Leigh Creek Energy

Groundwater and Soil Vapour Monitoring Plan

ISG Pre-Commercial Demonstration Facility

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Leigh Creek Energy would like to acknowledge the Adnyamathanha people, the traditional owners of the land on which our operations occur and pay our respects to their Elders past and present.

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1 Introduction

1.1 Leigh Creek Energy Project

Leigh Creek Energy Ltd (LCK) is the owner and proposed operator of the Leigh Creek Energy Project located at Leigh Creek in central South Australia, 550km north of Adelaide. The project sits within the existing Leigh Creek Coalfield area and will develop deep coal resources that are unable to be accessed by open-cut mining. Energy will be produced from coal using a process known as in situ gasification (ISG). The ISG process converts coal from its solid state into a gaseous form, resulting in the production of synthesis gas (syngas) containing methane, hydrogen and other valuable components.

To obtain information to inform the design for a potential commercial facility, LCK proposes to construct, operate and decommission a small-scale ISG Pre-Commercial Demonstration (PCD) facility. This facility will involve the construction of an above ground plant (and associated service infrastructure) and the establishment of a below ground single ISG gasifier chamber. The PCD facility would be commissioned and operated for a short period (approximately 2 to 3 months) to produce syngas, so that the technical and environmental performance of the process can be confirmed.

The location of the Leigh Creek Energy Project and PCD facility is shown in **Figure 1-1**.

1.2 Purpose and Scope

This Groundwater and Soil Vapour Monitoring Plan (GSVMP) has been prepared to meet the requirements of Sections 99 and 100 of the *Petroleum and Geothermal Energy Act 2000* and Regulations 12 and 13 of the *Petroleum and Geothermal Energy Regulations 2013*. The plan has been prepared to support an application for the Minister's approval and notification (Activity Notification) of the PCD facility.

Th GSVMP describes LCK's activities to measure the level of achievement of LCK's environmental objectives, as specified in LCK's "*Statement of Environmental Objectives. ISG PCD facility*" (SEO), dated 9 April 2018 (LCK, April 2018).

The specific environmental objectives for the operation of the PCD facility, relevant to the GSVMP, are:

a. no sustained change to background groundwater quality at the boundary of the gasifier buffer zone (i.e. containment is achieved);

b. no loss of gasification products to the surface or subsurface environment via pre-existing drill holes and/or transmissive geological features;

A detailed description of these environmental objectives and associated assessment criteria is provided in the SEO.

In practical terms, the objective of the GSVMP is to detect possible horizontal or vertical movements from the operational zone of the gasifier into other groundwater and soil zones, using pressure and chemical data from dedicated monitoring wells.

Figure 1-1: Location of Proposed PCD facility

1.3 Roles and Responsibilities

The overall responsibility for the application of this GSVMP belongs to LCK. Table 1-1 outlines the specific responsibilities of LCK personnel in regard to the implementation of this GSVMP.

Table 1-1: Roles and Responsibilities

Role	Responsibility
Environmental Manager	• Ensuring tasks are completed in compliance with relevant legislative requirements and commitments • Allocation of adequate resource requirements • Review and update of GSVMP as required • Data review • Quarterly reporting • Annual reporting • Incident reporting and investigation • Internal communication of monitoring results
Environmental Advisor	• Implementation of GSVMP • Assist in review and update of GSVMP as required • Data quality assurance (QA) and quality control (QC) • Data analysis • Quarterly reporting • Annual reporting • Incident reporting and investigation • Internal communication of monitoring results • Periodic audits of groundwater sampling protocols and sampling
Environmental Technicians or trained designated individuals	• Calibration of field equipment • Decontamination of field equipment • Groundwater monitoring and sampling • Field sample collection • Preparation of samples for dispatch e.g., appropriate storage, chain of custody and consignment notes

1.4 Relevant reports, guidelines and standards

Several groundwater investigations have been undertaken within, and in the immediate vicinity of, the PCD facility. The earlier investigations focused on groundwater occurrence, hydraulic pressure/gradients and mine dewatering requirements. More recent investigations were undertaken by LCK as part of the ISG PCD facility project. Relevant reports used in the development of this GSVMP are included in the references section (**Section 8**).

This GVMP also needs to be considered in conjunction with the following documents:

a. Leigh Creek Energy Limited (April 2018): *Environmental Impact Report. ISG Demonstration Plant.*

b. Leigh Creek Energy Limited (April 2018): *Statement of Environmental Objectives. ISG Demonstration Plant.*

This GVMP has been developed in general accordance with the following documents:

a. *Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater of the National Environment Protection (Assessment of Site Contamination) Measure 1999* [ASC NEPM]. (NEPC, 2013)

b. *Schedule B2 - Guideline on Data Collection, Sample Design and Reporting of the National Environment Protection (Assessment of Site Contamination) Measure 1999.* (NEPC, 2013)

c. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* (ANZECC, 2000)

d. South Australia Environment Protection (Water Quality) Policy, 2015

1.5 Terminology and Definitions

A list of abbreviations and a glossary of key terms used in this GSVMP is provided in **Section 9**. Definitions for key terms used in this GSVMP are also provided below.

The **gasifier buffer** is a sphere around the gasifier chamber, which is defined:

- laterally, by a 100m radius around the gasifier chamber. This distance has been determined based on geological investigations (which confirmed the absence of significant faulting within this distance from the gasifier) and estimate of groundwater migration (i.e. 100-year time travel based on groundwater movement of 1m/year), as discussed in the EIR.
- vertically, 100m above the top of the gasifier chamber. This distance is based on formation integrity testing, which determined that, for a 30 m (wide) gasifier chamber, the overall height of the combined collapsed and fractured zones would be likely to extend to a height above the coal seam in the order of 60 - 75 m. This is the maximum predicted extent of rock alteration due to cave-in filling the chamber after gasifier decommissioning, with the overlying layers remaining intact due to filling of the void by way of bulking of the rock mass (LCK, April 2018).

Groundwater assessment criteria are criteria to assess compliance with groundwater protection objectives, i.e.

- Criterion 1: no sustained change to background groundwater quality at the gasifier buffer zone boundary as a result of demonstration plant activities.
- Criterion 2: gasifier chamber is operated at a pressure below that of the groundwater pressure at all times, i.e. at pressure below 36 bar.

A **sustained change to background groundwater quality** is defined as a change in water quality that is demonstrated by exceedance of defined control limits for defined control parameters over a defined timeframe.

Control parameters are physical or chemical parameters that can be used as indicators of a non-compliance with the groundwater and soil vapour assessment criteria.

Internal triggers are qualitative or numerical values which provide an internal warning of potential future non-compliance with the groundwater and soil vapour assessment criteria. This trigger is less than the control limit.

Control limits are qualitative or numerical values which indicate non-compliance with the groundwater or soil vapour assessment criteria.

Non-compliances or excursions are exceedances of, or non-compliances with, the control limits over a defined time frame or set of monitoring events.

2 PCD Facility Details

2.1 Location of PCD Facility

The PCD facility location was chosen based on the following factors:

- the depth and dip of the coal seam is suitable for ISG demonstration
- the site is greater than 100 m from potential faults
- the site is more than 100 m from potential leakage pathways (old drill holes)
- the site is level and stable and uses existing access roads
- as indicated in the EIR and SEO, there is extensive existing disturbance with no environmentally sensitive features present (e.g. natural drainage, aquifers with beneficial uses and values, significant vegetation or habitat, known cultural heritage sites
- there is limited ongoing mine-related activity at the site
- sufficient space is available to safely undertake activities
- separation of the site from the mine pits and waste rock dumps is sufficient to ensure safe operation
- the site is readily accessible from the main access road (with no need to traverse mine pits or stockpiles).

The PCD facility is in a relatively flat area between waste rock stockpiles on the southern side of the main mine access road, within the Leigh Creek Coalfield (**Figure 2-1**). It is significantly disturbed, and a substantial proportion of the site has been previously graded. Haul roads, old road alignments, excavations, stockpiles and other disturbances are prevalent across the site. Aerial photographs indicate that the site is located west of the original path (before mine development) of the Leigh Creek floodplain.

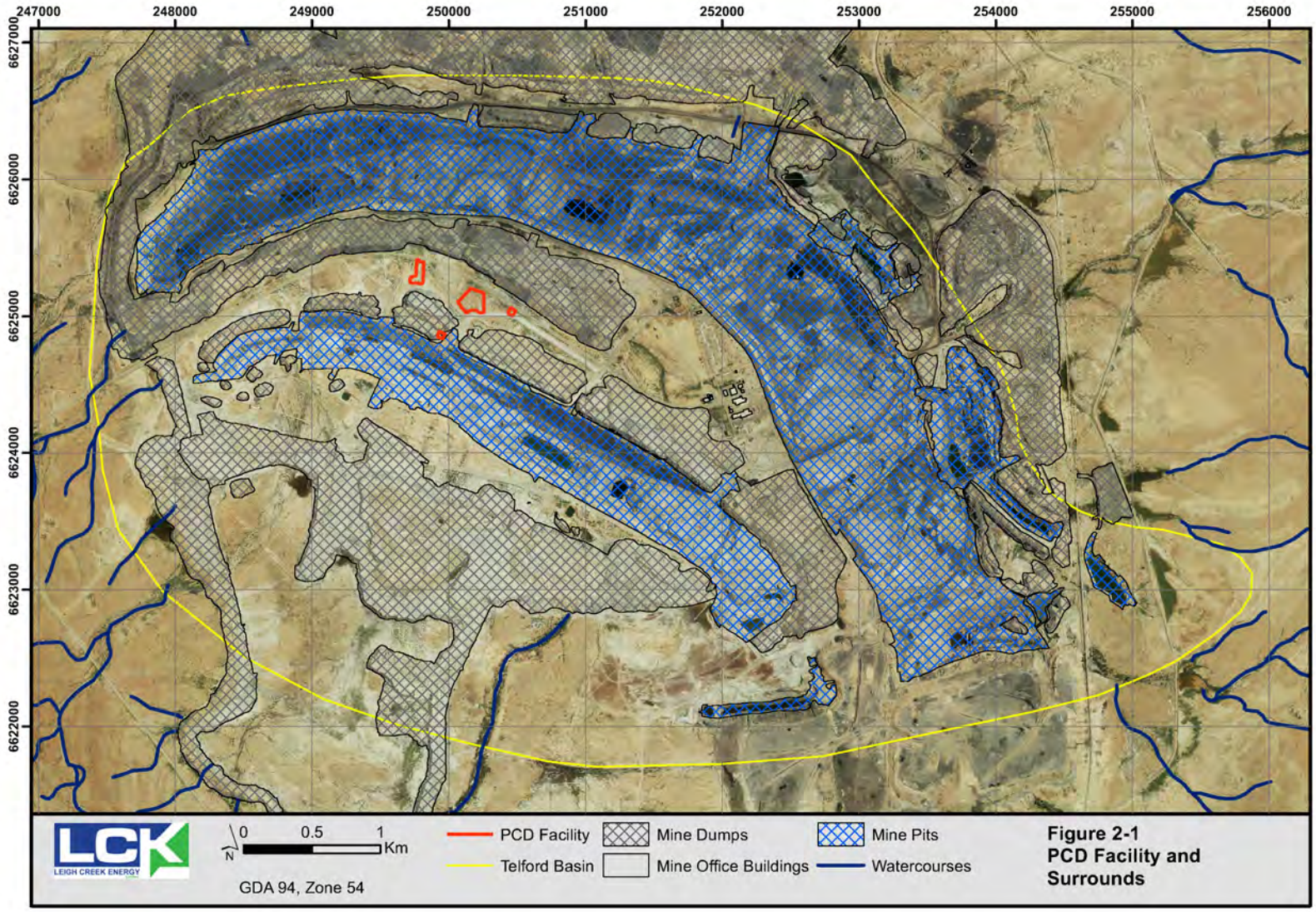

Figure 2-1: PCD Facility and Surrounds

2.2 PCD Facility Infrastructure

The PCD facility will include both subsurface and surface infrastructure.

Subsurface infrastructure will include the inlet and outlet wells, several monitoring wells and a gasifier observation well. Inlet, outlet, observation and monitoring wells will all contain instrumentation to monitor temperature and/or pressure.

LCK has applied on 23rd July 2018 for a Water Affecting Activity permit under the Natural Resources Management Act 2004

At the surface, most of the infrastructure will be installed adjacent to the inlet and the outlet wells, which will be approximately 300 m to 350 m apart at the surface. A combination of wired and wireless instrumentation equipment will be installed to communicate between the two sites and the control room.

A list of equipment at the inlet and outlet well is presented in **Table 2-1**.

Table 2-1: List of Equipment at Inlet and Outlet Wells

Inlet Well	Outlet Well
• the inlet wellhead • piping and valves • flow control and metering equipment • diesel-powered compressors to inject air into the well • pumps for water injection • tanks for water storage prior to injection • diesel generator(s) • diesel storage tank(s) for compressor and generator • electrical and control equipment • control room • site office and amenities • vehicle parking • truck off-loading area • equipment storage and maintenance facilities	• the outlet and observation wellheads • piping, valves and pressure safety valves • flow metering and pressure control equipment • gas analysis and sampling equipment • gas clean-up equipment • condensate storage vessel and transfer pumps • tanks for storage of outlet condensate and water • thermal oxidiser • cold vent • nitrogen storage vessels (for inert blanketing of vessels and purging of pipelines) • diesel generator(s) • diesel storage tank(s) • LPG cylinders • truck off-loading and loading area • pumps for water injection • tanks for water storage prior to injection • electrical and control equipment • vehicle parking.

Unsealed access tracks to the drilling locations have been created. No permanent roads have been constructed.

The PCD surface facilities will utilise standard oil and gas and petrochemical components. Many of these will be pre-assembled and skid-mounted to facilitate installation at the site and later removal. The sites will be fenced with stock-proof fencing to exclude larger wildlife and to control personnel access.

Figure 2-2 shows the indicative layout of the PCD facility.

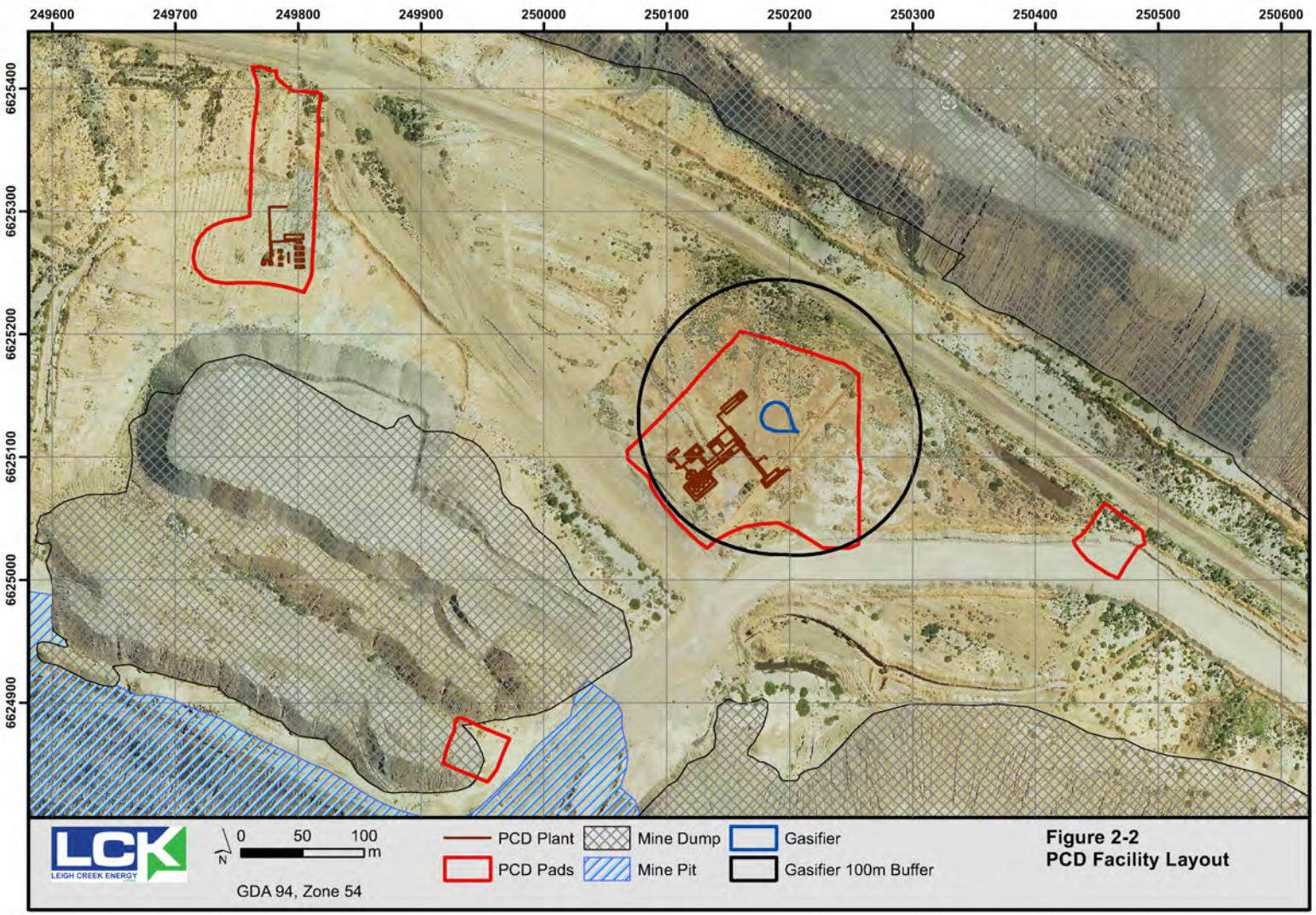

Figure 2-2: Indicative PCD Facility Layout

2.3 Gasifier Arrangement

The PCD gasifier chamber (the underground void where ISG takes place) will be of a single dual Linked Vertical Well type with vertical inlet, observation and outlet wells linked by directionally drilling the final inlet well section of the inlet well within the coal seam. The injection point at the end of the inlet well tubing casing will be approximately 30 m from the outlet well, within the Leigh Creek Main Series Coal seam at a depth of approximately 540 m below ground surface. This is shown in **Figure 2-3.**

The gasifier will be a single chamber gasifier, which will be operated continuously during operation of the PCD facility. As the PCD facility will operate over a short time frame (2 to 3 months), the injection point will remain in the same position (i.e. it will not be retracted to allow the ISG process to access more coal as would typically be the case for commercial operation).

Based on geotechnical investigations to date and experience from previous gasification trials at other sites, the gasifier chamber is expected to be a tear drop shape in the order of 30 m by 30 m laterally and approximately 19 m in height at the end of the PCD facility operation.

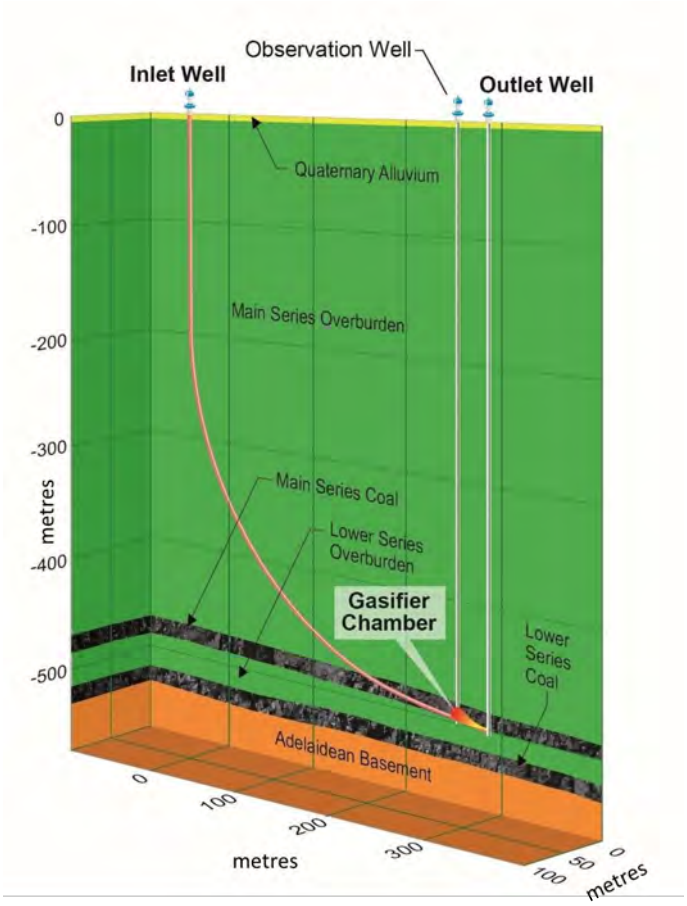

Figure 2-3: Schematic Showing the Depth and Shape of the Inlet Well, the Gasifier Chamber and the Outlet Well

Note: The above schematic is based on the formation depths at the Playford 1 site and is for illustrative purposes only. The Main Series Coal formations at the PCD facility are present at greater depths, i.e. at approximately 540 mbgl.

3 Hydrogeological Conceptual Site Model

3.1 Introduction

Several historical groundwater studies have been undertaken at the Leigh Creek Mine site. Relevant studies and reports include the following:

- Stage 2 Lower Series Terrace 1 Dewatering Investigations. 2014 Drilling and Aquifer Testing Program. (AWE, May 2015)
- Review of Leigh Creek Geotechnical and Hydrogeological Investigations on Leigh Creek Coalfield – Lobe B Deposit. (Connell Monenco, 1987)
- Leigh Creek Coalfield: Lobe B. Geotechnical and Hydrogeological Investigations. Phase 1. Groundwater and Dewatering. (Dames & Moore, October 1984)
- *The Leigh Creek Coalfield, Bulletin No 31*. (Parkin, 1953)

In addition to the above, LCK has undertaken site-specific drilling and hydrogeological investigations. Initial investigations were undertaken at the Playford 1 site and included the drilling and construction of three observation bores (P1M1, P1M2 and P1M3) and the drilling and installation of one piezometer (P1). This drilling program was undertaken to inform the understanding of the hydrogeological parameters of the target coal gasification zone and the overlying and underlying Leigh Creek Main Coal Measures sequences.

It must be noted that PCD facility is located approximately 600 m to the east of the Playford 1 site. LCK has completed the construction of a groundwater monitoring network at the PCD facility and has undertaken several groundwater monitoring events at the PCD facility. This program included:

- drilling, installation, monitoring and sampling of monitoring wells within the Telford Gravels, Main Series Overburden and Main Series Coal formations
- installation and monitoring of several vibrating wire piezometers (VWPs)
- monitoring and sampling of local wells within the Telford Gravels.

Details of the groundwater monitoring network are provided in **Section 4.3**, with well details presented in **Table 3-1** and locations shown on **Figure 3-1** and **Figure 3-2**.

The information from these wells and monitoring events has been incorporated in the further development of the hydrogeological conceptual site model (CSM) that was presented in the EIR (LCK, April 2018).

A detailed description of the geology and hydrogeology of the Telford Basin and surrounds and of the Leigh Creek Coalfield is provided in the project's EIR (LCK, April 2018). The updated hydrogeological conceptual site model (CSM) of the PCD facility is provided below.

Table 3-1: Details of local bores and bores drilled/installed at Playford 1 and PCD Facility

Bore ID		Purpose	Details/Location	Easting	Northing	Ground level (mAHD)	Screen Depth/ Open Hole	Bore Depth (mbgl)
Telford Gravels - Local Wells								
3965	-	Local wells - Background	adjacent haul road before FP main office	251333	6624839	190.716	NR	10.82
6536-1	-	Local wells - Background	Bore 34213 (Ti Tree), in creek bed north of retention dam wall	249939	6621330	206.114	NR	13.23
6537-2318	-	Local wells - Background	Stone Hut Windmill	246809	6625233	201.595	NR	14.8
Telford Gravels – PCD Facility								
MW11	-	Monitoring - Background	PCD facility	249814	6625396	189.363	5.0-8.0	8
MW12	-	Monitoring	PCD facility	249808	6625297	189.573	3.9-6.9	7
MW13	-	Monitoring	PCD facility	249817	6625251	189.593	5.1-8.1	8.1
MW14	-	Monitoring	PCD facility	250100	6625059	191.54	7.6-10.6	11
MW15	-	Monitoring	PCD facility	250094	6625113	191.385	6.0-9.0	9
MW16	-	Monitoring	PCD facility	250137	6625063	191.523	8.8-11.8	12
MW17	-	Monitoring	PCD facility	250145	6625081	191.389	5.8-8.8	9
MW18	-	Monitoring	PCD facility	250194	6625105	190.912	6.0-9.0	9
MW20	-	Abandoned	PCD facility	249923	6624851	192.692	12.0-15.0	16
MW21	-	Monitoring - Background	PCD facility	250454	6625056	190.178	5.0-8.0	8
MW22	-	Monitoring - Background	PCD facility	249926	6624850	192.692	8.75-11.75	12
Upper Main Series Overburden								

MW19	-	Monitoring – Supplemental Background	PCD facility (Supplemental)	250456	6625058	190.16	11.5-14.5	14.5
Main Series Overburden (80m)								
MW06	Playford 16	Monitoring - Background	Upgradient of gasifier	249942	6624862	192.676	50-78.6	78.6
MW07	Playford 17	Monitoring - Background	-	250458	6625035	190.047	50-80.8	80.8
MW08	Playford 18	Monitoring - Background	-	249776	6625390	189.299	50-80	80
MW09	Playford 19	Sentinel	-	250194	6625102	190.905	51.6-80	80
MW10	Playford 20	Sentinel	Downgradient of gasifier	250206	6625159	190.282	50-80	80
MW01	Playford 11	Sentinel	Upgradient of gasifier	250157	6625043	191.487	490-535	535
MW03	Playford 13	Sentinel	Downgradient of gasifier	250170	6625177	190.144	453-495.3	495.3
MW04	Playford 14	Sentinel	Downgradient of gasifier	250207	6625164	190.262	466-505.31	505.31
MW05	Playford 15	Sentinel	Downgradient of gasifier	250242	6625139	190.341	460-505.11	505.11
PZ01	Playford 9	VWP – pressure/temp	6 piezometers, at 100m, 450m, 500m, 515m, 530m and 575m	250159	6625053	191.38	-	581.91
PZ02	Playford 7	VWP – pressure/temp	6 piezometers, at 100m, 430m, 478m, 495m, 515m and 520m	250139	6625129	190.88	-	525.8
PZ03	Playford 10	VWP – pressure/temp	6 Piezometers, at 100m, 250m, 420m, 435m, 460m and 480m	250172	6625103	190.9	-	485.01
PZ04	Playford 8	VWP – pressure/temp	6 piezometers, at 100m, 443m, 493m, 508m, 526m and 536m	250225	6625074	191.01	-	585
PZ05	Playford 3	VWP – pressure/temp	6 Piezometers, at 100m, 250m, 420m, 435m, 460m and 480m	250198	6625140	190.13	-	543.18
Gasifier Wells								
MW02	Playford 12	Operational monitoring (completed in Main Series Coal)	Adjacent gasifier	250191	6625120	190.821	472-514	514
Outlet	Playford 21	Gasifier outlet well	-	250200	6625089	191.14	495-522	522

Observation	Playford 22	Gasifier observation well	-	250182	6625098	190.43	507.45-522.8	522.8
Inlet	Playford 23	Gasifier inlet well	-	249791	6625304	189.53	774.4-809.4	809.4/ 515.3*
Playford 1 Wells								
P1	Playford 1	VWP – pressure/temp	8 piezometers, at 327m, 464m, 484m, 508m, 530m, 550m, 591m and 630m	249546	6625241	192	-	695
P1M1	Playford 5	Monitoring well - Main Series Overburden	-	249554	6625253	189.88	486-498	570
P1M2	Playford 4	Monitoring well - Main Series Coal	-	249542	6625239	189.935	533.5-539.5	539.5
P1M3	Playford 6	Monitoring well - Main Series Coal/ Lower Series Overburden	-	249554	6625237	189.884	552-558	571

Notes:

- NR not recorded on Water Connect database
- * drill length/vertical depth (from surface)
- Coordinate system is MGA94, Zone 54
- To LCK's knowledge, there are no other local water wells within the immediate vicinity of the PCD facility. No additional wells were identified during community consultation sessions. LCK can undertake a census of water wells if the environmental objectives regarding groundwater are compromised/not achieved.

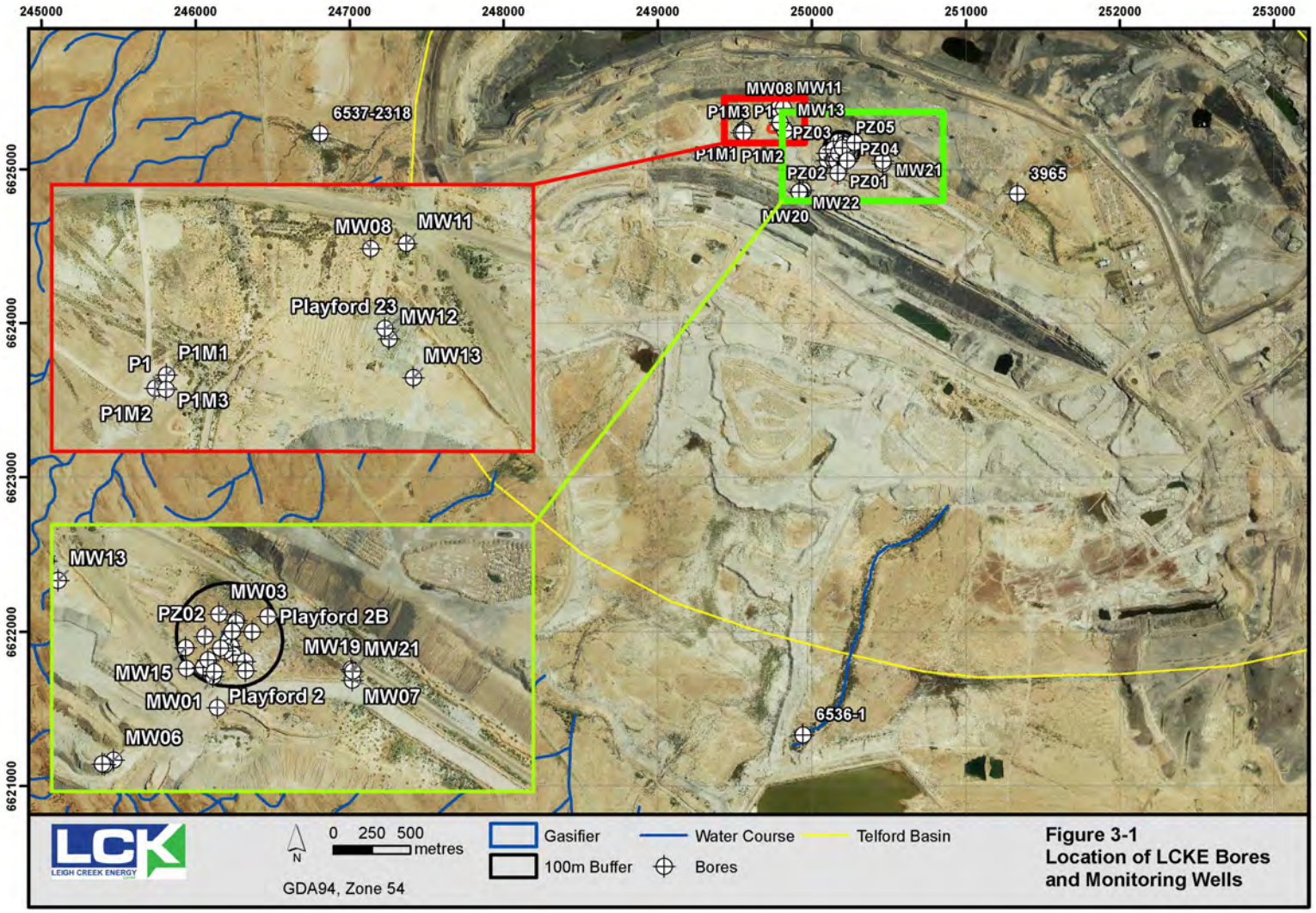

Figure 3-1: Location of Bores and Wells

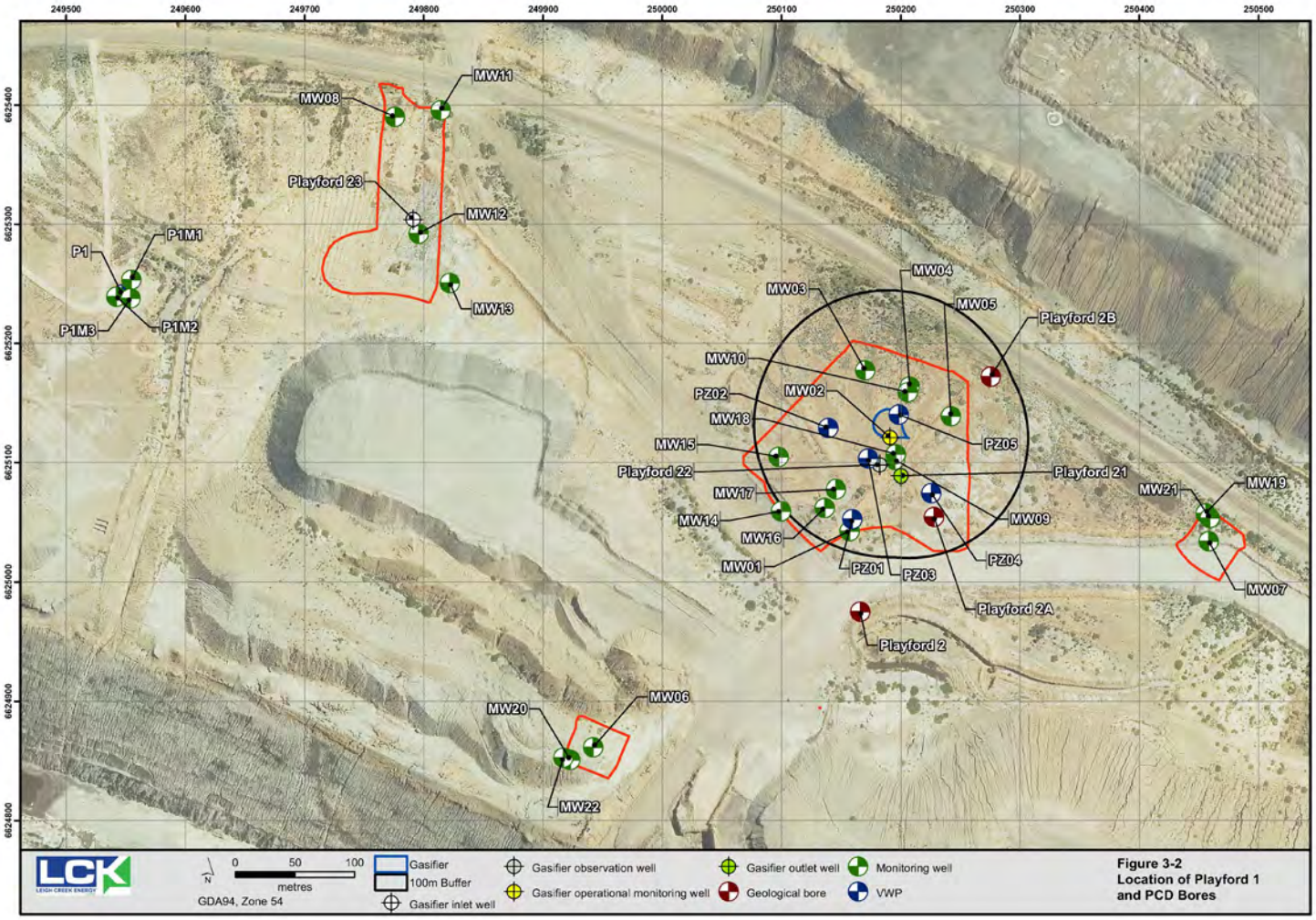

Figure 3-2: Playford 1 and PCD Facility Bores

It must be noted that PCD facility is located approximately 600 m to the east of the Playford 1 site. LCK has completed the drilling and installation of a groundwater monitoring network at the PCD Facility. The information from the Playford 1 wells together with recent information from the PCD Facility wells has been used in the development of the GSVMP.

3.2 Geology

At the PCD facility, the thickness of the Telford Gravels ranges from 12 m to 30m (based on the lithology encountered during drilling of the groundwater and soil vapour monitoring wells), with an average thickness of 16 metres. Typical lithology of the Telford Gravels comprised silty and sandy gravels, pale brown to orange brown in colour, with layers of sandy silts and clays. The gravel content was predominantly fine grained, while the sand content was fine to coarse grained (Greencap, July 2018). A hard layer was encountered at depth of between 3 to 4 metres during the drilling of the shallow monitoring wells. This layer was represented by cemented sands and gravels. The thickness of this hard layer ranged between 0.5 and 2 metres.

The stratigraphy of Leigh Creek Coal Measures at the PCD facility includes the following sequences:

- **Main Series Overburden (MO)**: overlies the Main Series Coal and comprises 460 to 516 metres of carbonaceous mudstone and sideritic siltstone.
- **Main Series Coal (MC)**: overlies the Lower Series Overburden and comprises a zone of (predominately) coal. At the PCD Facility, this zone ranges from 6 to 36 metres in thickness, with an average of 19 metres.
- **Lower Series Overburden (LO)**: overlies the Lower Coal Series and comprises approximately 50 m to 100 m of grey carbonaceous mudstone containing thin, hard sideritic siltstone interbeds (‘hardbars’).

Figure 3-3 shows the stratigraphy at the PCD facility (based on stratigraphy in the Playford-12 well).

The rock layers in the Main Series Overburden, Main Series Coal, and Lower Series Overburden all dip to the south at approximately 25 degrees. Seismic reflection survey data and drilling completed in 2016 indicates that natural fractures which occur within the Main Series Overburden are comprised of tight, closed joints. Geotechnical logging of the drill core indicated no evidence of weak material or gouge filled joints, and no faulting was evident.

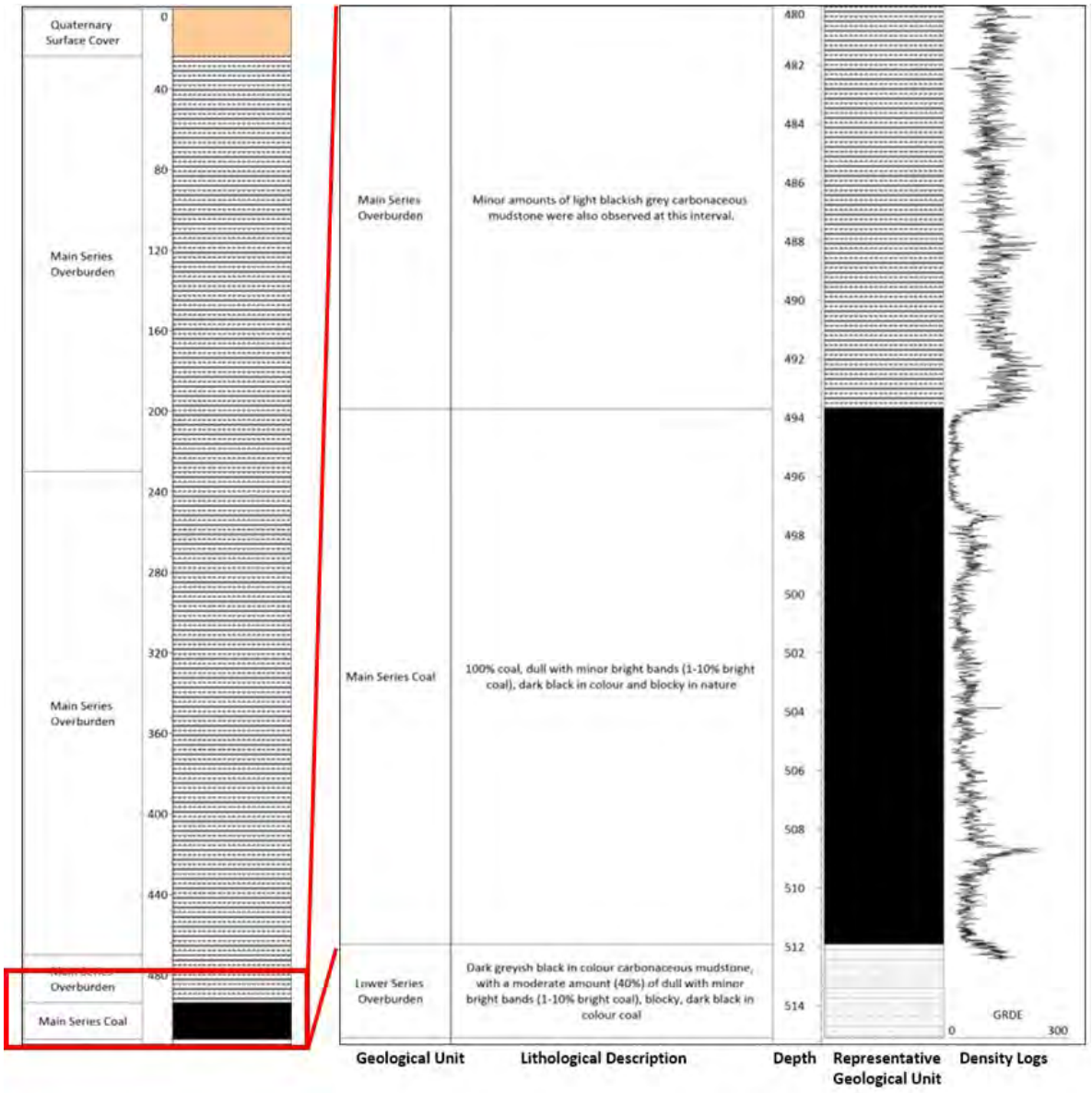

Figure 3-3: Geological Type Section at PCD Facility

Geotechnical observations of sections of the Main Series Pit highwall (180 m of exposed Main Series Overburden) did not identify weak seams or gouge filled joints. Exposed sections of the high wall to the north of the PCD facility location indicate the Main Series Overburden is laterally and vertically consistent in rock type and geological structures (**Plate 3-1**).

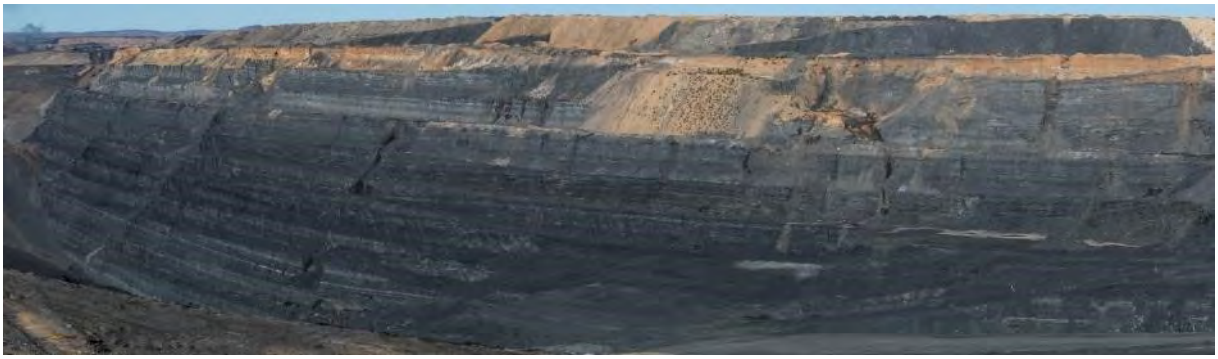

Plate 3-1: Main Series Pit high wall from the north west showing consistency of strata in the exposed Main Series Overburden.

Interpretation of the seismic sections and existing conventional exploration boreholes indicates that the PCD facility gasifier will be in an area that is at least 100 m from faults (that are inferred to pass at a steep dip angle through the coal) and where the target coal seam is laterally consistent along strike.

Figure 3-4 and **Figure 3-5** show a cross-section through the demonstration plant site that shows the geology and indicative faults.

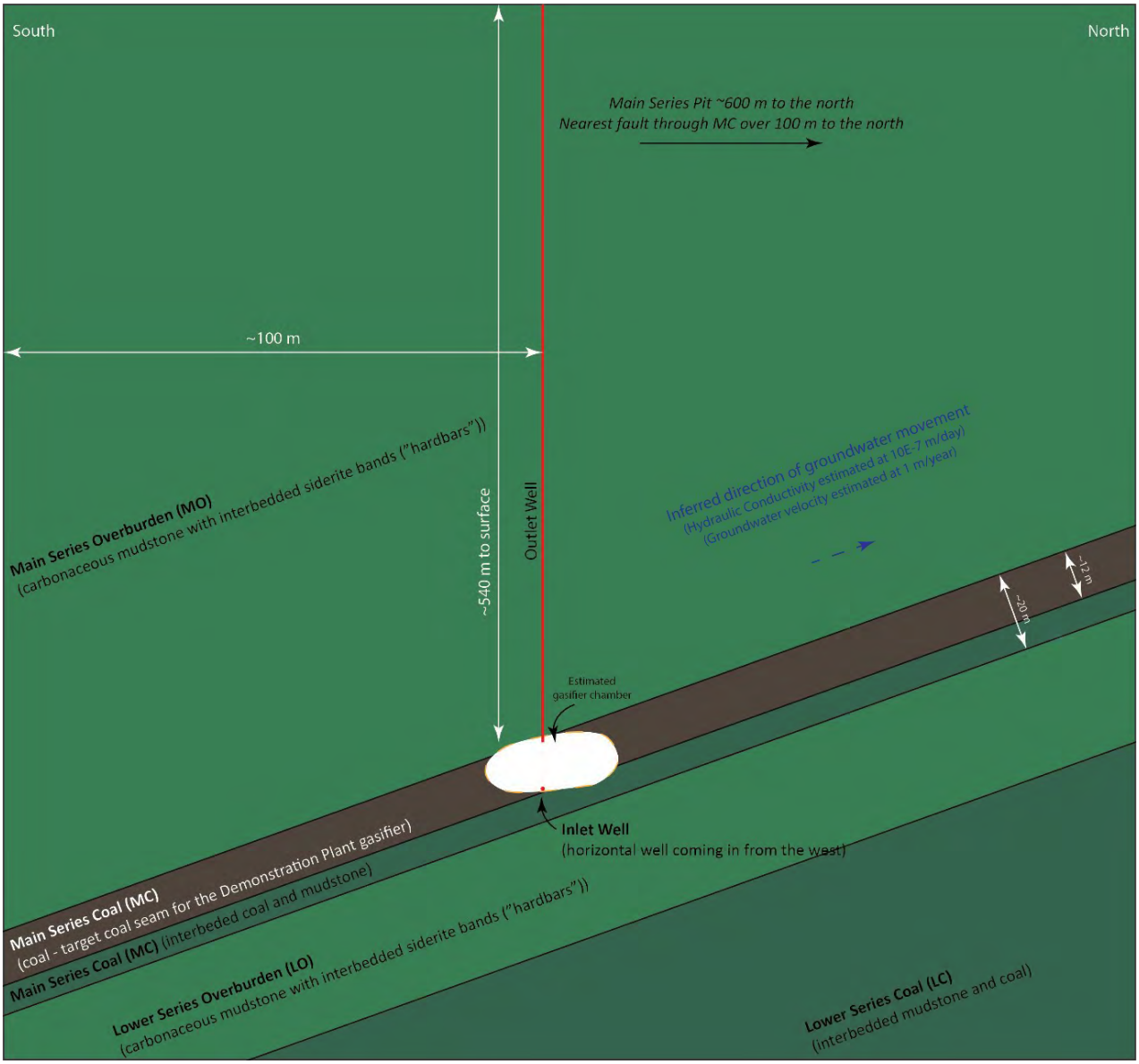

Figure 3-4: Cross-section through PCD facility site showing location of inferred faults

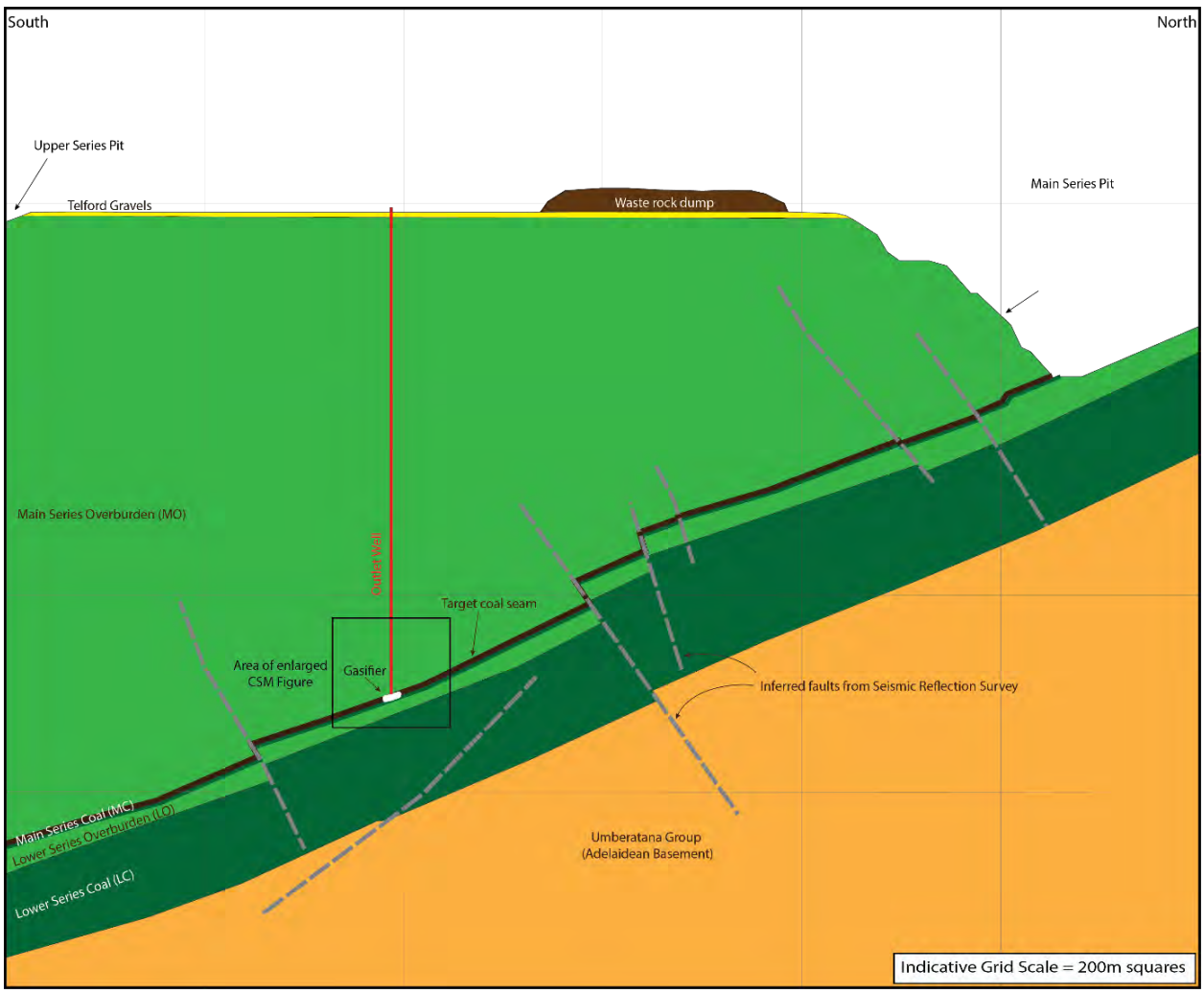

Figure 3-5: Detailed cross section through PCD gasifier

3.3 Groundwater Occurrence and Aquifers

3.3.1 Adelaidean Basement

The Adelaidean Basement is a fractured rock groundwater system. Most of the groundwater flow occurs through joints and faults, and little through the rock matrix itself. There is limited drill hole information available to determine groundwater hydraulic properties or flow processes. It is likely that the regional groundwater flow direction will follow the regional topographic gradient – a north westerly direction but locally subject to topographic control. Groundwater flow paths are likely to be controlled by the prevailing structural defect orientations and will be of varying lengths and/or compartmentalised.

Historically, recharge to the fractured rock systems is likely to be infiltration through surface fracture systems when surface flow occurs. The general brackish salinity suggests that the recharge is a small percentage of the incident rainfall. Current recharge to these systems is likely to be infiltration through the fracture systems when surface flow occurs and potentially point-source recharge at the various surface water retention areas when located over near-surface basement exposure.

Analysis of the groundwater data contained within the Department for Environment and Water (DEW) “Water Connect” database (www.waterconnect.sa.gov.au) suggests a groundwater salinity for the Adelaidean Basement ranges from approximately 2,200 mg/L TDS to 19,000 mg/L TDS in areas adjacent to the Telford

Basin. The higher groundwater salinities have been observed in wells completed in the basement beneath the Telford Basin. Well yield ranges from <0.5 L/sec to approximately 10 L/sec. In general, well yields are low and the rates and volumes of groundwater movement through the basement fractured rock aquifers are considered small.

Historic and current groundwater discharge processes are poorly understood. Noted springs in the region are the Aroona, Top Well and Myrtle Springs. These are eight to twelve kilometres distance ((LCK, April 2018). All these appear to be at higher hydraulic pressure head heights than the Telford Basin so are not sourced from groundwater in the Telford Basin.

3.3.2 Telford Basin Groundwater System

The Telford Basin, which hosts the Leigh Creek Mine, is a closed sedimentary basin, with low rate of recharge and finite groundwater storage capacity. The location of the Telford Basin within the Adelaide Geosyncline fractured rock province suggests that the groundwater at this site is sourced from local rainfall runoff and infiltration and not connected to other regional groundwater systems such as the Great Artesian Basin.

The depositional environment within the basin has resulted in separation of the groundwater storage into several aquifers separated by aquitards. The groundwater system comprises the upper Quaternary age alluvial deposits (Telford Gravels), the Upper Series Overburden and a series of confined sandstone units within the Main and Lower Series overburden and interburden units. Both the weathered and fractured portions of the basement rocks are also thought to contain confined and limited groundwater (MWH, February 2016). It must be noted that the Upper Series Overburden is not present at and near the PCD Facility.

Telford Gravels

At the PCD facility, the thickness of the Telford Gravels ranges from 12 m to 30m, with an average thickness of 16 metres. Typical lithology of the Telford Gravels comprised silty and sandy gravels, pale brown to orange brown in colour, with layers of sandy silts and clays. The gravel content was predominantly fine grained, while the sand content was fine to coarse grained (Greencap, July 2018). A hard layer was encountered at depth of between 3 to 4 metres during the drilling of the shallow monitoring wells. This layer was represented by cemented sands and gravels. The thickness of this hard layer ranged between 0.5 and 2 metres.

During the drilling of the shallow monitoring wells, groundwater was encountered in the Telford Gravels at depths ranging from 6.5 to 9.5 metres below ground level.

Leigh Creek Coal Measures

Dames & Moore identified an aquifer system in the Upper Series Overburden, with an average combined thickness of 55 metres (Dames & Moore, October 1984). However, the Upper Series Overburden is not present at and near the PCD Facility.

At the PCD Facility, groundwater was encountered in the monitoring wells drilled to depth of 80 metres below ground level, into the Main Overburden Series.

3.4 Hydraulic Properties

Assessment of hydraulic properties has been undertaken during several historical investigations. The results of these assessment are summarised in **Table 3-2**.

Table 3-2: Summary of hydraulic properties

Formation		Hydraulic Conductivity (m/d)	Specific Yield/ Storativity	Source
Telford Gravels	Clays	$2.8x10^{-06}$ to $1.6x10^{-05}$	-	PB (2015)
	Saturated Zone	$2.2x10^{-02}$	-	
Upper Series Overburden		1.5 to 2.0	$2x10^{-5}$ to $5x10^{-5}$	Dames and Moore (1984)
P1M1 (MO)		$1.1x10^{-6}$ - $9.7x10^{-7}$	-	AWE (2017)
P1M2 (MC)		$5.9x10^{-7}$	-	AWE (2017)
P1M3 (LO)		$1.5x10^{-6}$ - $3.7x10^{-6}$	-	AWE (2017)
Basement		No data	No data	-

Typical ranges and classification of hydraulic conductivities, as modified from Bear (Bear, 1972) are presented in **Table 3-3**.

Table 3-3: Typical Values of Hydraulic Conductivity and Permeability (modified from Bear, 1972)

Parameter	Range (cm/s)												
K (cm/s)	10^{2}	10^{1}	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}	10^{-9}	10^{-10}
Relative Permeability	Pervious				Semi-Pervious				Impervious				
Aquifer Potential	Good					Poor				None			

Based on the hydraulic properties calculated/obtained to date, classification of the formations within the Telford Basin is as presented in **Table 3-4**.

Table 3-4: Permeability Classification of Telford Basin formations

Aquifer/material	Hydraulic Conductivity		Relative Permeability	Aquifer Potential
	m/d	cm/s		
Telford Gravels - Clay	$1.6x10^{-5}$	$1.9x10^{-8}$	Impervious	None
Telford Gravels – Saturated Zone	$2.2x10^{-2}$	$2.5x10^{-5}$	Semi-Pervious	Poor
Upper Series Overburden	1.5 - 2.0	$1.7x10^{-3}$ - $2.3x10^{-3}$	Semi-Pervious	Good
Main Series Overburden (MO)	$1x10^{-6}$	$1.2x10^{-9}$	Impervious	None
Main Series Coal (MC)	$6x10^{-7}$	$7x10^{-10}$	Impervious	None
Lower Series Overburden (LO)	$2.6x10^{-6}$	$3x10^{-9}$	Impervious	None
Basement	No data	-	-	-

Except for the Upper Series Overburden, the range measured within the Leigh Creek Coal Measures (i.e. between 10^{-4} m/d and 10^{-6} m/d) represents impervious (i.e. impermeable) formations, with no evidence of any increase in hydraulic conductivity from faults or fractures.

3.5 Groundwater Levels and Pressure

3.5.1 General

The influence of the Leigh Creek Coal Measures on regional groundwater flow patterns may have changed since the creation of the open cut pits. The open cut pits expose rocks to a depth of up to 250 m, facilitating increased rates of evaporation from the groundwater system. This would likely encourage any movement of groundwater, however small, through the Coal Measures toward the open pits. When considered in the context of the modified surface drainage the Telford Basin could now be considered a terminal basin with almost all groundwater and runoff within the modified landscape now moving to the pits where it will evaporate (AWE & Greencap, December 2017).

Groundwater pressures and levels in the Telford Basin and the Adelaidean Basement may fluctuate with infiltration of precipitation, barometric pressure changes, earth tides caused by the moon, and seismic events. Historic coal mining has created significant changes in groundwater pressures and levels within the Telford Basin. The pressure changes caused by the gasifier operation are anticipated to be much smaller than the changes caused by historic mining and may be smaller than the pressure responses caused by the ongoing mine rehabilitation program. Barometric and earth tide fluctuations are cyclic, and their effect is relatively small. Seismic events may cause rapid responses but generally will have no lasting effect on groundwater pressures or levels.

3.5.2 Groundwater Levels at PCD Facility

Telford Gravels

Details on water levels measured in June and July 2018 from the Telford Gravels monitoring wells are presented in **Table 3-5**.

Table 3-5: June and July 2018 Groundwater Levels in Telford Gravels

Well ID	Ground Level (mAHD)	RL (magl)	DTW (June 2018)	Groundwater Level - June 2018 (mAHD)	DTW (July 2018)	Groundwater Level - July 2018 (mAHD)
MW11	190	0.81	6.29	184.52	6.24	184.57
MW12	190	0	4.06	185.94	4.99	185.01
MW13	190	0.8	4.61	186.19	5.4	185.4
MW14	194.975	1.1	6.192	189.883	6.24	189.835
MW15	193.997	0.9	6.03	188.867	6.34	188.557
MW16	194.28	0.8	5.64	189.44	5.81	189.27
MW17	193.607	0.73	5.31	189.027	5.81	188.527
MW18	191.924	0.77	4.735	187.959	5.26	187.434
MW19	190	0.89	5.17	185.72	5.08	185.81
MW21	190	0.8	-	-	5.32	185.48
MW22	210	0.8	-	-	Dry	Dry

Note: MW19 was over drilled and completed in the upper portion of the Main Series Overburden. MW21 was drilled and constructed under a new permit as a direct replacement for MW19. MW19 retained for supplemental purposes only.

MW20 was drilled and completed across two formations and was subsequently abandoned. MW22 was drilled and constructed as a direct replacement for MW20.

Figure 3-6 presents a contour map of the July 2018 groundwater levels within the Telford Gravels. Groundwater flow is in a north-easterly direction, towards the open pit of the former coal mine.

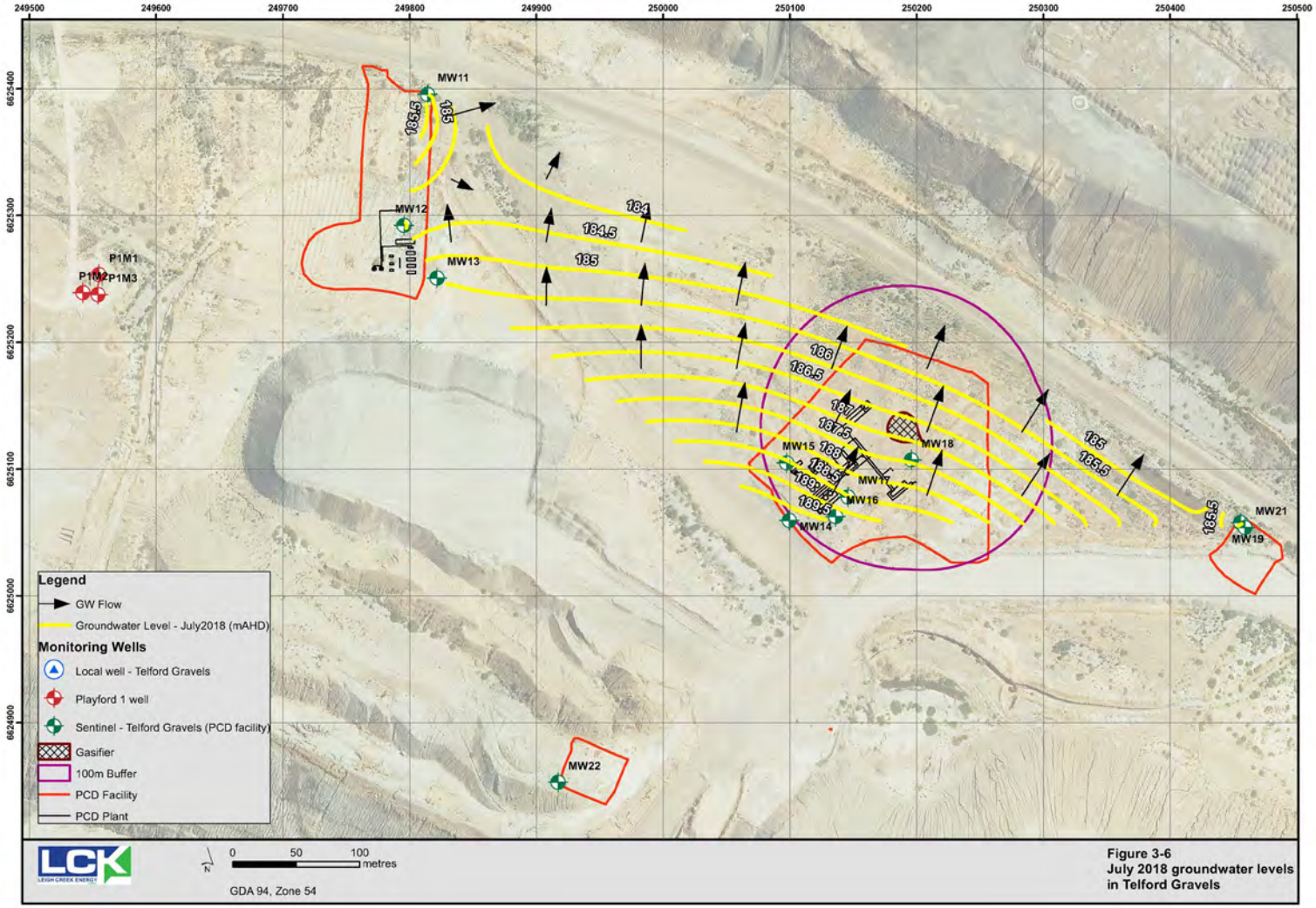

Figure 3-6: July 2018 groundwater levels in Telford Gravels

Main Series Overburden (80m)

At the PCD Facility, groundwater was encountered in the monitoring wells drilled to depth of 80 metres below ground level, into the Main Overburden Series. Details on water levels measured in June and July 2018 from the monitoring wells are presented in **Table 3-6**. Groundwater levels are still recovering following swabbing of these wells.

Table 3-6: June and July 2018 Groundwater Levels in the Main Series Overburden (80m)

Well ID	Ground Level (mAHD)	RL (magl)	DTW (June 2018)	Groundwater Level - June 2018 (mAHD)	DTW (July 2018)	Groundwater Level - July 2018 (mAHD)
MW06	200.128	0	9.72	190.408	9.8	190.328
MW07	190	0	41.54	148.46	40.78	149.22
MW08	190	0	30.45	159.55	41.4	148.6
MW09	192.099	0	22.83	169.269	31.8	160.299
MW10	190.054	0	36.24	153.814	40.49	149.564

Figure 3-7 present a contour map of the July 2018 groundwater levels within the Main Series Overburden (80m). Groundwater flow is in a north-easterly direction, towards the open pit of the former coal mine.

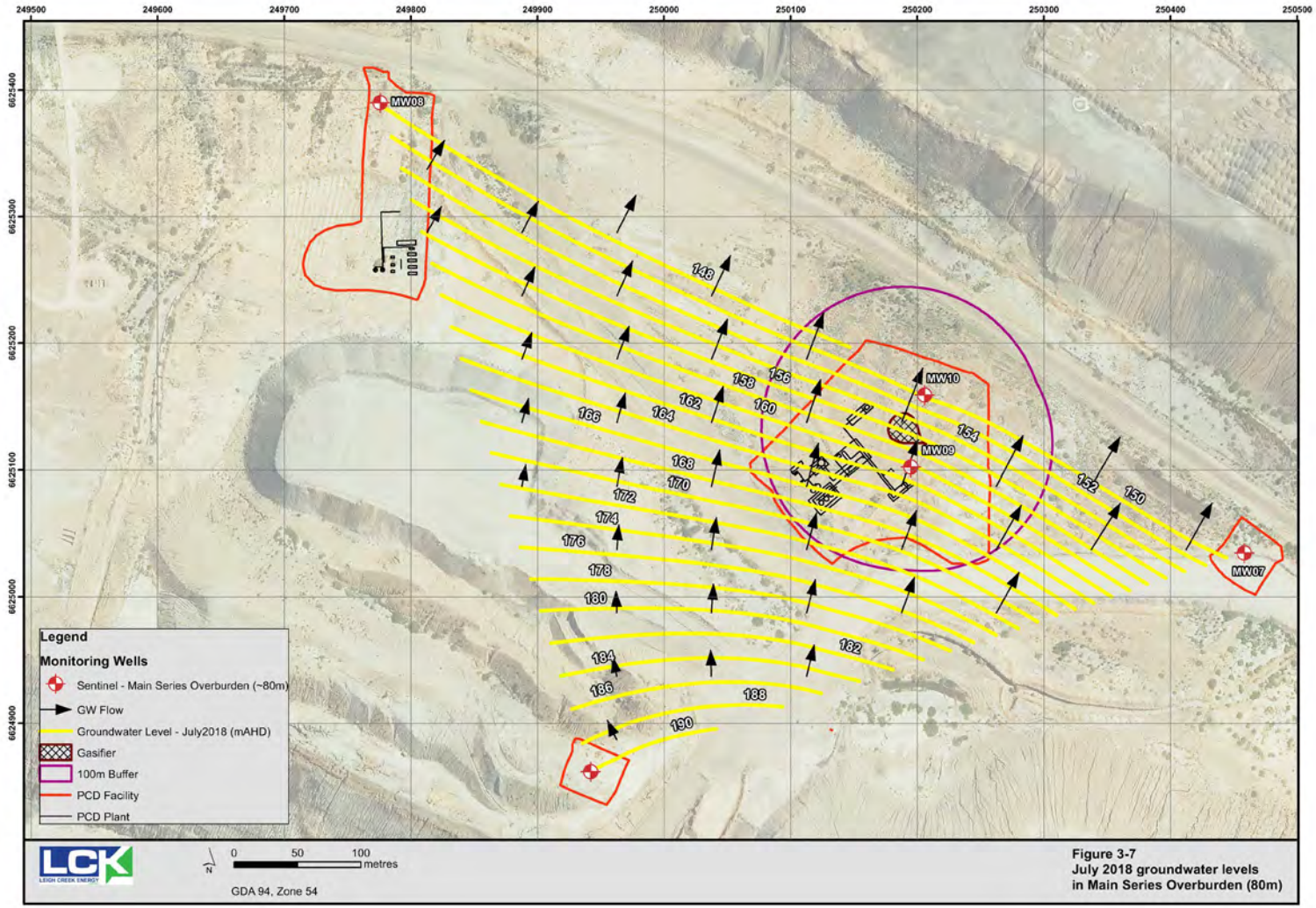

Figure 3-7: July 2018 groundwater levels in the Main Series Overburden (80m)

3.5.3 Groundwater Pressures at PCD Facility

Several Vibrating Wire Piezometers (VWPs) have been installed at the PCD Facility and at Playford 1, with details provided in **Table 3-7**.

Table 3-7: VWP Details

Well ID	Well Name	VWP Number	Depth Set (mbgl)	Formation
P1	Playford 1	PZ00_VWP1	562	Lower Series Coal
		PZ00_VWP2	435	Main Series Overburden
		PZ00_VWP3	534	Lower Series Coal
		PZ00_VWP4	452	Main Series Overburden
		PZ00_VWP5	489	Main Series Overburden
		PZ00_VWP6	316	Main Series Overburden
		PZ00_VWP7	502	Main Series Coal
		PZ00_VWP8	471	Main Series Overburden
P1M2	Playford 4	P1M2_VWP1	434	Main Series Overburden
		P1M2_VWP2	224	Main Series Overburden
PZ01	Playford 9	PZ01_VWP1	99	Main Series Overburden
		PZ01_VWP2	449	Lower Series Overburden
		PZ01_VWP3	499	Lower Series Overburden
		PZ01_VWP4	514	Lower Series Overburden
		PZ01_VWP5	529	Main Series Coal
		PZ01_VWP6	574	Main Series Coal
PZ02	Playford 7	PZ02_VWP1	100	Main Series Overburden
		PZ02_VWP2	430	Main Series Overburden
		PZ02_VWP3	478	Main Series Overburden
		PZ02_VWP4	495	Main Series Coal
		PZ02_VWP5	515	Lower Series Overburden
		PZ02_VWP6	520	Lower Series Overburden
PZ03	Playford 10	PZ03_VWP1	95	Main Series Overburden
		PZ03_VWP2	245	Main Series Overburden
		PZ03_VWP3	415	Main Series Overburden
		PZ03_VWP4	430	Main Series Overburden
		PZ03_VWP5	455	Main Series Overburden
		PZ03_VWP6	475	Main Series Overburden
PZ04	Playford 8	PZ04_VWP1	100	Main Series Overburden
		PZ04_VWP2	443	Main Series Overburden
		PZ04_VWP3	493	Main Series Overburden
		PZ04_VWP4	508	Main Series Coal
		PZ04_VWP5	526	Lower Series Overburden
		PZ04_VWP6	536	Lower Series Overburden
PZ05	Playford 3	PZ05_VWP1	100	Main Series Overburden
		PZ05_VWP2	420	Main Series Overburden
		PZ05_VWP3	470	Main Series Overburden
		PZ05_VWP4	486	Main Series Coal
		PZ05_VWP5	505	Lower Series Overburden
		PZ05_VWP6	515	Lower Series Overburden

VPW measurements are converted into pore water pressure and standing water levels, using calibration data obtained during the VWP installation. Timeseries of the VWP readings (i.e. measured temperature and VWP readings and converted pore pressures and standing water levels) are presented in **Appendix C**.

With respect to the VWP timeseries, the following needs to be considered:

- VWP readings can be affected by the activities at the PCD Facility, such as the swabbing or sampling of nearby wells or the drilling and installation of the gasifier inlet and outlet wells.
- The thermistor sensor in VWP3, installed at depth of 478 mbgl in well PZ02 (Playford 7) failed after May 2018. Readings from this VWP are no longer valid and will be excluded from future analysis and interpretation.
- The thermistor sensors in VWP4 (at depth of 508 mbgl) and VWP6 (at depth of 536 mbgl) in well PZ04 (Playford 8) show decreasing trend in temperature, which affects the calculation of pore pressure and standing water levels. This will be further investigated, to identify if the readings are due to site activities or if the thermistors have failed.

The current VWP configuration (location and depth) provides adequate lateral and vertical coverage to assess non-compliance with the stated assessment criteria, as discussed further in **Section 4.6.3**.

3.6 Groundwater Quality

Assessment of groundwater quality within the Telford Basin has been undertaken during several historical and current investigations. Historical groundwater quality data is presented in **Appendix A**. LCK has also undertaken groundwater sampling and analysis as part of its baseline monitoring program at Playford 1 and at the PCD facility. These groundwater sample analysis results are presented in **Appendix B**.

A summary of the groundwater sampling events undertaken by LCK is presented in **Table 3-8**.

Table 3-8: Groundwater Sampling Events Undertaken by LCK

Year	2016		2017							2018						
Month	2	10	6	7	8	9	10	11	12	1	2	3	4	5	6	7
Telford Gravels – Local Wells																
3965	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
6536-1	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
6537-2318	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Telford Gravels – LCK Wells																
MW11	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓
MW12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
MW13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
MW14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
MW15	-	-	-	-	-	-	-	-	-	-	-	-	-	-		✓
MW16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
MW17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
MW18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
MW20	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	-
MW21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Main Series Overburden (~80mbgl)																
MW06	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-
MW07	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-

Year	2016		2017							2018						
Month	2	10	6	7	8	9	10	11	12	1	2	3	4	5	6	7
MW08	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-
MW09	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-
MW10	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-
Main Series Overburden (~490mbgl)																
P1M1	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Main Series Coal																
MW01	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-
MW03	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-
MW04	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-
MW05	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-
P1M2	-	-	-	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	-
Main Series Coal/Lower Series Overburden																
P1M3	-	-	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-
Gasifier Operational Monitoring Well																
MW02	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-

3.6.1 Adelaidean Basement Formations

Groundwater quality information was collected by Dames & Moore (1984) and AWE (2015).

Dames & Moore (1984)

With respect to the Adelaidean Basement, Dames & Moore (1984) made the following comments on ground water quality:

> *"The groundwater at Leigh creek displays salinity and chemical characteristics typical of moderate to low permeability aquifers situated in a hot, arid environment with low, sporadic recharge potential.*
>
> *Groundwater salinity is a function of groundwater residence time within a groundwater flow system. Residence time is controlled by hydraulic gradient, length and depth of flow system, permeability of the aquifers and groundwater recharge rates.*
>
> *…*
>
> *Groundwater salinities within Lobe 'B' and the underlying Pre-Cambrian basements rocks, tend to increase with depth from 10000 – 20000 mg/l T.D.S. within the U.S. overburden to 30000 – 35000 mg/l T.D.S. within the Lower Series coal and Pre-Cambrian basement.*
>
> *…*
>
> *Groundwater from the Triassic and Pre-Cambrian aquifers is generally neutral to slightly acidic (pH of 6.5 to 7.0) while groundwater from shallow surficial aquifers (Cainozoic alluvium and colluvium) is alkaline (pH of 7.5 to 8.5)."*

AWE (2015)

In 2014 AWE obtained groundwater samples from two bores (LW-PB1 and LW-PB3) within the basement formations. The results confirm moderate to high levels of salinity, which concur with the earlier studies conducted by Dames & Moore (1984).

3.6.2 Leigh Creek Coal Measures

LCK has undertaken groundwater monitoring and sampling from three monitoring bores (P1M1, P1M2 and P1M3) at the Playford 1 site since 2016 and since March 2018 from the monitoring wells installed at the PCD Facility.

Groundwater analysis results are presented in **Appendix B,** together with time series and statistical analysis for selected parameters. Summary of the analytical results are also presented in **Appendix B**. A piper diagram, with samples grouped by formation, is presented in **Figure 3-8**.

Initial (i.e. until July 2017) readings/analysis results from the Playford 1 wells were excluded from this report, as the electrical conductivity values indicated that the samples were not representative of the formations (i.e. too fresh). Measurements obtained after July 2017 indicated that the water inside the wells was representative of the formations. There were no issues with the stabilisation of the water quality within the wells installed at the PCD Facility.

Groundwater quality within the Leigh Creek Coal Measures is characterised as follows:

- Ion composition indicates that the groundwater is a sodium-potassium-chloride type water.
- Groundwater is brackish to saline, with concentrations of Total Dissolved Solids ranging from 2,240 mg/L to 25,700 mg/L. Ranges of TDS values for the different formations are presented in **Table 3-9**.

Table 3-9: Range of TDS levels (mg/L) in Leigh Creek Coal Measures

Formation	Wells	No. Samples	Minimum	Maximum
Gasifier operational monitoring well (Main Series Coal)	MW02	3	19,300	25,700
Main Series Coal	MW01, MW03, MW04, MW05, P1M2	24	2,240	10,600
Main Series Coal/Lower Series Overburden	P1M3	13	4,650	7,800
Main Series Overburden (490m)	P1M1	18	7,800	9,360
Main Series Overburden (80m)	MW06, MW07, MW08, MW09, MW10	21	9,620	21,600

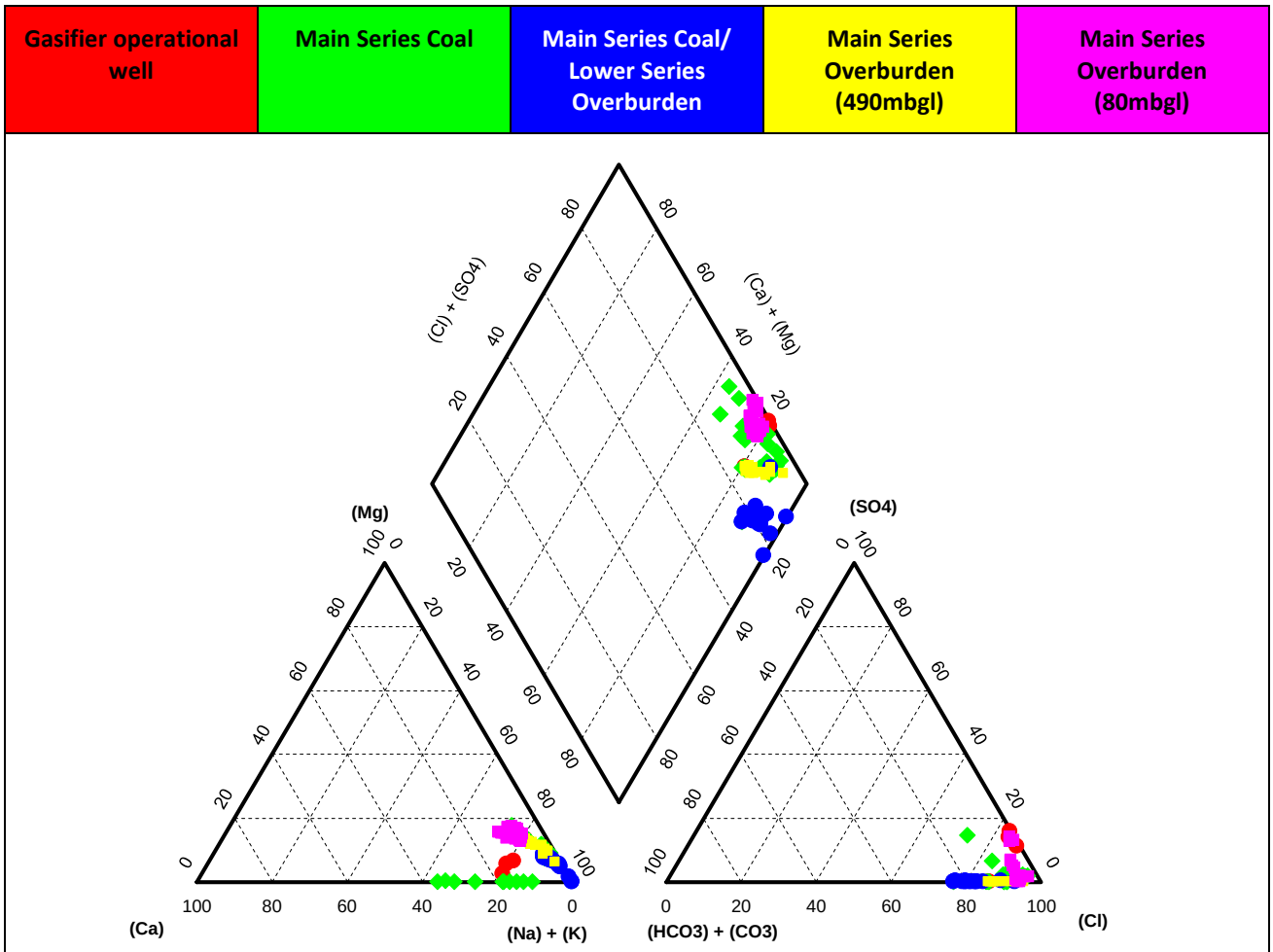

Figure 3-8: Piper Diagram for Leigh Creek Coal Measures

With respect to hydrocarbons, a summary of observed concentrations by formation is presented in **Table 3-10**.

Table 3-10: Range of representative hydrocarbon concentrations in Leigh Creek Coal Measures

Formation	Wells	Compound	No. Samples	No. Detects	Minimum	Maximum
Gasifier operational monitoring well	MW02	Total BTEX	3	0	-	-
		>C10-C40 fraction	3	3	310	1330
		Total PAHs	3	0	-	-
		Phenol	3	0	-	-
Main Series Coal	MW01, MW03, MW04, MW05, P1M2	Total BTEX	25	20	1	22
		>C10-C40 fraction	26	24	180	7400
		Total PAHs	24	0	-	-
		Phenol	16	9	1	19.6
	P1M3	Total BTEX	10	10	7	14
		>C10-C40 fraction	14	5	100	5120

Formation	Wells	Compound	No. Samples	No. Detects	Minimum	Maximum
Main Series Coal/ Lower Series Overburden		Total PAHs	10	0	-	-
		Phenol	13	6	1.2	4
Main Series Overburden (490m)	P1M1	Total BTEX	13	13	12	41
		>C10-C40 fraction	20	18	110	1970
		Total PAHs	12	0	-	-
		Phenol	21	0	-	-
Main Series Overburden (80m)	MW06, MW07, MW08, MW09, MW10	Total BTEX	21	7	1	2
		>C10-C40 fraction	21	5	110	440
		Total PAHs	21	0	-	-
		Phenol	16	2	1.4	2.4

Note: concentrations are in µg/L

The analysis results indicate the following:

- Concentrations of BTEXN compounds above the laboratory's LOR were observed within all wells, except for the gasifier operational monitoring well.
- Groundwater from the Main Series Coal horizon is characterised by higher concentrations of recoverable hydrocarbons (maximum >C10-C40 fraction concentration of 7,400 µg/L) compared to groundwater collected from the Main Series Overburden (80m) (at 440 µg/L) and Main Series Overburden (490m) (at 1,970 µg/L) horizons.
- BTEX compounds were reported at higher concentrations in samples collected from the groundwater well targeting the Main Series Overburden (490m) horizon compared to samples collected from the Main Series Coal and Main Series Overburden (80m) horizons. This may be due to the presence of oily inclusions within the Main Series Overburden 9490m) material reported in historical reports.
- Concentrations of PAHs compounds were below the LOR for all formations.
- Phenolic compounds were detected in samples collected from the groundwater wells targeting the Main Series Overburden (80m) and Main Series Coal horizon.

With respect to metals:

- No discernible differences in heavy metal concentrations were noted between groundwater samples from each of the three horizons. The key metals reported in groundwater samples included boron, copper and zinc (which was also noted in core samples).

The results show that naturally occurring chemicals in the Leigh Creek Coal Measures groundwater include organic compounds such as total and recoverable petroleum hydrocarbons (TPH/TRH); phenolic compounds; benzene, toluene, ethylbenzene and xylene (BTEX) compounds; and metals such as aluminium, arsenic, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, thorium, selenium, uranium and zinc.

These chemicals all occur naturally in this geological setting due to the presence of the coal and the hydrocarbon rich mudstones that form the remainder of the Leigh Creek Coal Measures, as well as originating from the mineral rich Adelaidean basement rocks.

These naturally occurring compounds are termed 'chemicals of potential concern' (COPCs) as they are potential contaminants dependent upon their background levels, where they are located and potential receptors. COPC is the terminology widely used in standard assessments of site contamination.

3.6.3 Telford Gravels

In addition to sampling existing local bores, LCK has commenced installation and monitoring/sampling of shallow monitoring wells at the PCD facility. Groundwater analysis results are presented in **Appendix B**. A piper diagram, with samples grouped by well location, is presented in **Figure 3-9**.

Telford Gravels – Local Wells	Telford Gravels – LCK Wells

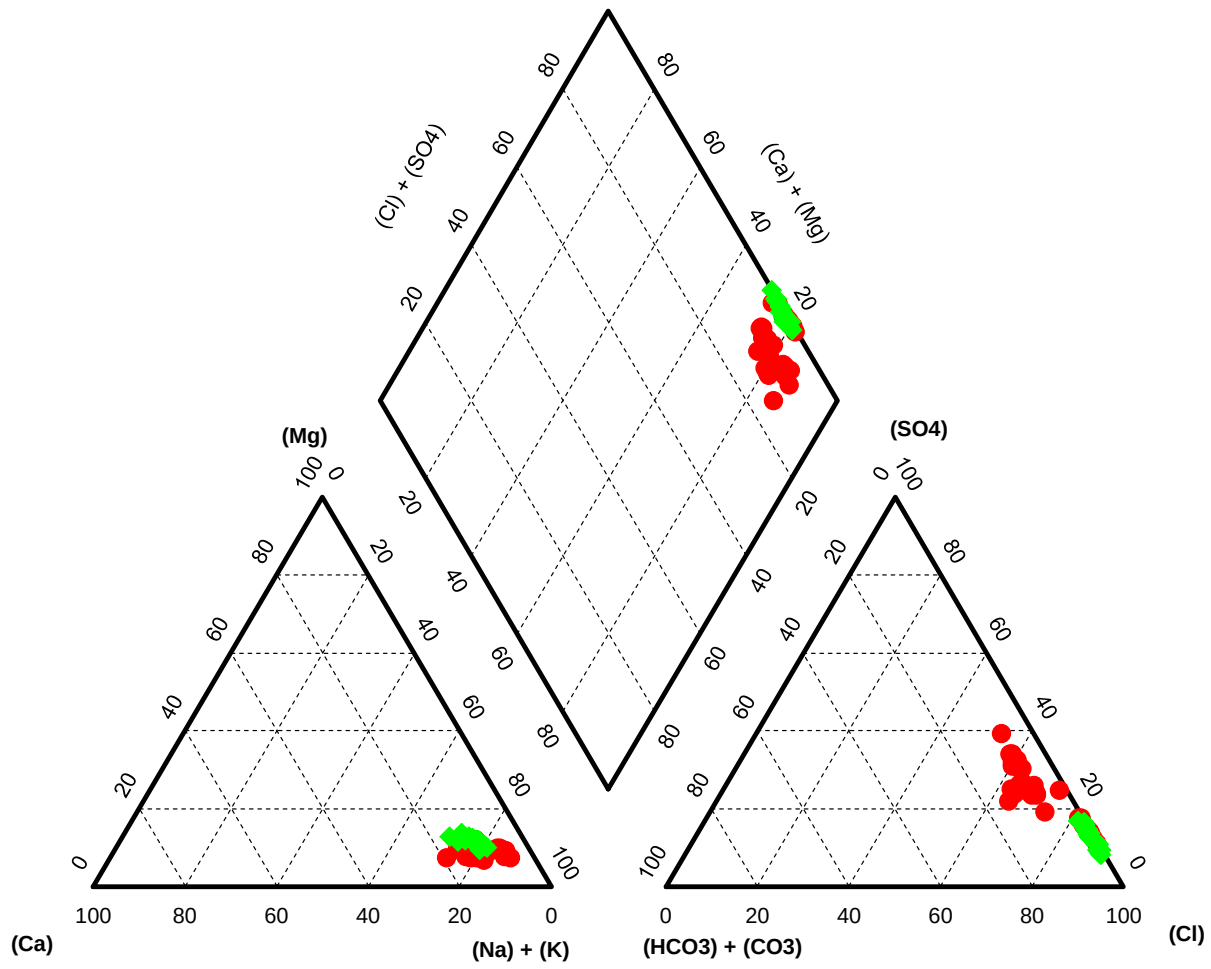

Figure 3-9: Piper Diagram for Telford Gravels

Groundwater quality within the Telford Gravels is characterised as follows:

- Ion composition indicates that the groundwater is a sodium-potassium-chloride type water.
- Groundwater is saline to hypersaline, with concentrations of Total Dissolved Solids ranging from 3,940 mg/L to 41,900 mg/L. There is some variability whereby the TDS concentrations in the local wells are generally less than the concentrations in the wells installed within the PCD facility.
- Groundwater is generally near neutral to slightly acidic, with pH values ranging from 6.37 to 8.16 in the local wells and from 5.55 to 7.55 in the PCD wells.

- With respect to hydrocarbons:
  - concentrations of BTEXN compounds were below the LOR in all analysed samples
  - concentrations of PAHs were below the LOR in all analysed samples
  - concentrations of phenolic compounds were below the LOR in all analysed samples
  - minor concentrations of TRH/TPH fractions were detected in the Telford Gravels within the PCD facility.
- With respect to metals and metalloids, concentrations above the LOR were detected for most metals, except for mercury. Highest concentrations were detected for boron, manganese, nickel and zinc.

3.7 Recharge and Discharge Mechanisms

Natural springs in the region include the Aroona, Top Well and Myrtle Springs. These springs are outside the Telford Basin, eight to twelve kilometres from the site, at higher elevation than the PCD facility site and are not hydraulically connected to the Telford Basin (LCK, April 2018). As such there is no potential for the groundwater discharged at these springs to be connected to the PCD facility site.

3.8 Groundwater Bore Survey

As part of the development of the PEPR for the Leigh Creek Mine, a detailed survey of existing groundwater bores across the mining lease was undertaken in July 2016 (FPP, February 2017). The survey of 102 bores was completed with reference to the South Australian Resource Information Geoserver (SARIG) database and the known bores utilised during FPP's operations.

The survey categorised the bores into the following types:

- Missing Bores – no trace of the bore installation present. All the SARIG-nominated bores fell into this category.
- Active/Open Bores – bores that are open and could potentially be pumped from.
- Monitoring Bores – consisting of:
  - the old Upper Series VWPs (Vibrating Wire Piezometers);
  - the old electric piezometers on the Main Series. Almost all have been lost to mining activity;
  - new VWP's that have the piezometers cemented in place; and
  - newly installed open monitoring bores.
- Capped bores – mining production bores used for dewatering that have since been decommissioned (utilising a bentonite cement mix).

Figure 3-10 shows the surveyed abandoned bores at and near the PCD facility, together with the geological bores drilled by Alinta and the bores drilled by LCK within 1km of the PCD facility.

With respect to the location and their potential as pathways for contamination migration, the nearest identified, abandoned bores are located at least 1,000m from the gasifier. Therefore, the potential pathway for contamination migration is considered unlikely.

The geological bores were drilled by Alinta as part of the geological exploration program and were located mainly within the former mine pits. Most of these bores were mined out and are no longer present.

Some Alinta bores were not mined out. Except for one, these bores are at least 500m outside the gasifier buffer. One Alinta geological bore (drill hole 2) was located 130 metres to the west of the gasifier buffer, between the inlet drill pad and the PCD facility pad. However, it is most likely that this drill holes has incorrect coordinates in the SARIG database.

Drill hole 2 (ETSA Bore 2 or 35484) was drilled in 1917, with recorded field coordinates (in AMG Zone 54) as E:249845.5 and N:6625058.6. The location of this drill hole in the SARIG database is considered inaccurate, most likely due to inaccurate conversion of coordinates from the 1917 coordinate system to current system. More information is provided in **Appendix I**.

The drill hole is located most likely to the south of the SARIG location, outside the gasifier buffer zone (the more accurate coal depths indicate a more southerly location). It is unlikely to present a potential preferential migration pathway for ISG by-products generated in the gasifier chamber, as the Inlet Well (Playford 23) has been cased and grouted more than 100m past any potential location of drill hole 2.

The non-mined out Alinta bores are unlikely to present a potential migration pathway for ISG by-products generated in the gasifier chamber. Drill hole 2 is located outside the gasifier buffer zone, and the low permeability of the formations would prevent migration of by-products to reach this bore.

The installed network of VWPs and groundwater monitoring wells will identify any potential migration of ISG by-products well before the by-products reach this Alinta bore. LCK will undertake surface gas monitoring at the SARIG location, to confirm that there is no such pathway to the surface.

3.9 Groundwater Dependent Ecosystems

Groundwater-Dependant Ecosystems (GDEs) are noted near the mine. However, there are no groundwater dependent ecosystems at or near the PCD facility site. There are several areas of vegetation in and adjacent to the PEL that are expected to be reliant on groundwater as well as surface water inflows and would be classified as groundwater dependent ecosystems. None of these areas of vegetation have any hydrogeological connectivity to the geological units present at the PCD facility site.

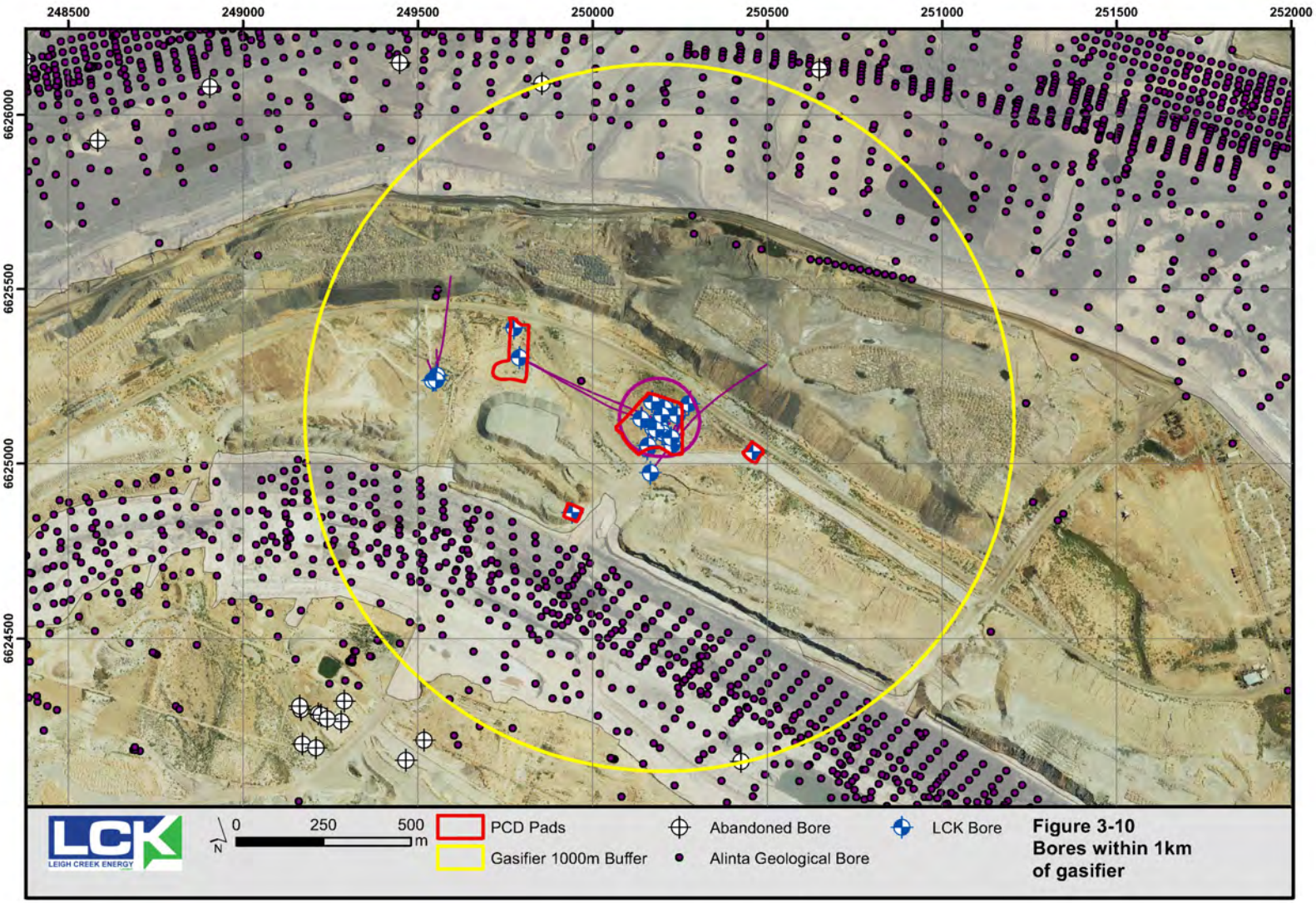

Figure 3-10: Abandoned Bores at and near the PCD Facility

3.10 Groundwater Environmental Values and Beneficial Use

As detailed in the Guidelines for the Investigation Levels for Soil and Groundwater (Schedule B1) of the National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM) (NEPC, 2013), an assessment needs to be made of the environmental values and the potential beneficial use of groundwater within the vicinity of the PCD facility to assist the selection of the relevant groundwater assessment criteria (a.k.a. compliance trigger levels).

Environmental values of groundwater in South Australia are defined in the *Environment Protection (Water Quality) Policy 2015* (Water Quality EPP). The SA EPA's Guideline EPA 738/16 "*Water Quality Guideline – Establishing environmental values and water quality objectives*" (SA EPA, May 2016) provides guidance for the establishment of environmental values and water quality objectives for both surface and ground water bodies across South Australia, consistent with the National Water Quality Management Strategy (ARMCANZ/ANZECC, 1998) and Water Quality EPP.

The Water Quality EPP recognises the following environmental values:

a. aquatic ecosystems

b. recreation and aesthetics

c. drinking water for human consumption

d. primary industries—irrigation and general water uses

e. primary industries—livestock drinking water

f. primary industries—aquaculture and human consumption of aquatic foods.

With respect to "underground waters", the Water Quality EPP specified that the environmental values, as presented in **Table 3-11**, apply.

.

Table 3-11: Environmental Values Applicable to Underground Waters (*Environment Protection (Water Quality) Policy 2015*)

Water	Aquatic Ecosystem	Recreation and Aesthetics	Drinking water for human consumption	Primary industries – irrigation and general water use	Primary industries – livestock drinking water	Primary industries – aquaculture and human consumption of aquatic foods
a. underground waters with a background TDS level of less than 1 200 mg/L	-	-	✓	✓	✓	✓
b. underground waters with a background TDS level of 1 200 mg/L or more, but less than 3 000 mg/L	-	-	-	✓	✓	✓
c. underground waters with a background TDS level of 3 000 mg/L or more, but less than 13 000 mg/L	-	-	-	-	✓	✓

To assist with the assessment of the environmental values and beneficial use of the groundwater, the analysis results have been compared against the following guidelines/trigger levels:

- Trigger values for the protection of freshwater aquatic ecosystems (ANZECC, 2000).
- Groundwater investigation levels for the protection of freshwater aquatic ecosystems (NEPC, 2013).
- Australian drinking water guidelines (ADWG) – health-related guideline values (NHMRC, NRMMC).
- Long-term trigger (LTV) values for irrigation water (ANZECC, 2000).
- Guidelines for livestock drinking water quality (cattle and sheep) (ANZECC, 2000).
- Guidelines for recreational water quality and aesthetics (ANZECC, 2000).

Analysis results of groundwater samples are presented in in **Appendix B**. Statistical analysis of the results is presented in **Appendix B**. A summary of the exceedances of the guidelines/trigger levels is presented in **Table 3-12**. It must be noted that these exceedances represent the naturally occurring groundwater quality at the Site and are not due to LCK's operations.

There are no environmental values for the groundwater, based on the natural chemical concentrations present and the adopted guidelines/trigger levels. No beneficial users have been identified within the existing coal mine footprint. The mine has ceased operations and groundwater is not believed to be extracted for any activities associated with the mine closure.

However, it must be recognised that the groundwater has a spiritual and cultural environmental value.

Groundwater is used from wells outside the mine footprint and outside the Telford Basin. It is used for stock water. Groundwater wells to the west (Myrtle Springs Station), east (Leigh Creek Station), and south (Copley area) are at higher elevations than the Coalfield and are likely to be extracting groundwater from shallow water table groundwater systems.

The Telford Basin is now understood to be a 'terminal sink' groundwater basin, due to the presence of the mine pits and related modifications to the landscape preventing external runoff from entering the mine site. Consequently, there will be no groundwater discharge outside the Telford Basin from the area of the PCD facility.

Table 3-12: Summary of the Exceedances of Groundwater Guidelines/Trigger Levels

Analyte	ADWG 2015 - Health	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Freshwater Aquaculture	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Marine Water - 95%
Telford Gravels – Local Wells							
BTEXN	×	×	-	-	-	-	×
Major Ions	✓	-	✓	✓	✓	✓	-
Metals	✓	✓	✓	×	×	✓	✓
Nutrients	×	✓	-	×	×	-	✓
Salinity	-	-	-	✓	-	-	-
Telford Gravels – PCD Facility							
BTEXN	×	×	-	-	-	-	×
Major Ions	✓	-	✓	✓	✓	✓	-
Metals	✓	✓	✓	✓	✓	✓	✓
Nutrients	×	✓	-	×	×	-	✓
Salinity	-	-	-	✓	-	-	-

Analyte	ADWG 2015 - Health	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Freshwater Aquaculture	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Marine Water - 95%
Main Series Overburden (80mbgl)							
BTEXN	✓	×	-	-	-	-	×
Major Ions	×	-	✓	✓	✓	×	-
Metals	✓	✓	✓	×	×	✓	✓
Nutrients	×	✓	-	×	×	-	✓
Salinity	-	-	-	✓	-	-	-
Main Series Overburden (490mbgl)							
BTEXN	✓	×	-	-	-	-	×
Major Ions	✓	-	✓	×	×	×	-
Metals	×	✓	✓	×	×	✓	✓
Nutrients	×	✓	-	×	×	-	✓
Salinity	-	-	-	✓	-	-	-
Main Series Coal							
BTEXN	✓	×	-	-	-	-	×
Major Ions	×	-	✓	✓	✓	×	-
Metals	4	✓	✓	✓	✓	✓	✓
Nutrients	×	✓	-	×	×	-	✓
Salinity	-	-	-	✓	-	-	-
Main Series Coal/Lower Series Overburden							
BTEXN	✓	×	-	-	-	-	×
Major Ions	✓	-	✓	×	×	×	-
Metals	×	✓	✓	×	1	✓	✓
Nutrients	×	✓	-	×	×	-	✓
Salinity	-	-	-	✓	-	-	-
Gasifier operational monitoring well (within Main Series Coal)							
BTEXN	×	×	-	-	-	-	×
Major Ions	×	-	✓	✓	✓	×	-
Metals	✓	✓	✓	×	✓	✓	✓
Nutrients	×	✓	×	×	×	-	✓
Salinity	-	-	-	3	-	-	-

Notes

✓: exceedances observed

×: no exceedances observed

-: no guideline value exists

TPH/TRH fractions are not included in the above table, as there are no relevant guideline values for these fractions.

4 Groundwater Monitoring Plan

4.1 Purpose and Objectives

The specific environmental objectives for the operation of the PCD facility, relevant to the groundwater, and the associated assessment criteria are presented in **Table 4-1**.

Table 4-1: Groundwater-Related Environmental Objectives and Assessment Criteria (LCK, April 2018)

Environmental Objectives	Assessment Criteria
2. No sustained change to background groundwater quality at the boundary of the gasifier buffer zone (i.e. containment is achieved).	Groundwater monitoring in accordance with the monitoring plan does not indicate a sustained change to background groundwater quality at the gasifier buffer zone[1] boundary as a result of PCD facility activities. A sustained change to background groundwater quality at the sentinel wells (located inside the gasifier buffer zone) will be taken as an indication of sustained change at the gasifier buffer zone boundary, unless further investigations and/or remedial action demonstrate that there is (or will be) no sustained change to background groundwater quality at the gasifier buffer zone boundary. Real time monitoring demonstrates that the gasifier chamber is operated at a pressure below that of the groundwater pressure at all times[2].
Guide to How Objectives Can be Achieved	
Gasifier operated automatically via a control system to keep pressure below surrounding groundwater pressure at top of gasifier chamber (including a safety factor) to avoid outwards pressure gradients and flows. Oxidant injection rate / pressure and outlet well pressure / flow used to control gasifier pressure. Real-time monitoring of pressure, temperature and flow at the inlet and outlet wells and sub-surface temperature monitoring of the casing strings. Pressure monitoring in vibrating wire piezometer wells surrounding the gasifier chamber to interpret groundwater pressure gradients. Abnormal and Emergency Operations Plan developed (scenario based) to detail actions required for each event (e.g. reduced pressure, increase sampling frequency). Location and status of existing drill holes identified and avoided by site location. Geotechnical investigations and modelling undertaken to confirm absence of significant faulting, gasifier chamber stability and likely extent of any fractured or collapse zones. Conservative geotechnical design used for PCD facility to avoid excessive gasifier chamber growth and unwanted gasifier chamber collapse. Oxidant supply shut off if required to control / halt ISG process and chamber growth. Decommissioning plan to minimise generation of chemicals of potential concern (COPC) and protect well integrity by: - removing oxidant supply. - active cooling of cavity through water injection to move though pyrolysis as quickly as practical without excessive thermal cycling of well. - using active cooling to steam the cavity of COPC. Sampling of the gasifier chamber after decommissioning via the observation well (if possible) for COPC and physical properties. Monitoring for gas and COPC undertaken in monitoring wells installed around gasifier and at selected surface locations. A Groundwater and Soil Vapour Monitoring Plan submitted to DPC-ERD for approval under Regulation 19 of the *Petroleum and Geothermal Energy Regulations 2013*.	

[1] The gasifier buffer zone is a 100 m radius around the gasifier.

[2] Note: Whilst the inlet and outlet well pressures will be maintained below groundwater pressure, minor pressures changes may occur due to normal gasifier movements such as rock fall and rib spalling causing transient pressure changes which restabilise rapidly.

In practical terms, the objective of the GSVMP is to detect possible horizontal or vertical movements from the operational zone of the gasifier into other groundwater and soil zones, using pressure and chemical data from dedicated monitoring wells.

The gasifier buffer zone is a sphere with a 100m diameter around the gasifier chamber. The dimensions have been defined:

- laterally, by a 100m radius around the gasifier chamber. This distance has been determined based on geological investigations (which confirmed the absence of significant faulting within this distance from the gasifier) and estimate of groundwater migration (i.e. 100-year time travel based on groundwater movement of 1m/year), as discussed in the EIR.
- vertically, 100m above the top of the gasifier chamber. This distance is based on formation integrity testing, which determined that, for a 30 m (wide) gasifier chamber, the overall height of the combined collapsed and fractured zones would be likely to extend to a height above the coal seam in the order of 60 - 75 m. This is the maximum predicted extent of rock alteration due to cave-in filling the chamber after gasifier decommissioning, with the overlying layers remaining intact due to filling of the void by way of bulking of the rock mass (LCK, April 2018).

A sustained change to background groundwater quality at the sentinel wells (located inside the gasifier buffer zone) will be taken as an indication of sustained change at the gasifier buffer zone boundary, unless further investigations and/or remedial action demonstrate that there is (or will be) no sustained change to background groundwater quality at the gasifier buffer zone boundary.

4.2 Compliance Control Parameters

To achieve the groundwater monitoring objectives, appropriate indicator parameters need to be selected and included in the monitoring program. The indicator parameters include both leading and lag indicators, and are selected based on:

- the existing, background (or reference) groundwater quality
- the chemical and physical processes involved in ISG and the chemical by-products produced during the ISG process
- the hydrogeological conceptual model.

The potential impacts of the ISG PCD facility of the surrounding hydrogeological environment can be assessed/evaluated through the monitoring of three different types of indicators, i.e.

- Pressure and temperature indicators
- Water quality indicators
- Water level indicators.

4.2.1 Pressure and temperature indicators

As discussed in detail in the EIR, the gasifier chamber will develop as the coal is consumed and it is anticipated to be approximately 30 m by 30 m laterally and approximately 15m to 19m in height (based on the thickness of the coal seams). This chamber will remain within the low to very low hydraulic conductivity mudstones above and below and by unchanged coal laterally.

The gasification process will consume the pore water in the coal. As all the in-situ groundwater will be consumed, the gasification process will create a low-pressure environment in the gasifier and an inward

groundwater pressure gradient. However, due to the low to very low hydraulic conductivity, the rate of groundwater movement is very low. Combined with the limited period of operation of the gasifier, the radius of influence of the gasifier on surrounding groundwater is expected to be limited. It also means the potential for any fluids from the gasifier to enter the surrounding rock will be similarly limited.

It must be noted that groundwater modelling to determine the radius of influence has not been undertaken. An external groundwater modelling consultant (GHD) was engaged to determine whether or not there is a need for detailed numerical groundwater of the PCD gasification, whether saturated flow only, unsaturated/saturated groundwater flow or dual phase liquid/gas flow.

The consultant's conclusions were that:

> *"Given the low permeability of the material surrounding the gasification zone, including the target coal seams, groundwater and gas flow will be constrained to discrete pathways such as the gasification cavern and overlying fracture zone, as yet unidentified open fracture zones, or failures of bore casing or grout. Groundwater flow and drawdown within the surrounding and overlying coal and overburden will be negligible during the trial and post-closure period and is unlikely to be detectible outside the fracture zone immediately above the chamber.*
>
> *Consequently, numerical hydrogeological modelling, either dual or single-phase, of the trial gasification is not useful or meaningful at this stage. It may be useful to construct and calibrate a simple model posttrial, based on measured and modelled fracturing, if testing of the trial gasification identifies a significant transition zone between the cavern and surrounding impermeable material. It would be appropriate to use saturated flow modelling unless the cavern was to be allowed to refill by inflow over a long time, rather than filled on completion. The latter is usually preferable to maximise on-site containment while the chamber cools."*

Post PCD facility operation, the chamber will be decommissioned and the majority of, if not all, volatile and soluble COPCs will be removed via the Outlet Well leaving the chamber largely empty except for the ash and other residue left after gasification. This process is not anticipated to leave any residual water within the chamber as the expected temperatures within the chamber will convert any added water into steam that will be exhausted from the chamber during the shut-down process.

It is thus expected that the chamber will be fluid free. Assuming a chamber volume of approximately 13,500 m^3 [e.g. 30 m x 30 m x 15 m], once the chamber temperature is low enough not to vaporise any moisture, the groundwater from surrounding strata will start seeping into the chamber which may take years or decades. Over this time the hydraulic gradient around the chamber will be inward. The calculated volume used here is considered an overestimate as the chamber will likely be a rounded chamber and not rectangular.

Once the chamber has refilled, there will still be a significant time lag while the groundwater heads revert to pre-operational conditions in the formation around the chamber. It is only when the groundwater pressures revert to pre-operational values that groundwater movement similar to ambient conditions near the chamber is expected. This is likely to be in the timescale of years to decades in addition to the time required to fill the chamber.

As groundwater movement through formations around the gasifier is likely to be very slow (a few millimetres to a few metres per year and assumed to be 1m/year for the purpose of the EIR and GSVMP), it is unlikely that any detection of COPC from a gasifier loss of containment will be made using a groundwater quality monitoring program. Since groundwater pressure changes can be transmitted through the formation much faster than groundwater flow and chemical movement, it is recommended that real time monitoring of the gasifier be undertaken using vibrating wire piezometers (VWPs) to measure the pressure around, above and below the gasifier.

Real-time monitoring of the groundwater pressure will be undertaken in the VWPs surrounding the PCD facility during baseline, pre- commissioning, operation and post-operation to confirm that the groundwater pressure around the PCD facility is higher than the operating gasifier pressure in order to avoid outward pressure gradients which could cause COPC to migrate away from the gasifier. On this basis, the gasifier will not be operated at a pressure above 36 bar to ensure that safe operating pressure is not reached[3].

Monitoring of temperature in the VWPs will be undertaken to provide baseline data during pre-commissioning, operation, and post-operation to provide an indication of the lateral and vertical extent of heating as initial studies have suggested that heating of the rock mass can cause changes to the rock mass, such as delamination, and cause a change to the solubility of the COPC.

4.2.2 Water quality indicators

Several environmental objectives are related to the protection of the existing, background water quality in the formations, both in the immediate vicinity of the gasifier chamber and in the surrounding environment.

The chemistry of groundwater in the PCD facility area has been assessed by sampling and laboratory analysis for a range of chemicals prior the commencement of site activities. Groundwater analysis results are presented in **Appendix B.1**.

Initial (i.e. until July 2017) readings/analysis results from the Playford 1 wells were excluded from this report, as the electrical conductivity values indicated that the samples were not representative of the formations (i.e. too fresh). Measurements obtained after July 2017 indicated that the water inside the wells was representative of the formations. There were no issues with the stabilisation of the water quality within the wells installed at the PCD Facility.

Sampling and analysis will also be undertaken for a range of diagnostic chemicals which are indicative of ISG operations during the operational stage and continue into the post- operational stage to confirm that site activities have not caused no sustained change to background groundwater quality at the boundary of the gasifier buffer zone.

Groundwater quality monitoring also provides for the detection of COPC and implementation of corrective action, in the unlikely event of escape from the gasifier area.

A complete list of the water quality parameters to be measured is presented in **Appendix E**.

4.2.3 Water level indicators

Changes in quantity of groundwater (or availability of groundwater), flow volumes in aquifers and interaction between groundwater and surface water features are primarily determined based on groundwater level/pressure levels and related changes in these levels.

Natural fluctuations in groundwater levels occur in response to daily and seasonal cycles and variability in climatic conditions (i.e. precipitation, evaporation and atmospheric pressure). The duration of these

[3] A safe gasifier operating pressure is determined by considering initial groundwater or “confining” pressure; the change in confining pressure over time; potential growth of the gasifier over time and any connected opening or joint above the gasifier; and a factor of safety to ensure that the gasifier pressure does not exceed the confining pressure. These elements will be monitored constantly throughout the operation of the gasifier and the gasifier pressure adjusted if required. Based on an initial confining pressure of 490 m of water, the gasifier releasing stress up to 75 m above the gasifier, and a 10% factor of safety, the maximum safe operating pressure is 373.5m of water or 37.35 bar. LCK plans to operate the gasifier at a variety of pressures to test the efficiency of the gasification processes. The gasifier will not be operated at a pressure above 36 bar to ensure the safe operating pressure is not reached.

fluctuations ranges from short-term (for example, shallow monitoring bores responding to individual precipitation events) to long-term (multi-year variations in climate and basin water balance).

Monitoring and trend analysis of groundwater levels at selected locations will be used as a lead and lag indicators of a potential sustained change to background groundwater quality at the boundary of the gasifier buffer zone.

Details on the groundwater monitoring network are presented in **Section 4.3**.

4.3 Groundwater Monitoring Network

To meet the environmental objectives and to allow monitoring of the compliance indicators, the groundwater monitoring network configuration comprises:

- PCD sentinel monitoring wells located:
    - in and adjacent to the coal seam approximately 50 m laterally from the gasifier upgradient and downgradient (MW01, MW03, MW04 and MW05)
    - in the Main Series Overburden above the gasifier at approximately 80 m below the surface (MW09 and MW10)
- a monitoring well (referred to as the gasifier operational monitoring well) installed as close as possible to the gasifier chamber to provide information on the environment immediately adjacent to the chamber. This well (which has been designed and constructed to manage the potential pressures and temperatures expected within the chamber) is intended to be within the area where changes are likely to occur and would not be used for assessing achievement of environmental objectives (MW02)
- in the Telford Gravels at background distances and above the gasifier at approximately 13 m below the surface (MW11 – MW18, MW21 and MW22)
- background monitoring wells in the Main Series Overburden (MW06, MW07 and MW08)
- Local wells, outside the PCD Facility area.

At this stage, compliance monitoring wells have not yet been installed. Compliance monitoring wells are wells installed at the edge of the gasifier buffer zone, defined as 100m radius from the gasifier chamber. As discussed in **Section 4.8**, compliance monitoring wells will be installed if the groundwater monitoring indicates a non-compliance or excursion that need to be addressed prior to the excursion leading to a sustained change in water quality.

Four different types of monitoring wells have been installed including:

- piezometer wells to measure groundwater pressures and temperatures in each relevant geological formation using “vibrating wire piezometers” (VWP). VWPs are installed at multiple levels within the bore, and the bore is fully sealed with bentonite-cement grout. The VWPs then read pore pressure in the adjacent formation through the grout. These wells also are fitted with thermocouples to measure temperature.
- groundwater monitoring wells to measure depth to water and to collect groundwater samples from deeper geological formations (i.e. Main Series Overburden and Main Series Coal). These groundwater monitoring wells are constructed with standpipes (which are sealed at the collar to prevent escape of gas) allowing for water quality sampling.
- water table wells to measure depth to water and to collect groundwater samples from the Telford

Gravels. Two different groups of wells are included, i.e.

- existing local wells located outside the PCD Facility
- groundwater monitoring wells installed by LCK at the PCD facility. These wells are constructed with standpipes (which are sealed at the collar to prevent escape of gas) allowing for water quality sampling.

- a gasifier operational monitoring well to measure depth to water and to collect groundwater samples from deeper geological formations (i.e. Main Series Coal). This groundwater monitoring well has been constructed with standpipes (which are sealed at the collar to prevent escape of gas) allowing for water quality sampling.

Table 4-2 presents the locations and details of the monitoring wells. The locations in relation to the gasifier and plant infrastructure are presented on **Figure 4-1** and **Figure 4-2**.

Table 4-2: Details of groundwater monitoring network

Bore ID		Purpose	Well Type	Details/Location	Easting	Northing	Ground level (mAHD)	Screen Depth/ Open Hole	Bore Depth (mbgl)
Telford Gravels - Local Wells									
3965	-	Monitoring - Background	Water table - Local Wells	adjacent haul road before FP main office	251333	6624839	190.716	NR	10.82
6536-1	-	Monitoring - Background	Water table - Local Wells	Bore 34213 (Ti Tree), in creek bed north of retention dam wall	249939	6621330	206.114	NR	13.23
6537-2318	-	Monitoring - Background	Water table - Local Wells	Stone Hut Windmill	246809	6625233	201.595	NR	14.8
Telford Gravels - PCD Facility									
MW11	-	Monitoring - Background	Water table	PCD facility	249814	6625396	189.363	5.0-8.0	8
MW12	-	Monitoring	Water table	PCD facility	249808	6625297	189.573	3.9-6.9	7
MW13	-	Monitoring	Water table	PCD facility	249817	6625251	189.593	5.1-8.1	8.1
MW14	-	Monitoring	Water table	PCD facility	250100	6625059	191.54	7.6-10.6	11
MW15	-	Monitoring	Water table	PCD facility	250094	6625113	191.385	6.0-9.0	9
MW16	-	Monitoring	Water table	PCD facility	250137	6625063	191.523	8.8-11.8	12
MW17	-	Monitoring	Water table	PCD facility	250145	6625081	191.389	5.8-8.8	9
MW18	-	Monitoring	Water table	PCD facility	250194	6625105	190.912	6.0-9.0	9
MW20	-	Abandoned	Water table	PCD facility	249923	6624851	192.692	12.0-15.0	16
MW21	-	Monitoring - Background	Water table	PCD facility	250454	6625056	190.178	5.0-8.0	8
MW22	-	Monitoring - Background	Water table	PCD facility	249926	6624850	192.692	8.75-11.75	12

Upper Main Series Overburden								
MW19	-	Monitoring – Supplemental Background	PCD facility	250456	6625058	190.16	11.5-14.5	14.5
Main Series Overburden (80m)								
MW06	Playford 16	Monitoring - Background	Groundwater	Upgradient of gasifier	249942	6624862	192.676	50-78.6	78.6
MW07	Playford 17	Monitoring - Background	Groundwater	-	250458	6625035	190.047	50-80.8	80.8
MW08	Playford 18	Monitoring - Background	Groundwater	-	249776	6625390	189.299	50-80	80
MW09	Playford 19	Sentinel	Groundwater	-	250194	6625102	190.905	51.6-80	80
MW10	Playford 20	Sentinel	Groundwater	Downgradient of gasifier	250206	6625159	190.282	50-80	80
Main Series Coal (open across Main Series Coal and Lower Series Overburden)								
MW01	Playford 11	Sentinel	Groundwater	Upgradient of gasifier	250157	6625043	191.487	490-535	535
MW03	Playford 13	Sentinel	Groundwater	Downgradient of gasifier	250170	6625177	190.144	453-495.3	495.3
MW04	Playford 14	Sentinel	Groundwater	Downgradient of gasifier	250207	6625164	190.262	466-505.31	505.31
MW05	Playford 15	Sentinel	Groundwater	Downgradient of gasifier	250242	6625139	190.341	460-505.11	505.11
VWP Wells								
PZ01	Playford 9	VWP – pressure/temp	Piezometer	6 piezometers, at 100m, 450m, 500m, 515m, 530m and 575m	250159	6625053	191.38	-	581.91
PZ02	Playford 7	VWP – pressure/temp	Piezometer	6 piezometers, at 100m, 430m, 478m, 495m, 515m and 520m	250139	6625129	190.88	-	525.8
PZ03	Playford 10	VWP – pressure/temp	Piezometer	6 Piezometers, at 100m, 250m, 420m, 435m, 460m and 480m	250172	6625103	190.9	-	485.01
PZ04	Playford 8	VWP – pressure/temp	Piezometer	6 piezometers, at 100m, 443m, 493m, 508m, 526m and 536m	250225	6625074	191.01	-	585

PZ05	Playford 3	VWP – pressure/temp	Piezometer	6 Piezometers, at 100m, 250m, 420m, 435m, 460m and 480m	250198	6625140	190.13	-	543.18
Gasifier Wells									
MW02	Playford 12	Operational monitoring (completed in Main Series Coal)		Adjacent gasifier	250191	6625120	190.821	472-514	514
Outlet	Playford 21	Gasifier outlet well		-	250200	6625089	191.14	495-522	522
Observation	Playford 22	Gasifier observation well		-	250182	6625098	190.43	507.45-522.8	522.8
Inlet	Playford 23	Gasifier inlet well		-	249791	6625304	189.53	774.4-809.4	*809.4/515.3
Playford 1 Wells									
P1	Playford 1	VWP – pressure/temp	Piezometer	8 piezometers, at 327m, 464m, 484m, 508m, 530m, 550m, 591m and 630m	249546	6625241	192	-	695
P1M1	Playford 5	Monitoring - Background Monitoring		-	249554	6625253	189.88	486-498	570
P1M2	Playford 4	Monitoring - Background Monitoring		-	249542	6625239	189.935	533.5-539.5	539.5
P1M3	Playford 6	Monitoring - Background Monitoring		-	249554	6625237	189.884	552-558	571

Notes:

- NR not recorded on Water Connect database
- * drill length/vertical depth (from surface)
- Coordinate system is MGA94, Zone 54

Figure 4-1: Locations of Gasifier Monitoring Wells

Figure 4-2: Locations of Other Groundwater Monitoring Wells

4.4 Monitoring Parameters, Frequency and Duration

4.4.1 Monitoring Parameters

Piezometer Wells

Monitoring parameters for the piezometer wells include:

- pressure
- temperature.

Groundwater Monitoring Wells, Water Table Wells and Gasifier Operational Monitoring Well

Water level indicators will be monitored by measurement of pressure and/or depth to water in the groundwater monitoring wells.

Water quality monitoring parameters have been identified through the review of:

- existing, background water quality data
- the identified environmental values
- ISG by-products.

Based on the above, the water quality monitoring parameters include:

- Field water quality parameters, including pH, electrical conductivity, dissolved oxygen, temperature and redox potential.
- Laboratory analysis for assessing potential groundwater quality
    - pH, electrical conductivity and total dissolved solids
    - alkalinity
    - major and minor cations and anions (including calcium, magnesium, potassium, sodium, chloride, bromide, fluoride, iodide and sulphate)
    - Organic compounds including total recoverable hydrocarbons (TRH); polycyclic aromatic hydrocarbons (PAHs); benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN) and phenols
    - Metals (total and dissolved) including arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc.

It must be noted that the above chemicals all occur naturally in the geological setting at the site. Additional laboratory analysis for assessing potential for natural attenuation of hydrocarbon may be undertaken.

A complete list of the water quality parameters to be measured/analysed is presented in **Appendix E**. It must be noted that this list is comprehensive and incorporates the chemicals that are representative of ISG by-products (i.e. BTEX compounds, phenols and polycyclic aromatic hydrocarbons).

4.4.2 Monitoring Frequency and Duration

Planned groundwater-related monitoring and data collection frequency is summarised in **Table 4-3**. The proposed groundwater monitoring frequencies are:

- groundwater pressure (piezometer) wells – VWP data will be collected continuously and reviewed live. Any sustained increase in pressure in the VWP network, which if not reversed could results in a loss of

containment, will trigger a review and response action for gasifier operation and will require corrective action if the gasifier pressure has increased above 36 bar. A sustained increase is defined as an increase observed over a period of at least 1 week and will be determined through regression analysis.

- gasifier operational monitoring well - water quality sampling will occur weekly during operations and results reviewed in the context of gasifier operations, VWP data, and background well data
- sentinel monitoring wells – water quality sampling will occur monthly and be reviewed in the context of background well data and to identify if there are any significant changes over the seasonal cycle.

Table 4-3: Groundwater monitoring and data collection frequency

Location/ Parameter	Frequency during Project Lifecycle Stage					
	Base line	Pre-Commissioning	Operation	Post-Operation		
				0-12 months	12-24 months	24-36 months
Stratigraphy	✓	-	-	-	-	-
Telford Gravel wells and Main Series Overburden (80m) wells						
Groundwater quality	✓	monthly	monthly	monthly	quarterly	six-monthly
Groundwater levels	✓	monthly	monthly	monthly	quarterly	six-monthly
Main Series Coal wells						
Groundwater quality	✓	monthly	weekly	monthly	quarterly	six-monthly
Groundwater levels	✓	monthly	weekly	monthly	quarterly	six-monthly
VWPs (PZ01 to PZ05)						
Groundwater pressure	-	hourly	hourly	hourly	six-hourly	six-hourly
Groundwater temperature	-	hourly	hourly	hourly	six-hourly	six-hourly
Gasifier operational monitoring well (MW02)						
Groundwater quality	-	-	weekly	monthly	quarterly	six-monthly
Groundwater levels	-	-	weekly	0-3mths: weekly 3-12mths: monthly	monthly	monthly
Gasifier						
Inlet well pressure	-	-	hourly	hourly	six-hourly	six-hourly
Outlet well pressure	-	-	hourly	hourly	six-hourly	six-hourly
Inlet well temperature	-	-	hourly	hourly	six-hourly	six-hourly
Outlet well temperature	-	-	hourly	hourly	six-hourly	six-hourly
Playford 1 wells						
Groundwater quality	✓	monthly	monthly	monthly	quarterly	six-monthly
Groundwater levels/ pressure	✓	monthly	monthly	monthly	quarterly	six-monthly

The monitoring requirements will be reviewed after three years, and any proposed amendments discussed with the relevant SA Government Agencies, prior to implementation.

4.5 Groundwater monitoring and sampling methodology

Field water quality measurements

Field water quality parameters including temperature, electric conductivity (EC), pH, dissolved oxygen (DO) and redox potential (redox) will be measured during groundwater purging and at sampling with field water quality meter. Field observations regarding odour and discoloration will also be recorded.

The field water quality meter will be calibrated against known standards, as supplied by the manufacturer, at the start of each day of groundwater sampling. Calibration records will be kept for inclusion in the report on the investigation.

Groundwater sampling – deep monitoring wells

LCK has undertaken detailed research in appropriate sampling methodology to obtain representative groundwater samples from depths of 500 mbgl. This has included a review of the applicability of sampling methodology currently used by the Coal Seam Gas CSG) industry in Queensland and used internationally.

This research determined that Snap Samplers would be the most suitable. However, field testing of the Snap Samplers has shown long term use may prove problematic with numerous issues encountered.

Following the Snap Sampler testing program, a wireline bore hole fluid sampler (BHFS) test was undertaken. This showed that many of the issues associated with the Snap Samplers were eliminated (especially sample depth location and winch safety issues) and was regarded as the preferred sampling equipment.

Detailed groundwater sampling methodology is specified in LCK's Groundwater Sampling Standard Operating Procedure (SOP), attached in **Appendix H**.

Groundwater sampling – water table wells

Following purging, groundwater will be sampled from each monitoring well using low flow methods (e.g. using low flow bladder pumps or equivalent). If other purge methods are used (e.g. a peristaltic pump or Waterra Inertial Pumps, using dedicated Teflon foot valves and LDPE polytube), the wells will be allowed to recover and samples obtained using a disposable or dedicated bailer. These techniques will ensure that the sample is able to be collected within the screened interval and not at the top of the groundwater column.

Groundwater samples will be carefully decanted into laboratory supplied, appropriately preserved containers as per analytical method. Samples to be collected for metals analysis will be field filtered using a 0.45µm filter prior to collection into sampling container.

Field duplicates and triplicates will be also prepared in the field.

Detailed groundwater sampling methodology is specified in LCK's Groundwater Sampling SOP (**Appendix H**).

Groundwater Sampling - Equipment Decontamination

The decontamination procedures will be performed before initial use of re-useable equipment and after each subsequent use. All re-usable sampling equipment (water quality meters, water dipper) will be decontaminated between each sampling and measurement event, by scrubbing with a solution of Decon 90 (a phosphate-free detergent followed by a rinse in potable water.

For each day of sampling, following decontamination procedures, a rinsate blank will be completed by running laboratory prepared deionised water over the re-usable sampling equipment for collection directly into laboratory prepared sampling containers for analysis.

At each well location a new set of disposable nitrile gloves will be used to during the collection of groundwater samples into the laboratory prepared glass sampling containers.

4.6 Non-Compliance Control Parameters, Control Limits and Non-Compliance Indicators

4.6.1 Introduction

To assess compliance with the proposed assessment criteria, appropriate non-compliance criteria need to be determined. As stated previously, the groundwater-related assessment criterion is that:

> *Groundwater monitoring in accordance with the monitoring plan does not indicate a sustained change to background groundwater quality at the gasifier buffer zone boundary as a result of demonstration plant activities.*

A sustained change to background groundwater quality at the sentinel wells (located inside the gasifier buffer zone) will be taken as an indication of sustained change at the gasifier buffer zone boundary, unless further investigations and/or remedial action demonstrate that there is (or will be) no sustained change to background groundwater quality at the gasifier buffer zone boundary. Real time monitoring demonstrates that the gasifier chamber is operated at a pressure below that of the groundwater pressure at all times.

Determination of non-compliance criteria must comprise:

- definition of non-compliance in terms of impact on the receiving environment
- identification of parameters to be measured to assess non-compliance (i.e. control parameters)
- determination of numerical values for the selected parameters against which measurements can be compared (i.e. control limits)
- determination of qualitative criteria (e.g. trend analysis) to assess compliance
- definition of corrective actions should a non-compliance be identified.

4.6.2 Terminology/Definitions

For this GSVMP, the following definitions are adopted:

- **Groundwater assessment criteria**: criteria to assess compliance with groundwater protection objective, i.e.
    - **Criterion 1**: no sustained change to background groundwater quality at the gasifier buffer zone boundary as a result of demonstration plant activities.
    - **Criterion 2**: gasifier chamber is operated at a pressure below that of the groundwater pressure at all times, i.e. at pressure below 36 bar.
- **Sustained change to background groundwater quality**: change in water quality as demonstrated by exceedance of defined control limits for defined control parameters over a defined timeframe.
- **Control parameters**: physical or chemical parameters that can be used as indicators of a non-compliance with the groundwater assessment criteria.
- **Internal trigger**: qualitative or numerical values which indicate provides an internal warning of potential future non-compliance with the groundwater assessment criteria. This trigger is less than the control limit.
- **Control limits**: qualitative or numerical values which indicate non-compliance with the groundwater

assessment criteria.

- **Non-compliance (excursion):** exceedance of or non-compliance with the control limits over a defined time frame or set of monitoring events.
- **Gasifier buffer zone**: 100 m buffer around the gasifier chamber.
- **Compliance assessment timeframe**: three years monitoring after shutdown of PCD gasifier (subject to review at three years that shows no exceedances of control limits in past 3 sampling events).

It is noted that it is not the intent of LCK to stop monitoring after three years. However, it is LCK's intent to review the monitoring program, based on the existing and/or future operations at the PCD facility.

If LCK has ceased operations at the PCD facility, it is envisaged that a closure plan will be implemented in accordance with relevant legislation. This closure plan will address ongoing groundwater monitoring requirements, including locations, frequency, parameters and closure completion criteria.

If operations at the PCD facility are ongoing (e.g. as part of commercial operations), groundwater monitoring will continue, as specified in the GSVMP for the commercial operations

4.6.3 Groundwater Pressure Control Parameters and Control Limits

With respect to compliance with assessment criterion 2:

- compliance is identified as "gasifier chamber is operated at a pressure below that of the groundwater pressure at all times".
- the control parameter is the pressure gradient from the sentinel wells to gasifier chamber, expressed as pressure gradient maps
- the control limit is an inward pressure gradient from the sentinel wells towards the gasifier chamber, at all times, as expressed by pressure gradient maps to be produced at regular intervals. Intervals are:
    - weekly during gasifier operations
    - weekly for a period of 12 months after gasifier shutdown
    - monthly after 12 months after gasifier shutdown.

Figure 4-3 to **Figure 4-5** provide examples of a pressure gradient map, based on VWP pressure observed on 1st May 2018 and 1st July 2018.

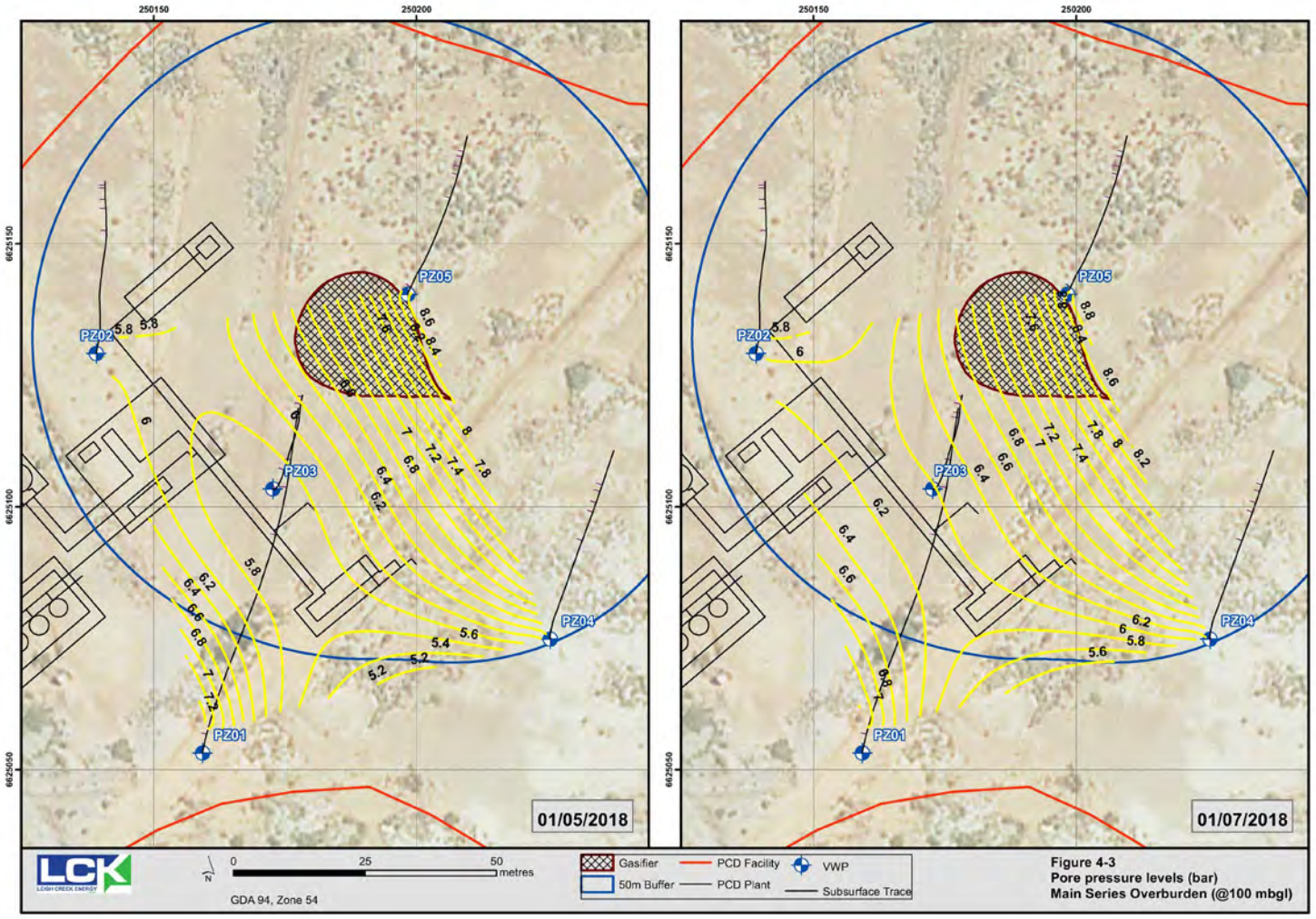

Figure 4-3: Pore pressure contour map – Main Series Overburden: VWPs at 100 mbgl

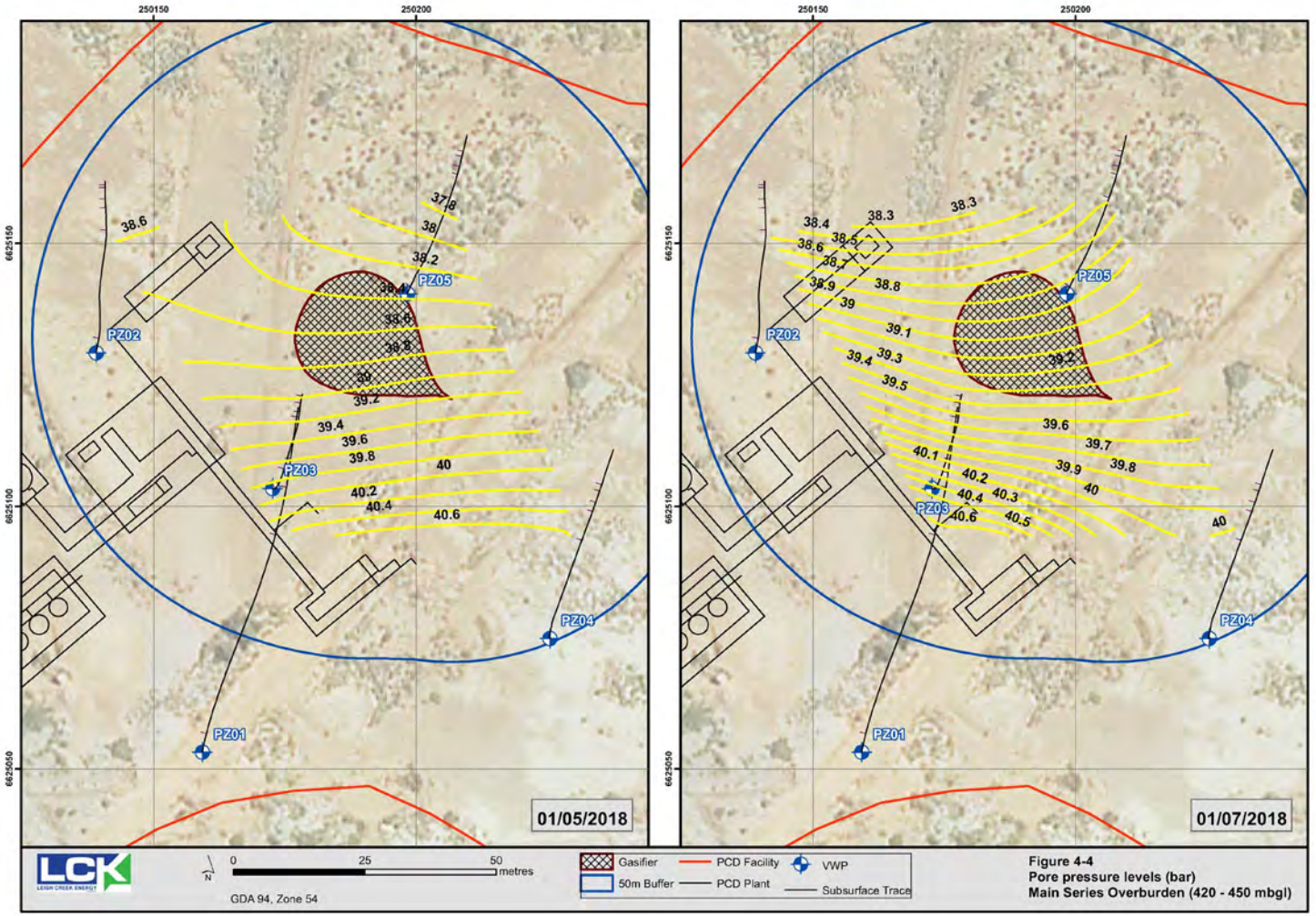

Figure 4-4: Pore pressure contour map – Main Series Overburden: VWPs between 420 and 450 mbgl

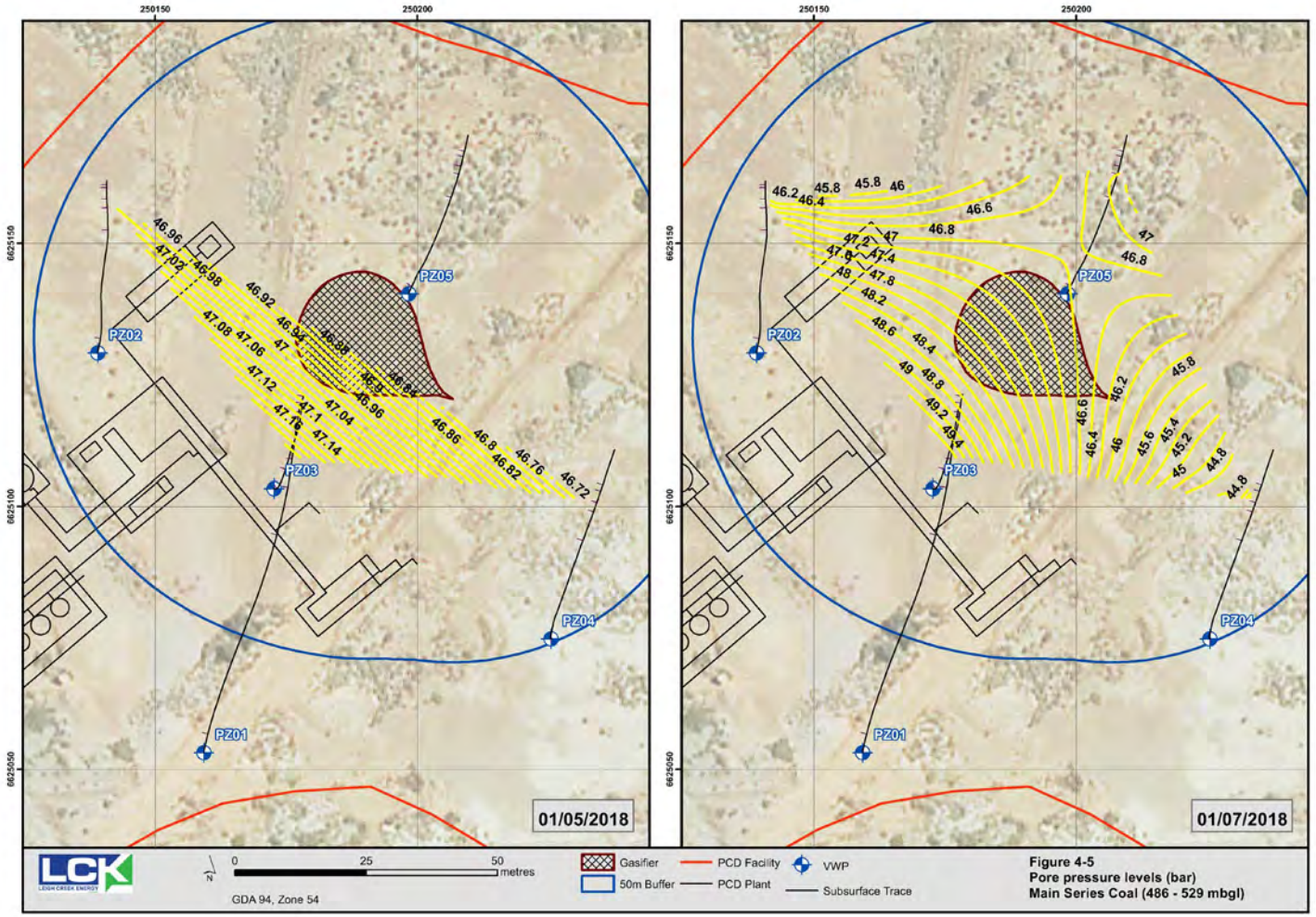

Figure 4-5: Pore pressure contour map – Main Series Coal: VWPs between 486 and 529 mbgl

4.6.4 Water Quality Control Parameters and Limits

With respect to compliance with assessment criterion 1, compliance is identified as "*no sustained change to background groundwater quality at the gasifier buffer zone boundary as a result of demonstration plant activities*".

Water quality control parameters

With respect to water quality control parameters, the following needs to be considered:

- Appropriate water quality control parameters need to be selected, to ensure that assessment of potential sustained change to background groundwater quality at the boundary of the gasifier buffer zone can be undertaken. The selection process needs to consider the existing, background water quality and the ISG by-products.
- Control parameters should be parameters that are strong indicators of ISG by-products affecting the groundwater quality.
- The control parameters should be easily analysed to allow timely data reporting.

Based on the background water quality and ISG by-products, the following groundwater quality control parameters have been adopted:

- Hydrocarbons
    - benzene, toluene, ethylbenzene and xylenes
    - polycyclic aromatic hydrocarbons, in particulate naphthalene and total PAHs
    - phenolic compounds, in particular 2-Methylphenol and 3-&4-Methylphenol
    - Total Recoverable Hydrocarbons
- Metals: fluoride, boron
- Other: ammonia

The list of control parameters will be reviewed upon shutdown of the PCD gasifier and sampling of the groundwater seeping into the gasifier chamber. The gasifier seepage water samples will be analysed for an extended analysis suite (i.e. full suite of VOCs and SVOCs, dioxins and furans and speciated PCBs). The list of control parameters may be extended based on the analysis results of the gasifier water sample.

Water quality control limits

Water quality control limits are concentration thresholds which indicate whether the operation of the PCD facility has caused a sustained change to background groundwater quality at the boundary of the gasifier buffer zone.

Control limits are normally based on statistical analysis of background water quality data, such as upper confidence limits (UCLs), percentiles, control charts, etc. Relevant information on control limits and control charts is available from the following publications:

- Australian and New Zealand Environment and Conservation Council, 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. (ANZECC, 2000)
- Queensland Department of Science, Information Technology and Innovation 2017. "*Using monitoring data to assess groundwater quality and potential environmental impacts. Version 1*". (DSITI, 2017)

- NUREG, 2003. "*Standard Review Plan for In Situ Leach Uranium Extraction License Applications*". Division of Fuel Cycle Safety and Safeguards Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC. Report: NUREG- 1569. (NUREG, 2002)

It must be recognised that background water quality varies between the formations at the PCD facility. For example, elevated hydrocarbon concentrations are naturally occurring within the Leigh Creek Coal Measures, whilst no such hydrocarbons were observed in the Telford Gravels.

Formation specific control limits have been developed for:

- Telford Gravels – local wells
- Telford Gravels – PCD facility
- Main Series Overburden (80m) – PCD Facility
- Main Series Coal – PCD Facility

The calculations for the formation-specific control limits are as follows:

- if background concentrations of a control parameter are below the laboratory's Limit of Reporting in all samples analysed, the internal trigger and the control limit are set equal to the LOR
- if background concentrations above the LOR are present within a formation, the following is adopted:
  - Calculation of the 95% Upper Confidence Limit (UCL)
  - Calculation of the 80th and 95th percentiles
  - Internal trigger: 80th percentile
  - Control Limit: highest of the 95%UCL and 95th percentile (dependant on distribution type curve)

The statistical data set includes all monitoring data from wells installed at the PCD Facility and relevant data from the wells at Playford 1. However, Playford 1 Main Series Coal well P1M2 monitoring data excluded data prior to July 2017 due to electrical conductivity measurements indicating that the samples were not representative of the formation. The detailed statistical assessment and derivation of control limits are presented in **Appendix B**. The control limits to be adopted for the various control parameters are presented in **Table 4-4**. With respect to the statistical calculations and graphs in **Appendix B.3**, the calculations consider concentrations above the LOR and<LOR. Where results are <LOR, the LOR value is used for the provision of a data point. All control limits are 95th percentiles due to a high number of monitoring results reporting <LOR and generating non-normally distributed data, which is not suitable for confidence limit calculations. **Appendix B.3** presents time series figures only where the 95th percentile control limit is greater than the LOR value.

Table 4-4: Groundwater quality control limits by formation

Control Parameter	Telford Gravels – Local Wells	Telford Gravels – LCK Wells	Main Series Overburden (80m)	Main Series Coal
TRH (µg/L)				
C6 - C10 Fraction	<20	<20	<20	57
>C10 - C16 Fraction	<100	100	<100	754
>C16 - C34 Fraction	<100	120	163	2,764
>C34 - C40 Fraction	<100	<100	<100	282

Control Parameter	Telford Gravels – Local Wells	Telford Gravels – LCK Wells	Main Series Overburden (80m)	Main Series Coal
>C10 - C40 Fraction (sum)	<100	120	163	3,728
BTEXN (µg/L)				
Benzene	<1	<1	1.35	10
Toluene	<2	<2	<2	4.6
Ethylbenzene	<2	<2	<2	2
Xylenes	<2	<2	<2	<2
Naphthalene	<5	<5	<5	<5
PAHs (µg/L)				
Naphthalene (exclusive to SVOCs)	<1	<1	<1	<1
Total PAHs	<0.5	0.5	<0.5	0.5
Phenolic Compounds (µg/L)				
Phenol	<1	<1	<1	5.4
2-Methylphenol	<1	<1	1	1
3- & 4-Methylphenol	<2	<2	<2	2.7
Other (mg/L)				
Ammonia	1.73	0.46	69.2	132
Fluoride	3.57	2.7	0.7	0.2
Boron (dissolved)	4.04	7.78	1.31	0.88

4.7 Non-compliance indicators

Groundwater quality non-compliance

The following non-compliance indicators have been adopted:

- Increasing trends in control parameter concentrations at the sentinel monitoring wells. An increasing trend is defined as an increase over a minimum of three successive sampling events, based on linear regression analysis of the data.
- Three consecutive exceedances (based on the monitoring frequency as presented in **Table 4-3**) of the control limits of any control parameter in any of the sentinel wells.
- If compliance monitoring wells have been installed at the gasifier buffer zone boundary, any exceedance of a control limit in any compliance well.

Non-compliance assessment will be undertaken as and when sample analysis results become available, in accordance with the adopted reporting regime (**Section 6**).

A graphical example of a non-compliance assessment is provided in **Figure 4-6**. Please note that the example uses hypothetical data and not real data.

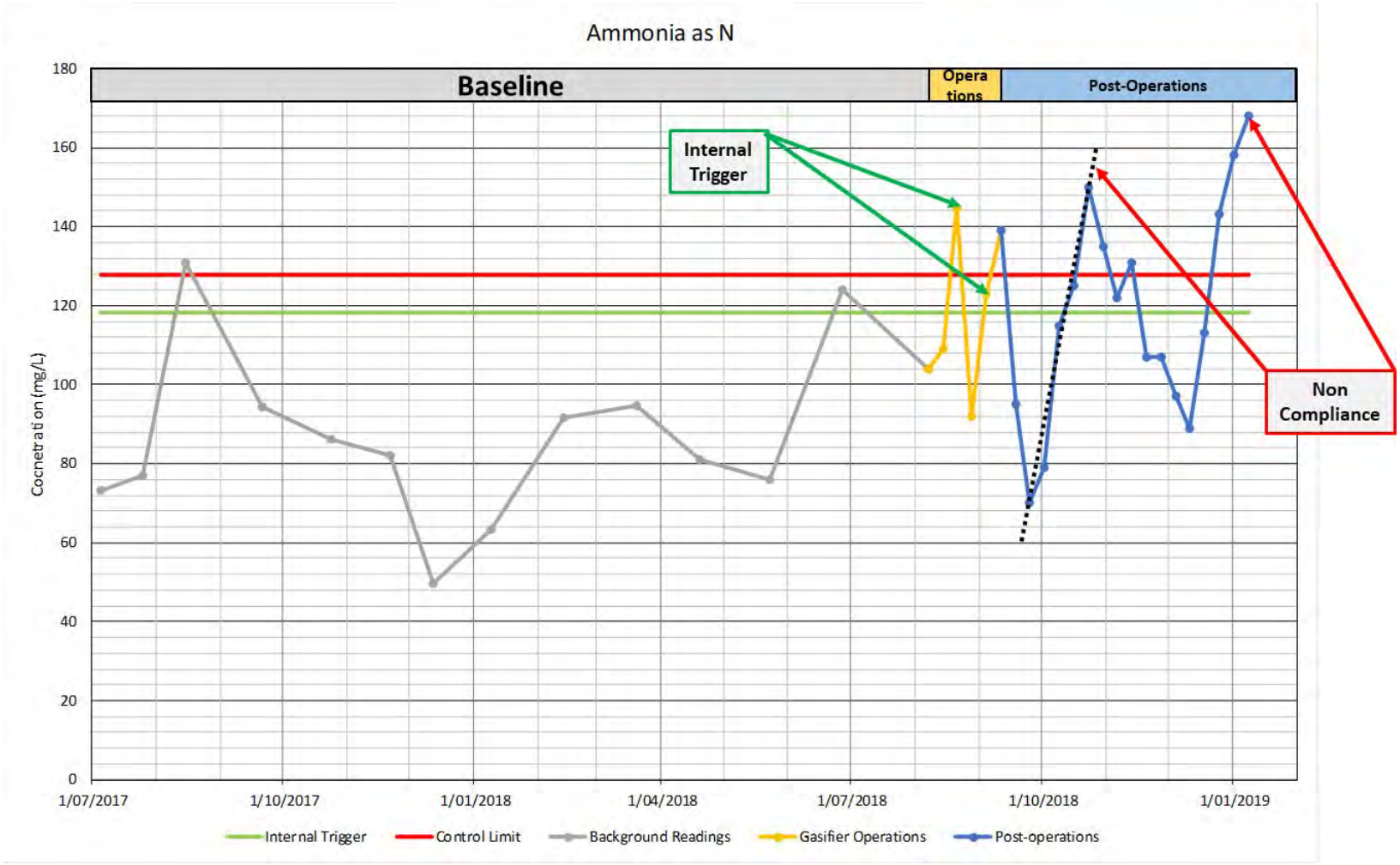

Figure 4-6: Graphical example of groundwater quality non-compliance assessment

Pressure and temperature non-compliance

The following non-compliance indicators have been adopted:

- Increasing trends in temperature in the VWPs, as determined through regression analysis.
- Outward pressure gradient from gasifier chamber to sentinel VWPs. This will be achieved by maintaining the pressure in the gasifier below 36 bar.

Non-compliance assessment will be undertaken on a regular basis, in accordance with the adopted reporting regime.

4.8 Contingency and Corrective Actions

Non-compliance regarding groundwater quality

Corrective actions will be implemented during and after the operation of the gasifier to ensure that any non-compliances with the groundwater assessment criteria are addressed prior to a sustained change to groundwater quality occurring at the gasifier buffer zone boundary.

With respect to a non-compliance regarding groundwater quality, the following corrective actions will be undertaken:

- Resample the relevant well(s) to confirm the results. Resampling is to be commenced within one week of identification of the non-compliance.
- If required, reduce the pressure in the gasifier chamber to induce inward pressure gradient.
- During operation of the gasifier:
    - Increase sampling frequency of relevant wells to weekly until non-compliance has been resolved.
    - Undertake fate and transport groundwater modelling to determine likelihood (and time frame) for non-compliance to occur at gasifier buffer zone boundary.
- After operation of the gasifier:
    - Increase the sampling frequency of relevant wells to monthly or weekly until the non-compliance has been resolved.
    - If non-compliance exists beyond the first 12 months of sampling:
        - Maintain monthly sampling frequency until non-compliance has been resolved.
        - Undertake fate and transport groundwater modelling to determine likelihood (and time frame) for non-compliance to occur at gasifier buffer zone boundary.
        - Develop a Remediation Action Plan to assess viability and effectiveness of potential groundwater remediation technologies/methods.
    - Install compliance monitoring wells in targeted formations and locations at gasifier buffer zone boundary.
    - If required, implement active/passive groundwater remediation.

Non-compliance regarding groundwater pressure

During and post gasifier operations, an inward pressure gradient (i.e. towards the gasifier chamber) will be maintained to ensure containment of ISG by-products. This will be achieved by maintaining the pressure in the gasifier below 36 bar. Real-time monitoring of pressure and temperature will be undertaken in the VWPs installed near the gasifier.

With respect to a non-compliance regarding pressure gradients, the following corrective actions will be undertaken:

- Lowering of the pressure in the gasifier chamber to induce inward pressure gradient.

4.9 Data Management and Analysis

4.9.1 Groundwater Pressure and Temperature

Real-time monitoring of pressure and temperature will be undertaken in the WWPs, with data reviewed and analysed by LCK's operators.

Six- or twelve-hour rolling averages will be provided to and displayed in the LCK offices. Weekly contour maps of pressure and temperature gradients will be prepared.

4.9.2 Groundwater Quality

Field Measurements

Records of field equipment calibration and water quality measurements will be entered onto datasheets and then transferred into the dedicated industry standard database.

Sampling and Analysis Data

All information relating to sampling events will be entered into the project database.

Analytical results will be imported directly into the database, without any need for manual transcription or manipulation during the import process. Analytical results will be processed and reviewed immediately upon receipt to verify completeness of sampling and analysis.

Data processing will include:

- Review of QA/QC results (both field QA/QC and laboratory QA/QC) to verify adequacy and useability of the data. Any anomalous data/results will be queried with the analytical laboratory and repeat analyses requested if necessary.
- Comparison of analysis results against control limits to identify potential non-compliances.
- Preparation of time series of control parameters to allow trend analysis

5 Soil Vapour Monitoring

5.1 Purpose and Objectives

The specific environmental objectives for the operation of the PCD facility, relevant to the soil vapour monitoring, and the associated assessment criteria are presented in **Table 5-1**.

Table 5-1: Soil Vapour-Related Environmental Objectives and Assessment Criteria

Environmental Objectives	Assessment Criteria
3. No loss of gasification products to the surface or subsurface environment via pre-existing drill holes and/or transmissive geological features.	Soil vapour monitoring indicates there has been no sustained change in levels of chemicals of potential concern (COPC) in soil vapour monitoring wells as a result of demonstration plant activities. No gas detected at the surface resulting from migration of gasification products from the gasifier.
Guide to How Objectives Can be Achieved	
All pre-existing drill holes mapped, and an exclusion zone of 100 m incorporated into delineating the gasifier location. 2D seismic undertaken and geological features mapped and an exclusion zone of 100 m from inferred faults incorporated into the gasifier location. Monitoring for COPC undertaken in soil vapour monitoring wells installed around gasifier and at selected surface locations. Personal gas detection / monitoring to indicate if dangerous levels of gas occur. Regular air quality and odour measurements undertaken throughout the project lifecycle.	

To achieve these objectives, the following sampling and monitoring will be undertaken:

- Soil vapour monitoring: Soil vapour monitoring wells have been installed in the PCD facility area (**Figure 5-1**) to enable sampling of gases in the sub-surface, initially to provide baseline information on gases that may be present naturally (baseline levels) pre-commissioning, and then during operation, and post-operation to provide information on whether there has been any migration of gases from the gasifier.
- Surface gas monitoring: monitoring of gas at the surface at the locations of the soil vapour monitoring wells.

5.2 Soil Vapour Monitoring Network

Soil vapour monitoring wells have been installed at the PCD facility to collect soil gases from the Telford Gravels. The soil vapour wells were installed in proximity of shallow groundwater monitoring wells.

Soil vapour monitoring wells were installed in two stages, as follows:

- December 2017: drilling and installation of wells SVMW01, SVMW09 and SVMW10. Sampling of wells SVMW01 and SVMW10 commenced in April 2018. Well SVMW09 was not sampled as the groundwater level was above the depth of the vapour probe. This well was decommissioned and replaced in June 2018.
- End-June 2018: drilling and installation of wells SVMW02, SVMW03, SVMW04, SVMW05, SVMW06, SVMW07_2.8, SVMW07_4.1, SVMW08, SVMW011. The depth of the soil vapour probes was determined on site and depended on the lithology encountered during the drilling of the shallow monitoring wells. A hard layer, comprising cemented sands and gravels, was observed at several

locations, at depths of approximately 3 to 4 mbgl. As this layer may act as a barrier against vertical vapour movement, it was decided to install soil vapour wells below and above this layer at selected locations.

Details of the wells are presented in **Table 5-2**, with locations shown on **Figure 5-1.** Construction details are provided in Appendix F.

Table 5-2: Details of soil vapour monitoring network

Well ID	Date installed	Easting	Northing	Lithology/Depth to Water [1]		Soil Vapour Well	
				'Hard layer' interval from-to (mbgl)	Depth to groundwater (mbgl)	Drill Depth (mbgl)	Implant depth (mbgl)
SVMW01	19/12/2017	249817.62	6625394.77	-	-	5.25	~5.0
SVMW02	30/06/2018	249796.94	6625289.10	4 - 5	4.06	3.2	~3.0
SVMW03	30/06/2018	249825.14	6625252.34	3 - 5	3.71	3.0	~2.6
SVMW04	29/06/2018	250103.96	6625058.32	3.3 - 3.5	5.29	4.0	~3.6
SVMW05	30/06/2018	250100.94	6625108.13	3.0 - 3.5	5.13	4.0	~3.7
SVMW06	29/06/2018	250139.30	6625059.38	3.3 - 3.8	4.84	3.0	~2.9
SVMW07_2.8[2]	29/06/2018	250149.35	6,625,081.27	3.3 – 4.0	4.61	3.0	~2.8
SVMW07_4.1[2]	29/06/2018	250150.35	6,625,082.27			4.5	~4.1
SVMW08	29/06/2018	250202.30	6625101.65	3.0 – 3.5	3.94	4.0	~3.7
SVMW09[3]	18/12/2017	250457.80	6625060.72	-	-	5.25	~5.0
SVMW10	19/12/2017	249919.70	6624852.71			5.4	~4.5
SVMW11[4]	26/06/2018	250451.80	6625061.72	Not observed	4.27	3.6	~2.9

Notes

(1): information from adjacent shallow groundwater monitoring well.

(2): a nested pair of vapour probes was installed at location SVMW07, i.e. probe SVMW07_2.8 at 2.8mbgl and SVMW07_4.1 at 4.1mbgl.

(3): well SVMW09 was decommissioned in June 2018, due to groundwater ingress.

(4): SVMW11 was installed as a replacement well for SVMW09.

Gas monitoring at the surface will be undertaken using a photoionisation device (PID) and landfill gas monitor at the above locations.

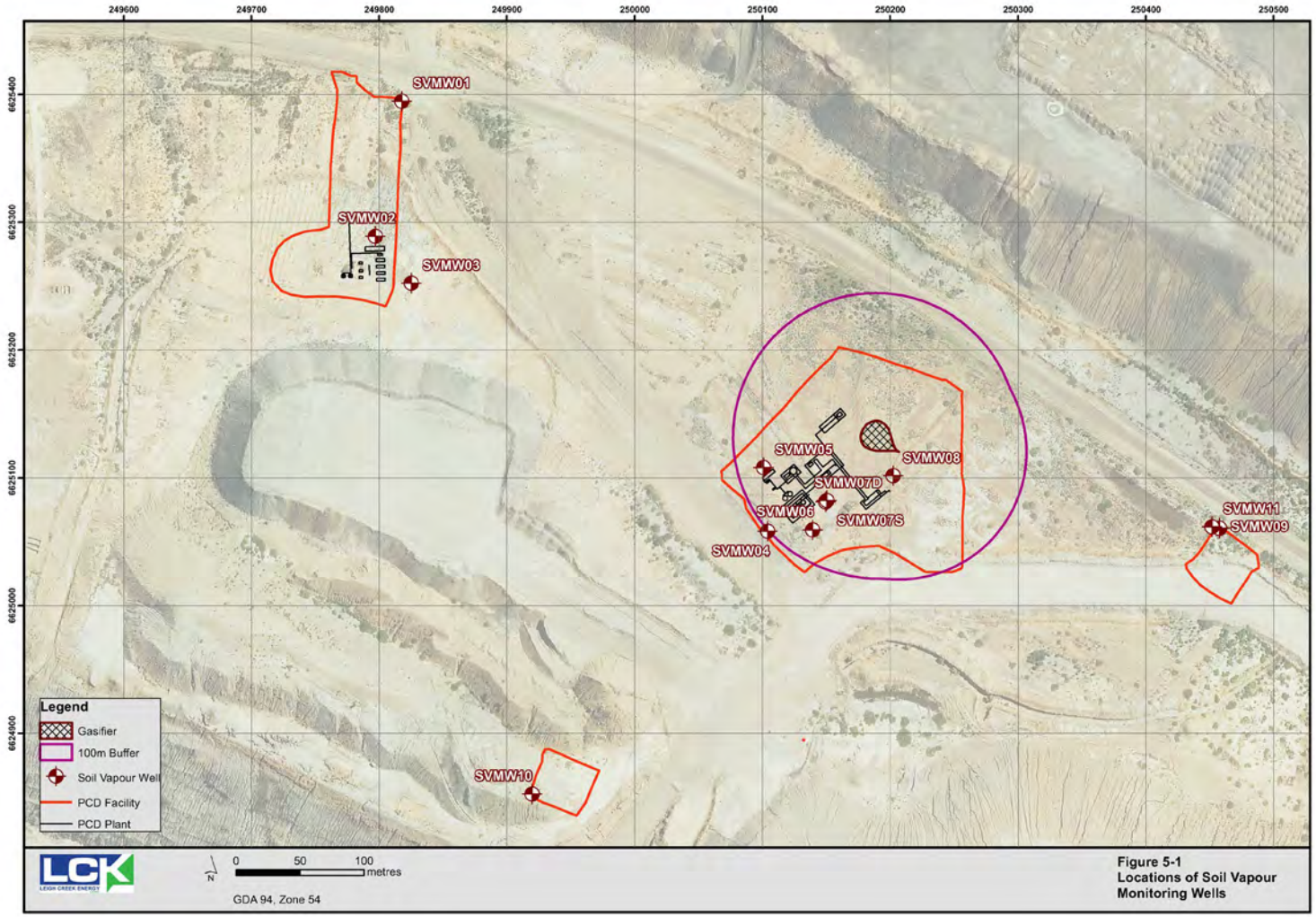

Figure 5-1: Locations of Soil Vapour Monitoring Wells

5.3 Well Installation and Development Methodology

The installation method was as follows:

- Each well was drilled using solid flight auger or rotary air drilling techniques to the target depth. The actual technique adopted depended on soil conditions encountered. The diameter of the borehole (augers) was approximately 115mm.
- Each soil vapour probe comprised a 0.17m long, 0.015m OD Geoprobe stainless steel implant (with woven stainless-steel mesh) installed to the selected depth and connected to 3/8" OD Teflon tubing extending to the ground surface.
- The implant was installed at the base of the borehole. The vapour point implant was surrounded by a discrete and lightly compacted clean washed sand pack (8/16 or 18/30 grade), finishing approximately 0.25m above and below the implant (i.e. borehole drilled to 5.25m, probe installed at 5m, sand pack to 4.75m).
- A bentonite plug was installed from the top of the sand pack to the surface to prevent atmospheric air and or gases entering the soil vapour point implant from the surface.
- The vapour points were completed with a standpipe extending approximately 0.7 to 1 m above ground level. The standpipes were concreted in place.

Each vapour point was checked following installation to ensure the integrity was appropriate. A hand held vacuum pump was used to confirm that vapour points were drawing air from the surrounding soil stratum.

A helium leak test was also conducted to ensure appropriate separation from the vapour point implant and the atmospheric air was achieved. The helium leak test comprised filling a shroud (which overlies the soil vapour point) with helium and measuring the concentration using a GasCheck 5000 handheld helium detector. Soil vapour was then drawn from the vapour point and a real-time helium concentration measured. The vapour point integrity was considered acceptable if the helium concentration in the soil vapours is less than 10% of helium concentration measured under the shroud.

The results of leak tests showed acceptable integrity with all measured helium concentrations in soil vapour points being measured as 0ppm, compared to the helium concentration in the shroud of "maximum" (expressed as $9x10^6$ ppm, or 100% by the GasCheck 5000 meter), for all wells except for SVMW03. A helium concentration of 100 ppm was measured in SVMW03; however, this concentration is still significantly less than 10% of the shroud concentration.

5.4 Soil Vapour Monitoring Well Sampling

Soil vapour sampling comprises the following steps, in accordance with industry-standard procedures and guidelines:

- Completion of a well integrity check.
- Purging a minimum of three dead volumes from within the screen implant, Teflon tubing and sand pack using a Landfill Gas Meter. The helium concentration within the shroud and the purged soil vapour is monitored continuously during the purging process using the Helium Meter.
- Screening the purged soil vapour in the field using a Landfill Gas Meter (i.e. a GA5000, for potential biodegradation parameters), a Photoionisation Detector (PID, for the presence of potential VOCs) and a Helium Meter (for the leak check to determine the integrity of the bore in regard to surface connection).

- Pressure checking the laboratory supplied 1.4 L Summa canister and sampling manifolds with an analogue pressure gauge prior to sampling.
- Connecting Teflon tubing from the well to the sampling manifold which is connected to the 1.4 L Silonite Mini-Can for sample collection. Each canister's flow controller will be laboratory calibrated to 12 mL/minute;
- Monitoring the Silonite Mini-Cans during sampling by using the dedicated analogue pressure gauge supplied by the laboratory to allow the sampler to stop sampling before the pressure within the canister reached zero "Hg".
- Following sampling, the vacuum within the Silonite Mini-Cans is recorded to allow for comparison with the vacuum of the canisters once received by the laboratory;
- One intra-laboratory field duplicate is collected from a specific well and analysed for the same analysis as its' primary sample. The intra-laboratory field duplicate and its' primary sample are collected simultaneously through splitting the extracted sample into two canisters;

The soil vapour samples are sent to ALS, a NATA accredited laboratory, in the laboratory supplied Silonite Mini-Cans for analysis. ALS is selected to undertake the soil vapour analysis due to their ability to provide sampling equipment more suited to the geological constraints of the Site (i.e. low soil vapour flow rate).

5.5 Soil Vapour Monitoring Results to Date

A summary of the soil vapour sampling events undertaken by LCK is presented in Table 5-3.

Table 5-3: Soil Vapour Sampling Events Undertaken by LCK

Year	2018		
Month	4	5	6
SVMW01	✓	✓	✓
SVMW02	-	-	✓
SVMW03	-	-	✓
SVMW04	-	-	✓
SVMW05	-	-	✓
SVMW06	-	-	✓
SVMW07_4.1	-	-	✓
SVMW08	-	-	✓
SVMW10	✓	✓	✓
SVMW11	-	-	✓

The results of the soil vapour monitoring are presented in Appendix G. To date, soil vapour samples have been analysed for a comprehensive suite, including:

- Volatile organic compounds (83 analytes)
- Petroleum hydrocarbon (C_6-C_9, C_{10}-C_{14})
- Total recoverable hydrocarbons (>C_{10} - C_{16} Fraction, >C_{10} - C_{16} Fraction minus Naphthalene (F2), C_6 - C_{10} Fraction, C_6 - C_{10} Fraction minus BTEX (F1)).

A summary of the analysis results is provided in **Table 5-4** and **Table 5-5**.

Table 5-4: Summary of Soil Vapour Analysis Results – Volatile Compounds

Analyte	No. samples	Min	Max	Method/Analyte	No. samples	Min	Max
1,1,1,2-Tetrachloroethane	10	<340	<340	cis-1,3-Dichloropropylene	14	<230	<230
1,1,1-Trichloroethane	14	<270	<270	Cyclohexane	14	<170	<170
1,1,2,2-Tetrachloroethane	14	<340	<340	Dibromochloromethane	14	<430	<430
1,1,2-Trichloroethane	14	<270	<270	Di-isopropyl Ether	10	<210	<210
1,1-Dichloroethane	14	<200	<200	Ethanol	10	<90	<90
1,1-Dichloroethene	14	<200	<200	Ethyl tert-Butyl Ether (ETBE)	10	<210	<210
1,2,4-Trichlorobenzene	14	<370	<370	Ethylacetate	14	<180	<180
1,2,4-Trimethylbenzene	14	<240	<240	Ethylbenzene	14	<220	<220
1,2-Dibromoethane (EDB)	14	<380	<380	Freon 11	14	<280	<280
1,2-Dichlorobenzene	14	<300	<300	Freon 113	14	<380	<380
1,2-Dichloroethane	14	<200	<200	Freon 114	14	<350	<350
1,2-Dichloropropane	14	<230	<230	Freon 12	14	<250	<250
1,3,5-Trimethylbenzene	14	<240	<240	Heptane	14	<200	<200
1,3-Butadiene	14	<110	<110	Hexachlorobutadiene	14	<530	<530
1,3-Dichlorobenzene	14	<300	<300	Isooctane	14	<230	<230
1,4-Dichlorobenzene	14	<300	<300	Isopropyl Alcohol	14	<120	<120
1,4-Dioxane	14	<180	<180	Isopropylbenzene	10	<250	<250
1-Chloro-2-propene (Allyl chloride)	14	<160	<160	meta- & para-Xylene	14	<430	542
2-Butanone (MEK)	14	<150	<150	Methyl Methacrylate	10	<210	<210
2-Chloro-1,3-butadiene	10	<180	<180	Methyl tert-Butyl Ether (MTBE)	14	<180	<180
2-Chlorotoluene	10	<260	<260	Methylene chloride	14	<170	<170
2-Hexanone (MBK)	14	<200	<200	Naphthalene	10	<100	<100
2-isopropyltoluene	10	<270	<270	n-Butylbenzene	10	<270	<270
2-Propanone (Acetone)	14	<120	130	n-Hexane	14	<180	<180
4-Ethyltoluene	14	<240	<240	n-Propylbenzene	10	<250	<250
4-Methyl-2-pentanone (MIBK)	14	<200	<200	ortho-Xylene	14	<220	<220
Acetonitrile	10	<80	<80	Propene	14	<90	356
Acrolein	10	<110	<110	sec-Butylbenzene	10	<270	<270
Acrylonitrile	10	<110	<110	Styrene	14	<210	<210
Benzene	14	<100	<100	tert-Amyl Methyl Ether (TAME)	10	<210	<210
Benzyl Chloride	14	<260	<260	tert-Butyl alcohol (TBA)	10	<150	<150
Bromodichloromethane	14	<340	<340	tert-Butylbenzene	10	<270	<270
Bromoform	14	<520	<520	Tetrachloroethene	14	<340	<340
Bromomethane	14	<190	<190	Tetrahydrofuran	14	<150	<150
Carbon disulfide	14	<160	<160	Toluene	14	<190	723
Carbon Tetrachloride	14	<310	<310	trans-1,2-Dichloroethene	14	<650	<650
Chlorobenzene	14	<230	<230	trans-1,3-Dichloropropylene	14	<200	<200
Chloroethane	14	<130	<130	Trichloroethylene (TCE)	14	<230	<230
Chloroform	14	<240	<240	Vinyl Acetate	14	<5	<5.4
Chloromethane	14	<100	<100	Vinyl bromide	14	<180	<180
cis-1,2-Dichloroethene	14	<20	<20	Vinyl chloride	14	<220	<220

Note: analysis units are µg/m³

Table 5-5: Summary of Soil Vapour Analysis Results – Hydrocarbons

Analyte	No. Samples	Minimum	Maximum
Petroleum Hydrocarbons in Gaseous Samples (µg/m³)			
C10 - C14 Fraction	14	<35	<35
C6 - C9 Fraction	14	<20	<20

Analyte	No. Samples	Minimum	Maximum
Total Recoverable Hydrocarbons - NEPM 2013			
>C10 - C16 Fraction	14	<40	<40
>C10 - C16 Fraction minus Naphthalene (F2)	14	<40	<40
C6 - C10 Fraction	14	<20	<20
C6 - C10 Fraction minus BTEX (F1)	14	<20	<20

Note: analysis units are mg/m³

Concentrations above the laboratory's Limit of Reporting are presented in **Table 5-6**.

Table 5-6: Soil Vapour Analysis Results above Limit of Reporting

Well ID	Sample Date/Time	Analyte	LOR	Analysis Result	Analysis Unit
SVMW03	02/07/2018 09:31	2-Propanone (Acetone)	120	130	µg/m³
SVMW05	02/07/2018 14:28	Toluene	190	318	µg/m³
SVMW07D	02/07/2018 12:41	meta- & para-Xylene	430	542	µg/m³
SVMW07D	02/07/2018 12:41	Toluene	190	723	µg/m³
SVMW11	02/07/2018 16:32	Propene	90	356	µg/m³

It is not yet known if the exceedances above the LOR are representative of soil vapour within the Telford Gravels or if they are an anomaly. The soil vapour analysis results of the July 2018 sampling event will provide clarity around this issue.

5.6 Monitoring Parameters, Frequency and Duration

Monitoring Parameters

Samples will be submitted for analysis of TO15 VOCs (83 analytes) and general gases (i.e. oxygen, carbon dioxide, carbon monoxide, hydrogen, helium, methane, ethane, ethene, propane and butane). Detailed analysis list is provided in **Appendix G**.

Monitoring Frequency

Planned soil vapour-related monitoring and data collection frequency is summarised in **Table 5-7**.

Table 5-7: Soil Vapour Monitoring Frequency during PCD Lifecycle

Parameter	Frequency during Project Lifecycle Stage					
	Base-line	Pre- Commissioning	Operation	Post- Operation		
				0-12	12-24	24-36
Soil vapour	✓	monthly	monthly	monthly	quarterly	six-monthly
Surface gas monitoring	-	monthly	monthly	monthly	quarterly	six-monthly

The proposed sampling frequency could change as part of the proposed corrective actions to be implemented when non-compliances are observed, as explained below. The monitoring requirements will be reviewed after three years, and any proposed amendments discussed with the relevant SA Government Agencies, prior to implementation.

5.7 Non-Compliance Control Parameters, Control Limits and Non-Compliance Indicators

5.7.1 Introduction

To assess compliance with soil vapour-related assessment criterion specified in the SEO, appropriate non-compliance criteria or control limits need to be determined. As stated previously, the soil vapour-related assessment criterion is that:

- Soil vapour monitoring indicates there has been no sustained change in levels of chemicals of potential concern (COPC) in soil vapour monitoring wells as a result of demonstration plant activities.
- No gas detected at the surface resulting from migration of gasification products from the gasifier.

5.7.2 Control Parameters and Limits

Control parameters

The results of the soil vapour monitoring are presented in Appendix G. To date, soil vapour samples have been analysed for a comprehensive suite, including:

- Volatile organic compounds (83 analytes)
- Petroleum hydrocarbon (C_6-C_9, C_{10}-C_{14})
- Total recoverable hydrocarbons (>C_{10} - C_{16} Fraction, >C_{10} - C_{16} Fraction minus Naphthalene (F2), C_6 - C_{10} Fraction, C_6 - C_{10} Fraction minus BTEX (F1)).

Going forward, the analysis suite will be expanded to include general gases:

- oxygen, carbon dioxide, carbon monoxide, hydrogen, helium
- methane, ethane, ethene, propane and butane.

The list of control parameters will be reviewed once samples can be obtained from the syngas generated during the PCD operations.

Control limits

Control limits are concentration thresholds which indicate whether the operation of the PCD facility has created a sustained change in levels of chemicals of potential concern (COPC) in soil vapour monitoring wells.

Control limits are normally based on statistical analysis of background data, such as upper confidence limits (UCLs), percentiles, control charts, etc. However, there is not yet a comprehensive set of background data to undertake statistical analysis.

Therefore, the following control limits are adopted:

- Detection limits of background COPCs.
- Trend analysis of soil vapour concentrations to determine whether concentrations are increasing.

5.8 Non-compliance indicators

The following non-compliance indicators have been adopted:

- Increasing trends in control parameter concentrations at the soil vapour wells. An increasing trend is defined as an increase over a minimum of three successive sampling events, based on linear regression analysis of the data.
- Gas detected at the surface resulting from migration of gasification products from the gasifier (refer

section 5.6.2).

- Three consecutive exceedances (on a monthly basis) of the control limits of any control parameter in any of the soil vapour wells.

5.9 Contingency and Corrective Actions

Corrective actions will be implemented during and after the operation of the gasifier to ensure that any non-compliances with the soil vapour assessment criteria are addressed prior to a sustainable change occurring.

With respect to a non-compliance regarding soil vapour, the following corrective actions will be undertaken:

- Resample the relevant well(s) to confirm the results.
- During operation of the gasifier:
    - Increase sampling frequency of relevant wells to weekly until non-compliance has been resolved.
    - Undertake more detailed site assessment (including installation of additional monitoring wells) to determine transport mechanisms and exposure pathway from gasifier to the surface.
    - Undertake qualitative and/or quantitative risk assessment, as appropriate for the potential receptors.
- After operation of the gasifier:
    - Increase the sampling frequency of relevant wells to monthly or weekly until the non-compliance has been resolved.
    - If non-compliance exists beyond the first 12 months of sampling:
        - Maintain monthly sampling frequency until non-compliance has been resolved.
    - Undertake qualitative and/or quantitative risk assessment, as appropriate for the potential receptors.
        - Develop a Remediation Action Plan to assess viability and effectiveness of potential soil vapour remediation technologies/methods.
    - If required, implement active/passive soil vapour remediation.

6 Reporting and Notification

6.1 Internal reporting

Internal reporting will comprise the following:

- Weekly reports on pressures and temperatures measured in the VWPs, including pressure gradient maps.
- Monthly reports on groundwater and soil vapour monitoring and sampling, including:
  - field water quality measurements
  - groundwater level time series and gradient maps
  - sample analysis results, with comparison against control limits
  - time series graphs for trend analysis
  - identification of non-compliances

6.2 Regulatory Reporting

External, regulatory reporting will be carried out in accordance with *Petroleum and Geothermal Energy Act* 2000 requirements and the SEO.

It is a requirement under Section 85 of the *Petroleum and Geothermal Energy Act* that 'serious' and 'reportable' incidents must be reported to the Minister.

Serious Incidents must be reported as soon as practicable after the occurrence, as per Section 85 of the Act and Regulation 32 of the Regulations.

Reportable Incidents must be reported on a quarterly basis within 1 month of the end of the quarter, as per Regulation 32 of the Regulations.

6.2.1 Incident Definitions

In accordance with Section 85 of the Act and Regulation 32(1):

Serious incident means an incident arising from activities conducted under the licence in which:

(a) a person is seriously injured or killed; or

(b) an imminent risk to public health or safety arises; or

(c) serious environmental damage occurs, or an imminent risk of serious environmental damage arises; or

(d) security of natural gas supply is prejudiced or an imminent risk of prejudice to security of natural gas supply arises.

(e) some other event or circumstance occurs or arises that results in the incident falling within a classification of serious incidents under the regulations or a relevant statement of environmental objectives.

Reportable incident is defined in Section 85(1) of the Act as incidents (other than a serious incident) arising from activities conducted under a licence that are classified under the Regulations as a reportable incident. Regulation 32(1) classifies the following as reportable incidents:

(a) an escape of petroleum, a processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape; and

(b) an incident identified as a reportable incident under the relevant statement of environmental objectives.

Table 6-1 identifies the potential serious and reportable incidents relevant to production activities.

Table 6-1: Potential Serious and Reportable Incidents

Serious Incidents
1. A person is seriously injured or killed. 2. An imminent risk to public health or safety arises. 3. Loss of containment of the gasifier is detected (e.g. via sustained change from background water quality in sentinel monitoring wells or sustained change in levels of COPC in soil vapour monitoring wells). 4. Gasifier induced subsidence is measured at the ground surface. 5. Serious environmental damage occurs, or an imminent risk of serious environmental damage arises. For example: • Damage, disturbance or interference to sites of cultural and / or heritage significance without appropriate permits and approvals. • An escape of petroleum, process substance, a chemical or a fuel to a water body, or to land in a place where it is reasonably likely to enter a water body by seepage or infiltration, or onto land that affects the health of native flora and fauna species. • Identification of uncontrolled flows to the surface. • Any well incident or failure that threatens or poses an imminent risk to safety or a risk of serious damage to environmental values. • Detection of a declared weed, animal / plant pathogen or plant pest species that has been introduced or spread as a direct result of activities. • Any removal of rare, vulnerable or endangered flora and fauna or threatened ecological communities without appropriate permits and approvals. 6. An event that results in a rupture of a pressure containing asset or facility. 7. A regulated activity being undertaken in manner that involved or will involve a serious risk to the health or safety of a person emanating from an immediate or imminent exposure to a hazard. 8. An uncontrolled gas release resulting in the activation of emergency response and / or evacuation procedures of an area in or adjacent to the gas release, and / or fire or explosion.
Reportable Incidents
1. An escape of petroleum, processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape15 (other than a serious incident). 2. Any event where an incursion outside a culturally cleared area has occurred or the conditions of a cultural heritage clearance have not been complied with (other than a serious incident). 3. An event that has the potential to compromise the physical integrity of an asset or facility. For example: • Identification of a through-wall defect on a pipeline16 or plant component (other than a serious incident). 4. Malfunction or failure of critical plant or equipment that had (or still has) potential to cause a serious incident.

6.2.2 Reporting on Demonstration Plan Operational Matters

LCK will provide weekly progress reports to DPC-ERD during the operation of the demonstration plant. These reports will include details on the testing schedule undertaken during the week and the gasifier performance such as temperature, pressure and flow in the inlet and outlet wells and syngas chemical composition.

Notification will also be provided where relevant for the following non-routine operational matters. These matters will generally not fall into the reportable incident classification; the notification is intended to keep DPC-ERD informed on the demonstration plant operations.

Operational matters where notification will be provided to DPC-ERD will include:

- thermal oxidiser off-line for unscheduled extended period
- cold vent on-line for unscheduled extended period

- unexpected and sustained changes in groundwater pressure in vibrating wire piezometer wells surrounding the gasifier chamber
- unexpected and sustained changes in groundwater monitoring data (which will allow DPC-ERD and LCK to agree upon any further monitoring requirements to determine whether a 'sustained change' to groundwater quality has resulted)
- unexpected and sustained changes in soil vapour monitoring data (which will allow DPC-ERD and LCK to agree upon any further monitoring requirements to determine whether a 'sustained change' to soil vapour quality has resulted)
- deviations from standard process parameters (i.e. cavity pressure above groundwater pressure) that could lead to outward migration of COPC from the gasifier
- reasonable complaints from directly affected stakeholders.

Venting events and thermal oxidiser outages would be notified as soon as practicable. Other matters would be notified within one week.

LCK will also provide a closure report to DPC-ERD summarising performance of the demonstration including syngas composition, flowrates, temperature and pressures, and environmental monitoring including air quality, groundwater, surface water, soil and soil vapour.

Groundwater and soil vapour monitoring and sampling data will be made available to government representatives from the South Australian Department of the Premier and Cabinet at any time upon request.

6.2.3 Reporting on EPA

Where applicable, incidents causing or threatening serious or material environmental harm under the *Environment Protection Act 1993* must be reported to the EPA in accordance with section 83 of the *Environment Protection Act 1993*.

The reporting obligation under the Environment Protection Act does not apply to:

- petroleum exploration activity undertaken under the Petroleum and Geothermal Energy Act; or
- wastes produced in the course of an activity (not being a prescribed activity of environmental significance) authorised by a licence under the Petroleum and Geothermal Energy Act when produced and disposed of to land and contained within the area of the licence.

6.2.4 Annual Reporting

Annual reports will be provided to DPC are per the requirements of the licence conditions. Annual reports will include:

- Raw groundwater results (physical and chemical data) from all monitoring wells.
- Raw soil vapour results
- Full details of any non-compliance, including follow-up investigations and/or corrective actions undertaken.
- Interpretation of the data, including quality of groundwater/soil vapour with respect to background data
- Review of compliance with the hydrogeological conceptual model

- Data relating to groundwater pressures and temperatures, and pressure gradients
- Conclusions and recommendations with respect to effectiveness of the groundwater and soil vapour monitoring program.
- Details on any changes to the monitoring program methodology and scope of works.

7 Sampling and Analysis Quality Plan

7.1 Sample labelling, storage and transport and documentation

All samples will be clearly labelled with unique sample identification numbers consisting of the date/time, sample location, depth of sample and sampler's initials. In the case of field duplicates and triplicates, sample containers will be labelled so as to not reveal their purpose or sample location to the laboratory. All samples will be kept chilled in an ice-filled esky or dedicated site refrigerator prior to dispatch to the NATA registered laboratory under chain of custody procedures.

All samples collected will be stored at the laboratory (3 months for metals [28 days for mercury] or 14 days for organics) and could potentially be selected for analysis if further assessment of identified contamination is required.

7.2 Analytical laboratories and methods

Analytical laboratories

Primary, intra-laboratory duplicate, inter-laboratory duplicate and rinsate and trip blank samples will be submitted to ALS Environmental laboratory (as primary laboratory) an eurofins|mgt (as secondary laboratory). The selected laboratories are National Association of Testing Authorities (NATA) certified for the analysis required.

Analytical methods

Laboratory analysis will be conducted in accordance with the requirements of NEPM and are referenced to USEPA and APHA methods.

7.3 Data Quality Objectives and QA/QC Plan

Data Quality Objectives (DQOs)

The ASC NEPM (NEPC, 2013) specifies that the nature and quality of the data produced in an investigation will be determined by the DQOs. As referenced by the NEPM, the DQO process is detailed in the United States Environmental Protection Agency (US EPA) *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4: EPA/240/B-06/001)*, February 2006 (USEPA, February 2006).

The US EPA defines the process as 'a strategic planning approach based on the Scientific Method that is used to prepare for a data collection activity and comprises seven steps (refer Table 7-2). It provides a systematic procedure for defining the criteria that a data collection design should satisfy, including when to collect samples, where to collect samples, the tolerable level of decision errors for the study, and how many samples to collect'.

Details on the adopted DQOs will be provided in the monthly monitoring reports.

Table 7-1: The seven steps in defining DQOs

Step	Data Quality Objective
1	State the problem: Define the problem to be addressed, identify the planning team, and examine budget and schedule.
2	Identify the decision/goal of the study: Outline the decision, the study question and alternative actions.

Step	Data Quality Objective
3	Identify the information inputs: Present parameters and inputs for decision, including information sources, basis for trigger / guideline levels, sampling and analysis methodology, etc.
4	Define the boundaries of the study: Present spatial and temporal limits for study, sample characteristics and decision-making units.
5	Develop the analytical approach: Define a statistical parameter, specify trigger / guideline levels and develop argument for action.
6	Specify performance or acceptance criteria: Set acceptable limits for decision errors relative to potential consequences such as health, budget, social or environmental impacts.
7	Develop a plan for obtaining data: Develop an effective sampling and analysis plan that meets resources and performance criteria.

7.4 QA/QC Plan

The field and laboratory quality assurance and quality control plan to be adopted for the investigation needs to be designed to achieve pre-determined data quality indicators (DQIs) that will demonstrate that the precision, accuracy, representativeness, completeness and comparability of the data set and that the data set is of acceptable quality to meet the objectives of the investigations.

Analytical data validation is the process of assessing whether data are in compliance with method requirements and project specifications. The primary objectives of this process are to ensure that data of known quality are reported, and to identify if the data can be used to fulfil the overall project objectives.

The data validation guidelines are based upon data validation guidance documents published by the United States Environmental Protection Agency (USEPA, February 2006) and the ASC NEPM (NEPC, 2013). The process involves the checking of analytical procedure compliance and an assessment of the accuracy and precision of analytical data from a range QA/QC measures, generated from both the sampling and analytical programs.

Specific elements that have been checked and assessed for this project include:

- frequency of conducting quality control measurements
- field QA/QC, including:
    - record keeping, sample collection and labelling, Chain of Custody procedures, sample storage and transport and decontamination procedures
    - rinsate blank results
    - intra- and inter-laboratory field duplicates
    - trip blank samples
    - field blank samples.
- the occurrence of apparently unusual or anomalous results, e.g. laboratory results that appear to be inconsistent with field observations or measurements.

Field QA/QC

The field quality assurance procedures to be adopted and the field quality control samples to be collected during the investigation and the corresponding acceptable control limits are presented in the table below.

Table 7-2: Field QA/QC DQIs

Data type	Comments and acceptable control limits
Field personnel	Use appropriately trained field personnel.
Field data collection	Site conditions and sample locations properly described
Sample handling (storage and transport)	Soil vapour and water samples will be collected into the sample jars, bottles and canisters supplied by the selected analytical laboratory. The filled jars and bottles will be stored on ice in a chilled, insulated container until received by the analysing laboratory. Sample numbers, dates, preservation and analytical requirements will be recorded on Chain of Custody (COC) documentation, which will also be delivered to the analytical laboratory. All samples are required to be documented as received by the laboratory chilled and intact.
Calibration of Field Equipment	The water quality meter will be calibrated against known standards, as supplied by the manufacturer, at the start of each day of groundwater sampling. Calibration records will be kept for inclusion in the report on the investigation.
Field duplicates (Intra-laboratory) Field triplicates (Inter-laboratory)	Intra-laboratory duplicates will be collected and analysed at a rate of 1 in every 20 primary samples, with a minimum of one duplicate analysed per batch. Inter-laboratory duplicates will be collected and analysed at a rate of 1 in every 20 primary samples, with a minimum of one duplicate analysed per batch. RPDs to be less than 50% for inorganic and organic analyses
Rinsate Blanks	Rinsate blank samples (from an item of sampling equipment) will be collected and analysed at a rate of one per day of sampling. Concentrations of analytes to be less than the laboratory detection limits.
Trip blanks Trip Spikes	Laboratory prepared trip blanks and trip spikes will be used and analysed at a rate of one per sample batch. Concentrations of analytes to be less than the laboratory detection limits.

Laboratory QA/QC

The laboratory quality assurance procedures to be adopted, the internal laboratory quality control samples to be analysed and the corresponding acceptable control limits are presented in the table below.

Table 7-3: Laboratory QA/QC DQIs

Data type	Comments and acceptable control limits
Sample Analysis	All sample analyses to be conducted using NATA certified laboratories which will implement a quality control plan in accordance with ASC NEPM.
Holding times	Maximum acceptable sample holding times: Groundwater/surface water: 14 days for organic analyses and 6 months for inorganic analyses (28 days for mercury)
Laboratory detection limits	All laboratory detection limits to be less than the control limits.
Laboratory Blanks	Laboratory blanks to be analysed at a rate of 1 in 20, with a minimum of one analysed per batch. Concentration of analytes to be less than the laboratory detection limits.
Laboratory Duplicates	Laboratory duplicates to be analysed at a rate of 1 in 20, with a minimum of one analysed per batch. RPDs to be less than 50%.
Laboratory Control Samples (LCS)	LCSs to be analysed at a rate of 1 in 20, with a minimum of one analysed per analytical batch. Control limits: 70 to 130 % Acceptable Recovery
Surrogates	Surrogate compound concentrations will be required to be spiked at similar concentration to sample results, at a rate of 1 in 20. Control limits: 70% to 130% Acceptable recovery.
Matrix spikes	Matrix spikes matrix spike duplicate prepared by dividing a field sample into two aliquots, then spiking each with identical concentrations of the analytes at a rate of 1 in 20. Matrix spike control limits: 70–130 % Acceptable recovery. Lower recoveries may be acceptable for OCPs, OPPs, PCBs and phenols and will be assessed according to USEPA protocols. Matrix spike duplicates: RPDs <50%

7.5 Data quality indicators

A summary of the data quality indicators (DQIs) and the corresponding measures to be applied for the investigation are presented in **Table 7-4**.

Table 7-4: Project Data Quality Indicators and Acceptance/Validation Criteria

Field DQIs and Acceptance Criteria	Lab Data Quality Indicator	Acceptance/Validation Criteria
Completeness		
• All critical locations sampled • All required samples collected • Standard Operating Procedures (SOPs) appropriate and complied with • Experienced sampler • Documentation correct	• All critical samples analysed, and all analytes analysed according to SAQP • Appropriate methods • Appropriate limits of reporting (LORs) • Sample documentation complete • Sample holding times complied with	As per ASC NEPM < nominated criteria As per ASC NEPM All LORs < nominated criteria
Comparability		
• Sampling SOPs used on each occasion • Experienced sampler used • Same types of samples collected	• Same analytical methods used between events and laboratories • Sample LORs (justify/quantify if different) same • Same laboratories (NATA accredited) used	As per ASC NEPM < nominated criteria
Representativeness		
• Appropriate media sampled according to project SAQP and/or objectives • Limit of Reporting: Less than applicable water assessment criteria	• All samples analysed to meet project SAQP and/or objectives	
Precision		
Collection of: • Field intra-laboratory duplicate samples at ratio of 1 per 20 primary samples • Sample Holding Time: Less than method holding/extraction time	Analysis of: • Field intra-laboratory duplicate samples (1 in 10 samples) • Laboratory duplicate samples	RPD less than ± 30 to 50%
Accuracy		
• SOPs appropriate and complied with • Trip blanks (1 per batch file, when analysing VOCs)	Intra laboratory field duplicates [(1) (3)]	RPD less than ± 30 to 50%
	Laboratory Duplicates [(2) (3)]	RPDs less than: 20% for high level laboratory duplicates (i.e. >20 x LOR)

Field DQIs and Acceptance Criteria	Lab Data Quality Indicator	Acceptance/Validation Criteria
		50% for medium level laboratory duplicates (i.e. 10 to 20 x LOR)
	Matrix Spikes (3) (4)	Recoveries between 70%-130% of the theoretical recovery
	Method Blanks	Less than the laboratory LOR
	Laboratory Control Samples (5)	Recoveries between 70%-130%
	Surrogate Spikes	See note 6

Notes:

1. Potential exceptions to this criterion may occur where sample variation or heterogeneity, rather than poor laboratory performance, is accountable for the poor reproducibility, or where the results are close to the LOR. This typical RPD range is obtained from AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil.

2. If the results are close to the LOR, then higher results will be accepted.

3. Criteria for sample duplicate and matrix spike results assume no sample heterogeneity. If samples are found to be heterogeneous with respect to a particular analyte the above criteria do not apply.

4. Assumes that samples are homogeneous and the background analyte level is less than 20% of the spike level (refer to USEPA Method 8000B). Note that there is no requirement for matrix spikes to pass as certain matrices may preclude recovery of spiked compounds. In this case, data will be accepted if LCS data meets the acceptance criteria.

5.80% of the compounds tested must fall within the control limits. Control limits are dynamic and vary for individual tests as per USEPA Method 8000B.

6. Recoveries for surrogates are test dependent and are based on USEPA Method SW846. Control limits are dynamic and vary for individual tests but are within the criteria described in USEPA Method SW846.

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9 Abbreviations and Glossary

Table 9-1 presents a list of abbreviations and a glossary of key terms used in this GSVMP.

Table 9-1: Glossary and List of Abbreviations

Term	Definition
Aquifer	A geological formation or group of formations; able to receive, store and transmit significant quantities of water. Source: Bureau of Meteorology "*Australian Water Information Dictionary*" (http://www.bom.gov.au/water/awid/index.shtml)
Aquitard	A geological formation that may contain groundwater but is not capable of transmitting significant quantities of it under normal hydraulic gradients. May function as a confining bed. Source: Bureau of Meteorology "*Australian Water Information Dictionary*" (http://www.bom.gov.au/water/awid/index.shtml
BOM	Bureau of Meteorology.
BTEX	Refers to the chemicals Benzene, Toluene, Ethylbenzene and Xylene.
Contamination	Contamination means the condition of land or water where any chemical substance or waste has been added as a direct or indirect result of human activity at above background level and represents, or potentially represents, an adverse health or environmental impact.
COPC	Chemical(s) of potential concern. Chemicals with the potential (depending on background levels, where they are located and potential receptors) to have adverse impacts on human health or the environment.
DEE	Department of Environment and Energy.
DEH	Department of Environment and Heritage (SA) (now DEW).
DEW	Department for Environment and Water (SA).
DEWNR	Department of Environment, Water and Natural Resources (SA).
DPC	Department of Premier and Cabinet.
DSD	Department of State Development.
EIR	Environmental Impact Report.
EMP	Environmental Management Plan.
EPA	Environment Protection Authority (SA).
Formation	The term for the primary unit in stratigraphy consisting of a succession of strata useful for mapping or description, which possesses certain distinctive lithologic and other features.
Gasification	Process that converts coal into gas, principally carbon dioxide, hydrogen and carbon monoxide.
Gasifier chamber	The void that is formed underground in the coal seam following consumption of coal in the ISG process.

Term	Definition
Groundwater	Subsurface water in soils and geological formations that are fully saturated. Source: Bureau of Meteorology "*Australian Water Information Dictionary*" (http://www.bom.gov.au/water/awid/index.shtml
Hydraulic head	Measurement of groundwater pressure above a height datum, expressed in units of length.
IESC	Independent Expert Scientific Committee (on Coal Seam Gas and Large Coal Mining Development).
Independent Scientific Panel	Independent Scientific Panel for Underground Coal Gasification, established in Queensland in 2013 to review and report on outcomes of UCG trial activities in Queensland.
Inlet well	The well that is used to inject oxidant into the gasifier.
ISG	In situ gasification. In situ (underground) conversion of coal into an energy-rich product gas.
LCEP	Leigh Creek Energy Project.
LCK	Leigh Creek Energy Limited
LOR	Limit of Reporting
NEPM	National Environment Protection (Assessment of Site Contamination) Measure (1999), amended in 2013
Outlet well	The well that is used to bring the target liquid or gas to the surface.
Outward pressure gradient	A situation where pressure is higher on the inside than the outside.
Overburden	Rock or soil overlying a mineral deposit which would need to be removed for the deposit to be mined.
PAH	Polycyclic Aromatic Hydrocarbon.
PCB	Polychlorinated Biphenyl.
PCD	Pre-Commercial Demonstration
PEL	Petroleum Exploration Licence.
PELA	Petroleum Exploration Licence Application.
Piezometer	A pipe in which the elevation of the water level or potentiometric surface can be determined. The pipe is sealed along its length and open to water flow at the bottom. **Source**: *Minimum Construction Requirements for Water Bores in Australia. Third Edition 2012*. National Uniform Drillers Licensing Committee, National Water Commission. 2012 (National Water Commission, 2012)
Produced water	In conventional oil and gas, refers to water from an underground formation that is brought to the surface during petroleum exploration and production. In the ISG process, produced water is used to refer to any water that flows to the surface through the outlet well. For the demonstration plant, this water is predominantly water that has been injected from the surface.
Pyrolysis	The breaking of large organic molecules into smaller parts due to heat. Occurs when coal is heated in the absence of oxygen.

Term	Definition
Receptor	A person, animal, plant, ecosystem, property or water with the potential to be adversely affected or impacted by an activity
SEO	Statement of Environmental Objectives.
Soil Vapour	Gas which is held within the pore space or structure within rocks and sediments
Syngas	Synthesis gas. The product of gasification composed mainly of carbon dioxide, hydrogen, carbon monoxide, methane, nitrogen, steam and gaseous hydrocarbons.
Thermal oxidiser	A process unit for air pollution control to remove hazardous gases from industrial air streams by destroying them using high temperature.
UCG	Underground coal gasification. UCG is equivalent to ISG.

Appendix A Historical Groundwater Quality Data

Table A-1: Groundwater quality analysis (after Dames & Moore, 1984)

TABLE 5 - CHEMICAL ANALYSES OF GROUNDWATER

WELL NO	9040W	9050W	9061P	9062P	9063P	9064P	9065P	9081P	9082P	9904P	9907P	SUMP	SUMP	8130C
MINING BLOCK	U25	U27	U25	U25	U25	U25	U25	U27	U27	U26	U23	U25	M7	M12
AQUIFER	1/2	1/2	1	2A	2B	3	4 SURFICIAL	3	3^1	4	1	SURFICIAL	SURFICIAL	BASEMENT
T.D.S.	14165	14610	16020	14350	12996	13250	8120	18280	20495	10735	9985	2500	13290	34380
CONDUCTIVITY (micro-mhos/cm @ 25°C)	19691*	16815*	22500	21500	19000	17000	13000	22880	28520	26890	13500	3960	17915	40800
pH	7.7*	7.8*	6.2	6.8	7.2	7.4	8.5	6.1	7.1	7.4	7.5	8.1	7.6	7.2
TOTAL HARDNESS (as Ca C03)	2788	2833	3266	2369	2017	1668	1157	4398	3795	2734	1563	569	2091	7322
Ca^{++}	515	525	655	462	345	333	221	810	707	593	286	147	440	1333
Mg^{++}	365	370	388	289	275	199	144	565	483	298	202	48	236	950
Na^{+}	4220	4380	4444	4310	3910	3553	2561	5057	5682	3987	3188	726	3929	9500
K^{+}	22	25	46	53	58	52	56	52	250	40	35	20	44	150
Cl^{-}	6269	6478	7464	6129	5522	4673	3702	7888	9354	6189	4369	1214	5704	15778
$SO4^{--}$	2620	2680	2542	2869	2450	2611	1837	3595	3071	2053	1984	311	2804	4367
$HCO3^{-}$	311	308	182	239	237	263	34	191	114	187	299	83	30	209
$CO3^{-}$	0	0	0.27	0.51	0.51	0.39	0.33	0.53	0.17	0.09	0.41	0.56	0.06	0.25
$NO3^{-}$	1	1	1.77	1.50	1.85	1.60	2.65	1.77	1.75	0.50	0.40	0.30	1.33	1.78
TOTAL IRON	-	-	0.85	0.78	0.85	0.71	0.42	1.00	1.00	0.85	0.57	0.30	0.50	1.80
SIO2	-	-	11.64	16.30	14.20	17.00	15.60	12.50	10.50	27.00	34.00	3.00	1.40	14.00

* LABORATORY CONDUCTIVITIES AND pH VALUES (All other pH/Cond. values are field measurements). Analytical units are mg/l unless otherwise stated.

Table A-2: Groundwater Quality (AWE, 2015)

		LW PB 01		LW PB 03		U23 PB 01	
		Sample ID	2014-007-6167	**Sample ID**	2014-007-6167	**Sample ID**	2014-007-6166
Analytes	**Units**	**Date**	28/11/2014	**Date**	24/11/2014	**Date**	19/11/2014
pH	pH units		7.2		7.3		7.2
Alkalinity as Calcium Carbonate	mg/L		377		168		418
Bicarbonate	mg/L		460		206		510
Carbonate	mg/L		0		0		0
Hydroxide	mg/L		0		0		0
Aluminium - Soluble	mg/L		1.562		0.804		5.312
Chromium (VI) - Soluble	mg/L		<0.0059		0.0025		0.1203
Comment	Maximum amount of Chromium 6 present as derived from the Total Chromium						
Mercury - Total	mg/L		0.00007		0.00007		0.00033
Selenium - Total	mg/L		0.0024		0.0017		0.0248
Fluoride	mg/L		1.9		0.71		2.7
Calcium	mg/L		972		983		313
Sulphate	mg/L		4500		4050		1690
Sodium	mg/L		6910		5240		2790
Ammonia as N	mg/L		0.14		1.676		0.416
Nitrate + Nitrite as N	mg/L		109		10.6		0.015
Conductivity	µScm		33000		27200		15600
Total Dissolved Solids (by EC)	mg/L		20000		16000		9100
Suspended Solids	mg/L		103		66		4500
Turbidity	NTU		88		45		4300
Chromium - Total	mg/L		0.0059		0.0025		0.1301
Potassium	mg/L		23.8		30.9		30.1
Magnesium	mg/L		630		591		231
Arsenic - Total	mg/L		0.0016		0.0018		0.0202
Boron - Soluble	mg/L		5.25		3.79		2.35
Barium - Total	mg/L		0.177		0.1047		0.0502
Cadmium - Total	mg/L		0.0004		0.0003		0.0002
Copper - Total	mg/L		0.0491		0.0085		0.0001
Iron - Total	mg/L		1.927		1.077		9.35
Manganese - Total	mg/L		0.8801		0.3813		0.0001
Nickel - Total	mg/L		0.0144		0.0057		0.0401
Lead - Total	mg/L		0.0054		0.0023		0.0738
Zinc - Total	mg/L		7.206		0.9938		0.0003

Table A-3: Upper Series Groundwater Bore – Water Quality results 2012

Parameter	WQP*	4/06/2012	2/07/2012	6/08/2012
Metals				
Aluminium (soluble) mg/L	0.1	<0.010	<0.010	<0.010
Chromium VI –Soluble mg/L	0.001	<0.001	<0.001	<0.001
Mercury (total) mg/L	0.0001	0.0004	<0.0003	<0.0003
Selenium (total) mg/L	0.005	<0.001	<0.001	<0.001
Inorganic pollutants:				
Ammonia (total as Nitrogen) mg/L	0.5	<0.5	<0.5	<0.5
oxidised Nitrogen (sum of Nitrate + Nitrite as N) mg/L	0.3	0.004	<0.003	0.363
conductivity µScm	ND	18100	18600	9130
total dissolved solids (TDS) mg/L	ND	11000	11000	5200
suspended sediment mg/L	20	4	2	31
turbidity (Nephelometric Turbidity units (NTU))	20	19	14	23

Table A-4: Telford Gravel Groundwater Well Depth and Installation and Water Quality (FPP, February 2017)

Area	Well ID	Date Measured	Total Well Depth	Top-of Casing Elevation	Depth to LNAPL	Depth to Water	LNAPL Thickness	Product Gravity	Hydraulic Equivalent	Corrected Depth to Water	Corrected Water Elevation	Comments
			(mbtoc)	(mAHD)	(mbtoc)	(mbtoc)	(m)		(m)	(mbtoc)	(mAHD)	
AEC 2	MW101A	15-Nov-16	5.500	201.113	-	NR	-	-	-	NR	NA	Slow recharge.
	MW111A	23-Nov-16	6.200	201.454	-	NR	-	-	-	NR	NA	Clear water and then cloudy brown turbid water.
	MW112A	23-Nov-16	5.500	201.400	-	NR	-	-	-	NR	NA	Dry at 3L.
AEC 3	MW02	21-Nov-16	12.735	200.700	-	6.225	-	-	-	6.225	194.475	570mm stickup. Slight odour on gauging. Odour present after 20L. Cloudy grey water. LNAPL present (2mm) at 60L. Dry at 66L.
	MW102A	21-Nov-16	10.818	201.149	-	6.528	-	-	-	6.528	194.621	710mm stickup. Cloudy brown water. Dry at 34L.
	MW04	21-Nov-16	11.980	200.500	-	6.358	-	-	-	6.358	194.142	570mm stickup. Clear water and then pink and slightly cloudy.
	MW06	21-Nov-16	11.120	200.400	-	6.412	-	-	-	6.412	193.988	340mm stickup. Clear water. Maybe a sheen after water has sat in bucket.
	MW106A	21-Nov-16	10.700	200.890	-	6.843	-	-	-	6.843	194.047	799mm Stickup. Clear water.
	MW107A	21-Nov-16	8.880	200.795	-	6.540	-	-	-	6.540	194.255	800mm stickup. Clear water and then slightly cloudy. Dry at 7L.
	MW108A	21-Nov-16	8.560	200.753	-	6.507	-	-	-	6.507	194.246	800mm stickup. Slow recharge. Dry at 7L.
	MW08	21-Nov-16	12.382	200.800	-	6.289	-	-	-	6.289	194.511	670mm stickup. Clear water and then slightly cloudy.
	MW09	21-Nov-16	12.165	200.700	-	6.112	-	-	-	6.112	194.588	580mm stickup.
	MW10	21-Nov-16	12.280	199.900	-	5.982	-	-	-	5.982	193.918	590mm Stickup. Clear water til 20L and then slightly cloudy.
	MW11	21-Nov-16	12.250	198.700	-	5.965	-	-	-	5.965	192.735	670mm stickup. Pale red water. No drawdown.
AEC 8	MW109A	22-Nov-16	5.873	196.449	-	3.302	-	-	-	3.302	193.147	800mm stickup. Very cloudy brown turbis water.
	MW110A	22-Nov-16	9.951	197.057	-	3.704	-	-	-	3.704	193.353	Cloudy turbid dark brown water. Maybe slight sheen. Dry at 40L.

Notes:
MW = Monitoring Well
ID = Identification
mAHD = metres Australian Height Datum
mbtoc = metres below top of casing
** Installed within the secondary aquifer
NA = Not applicable
m = metres
LNAPL = Light non aqueous phase liquid
"-" = Not recorded
h/c = hydrocarbon
NR = Not recorded due to field quality control requirements for PFCs

Field Equipment Used:
Heren Interface Probe

Area	Well ID	Date Measured	Dissolved Oxygen	EC	pH	Redox Potential	Total Dissolved Solids*	Temperature	Purge Volume	Comments
			(mg/L)	(µS/cm)		(mV)	(mg/L)	(°C)	(L)	
AEC 2	MW101A	15-Nov-16	5.6	10,220	6.05	135	6,643	30.4	1	Slow recharge.
	MW111A	23-Nov-16	7.3	11,063	7.35	100	7,191	24.1	60	Clear water and then cloudy brown turbid water.
	MW112A	23-Nov-16	5.4	38,839	6.90	159	25,245	25.8	3	Dry at 3L.
AEC 3	MW02	21-Nov-16	1.1	50,333	6.59	15	32,716	25.5	44	570mm stickup. Slight odour on gauging. Odour present after 20L. Cloudy grey water. LNAPL present (2mm) at 60L. Dry at 66L.
	MW102A	21-Nov-16	3.2	50,825	6.40	239	33,036	25.4	30	710mm stickup. Cloudy brown water. Dry at 34L.
	MW04	22-Nov-16	5.7	44,223	7.30	179	28,745	27.2	80	570mm stickup. Clear water and then pink and slightly cloudy.
	MW06	22-Nov-16	2.6	40,408	7.30	239	26,265	24.5	61	340mm stickup. Clear water. Maybe a sheen after water has sat in bucket.
	MW106A	22-Nov-16	3.6	59,668	7.10	524	38,784	25.5	25	799mm Stickup. Clear water. Dry at 25L.
	MW107A	22-Nov-16	5.1	29,696	7.48	171	19,303	26.3	7	800mm stickup. Clear water and then slightly cloudy. Dry at 7L.
	MW108A	22-Nov-16	2.7	58,124	7.11	206	37,780	25.4	7	800mm stickup. Slow recharge. Dry at 7L.
	MW08	21-Nov-16	5.7	26,429	7.36	347	17,179	29.4	123	670mm stickup. Clear water and then slightly cloudy.
	MW09	22-Nov-16	7.0	34,452	7.62	144	22,394	25.3	82	580mm stickup.
	MW10	21-Nov-16	7.3	21,662	7.23	268	14,080	25.6	109	590mm Stickup. Clear water til 20L and then slightly cloudy.
	MW11	21-Nov-16	6.8	26,045	7.11	346	16,929	25.2	84	670mm stickup. Pale red water. No drawdown.
AEC 8	MW109A	23-Nov-16	1.2	5,467	7.97	128	3,553	19.2	53	800mm stickup. Very cloudy brown turbis water.
	MW110A	23-Nov-16	5.2	79,893	6.64	179	51,931	24.2	40	Cloudy turbid dark brown water. Maybe slight sheen. Dry at 40L.

Notes:
ID = identification
mg/L = milligrams per litre
L = litres
HC = hydrocarbon
mV = millivolts
°C = degrees Celsius
µS/cm = microsiemens per centimetre
* Approximate value determined using the following equation: TDS (mg/L) = EC x 0.65
** Installed within the secondary aquifer

Field Equipment Used:
smarTroll

Appendix B LCK Groundwater Analysis Results

B.1 Detailed Groundwater Analysis Results

Table B-1: Telford Gravels Analysis Results

Table B.1 - Telford Gravels

Location											3965	3965	3965	3965	3965	3965	3965	3965
Sample ID											BHL3965	LC04-ENV-GW	LC04-ENV-SW	LC04-ENV-GW	3965	3965	3965	3965
Date Sampled											25-10-16 14:30	27-07-17 10:45	15-08-17 15:00	20-09-17 11:20	26-10-17 15:00	22-11-17 15:00	13-12-17 15:43	10-01-18 14:30
Batch No.											EM1613092	EM1710159	EM1711030	EM1713199	EM1714942	EM1716250	EM1717397	EM1801459
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	18300	42900	9070	31000	39000	42700	43200	44500
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.33	6.98	7.15	7.11	7.14	6.69	6.45	6.59
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	29.6	53.5	48.5	39.9	48.1	53.6	50.5	57.4
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	11900	27900	5900	20200	25400	27800	28100	28900
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	197	124	152	174	149	142	125	100
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	197	124	152	174	149	142	125	100
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2820	5060	4610	3960	4300	4920	4770	5140
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	5.09	<0.01	0.34	2.26	3.3	8.82	9.96	11.5
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	237	482	419	359	429	499	465	409
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	214	482	422	343	401	418	381	515
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	4.46	4.1	3.5	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	823	1290	1200	1020	1100	1150	1190	1300
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	6190	14600	12400	10400	12600	15100	13900	11900
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	2.1	0.9	1.3	1.5	1.5	1.4	1.1	0.8
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	<2	<1	<2	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	187	446	391	314	376	374	436	460
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	7	37	15	18	6	16	22	17
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	3620	8740	7570	6120	7250	7580	6550	9470
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	2810	3260	3170	3000	3380	3380	3380	3430
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	<0.01	1.28	0.05	0.05	0.13	1.28	0.08	0.74
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.05	0.72	0.34	0.32	0.21	0.11	0.15	0.12
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.05	0.72	0.34	0.34	0.21	0.11	0.16	0.13
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.01	0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	1.3	0.2	0.2	0.1	1.3	<0.1	0.4
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	2	0.5	0.5	0.3	1.4	0.2	0.5
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	0.14	0.04	0.1	0.09	0.17	0.18	0.26
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	0.01	0.01	<0.01	0.02	<0.01	0.02	0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	1.54	2.46	1.81	2.63	1.68	2.77	2.44
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	0.0004	<0.0001	0.0006	0.0003	0.0003	0.0005	0.0006	0.0004
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	-	-	-	-	-	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.001	<0.001	0.001	<0.001	0.002	0.002	0.001	0.003
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.05	1.05	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	<0.05	1.06	<0.05	0.11	<0.05	1.42	0.17
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	0.019	0.002	0.003	0.002	0.002	0.004	0.004	0.003
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	0.213	4.63	0.147	1.94	0.138	7.02	2.57

Table B.1 - Telford Gravels

Location											3965	3965	3965	3965	3965	3965	3965	3965
Sample ID											BHL3965	LC04-ENV-GW	LC04-ENV-SW	LC04-ENV-GW	3965	3965	3965	3965
Date Sampled											25-10-16 14:30	27-07-17 10:45	15-08-17 15:00	20-09-17 11:20	26-10-17 15:00	22-11-17 15:00	13-12-17 15:43	10-01-18 14:30
Batch No.											EM1613092	EM1710159	EM1711030	EM1713199	EM1714942	EM1716250	EM1717397	EM1801459
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.004	0.009	0.193	0.012	0.086	0.018	0.237	0.105
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.019	0.024	0.005	0.023	0.016	0.027	0.014	0.014
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	1.13	0.04	0.807	0.096	0.396	0.158	0.864	0.445
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.004	<0.004	<0.004	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.1	<0.1	<0.1	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	<0.004	<0.004	<0.004	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.004	<0.004	<0.004	-	-	-	-
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	-	<20	-	-	<20	<20
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<50	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	<50	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<50	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	<50	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	<100	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<50	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	<50	-	-	-	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	-	<20	-	-	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	-	<20	-	-	<20	<20
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	<100	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	<100	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	<100	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	<100	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	<100	-	-	-	-

Table B.1 - Telford Gravels

Location											3965	3965	3965	3965	3965	3965	3965	3965
Sample ID											BHL3965	LC04-ENV-GW	LC04-ENV-SW	LC04-ENV-GW	3965	3965	3965	3965
Date Sampled											25-10-16 14:30	27-07-17 10:45	15-08-17 15:00	20-09-17 11:20	26-10-17 15:00	22-11-17 15:00	13-12-17 15:43	10-01-18 14:30
Batch No.											EM1613092	EM1710159	EM1711030	EM1713199	EM1714942	EM1716250	EM1717397	EM1801459
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	<2	-	<2	-	-	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	<2	-	-	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	-	<5	-	<5	-	-	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	-	<2	-	<2	-	-	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	-	<2	-	<2	-	-	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	-	<2	-	<2	-	-	<2	<2
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	-	<0.5	-	<0.5	-	-	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.5	-	<0.5	-	-	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	<1	-	-	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.5	-	<0.5	-	-	<0.5	<0.5
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	38	40	40	40	40	41	42
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	35	39	39	38	41	37	41
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	2	2	1	2	<1	4	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											3965	3965	3965	3965	3965	6536-1	6536-1	6536-1
Sample ID											3965	3965	3965	3965	3965	LC13	LC05-ENV-GW	LC05-ENV-SW
Date Sampled											14-02-18 14:30	22-03-18 13:35	17-04-18 14:00	23-05-18 14:30	28-06-18 16:10	28-02-16 15:00	27-07-17 9:15	15-08-17 14:30
Batch No.											EM1803111	EM1805293	EM1806819	EM1808678	EM1810593	EM1602086	EM1710159	EM1711030
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	47900	49400	46500	55200	50700	6060	10700	10000
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	6.37	6.8	6.96	6.68	6.44	8.09	8.03	7.93
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	55.6	62.9	64.5	63	61	-	30.9	32.1
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	31100	32100	30200	35900	33000	3940	6960	6500
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	98	85	123	89	109	443	430	441
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	98	85	123	89	109	443	430	441
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	5090	5470	5020	5670	5510	405	932	849
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	7.03	3.63	3.06	4.26	10.4	3.91	2.14	3.56
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	575	535	524	539	705	62.9	119	119
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	499	575	557	587	572	58.2	114	111
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	2.9	2.98
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1270	1310	1260	1370	1320	73	154	129
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	17800	16200	16000	16400	22200	1430	2640	2530
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.8	0.6	1	0.8	0.6	1	2.8	3.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.5	0.62
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	467	534	454	546	538	54	133	128
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	14	16	13	<10	19	20	26	17
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	9130	10700	10500	10900	10600	1140	2170	2150
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	3400	3660	3380	3600	3680	658	1710	1870
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	2.25	1.76	1.58	0.32	3.43	-	0.26	0.05
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.37	0.94	0.14	0.27	0.51	-	<0.01	0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.37	0.94	0.38	0.47	0.55	-	<0.01	0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	0.24	0.2	0.04	-	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	<0.01	0.01	<0.01	<0.01	-	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2.3	1.9	1.7	0.4	3.8	-	0.3	<0.1
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2.7	2.8	2.1	0.9	4.4	-	0.3	<0.1
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.36	0.54	0.76	0.32	0.71	-	0.06	<0.01
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.04	0.03	0.03	0.05	0.09	-	<0.01	<0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.002	<0.001	<0.001	<0.002	<0.001	-	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	3.23	3.08	2.82	4.02	3.71	-	2.31	1.94
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	0.0007	0.001	0.0007	<0.0002	0.0011	-	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.002	<0.001	<0.001	<0.002	<0.001	-	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.009	0.002	<0.001	0.002	0.004	-	<0.001	<0.001
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	2.59	<0.05
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	1.83	0.19	0.22	2.45	0.11	-	2.09	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	0.006	0.003	0.006	<0.002	0.002	-	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	9.77	4.18	5.13	18.6	7.98	-	0.247	0.232

Table B.1 - Telford Gravels

Location											3965	3965	3965	3965	3965	6536-1	6536-1	6536-1
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Date Sampled											14-02-18 14:30	22-03-18 13:35	17-04-18 14:00	23-05-18 14:30	28-06-18 16:10	28-02-16 15:00	27-07-17 9:15	15-08-17 14:30
Batch No.											EM1803111	EM1805293	EM1806819	EM1808678	EM1810593	EM1602086	EM1710159	EM1711030
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.361	0.172	0.2	0.345	0.261	-	<0.001	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.02	<0.01	<0.01	<0.02	<0.01	-	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.002	<0.001	<0.001	<0.002	0.002	-	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.002	0.009	0.011	0.004	0.002	-	0.016	0.015
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	1.56	0.733	0.614	0.552	0.952	-	<0.005	0.011
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.004	<0.004
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.1	<0.1
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.004	<0.004
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.004	<0.004
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	1.4	0.2	<0.1	<0.1	-	3.7	0.1
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	-	<20	-
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<50
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<50	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<50
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<50	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<100
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<50
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<50	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	-	<20	-
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	-	<20	-
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<100
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<100
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<100
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<100
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	<100
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	-

Table B.1 - Telford Gravels

Location											3965	3965	3965	3965	3965	6536-1	6536-1	6536-1
Sample ID											3965	3965	3965	3965	3965	LC13	LC05-ENV-GW	LC05-ENV-SW
Date Sampled											14-02-18 14:30	22-03-18 13:35	17-04-18 14:00	23-05-18 14:30	28-06-18 16:10	28-02-16 15:00	27-07-17 9:15	15-08-17 14:30
Batch No.											EM1803111	EM1805293	EM1806819	EM1808678	EM1810593	EM1602086	EM1710159	EM1711030
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	<2	-
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	<2	-
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	-	<5	-
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	<2	-
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	<2	-
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	<2	-
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	-
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	50	28	36	21	32	-	102	99
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	45	26	35	22	32	-	96	97
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2	3	2	<1	<1	-	1	2

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1
Sample ID											LC05-ENV-GW	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1
Date Sampled											20-09-17 10:10	26-10-17 15:00	22-11-17 15:00	13-12-17 15:43	09-01-18 14:30	13-02-18 14:30	22-03-18 13:35	18-04-18 8:30
Batch No.											EM1713199	EM1714942	EM1716250	EM1717397	EM1801459	EM1803111	EM1805293	EM1806819
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	11000	10800	10600	10500	9440	10300	10600	10600
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.9	7.99	7.74	7.74	7.93	7.82	7.99	7.93
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	33.2	33.3	34.7	34.5	30.2	28.7	30.2	33.7
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	7150	7020	6890	6820	6140	6700	6890	6890
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	444	442	407	430	360	444	440	465
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	444	442	407	430	360	444	440	465
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	856	803	797	610	767	696	806	838
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	4.61	2.44	4	1.03	2.26	15.2	4.06	3.36
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	126	116	124	99.5	104	122	111	122
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	114	111	114	97.4	99.3	90.1	102	115
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2.86	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	130	117	136	101	124	112	130	141
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	2700	2470	2970	2130	1980	2550	2290	2540
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	2.7	3	3.1	2.9	2.6	3.3	2.9	3.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	<0.5	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	129	124	111	87	111	101	117	118
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	18	16	18	<2	17	22	16	17
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	2230	2170	2250	1960	1920	1740	1970	2240
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1950	1820	1530	1480	1960	2000	1800	2000
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.02	0.02	0.09	0.19	0.1	0.08	0.13	1.67
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.03	0.01	0.02	0.11	0.04	<0.01	<0.01	0.02
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.04	0.01	0.02	0.11	0.05	<0.01	<0.01	0.02
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	0.3	<0.1	0.2	<0.1	<0.1	0.2	1.7
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	0.3	<0.1	0.3	<0.1	<0.1	0.2	1.7
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.08	0.06	0.04	0.04	0.11	0.05	0.12	0.13
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.15	0.01	0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	2.1	2.23	1.81	2.16	2.22	2.62	2.32	2.1
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.05	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.05	<0.05	1.45	2.58	0.12	2.16	2.24	0.72
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.157	0.175	0.216	0.205	0.147	0.173	0.184	0.196

Table B.1 - Telford Gravels

Location											6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1
Sample ID											LC05-ENV-GW	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1
Date Sampled											20-09-17 10:10	26-10-17 15:00	22-11-17 15:00	13-12-17 15:43	09-01-18 14:30	13-02-18 14:30	22-03-18 13:35	18-04-18 8:30
Batch No.											EM1713199	EM1714942	EM1716250	EM1717397	EM1801459	EM1803111	EM1805293	EM1806819
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.013	0.013	0.014	0.013	0.012	0.013	0.013	0.012
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.036	0.02	0.008	0.013	0.024	<0.005	<0.005	0.008
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.004	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	<0.004	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.004	-	-	-	-	-	-	-
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	14
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	-	-	<20	<20	<20	<20	<20
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	-	-	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	-	-	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	-	-	-	-

Table B.1 - Telford Gravels

Location											6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1	6536-1
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BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	-	-	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	96	98	102	110	100	133	100	113
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	95	94	101	105	102	119	98	112
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	4	<1	5	<1	5	2	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											6536-1	6536-1	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318
Sample ID											6536.1	6536-1	LC08	WM01	LC03-ENV-GW	LC03-ENV-SW	LC03-ENV-GW	6537-2318
Date Sampled											23-05-18 14:30	28-06-18 14:00	27-02-16 15:00	07-07-17 15:15	27-07-17 15:30	16-08-17 10:00	20-09-17 8:00	25-10-17 15:00
Batch No.											EM1808678	EM1810593	EM1602086	EM1709025	EM1710159	EM1711030	EM1713199	EM1714942
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	11100	10400	8630	10000	9710	32200	9740	9270
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.72	7.81	8.04	7.53	8	7.79	7.77	7.88
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	30.7	32.4	-	20.9	20.6	20.5	21.3	22.2
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	7220	6760	5610	6500	6310	20900	6330	6020
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	475	506	415	392	396	384	396	398
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	475	506	415	392	396	384	396	398
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	869	738	856	1310	1330	1300	1350	935
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	4.5	8.01	2.86	4.43	1.02	2.83	2.88	3.29
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	118	121	90.6	112	105	107	112	93.2
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	108	103	85.6	103	103	101	106	87.2
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	2.75	2.8	2.86	2.68	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	137	119	186	307	308	298	296	193
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	2500	2580	2130	2730	2740	2590	2760	2150
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	3.2	3.4	2.6	2.2	2.6	3	3	3.5
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	<0.5	<0.5	<0.2	<0.5	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	128	107	95	132	137	136	148	110
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	19	17	27	36	42	34	34	27
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	2080	2020	1560	1740	1730	1700	1800	1560
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1850	1830	1070	1320	955	1250	1280	1180
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.34	0.7	-	0.03	0.05	0.03	0.06	0.07
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	<0.01	-	0.32	0.39	0.32	0.34	0.17
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	-	0.32	0.39	0.32	0.35	0.17
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	-	<0.01	<0.01	<0.01	0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.4	0.7	-	<0.1	0.4	0.1	<0.1	<0.1
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.4	0.7	-	0.3	0.8	0.4	0.4	0.2
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.06	0.13	-	0.07	<0.01	<0.01	0.04	0.04
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.02	<0.01	-	-	0.01	<0.01	<0.01	<0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	2.16	2.19	-	1.42	1.51	1.41	1.39	1.82
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	-	0.001	<0.001	<0.001	<0.001	<0.001
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<0.05	<0.05	<0.05	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	0.1	0.23	-	-	<0.05	<0.05	<0.05	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.179	0.206	-	-	0.039	0.032	0.025	0.163

Table B.1 - Telford Gravels

Location											6536-1	6536-1	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318
Sample ID											6536.1	6536-1	LC08	WM01	LC03-ENV-GW	LC03-ENV-SW	LC03-ENV-GW	6537-2318
Date Sampled											23-05-18 14:30	28-06-18 14:00	27-02-16 15:00	07-07-17 15:15	27-07-17 15:30	16-08-17 10:00	20-09-17 8:00	25-10-17 15:00
Batch No.											EM1808678	EM1810593	EM1602086	EM1709025	EM1710159	EM1711030	EM1713199	EM1714942
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	0.001	-	<0.001	0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.008	0.01	-	0.004	0.003	0.003	0.004	0.004
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.006	0.005	-	0.013	<0.005	0.011	0.011	0.011
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.004	<0.004	<0.004	<0.004	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.1	<0.1	<0.1	<0.1	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.004	<0.004	<0.004	<0.004	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.004	<0.004	<0.004	<0.004	-
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	4.7	9	-	-	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	-	-	<20	-	<20	-
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<50	-	<50	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	<50	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<50	-	<50	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	<50	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<100	-	<100	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	<100	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<50	-	<50	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	<50	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	-	-	<20	-	<20	-
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	-	-	<20	-	<20	-
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<100	-	<100	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	<100	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<100	-	<100	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	<100	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<100	-	<100	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	<100	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<100	-	<100	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	<100	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<100	-	<100	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	<100	-

Table B.1 - Telford Gravels

Location											6536-1	6536-1	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318
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Date Sampled											23-05-18 14:30	28-06-18 14:00	27-02-16 15:00	07-07-17 15:15	27-07-17 15:30	16-08-17 10:00	20-09-17 8:00	25-10-17 15:00
Batch No.											EM1808678	EM1810593	EM1602086	EM1709025	EM1710159	EM1711030	EM1713199	EM1714942
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	-	-	<2	-	<2	-
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	-	-	<2	-	<2	-
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	-	-	<5	-	<5	-
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	-	-	<2	-	<2	-
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	-	-	<2	-	<2	-
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	-	-	<2	-	<2	-
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	-	-	<0.5	-	<0.5	-
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	-	-	<0.5	-	<0.5	-
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	-	<1	-	<1	-
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	-	-	<0.5	-	<0.5	-
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	96	78	-	83	91	88	92	107
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	115	79	-	82	88	87	91	103
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	-	<1	1	2	<1	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318
Sample ID											6537-2318	6537-2318	6537-2318	6547-2318	6537-2318	6537-2318	6537-2318	6537-2318
Date Sampled											22-11-17 15:00	13-12-17 15:43	10-01-18 14:30	14-02-18 14:30	22-03-18 13:35	17-04-18 16:00	23-05-18 14:30	29-06-18 7:20
Batch No.											EM1716250	EM1717397	EM1801459	EM1803111	EM1805293	EM1806819	EM1808678	EM1810593
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	9540	9050	7070	7350	7500	7400	8130	7940
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.63	7.65	6.93	7.83	8.06	8.16	7.86	7.75
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	22.3	20.8	21.6	21.4	20.6	23.6	20.2	18.6
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	6200	5880	4600	4780	4880	4810	5280	5160
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	396	433	252	449	446	444	433	414
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	396	433	252	449	446	444	433	414
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1130	936	818	628	662	692	990	912
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	5.32	4.55	3.44	6.19	6.32	1.04	4.1	13.2
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	109	90.5	73.6	75.8	75.9	75	77.5	98
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	98.2	82.6	78.8	67	66.9	76.6	84.1	75.2
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	262	205	176	126	135	142	215	197
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	2690	2060	1640	1730	1720	1680	1750	2370
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	3.4	3.2	3.1	3.9	3.6	3.5	3.6	3.4
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	115	103	92	76	79	82	110	102
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	32	16	27	36	23	23	31	32
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	1720	1460	1420	1230	1220	1430	1460	1290
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1220	1140	1070	866	888	902	934	1100
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.06	0.08	0.04	0.05	0.07	0.06	0.14	0.09
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.17	0.16	0.06	0.07	0.23	0.07	0.09	0.09
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.17	0.16	0.07	0.07	0.24	0.07	0.09	0.09
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	0.02	0.08	0.09	0.02	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	0.2	0.1	<0.1	0.3	0.2	0.1
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.2	0.2	0.3	0.2	0.2	0.4	0.3	0.2
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	<0.01	0.11	0.16	0.23	0.18	0.04	0.09
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	<0.01	<0.01	<0.01	0.03	0.01	<0.01	<0.01	<0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	1.14	1.67	1.41	1.79	1.52	1.25	1.39	1.16
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	0.002
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.105	0.046	0.287	0.101	0.051	0.062	0.503	0.037

Table B.1 - Telford Gravels

Location											6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318
Sample ID											6537-2318	6537-2318	6537-2318	6547-2318	6537-2318	6537-2318	6537-2318	6537-2318
Date Sampled											22-11-17 15:00	13-12-17 15:43	10-01-18 14:30	14-02-18 14:30	22-03-18 13:35	17-04-18 16:00	23-05-18 14:30	29-06-18 7:20
Batch No.											EM1716250	EM1717397	EM1801459	EM1803111	EM1805293	EM1806819	EM1808678	EM1810593
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.004	0.004	0.002	0.004	0.004	0.004	0.003	0.003
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.015	0.013	0.014	0.013	0.011	0.014	0.022	0.012
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	<20	<20	<20	<20	<20	<20
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.1 - Telford Gravels

Location											6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318	6537-2318
Sample ID											6537-2318	6537-2318	6537-2318	6547-2318	6537-2318	6537-2318	6537-2318	6537-2318
Date Sampled											22-11-17 15:00	13-12-17 15:43	10-01-18 14:30	14-02-18 14:30	22-03-18 13:35	17-04-18 16:00	23-05-18 14:30	29-06-18 7:20
Batch No.											EM1716250	EM1717397	EM1801459	EM1803111	EM1805293	EM1806819	EM1808678	EM1810593
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	-	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	98	112	104	132	100	104	90	62
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	99	107	108	122	100	106	111	62
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	5	<1	<1	<1	<1	<1	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW13	MW14
Sample ID											MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW13	MW14
Date Sampled											10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 10:00	22-05-18 14:45	01-07-18 14:20	02-07-18 8:03	02-07-18 9:50	30-06-18 10:15
Batch No.											EM1801467	EM1803121	EM1805287	EM1806814	EM1808678	EM1810539	EM1810539	EM1810539	EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture									
Physico-Chemical Parameters																			
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	46500	46300	49500	50800	51300	45900	31400	40300	46600
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.55	7.32	7.54	7.23	7.39	6.99	7.39	7.28	6.16
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	48.9	45.5	50.8	58.8	52.7	47	44.2	49.1	47.6
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	30200	30100	32200	33000	33300	29800	20400	26200	30300
Alkalinity																			
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	130	147	145	147	154	151	322	209	82
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	130	147	145	147	154	151	322	209	82
Hardness																			
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	6540	6520	6460	7120	7240	7270	3870	5310	7270
Ion Balance																			
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	2.69	5.02	2.72	4.66	0.83	0.87	3.88	4.24	3.02
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	499	551	567	582	583	556	381	506	586
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	527	498	537	638	593	547	353	464	552
Major Ions																			
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1310	1280	1220	1330	1380	1410	711	998	1620
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	14700	16600	16800	17500	17500	16900	11000	14600	18400
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	1.1	1.2	1.4	1.4	1.7	1.5	1.9	2.7	1.3
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	794	807	828	922	921	910	508	685	783
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	14	18	13	13	<10	18	16	16	17
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	9100	8450	9380	11400	10300	9220	6320	8230	9330
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	3940	3830	4350	4080	4140	3680	3090	4310	3130
Nutrients																			
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.44	0.16	0.46	0.24	0.1	0.11	0.11	0.05	0.06
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	2.72	5.57	3.66	3.15	3.49	6.38	0.04	<0.01	6.24
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2.96	5.65	3.88	3.28	3.55	6.38	0.04	<0.01	6.24
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	0.24	0.08	0.22	0.13	0.06	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	<0.01	<0.01	0.02	<0.01	0.01	<0.01	0.01	0.1
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.9	0.8	0.5	0.2	1.4	0.4	1.4	0.8	<0.1
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	3.9	6.4	4.4	3.5	5	6.8	1.4	0.8	6.2
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	3.5	1.16	0.66	0.3	0.59	1.21	2.27	0.39	0.34
Metals (dissolved)																			
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.05	0.02	<0.02	0.01	0.01	0.02	0.03	0.02	0.05
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	5.02	4.69	5.52	6.46	5.19	5.29	4.39	6.49	4.46
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	0.0008	0.0004	0.0004	0.0006	0.0004	0.0001	0.0006	0.0011	0.0018
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	0.124	0.103	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.131	<0.002	<0.002	<0.001	0.001	0.003	0.004	0.003	0.002
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.25	<0.05	<0.1	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.009
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	2.39	0.767	1.25	1.12	0.863	0.036	3.44	0.326	0.019

Table B.1 - Telford Gravels

Location											MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW13	MW14
Sample ID											MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW13	MW14
Date Sampled											10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 10:00	22-05-18 14:45	01-07-18 14:20	02-07-18 8:03	02-07-18 9:50	30-06-18 10:15
Batch No.											EM1801467	EM1803121	EM1805287	EM1806814	EM1808678	EM1810539	EM1810539	EM1810539	EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture									
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.027	0.004	0.005	0.006	0.006	0.002	0.026	0.009	0.019
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.05	<0.02	<0.02	0.02	0.02	0.02	<0.01	0.02	0.02
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	0.002	0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.013	0.019	0.014	0.016	0.015	0.026	0.029	0.034	0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.084	0.013	<0.01	0.017	0.01	0.023	0.015	0.132	0.082
Cyanides																			
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Sulfides																			
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.6	<0.5	<2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																			
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	100	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	440	150	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	340	150	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Petroleum Hydrocarbons (SG)																			
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																			
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	130	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	130	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	450	120	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	320	120	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons (SG)																			
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-

Table B.1 - Telford Gravels

Location											MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW13	MW14
Sample ID											MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW13	MW14
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Batch No.											EM1801467	EM1803121	EM1805287	EM1806814	EM1808678	EM1810539	EM1810539	EM1810539	EM1810539
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BTEXN																			
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																			
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																			
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	33	43	33	34	34	90	64	41	14
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	32	38	32	33	35	93	83	26	14
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2	3	2	<1	1	<1	20	15	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											MW15	MW16	MW17	MW18	MW19	MW19	MW19	MW19
Sample ID											MW15	MW16	MW17	MW18	MW19	MW19	MW19	MW19
Date Sampled											01-07-18 12:30	30-06-18 14:00	29-06-18 16:20	01-07-18 15:10	10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 12:00
Batch No.											EM1810539	EM1810539	EM1810539	EM1810539	EM1801467	EM1803121	EM1805287	EM1806814
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	44000	54000	49700	52800	67700	70200	73100	75600
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	6.47	6.02	6.63	6.31	6.85	6.92	7.17	6.74
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	49.7	50.3	50.9	47.2	67.7	60.1	67.1	78.9
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	28600	35100	32300	34300	44000	45600	47500	49100
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	108	96	132	103	299	395	404	431
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	108	96	132	103	299	395	404	431
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	6590	8260	7040	9010	8930	8570	9090	8570
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	1.7	3.75	1.83	2.1	1.89	12.8	3.54	1.04
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	554	671	589	656	851	944	882	885
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	535	622	568	629	819	729	822	903
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1370	1700	1440	1980	1730	1620	1660	1620
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	17200	21200	18500	21000	27100	30400	28000	28200
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	1.7	0.8	2.5	1.6	0.2	0.2	0.3	0.2
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	770	974	836	988	1120	1100	1200	1100
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	19	22	12	30	53	51	45	51
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	9270	10500	9820	10300	14700	12800	14700	16800
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	3200	3400	3110	2950	3860	3770	4060	3880
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.08	0.25	0.06	0.09	10.5	15	6.71	13.7
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	5.87	1.76	6.41	6.83	0.04	<0.01	0.16	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	5.87	2.16	6.41	6.83	0.06	<0.01	0.16	<0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	0.4	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.06	<0.01	0.04	0.03	0.02	<0.01	<0.01	0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.3	0.3	<0.1	<0.1	13.2	15.7	7.1	15.8
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	6.2	2.5	6.4	6.8	13.3	15.7	7.3	15.8
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1.9	0.29	0.79	0.29	6.88	3.63	0.74	2.05
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.02	0.04	0.02	0.04	<0.05	0.02	<0.02	0.03
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.002	0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	5.22	3.7	3.8	3.17	4.55	4.11	4.11	4.31
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	0.0014	0.0045	0.001	0.0035	0.0017	<0.0002	<0.0002	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	0.001	<0.001	<0.001	<0.005	<0.002	<0.002	0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.002	0.003	0.002	0.002	0.016	<0.002	<0.002	<0.001
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.05	<0.05	<0.05	<0.05	<0.25	1.35	2.6	1.97
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	0.003	0.002	<0.001	<0.005	<0.002	<0.002	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.018	0.889	0.005	0.006	21	23.6	23.9	23.2

Table B.1 - Telford Gravels

Location											MW15	MW16	MW17	MW18	MW19	MW19	MW19	MW19
Sample ID											MW15	MW16	MW17	MW18	MW19	MW19	MW19	MW19
Date Sampled											01-07-18 12:30	30-06-18 14:00	29-06-18 16:20	01-07-18 15:10	10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 12:00
Batch No.											EM1810539	EM1810539	EM1810539	EM1810539	EM1801467	EM1803121	EM1805287	EM1806814
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	0.0011	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.005	0.047	0.006	0.021	0.091	0.057	0.054	0.037
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.03	<0.05	<0.02	<0.02	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.002	<0.001	<0.001	<0.001	<0.005	<0.002	<0.002	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.003	0.015	0.015	0.004	<0.005	0.004	0.004	0.004
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.099	0.168	0.092	0.115	0.327	0.011	0.013	0.015
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	<0.1	1.1	<0.5	<1	0.4
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.1 - Telford Gravels

Location											MW15	MW16	MW17	MW18	MW19	MW19	MW19	MW19
Sample ID											MW15	MW16	MW17	MW18	MW19	MW19	MW19	MW19
Date Sampled											01-07-18 12:30	30-06-18 14:00	29-06-18 16:20	01-07-18 15:10	10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 12:00
Batch No.											EM1810539	EM1810539	EM1810539	EM1810539	EM1801467	EM1803121	EM1805287	EM1806814
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	21	25	17	18	121	149	124	133
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	21	22	16	19	102	120	113	134
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	2	1	<1	6	14	11	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.1 - Telford Gravels

Location											MW19	MW20	MW20	MW20	MW20	MW20	MW21
Sample ID											MW19	MW20	MW20	MW20	MW20	MW20	MW21
Date Sampled											22-05-18 13:30	10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 11:00	22-05-18 10:30	01-07-18 15:35
Batch No.											EM1808678	EM1801467	EM1803121	EM1805287	EM1806814	EM1808678	EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture							
Physico-Chemical Parameters																	
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	74500	52100	56900	57700	60500	59900	44500
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.19	7.1	6.96	7.23	6.7	7.01	5.55
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	67.1	59.8	55	58.4	66.8	61.2	58.4
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	48400	33900	37000	37500	39300	38900	28900
Alkalinity																	
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	439	347	390	374	362	349	31
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	439	347	390	374	362	349	31
Hardness																	
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	9200	7360	7440	6840	6950	7650	5650
Ion Balance																	
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	5.11	6.53	4.02	7.19	1.45	0.65	4.32
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	918	580	676	716	716	679	603
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	828	661	624	620	696	688	553
Major Ions																	
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	1720	1420	1440	1270	1280	1420	1220
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	29400	17300	20700	21900	21700	20700	19000
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.2	0.5	0.5	0.6	0.5	0.6	0.7
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	1190	927	934	892	912	996	632
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	34	28	29	20	15	<10	25
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	14800	11800	10900	11100	12800	12300	10100
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	3820	4090	4040	4370	4670	4230	3180
Nutrients																	
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	13.6	0.81	1.3	1.26	0.63	0.83	0.43
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	0.02	<0.01	0.01	<0.01	0.04	11.2
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	0.02	<0.01	0.01	<0.01	0.04	11.2
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	14.4	1.6	3.8	1.4	14.3	1.2	0.4
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	14.4	1.6	3.8	1.4	14.3	1.2	11.6
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.72	1.13	4.52	0.89	2.9	1.29	0.34
Metals (dissolved)																	
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.03	<0.05	<0.02	<0.02	0.02	<0.02	0.79
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.002	<0.005	0.005	0.003	0.005	0.005	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	5.04	4.2	3.65	3.69	4.32	4.84	4.35
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0001	<0.0002	0.0023
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.002	<0.005	<0.002	<0.002	<0.001	<0.002	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.002	<0.005	<0.002	<0.002	<0.001	<0.002	0.002
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	1.98	4.02	1.75	3.13	3.69	3.78	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.002	<0.005	<0.002	<0.002	<0.001	<0.002	0.002
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	25.4	14.4	14.4	15.2	13	15.4	2.95

Table B.1 - Telford Gravels

Location											MW19	MW20	MW20	MW20	MW20	MW20	MW21
Sample ID											MW19	MW20	MW20	MW20	MW20	MW20	MW21
Date Sampled											22-05-18 13:30	10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 11:00	22-05-18 10:30	01-07-18 15:35
Batch No.											EM1808678	EM1801467	EM1803121	EM1805287	EM1806814	EM1808678	EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture							
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.009	0.029	0.026	0.026	0.03	0.031	0.173
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.02	0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.004	<0.005	<0.002	<0.002	<0.001	0.004	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	0.004	0.006	0.005	0.004	0.003	0.004	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	<0.01	0.161	0.127	0.021	0.042	0.034	0.662
Cyanides																	
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Sulfides																	
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1.6	0.1	1	<1	<0.1	0.1	<0.1
Total Petroleum Hydrocarbons																	
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20
Total Petroleum Hydrocarbons (SG)																	
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																	
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons (SG)																	
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-

Table B.1 - Telford Gravels

Location											MW19	MW20	MW20	MW20	MW20	MW20	MW21
Sample ID											MW19	MW20	MW20	MW20	MW20	MW20	MW21
Date Sampled											22-05-18 13:30	10-01-18 14:30	14-02-18 12:13	21-03-18 12:28	17-04-18 11:00	22-05-18 10:30	01-07-18 15:35
Batch No.											EM1808678	EM1801467	EM1803121	EM1805287	EM1806814	EM1808678	EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture							
BTEXN																	
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																	
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	1.6	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	1.6	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																	
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	108	138	101	118	87	19
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	106	121	97	97	92	19
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	12	1	2	4	21	4	<1

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B-2: Main Series Overburden (80m) Analysis Results

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW06	MW06	MW06	MW06	MW06	MW07	MW07	MW07	MW07	MW08
Sample ID											MW06	MW06	QA01_16042018	MW06	MW06	MW07	MW07	MW07	MW07	MW08
Date Sampled											21-03-18 12:28	16-04-18 9:00	16-04-18 11:30	22-05-18 9:20	27-06-18 14:50	21-03-18 12:28	16-04-18 14:00	22-05-18 14:15	27-06-18 15:45	21-03-18 12:28
Batch No.											EM1805287	EM1806814	EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678	EM1810539	EM1805287
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture										
Physico-Chemical Parameters																				
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	30900	31100	31100	33300	32700	16200	24000	21800	31200	14800
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.06	6.61	6.9	6.5	6.27	7.8	7.17	6.97	6.91	7.51
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	35.4	39.6	39.9	35.7	38.4	31.5	36.4	36.1	38	26.1
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	20100	20200	20200	21600	21200	10500	15600	14200	20300	9620
Alkalinity																				
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	301	309	282	241	117	384	516	297	557	491
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	301	309	282	241	117	384	516	297	557	491
Hardness																				
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	4110	4060	4080	4660	4440	1750	2280	2130	2860	1420
Ion Balance																				
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	2.12	1.8	1.2	3.55	3.42	1.21	7.76	4.46	11.9	8.5
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	324	346	346	363	370	164	258	230	339	152
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	310	334	338	338	346	168	221	211	266	128
Major Ions																				
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	693	704	709	804	708	247	331	314	436	172
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	9770	10400	10400	10900	11300	5440	8650	7810	11400	5000
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.6	0.7	0.7	0.7	0.4	0.3	0.3	0.3	0.3	0.4
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	577	558	562	644	649	275	353	327	431	240
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	43	41	43	59	55	63	67	59	83	58
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	5220	5790	5860	5600	5880	3030	4000	3830	4670	2260
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	2020	2240	2250	2440	2370	154	202	198	286	51
Nutrients																				
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	29	30.5	33.5	30.4	30	38.9	59.4	47.5	49.4	26.6
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.05	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.05	<0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	30.6	35.1	35.3	80.6	43.5	39.1	60.3	48	58.9	35.7
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	30.6	35.1	35.3	80.6	43.5	39.1	60.3	48.1	59	35.7
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.28	0.32	0.23	0.14	0.05	0.26	0.18	0.15	0.15	0.34
Metals (dissolved)																				
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	1.12	1.65	1.66	1.03	1.33	0.33	0.34	0.27	0.39	0.46
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.002	<0.001
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	31.3	52.2	63.9	62.7	76	1.23	2.31	38.5	7.33	7.59
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW06	MW06	MW06	MW06	MW06	MW07	MW07	MW07	MW07	MW08
Sample ID											MW06	MW06	QA01_16042018	MW06	MW06	MW07	MW07	MW07	MW07	MW08
Date Sampled											21-03-18 12:28	16-04-18 9:00	16-04-18 11:30	22-05-18 9:20	27-06-18 14:50	21-03-18 12:28	16-04-18 14:00	22-05-18 14:15	27-06-18 15:45	21-03-18 12:28
Batch No.											EM1805287	EM1806814	EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678	EM1810539	EM1805287
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture										
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.802	1.37	1.4	2.12	2.05	0.204	0.282	1.4	0.479	0.468
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	0.001	<0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.013	0.01	0.013	0.012	0.005	<0.005	0.006	0.007	<0.005	0.019
Sulfides																				
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.6	0.4	0.3	<0.1
Total Petroleum Hydrocarbons																				
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	480	<50	200	<50	<50	120	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	380	<100	110	<100	<100	120	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	100	<50	90	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons																				
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	440	<100	170	<100	<100	130	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	440	<100	170	<100	<100	130	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
BTEXN																				
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																				
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW06	MW06	MW06	MW06	MW06	MW07	MW07	MW07	MW07	MW08
Sample ID											MW06	MW06	QA01_16042018	MW06	MW06	MW07	MW07	MW07	MW07	MW08
Date Sampled											21-03-18 12:28	16-04-18 9:00	16-04-18 11:30	22-05-18 9:20	27-06-18 14:50	21-03-18 12:28	16-04-18 14:00	22-05-18 14:15	27-06-18 15:45	21-03-18 12:28
Batch No.											EM1805287	EM1806814	EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678	EM1810539	EM1805287
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture										
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																				
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	83	77	75	75	44	110	128	75	123	124
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	81	80	74	81	42	104	133	77	128	120
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2	<1	<1	4	3	7	<1	4	<5	5

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW08	MW08	MW08	MW09	MW09	MW09	MW09	MW10	MW10	MW10
Sample ID											MW08	MW08	MW08	MW09	MW09	MW09	MW09	MW10	MW10	MW10
Date Sampled											16-04-18 16:55	22-05-18 15:25	27-06-18 8:30	21-03-18 12:28	16-04-18 11:25	22-05-18 13:10	26-06-18 15:00	21-03-18 12:28	16-04-18 12:15	22-05-18 16:25
Batch No.											EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture										
Physico-Chemical Parameters																				
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	18300	20600	19800	24100	25100	28300	27900	15300	17500	21600
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.01	7.08	6.81	7.53	6.99	7.15	6.94	7.63	7.22	7.12
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	32.3	33.6	29.7	31	35.2	34.8	35	24.2	31.9	32.4
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	11900	13400	12900	15700	16300	18400	18100	9940	11400	14000
Alkalinity																				
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	534	639	598	581	655	734	771	459	545	620
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	534	639	598	581	655	734	771	459	545	620
Hardness																				
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1750	2010	2060	2940	3210	3420	3490	1490	1950	2430
Ion Balance																				
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	3.5	4.68	9.36	5.34	1.65	3.93	5.16	8.58	1.96	2.33
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	184	211	215	254	274	296	309	149	189	220
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	172	192	178	228	265	273	278	125	182	210
Major Ions																				
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	224	223	242	387	430	415	437	183	234	269
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	6120	7000	7170	7950	8580	9430	9910	4890	6260	7320
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	289	352	354	479	518	579	583	251	332	427
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	56	74	58	61	60	78	74	79	88
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	3110	3460	3100	3860	4580	4680	4750	2150	3240	3670
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	44	31	24	865	896	728	661	76	84	78
Nutrients																				
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	48.2	44.9	59	33.7	62.6	55.3	55.7	36.3	57.5	46.2
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	<0.01	0.03	0.01	<0.01	<0.01	0.05	<0.01	<0.01	0.05
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	0.03	0.01	<0.01	<0.01	0.05	<0.01	0.01	0.05
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	48.3	45.7	60.5	38.2	67.8	58	66.6	37.3	57.7	52.4
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	48.3	45.7	60.5	38.2	67.8	58	66.6	37.3	57.7	52.4
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.3	0.21	0.22	0.52	0.32	0.18	0.16	0.23	0.32	0.27
Metals (dissolved)																				
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.01	0.01	0.03	0.02	0.01	0.01	0.01	0.03	0.01	0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.42	0.3	0.4	0.93	0.81	0.6	0.61	0.4	0.45	0.35
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	20	22.4	27.1	2.12	2.99	10.9	17.7	3.37	14	8.64
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW08	MW08	MW08	MW09	MW09	MW09	MW09	MW10	MW10	MW10
Sample ID											MW08	MW08	MW08	MW09	MW09	MW09	MW09	MW10	MW10	MW10
Date Sampled											16-04-18 16:55	22-05-18 15:25	27-06-18 8:30	21-03-18 12:28	16-04-18 11:25	22-05-18 13:10	26-06-18 15:00	21-03-18 12:28	16-04-18 12:15	22-05-18 16:25
Batch No.											EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture										
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.601	0.548	0.629	0.557	0.523	0.642	0.633	0.278	0.509	0.485
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.006	0.007	0.02	0.007	0.008	0.006	0.006	<0.005	0.01	<0.005
Sulfides																				
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																				
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	200	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	150	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons																				
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	190	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	190	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
BTEXN																				
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	1	<1	1	1	2	1	1	<1	<1	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	1	<1	1	1	2	1	1	<1	<1	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons																				
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW08	MW08	MW08	MW09	MW09	MW09	MW09	MW10	MW10	MW10
Sample ID											MW08	MW08	MW08	MW09	MW09	MW09	MW09	MW10	MW10	MW10
Date Sampled											16-04-18 16:55	22-05-18 15:25	27-06-18 8:30	21-03-18 12:28	16-04-18 11:25	22-05-18 13:10	26-06-18 15:00	21-03-18 12:28	16-04-18 12:15	22-05-18 16:25
Batch No.											EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678	EM1810539	EM1805287	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture										
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon																				
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	149	166	149	154	158	184	140	114	143	155
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	153	175	158	148	163	199	144	112	147	162
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	6	<5	6	<1	6	<5	2	<1	7

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW10
Sample ID											MW10
Date Sampled											27-06-18 10:50
Batch No.											EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture	
Physico-Chemical Parameters											
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	22600
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.03
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	32.3
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	14700
Alkalinity											
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	669
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	669
Hardness											
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	2590
Ion Balance											
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	7.44
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	254
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	218
Major Ions											
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	297
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	8450
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.5
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	448
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	94
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	3780
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	92
Nutrients											
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	47
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.08
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.08
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	50.6
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	50.7
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.24
Metals (dissolved)											
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	<0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.36
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.002
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	12.3
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW10
Sample ID											MW10
Date Sampled											27-06-18 10:50
Batch No.											EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture	
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.403
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	<0.005
Sulfides											
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1
Total Petroleum Hydrocarbons											
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	110
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	110
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20
Total Recoverable Hydrocarbons											
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	110
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	110
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20
BTEXN											
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2
Polycyclic Aromatic Hydrocarbons											
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1

Table B2 - Main Series Overburden (80m) Analysis Results

Location											MW10
Sample ID											MW10
Date Sampled											27-06-18 10:50
Batch No.											EM1810539
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture	
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5
Carbon											
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	118
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	125
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B-3: Main Series Overburden (490m) Analysis Results

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	264	235	13800	14100	14300	13400	13400	13400
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	9.17	9.24	7.57	7.53	7.59	7.69	7.73	7.69
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	2.52	2.38	29.4	29.1	30.8	30.1	30.6	29
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	172	153	8970	9160	9300	8710	8710	8710
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	12	8	1030	1060	1090	1100	1120	1020
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	8	9	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	20	17	1030	1060	1090	1100	1120	1020
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	25	22	1210	1260	1190	1160	1190	1090
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	1.88	0.45	5.38	8.02	7.88	9.23	7.58	11.8
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	1.93	1.7	152	155	155	154	154	161
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	1.86	1.68	136	132	132	128	132	127
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	0.053	7.74	7.86	7.43	8.2	8.2	7.85
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	10	9	149	153	137	132	134	124
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	33	26	4650	4730	4730	4700	4660	4990
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.2	0.2	0.4	0.1	<0.1	0.2	0.1	0.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	<0.01	<0.5	<0.5	<0.5	1.4	1.55	<0.5
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	<1	<1	203	214	206	202	208	189
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	4	4	106	113	102	101	103	95
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	29	26	2350	2380	2440	2360	2430	2200
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	29	30	<1	<1	<1	1	<1	1
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.51	0.47	101	94	100	94.9	101	103
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.02	0.01	<0.01	0.01	0.02	0.02	0.02	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	0.01	<0.01	0.01	0.02	0.02	0.02	0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.5	0.6	116	98.2	101	96.4	100	105
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.5	0.6	116	98.2	101	96.4	100	105
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	0.06	0.33	0.23	0.22	0.47	0.24	0.44
Metals (total)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	0.001	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	0.32	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	<0.0001	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	0.085	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	0.011	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	12.2	12.7	11.5	11.4	2.83
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	0.003	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	<0.0001	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	0.009	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	<0.01	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.001	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	<0.001	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	0.459	-	-	-	-	-	-
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	0.01	0.01	<0.01	<0.01	0.02
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	0.37	0.3	0.36	0.28	0.26	0.3
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	12.9	13.2	13	13	7.59
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	0.171	0.176	0.16	0.158	0.142
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	0.001	<0.001	<0.001	0.002	0.002	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	0.009	<0.005	<0.005	0.01	0.009	0.008
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	0.6	0.7	0.3	0.3	0.3
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	60	120	130	160	110	130	110
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	180	120	130	160	110	230	110
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	120	<100	<100	<100	<100	100	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	40	40	-	-	-	-	-	30
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<50	<50	<50	<50	<50	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	50	<50	<50	<50	<50	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	<50
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	<100	<100	<100	<100	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	50	<50	<50	<50	<50	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	<50
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	120	120	150	110	130	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	120	120	150	110	130	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	130	120	120	150	110	130	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	130	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	30	30	-	-	-	-	-	50
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	-	-	-	-	-	20
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	<100	<100	<100	<100	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	<100	<100	<100	<100	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	<100	<100	<100	<100	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	<100	<100	<100	<100	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	<100	<100	<100	<100	<100	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	-	-	-	-	-	<100
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	1	<1	-	-	-	-	-	15
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	-	-	-	-	-	6
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	3	3	-	-	-	-	-	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	-	-	-	-	-	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	-	-	-	-	-	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	11	11	-	-	-	-	-	26
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	7	8	-	-	-	-	-	5
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	3	3	-	-	-	-	-	<2
Phenols																		
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	<2	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	-	<2	-	-	-	-	-	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<0.6
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	-	-	-	-	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	-	-	-	-	-	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	<0.6
Anilines and Benzidines																		
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	9	246	281	277	279	275	199
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	3	220	254	247	261	253	196
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	4	-	30	34	21	21	5
Chlorinated Hydrocarbons																		
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<10	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Fumigants																		
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Haloethers																		
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Halogenated Aliphatics																		
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Halogenated Aromatics																		
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																		
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Nitroaromatics & Ketones																		
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Nitrosamines																		
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
Organochlorine Pesticides																		
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	<2	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	<2	-	-	-	-	-	-
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	<2	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	<2	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<4	-	-	-	-	-	-
Organophosphorus Pesticides																		
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	<2	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	<2	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Oxygenated Compounds																		
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	-	-	-	-	-	-
Phthalate Esters																		
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	<10	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	-	-	-	-	-	-
Sulfonated Compounds																		
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Trihalomethanes																		
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<5	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1S	P1M1	P1M1	P1M1-ENV-GW	QA01-26072017	P1M1-ENV-GW	QA01_14082017	P1M1-ENV-GW
Date Sampled											20-06-17 14:30	20-06-17 14:30	05-07-17 16:00	26-07-17 16:00	26-07-17 16:00	14-08-17 9:45	14-08-17 11:54	19-09-17 9:40
Batch No.											EM1708197	EM1708197	EM1709026	EM1710154	EM1710154	EM1711033	EM1711033	EM1713198
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Physico-Chemical Parameters																		
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	13600	12700	13400	13600	13400	13500	13600	13700
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.71	7.83	7.88	7.58	7.58	8	7.88	8.06
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	30.8	34.6	36.7	31.8	31	34.8	34.8	33.6
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	8840	8260	8710	8840	8710	8780	8840	8900
Alkalinity																		
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	892	754	532	916	950	717	738	703
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	892	754	532	916	950	717	738	703
Hardness																		
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1040	842	672	912	1030	645	626	755
Ion Balance																		
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	9.52	9.43	7.52	9.05	5.91	13.6	14.5	7.94
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	148	159	149	146	138	147	147	135
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	122	132	130	122	123	112	110	115
Major Ions																		
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	108	88	73	90	110	39	33	50
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	4620	5110	4910	4540	4230	4700	4690	4280
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	186	151	119	167	184	133	132	153
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	98	97	97	92	103	114	111	96
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	2280	2310	2190	2210	2290	2030	2000	2120
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	<1	5	11	<1	1	1	2	<1
Nutrients																		
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	104	81.3	98	73.3	55.7	108	104	72.8
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	0.01	0.01	0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	0.02	<0.01	0.01	0.01	0.03	0.03	0.03
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	105	81.3	101	96.9	82.4	111	111	87.6
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	105	81.3	101	96.9	82.4	111	111	87.6
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.43	0.13	0.1	0.11	0.25	0.32	0.38	0.13
Metals (total)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	-	-	-	-	-	-
Metals (dissolved)																		
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.01	0.01	<0.01	0.01	<0.01	0.02	0.02	0.02
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.29	0.26	0.26	0.29	0.33	0.32	0.32	0.28
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	11	10.6	10.6	11	10.6	0.13	0.13	0.06
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.104	0.106	0.108	0.105	0.12	0.148	0.149	0.111
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.007	0.008	0.008	0.009	0.007	0.006	0.007	<0.005
Cyanides																		
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Sulfides																		
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.2	<0.1	<0.1	0.1	0.2	0.1	<0.1	0.2
Total Petroleum Hydrocarbons																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	110	120	140	110	120	160	100
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	110	120	260	110	440	700	230
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	120	<100	320	540	130
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	-	-	80	70	40	30	50
Total Petroleum Hydrocarbons (SG)																		
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	120	130	150	120	140	190	130
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	120	130	150	120	140	190	130
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	120	130	250	120	430	680	130
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	100	<100	290	490	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	-	-	80	90	40	30	60
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	30	-	-	50	50	<20	<20	30
Total Recoverable Hydrocarbons (SG)																		
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
BTEXN																		
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	19	-	-	19	24	13	13	19
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	8	-	-	8	10	2	3	6
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	-	-	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	34	-	-	34	41	21	22	32
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	7	-	-	7	7	6	6	7
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	-	-	<2	<2	<2	<2	<2
Phenols																		
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																		
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
Anilines and Benzidines																		
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Carbon																		
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	243	170	198	246	250	199	223	168
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	233	169	195	235	249	175	199	159
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	13	1	2	11	2	20	21	9
Chlorinated Hydrocarbons																		
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Fumigants																		
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Haloethers																		
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Halogenated Aliphatics																		
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Halogenated Aromatics																		
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																		
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Nitroaromatics & Ketones																		
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Nitrosamines																		
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Organochlorine Pesticides																		
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	-	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	-	-	-	-	-	-	-
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	-	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	-	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Organophosphorus Pesticides																		
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	-	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Oxygenated Compounds																		
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Phthalate Esters																		
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Sulfonated Compounds																		
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Trihalomethanes																		
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											P1M1-ENV-GW	QA01_21112017	PIM1	P1M1	P1M1	P1M1	QA01_13022018	P1M1
Date Sampled											24-10-17 14:30	21-11-17 8:11	21-11-17 12:00	12-12-17 14:30	09-01-18 14:30	13-02-18 12:18	13-02-18 12:18	20-03-18 14:30
Batch No.											EM1714933	EM1716251	EM1716251	EM1717394	EM1801460	EM1803123	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture								

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
Physico-Chemical Parameters																
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	14200	-	14400	-	13400	12000
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.98	-	7.46	-	8.22	8.9
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	33.3	-	32.9	-	40	47.4
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	9230	-	9360	-	8710	7800
Alkalinity																
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	769	-	1050	-	570	109
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	<1	-	3	194
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	<1	-	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	769	-	1050	-	573	303
Hardness																
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	827	-	1200	-	704	415
Ion Balance																
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	6.17	-	6.01	-	8.7	6.82
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	137	-	158	-	147	132
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	121	-	140	-	123	116
Major Ions																
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	51	-	147	-	41	31
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	4310	-	4870	-	4790	4470
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	<0.1	-	0.1	-	0.1	0.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	170	-	202	-	146	82
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	96	-	97	-	118	124
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	2200	-	2620	-	2440	2220
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	<1	-	<1	-	6	18
Nutrients																
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	89	-	80.2	-	72	106
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	-	0.06	-	<0.01	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	-	0.06	-	<0.01	<0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	-	<0.01	-	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.03	-	0.03	-	<0.01	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	89.4	-	82	-	76.3	106
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	89.4	-	82.1	-	76.3	106
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.26	-	0.3	-	0.05	0.08
Metals (total)																
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	-	-	-	-
Metals (dissolved)																
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.02	-	0.01	-	0.02	0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	-	<0.001	-	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.3	-	0.27	-	0.23	0.41
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	-	<0.0001	-	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	-	<0.001	-	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	-	<0.01	-	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	-	0.26	-	0.138	0.215
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	0.07	-	<0.05	-	<0.05	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	-	<0.001	-	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.11	-	0.12	-	0.072	0.077
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	-	<0.0001	-	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	<0.001	-	0.005	-	0.001	0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	-	<0.01	-	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	-	<0.001	-	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	-	<0.001	-	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	<0.005	-	0.127	-	0.011	0.191
Cyanides																
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Sulfides																
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.1	-	<0.1	-	0.1	<0.1
Total Petroleum Hydrocarbons																
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	80	80	<50	140	210
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	190	510	<50	640	2070
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	110	370	<100	440	1790
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	60	<50	60	70
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	50	60	40	50	30	30
Total Petroleum Hydrocarbons (SG)																
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Total Recoverable Hydrocarbons																
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	140	120	120	<100	180	240
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	140	120	120	<100	180	240
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	140	120	480	<100	580	1970
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	360	<100	400	1730
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	60	40	60	30	40
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	30	30	<20	30	<20	30
Total Recoverable Hydrocarbons (SG)																
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
BTEXN																
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	20	20	16	16	10	7
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	6	8	4	4	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	33	34	24	27	15	12
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	7	6	4	7	5	5
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2
Phenols																
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	-	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	-	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	-	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	-	<0.5	<0.5
Anilines and Benzidines																
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Carbon																
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	172	-	272	-	130	36
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	168	-	267	-	125	14
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	3	-	9	-	24	22
Chlorinated Hydrocarbons																
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Fumigants																
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Haloethers																
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Halogenated Aliphatics																
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-
Halogenated Aromatics																
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Nitroaromatics & Ketones																
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	-	-	-	-	-
Nitrosamines																
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Organochlorine Pesticides																
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	-	-	-	-	-
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Organophosphorus Pesticides																
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Oxygenated Compounds																
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Phthalate Esters																
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Sulfonated Compounds																
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Trihalomethanes																
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Table B.3 - Main Series Overburden (490m) Analysis Results

Location											P1M1	P1M1	P1M1	P1M1	P1M1	P1M1
Sample ID											QA01_20032018	P1M1	P1M1	P1M1	P1M1	P1M1
Date Sampled											20-03-18 14:30	18-04-18 13:30	19-04-18 13:50	23-05-18 16:10	24-05-18 9:00	28-06-18 9:30
Batch No.											EM1805282	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture						

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B-4: Main Series Coal Analysis Results

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Physico-Chemical Parameters																						
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	13100	13400	13700	13100	34200	39600	29700	16300	4230	15400	15800	5700
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	7.01	6.97	7.02	6.83	6.87	6.79	6.54	6.84	8.87	6.85	6.77	9.14
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	27.8	29	27.3	27.8	35.8	37.1	35.6	25.8	16.9	24	25	24.2
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	8520	8710	8900	8520	22200	25700	19300	10600	2750	10000	10300	3700
Alkalinity																						
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1020	1020	1070	1080	319	83	168	792	73	884	773	26
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	62	<1	<1	129
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1020	1020	1070	1080	319	83	168	792	135	884	773	155
Hardness																						
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1160	1230	1180	1080	3510	4230	2900	1800	224	1740	1690	238
Ion Balance																						
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	9.81	5.63	9.47	9.58	2.67	2.94	5.36	7.25	7.67	8.69	9.56	5.8
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	146	144	145	151	365	398	340	171	37.3	176	168	51
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	120	129	120	125	346	422	306	148	32	148	139	45.5
Major Ions																						
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	142	154	130	122	1010	1470	743	230	17	206	223	13
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	4470	4390	4380	4600	10900	11800	10600	5490	1190	5600	5420	1630
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.1	0.2	0.2	0.2	<0.1	0.2	<0.1	0.1	0.2	0.1	0.1	0.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	196	205	207	189	239	135	253	297	44	297	276	50
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	88	98	110	114	2510	3780	2210	102	91	132	103	132
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	2180	2340	2150	2100	4870	5550	4400	2510	580	2300	2360	858
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	<1	<1	<1	<1	2460	3070	1830	5	52	1	11	95
Nutrients																						
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	117	117	120	126	94.3	37.4	101	110	21.7	132	118	41.6
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.01	0.02	0.01	<0.01	0.01	<0.01	<0.01	0.01	0.02	<0.01	0.02	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	122	120	124	137	96.2	37.4	110	132	32.5	135	128	44.6
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	122	120	124	137	96.2	37.4	110	132	32.5	135	128	44.6
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.35	0.45	0.38	0.35	0.85	0.52	0.36	1.17	0.08	0.36	0.7	0.16
Metals (total)																						
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Metals (dissolved)																						
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.01	0.01	0.02	0.1	0.01	<0.01	<0.01	0.02	0.04	<0.01	0.02	0.04
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.37	0.4	0.33	0.32	0.54	0.6	0.51	0.32	0.83	0.35	0.36	0.71
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	0.0001	0.0001	<0.0001	0.0003	0.0001	0.0002	0.0002	0.0001	<0.0001	0.0002	0.0002	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.143	0.141	0.753	0.616	0.258	0.609	0.413	1.18	0.042	0.628	0.582	0.323
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	0.64	<0.05	<0.05	0.28	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	0.003	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.154	0.15	0.161	0.241	0.85	1.2	2.53	0.157	0.037	0.173	0.196	0.044
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	0.0006	0.0003	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.008	0.007	0.009	0.028	0.006	0.005	0.006	0.005	0.001	0.004	0.007	0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.248	0.244	0.442	0.429	0.142	0.125	0.141	0.292	<0.005	0.22	0.478	0.014
Cyanides																						
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Sulfides																						
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																						
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	90	150	<50	110	100	<50	210	<50	<50	150
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	2750	3650	1140	3490	820	310	1230	1300	3380	450	820	1490
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	1790	2550	760	2480	580	200	850	980	2840	400	700	1160
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	960	1100	290	860	240	<50	280	320	330	50	120	180
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	40	40	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Petroleum Hydrocarbons (SG)																						
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																						

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	160	<100	120	110	<100	310	<100	<100	210
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	160	<100	120	110	<100	310	<100	<100	210
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	2920	3830	1100	3790	850	310	1330	1370	3330	420	760	1370
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	2460	3290	920	3050	740	190	1010	1200	2840	420	760	1160
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	460	540	180	580	110	<100	210	170	180	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	40	40	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	40	40	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Recoverable Hydrocarbons (SG)																						
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
BTEXN																						
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	2	2	3	3	<1	<1	<1	<1	<1	<1	<1	1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	2	2	3	3	<1	<1	<1	<1	<1	<1	<1	1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Phenols																						
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																						
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anilines and Benzidines																						
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																						
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	275	292	289	241	91	30	49	202	39	184	186	30
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	272	296	295	214	83	19	42	208	19	189	194	16
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	3	<1	7	27	13	17	7	<1	23	<5	<1	18
Chlorinated Hydrocarbons																						
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Fumigants																						
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Haloethers																						
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Halogenated Aliphatics																						
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Halogenated Aromatics																						
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																						
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Nitroaromatics & Ketones																						
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Nitrosamines																						
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Organochlorine Pesticides																						
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW01	MW01	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Sample ID											MW01	QA01_17042018	MW01	MW01	MW02	MW02	MW02	MW03	MW03	MW03	MW04	MW04
Date Sampled											17-04-18	17-04-18	22-05-18	26-06-18	17-04-18	22-05-18	26-06-18	18-04-18	22-05-18	27-06-18	18-04-18	22-05-18
Batch No.											EM1806814	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678	EM1810539	EM1806814	EM1808678
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	-	-	-	-	-	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Organophosphorus Pesticides																						
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Oxygenated Compounds																						
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Phthalate Esters																						
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Sulfonated Compounds																						
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes																						
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Physico-Chemical Parameters																					
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	5470	14900	4080	3450	5260	-	9960	-	727	14100	14800
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	8.96	6.86	9.23	9.28	11.6	-	12.2	-	11.6	12	12
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	23.9	25.8	16.2	17.6	13.7	-	23	-	2.52	31.9	35.8
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	3560	9680	2650	2240	3420	-	6470	-	472	9160	9620
Alkalinity																					
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	45	801	29	13	<1	-	<1	-	<1	<1	<1
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	100	<1	136	138	88	-	233	-	60	171	177
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	327	-	1340	-	213	1510	1350
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	146	801	165	151	415	-	1570	-	272	1680	1530
Hardness																					
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	258	1630	216	157	342	-	337	-	287	642	499
Ion Balance																					
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	7.51	7.83	9.58	9.94	8.32	-	11.9	-	1.3	11.3	11.5
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	54.9	163	36.6	35.1	39.9	-	68.3	-	10.9	134	129
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	47.2	139	30.2	28.8	33.8	-	53.8	-	10.6	107	102
Major Ions																					
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	1.98	-	0.146	2.59	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	16	217	14	10	23800	-	135	-	115	257	200
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	1780	5200	1150	1110	1060	-	1260	-	131	3510	3430
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.1	0.1	0.1	0.1	<0.1	-	0.2	-	0.2	0.1	<0.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.1	-	<0.05	<0.5	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	53	264	44	32	1220	-	<1	-	<1	<2	<1
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	144	103	83	84	319	-	190	-	25	198	172
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	882	2390	546	506	565	-	970	-	98	1860	1840
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	84	5	41	39	83	-	68	-	86	91	77
Nutrients																					
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	41.5	107	31.4	21	33.6	-	-	-	13.8	118	110
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.07	<0.01	<0.01	0.02	0.1	-	-	-	<0.01	<0.01	0.02
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.07	<0.01	<0.01	0.02	0.22	-	-	-	0.04	0.02	0.02
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	<0.01	0.12	-	-	-	0.04	0.02	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	0.02	<0.01	<0.01	<0.05	-	<0.01	-	<0.01	0.06	<0.01
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	47.4	144	31.5	42	34.3	-	-	-	13.8	121	114
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	47.5	144	31.5	42	34.5	-	-	-	13.8	121	114
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.13	0.45	0.08	0.09	0.67	-	-	-	<0.01	0.04	0.09
Metals (total)																					
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	-	-	0.085	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	-	-	3.35	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	-	-	0.0495	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	-	-	88.6	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	-	-	26.8	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	<0.05	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	-	-	65.1	-	-	-	-	-	-
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	-	-	0.0013	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	-	-	13.5	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	0.19	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	0.603	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	-	-	0.241	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	-	-	443	-	-	-	-	-	-
Metals (dissolved)																					
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.02	0.02	0.03	0.02	-	-	-	-	2.21	0.61	0.91
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	-	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.83	0.4	0.88	0.95	-	-	0.22	-	0.29	0.12	0.13
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	0.0001	<0.0001	<0.0001	-	-	<0.0001	-	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	-	<0.001	<0.001	0.002
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.054	0.409	0.084	0.062	-	-	<0.001	-	<0.001	<0.001	<0.001
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.05	<0.05	<0.05	<0.05	-	-	-	-	<0.05	<0.05	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	0.001	<0.001	<0.001	-	-	0.001	-	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	0.039	0.187	0.035	0.009	-	-	-	-	<0.001	<0.001	<0.001
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.0001	-	<0.0001	<0.0001	0.0009
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.001	0.01	0.002	0.002	-	-	0.005	-	<0.001	0.003	0.002
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	-	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	-	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.006	0.8	0.006	<0.005	-	-	0.012	-	<0.005	0.007	0.012
Cyanides																					
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	<0.004	<0.004	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	<0.1	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	<0.004	<0.004	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	<0.004	<0.004	-
Sulfides																					
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	4.1	<0.1
Total Petroleum Hydrocarbons																					
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	140	<50	100	140	190	<50	320	420	-	<50	140
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	1280	900	990	1060	3660	320	860	600	-	140	340
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	960	700	770	750	2850	260	390	180	-	140	200
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	180	200	120	170	620	60	150	<50	-	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	-	-	-	-	<20	<20
Total Petroleum Hydrocarbons (SG)																					
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<50	<50	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	<50	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	340	<50	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	2500	-	-	-	-	<50	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	230	<100	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	2030	-	-	-	-	<100	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	110	<50	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	470	-	-	-	-	<50	-
Total Recoverable Hydrocarbons																					

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	180	<100	120	160	330	<100	320	<100	-	<100	130
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	180	<100	120	160	330	<100	320	<100	-	<100	130
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	1330	920	920	1100	3580	290	720	190	-	180	330
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	1030	820	800	820	3140	290	400	190	-	180	200
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	120	100	<100	120	110	<100	<100	<100	-	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	20	-	-	-	-	<20	20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	<20	<20	-	-	-	-	<20	<20
Total Recoverable Hydrocarbons (SG)																					
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	<100	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	-	-	-	<100	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	<100	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<100	-	-	-	-	<100	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	290	<100	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	2400	-	-	-	-	<100	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	290	<100	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	2220	-	-	-	-	<100	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	<100	<100	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	180	-	-	-	-	<100	-
BTEXN																					
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	1	<1	1	1	4	-	-	-	-	7	10
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	-	-	-	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	-	-	-	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5	<5	-	-	-	-	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	-	-	-	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	1	<1	1	1	4	-	-	-	-	7	10
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	-	-	-	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	<2	<2	<2	-	-	-	-	<2	<2
Phenols																					
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	-	-	-	<2	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																					
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<2	-	-	-	-	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<2	-	-	-	-	<0.5	<0.6
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	-	-	-	-	-	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	-	-	-	-	-	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<2	-	-	-	-	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5	<2	-	-	-	-	<0.5	<0.6
Anilines and Benzidines																					
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Carbon																					
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	25	243	31	22	-	-	12	-	18	10	8
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	11	244	19	9	-	-	1	-	<10	<5	<1
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	14	<1	17	14	-	-	-	8	-	6	9
Chlorinated Hydrocarbons																					
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<10	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Fumigants																					
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Haloethers																					
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Halogenated Aliphatics																					
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Halogenated Aromatics																					
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																					
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Nitroaromatics & Ketones																					
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Nitrosamines																					
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
Organochlorine Pesticides																					
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	-	-	-	<2	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	-	-	-	<2	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											MW04	MW05	MW05	MW05	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2
Sample ID											MW04	MW05	MW05	MW05	PIM2	P1M2 11:40:00 AM	P1M2	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW	P1M2-ENV-GW
Date Sampled											27-06-18	18-04-18	22-05-18	27-06-18	28-06-17	04-07-17	04-07-17	25-07-17	27-07-17	20-09-17	25-10-17
Batch No.											EM1810539	EM1806814	EM1808678	EM1810539	EM1708463	EM1709026	EM1709026	EM1710154	EM1710154	EM1713198	EM1714933
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	-	-	-	<2	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	-	-	-	<2	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<4	-	-	-	-	-	-
Organophosphorus Pesticides																					
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	-	-	-	<2	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	-	-	-	<2	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Oxygenated Compounds																					
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<50	-	-	-	-	-	-
Phthalate Esters																					
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	-	-	-	128	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<2	-	-	-	-	-	-
Sulfonated Compounds																					
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Trihalomethanes																					
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	<5	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Physico-Chemical Parameters																						
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	15200	13000	14300	12300	13800	-	14000	14200	-	6750	4020	296
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	12.1	12.2	11.9	12.1	12.3	-	12.2	12.2	-	12.2	11.8	10
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	26.2	16.7	26	22.4	15.9	-	13.8	14	-	16.2	6.38	6.23
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	9880	8450	9300	8000	8970	-	9100	9230	-	4390	2610	192
Alkalinity																						
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	5
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	194	238	122	141	186	-	206	226	-	131	95	52
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1520	1820	830	1520	1660	-	1810	1830	-	993	498	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1710	2060	953	1660	1840	-	2020	2060	-	1120	594	58
Hardness																						
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	752	961	949	719	1480	-	1650	1650	-	252	350	5
Ion Balance																						
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	9.63	7.96	0.66	8.95	7.96	-	9.9	12	-	8.59	4.28	2.19
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	124	96.5	105	104	110	-	112	118	-	46.4	25.6	1.96
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	151	82.3	104	86.7	94.2	-	92.1	92.8	-	39.1	23.6	1.88
Major Ions																						
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	301	385	380	288	592	-	662	660	-	101	140	2
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	3130	1910	2990	2440	2570	-	2510	2680	-	790	406	21
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.1	<0.1	<0.1	0.2	0.1	-	0.1	<0.1	-	0.3	0.3	0.1
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	<2	<2	<1	<2	<2	-	<2	<2	-	<1	<1	<1
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	156	119	182	149	131	-	114	115	-	122	69	15
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	1650	1190	1840	1380	1410	-	1290	1310	-	595	275	32
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	83	70	79	83	61	-	54	64	-	84	112	10
Nutrients																						
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	114	116	72.7	119	88	-	146	140	-	70.6	39.8	0.16
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	<0.01	0.01	0.01	0.02	0.02	-	0.02	0.02	-	<0.01	0.01	0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.01	0.03	0.02	0.02	0.02	-	0.03	0.04	-	<0.01	0.01	0.03
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	0.01	0.02	0.01	<0.01	<0.01	-	0.01	0.02	-	<0.01	<0.01	0.02
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	-	0.01	0.01	-	<0.01	<0.01	0.02
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	117	123	82.8	120	88.3	-	147	142	-	84.9	47.8	0.4
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	117	123	82.8	120	88.3	-	147	142	-	84.9	47.8	0.4
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.03	0.12	3.04	0.18	0.77	-	0.02	0.05	-	0.06	0.08	0.27
Metals (total)																						
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Metals (dissolved)																						
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	0.58	0.66	0.64	0.53	0.67	-	0.1	0.1	-	0.71	0.73	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	0.001	0.001	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.13	0.12	0.14	0.13	0.07	-	0.1	0.1	-	0.21	0.25	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	<0.001	<0.001	0.004	<0.001	<0.001	-	<0.001	<0.001	-	0.001	<0.001	-
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	-	0.303	0.302	-	0.104	0.044	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	-	0.07	0.07	-	<0.05	<0.05	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	0.049	0.048	-	0.028	0.006	-
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	-	0.003	0.003	-	<0.001	<0.001	-
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.004	0.003	0.002	0.006	0.002	-	0.008	0.009	-	0.007	0.004	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.007	0.01	0.01	0.016	0.094	-	0.667	0.672	-	0.139	0.328	-
Cyanides																						
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Sulfides																						
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.3	3.2	1.3	2	3	-	<0.1	<0.1	-	<0.1	<0.1	-
Total Petroleum Hydrocarbons																						
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	110	90	230	200	330	5560	2620	120	2790	790	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	500	90	1320	950	1480	7800	3190	660	4360	1800	150
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	310	<100	1000	550	890	2050	470	420	1500	920	150
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	80	<50	90	200	260	190	100	120	70	90	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	20	20	<20	<20	30	30	<20	20	20	<20
Total Petroleum Hydrocarbons (SG)																						
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																						

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	120	<100	250	220	370	5430	2340	160	2780	850	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	120	<100	250	220	370	5430	2340	160	2780	850	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	460	<100	1250	1000	1530	7400	2820	620	4050	1700	170
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	340	<100	1000	640	980	1860	480	460	1270	850	170
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	140	180	110	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	20	40	40	30	20	100	100	30	60	60	<20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<20	30	30	<20	<20	80	80	20	50	50	<20
Total Recoverable Hydrocarbons (SG)																						
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
BTEXN																						
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	-	9	12	9	9	10	13	12	8	5	3	<1
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	3	2	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	9	12	11	11	12	22	19	8	10	8	<1
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	-	<2	<2	2	2	2	6	5	<2	5	5	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Phenols																						
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																						
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	-
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-
Anilines and Benzidines																						
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																						
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	11	21	8	18	15	-	22	21	-	20	14	-
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	1	1	<1	<1	-	2	1	-	2	<1	-
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	11	20	6	13	14	-	20	20	-	23	13	-
Chlorinated Hydrocarbons																						
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Fumigants																						
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Haloethers																						
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Halogenated Aliphatics																						
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Halogenated Aromatics																						
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																						
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Nitroaromatics & Ketones																						
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Nitrosamines																						
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Organochlorine Pesticides																						
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M3
Sample ID											PIM2	P1M2	P1M2	P1M2	P1M2	P1M2	P1M2	QA01_19042018	P1M2	P1M2	P1M2	P1M3S
Date Sampled											21-11-17	12-12-17	09-01-18	13-02-18	20-03-18	19-04-18	19-04-18	19-04-18	24-05-18	24-05-18	28-06-18	20-06-17
Batch No.											EM1716251	EM1717394	EM1801460	EM1803123	EM1805282	EM1806818	EM1806818	EM1806818	EM1808684	EM1808684	EM1810592	EM1708197
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture												
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	-	-	-	-	-	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Organophosphorus Pesticides																						
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Oxygenated Compounds																						
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Phthalate Esters																						
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Sulfonated Compounds																						
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Trihalomethanes																						
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-	-	-	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Physico-Chemical Parameters																					
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	273	9090	10200	7160	10600	12000	11000	11000	10100	10800	11000
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	10.1	8	8.22	11.2	7.98	8.02	8.01	8.09	8.28	8.04	8.27
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	5.84	31.9	37.8	192	42.2	36	53.6	48.4	49.3	50.4	40.4
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	177	5910	6630	4650	6890	7800	7150	7150	6560	7020	7150
Alkalinity																					
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	1	1130	889	<1	1260	1340	965	1100	910	1120	1150
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	60	<1	<1	777	<1	<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	601	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	62	1130	889	1380	1260	1340	965	1100	910	1120	1150
Hardness																					
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	5	441	473	<10	433	609	296	301	299	244	431
Ion Balance																					
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	-	7.28	4.7	11.2	7.77	7.74	7.9	8.8	4.76	12.4	8.67
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	2.02	96.8	104	80.4	124	127	125	114	103	119	113
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	1.79	83.7	94.7	64.2	106	109	107	96	94	93	94.9
Major Ions																					
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.039	4.64	5.59	4.9	5.78	-	-	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	2	58	41	2	40	79	18	20	11	12	34
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	21	2630	3060	1860	3500	3570	3750	3280	3020	3440	3190
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	<0.01	2.12	<0.5	3.44	<0.5	-	-	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	<1	72	90	1	81	100	61	61	66	52	84
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	15	103	120	242	110	83	109	97	108	112	93
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	30	1540	1890	1330	2020	2040	2120	1930	1960	1810	1930
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	9	1	<1	17	2	<1	1	<1	1	<1	<1
Nutrients																					
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	0.2	73.2	77	131	94.5	86.1	82.2	49.7	63.2	91.8	94.7
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	0.02	0.02	0.01	0.01	0.04	0.01	<0.01	0.09	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.02	0.02	0.01	0.03	0.06	0.01	<0.01	0.1	0.01	<0.01	<0.01
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	0.01	0.01	<0.01	<0.01
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.01	<0.01	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.02
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.5	86.6	77.2	132	95.8	94.5	83.3	91.8	77.1	92.5	104
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.5	86.6	77.2	132	95.9	94.5	83.3	91.9	77.1	92.5	104
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.23	0.19	0.17	0.64	0.25	0.05	0.03	0.19	0.61	0.1	0.45
Metals (total)																					
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	0.006	-	-	-	-	-	-	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	0.44	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	<0.0001	-	-	-	-	-	-	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	0.033	-	-	-	-	-	-	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	0.015	-	-	-	-	-	-	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	8.53	5.2	2.4	-	-	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	0.004	-	-	-	-	-	-	-	-	-	-
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	<0.0001	-	-	-	-	-	-	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	0.01	-	-	-	-	-	-	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	<0.01	-	-	-	-	-	-	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	0.001	-	-	-	-	-	-	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	<0.001	-	-	-	-	-	-	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	0.06	-	-	-	-	-	-	-	-	-	-
Metals (dissolved)																					
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	<0.01	<0.01	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	0.4	0.38	0.34	0.34	0.37	0.36	0.38	0.35	0.3	0.27
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	7	7.23	4.69	6.1	4.87	6.36	7.42	5.98	2.73
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	0.095	0.08	0.068	0.068	0.065	0.066	0.062	0.049	0.03
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	0.007	<0.005	<0.005	0.007	0.008	0.007	0.009	0.007	0.005	0.006
Cyanides																					
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	<0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-
Sulfides																					
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	0.2	0.3	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons																					
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	210	<50	<50	<50	<50	<50	<50	50	<50	100	100
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	210	<100	<100	<100	<100	<100	<100	<100	<100	100	100
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	<50	<50	<50	<50	<50	50	<50	<50	<50
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	-	-	-	<20	<20	-	20	<20	20	20
Total Petroleum Hydrocarbons (SG)																					
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	<50	<50	-	-	-	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	<50	-	-	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	<50	<50	-	-	-	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	<50	-	-	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	-	-	-	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<50	<50	<50	-	-	-	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	<50	-	-	-	-	-	-
Total Recoverable Hydrocarbons																					

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	230	100	<100	<100	<100	<100	<100	110	<100	<100	<100
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	230	100	<100	<100	<100	<100	<100	110	<100	<100	<100
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	-	-	-	<20	<20	-	20	<20	40	30
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	-	-	-	<20	<20	-	<20	<20	30	<20
Total Recoverable Hydrocarbons (SG)																					
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	-	-	-	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<100	<100	<100	-	-	-	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	-	-	-	<100	-	-	-	-	-	-
BTEXN																					
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	<1	-	-	-	5	7	-	7	7	8	9
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	-	-	-	<2	<2	-	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<2	<2	-	<2	<2	2	2
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	-	-	-	<5	<5	-	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	2	2	-	<2	<2	3	3
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	-	7	9	-	7	7	13	14
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	-	-	-	<2	<2	-	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	-	-	-	2	2	-	<2	<2	5	5
Phenols																					
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	<2	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																					
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<2	-	-	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	-	<1	<1	-	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	-	-	-	<1	<1	-	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<1	<1	-	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
Anilines and Benzidines																					
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Carbon																					
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	18	241	261	146	282	367	272	288	253	337	269
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	6	229	245	126	277	346	267	266	245	292	262
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	6	3	25	20	4	15	5	22	9	35	7
Chlorinated Hydrocarbons																					
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<10	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Fumigants																					
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Haloethers																					
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Halogenated Aliphatics																					
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Halogenated Aromatics																					
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Monocyclic Aromatic Hydrocarbons																					
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Nitroaromatics & Ketones																					
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Nitrosamines																					
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
Organochlorine Pesticides																					
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	<2	-	-	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	<2	-	-	-	-	-	-	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	P1M3-ENV-GW	PIM3	P1M3	P1M3	P1M3	P1M3
Date Sampled											20-06-17	05-07-17	25-07-17	15-08-17	21-09-17	24-10-17	21-11-17	12-12-17	09-01-18	13-02-18	20-03-18
Batch No.											EM1708197	EM1709026	EM1710154	EM1711033	EM1713198	EM1714933	EM1716251	EM1717394	EM1801460	EM1803123	EM1805282
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture											
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	<2	-	-	-	-	-	-	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	<2	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<4	-	-	-	-	-	-	-	-	-	-
Organophosphorus Pesticides																					
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	<2	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	<2	-	-	-	-	-	-	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Oxygenated Compounds																					
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	-	-	-	-	-	-	-	-	-	-
Phthalate Esters																					
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	<10	-	-	-	-	-	-	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	-	-	-	-	-	-	-	-	-	-
Sulfonated Compounds																					
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Trihalomethanes																					
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<5	-	-	-	-	-	-	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
Physico-Chemical Parameters														
Electrical Conductivity @ 25°C	1	µS/cm	ne	ne	ne	ne	ne	5970	ne	ne	-	11500	9320	8510
pH - Lab	0.01	pH Units	ne	ne	ne	-8.5	ne	ne	ne	9	-	7.75	9.88	11.3
Sodium Adsorption Ratio	0.01	-	ne	ne	ne	ne	ne	ne	ne	ne	-	42	83.4	211
Total Dissolved Solids (Calc,)	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	7480	6060	5530
Alkalinity														
Bicarbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	1270	<1	<1
Carbonate Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	902	431
Hydroxide Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<1	54	539
Total Alkalinity as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	1270	956	970
Hardness														
Total Hardness as CaCO3	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	530	66	<10
Ion Balance														
Ionic Balance	0.01	%	ne	ne	ne	ne	ne	ne	ne	ne	-	7.01	13.4	12.8
Total Anions	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	-	126	104	91.7
Total Cations	0.01	meq/L	ne	ne	ne	ne	ne	ne	ne	ne	-	110	79.8	71
Major Ions														
Bromide	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Calcium	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	-	62	<1	2
Chloride	1	mg/L	ne	ne	ne	400	ne	ne	ne	ne	-	3550	3020	2550
Fluoride	0.1	mg/L	ne	ne	1.5	ne	1	2	2	0.02	-	0.2	0.2	0.2
Iodide	0.01	mg/L	ne	ne	0.5	ne	ne	ne	ne	ne	-	-	-	-
Magnesium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	15	-	91	16	<1
Potassium	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	92	188	230
Sodium	1	mg/L	ne	ne	ne	300	ne	ne	ne	ne	-	2220	1570	1290
Sulphate (as SO4)	1	mg/L	ne	ne	ne	ne	ne	1000	1000	ne	-	24	8	18
Nutrients														
Ammonia as N	0.01	mg/L	0.9	0.91	ne	0.01	ne	ne	ne	ne	-	81	76	124
Nitrate as N	0.01	mg/L	0.7	ne	ne	10	ne	400	400	ne	-	0.02	<0.01	0.01
Nitrite + Nitrate as N	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	0.02	<0.01	0.04
Nitrite as N	0.01	mg/L	ne	ne	3	1	ne	30	30	ne	-	<0.01	0.01	0.03
Reactive Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	0.02	0.03	0.08
Total Kjeldahl Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	81.3	88.6	130
Total Nitrogen as N	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	81.3	88.6	130
Total Phosphorus as P	0.01	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	0.07	0.06	0.16
Metals (total)														
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	-	-	-
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	-	-	-
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	-	-	-
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	-	-	-
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	-	-	-
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	-	-	-
Ferrous Iron	0.05	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	-	-	-
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	-	-	-
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	-	-	-
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	-	-	-
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	-	-	-
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	-	-	-
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	-	-	-
Metals (dissolved)														
Aluminium	0.01	mg/L	0.055	ne	ne	0.2	5	5	5	0.01	-	<0.01	0.02	0.01
Arsenic	0.001	mg/L	0.013	ne	0.01	0.05	0.1	0.5	0.5	0.05	-	<0.001	0.003	0.007
Boron	0.05	mg/L	0.37	ne	4	1	0.5	5	5	ne	-	0.31	0.22	0.27
Cadmium	0.0001	mg/L	0.0002	0.0055	0.002	0.005	0.01	0.01	0.01	0.0002	-	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	0.001	0.0044	ne	0.05	0.1	1	1	0.02	-	<0.001	<0.001	<0.001
Chromium (as Cr VI)	0.01	mg/L	0.001	0.0044	0.05	ne	ne	ne	ne	ne	-	<0.01	<0.01	<0.01
Copper	0.001	mg/L	0.0014	0.0013	2	1	0.2	1	0.4	0.005	-	0.545	0.225	0.034
Iron	0.05	mg/L	ne	ne	ne	0.3	0.2	ne	ne	0.01	-	<0.05	<0.05	<0.05
Lead	0.001	mg/L	0.0034	0.0044	0.01	0.05	2	0.1	0.1	0.001	-	<0.001	<0.001	<0.001
Manganese	0.001	mg/L	1.9	ne	0.5	0.1	0.2	ne	ne	0.01	-	0.046	0.002	<0.001
Mercury	0.0001	mg/L	0.0006	0.0004	0.001	0.001	0.002	0.002	0.002	0.001	-	<0.0001	<0.0001	<0.0001
Nickel	0.001	mg/L	0.011	0.07	0.02	0.1	0.2	1	1	0.1	-	0.005	0.002	0.004
Selenium	0.01	mg/L	0.011	ne	0.01	0.01	0.02	0.02	0.02	0.01	-	<0.01	<0.01	<0.01
Thorium	0.001	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.001	<0.001	<0.001
Uranium	0.001	mg/L	ne	ne	0.017	ne	0.01	0.2	0.2	ne	-	<0.001	<0.001	<0.001
Zinc	0.005	mg/L	0.008	0.015	ne	5	2	20	20	0.005	-	0.148	0.008	0.007
Cyanides														
Free Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Thiocyanate	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Total Cyanide	0.004	mg/L	0.007	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Weak Acid Dissociable Cyanide	0.004	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Sulfides														
Sulfide as S2-	0.1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons														
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	<50	140	2280
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	650	1060	5250
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	510	850	2690
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<50	140	70	280
C6 - C9 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	40
Total Petroleum Hydrocarbons (SG)														
C10 - C14 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C10 - C14 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C10 - C36 Fraction (sum)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C10 - C36 Fraction (sum) (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C15 - C28 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C15 - C28 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C29 - C36 Fraction	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
C29 - C36 Fraction (SG)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Total Recoverable Hydrocarbons														

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	160	2380
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	160	2380
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	570	980	5120
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	570	820	2600
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<100	<100	<100	140
C6 - C10 Fraction	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	30	70
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<20	<20	<20	60
Total Recoverable Hydrocarbons (SG)														
>C10 - C16 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C10 - C16 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C10 - C40 Fraction (sum)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C10 - C40 Fraction (sum) (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C16 - C34 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C16 - C34 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C34 - C40 Fraction	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
>C34 - C40 Fraction (SG)	100	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
BTEXN														
Benzene	1	µg/L	950	700	1	10	ne	ne	ne	ne	8	7	5	2
Ethylbenzene	2	µg/L	ne	ne	300	ne	ne	ne	ne	ne	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<2	<2	3	4
Naphthalene	5	µg/L	16	70	ne	ne	ne	ne	ne	ne	<5	<5	<5	<5
ortho-Xylene	2	µg/L	350	ne	ne	ne	ne	ne	ne	ne	<2	<2	5	6
Sum of BTEX	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	8	7	13	12
Toluene	2	µg/L	ne	ne	800	ne	ne	ne	ne	ne	<2	<2	<2	<2
Total Xylenes	2	µg/L	550	ne	600	ne	ne	ne	ne	ne	<2	<2	8	10
Phenols														
2,4,5-Trichlorophenol	2	µg/L	ne	ne	ne	1	ne	ne	ne	ne	-	-	-	-
2,4,6-Trichlorophenol	2	µg/L	20	ne	20	10	ne	ne	ne	ne	-	-	-	-
2,4-Dichlorophenol	2	µg/L	160	ne	200	ne	ne	ne	ne	4	-	-	-	-
2,4-Dimethylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2,6-Dichlorophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2-Chlorophenol	2	µg/L	490	ne	300	ne	ne	ne	ne	ne	-	-	-	-
2-Methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2-Nitrophenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
3- & 4-Methylphenol	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Chloro-3-methylphenol	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Pentachlorophenol	4	µg/L	10	22	10	10	ne	ne	ne	ne	-	-	-	-
Phenol	2	µg/L	320	400	ne	ne	ne	ne	ne	ne	-	-	-	-
Polycyclic Aromatic Hydrocarbons														
2-Chloronaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2-Methylnaphthalene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
3-Methylcholanthrene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
7,12-Dimethylbenz(a)anthracene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Acenaphthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
Acenaphthylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Benz(a)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Benzo(a)pyrene	0.5	µg/L	ne	ne	0.01	0.01	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Benzo(b+j)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Benzo(g,h,i)perylene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Benzo(k)fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Chrysene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Fluoranthene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Fluorene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Indeno(1,2,3,cd)pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
N-2-Fluorenylacetamide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Naphthalene (Ex SVOC)	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Phenanthrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Pyrene	1	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<1	<1	<1	<1
Total PAHs	0.5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	<0.5	<0.5	<0.5	<0.5
Anilines and Benzidines														
2-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
3,3-Dichlorobenzidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
3-Nitroaniline	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Chloroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Nitroaniline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Aniline	2	µg/L	250	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Carbazole	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dibenzofuran	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Carbon														
Total Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	318	137	60
Total Inorganic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	315	106	16
Total Organic Carbon	1	mg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	12	39	43
Chlorinated Hydrocarbons														
1,2,4-Trichlorobenzene	2	µg/L	170	80	ne	ne	ne	ne	ne	ne	-	-	-	-
1,2-Dichlorobenzene	2	µg/L	160	ne	1500	ne	ne	ne	ne	ne	-	-	-	-
1,3-Dichlorobenzene	2	µg/L	260	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,4-Dichlorobenzene	2	µg/L	60	ne	40	ne	ne	ne	ne	ne	-	-	-	-
Hexachlorobenzene (HCB)	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Hexachlorobutadiene	2	µg/L	ne	ne	0.7	ne	ne	ne	ne	ne	-	-	-	-
Hexachlorocyclopentadiene	10	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Hexachloroethane	2	µg/L	360	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Hexachloropropylene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Pentachlorobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Fumigants														
1,2-Dibromoethane (EDB)	5	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-
1,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
2,2-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
cis-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
trans-1,3-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Haloethers														
4-Bromophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Chlorophenyl phenyl ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Bis(2-chloroethoxy) methane	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Bis(2-chloroethyl) ether	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Halogenated Aliphatics														
1,1,1,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,1,1-Trichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,1,2,2-Tetrachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,1,2-Trichloroethane	5	µg/L	6500	1900	ne	ne	ne	ne	ne	ne	-	-	-	-
1,1-Dichloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,1-Dichloroethene	5	µg/L	ne	ne	30	0.3	ne	ne	ne	ne	-	-	-	-
1,1-Dichloropropylene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,2,3-Trichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,2-Dibromo-3-chloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,2-Dichloroethane	5	µg/L	ne	ne	3	10	ne	ne	ne	ne	-	-	-	-
1,3-Dichloropropane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Bromomethane	50	µg/L	ne	ne	1	ne	ne	ne	ne	ne	-	-	-	-
Carbon Tetrachloride	5	µg/L	ne	ne	3	3	ne	ne	ne	ne	-	-	-	-
Chloroethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Chloromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
cis-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
cis-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dibromomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dichlorodifluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Iodomethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Pentachloroethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Tetrachloroethene	5	µg/L	ne	ne	50	10	ne	ne	ne	ne	-	-	-	-
trans-1,2-Dichloroethene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
trans-1,4-Dichloro-2-butene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Trichloroethylene (TCE)	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Trichlorofluoromethane	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Vinyl chloride	50	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-
Halogenated Aromatics														
1,2,3-Trichlorobenzene	5	µg/L	10	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Chlorotoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Bromobenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Chlorobenzene	5	µg/L	ne	ne	300	ne	ne	ne	ne	ne	-	-	-	-
Monocyclic Aromatic Hydrocarbons														
1,2,4-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1,3,5-Trimethylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Isopropylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
n-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
n-Propylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
p-Isopropyltoluene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
sec-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Styrene	5	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-
tert-Butylbenzene	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Nitroaromatics & Ketones														
1,3,5-Trinitrobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
1-Naphthylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2,4-Dinitrotoluene	4	µg/L	65	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2,6-Dinitrotoluene	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2-Picoline	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Aminobiphenyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Nitroquinoline-N-oxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
5-Nitro-o-toluidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Acetophenone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Azobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Chlorobenzilate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dimethylaminoazobenzene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Isophorone	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Nitrobenzene	2	µg/L	550	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Pentachloronitrobenzene	2	µg/L	ne	ne	30	ne	ne	ne	ne	ne	-	-	-	-
Phenacetin	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Pronamide	2	µg/L	ne	ne	70	ne	ne	ne	ne	ne	-	-	-	-
Nitrosamines														
Methapyrilene	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosodibutylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosodiethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosodi-n-propylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosodiphenyl & Diphenylamine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosomethylethylamine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosomorpholine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosopiperidine	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
N-Nitrosopyrrolidine	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Organochlorine Pesticides														
Aldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.01	-	-	-	-
Aldrin + Dieldrin	4	µg/L	ne	ne	0.3	ne	ne	ne	ne	ne	-	-	-	-
alpha-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
alpha-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
beta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
beta-Endosulfan	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
DDD	2	µg/L	0.01	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
DDE	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
DDT	4	µg/L	0.01	ne	9	3	ne	ne	ne	ne	-	-	-	-
delta-BHC	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dieldrin	2	µg/L	ne	ne	ne	1	ne	ne	ne	0.005	-	-	-	-

Table B.4 - Main Series Coal Analysis Results

Location											P1M3	P1M3	P1M3	P1M3
Sample ID											P1M3	P1M3	P1M3	P1M3
Date Sampled											18-04-18	19-04-18	23-05-18	27-06-18
Batch No.											EM1806818	EM1806818	EM1808684	EM1810592
Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%	ANZECC 2000 - Marine Water - 95%	ADWG 2015 - Health	ADWG - Health (Primary Recreation Contact)	ANZECC 2000 - LTV Irrigation	ANZECC 2000 - Livestock - Cattle	ANZECC 2000 - Livestock - Sheep	ANZECC 2000 - Freshwater Aquaculture				
Endosulfan sulfate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Endrin	2	µg/L	0.02	0.008	ne	1	ne	ne	ne	0.002	-	-	-	-
gamma-BHC	2	µg/L	0.2	ne	10	ne	ne	ne	ne	ne	-	-	-	-
Heptachlor	2	µg/L	0.09	ne	0.3	3	ne	ne	ne	0.005	-	-	-	-
Heptachlor epoxide	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Sum of DDD + DDE + DDT	4	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Organophosphorus Pesticides														
Chlorfenvinphos	2	µg/L	ne	ne	2	10	ne	ne	ne	ne	-	-	-	-
Chlorpyrifos	2	µg/L	0.01	0.009	10	2	ne	ne	ne	0.001	-	-	-	-
Chlorpyrifos-methyl	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Diazinon	2	µg/L	0.01	ne	4	10	ne	ne	ne	ne	-	-	-	-
Dichlorvos	2	µg/L	ne	ne	5	20	ne	ne	ne	ne	-	-	-	-
Dimethoate	2	µg/L	0.15	ne	7	100	ne	ne	ne	ne	-	-	-	-
Ethion	2	µg/L	ne	ne	4	6	ne	ne	ne	ne	-	-	-	-
Fenthion	2	µg/L	ne	ne	7	ne	ne	ne	ne	ne	-	-	-	-
Malathion	2	µg/L	0.05	ne	70	ne	ne	ne	ne	0.1	-	-	-	-
Pirimiphos-ethyl	2	µg/L	ne	ne	0.5	1	ne	ne	ne	ne	-	-	-	-
Prothiofos	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Oxygenated Compounds														
2-Butanone (MEK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
2-Hexanone (MBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
4-Methyl-2-pentanone (MIBK)	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Vinyl Acetate	50	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Phthalate Esters														
bis(2-ethylhexyl) phthalate	10	µg/L	ne	ne	10	ne	ne	ne	ne	ne	-	-	-	-
Butyl benzyl phthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Diethyl phthalate	2	µg/L	1000	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dimethyl phthalate	2	µg/L	3700	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Di-n-butyl phthalate	2	µg/L	26	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Di-n-octylphthalate	2	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Sulfonated Compounds														
Carbon disulfide	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Trihalomethanes														
Bromodichloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Bromoform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Chloroform	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-
Dibromochloromethane	5	µg/L	ne	ne	ne	ne	ne	ne	ne	ne	-	-	-	-

Exceeds the ANZECC/ARMCANZ Trigger values for freshwater ecosystems - Level of protection 95% species

Exceeds the ANZECC/ARMCANZ Trigger values for marine water ecosystems - Level of protection 95% species

Exceeds the NHMRC Australian Drinking Water Guideline 2015 - Health

Exceeds the NHMRC Primary Recreational Water

Exceeds the ANZECC/ARMCANZ Long-Term Trigger Value (LTV) for irrigation

Exceeds the ANZECC/ARMCANZ Livestock Watering - Cattle

Exceeds the ANZECC/ARMCANZ Livestock Watering - Sheep

Exceeds the ANZECC ANZECC 2000 - Guideline for Protection of Freshwater Aquaculture Species

B.2 Summary of Groundwater Analysis Results

Table B-5: Baseline Groundwater Concentration Ranges at Local Groundwater Wells (Telford Gravels)

		3965				6536-1				6537-2318			
Analyte	Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Alkalinity													
Bicarbonate Alkalinity as CaCO3	mg/L	13	-	85	197	13		360	506	14		252	449
Carbonate Alkalinity as CaCO3	mg/L	-	13	-	-	-	13				14		
Hydroxide Alkalinity as CaCO3	mg/L	-	13	-	-	-	13				14		
Total Alkalinity as CaCO3	mg/L	13	-	85	197	13		360	506	14		252	449
BTEXN													
Benzene	µg/L		9				9				9		
Ethylbenzene	µg/L		9				9				9		
meta- & para-Xylene	µg/L		9				9				9		
Naphthalene	µg/L		9				9				9		
ortho-Xylene	µg/L		9				9				9		
Sum of BTEX	µg/L		9				9				9		
Toluene	µg/L		9				9				9		
Total Xylenes	µg/L		9				9				9		
Carbon													
Total Carbon	mg/L	12		21	50	12		78	133	13		62	132
Total Inorganic Carbon	mg/L	12		22	45	12		79	119	13		62	122
Total Organic Carbon	mg/L	8	4	1	4	6	6	1	5	3	10	1	5
Cyanides													
Free Cyanide	mg/L		3				3				4		
Thiocyanate	mg/L		3				3				4		
Total Cyanide	mg/L		3				3				4		
Weak Acid Dissociable Cyanide	mg/L		3				3				4		

		3965				6536-1				6537-2318			
Analyte	Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Hardness													
Total Hardness as CaCO3	mg/L	13		2820	5670	13		405	932	14		628	1350
Major Ions													
Bromide	mg/L	3		3.5	4.46	3		2.86	2.98	4		2.68	2.86
Calcium	mg/L	13		823	1370	13		73	154	14		126	308
Chloride	mg/L	13		6190	22200	13		1430	2970	14		1640	2760
Fluoride	mg/L	13		0.6	2.1	13		1	3.4	14		2.2	3.9
Iodide	mg/L		3			1	2	0.62	0.62		4		
Magnesium	mg/L	13		187	546	13		54	133	14		76	148
Potassium	mg/L	12	1	6	37	12	1	16	26	14		16	42
Sodium	mg/L	13		3620	10900	13		1140	2250	14		1220	1800
Sulphate (as SO4)	mg/L	13		2810	3680	13		658	2000	14		866	1320
Metals (dissolved)													
Aluminium	mg/L	10	2	0.01	0.09	4	8	0.01	0.15	3	9	0.01	0.03
Arsenic	mg/L	2	11	0.001	0.001		12			1	12	0.001	0.001
Boron	mg/L	12		1.54	4.02	12		1.81	2.62	13		1.14	1.82
Cadmium	mg/L	11	2	0.0003	0.0011		12				13		
Chromium	mg/L		13				12				13		
Chromium (as Cr VI)	mg/L		8				8				8		
Copper	mg/L	10	3	0.001	0.009	1	11	0.001	0.001	3	10	0.001	0.006
Iron	mg/L	9	3	0.11	2.45	9	3	0.1	2.58	1	11	0.09	0.09
Lead	mg/L	12	1	0.002	0.019	1	11	0.001	0.001		13		
Manganese	mg/L	12		0.138	18.6	12		0.147	0.247	12		0.025	0.503
Mercury	mg/L		13				12				13		
Nickel	mg/L	13		0.004	0.361		12			1	12	0.001	0.001

		3965				6536-1				6537-2318			
Analyte	Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Selenium	mg/L		12				12				13		
Thorium	mg/L	2	11	0.001	0.002	2	10	0.001	0.001	1	12	0.001	0.001
Uranium	mg/L	12	1	0.002	0.027	12		0.008	0.016	13		0.002	0.004
Zinc	mg/L	13		0.04	1.56	9	3	0.005	0.036	12	1	0.011	0.022
Nutrients													
Ammonia as N	mg/L	12	1	0.05	3.43	12		0.02	1.67	13		0.03	0.14
Nitrate as N	mg/L	13		0.05	0.94	7	5	0.01	0.11	13		0.06	0.39
Nitrite + Nitrate as N	mg/L	13		0.05	0.94	7	5	0.01	0.11	13		0.07	0.39
Nitrite as N	mg/L	6	7	0.01	0.24	2	10	0.01	0.01	3	10	0.01	0.01
Reactive Phosphorus as P	mg/L	4	9	0.01	0.02	1	11	0.01	0.01	4	9	0.02	0.09
Total Kjeldahl Nitrogen as N	mg/L	11	2	0.1	3.8	7	5	0.2	1.7	7	6	0.1	0.4
Total Nitrogen as N	mg/L	12	1	0.2	4.4	7	5	0.2	1.7	13		0.2	0.8
Total Phosphorus as P	mg/L	13		0.02	0.76	11	1	0.04	0.13	10	3	0.02	0.23
Physico-Chemical Parameters													
Electrical Conductivity @ 25°C	µS/cm	13		9070	55200	13		6060	11100	14		7070	32200
pH - Lab	pH Units	13		6.37	7.33	13		7.72	8.09	14		6.93	8.16
Sodium Adsorption Ratio	-	13		29.6	64.5	12		28.7	34.7	13		18.6	23.6
Total Dissolved Solids (Calc,)	mg/L	13		5900	35900	13		3940	7220	14		4600	20900
Sulfides													
Sulfide as S2-	mg/L	2	10	0.2	1.4	6	6	0.1	14		12		
Total Petroleum Hydrocarbons													
C10 - C14 Fraction	µg/L		12				13				14		
C10 - C36 Fraction (sum)	µg/L		12				13				14		
C15 - C28 Fraction	µg/L		12				13				14		
C29 - C36 Fraction	µg/L		12				13				14		

		3965				6536-1				6537-2318			
Analyte	Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
C6 - C9 Fraction	µg/L		9				9				9		
Total Petroleum Hydrocarbons (SG)													
C10 - C14 Fraction	µg/L		1				1				2		
C10 - C36 Fraction (sum)	µg/L		1				1				2		
C15 - C28 Fraction	µg/L		1				1				2		
C29 - C36 Fraction	µg/L		1				1				2		
C10 - C14 Fraction (SG)	µg/L		2				2				2		
C10 - C36 Fraction (sum) (SG)	µg/L		2				2				2		
C29 - C36 Fraction (SG)	µg/L		2				2				2		
C15 - C28 Fraction (SG)	µg/L		2				2				2		
Total Recoverable Hydrocarbons													
>C10 - C16 Fraction	µg/L		12				13				14		
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L		12				13				14		
>C10 - C40 Fraction (sum)	µg/L		12				13				14		
>C16 - C34 Fraction	µg/L		12				13				14		
>C34 - C40 Fraction	µg/L		12				13				14		
C6 - C10 Fraction	µg/L		9				9				9		
C6 - C10 Fraction minus BTEX (F1)	µg/L		9				9				9		
Total Recoverable Hydrocarbons (SG)													
>C10 - C16 Fraction	µg/L		1				1				2		
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L		1				1				2		
>C10 - C40 Fraction (sum)	µg/L		1				1				2		
>C16 - C34 Fraction	µg/L		1				1				2		
>C34 - C40 Fraction	µg/L		1				1				2		
>C10 - C16 Fraction (SG)	µg/L		2				2				2		

		3965				6536-1				6537-2318			
Analyte	Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	µg/L		2				2				2		
>C10 - C40 Fraction (sum) (SG)	µg/L		2				2				2		
>C16 - C34 Fraction (SG)	µg/L		2				2				2		
>C34 - C40 Fraction (SG)	µg/L		2				2				2		
Polycyclic Aromatic Hydrocarbons													
Acenaphthene	µg/L		9				9				9		
Acenaphthylene	µg/L		9				9				9		
Anthracene	µg/L		9				9				9		
Benz(a)anthracene	µg/L		9				9				9		
Benzo(a)pyrene	µg/L		9				9				9		
Benzo(a)pyrene TEQ (zero)	µg/L		9				9				9		
Benzo(b+j)fluoranthene	µg/L		9				9				9		
Benzo(g,h,i)perylene	µg/L		9				9				9		
Benzo(k)fluoranthene	µg/L		9				9				9		
Chrysene	µg/L		9				9				9		
Dibenz(a,h)anthracene	µg/L		9				9				9		
Fluoranthene	µg/L		9				9				9		
Fluorene	µg/L		9				9				9		
Indeno(1,2,3,cd)pyrene	µg/L		9				9				9		
Naphthalene (Ex SVOC)	µg/L		9				9				9		
Phenanthrene	µg/L		9				9				9		
Pyrene	µg/L		9				9				9		
Total PAHs	µg/L		9				9				9		

Table B-6: Baseline Groundwater Concentration Ranges at LCK Telford Gravels Monitoring Wells

Analyte	Units	MW19				MW20				MW11				MW12				MW13				MW14			
		Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Alkalinity																									
Bicarbonate Alkalinity as CaCO3	mg/L	5	-	299	439	5	-	347	390	6	-	130	154	1	-	322	322	1	-	209	209	1	-	82	82
Carbonate Alkalinity as CaCO3	mg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Hydroxide Alkalinity as CaCO3	mg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Alkalinity as CaCO3	mg/L	5	-	299	439	5	-	347	390	6	-	130	154	1	-	322	322	1	-	209	209	1	-	82	82
BTEXN																									
Benzene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Ethylbenzene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
meta- & para-Xylene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Naphthalene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
ortho-Xylene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Sum of BTEX	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Toluene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Xylenes	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Carbon																									
Total Carbon	mg/L	5	-	120	149	5	-	87	138	6	-	33	90	1	-	64	64	1	-	41	41	1	-	14	14
Total Inorganic Carbon	mg/L	5	-	102	134	5	-	92	121	6	-	32	93	1	-	83	83	1	-	26	26	1	-	14	14
Total Organic Carbon	mg/L	4	1	6	14	5	-	1	21	4	2	1	3	1	-	20	20	1	-	15	15	-	1	-	-
Hardness																									
Total Hardness as CaCO3	mg/L	5	-	8570	9200	5	-	6840	7650	6	-	6460	7270	1	-	3870	3870	1	-	5310	5310	1	-	7270	7270
Major Ions																									
Calcium	mg/L	5	-	1620	1730	5	-	1270	1440	6	-	1220	1410	1	-	711	711	1	-	998	998	1	-	1620	1620
Chloride	mg/L	5	-	27100	30400	5	-	17300	21900	6	-	14700	17500	1	-	11000	11000	1	-	14600	14600	1	-	18400	18400
Fluoride	mg/L	5	-	0.2	0.3	5	-	0.5	0.6	6	-	1.1	1.7	1	-	1.9	1.9	1	-	2.7	2.7	1	-	1.3	1.3
Magnesium	mg/L	5	-	1100	1200	5	-	892	996	6	-	794	922	1	-	508	508	1	-	685	685	1	-	783	783
Potassium	mg/L	5	-	34	53	4	1	15	29	5	1	13	18	1	-	16	16	1	-	16	16	1	-	17	17
Sodium	mg/L	5	-	12800	16800	5	-	10900	12800	6	-	8450	11400	1	-	6320	6320	1	-	8230	8230	1	-	9330	9330
Sulphate (as SO4)	mg/L	5	-	3770	4060	5	-	4040	4670	6	-	3680	4350	1	-	3090	3090	1	-	4310	4310	1	-	3130	3130
Metals (dissolved)																									
Aluminium	mg/L	3	2	0.02	0.03	1	4	0.02	0.02	5	1	0.01	0.05	1	-	0.03	0.03	1	-	0.02	0.02	1	-	0.05	0.05
Arsenic	mg/L	2	3	0.001	0.002	4	1	0.003	0.005	-	6	-	-	1	-	0.001	0.001	-	1	-	-	-	1	-	-
Boron	mg/L	5	-	4.11	5.04	5	-	3.65	4.84	6	-	4.69	6.46	1	-	4.39	4.39	1	-	6.49	6.49	1	-	4.46	4.46
Cadmium	mg/L	1	4	0.0017	0.0017	-	5	-	-	6	-	0.0001	0.0008	1	-	0.0006	0.0006	1	-	0.0011	0.0011	1	-	0.0018	0.0018
Chromium	mg/L	1	4	0.001	0.001	-	5	-	-	-	6	-	-	1	-	0.124	0.124	1	-	0.103	0.103	-	1	-	-
Chromium (as Cr VI)	mg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Copper	mg/L	1	4	0.016	0.016	-	5	-	-	3	3	0.001	0.131	1	-	0.004	0.004	1	-	0.003	0.003	1	-	0.002	0.002
Iron	mg/L	4	1	1.35	2.6	5	-	1.75	4.02	1	5	0.06	0.06	-	1	-	-	-	1	-	-	-	1	-	-
Lead	mg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	1	-	0.009	0.009
Manganese	mg/L	5	-	21	25.4	5	-	13	15.4	6	-	0.036	2.39	1	-	3.44	3.44	1	-	0.326	0.326	1	-	0.019	0.019
Mercury	mg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	1	-	0.0003	0.0003
Nickel	mg/L	5	-	0.009	0.091	5	-	0.026	0.031	6	-	0.002	0.027	1	-	0.026	0.026	1	-	0.009	0.009	1	-	0.019	0.019
Selenium	mg/L	-	5	-	-	-	5	-	-	3	3	0.02	0.02	-	1	-	-	1	-	0.02	0.02	1	-	0.02	0.02
Thorium	mg/L	1	4	0.004	0.004	1	4	0.004	0.004	-	6	-	-	1	-	0.002	0.002	1	-	0.001	0.001	-	1	-	-
Uranium	mg/L	4	1	0.004	0.004	5	-	0.003	0.006	6	-	0.013	0.026	1	-	0.029	0.029	1	-	0.034	0.034	1	-	0.001	0.001
Zinc	mg/L	4	1	0.011	0.327	5	-	0.021	0.161	5	1	0.01	0.084	1	-	0.015	0.015	1	-	0.132	0.132	1	-	0.082	0.082
Nutrients																									

		MW19				MW20				MW11				MW12				MW13				MW14			
Analyte	Units	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Ammonia as N	mg/L	5	-	6.71	15	5	-	0.63	1.3	6	-	0.1	0.46	1	-	0.11	0.11	1	-	0.05	0.05	1	-	0.06	0.06
Nitrate as N	mg/L	2	3	0.04	0.16	3	2	0.01	0.04	6	-	2.72	6.38	1	-	0.04	0.04	-	1	-	-	1	-	6.24	6.24
Nitrite + Nitrate as N	mg/L	2	3	0.06	0.16	3	2	0.01	0.04	6	-	2.96	6.38	1	-	0.04	0.04	-	1	-	-	1	-	6.24	6.24
Nitrite as N	mg/L	1	4	0.02	0.02	-	5	-	-	5	1	0.06	0.24	-	1	-	-	-	1	-	-	-	1	-	-
Reactive Phosphorus as P	mg/L	2	3	0.01	0.02	1	4	0.02	0.02	3	3	0.01	0.02	-	1	-	-	1	-	0.01	0.01	1	-	0.1	0.1
Total Kjeldahl Nitrogen as N	mg/L	5	-	7.1	15.8	5	-	1.2	14.3	6	-	0.2	1.4	1	-	1.4	1.4	1	-	0.8	0.8	-	1	-	-
Total Nitrogen as N	mg/L	5	-	7.3	15.8	5	-	1.2	14.3	6	-	3.5	6.8	1	-	1.4	1.4	1	-	0.8	0.8	1	-	6.2	6.2
Total Phosphorus as P	mg/L	5	-	0.72	6.88	5	-	0.89	4.52	6	-	0.3	3.5	1	-	2.27	2.27	1	-	0.39	0.39	1	-	0.34	0.34
Physico-Chemical Parameters																									
Electrical Conductivity @ 25°C	µS/cm	5	-	67700	75600	5	-	52100	60500	6	-	45900	51300	1	-	31400	31400	1	-	40300	40300	1	-	46600	46600
pH - Lab	pH Units	5	-	6.74	7.19	5	-	6.7	7.23	6	-	6.99	7.55	1	-	7.39	7.39	1	-	7.28	7.28	1	-	6.16	6.16
Sodium Adsorption Ratio	-	5	-	60.1	78.9	5	-	55	66.8	6	-	45.5	58.8	1	-	44.2	44.2	1	-	49.1	49.1	1	-	47.6	47.6
Total Dissolved Solids (Calc,)	mg/L	5	-	44000	49100	5	-	33900	39300	6	-	29800	33300	1	-	20400	20400	1	-	26200	26200	1	-	30300	30300
Sulfides																									
Sulfide as S2-	mg/L	3	2	0.4	1.6	3	2	0.1	1	2	4	0.1	0.6	-	1	-	-	-	1	-	-	-	1	-	-
Total Petroleum Hydrocarbons																									
C10 - C14 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	100	100	-	1	-	-	-	1	-	-
C10 - C36 Fraction (sum)	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	440	440	1	-	150	150	-	1	-	-
C15 - C28 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	340	340	1	-	150	150	-	1	-	-
C29 - C36 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C6 - C9 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Recoverable Hydrocarbons																									
>C10 - C16 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	130	130	-	1	-	-	-	1	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	130	130	-	1	-	-	-	1	-	-
>C10 - C40 Fraction (sum)	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	450	450	1	-	120	120	-	1	-	-
>C16 - C34 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	1	-	320	320	1	-	120	120	-	1	-	-
>C34 - C40 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C6 - C10 Fraction	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Polycyclic Aromatic Hydrocarbons																									
Acenaphthene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Acenaphthylene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Anthracene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benz(a)anthracene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(a)pyrene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(b+j)fluoranthene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(g,h,i)perylene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(k)fluoranthene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Chrysene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Dibenz(a,h)anthracene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Fluoranthene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Fluorene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Indeno(1,2,3,cd)pyrene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Naphthalene (Ex SVOC)	µg/L	-	5	-	-	1	4	1.6	1.6	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Phenanthrene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Pyrene	µg/L	-	5	-	-	-	5	-	-	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total PAHs	µg/L	-	5	-	-	1	4	1.6	1.6	-	6	-	-	-	1	-	-	-	1	-	-	-	1	-	-

Analyte	Units	MW15				MW16				MW17				MW18				MW21			
		Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Alkalinity																					
Bicarbonate Alkalinity as CaCO3	mg/L	1	-	108	108	1	-	96	96	1	-	132	132	1	-	103	103	1	-	31	31
Carbonate Alkalinity as CaCO3	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Hydroxide Alkalinity as CaCO3	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Alkalinity as CaCO3	mg/L	1	-	108	108	1	-	96	96	1	-	132	132	1	-	103	103	1	-	31	31
BTEXN																					
Benzene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Ethylbenzene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
meta- & para-Xylene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Naphthalene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
ortho-Xylene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Sum of BTEX	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Toluene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Xylenes	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Carbon																					
Total Carbon	mg/L	1	-	21	21	1	-	25	25	1	-	17	17	1	-	18	18	1	-	19	19
Total Inorganic Carbon	mg/L	1	-	21	21	1	-	22	22	1	-	16	16	1	-	19	19	1	-	19	19
Total Organic Carbon	mg/L	-	1	-	-	1	-	2	2	1	-	1	1	-	1	-	-	-	1	-	-
Hardness																					
Total Hardness as CaCO3	mg/L	1	-	6590	6590	1	-	8260	8260	1	-	7040	7040	1	-	9010	9010	1	-	5650	5650
Major Ions																					
Calcium	mg/L	1	-	1370	1370	1	-	1700	1700	1	-	1440	1440	1	-	1980	1980	1	-	1220	1220
Chloride	mg/L	1	-	17200	17200	1	-	21200	21200	1	-	18500	18500	1	-	21000	21000	1	-	19000	19000
Fluoride	mg/L	1	-	1.7	1.7	1	-	0.8	0.8	1	-	2.5	2.5	1	-	1.6	1.6	1	-	0.7	0.7
Magnesium	mg/L	1	-	770	770	1	-	974	974	1	-	836	836	1	-	988	988	1	-	632	632
Potassium	mg/L	1	-	19	19	1	-	22	22	1	-	12	12	1	-	30	30	1	-	25	25
Sodium	mg/L	1	-	9270	9270	1	-	10500	10500	1	-	9820	9820	1	-	10300	10300	1	-	10100	10100
Sulphate (as SO4)	mg/L	1	-	3200	3200	1	-	3400	3400	1	-	3110	3110	1	-	2950	2950	1	-	3180	3180
Metals (dissolved)																					
Aluminium	mg/L	1	-	0.02	0.02	1	-	0.04	0.04	1	-	0.02	0.02	1	-	0.04	0.04	1	-	0.79	0.79
Arsenic	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Boron	mg/L	1	-	5.22	5.22	1	-	3.7	3.7	1	-	3.8	3.8	1	-	3.17	3.17	1	-	4.35	4.35
Cadmium	mg/L	1	-	0.0014	0.0014	1	-	0.0045	0.0045	1	-	0.001	0.001	1	-	0.0035	0.0035	1	-	0.0023	0.0023
Chromium	mg/L	-	1	-	-	1	-	0.001	0.001	-	1	-	-	-	1	-	-	-	1	-	-
Chromium (as Cr VI)	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Copper	mg/L	1	-	0.002	0.002	1	-	0.003	0.003	1	-	0.002	0.002	1	-	0.002	0.002	1	-	0.002	0.002
Iron	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Lead	mg/L	-	1	-	-	1	-	0.003	0.003	1	-	0.002	0.002	-	1	-	-	1	-	0.002	0.002
Manganese	mg/L	1	-	0.018	0.018	1	-	0.889	0.889	1	-	0.005	0.005	1	-	0.006	0.006	1	-	2.95	2.95
Mercury	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	1	-	0.0011	0.0011	-	1	-	-
Nickel	mg/L	1	-	0.005	0.005	1	-	0.047	0.047	1	-	0.006	0.006	1	-	0.021	0.021	1	-	0.173	0.173
Selenium	mg/L	1	-	0.02	0.02	1	-	0.01	0.01	1	-	0.02	0.02	1	-	0.03	0.03	1	-	0.01	0.01
Thorium	mg/L	1	-	0.002	0.002	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Uranium	mg/L	1	-	0.003	0.003	1	-	0.015	0.015	1	-	0.015	0.015	1	-	0.004	0.004	-	1	-	-
Zinc	mg/L	1	-	0.099	0.099	1	-	0.168	0.168	1	-	0.092	0.092	1	-	0.115	0.115	1	-	0.662	0.662
Nutrients																					
Ammonia as N	mg/L	1	-	0.08	0.08	1	-	0.25	0.25	1	-	0.06	0.06	1	-	0.09	0.09	1	-	0.43	0.43

Analyte	Units	MW15				MW16				MW17				MW18				MW21			
		Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Nitrate as N	mg/L	1	-	5.87	5.87	1	-	1.76	1.76	1	-	6.41	6.41	1	-	6.83	6.83	1	-	11.2	11.2
Nitrite + Nitrate as N	mg/L	1	-	5.87	5.87	1	-	2.16	2.16	1	-	6.41	6.41	1	-	6.83	6.83	1	-	11.2	11.2
Nitrite as N	mg/L	-	1	-	-	1	-	0.4	0.4	-	1	-	-	-	1	-	-	1	-	0.02	0.02
Reactive Phosphorus as P	mg/L	1	-	0.06	0.06	-	1	-	-	1	-	0.04	0.04	1	-	0.03	0.03	-	1	-	-
Total Kjeldahl Nitrogen as N	mg/L	1	-	0.3	0.3	1	-	0.3	0.3	-	1	-	-	-	1	-	-	1	-	0.4	0.4
Total Nitrogen as N	mg/L	1	-	6.2	6.2	1	-	2.5	2.5	1	-	6.4	6.4	1	-	6.8	6.8	1	-	11.6	11.6
Total Phosphorus as P	mg/L	1	-	1.9	1.9	1	-	0.29	0.29	1	-	0.79	0.79	1	-	0.29	0.29	1	-	0.34	0.34
Physico-Chemical Parameters																					
Electrical Conductivity @ 25°C	µS/cm	1	-	44000	44000	1	-	54000	54000	1	-	49700	49700	1	-	52800	52800	1	-	44500	44500
pH - Lab	pH Units	1	-	6.47	6.47	1	-	6.02	6.02	1	-	6.63	6.63	1	-	6.31	6.31	1	-	5.55	5.55
Sodium Adsorption Ratio	-	1	-	49.7	49.7	1	-	50.3	50.3	1	-	50.9	50.9	1	-	47.2	47.2	1	-	58.4	58.4
Total Dissolved Solids (Calc,)	mg/L	1	-	28600	28600	1	-	35100	35100	1	-	32300	32300	1	-	34300	34300	1	-	28900	28900
Sulfides																					
Sulfide as S2-	mg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Petroleum Hydrocarbons																					
C10 - C14 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C10 - C36 Fraction (sum)	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C15 - C28 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C29 - C36 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C6 - C9 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total Recoverable Hydrocarbons																					
>C10 - C16 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
>C10 - C40 Fraction (sum)	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
>C16 - C34 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
>C34 - C40 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C6 - C10 Fraction	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Polycyclic Aromatic Hydrocarbons																					
Acenaphthene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Acenaphthylene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Anthracene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benz(a)anthracene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(a)pyrene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(b+j)fluoranthene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(g,h,i)perylene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(k)fluoranthene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Chrysene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Dibenz(a,h)anthracene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Fluoranthene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Fluorene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Indeno(1,2,3,cd)pyrene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Naphthalene (Ex SVOC)	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Phenanthrene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Pyrene	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Total PAHs	µg/L	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-

Table B-7: Baseline Groundwater Concentration Ranges of Main Series Overburden (80mbgl)

		MW06				MW07				MW08				MW09				MW10			
Analyte	Analysis Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Alkalinity																					
Bicarbonate Alkalinity as CaCO3	mg/L	5	-	117	309	4	-	297	557	4	-	491	639	4	-	581	771	4	-	459	669
Carbonate Alkalinity as CaCO3	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Hydroxide Alkalinity as CaCO3	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Total Alkalinity as CaCO3	mg/L	5	-	117	309	4	-	297	557	4	-	491	639	4	-	581	771	4	-	459	669
BTEXN																					
Benzene	µg/L	-	5	-	-	-	4	-	-	3	1	1	1	4	-	1	2	-	4	-	-
Ethylbenzene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
meta- & para-Xylene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Naphthalene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
ortho-Xylene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Sum of BTEX	µg/L	-	5	-	-	-	4	-	-	3	1	1	1	4	-	1	2	-	4	-	-
Toluene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Total Xylenes	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Carbon																					
Total Carbon	mg/L	5	-	44	83	4	-	75	128	4	-	124	166	4	-	140	184	4	-	114	155
Total Inorganic Carbon	mg/L	5	-	42	81	4	-	77	133	4	-	120	175	4	-	144	199	4	-	112	162
Total Organic Carbon	mg/L	3	2	2	4	2	2	4	7	2	2	5	6	2	2	6	6	2	2	2	7
Hardness																					
Total Hardness as CaCO3	mg/L	5	-	4060	4660	4	-	1750	2860	4	-	1420	2060	4	-	2940	3490	4	-	1490	2590
Major Ions																					
Calcium	mg/L	5	-	693	804	4	-	247	436	4	-	172	242	4	-	387	437	4	-	183	297
Chloride	mg/L	5	-	9770	11300	4	-	5440	11400	4	-	5000	7170	4	-	7950	9910	4	-	4890	8450
Fluoride	mg/L	5	-	0.4	0.7	4	-	0.3	0.3	4	-	0.4	0.5	4	-	0.3	0.4	4	-	0.3	0.5
Magnesium	mg/L	5	-	558	649	4	-	275	431	4	-	240	354	4	-	479	583	4	-	251	448
Potassium	mg/L	5	-	41	59	4	-	59	83	4	-	56	74	4	-	58	78	4	-	74	94
Sodium	mg/L	5	-	5220	5880	4	-	3030	4670	4	-	2260	3460	4	-	3860	4750	4	-	2150	3780
Sulphate (as SO4)	mg/L	5	-	2020	2440	4	-	154	286	4	-	24	51	4	-	661	896	4	-	76	92
Metals (dissolved)																					
Aluminium	mg/L	5	-	0.01	0.02	4	-	0.01	0.02	4	-	0.01	0.03	4	-	0.01	0.02	3	1	0.01	0.03
Arsenic	mg/L	1	4	0.002	0.002	-	4	-	-	-	4	-	-	1	3	0.001	0.001	2	2	0.001	0.002
Boron	mg/L	5	-	1.03	1.66	4	-	0.27	0.39	4	-	0.3	0.46	4	-	0.6	0.93	4	-	0.35	0.45
Cadmium	mg/L	1	4	0.0001	0.0001	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Chromium	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Chromium (as Cr VI)	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Copper	mg/L	1	4	0.003	0.003	1	3	0.002	0.002	1	3	0.007	0.007	1	3	0.001	0.001	1	3	0.002	0.002
Iron	mg/L	5	-	31.3	76	4	-	1.23	38.5	4	-	7.59	27.1	4	-	2.12	17.7	4	-	3.37	14
Lead	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Manganese	mg/L	5	-	0.802	2.12	4	-	0.204	1.4	4	-	0.468	0.629	4	-	0.523	0.642	4	-	0.278	0.509
Mercury	mg/L	-	5	-	-	-	4	-	-	1	3	0.0002	0.0002	-	4	-	-	-	4	-	-
Nickel	mg/L	1	4	0.001	0.001	-	4	-	-	2	2	0.001	0.007	-	4	-	-	3	1	0.001	0.002
Selenium	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Thorium	mg/L	2	3	0.001	0.006	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Uranium	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Zinc	mg/L	5	-	0.005	0.013	2	2	0.006	0.007	4	-	0.006	0.02	4	-	0.006	0.008	1	3	0.01	0.01
Nutrients																					
Ammonia as N	mg/L	5	-	29	33.5	4	-	38.9	59.4	4	-	26.6	59	4	-	33.7	62.6	4	-	36.3	57.5

Analyte	Analysis Unit	MW06				MW07				MW08				MW09				MW10			
		Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Nitrate as N	mg/L	-	5	-	-	2	2	0.05	0.08	1	3	0.03	0.03	2	2	0.01	0.05	2	2	0.05	0.08
Nitrite + Nitrate as N	mg/L	-	5	-	-	2	2	0.05	0.08	1	3	0.03	0.03	2	2	0.01	0.05	3	1	0.01	0.08
Nitrite as N	mg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	1	3	0.01	0.01
Reactive Phosphorus as P	mg/L	1	4	0.01	0.01	1	3	0.02	0.02	1	3	0.01	0.01	1	3	0.01	0.01	1	3	0.01	0.01
Total Kjeldahl Nitrogen as N	mg/L	5	-	30.6	80.6	4	-	39.1	60.3	4	-	35.7	60.5	4	-	38.2	67.8	4	-	37.3	57.7
Total Nitrogen as N	mg/L	5	-	30.6	80.6	4	-	39.1	60.3	4	-	35.7	60.5	4	-	38.2	67.8	4	-	37.3	57.7
Total Phosphorus as P	mg/L	5	-	0.05	0.32	4	-	0.15	0.26	4	-	0.21	0.34	4	-	0.16	0.52	4	-	0.23	0.32
Physico-Chemical Parameters																					
Electrical Conductivity @ 25°C	µS/cm	5	-	30900	33300	4	-	16200	31200	4	-	14800	20600	4	-	24100	28300	4	-	15300	22600
pH - Lab	pH Units	5	-	6.27	7.06	4	-	6.91	7.8	4	-	6.81	7.51	4	-	6.94	7.53	4	-	7.03	7.63
Sodium Adsorption Ratio	-	5	-	35.4	39.9	4	-	31.5	38	4	-	26.1	33.6	4	-	31	35.2	4	-	24.2	32.4
Total Dissolved Solids (Calc,)	mg/L	5	-	20100	21600	4	-	10500	20300	4	-	9620	13400	4	-	15700	18400	4	-	9940	14700
Sulfides																					
Sulfide as S2-	mg/L	-	5	-	-	4	-	0.3	0.6	-	4	-	-	1	3	0.1	0.1	-	4	-	-
Total Petroleum Hydrocarbons																					
C10 - C14 Fraction	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
C10 - C36 Fraction (sum)	µg/L	2	3	200	480	1	3	120	120	1	3	200	200	-	4	-	-	1	3	110	110
C15 - C28 Fraction	µg/L	2	3	110	380	1	3	120	120	1	3	150	150	-	4	-	-	1	3	110	110
C29 - C36 Fraction	µg/L	2	3	90	100	-	4	-	-	1	3	50	50	-	4	-	-	-	4	-	-
C6 - C9 Fraction	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Total Recoverable Hydrocarbons																					
>C10 - C16 Fraction	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
>C10 - C40 Fraction (sum)	µg/L	2	3	170	440	1	3	130	130	1	3	190	190	-	4	-	-	1	3	110	110
>C16 - C34 Fraction	µg/L	2	3	170	440	1	3	130	130	1	3	190	190	-	4	-	-	1	3	110	110
>C34 - C40 Fraction	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
C6 - C10 Fraction	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Polycyclic Aromatic Hydrocarbons																					
Acenaphthene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Acenaphthylene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Anthracene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Benz(a)anthracene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Benzo(a)pyrene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Benzo(b+j)fluoranthene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Benzo(g,h,i)perylene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Benzo(k)fluoranthene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Chrysene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Dibenz(a,h)anthracene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Fluoranthene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Fluorene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Indeno(1,2,3,cd)pyrene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Naphthalene (Ex SVOC)	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Phenanthrene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Pyrene	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-
Total PAHs	µg/L	-	5	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-

Note: MW19 was over drilled and completed in the upper portion of the Main Series Overburden. MW21 was drilled and constructed as a direct replacement under a new permit. MW20 was abandoned due to duel formation intersection.

Table B-8: Baseline Groundwater Concentration Ranges of Main Series Coal Wells at PCD Facility

		MW01				MW03				MW04				MW05			
Analyte	Analysis Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Alkalinity																	
Bicarbonate Alkalinity as CaCO3	mg/L	4	-	1020	1080	3	-	73	884	3	-	26	773	3	-	13	801
Carbonate Alkalinity as CaCO3	mg/L	-	4	-	-	1	2	62	62	2	1	100	129	2	1	136	138
Hydroxide Alkalinity as CaCO3	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Total Alkalinity as CaCO3	mg/L	4	-	1020	1080	3	-	135	884	3	-	146	773	3	-	151	801
BTEXN																	
Benzene	µg/L	4	-	2	3	-	3	-	-	2	1	1	1	2	1	1	1
Ethylbenzene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
meta- & para-Xylene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Naphthalene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
ortho-Xylene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Sum of BTEX	µg/L	4	-	2	3	-	3	-	-	2	1	1	1	2	1	1	1
Toluene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Total Xylenes	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Carbon																	
Total Carbon	mg/L	4	-	241	292	3	-	39	202	3	-	25	186	3	-	22	243
Total Inorganic Carbon	mg/L	4	-	214	296	3	-	19	208	3	-	11	194	3	-	9	244
Total Organic Carbon	mg/L	3	1	3	27	1	2	23	23	2	1	14	18	2	1	14	17
Hardness																	
Total Hardness as CaCO3	mg/L	4	-	1080	1230	3	-	224	1800	3	-	238	1690	3	-	157	1630
Major Ions																	
Calcium	mg/L	4	-	122	154	3	-	17	230	3	-	13	223	3	-	10	217
Chloride	mg/L	4	-	4380	4600	3	-	1190	5600	3	-	1630	5420	3	-	1110	5200
Fluoride	mg/L	4	-	0.1	0.2	3	-	0.1	0.2	3	-	0.1	0.1	3	-	0.1	0.1
Magnesium	mg/L	4	-	189	207	3	-	44	297	3	-	50	276	3	-	32	264
Potassium	mg/L	4	-	88	114	3	-	91	132	3	-	103	144	3	-	83	103
Sodium	mg/L	4	-	2100	2340	3	-	580	2510	3	-	858	2360	3	-	506	2390
Sulphate (as SO4)	mg/L	-	4	-	-	3	-	1	52	3	-	11	95	3	-	5	41
Metals (dissolved)																	
Aluminium	mg/L	4	-	0.01	0.1	2	1	0.02	0.04	3	-	0.02	0.04	3	-	0.02	0.03
Arsenic	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Boron	mg/L	4	-	0.32	0.4	3	-	0.32	0.83	3	-	0.36	0.83	3	-	0.4	0.95
Cadmium	mg/L	3	1	0.0001	0.0003	2	1	0.0001	0.0002	1	2	0.0002	0.0002	1	2	0.0001	0.0001
Chromium	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Chromium (as Cr VI)	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Copper	mg/L	4	-	0.141	0.753	3	-	0.042	1.18	3	-	0.054	0.582	3	-	0.062	0.409
Iron	mg/L	-	4	-	-	1	2	0.64	0.64	1	2	0.28	0.28	-	3	-	-
Lead	mg/L	1	3	0.001	0.001	1	2	0.004	0.004	1	2	0.003	0.003	1	2	0.001	0.001
Manganese	mg/L	4	-	0.15	0.241	3	-	0.037	0.173	3	-	0.039	0.196	3	-	0.009	0.187
Mercury	mg/L	1	3	0.0006	0.0006	-	3	-	-	-	3	-	-	-	3	-	-
Nickel	mg/L	4	-	0.007	0.028	3	-	0.001	0.005	3	-	0.001	0.007	3	-	0.002	0.01
Selenium	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Thorium	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Uranium	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Zinc	mg/L	4	-	0.244	0.442	2	1	0.22	0.292	3	-	0.006	0.478	2	1	0.006	0.8
Nutrients																	
Ammonia as N	mg/L	4	-	117	126	3	-	21.7	132	3	-	41.5	118	3	-	21	107

Analyte	Analysis Unit	MW01				MW03				MW04				MW05			
		Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Nitrate as N	mg/L	1	3	0.01	0.01	-	3	-	-	1	2	0.07	0.07	1	2	0.02	0.02
Nitrite + Nitrate as N	mg/L	1	3	0.01	0.01	-	3	-	-	1	2	0.07	0.07	1	2	0.02	0.02
Nitrite as N	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Reactive Phosphorus as P	mg/L	3	1	0.01	0.02	2	1	0.01	0.02	1	2	0.02	0.02	1	2	0.02	0.02
Total Kjeldahl Nitrogen as N	mg/L	4	-	120	137	3	-	32.5	135	3	-	44.6	128	3	-	31.5	144
Total Nitrogen as N	mg/L	4	-	120	137	3	-	32.5	135	3	-	44.6	128	3	-	31.5	144
Total Phosphorus as P	mg/L	4	-	0.35	0.45	3	-	0.08	1.17	3	-	0.13	0.7	3	-	0.08	0.45
Physico-Chemical Parameters																	
Electrical Conductivity @ 25°C	µS/cm	4	-	13100	13700	3	-	4230	16300	3	-	5470	15800	3	-	3450	14900
pH - Lab	pH Units	4	-	6.83	7.02	3	-	6.84	8.87	3	-	6.77	9.14	3	-	6.86	9.28
Sodium Adsorption Ratio	-	4	-	27.3	29	3	-	16.9	25.8	3	-	23.9	25	3	-	16.2	25.8
Total Dissolved Solids (Calc,)	mg/L	4	-	8520	8900	3	-	2750	10600	3	-	3560	10300	3	-	2240	9680
Sulfides																	
Sulfide as S2-	mg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Total Petroleum Hydrocarbons																	
C10 - C14 Fraction	µg/L	2	2	90	150	1	2	210	210	2	1	140	150	2	1	100	140
C10 - C36 Fraction (sum)	µg/L	4	-	1140	3650	3	-	450	3380	3	-	820	1490	3	-	900	1060
C15 - C28 Fraction	µg/L	4	-	760	2550	3	-	400	2840	3	-	700	1160	3	-	700	770
C29 - C36 Fraction	µg/L	4	-	290	1100	3	-	50	330	3	-	120	180	3	-	120	200
C6 - C9 Fraction	µg/L	2	2	40	40	-	3	-	-	-	3	-	-	-	3	-	-
Total Recoverable Hydrocarbons																	
>C10 - C16 Fraction	µg/L	1	3	160	160	1	2	310	310	2	1	180	210	2	1	120	160
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	1	3	160	160	1	2	310	310	2	1	180	210	2	1	120	160
>C10 - C40 Fraction (sum)	µg/L	4	-	1100	3830	3	-	420	3330	3	-	760	1370	3	-	920	1100
>C16 - C34 Fraction	µg/L	4	-	920	3290	3	-	420	2840	3	-	760	1160	3	-	800	820
>C34 - C40 Fraction	µg/L	4	-	180	580	2	1	170	180	1	2	120	120	2	1	100	120
C6 - C10 Fraction	µg/L	2	2	40	40	-	3	-	-	-	3	-	-	-	3	-	-
C6 - C10 Fraction minus BTEX (F1)	µg/L	2	2	40	40	-	3	-	-	-	3	-	-	-	3	-	-
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Acenaphthylene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Anthracene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Benz(a)anthracene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Benzo(a)pyrene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Benzo(b+j)fluoranthene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Benzo(g,h,i)perylene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Benzo(k)fluoranthene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Chrysene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Dibenz(a,h)anthracene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Fluoranthene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Fluorene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Indeno(1,2,3,cd)pyrene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Naphthalene (Ex SVOC)	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Phenanthrene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Pyrene	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-
Total PAHs	µg/L	-	4	-	-	-	3	-	-	-	3	-	-	-	3	-	-

Table B-9: Baseline Groundwater Concentration Ranges of Playford 1 Wells and Gasifier Operational Monitoring Well

Analyte	Analysis Unit	MW02				P1M1				P1M2				P1M3			
		Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Alkalinity																	
Bicarbonate Alkalinity as CaCO3	mg/L	3	-	83	319	20	-	8	1120	-	14	-	-	12	3	1	1340
Carbonate Alkalinity as CaCO3	mg/L	-	3	-	-	4	16	3	194	14	-	60	238	5	10	52	902
Hydroxide Alkalinity as CaCO3	mg/L	-	3	-	-	-	20	-	-	14	-	213	1830	3	12	54	601
Total Alkalinity as CaCO3	mg/L	3	-	83	319	20	-	17	1120	14	-	272	2060	15	-	58	1380
BTEXN																	
Benzene	µg/L	-	3	-	-	14	1	1	24	13	-	3	13	10	2	2	9
Ethylbenzene	µg/L	-	3	-	-	11	4	2	10	2	11	2	3	-	12	-	-
meta- & para-Xylene	µg/L	-	3	-	-	2	13	3	3	-	13	-	-	4	8	2	4
Naphthalene	µg/L	-	3	-	-	-	15	-	-	-	13	-	-	-	12	-	-
ortho-Xylene	µg/L	-	3	-	-	-	15	-	-	-	13	-	-	6	6	2	6
Sum of BTEX	µg/L	-	3	-	-	15	-	11	41	13	-	4	22	10	2	7	14
Toluene	µg/L	-	3	-	-	15	-	4	8	7	6	2	6	-	12	-	-
Total Xylenes	µg/L	-	3	-	-	2	13	3	3	-	13	-	-	6	6	2	10
Carbon																	
Total Carbon	mg/L	3	-	30	91	19	-	9	281	13	-	8	22	14	-	18	367
Total Inorganic Carbon	mg/L	3	-	19	83	19	-	3	267	6	7	1	2	14	-	6	346
Total Organic Carbon	mg/L	3	-	7	17	18	-	1	34	12	-	6	23	14	-	3	43
Cyanides																	
Free Cyanide	mg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	4	-	-
Thiocyanate	mg/L	-	-	-	-	-	6	-	-	-	1	-	-	-	4	-	-
Total Cyanide	mg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	4	-	-
Weak Acid Dissociable Cyanide	mg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	4	-	-
Hardness																	
Total Hardness as CaCO3	mg/L	3	-	2900	4230	20	-	22	1260	14	-	252	1650	13	2	5	609
Major Ions																	
Bromide	mg/L	-	-	-	-	7	-	0.053	8.2	3	-	0.146	2.59	5	-	0.039	5.78
Calcium	mg/L	3	-	743	1470	20	-	9	153	15	-	101	23800	14	1	2	79
Chloride	mg/L	3	-	10600	11800	20	-	26	5110	14	-	131	3510	15	-	21	3750
Fluoride	mg/L	1	2	0.2	0.2	11	9	0.1	0.4	9	5	0.1	0.3	15	-	0.1	0.2
Iodide	mg/L	-	-	-	-	2	5	1.4	1.55	-	3	-	-	2	3	2.12	3.44
Magnesium	mg/L	3	-	135	253	18	2	82	214	1	14	1220	1220	12	3	1	100
Potassium	mg/L	3	-	2210	3780	20	-	4	124	15	-	25	319	15	-	15	242
Sodium	mg/L	3	-	4400	5550	20	-	26	2620	15	-	98	1860	15	-	30	2220
Sulphate (as SO4)	mg/L	3	-	1830	3070	11	9	1	30	14	-	54	112	10	5	1	24
Metals (dissolved)																	
Aluminium	mg/L	1	2	0.01	0.01	13	4	0.01	0.02	12	-	0.1	2.21	9	3	0.01	0.02
Arsenic	mg/L	1	2	0.001	0.001	-	18	-	-	2	11	0.001	0.001	4	9	0.001	0.007
Boron	mg/L	3	-	0.51	0.6	18	-	0.23	0.41	13	-	0.07	0.29	13	-	0.22	0.4
Cadmium	mg/L	3	-	0.0001	0.0002	-	18	-	-	-	13	-	-	-	13	-	-
Chromium	mg/L	-	3	-	-	-	18	-	-	3	10	0.001	0.004	1	12	0.001	0.001
Chromium (as Cr VI)	mg/L	-	3	-	-	-	11	-	-	-	9	-	-	-	8	-	-
Copper	mg/L	3	-	0.258	0.609	3	15	0.138	0.26	4	9	0.044	0.303	3	10	0.034	0.545
Iron	mg/L	1	2	0.07	0.07	14	3	0.06	13.2	2	10	0.07	0.07	9	3	2.73	7.42

		MW02				P1M1				P1M2				P1M3			
Analyte	Analysis Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
Lead	mg/L	-	3	-	-	-	18	-	-	5	8	0.001	0.049	-	13	-	-
Manganese	mg/L	3	-	0.85	2.53	17	-	0.072	0.176	2	10	0.003	0.003	11	1	0.002	0.095
Mercury	mg/L	2	1	0.0003	0.0003	-	18	-	-	1	12	0.0009	0.0009	-	13	-	-
Nickel	mg/L	3	-	0.005	0.006	6	12	0.001	0.005	12	1	0.002	0.009	3	10	0.002	0.005
Selenium	mg/L	-	3	-	-	-	18	-	-	-	13	-	-	-	13	-	-
Thorium	mg/L	1	2	0.001	0.001	-	18	-	-	-	13	-	-	-	13	-	-
Uranium	mg/L	-	3	-	-	-	18	-	-	-	13	-	-	-	13	-	-
Zinc	mg/L	3	-	0.125	0.142	14	4	0.006	0.191	12	1	0.007	0.672	11	2	0.005	0.148
Nutrients																	
Ammonia as N	mg/L	3	-	37.4	101	20	-	0.47	108	13	-	13.8	146	15	-	0.16	131
Nitrate as N	mg/L	1	2	0.01	0.01	8	12	0.01	0.06	9	4	0.01	0.1	10	5	0.01	0.09
Nitrite + Nitrate as N	mg/L	1	2	0.01	0.01	10	10	0.01	0.06	12	1	0.01	0.22	11	4	0.01	0.1
Nitrite as N	mg/L	-	3	-	-	4	16	0.01	0.01	8	5	0.01	0.12	7	8	0.01	0.03
Reactive Phosphorus as P	mg/L	1	2	0.01	0.01	9	11	0.01	0.03	3	11	0.01	0.06	8	7	0.01	0.08
Total Kjeldahl Nitrogen as N	mg/L	3	-	37.4	110	20	-	0.5	116	13	-	13.8	147	15	-	0.4	132
Total Nitrogen as N	mg/L	3	-	37.4	110	20	-	0.5	116	13	-	13.8	147	15	-	0.4	132
Total Phosphorus as P	mg/L	3	-	0.36	0.85	20	-	0.02	0.47	12	1	0.02	3.04	15	-	0.03	0.64
Physico-Chemical Parameters																	
Electrical Conductivity @ 25°C	µS/cm	3	-	29700	39600	20	-	235	14400	14	-	727	15200	15	-	273	12000
pH - Lab	pH Units	3	-	6.54	6.87	20	-	7.46	9.24	14	-	11.6	12.3	15	-	7.75	11.3
Sodium Adsorption Ratio	-	3	-	35.6	37.1	20	-	2.38	47.4	14	-	2.52	35.8	15	-	5.84	211
Total Dissolved Solids (Calc,)	mg/L	3	-	19300	25700	20	-	153	9360	14	-	472	9880	15	-	177	7800
Sulfides																	
Sulfide as S2-	mg/L	1	2	0.1	0.1	12	5	0.1	0.7	6	5	0.3	4.1	4	8	0.2	0.3
Total Petroleum Hydrocarbons																	
C10 - C14 Fraction	µg/L	2	1	100	110	20	2	60	210	15	2	60	5560	2	14	140	2280
C10 - C36 Fraction (sum)	µg/L	3	-	310	1230	20	2	110	2070	17	-	60	7800	8	8	50	5250
C15 - C28 Fraction	µg/L	3	-	200	850	10	12	100	1790	15	2	140	2850	7	9	100	2690
C29 - C36 Fraction	µg/L	2	1	240	280	3	19	60	70	12	5	60	620	4	12	50	280
C6 - C9 Fraction	µg/L	-	3	-	-	15	-	30	80	6	7	20	30	4	8	20	40
Total Petroleum Hydrocarbons (SG)																	
C10 - C14 Fraction	µg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	3	-	-
C10 - C36 Fraction (sum)	µg/L	-	-	-	-	1	4	50	50	1	1	340	340	-	3	-	-
C15 - C28 Fraction	µg/L	-	-	-	-	-	5	-	-	1	1	230	230	-	3	-	-
C29 - C36 Fraction	µg/L	-	-	-	-	1	4	50	50	1	1	110	110	-	3	-	-
C10 - C14 Fraction (SG)	µg/L	-	-	-	-	-	2	-	-	-	2	-	-	-	2	-	-
C10 - C36 Fraction (sum) (SG)	µg/L	-	-	-	-	-	2	-	-	1	1	2500	2500	-	2	-	-
C29 - C36 Fraction (SG)	µg/L	-	-	-	-	-	2	-	-	1	1	470	470	-	2	-	-
C15 - C28 Fraction (SG)	µg/L	-	-	-	-	-	2	-	-	1	1	2030	2030	-	2	-	-
Total Recoverable Hydrocarbons																	
>C10 - C16 Fraction	µg/L	2	1	110	120	18	4	110	240	12	5	120	5430	2	14	160	2380
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	2	1	110	120	18	4	110	240	12	5	120	5430	2	14	160	2380
>C10 - C40 Fraction (sum)	µg/L	3	-	310	1330	19	3	110	1970	15	2	180	7400	7	9	100	5120
>C16 - C34 Fraction	µg/L	3	-	190	1010	7	15	100	1730	15	2	180	3140	7	9	100	2600
>C34 - C40 Fraction	µg/L	2	1	110	210	-	22	-	-	4	13	110	180	1	15	140	140

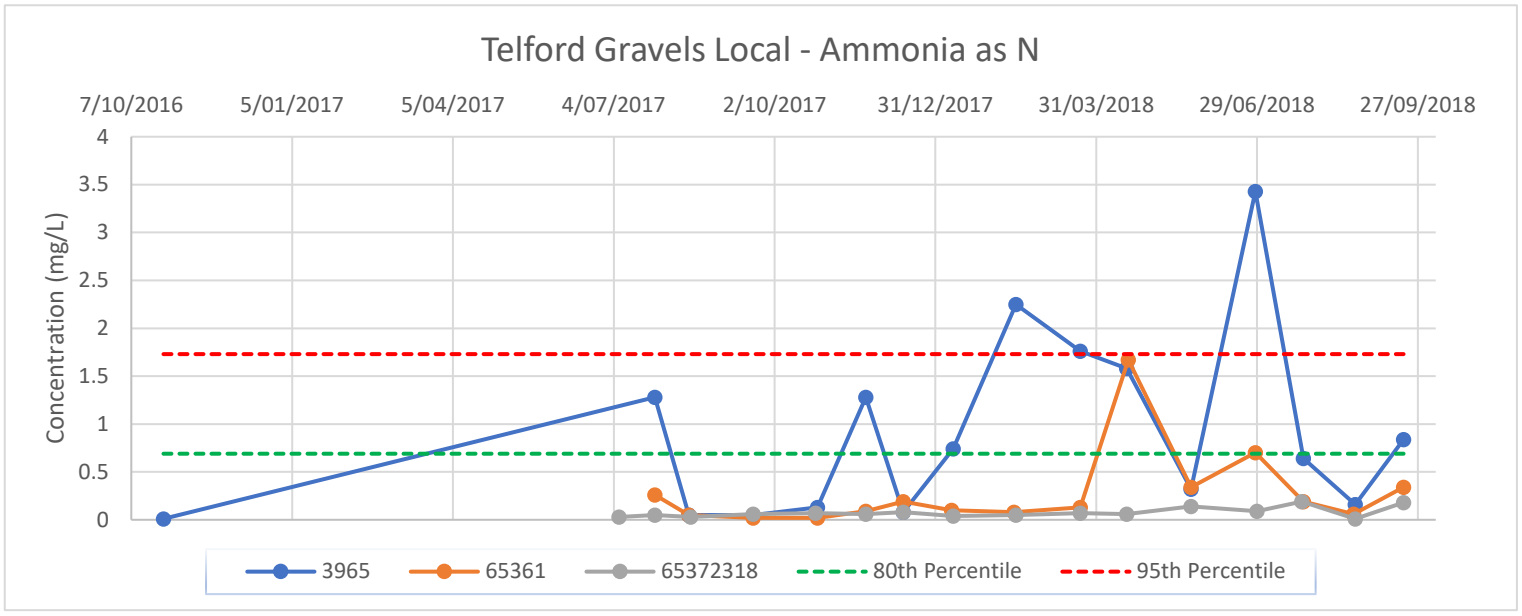
		MW02				P1M1				P1M2				P1M3			
Analyte	Analysis Unit	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR	Results above LOR	Results <LOR	Min of above LOR	Max of above LOR
C6 - C10 Fraction	µg/L	-	3	-	-	15	-	30	90	12	1	20	100	5	7	20	70
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	3	-	-	9	6	20	50	7	6	20	80	2	10	30	60
Total Recoverable Hydrocarbons (SG)																	
>C10 - C16 Fraction	µg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	3	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	3	-	-
>C10 - C40 Fraction (sum)	µg/L	-	-	-	-	-	5	-	-	1	1	290	290	-	3	-	-
>C16 - C34 Fraction	µg/L	-	-	-	-	-	5	-	-	1	1	290	290	-	3	-	-
>C34 - C40 Fraction	µg/L	-	-	-	-	-	5	-	-	-	2	-	-	-	3	-	-
>C10 - C16 Fraction (SG)	µg/L	-	-	-	-	-	2	-	-	-	2	-	-	-	2	-	-
>C10 - C16 Fraction minus Naphthalene (F2) (SG)	µg/L	-	-	-	-	-	2	-	-	-	2	-	-	-	2	-	-
>C10 - C40 Fraction (sum) (SG)	µg/L	-	-	-	-	-	2	-	-	1	1	2400	2400	-	2	-	-
>C16 - C34 Fraction (SG)	µg/L	-	-	-	-	-	2	-	-	1	1	2220	2220	-	2	-	-
>C34 - C40 Fraction (SG)	µg/L	-	-	-	-	-	2	-	-	1	1	180	180	-	2	-	-
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Acenaphthylene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Anthracene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Benz(a)anthracene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Benzo(a)pyrene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Benzo(b+j)fluoranthene	µg/L	-	3	-	-	-	13	-	-	-	11	-	-	-	11	-	-
Benzo(g,h,i)perylene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Benzo(k)fluoranthene	µg/L	-	3	-	-	-	13	-	-	-	11	-	-	-	11	-	-
Chrysene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Dibenz(a,h)anthracene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Fluoranthene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Fluorene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Indeno(1,2,3,cd)pyrene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Naphthalene (Ex SVOC)	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Phenanthrene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Pyrene	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
Total PAHs	µg/L	-	3	-	-	-	14	-	-	-	12	-	-	-	12	-	-
2-Chloronaphthalene	µg/L	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
2-Methylnaphthalene	µg/L	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
3-Methylcholanthrene	µg/L	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
7,12-Dimethylbenz(a)anthracene	µg/L	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
N-2-Fluorenylacetamide	µg/L	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Benzo(b+j) & Benzo(k)fluoranthene	µg/L	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-

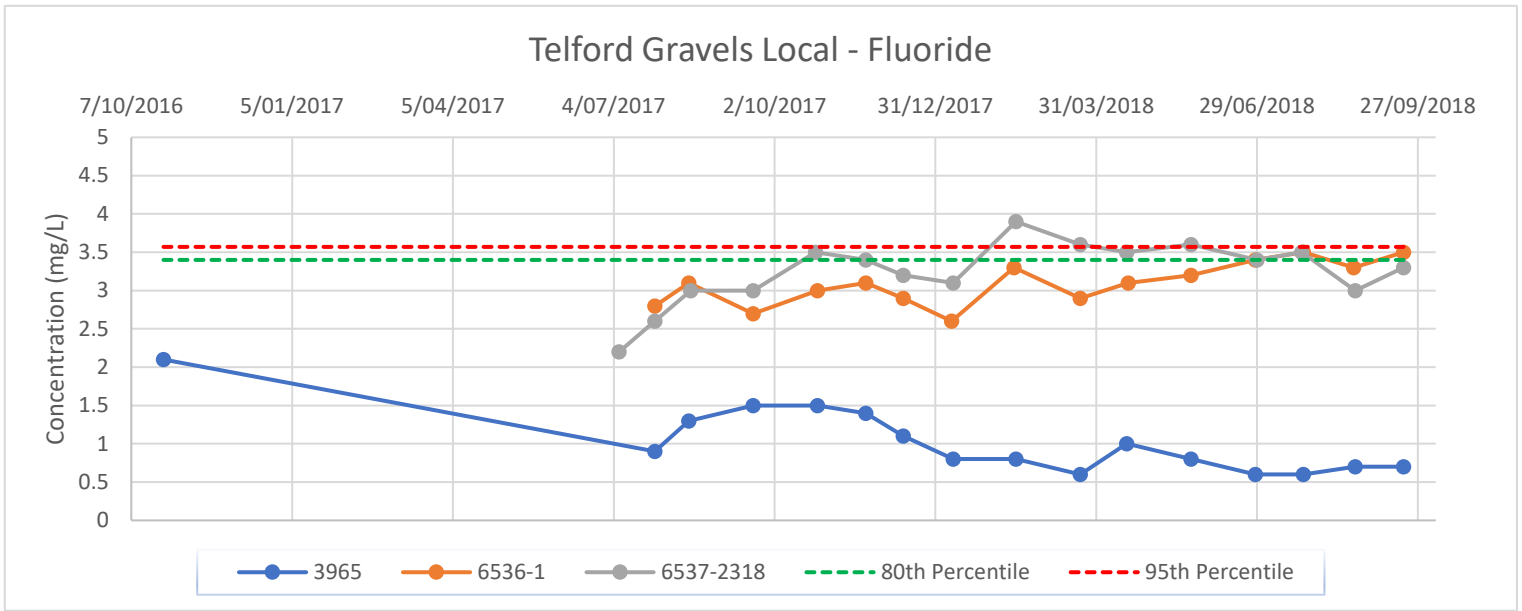
B.3 Statistical Analysis of Groundwater Results by Formation

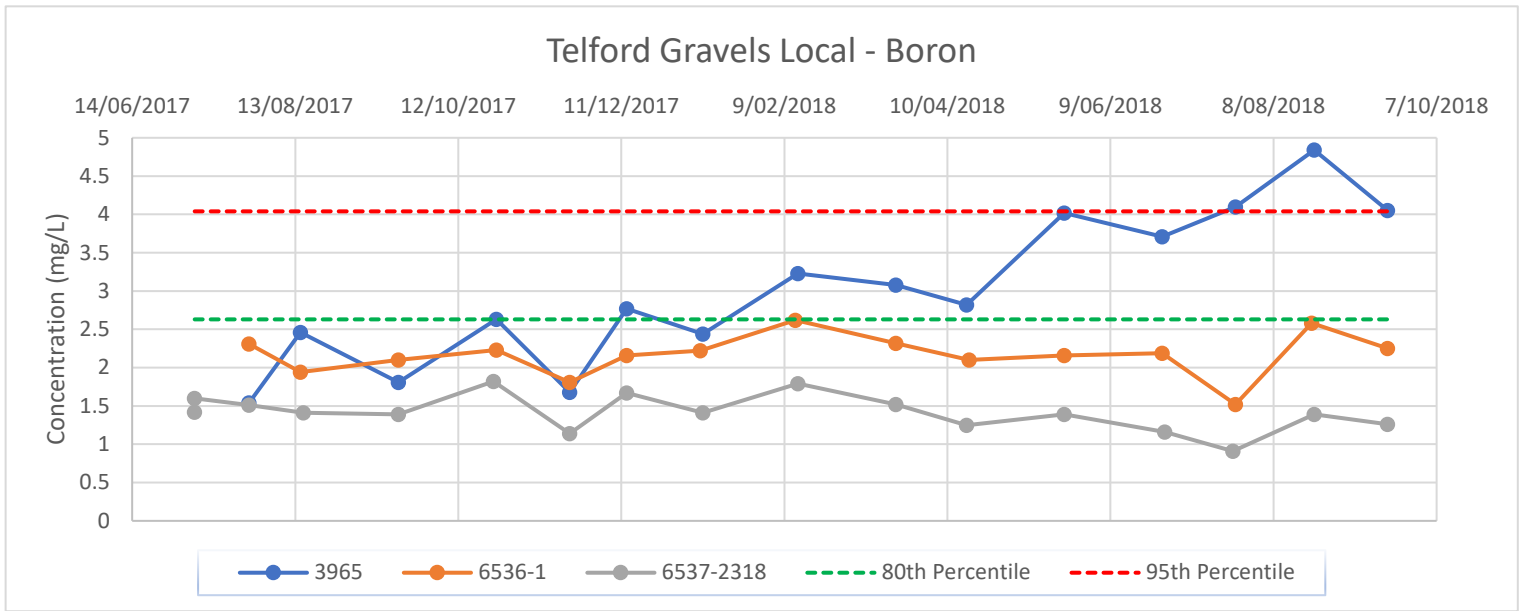
Telford Gravels – Local Wells

Telford Gravels – Local Wells

Telford Gravels - Local. Includes wells 3965, 6536-1 and 6537-2318																		
	C6 - C10 Fraction	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Naphthalene (Ex SVOC)	Total PAHs	Phenol	2-Methylphenol	3- & 4-Methylphenol	Ammonia as N	Fluoride	Boron
	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	0.01	2.1	1.54
																1.28	0.9	2.46
																0.05	1.3	1.81
																0.05	1.5	2.63
																0.13	1.5	1.68
																1.28	1.4	2.77
																0.08	1.1	2.44
																0.74	0.8	3.23
																2.25	0.8	3.08
																1.76	0.6	2.82
																1.58	1	4.02
																0.32	0.8	3.71
																3.43	0.6	4.1
																0.64	0.6	4.84
																0.16	0.7	4.05
																0.84	0.7	2.31
																0.26	2.8	1.94
																0.05	3.1	2.1
																0.02	2.7	2.23
																0.02	3	1.81
																0.09	3.1	2.16
																0.19	2.9	2.22
																0.1	2.6	2.62
																0.08	3.3	2.32
																0.13	2.9	2.1
																1.67	3.1	2.16
																0.34	3.2	2.19
																0.7	3.4	1.52
																0.19	3.5	2.58
																0.06	3.3	2.25
																0.34	3.5	1.42
																0.03	2.2	1.6
																0.05	2.6	1.51
																0.03	3	1.41
																0.06	3	1.39
																0.07	3.5	1.82
																0.06	3.4	1.14
																0.08	3.2	1.67
																0.04	3.1	1.41
																0.05	3.9	1.79
																0.07	3.6	1.52
																0.06	3.5	1.25
																0.14	3.6	1.39
																0.09	3.4	1.16
																0.19	3.5	0.91
																0.01	3	1.39
																0.18	3.3	1.26
Number of records (incl. LOR value)																47	47	47
Maximum																3.43	3.9	4.84
Median																0.1	3	2.1
Minimum																0.01	0.6	0.91
Range																3.42	3.3	3.93
Standard Deviation																0.7039339	1.094364	0.880671
80th%ile																0.69	3.4	2.63
95th%ile	**<20**	**<100**	**<100**	**<100**	**<100**	**<1**	**<2**	**<2**	**<2**	**<5**	**<1**	**<0.5**	**<1**	**<1**	**<2**	**1.73**	**3.57**	**4.04**


Telford Gravels Local - Ammonia as N
7/10/2016
5/01/2017
5/04/2017
4/07/2017
2/10/2017
31/12/2017
31/03/2018
29/06/2018
27/09/2018
Concentration (mg/L)
4
3.5
3
2.5
2
1.5
1
0.5
0
3965
65361
65372318
80th Percentile
95th Percentile


Telford Gravels Local - Fluoride
7/10/2016
5/01/2017
5/04/2017
4/07/2017
2/10/2017
31/12/2017
31/03/2018
29/06/2018
27/09/2018
Concentration (mg/L)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
3965
6536-1
6537-2318
80th Percentile
95th Percentile

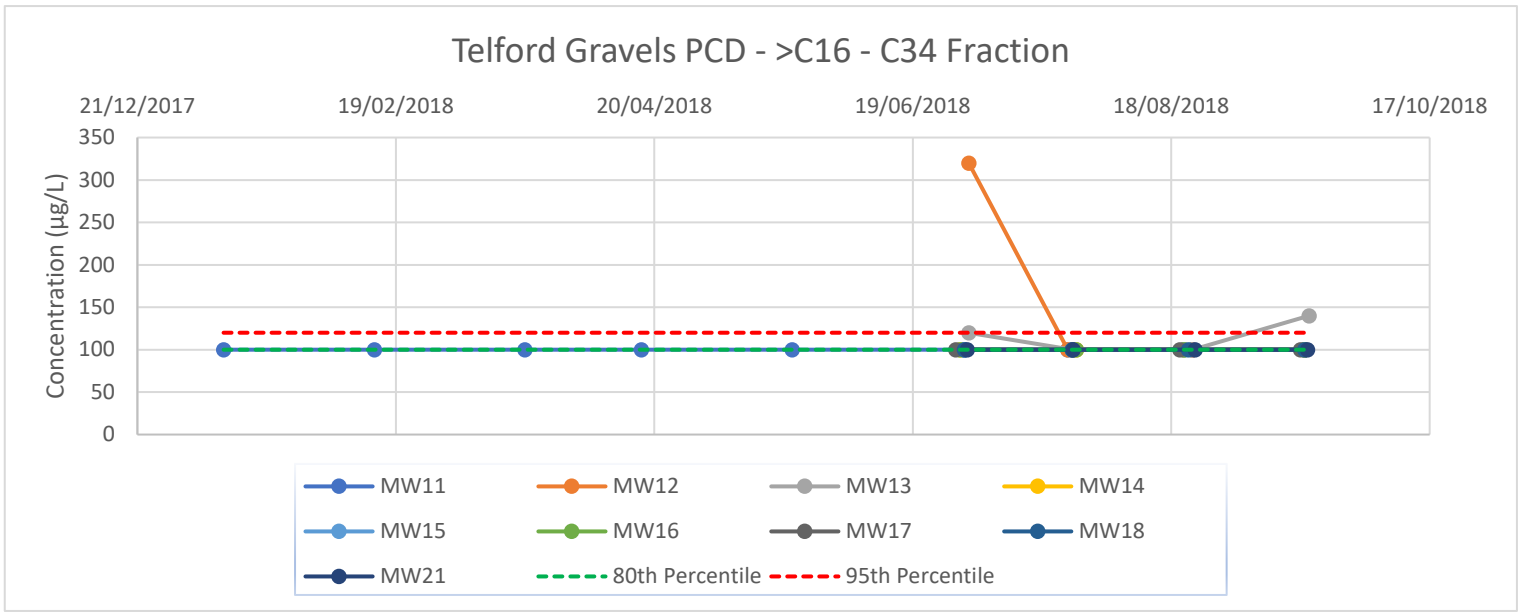

Telford Gravels Local - Boron
14/06/2017
13/08/2017
12/10/2017
11/12/2017
9/02/2018
10/04/2018
9/06/2018
8/08/2018
7/10/2018
Concentration (mg/L)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
3965
6536-1
6537-2318
80th Percentile
95th Percentile

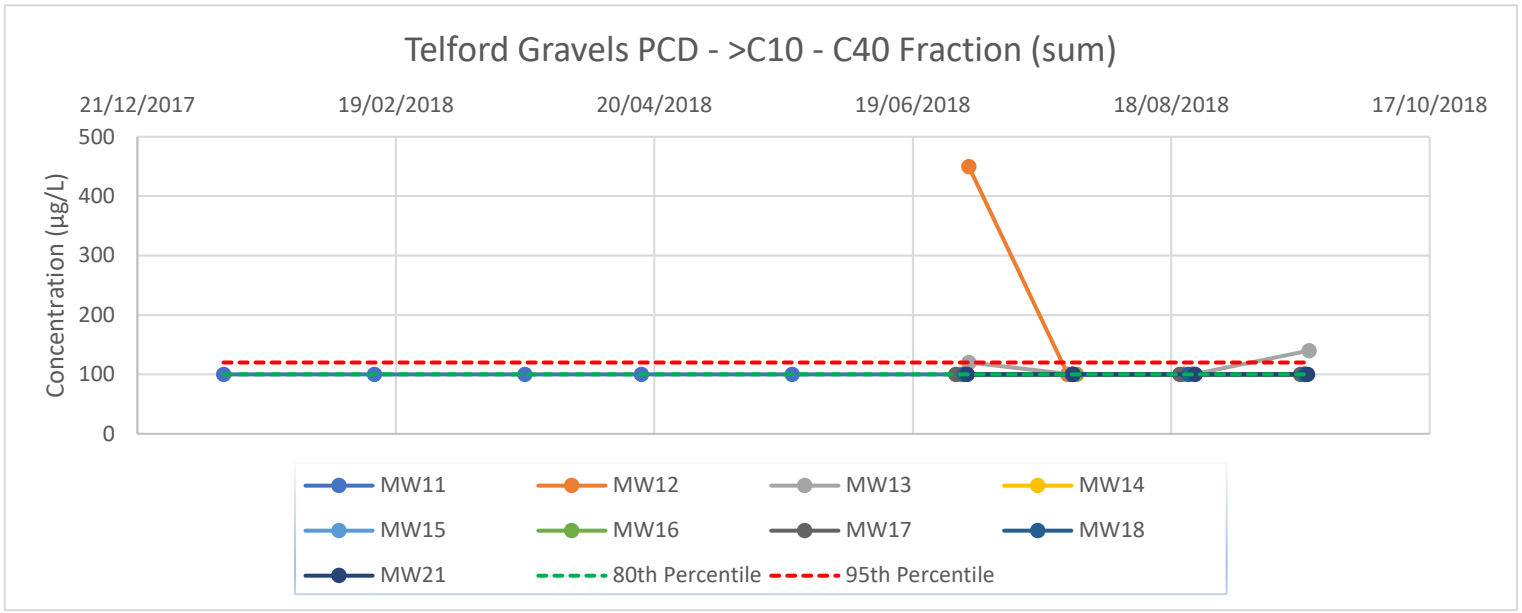
Telford Gravels – PCD (LCK Wells)

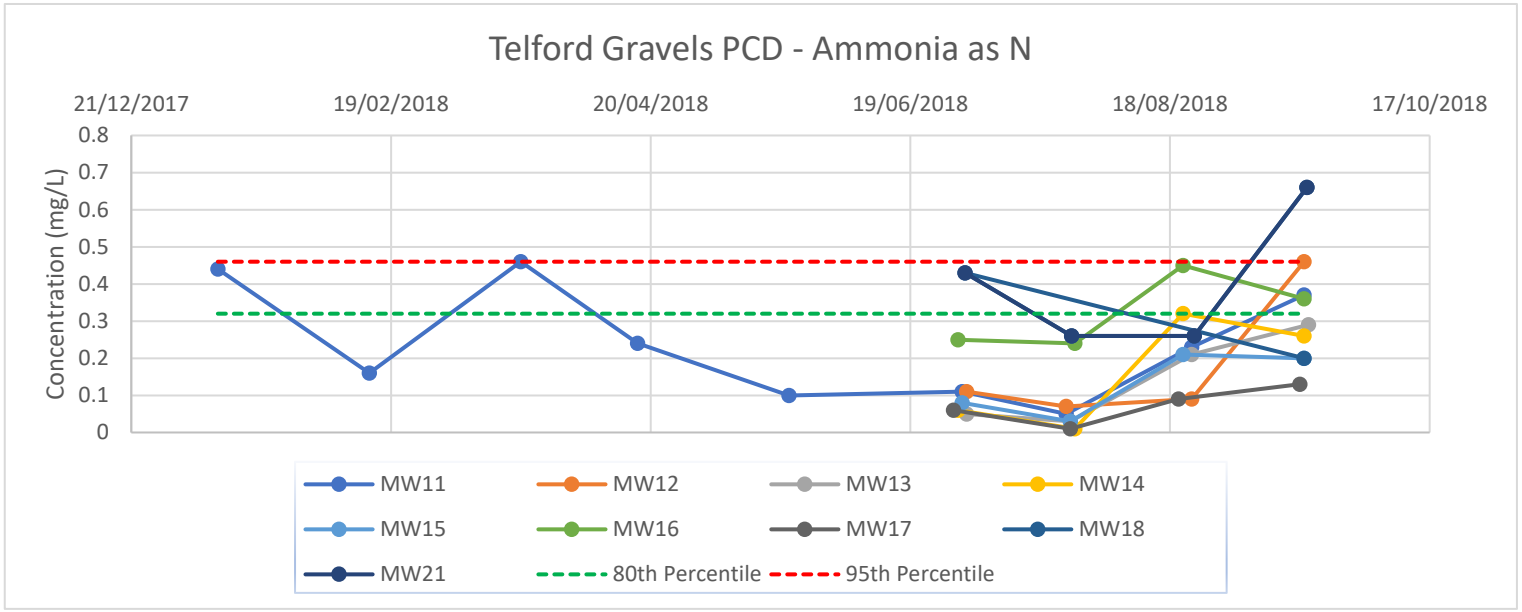
Telford Gravels - PCD

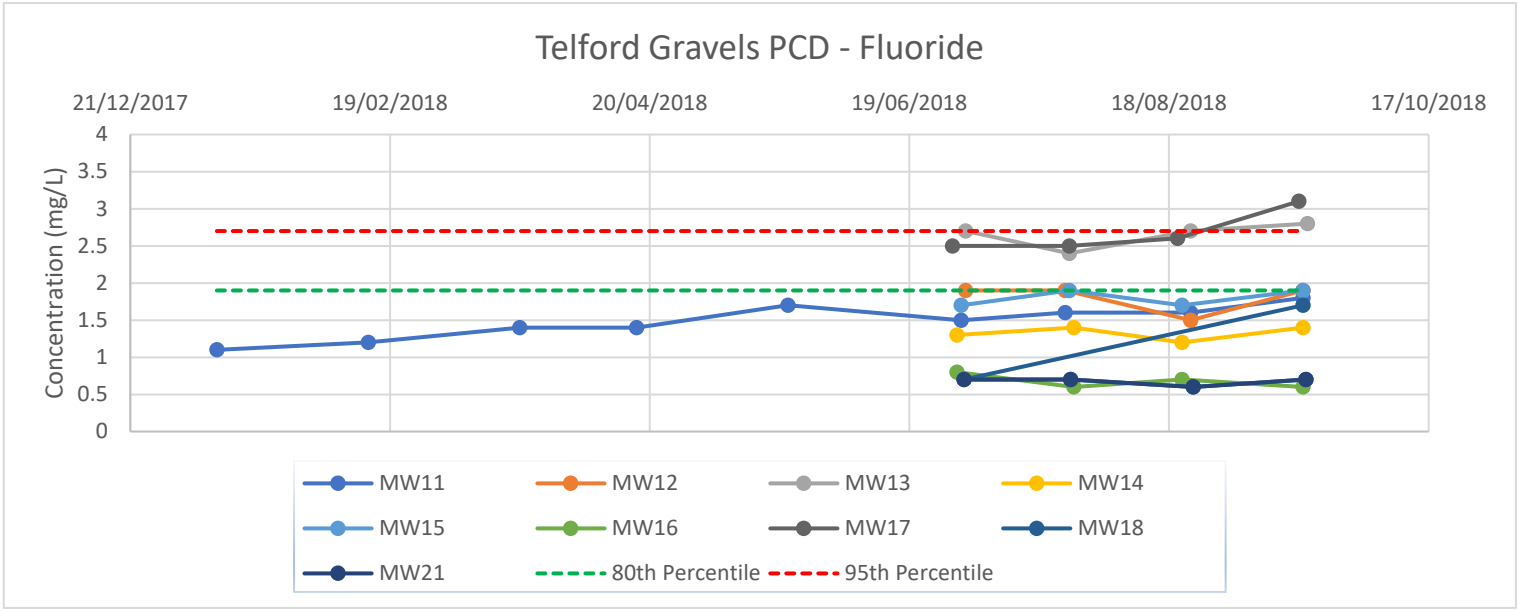
Telford Gravels - PCD. Including wells MW11, MW12, MW13, MW14, MW15, MW16, MW17, MW18, MW21 and MW22

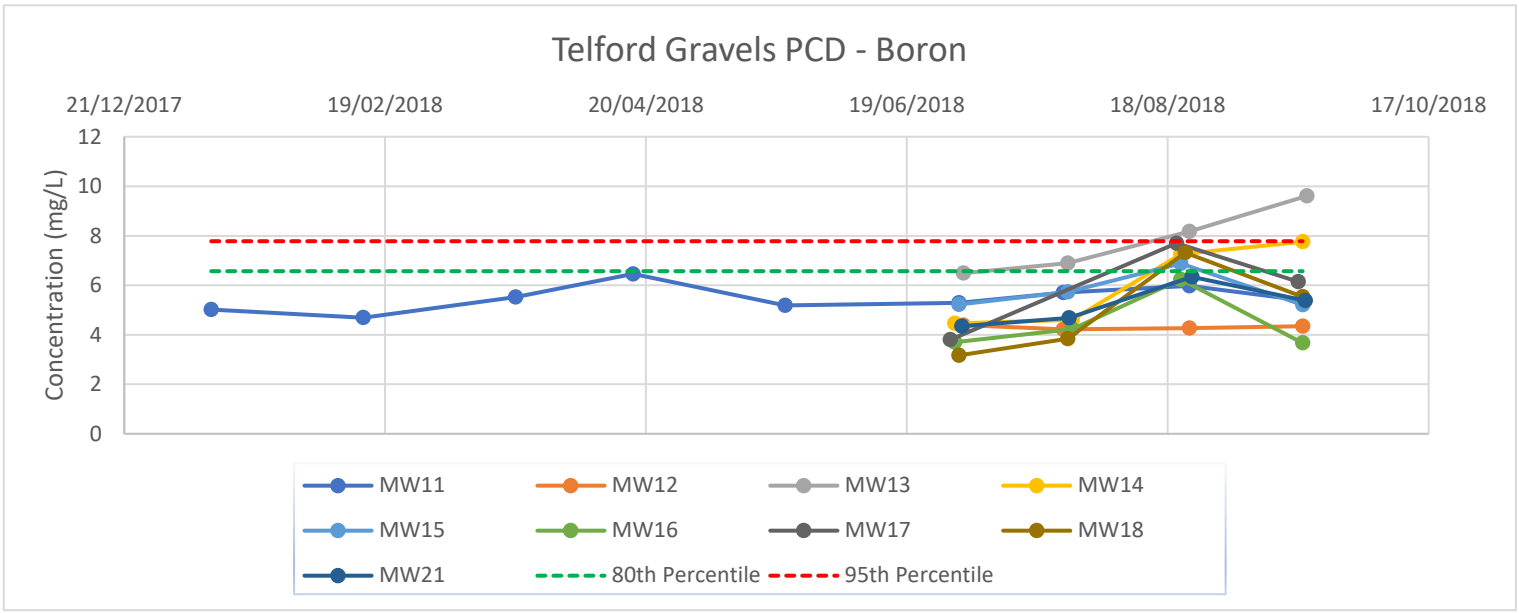
	C6 - C10 Fraction	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Naphthalene (Ex SVOC)	Total PAHs	Phenol	2-Methylphenol	3- & 4-Methylphenol	Ammonia as N	Fluoride	Boron
	all <LOR	100	100	all <LOR	100	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	1	0.5	all <LOR	all <LOR	all <LOR	0.44	1.1	5.02
		100	100		100						1	0.5				0.16	1.2	4.69
		100	100		100						1	0.5				0.46	1.4	5.52
		100	100		100						1	0.5				0.24	1.4	6.46
		100	100		100						1	0.5				0.1	1.7	5.19
		100	100		100						1	0.5				0.11	1.5	5.29
		100	100		100						1	0.5				0.05	1.6	5.7
		100	100		100						1	0.5				0.23	1.6	5.98
		100	100		100						1	0.5				0.37	1.8	5.4
		130	320		450						1	0.5				0.11	1.9	4.39
		100	100		100						1	0.5				0.07	1.9	4.22
		100	100		100						1	0.5				0.09	1.5	4.27
		100	100		100						1	0.5				0.46	1.9	4.35
		100	120		120						1	0.5				0.05	2.7	6.49
		100	100		100						1	0.5				0.03	2.4	6.89
		100	100		100						1	0.5				0.21	2.7	8.18
		100	140		140						1.5	1.5				0.29	2.8	9.61
		100	100		100						1	0.5				0.06	1.3	4.46
		100	100		100						1	0.5				0.01	1.4	4.6
		100	100		100						1	0.5				0.32	1.2	7.26
		100	100		100						1	0.5				0.26	1.4	7.76
		100	100		100						1	0.5				0.08	1.7	5.22
		100	100		100						1	0.5				0.03	1.9	5.73
		100	100		100						1	0.5				0.21	1.7	6.88
		100	100		100						1	0.5				0.2	1.9	5.21
		100	100		100						1	0.5				0.25	0.8	3.7
		100	100		100						1	0.5				0.24	0.6	4.23
		100	100		100						1	0.5				0.45	0.7	6.24
		100	100		100						1	0.5				0.36	0.6	3.67
		100	100		100						1	0.5				0.06	2.5	3.8
		100	100		100						1	0.5				0.01	2.5	7.7
		100	100		100						1	0.5				0.09	2.6	6.15
		100	100		100						1	0.5				0.13	3.1	3.17
		100	100		100						1	0.5				0.09	1.6	3.84
		100	100		100						1	0.5				0.21	1.6	7.32
		100	100		100						1	0.5				0.09	1.6	5.53
		100	100		100						1	0.5				0.2	1.7	4.35
		100	100		100						1	0.5				0.43	0.7	4.68
		100	100		100						1	0.5				0.26	0.7	6.34
		100	100		100						1	0.5				0.26	0.6	5.38
		100	100		100						1	0.5				0.66	0.7	
Number of records (incl. LOR value)		41	41		41						41	41				41	41	40
Maximum		130	320		450						1.5	1.5				0.66	3.1	9.61
Median		100	100		100						1	0.5				0.2	1.6	5.335
Minimum		100	100		100						1	0.5				0.01	0.6	3.17
Range		30	220		350						0.5	1				0.65	2.5	6.44
Standard Deviation		4.69	34.82		54.86						0.08	0.16				0.15	0.66	1.42
80th%ile		100	100		100						1	0.5				0.32	1.9	6.57
95th%ile	**<20**	**100**	**120**	**<100**	**120**	**<1**	**<2**	**<2**	**<2**	**<5**	**1**	**0.5**	**<1**	**<1**	**<2**	**0.46**	**2.7**	**7.78**


Telford Gravels PCD - >C16 - C34 Fraction
21/12/2017
19/02/2018
20/04/2018
19/06/2018
18/08/2018
17/10/2018
Concentration (µg/L)
350
300
250
200
150
100
50
0
MW11
MW12
MW13
MW14
MW15
MW16
MW17
MW18
MW21
80th Percentile
95th Percentile


Telford Gravels PCD - >C10 - C40 Fraction (sum)
21/12/2017
19/02/2018
20/04/2018
19/06/2018
18/08/2018
17/10/2018
Concentration (µg/L)
500
400
300
200
100
0
MW11
MW12
MW13
MW14
MW15
MW16
MW17
MW18
MW21
80th Percentile
95th Percentile

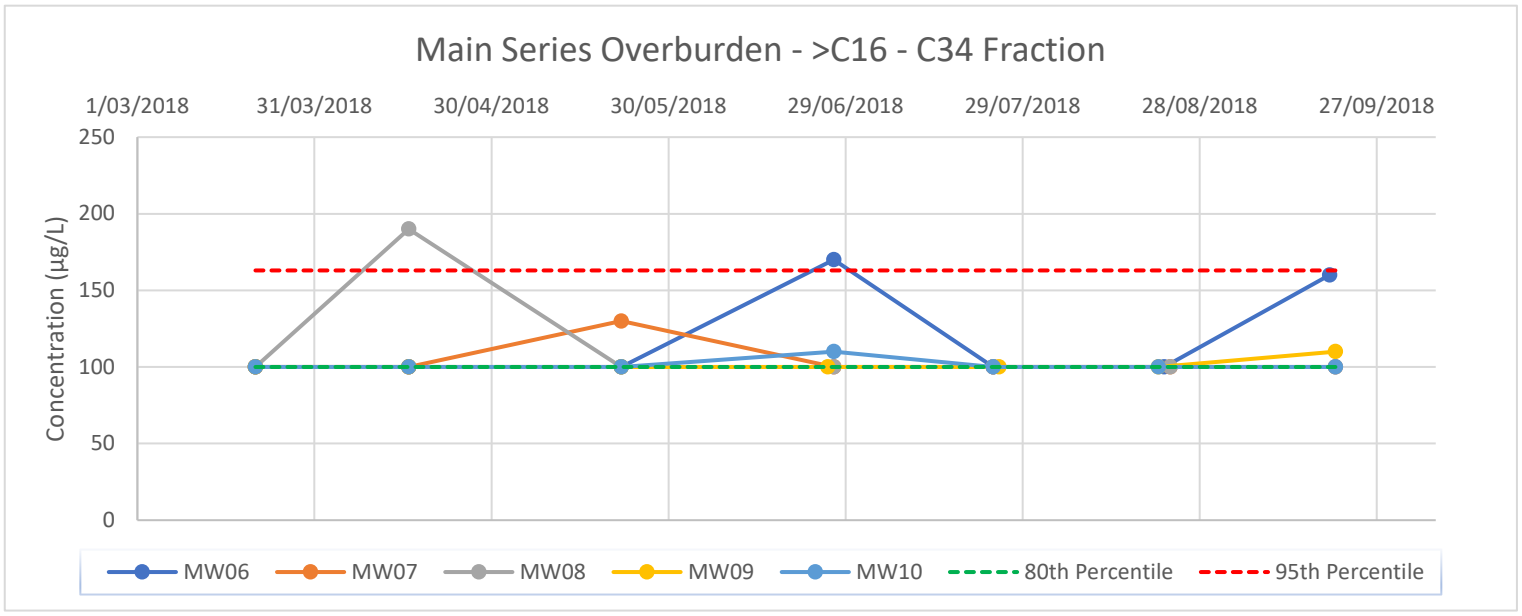

Telford Gravels PCD - Ammonia as N
21/12/2017
19/02/2018
20/04/2018
19/06/2018
18/08/2018
17/10/2018
Concentration (mg/L)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
MW11
MW12
MW13
MW14
MW15
MW16
MW17
MW18
MW21
80th Percentile
95th Percentile

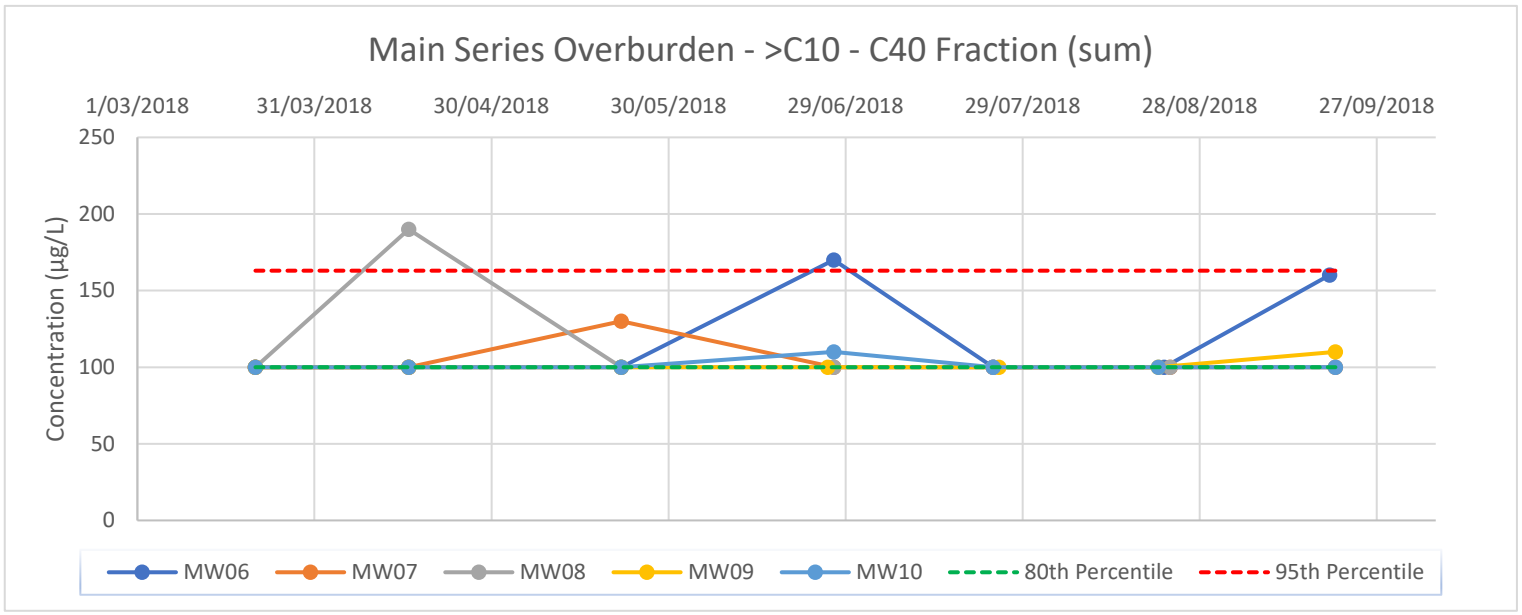

Telford Gravels PCD - Fluoride
21/12/2017
19/02/2018
20/04/2018
19/06/2018
18/08/2018
17/10/2018
Concentration (mg/L)
4
3.5
3
2.5
2
1.5
1
0.5
0
MW11
MW12
MW13
MW14
MW15
MW16
MW17
MW18
MW21
80th Percentile
95th Percentile

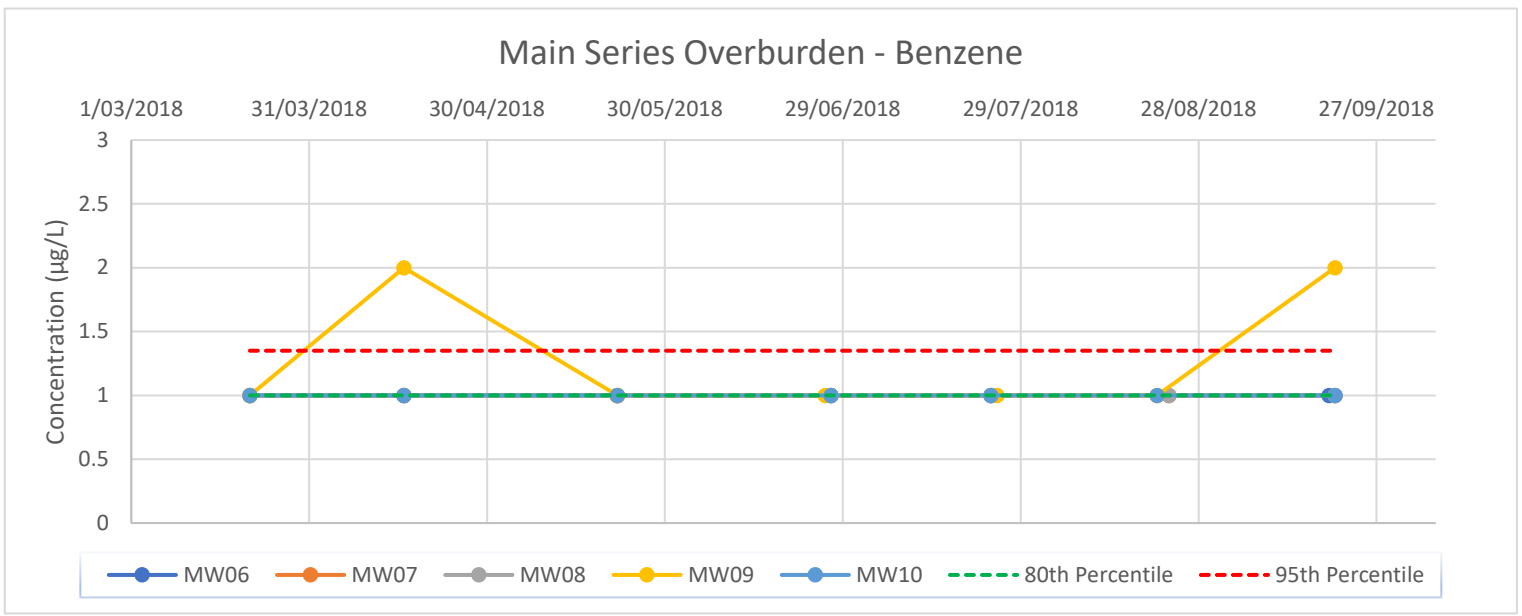

Telford Gravels PCD - Boron
21/12/2017
19/02/2018
20/04/2018
19/06/2018
18/08/2018
17/10/2018
Concentration (mg/L)
12
10
8
6
4
2
0
MW11
MW12
MW13
MW14
MW15
MW16
MW17
MW18
MW21
80th Percentile
95th Percentile

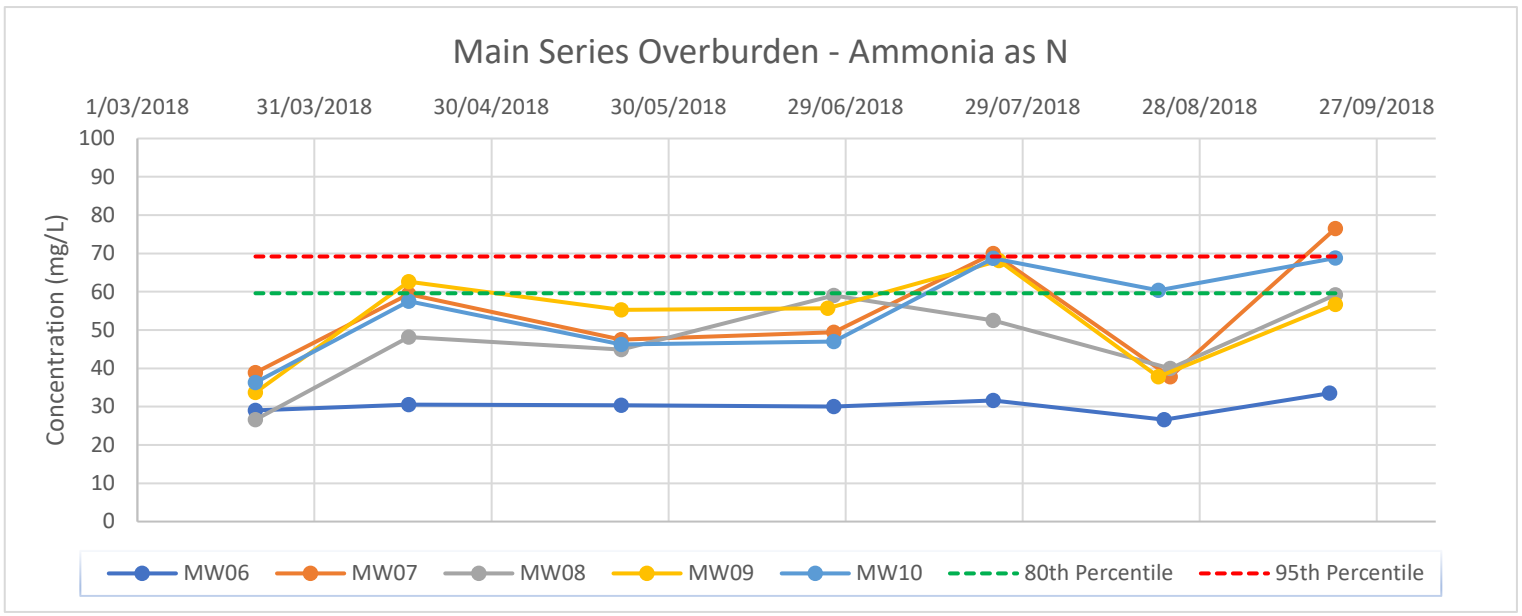
Main Series Overburden – 80m

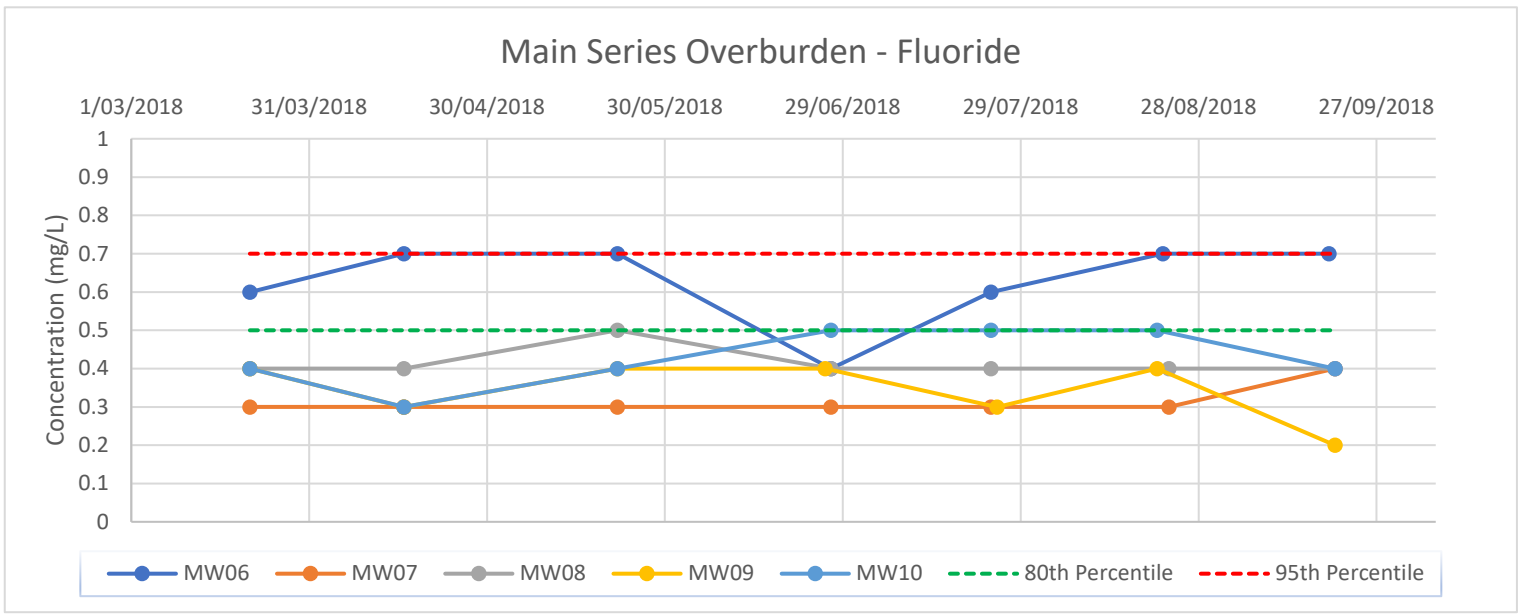
Main Series Overburden - 80m. Including MW06, MW07, MW08, MW09 and MW10																		
	C6 - C10 Fraction	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Naphthalene (Ex SVOC)	Total PAHs	Phenol	2-Methylphenol	3- & 4-Methylphenol	Ammonia as N	Fluoride	Boron
	all <LOR	all <LOR	100	all <LOR	100	1	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	all <LOR	1	all <LOR	29	0.6	1.12
			100		100	1								1		30.5	0.7	1.65
			100		100	1								1		30.4	0.7	1.03
			170		170	1								1		30	0.4	1.33
			100		100	1								1		31.6	0.6	1.3
			100		100	1								1		26.6	0.7	1.29
			160		160	1								1		33.5	0.7	1.29
			100		100	1								1		38.9	0.3	0.33
			100		100	1								1		59.4	0.3	0.34
			130		130	1								1.1		47.5	0.3	0.27
			100		100	1								1		49.4	0.3	0.39
			100		100	1								1		70	0.3	0.35
			100		100	1								1		37.8	0.3	0.48
			100		100	1								1		76.5	0.4	0.36
			100		100	1								1		26.6	0.4	0.46
			190		190	1								1		48.2	0.4	0.42
			100		100	1								1		44.9	0.5	0.3
			100		100	1								1		59	0.4	0.4
			100		100	1								1		52.5	0.4	0.47
			100		100	1								1		40	0.4	0.49
			100		100	1								1		59.2	0.4	0.42
			100		100	2								1		33.7	0.4	0.93
			100		100	1								1		62.6	0.3	0.81
			100		100	1								1		55.3	0.4	0.6
			100		100	1								1		55.7	0.4	0.61
			100		100	1								1		68.1	0.3	0.57
			100		100	2								1		37.8	0.4	0.64
			110		110	1								1		56.7	0.2	0.35
			100		100	1								1		36.3	0.4	0.4
			100		100	1								1		57.5	0.3	0.45
			100		100	1								1		46.2	0.4	0.35
			110		110	1								1		47	0.5	0.36
			100		100	1								1		68.7	0.5	0.41
			100		100	1								1		60.4	0.5	0.49
			100		100									1		68.8	0.4	0.33
Number of records (incl. LOR value)			35		35	34								35		35	35	35
Maximum			190		190	2								1.1		76.5	0.7	1.65
Median			100		100	1								1		47.5	0.4	0.46
Minimum			100		100	1								1		26.6	0.2	0.27
Range			90		90	1								0.1		49.9	0.5	1.38
Standard Deviation			21.43		21.43	0.24								0.02		14.36	0.13	0.37
80th%ile			100		100	1								1		59.6	0.5	0.95
95th%ile	**<20**	**<100**	**163**	**<100**	**163**	**1.35**	**<2**	**<2**	**<2**	**<5**	**<1**	**<0.5**	**<1**	**1**	**<2**	**69.2**	**0.7**	**1.31**

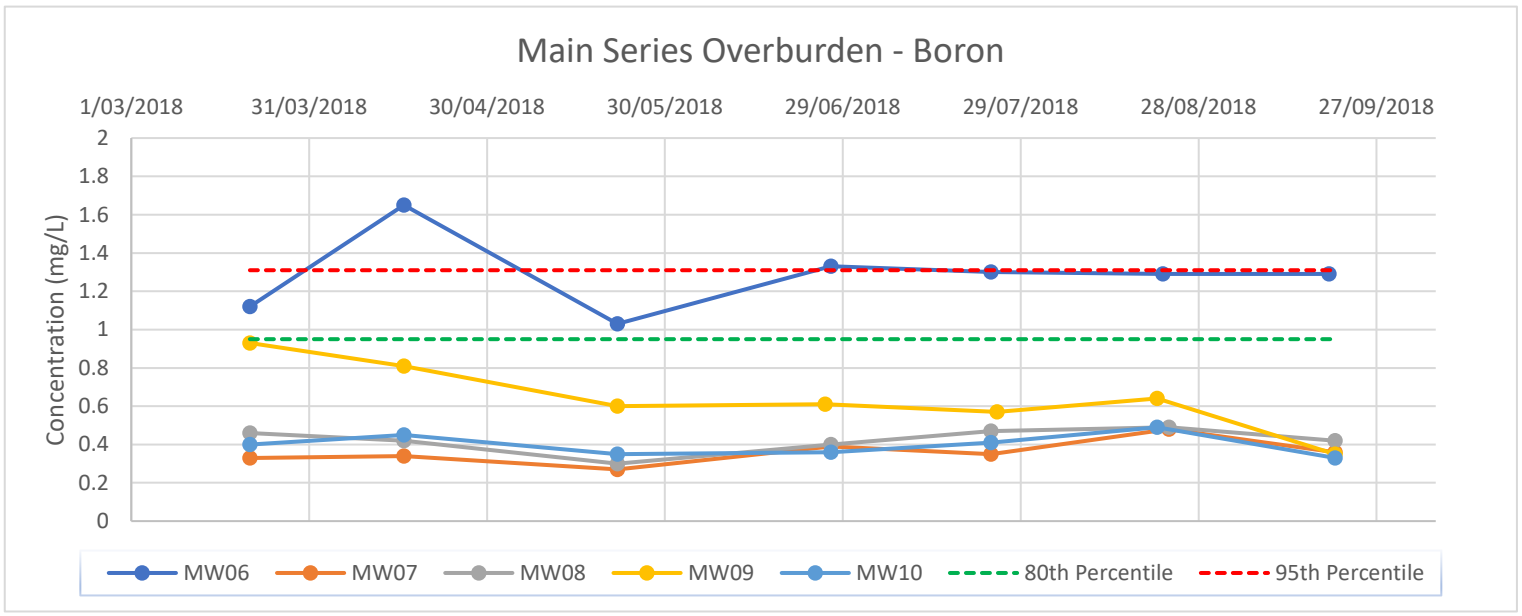

Main Series Overburden - >C16 - C34 Fraction
1/03/2018
31/03/2018
30/04/2018
30/05/2018
29/06/2018
29/07/2018
28/08/2018
27/09/2018
250
200
150
100
50
0
Concentration (µg/L)
MW06
MW07
MW08
MW09
MW10
80th Percentile
95th Percentile


Main Series Overburden - >C10 - C40 Fraction (sum)
1/03/2018
31/03/2018
30/04/2018
30/05/2018
29/06/2018
29/07/2018
28/08/2018
27/09/2018
250
200
150
100
50
0
Concentration (µg/L)
MW06
MW07
MW08
MW09
MW10
80th Percentile
95th Percentile


Main Series Overburden - Benzene
1/03/2018
31/03/2018
30/04/2018
30/05/2018
29/06/2018
29/07/2018
28/08/2018
27/09/2018
3
2.5
2
1.5
1
0.5
0
Concentration (µg/L)
MW06
MW07
MW08
MW09
MW10
80th Percentile
95th Percentile


Main Series Overburden - Ammonia as N
1/03/2018
31/03/2018
30/04/2018
30/05/2018
29/06/2018
29/07/2018
28/08/2018
27/09/2018
Concentration (mg/L)
100
90
80
70
60
50
40
30
20
10
0
MW06
MW07
MW08
MW09
MW10
80th Percentile
95th Percentile


Main Series Overburden - Fluoride
1/03/2018
31/03/2018
30/04/2018
30/05/2018
29/06/2018
29/07/2018
28/08/2018
27/09/2018
Concentration (mg/L)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
MW06
MW07
MW08
MW09
MW10
80th Percentile
95th Percentile

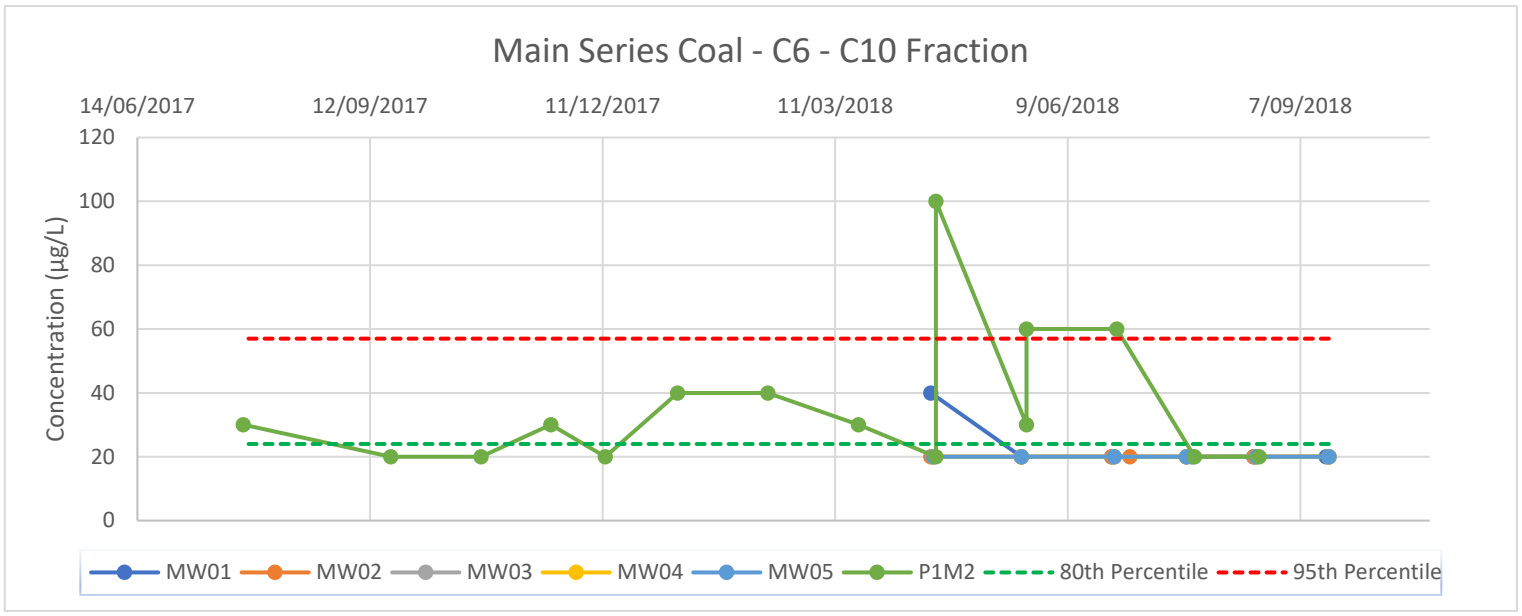

Main Series Overburden - Boron
1/03/2018
31/03/2018
30/04/2018
30/05/2018
29/06/2018
29/07/2018
28/08/2018
27/09/2018
Concentration (mg/L)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
MW06
MW07
MW08
MW09
MW10
80th Percentile
95th Percentile

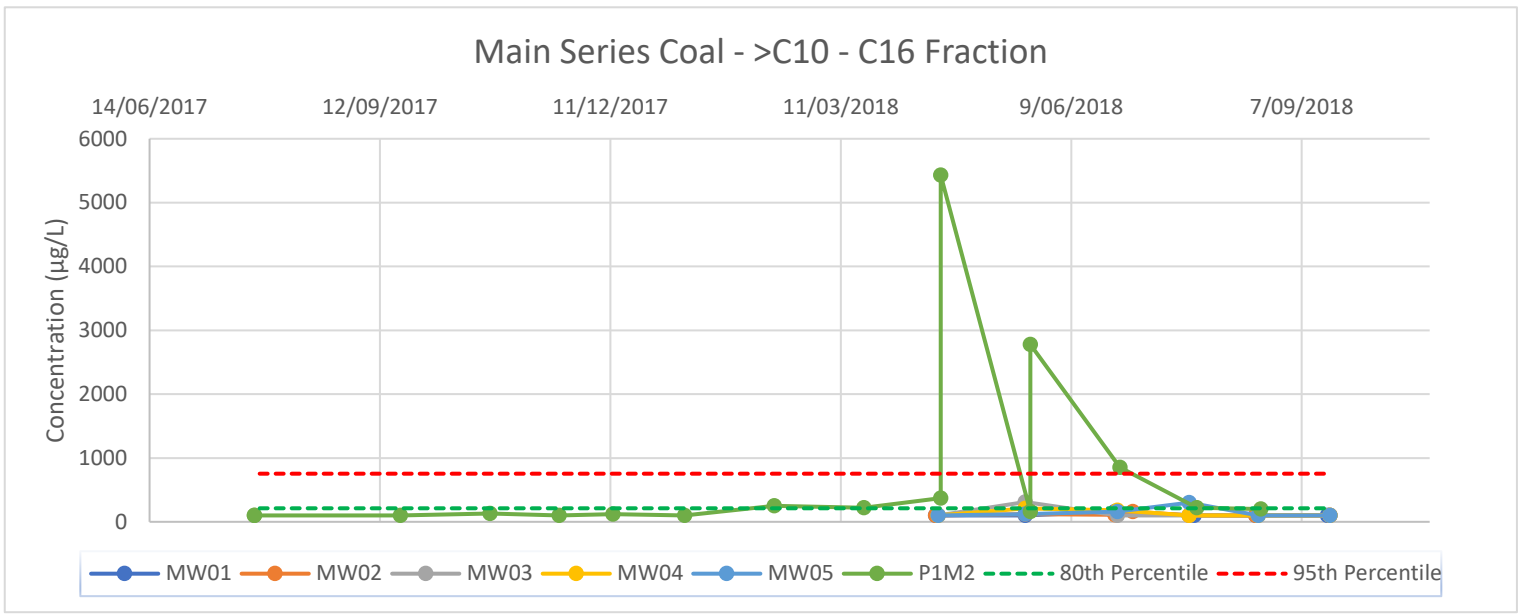
Leigh Creek Coal Measures

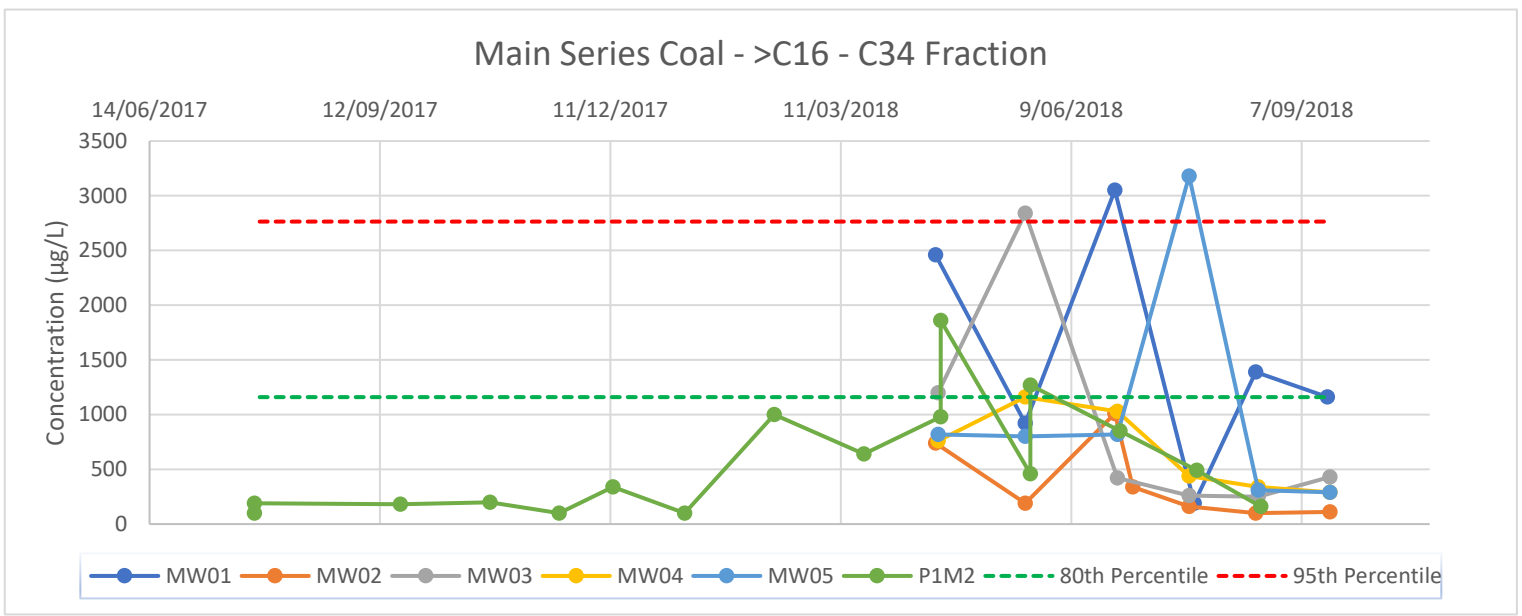
Main Series Coal

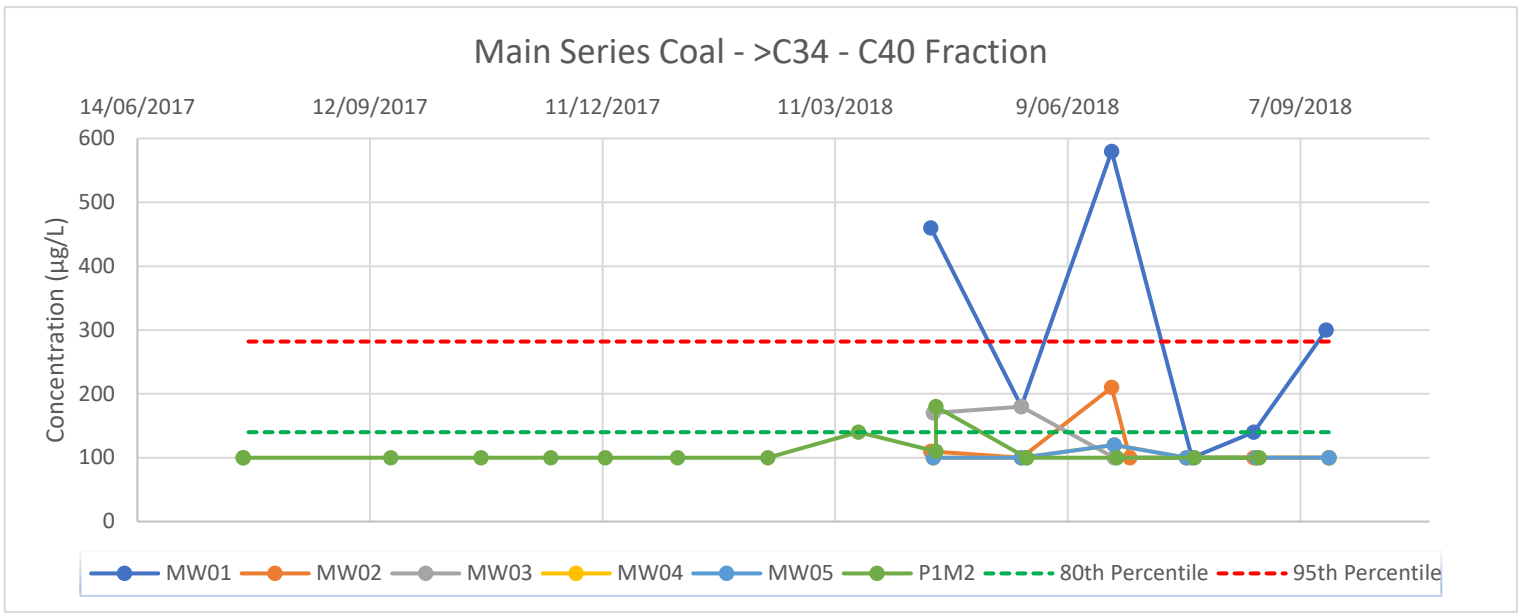
Main Series Coal. Including MW01, MW02, MW03, MW04, MW05 and P1M2

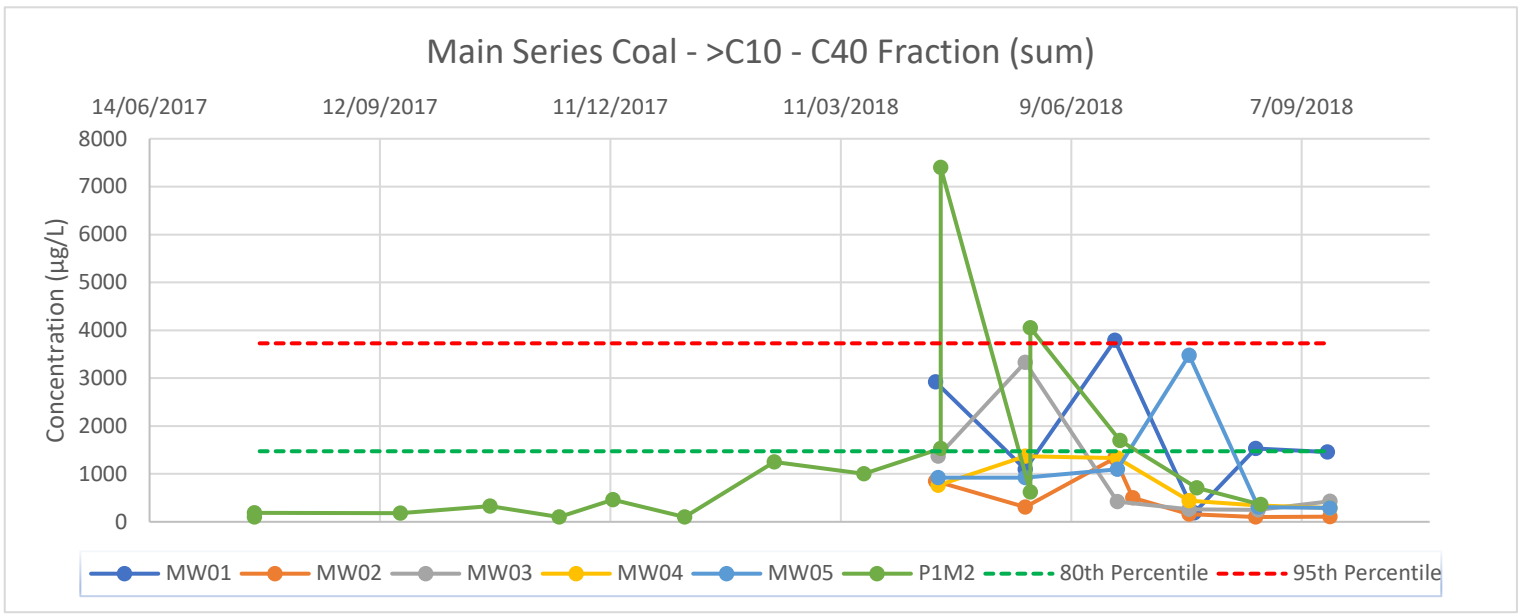
	C6 - C10 Fraction	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Naphthalene (Ex SVOC)	Total PAHs	Phenol	2-Methylphenol	3- & 4-Methylphenol	Ammonia as N	Fluoride	Boron
	40	100	2460	460	2920	2	2	2	all <LOR	all <LOR	all <LOR	0.5	1	1	2	117	0.1	0.37
	20	100	920	180	1100	3	2	2				0.5	1	1	2	120	0.2	0.33
	20	160	3050	580	3790	3	2	2				0.5	4	1	2	126	0.2	0.32
	20	100	190	100	190	4	2	2				0.5	1	1	2	127	0.2	0.33
	20	100	1390	140	1530	5	2	2				0.5	1	1	2	118	0.2	0.51
	20	100	1160	300	1460	4	2	2				0.5	1.1	1	2	126	0.2	0.36
	20	100	740	110	850	1	2	2				0.5	1	1	2	94.3	0.1	0.54
	20	120	190	100	310	1	2	2				0.5	1	1	2	37.4	0.2	0.6
	20	110	1010	210	1330	1	2	2				0.5	1	1	2	101	0.1	0.51
	20	100	160	100	160	1	2	2				0.5	3.5	1	2.7	41.5	0.1	0.58
	20	100	100	100	100	1	2	2				0.5	1	1	2	121	0.2	0.44
	20	100	110	100	110	1	2	2				0.5	1	1	2	93.1	0.2	0.37
	20	100	1200	170	1370	1	2	2				0.5	1	1	2	110	0.1	0.32
	20	310	2840	180	3330	1	2	2				0.5	1.2	1	2	21.7	0.2	0.83
	20	100	420	100	420	1	2	2				0.5	1	1	2	132	0.1	0.35
	20	100	260	100	260	1	2	2				0.5	1	1	2	130	0.1	0.38
	20	100	250	100	250	1	2	2				0.5	1	1	2	129	0.2	0.38
	20	100	430	100	430	1	2	2				0.5	1	1	2	131	0.2	0.33
	20	100	760	100	760	1	2	2				0.5	1	1	2	118	0.1	0.36
	20	210	1160	100	1370	1	2	2				0.5	1.8	1	2	41.6	0.1	0.71
	20	180	1030	120	1330	1	2	2				0.5	1.7	1	2	41.5	0.1	0.83
	20	100	440	100	440	1	2	2				0.5	1	1	2	130	0.1	0.38
	20	100	340	100	340	1	2	2				0.5	1	1	2	153	0.2	0.43
	20	100	290	100	290	1	2	2				0.5	1	1	2	101	0.2	0.37
	20	100	820	100	920	1	2	2				0.5	1	1	2	107	0.1	0.4
	20	120	800	100	920	1	2	2				0.5	1.5	1	2	31.4	0.1	0.88
	20	160	820	120	1100	1	2	2				0.5	2.2	1	2	21	0.1	0.95
	20	300	3180	100	3480	2	2	2				0.5	2.1	1	2	43.7	0.1	0.96
	20	100	310	100	310	1	2	2				0.5	1	1	2	98.5	0.1	0.45
	20	100	290	100	290	1	2	2				0.5	1	1	2	83.6	0.1	0.38
	30	100	100	100	100	4	2	2				0.6	5.5	1	2.5	13.8	0.2	0.29
	20	100	190	100	190	7	2	2				0.5	1	1	2	118	0.1	0.12
	20	100	180	100	180	10	2	2				0.6	1	1	2	110	0.1	0.13
	20	130	200	100	330	9	2	2				0.5	1	1	2	116	0.1	0.12
	40	120	340	100	460	12	2	2				0.5	1	1	2	72.7	0.1	0.14
	40	100	100	100	100	9	2	2				0.5	2.9	1	2	119	0.2	0.13
	30	250	1000	100	1250	9	2	2				0.5	1.5	1	2	88	0.1	0.07
	20	220	640	140	1000	10	2	2				0.5	1.7	1	2	146	0.1	0.1
	100	370	980	110	1530	13	6	3				0.5	19.6	1.9	8.7	70.6	0.3	0.21
	30	5430	1860	180	7400	5	2	2				0.5	8.6	1.6	6.7	39.8	0.3	0.25
	60	160	460	100	620	8	5	2				0.5	3.4	1	2	112	0.1	0.1
	60	2780	1270	100	4050	3	5	2				0.5	2	1	2	104	0.1	0.09
	20	850	850	100	1700	7	2	2				0.5	1.6	1	2			
	20	220	490	100	710	10	2	2										
		200	160	100	360													
Number of records (incl. LOR value)	44	45	45	45	45	44	44	44				43	43	43	43	42	42	42
Maximum	100	5430	3180	580	7400	13	6	3				0.6	19.6	1.9	8.7	153	0.3	0.96
Median	20	100	490	100	710	1	2	2				0.5	1	1	2	108.5	0.1	0.37
Minimum	20	100	100	100	100	1	2	2				0.5	1	1	2	13.8	0.1	0.07
Range	80	5330	3080	480	7300	12	4	1				0.1	18.6	0.9	6.7	139.2	0.2	0.89
Standard Deviation	15.00	879.05	783.35	93.36	1398.81	3.66	0.86	0.15				0.02	3.09	0.16	1.23	38.55	0.06	0.24
80th%ile	24	212	1160	140	1474	7.4	2	2				0.5	2.1	1	2	126	0.2	0.53
95th%ile	**57**	**754**	**2764**	**282**	**3728**	**10**	**4.6**	**2**	**<2**	**<5**	**<1**	**0.5**	**5.4**	**1**	**2.7**	**132**	**0.20**	**0.88**

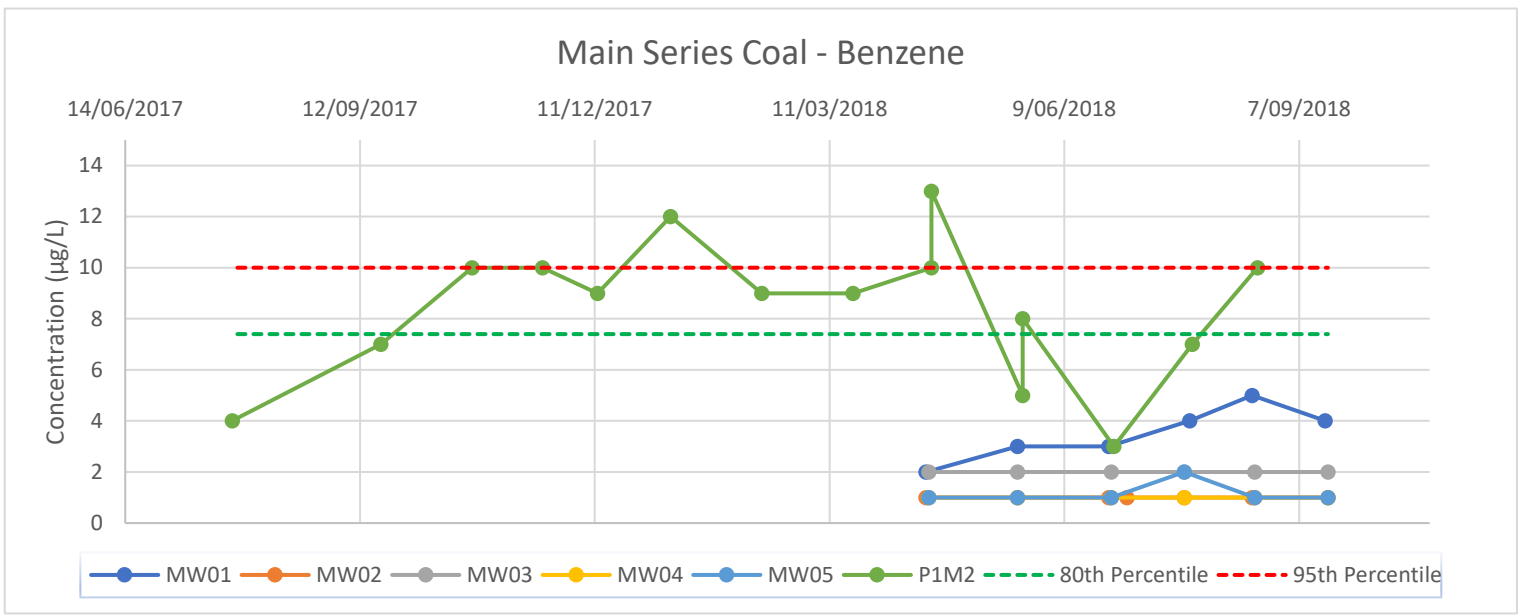

Main Series Coal - C6 - C10 Fraction
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
120
100
80
60
40
20
0
Concentration (µg/L)
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

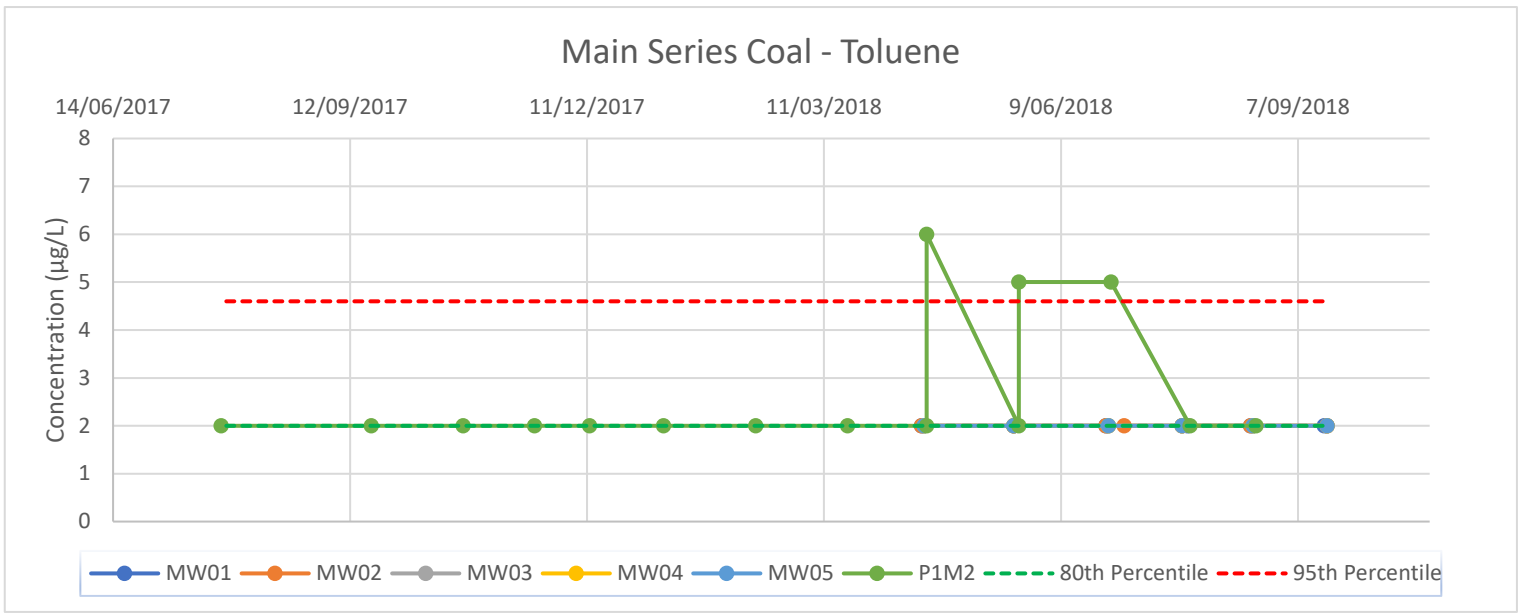

Main Series Coal - >C10 - C16 Fraction
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
6000
5000
4000
3000
2000
1000
0
Concentration (µg/L)
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

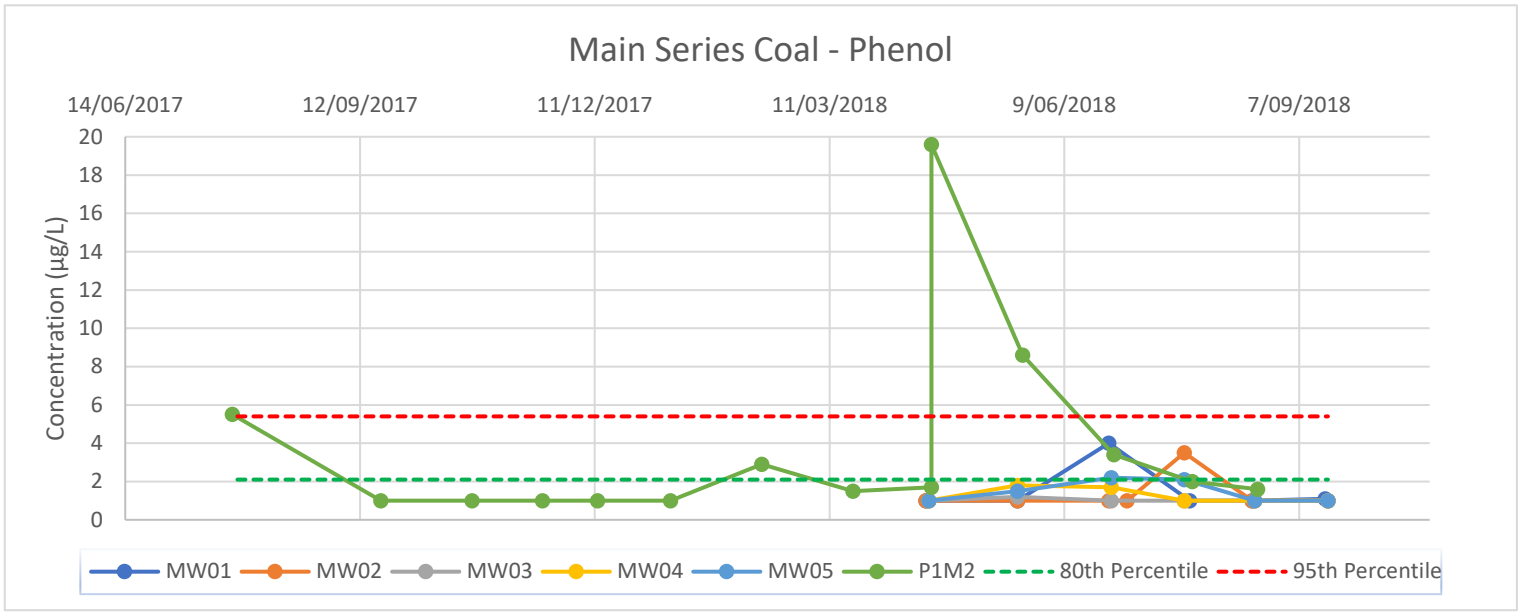

Main Series Coal - >C16 - C34 Fraction
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
3500
3000
2500
2000
1500
1000
500
0
Concentration (µg/L)
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

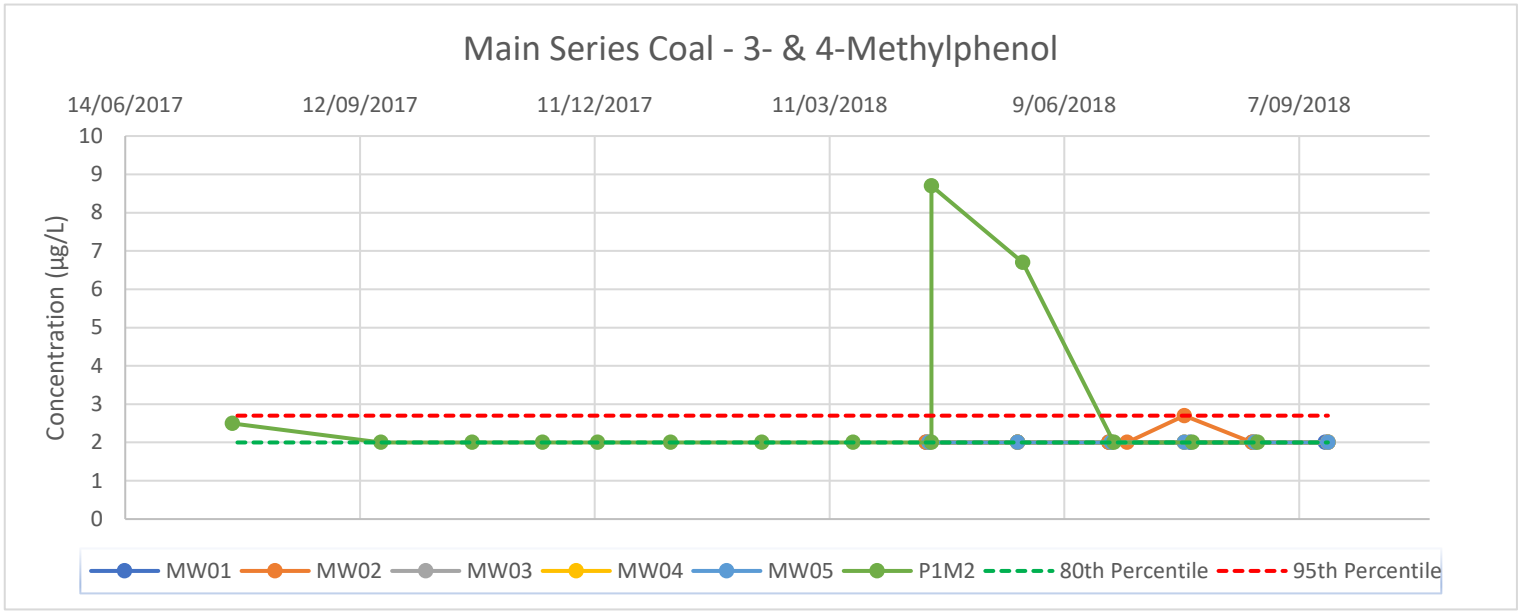

Main Series Coal - >C34 - C40 Fraction
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
600
500
400
300
200
100
0
Concentration (µg/L)
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

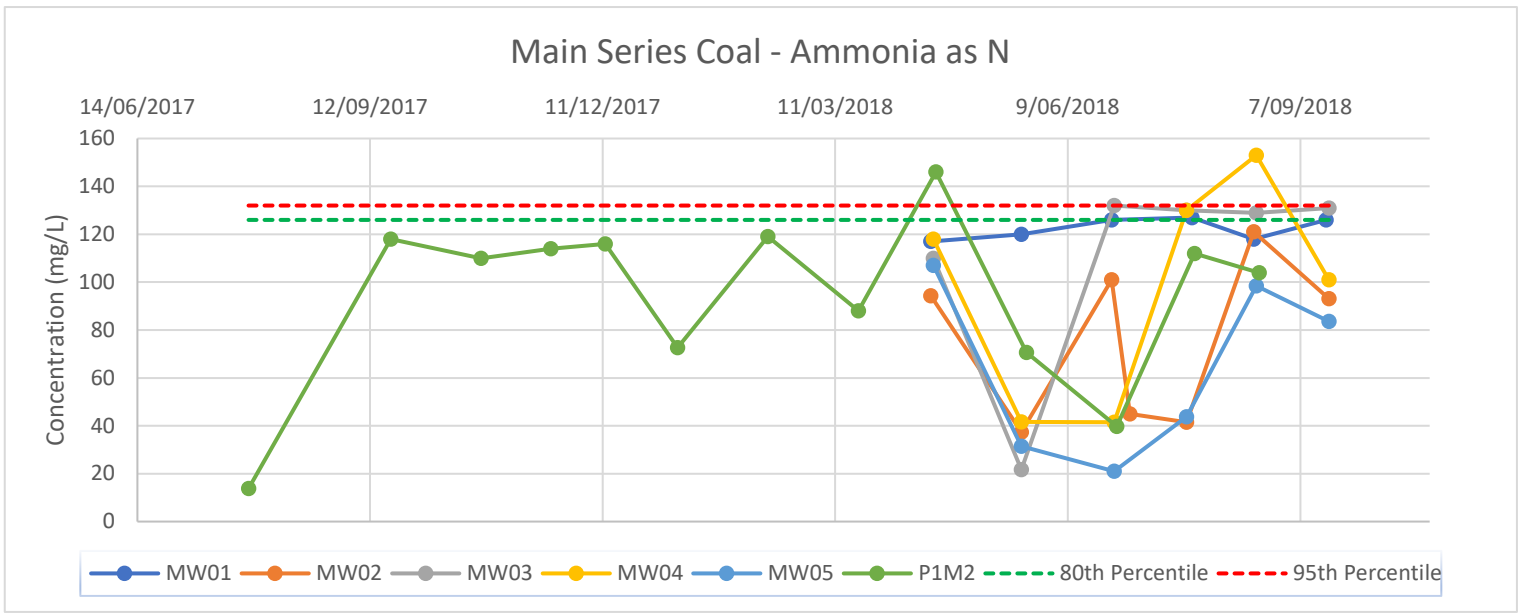

Main Series Coal - >C10 - C40 Fraction (sum)
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
8000
7000
6000
5000
4000
3000
2000
1000
0
Concentration (µg/L)
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

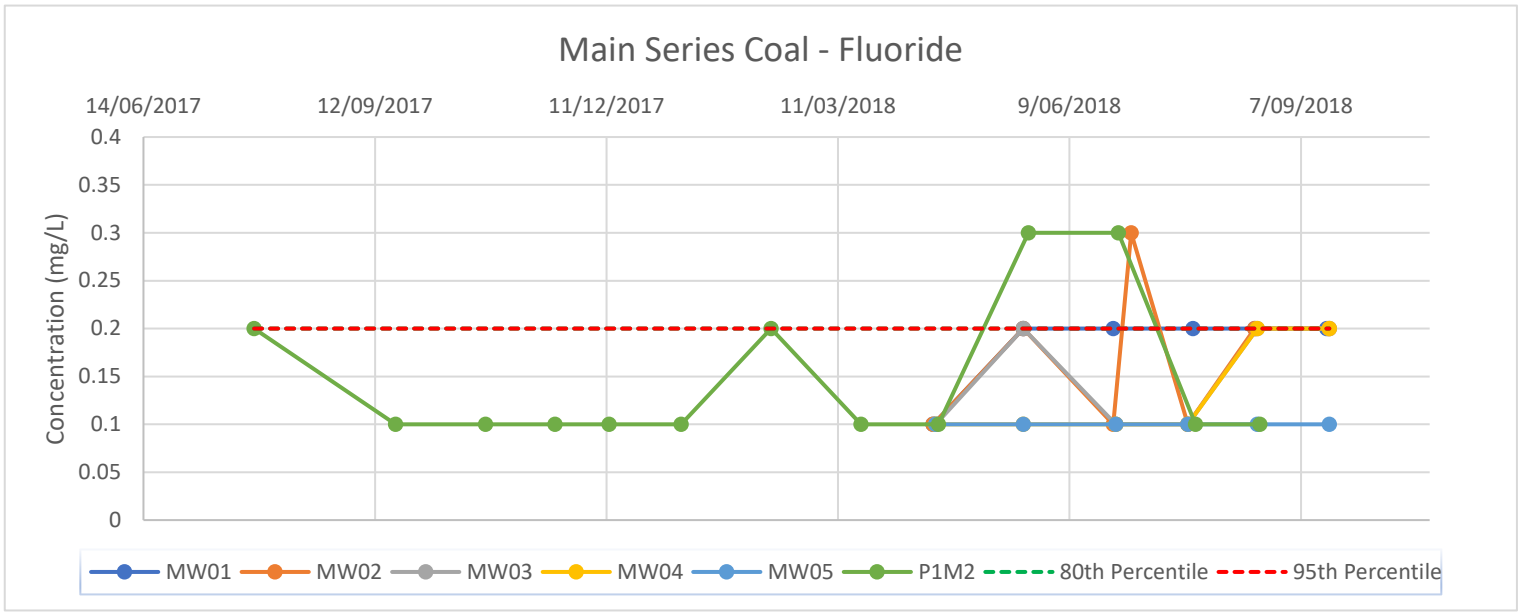

Main Series Coal - Benzene
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
14
12
10
8
6
4
2
0
Concentration (µg/L)
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

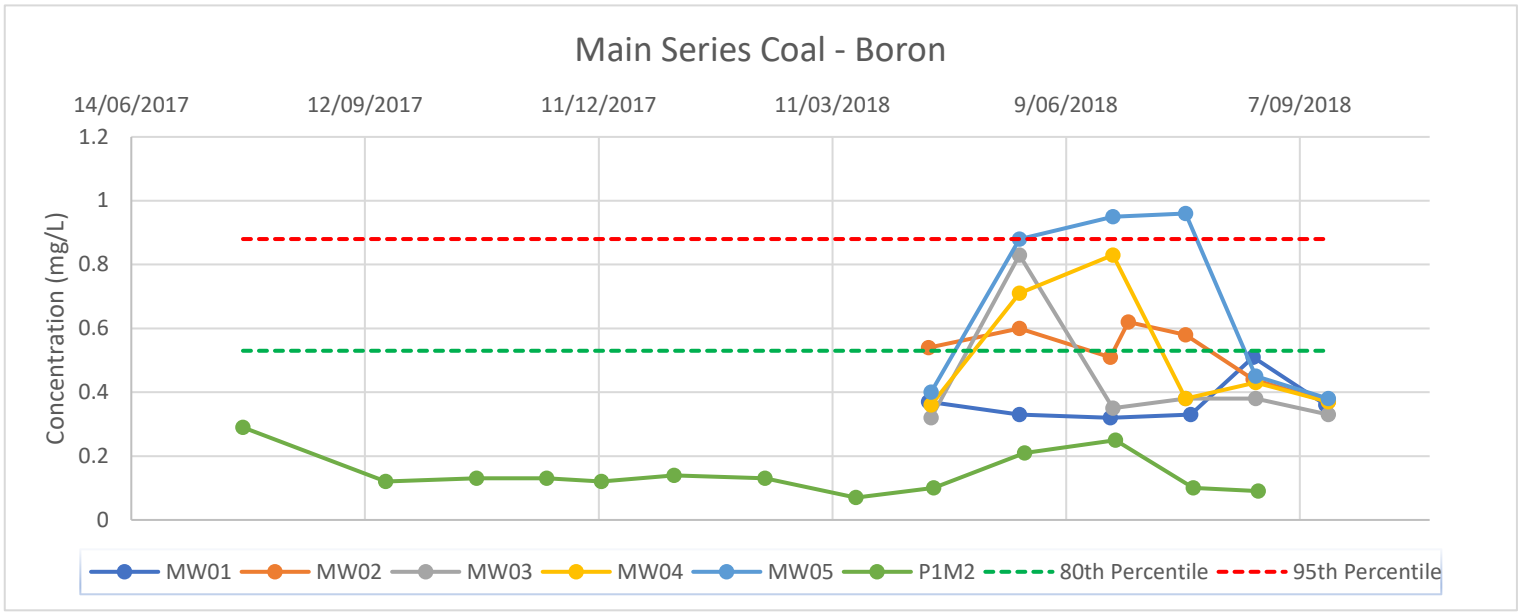

Main Series Coal - Toluene
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
Concentration (µg/L)
0
1
2
3
4
5
6
7
8
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile


Main Series Coal - Phenol
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
Concentration (µg/L)
0
2
4
6
8
10
12
14
16
18
20
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

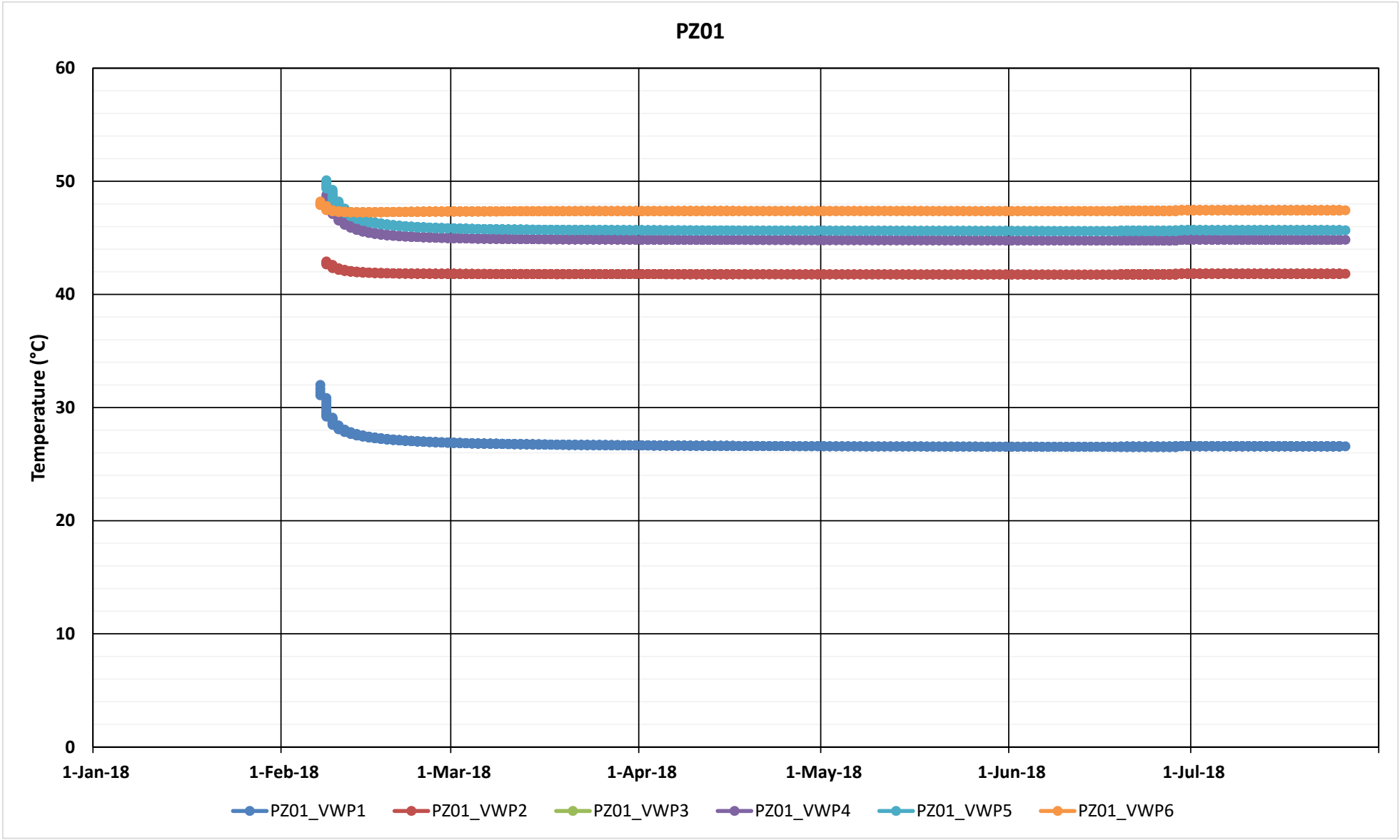

Main Series Coal - 3- & 4-Methylphenol
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
Concentration (µg/L)
0
1
2
3
4
5
6
7
8
9
10
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile


Main Series Coal - Ammonia as N
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
Concentration (mg/L)
160
140
120
100
80
60
40
20
0
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

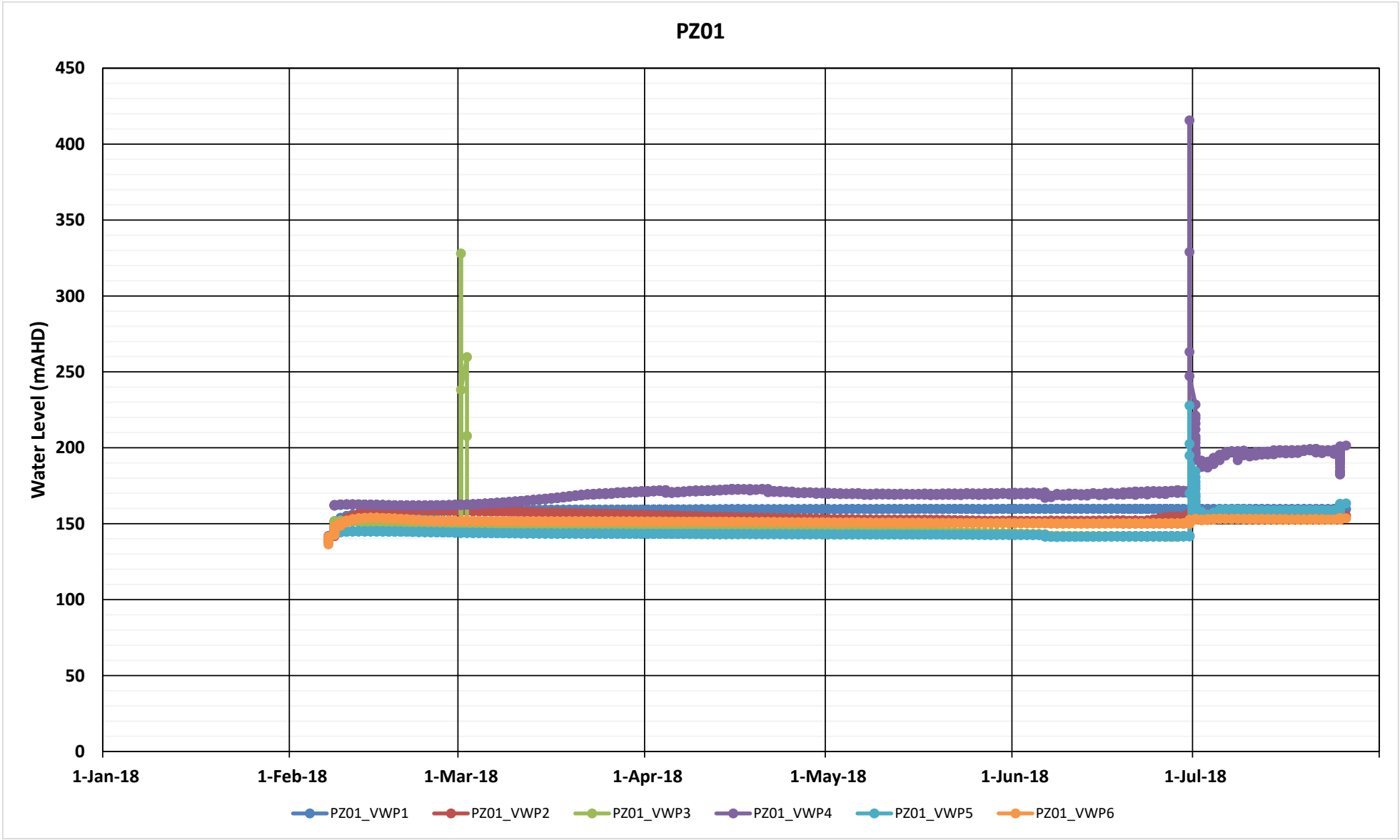

Main Series Coal - Fluoride
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
Concentration (mg/L)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

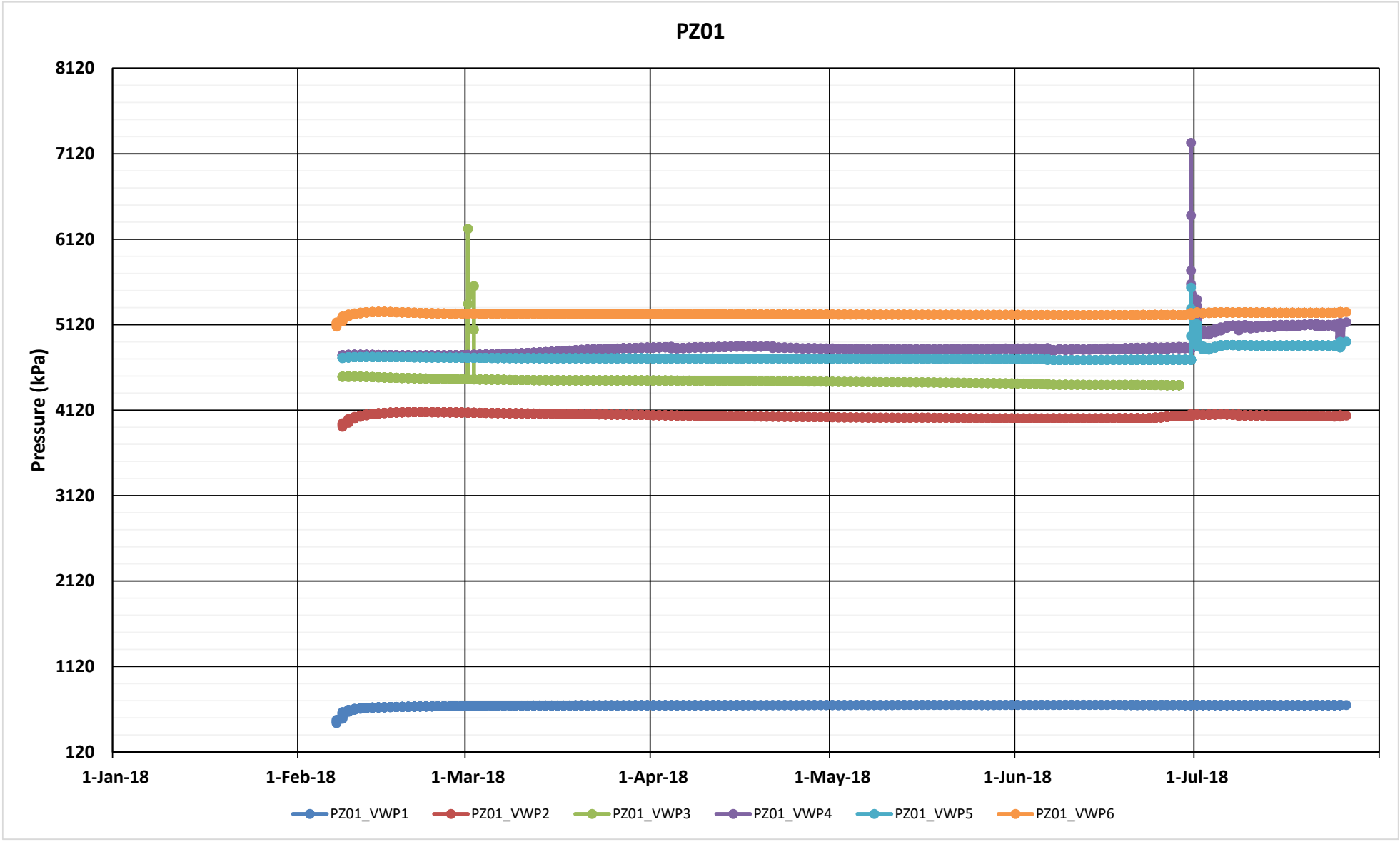

Main Series Coal - Boron
14/06/2017
12/09/2017
11/12/2017
11/03/2018
9/06/2018
7/09/2018
Concentration (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
MW01
MW02
MW03
MW04
MW05
P1M2
80th Percentile
95th Percentile

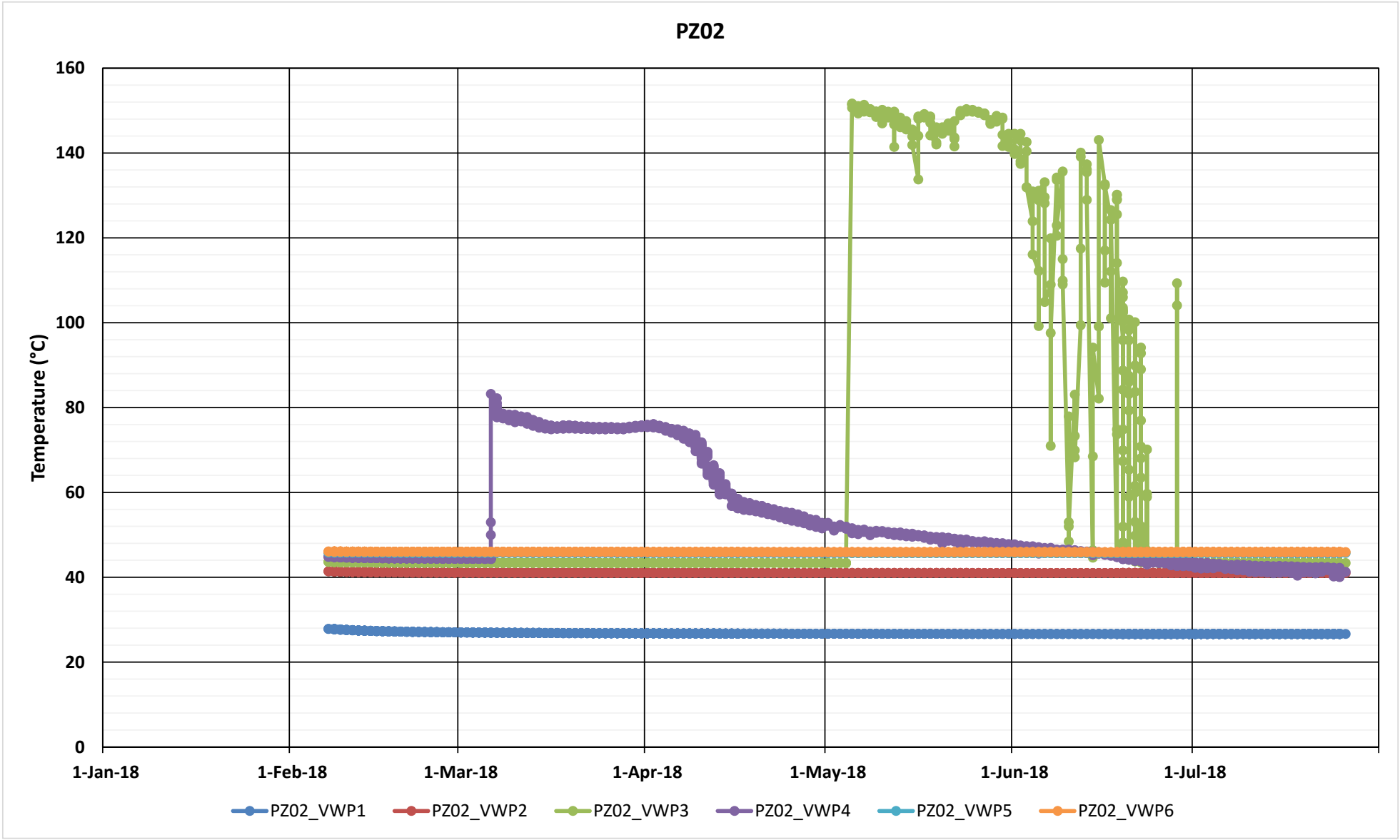
Appendix C VWP Timeseries

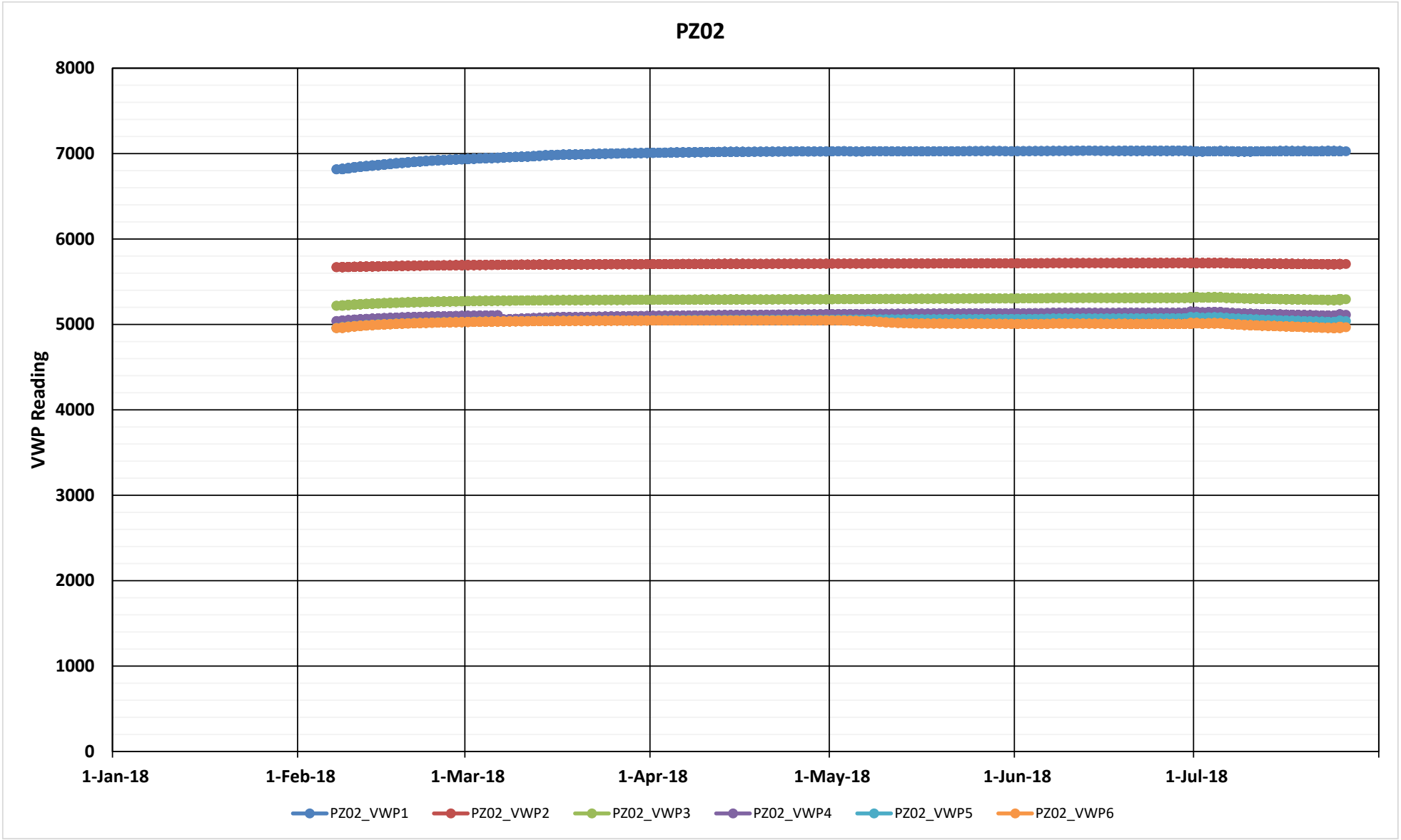

PZ01
60
50
40
30
20
10
0
Temperature (°C)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ01_VWP1
PZ01_VWP2
PZ01_VWP3
PZ01_VWP4
PZ01_VWP5
PZ01_VWP6

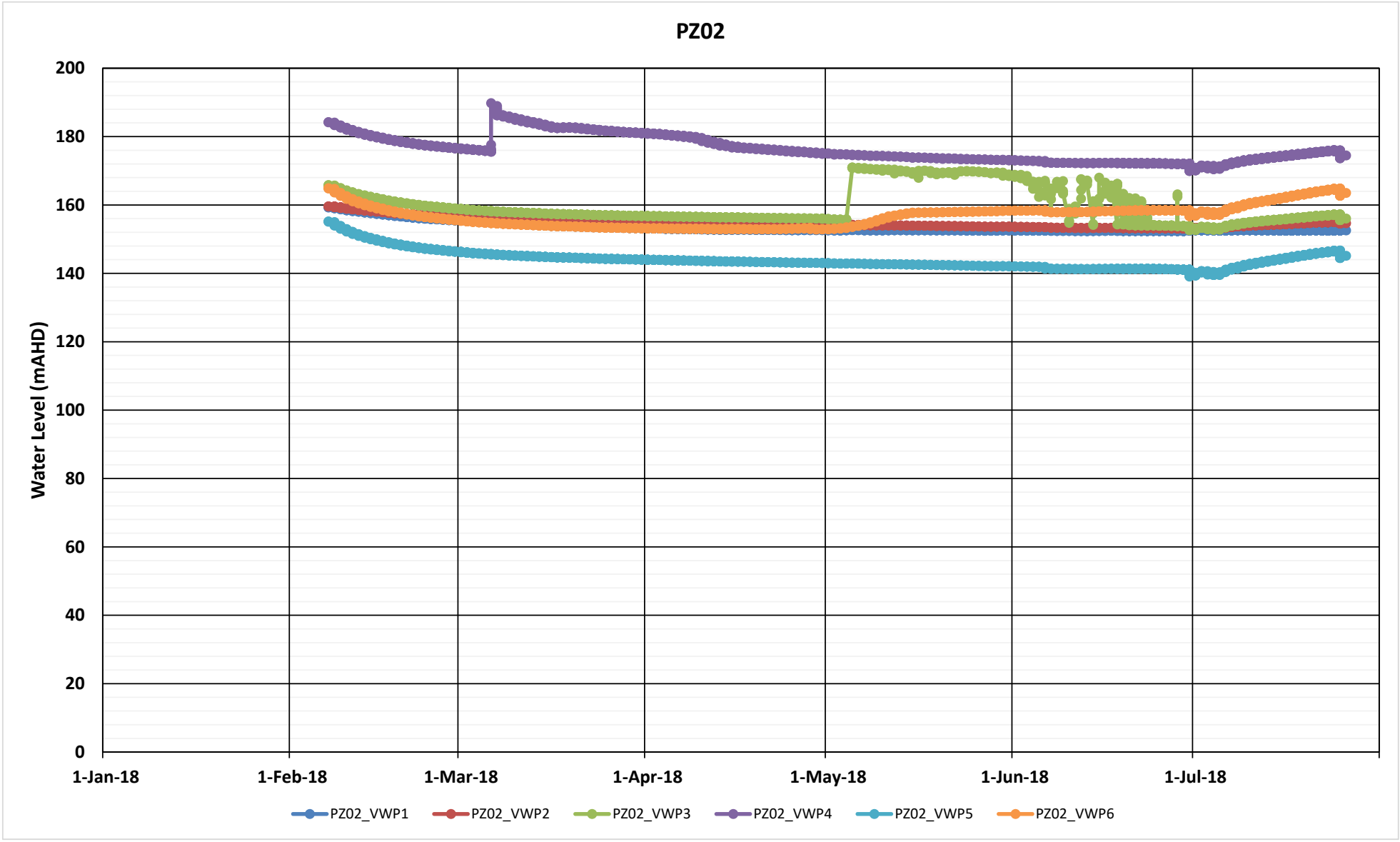
PZ01
VWP Reading
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ01_VWP1
PZ01_VWP2
PZ01_VWP3
PZ01_VWP4
PZ01_VWP5
PZ01_VWP6

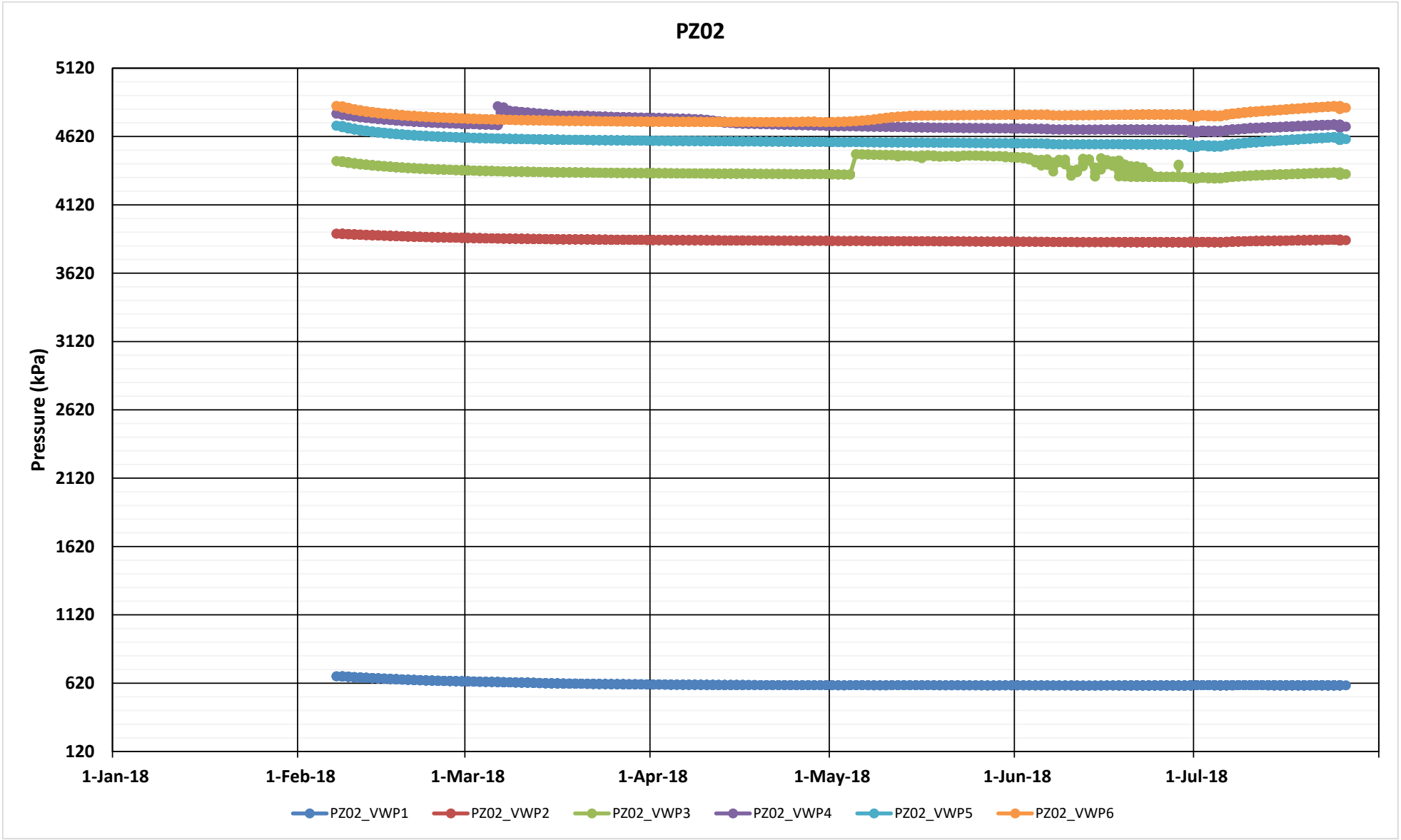

PZ01
Water Level (mAHD)
450
400
350
300
250
200
150
100
50
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ01_VWP1
PZ01_VWP2
PZ01_VWP3
PZ01_VWP4
PZ01_VWP5
PZ01_VWP6

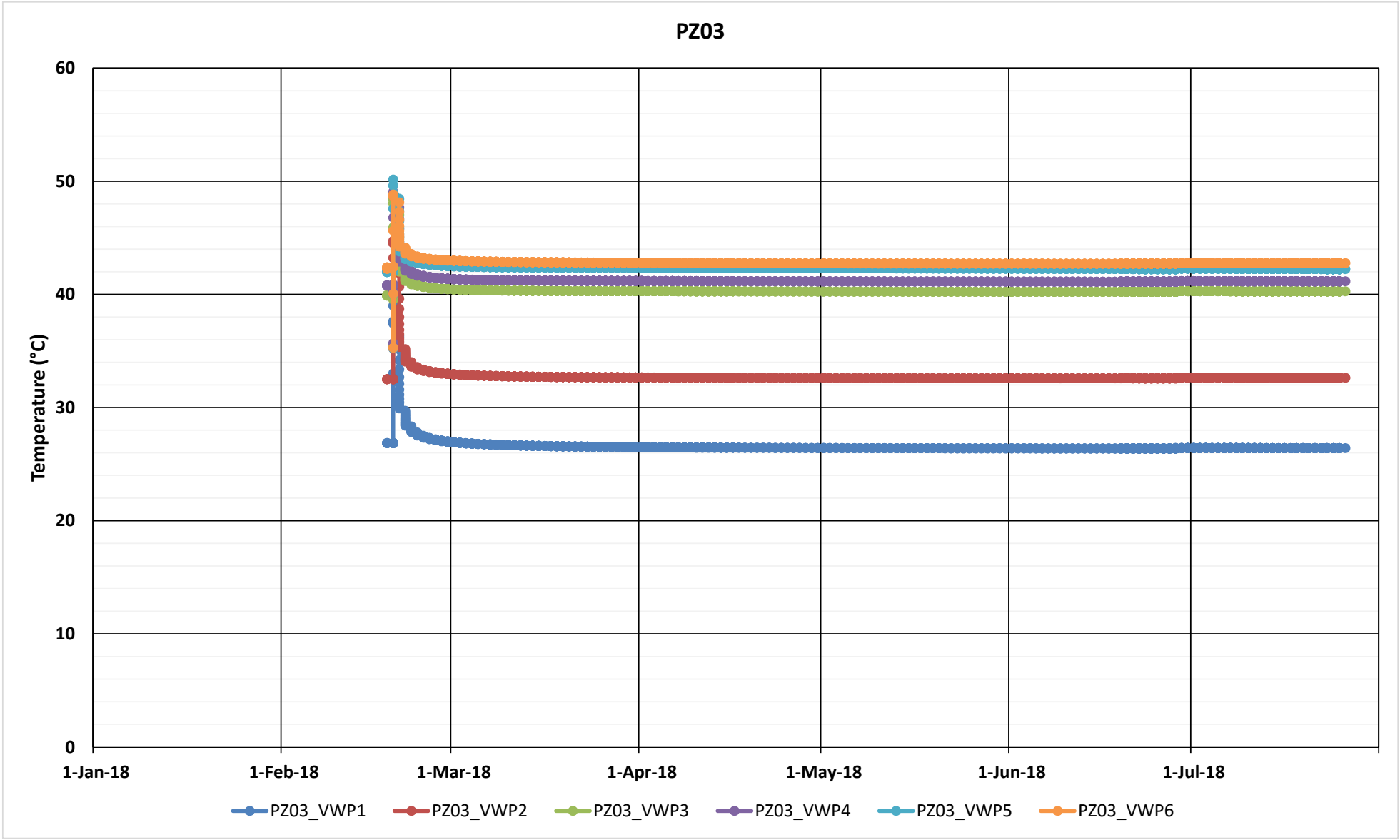

PZ01
8120
7120
6120
5120
4120
3120
2120
1120
120
Pressure (kPa)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ01_VWP1
PZ01_VWP2
PZ01_VWP3
PZ01_VWP4
PZ01_VWP5
PZ01_VWP6

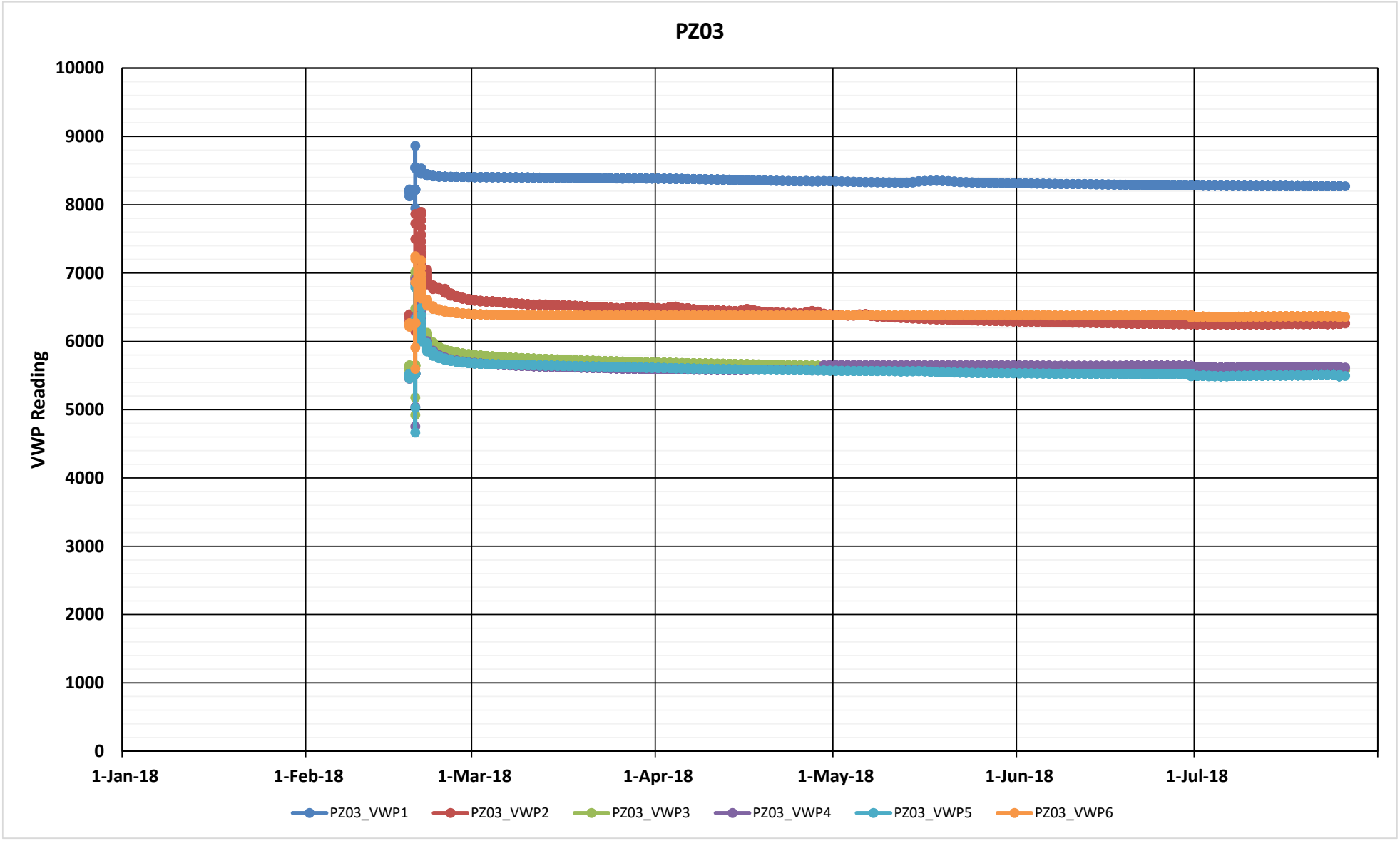

PZ02
Temperature (°C)
160
140
120
100
80
60
40
20
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ02_VWP1
PZ02_VWP2
PZ02_VWP3
PZ02_VWP4
PZ02_VWP5
PZ02_VWP6

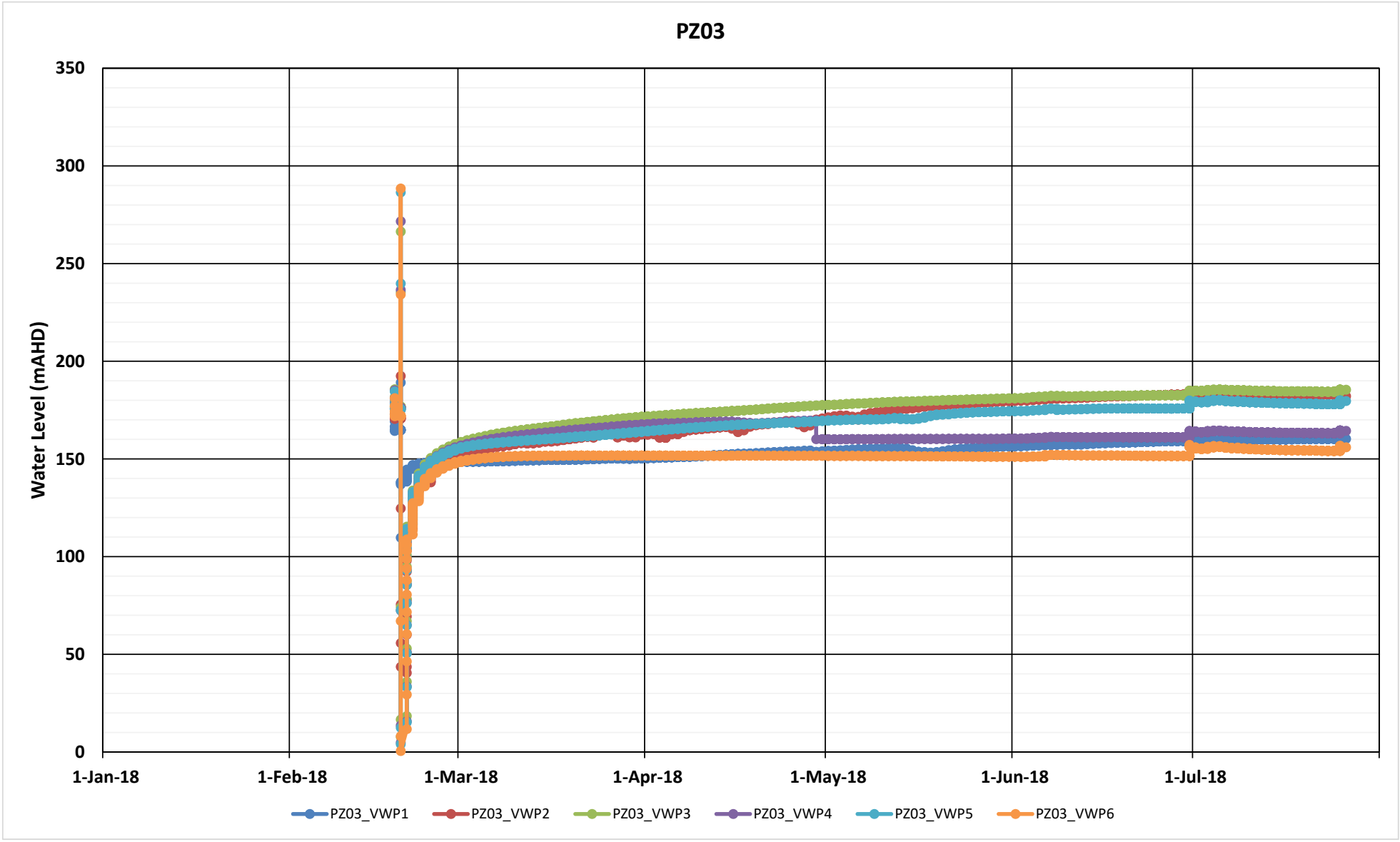

PZ02
8000
7000
6000
5000
4000
3000
2000
1000
0
VWP Reading
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ02_VWP1
PZ02_VWP2
PZ02_VWP3
PZ02_VWP4
PZ02_VWP5
PZ02_VWP6

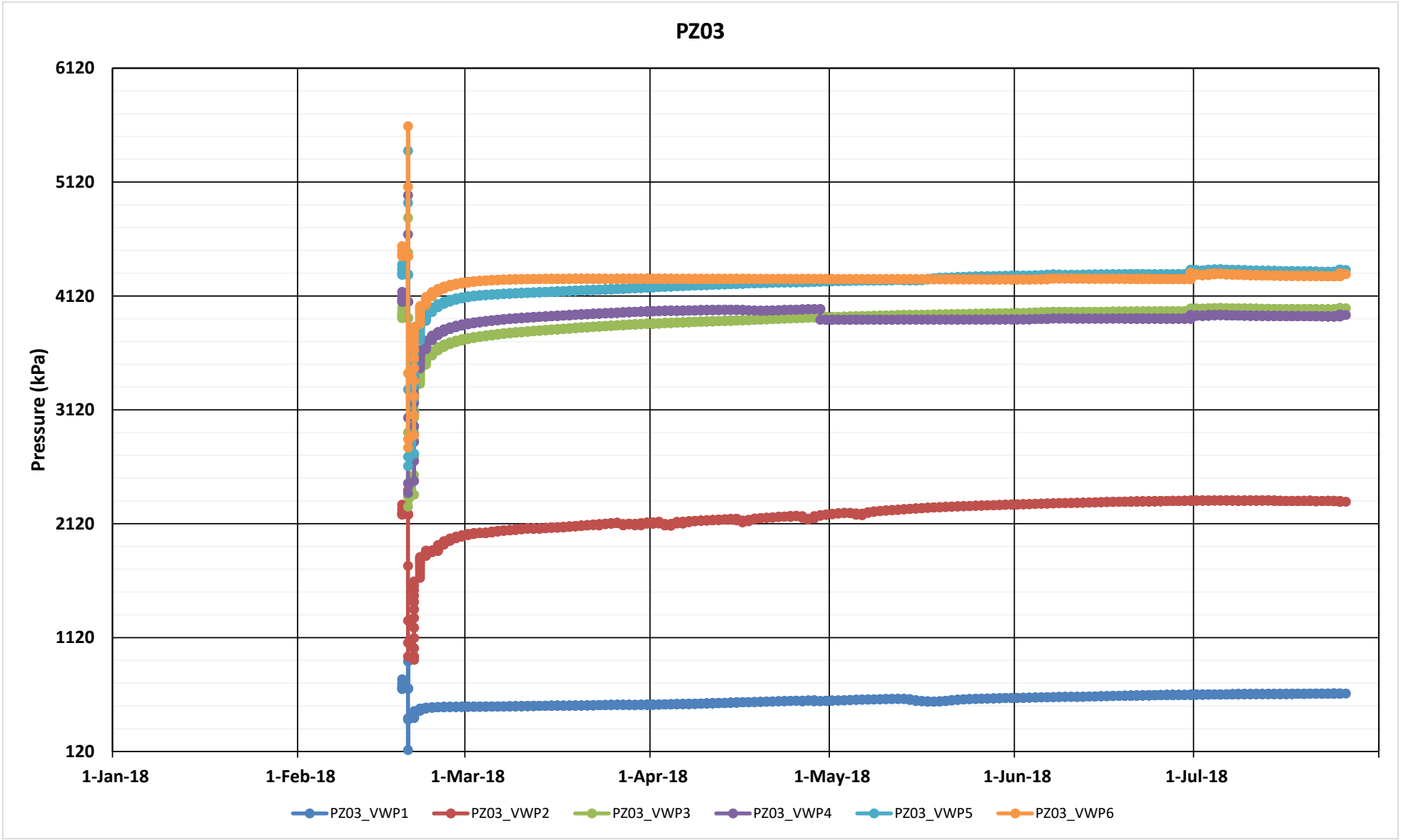

PZ02
Water Level (mAHD)
200
180
160
140
120
100
80
60
40
20
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ02_VWP1
PZ02_VWP2
PZ02_VWP3
PZ02_VWP4
PZ02_VWP5
PZ02_VWP6

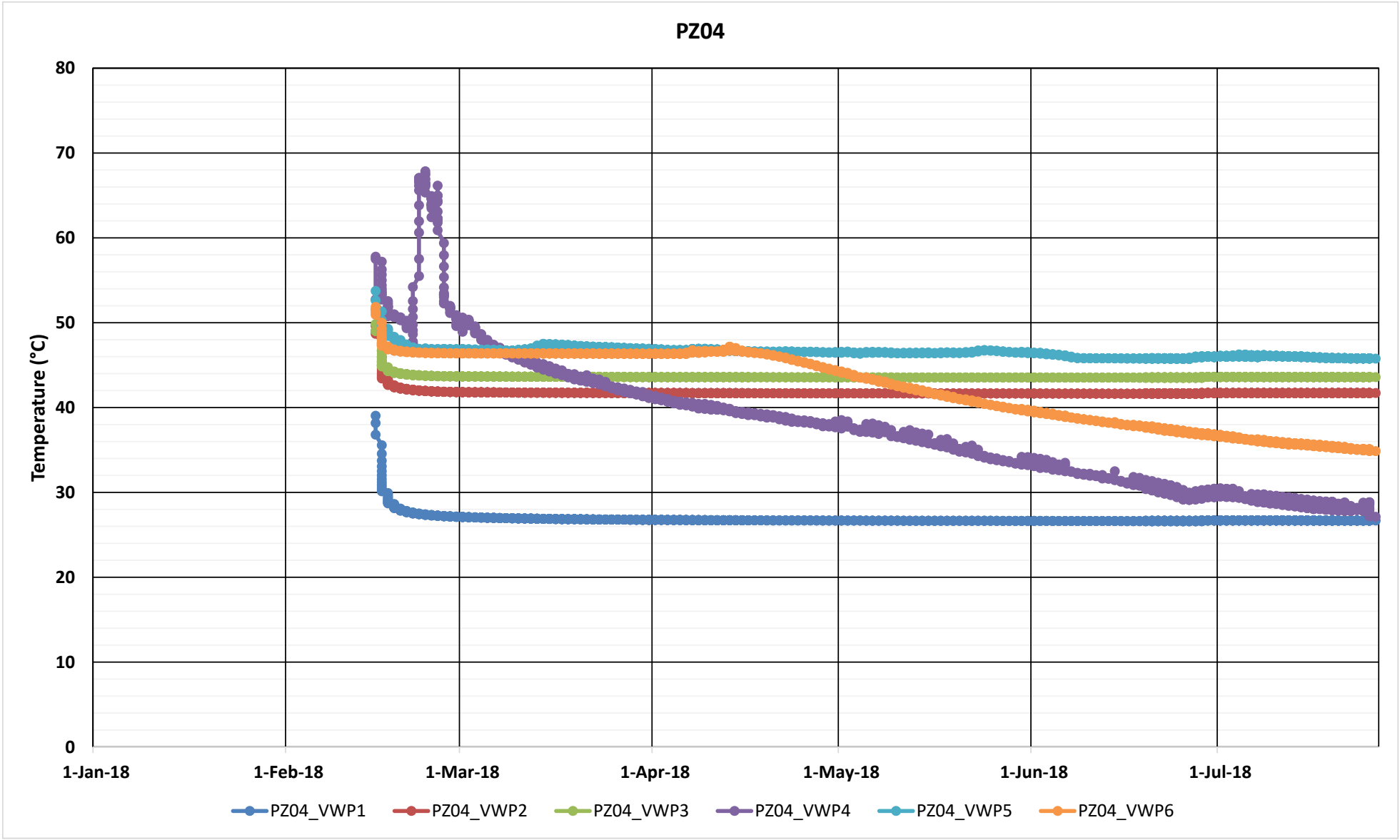

PZ02
5120
4620
4120
3620
3120
2620
2120
1620
1120
620
120
Pressure (kPa)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ02_VWP1
PZ02_VWP2
PZ02_VWP3
PZ02_VWP4
PZ02_VWP5
PZ02_VWP6

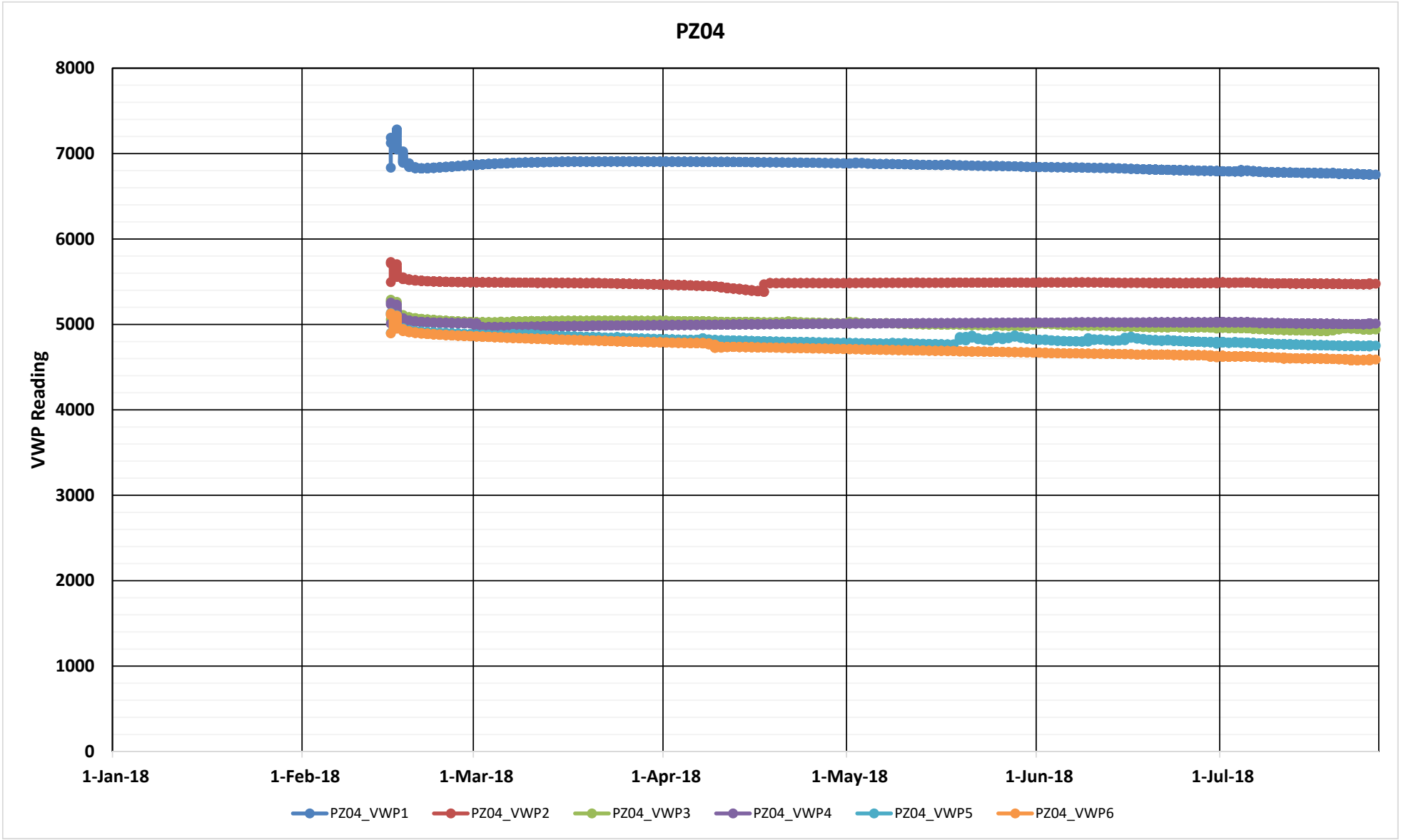

PZ03
60
50
40
30
20
10
0
Temperature (°C)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ03_VWP1
PZ03_VWP2
PZ03_VWP3
PZ03_VWP4
PZ03_VWP5
PZ03_VWP6

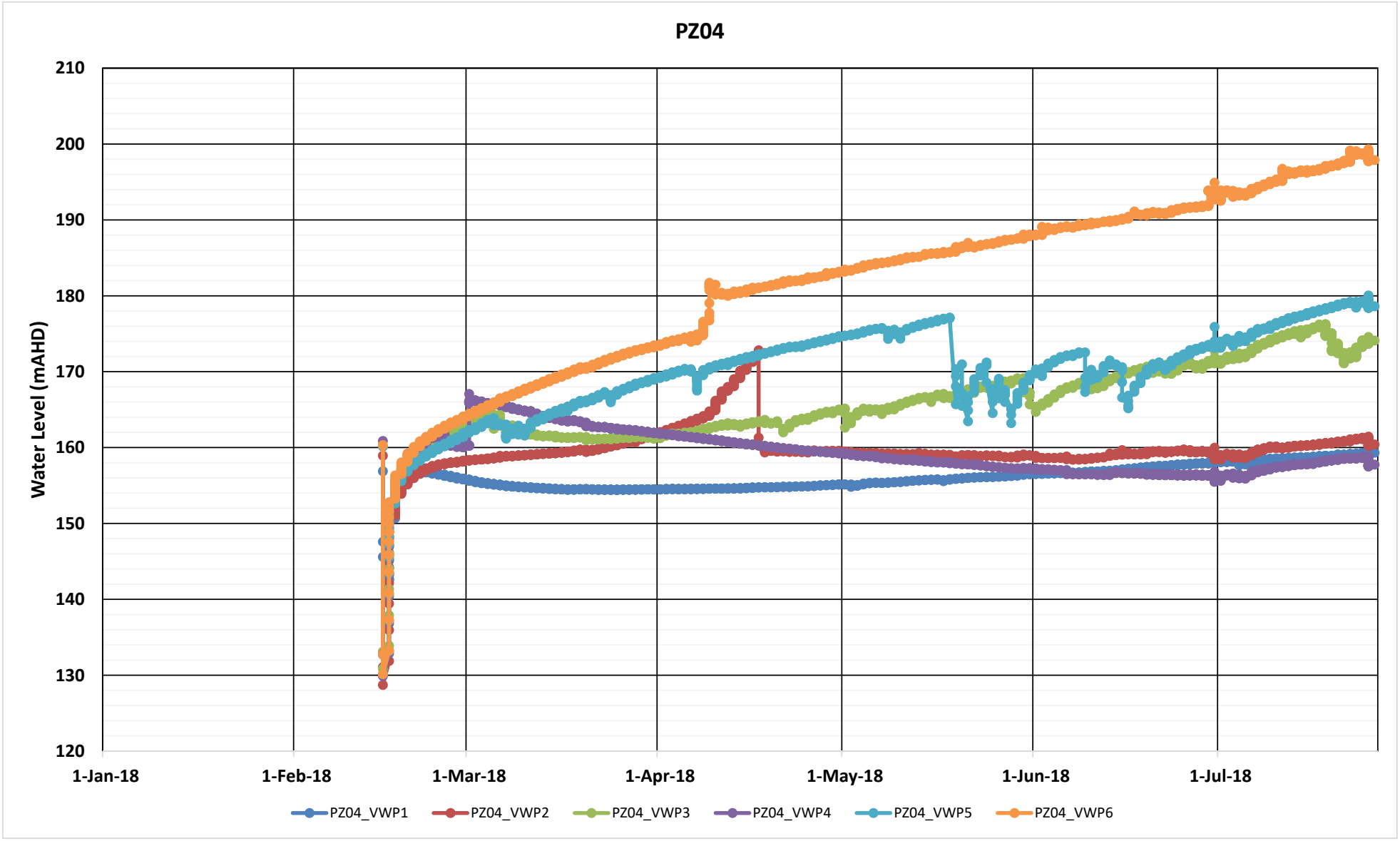

PZ03
VWP Reading
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ03_VWP1
PZ03_VWP2
PZ03_VWP3
PZ03_VWP4
PZ03_VWP5
PZ03_VWP6

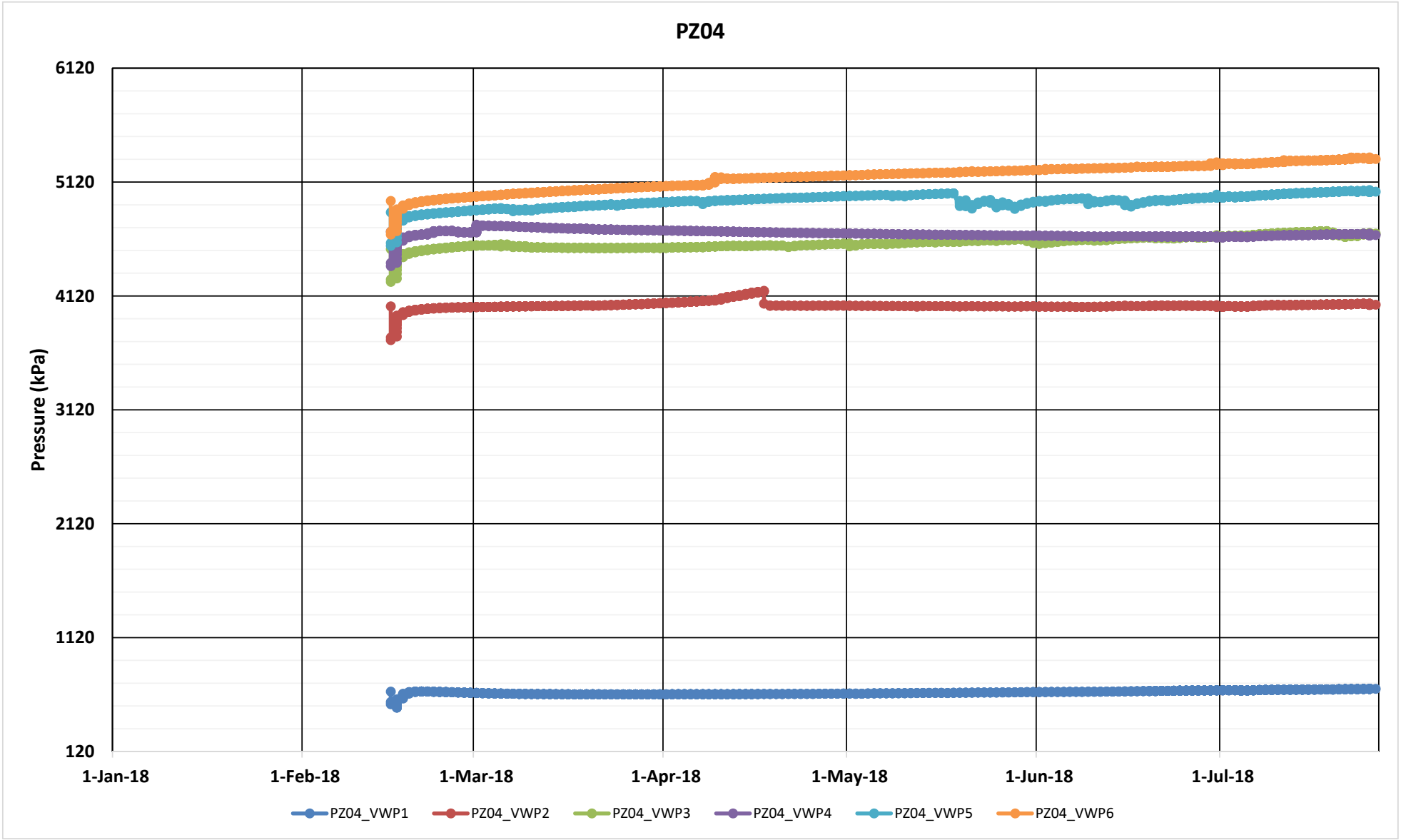

PZ03
Water Level (mAHD)
350
300
250
200
150
100
50
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ03_VWP1
PZ03_VWP2
PZ03_VWP3
PZ03_VWP4
PZ03_VWP5
PZ03_VWP6

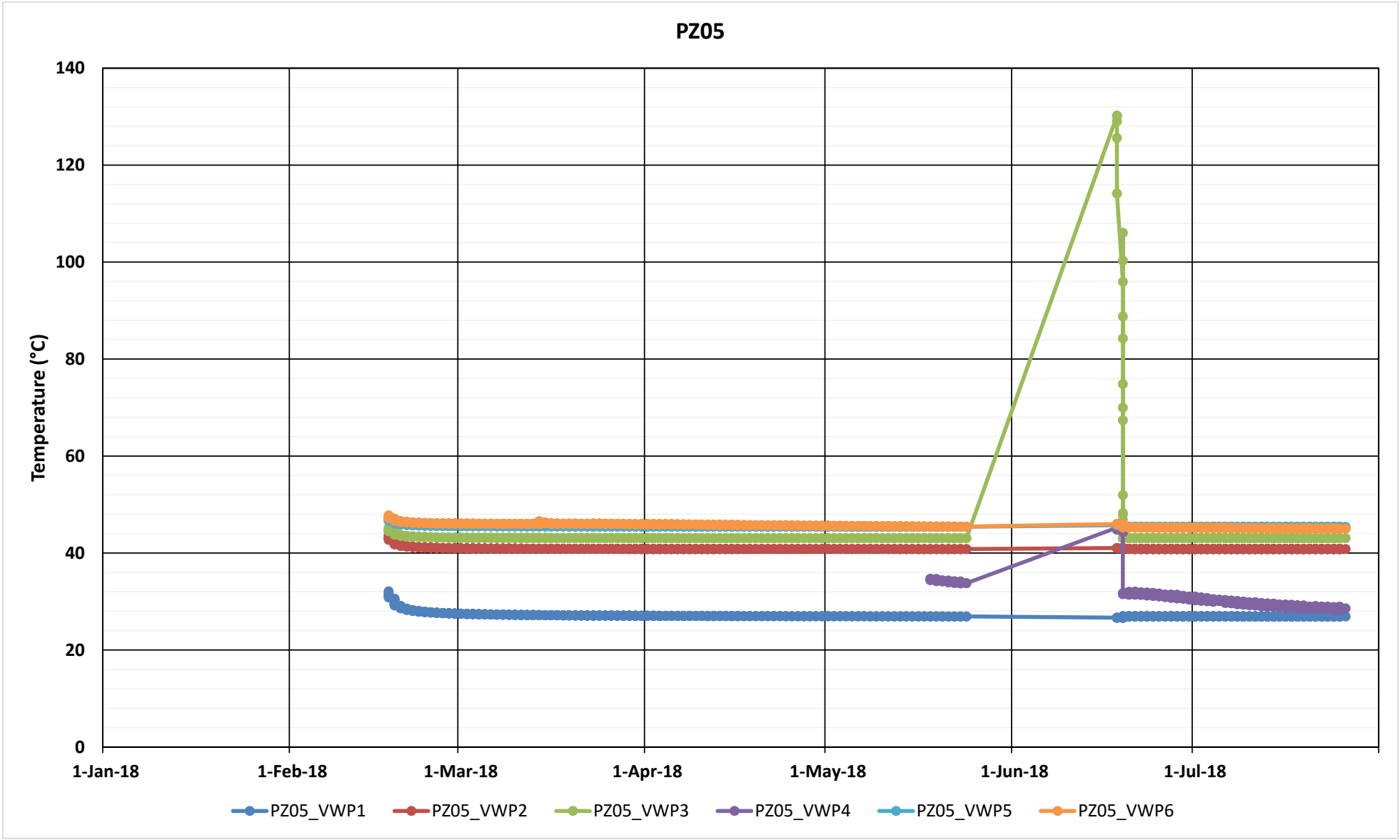

PZ03
6120
5120
4120
3120
2120
1120
120
Pressure (kPa)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ03_VWP1
PZ03_VWP2
PZ03_VWP3
PZ03_VWP4
PZ03_VWP5
PZ03_VWP6

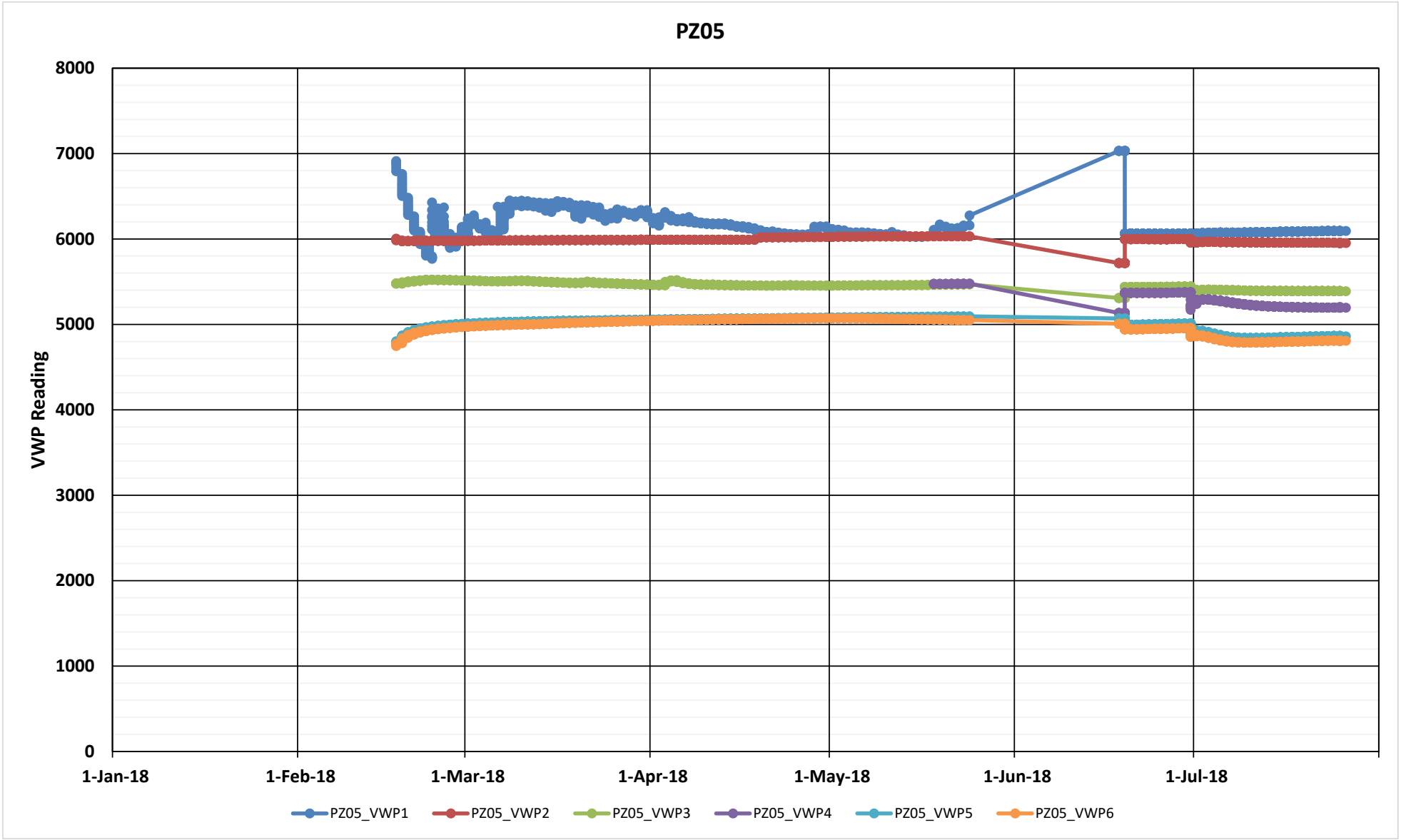

PZ04
Temperature (°C)
80
70
60
50
40
30
20
10
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ04_VWP1
PZ04_VWP2
PZ04_VWP3
PZ04_VWP4
PZ04_VWP5
PZ04_VWP6

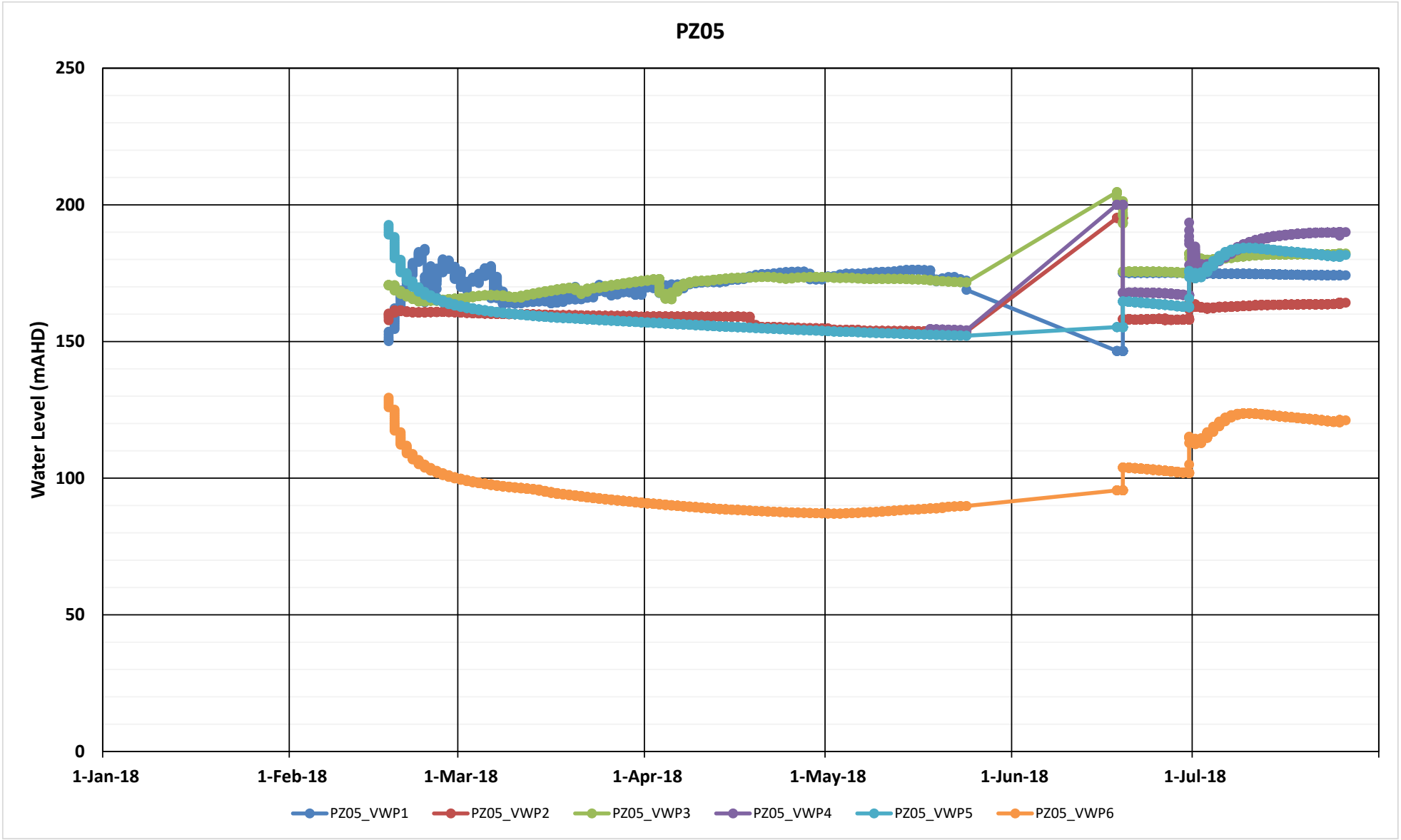

PZ04
VWP Reading
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ04_VWP1
PZ04_VWP2
PZ04_VWP3
PZ04_VWP4
PZ04_VWP5
PZ04_VWP6

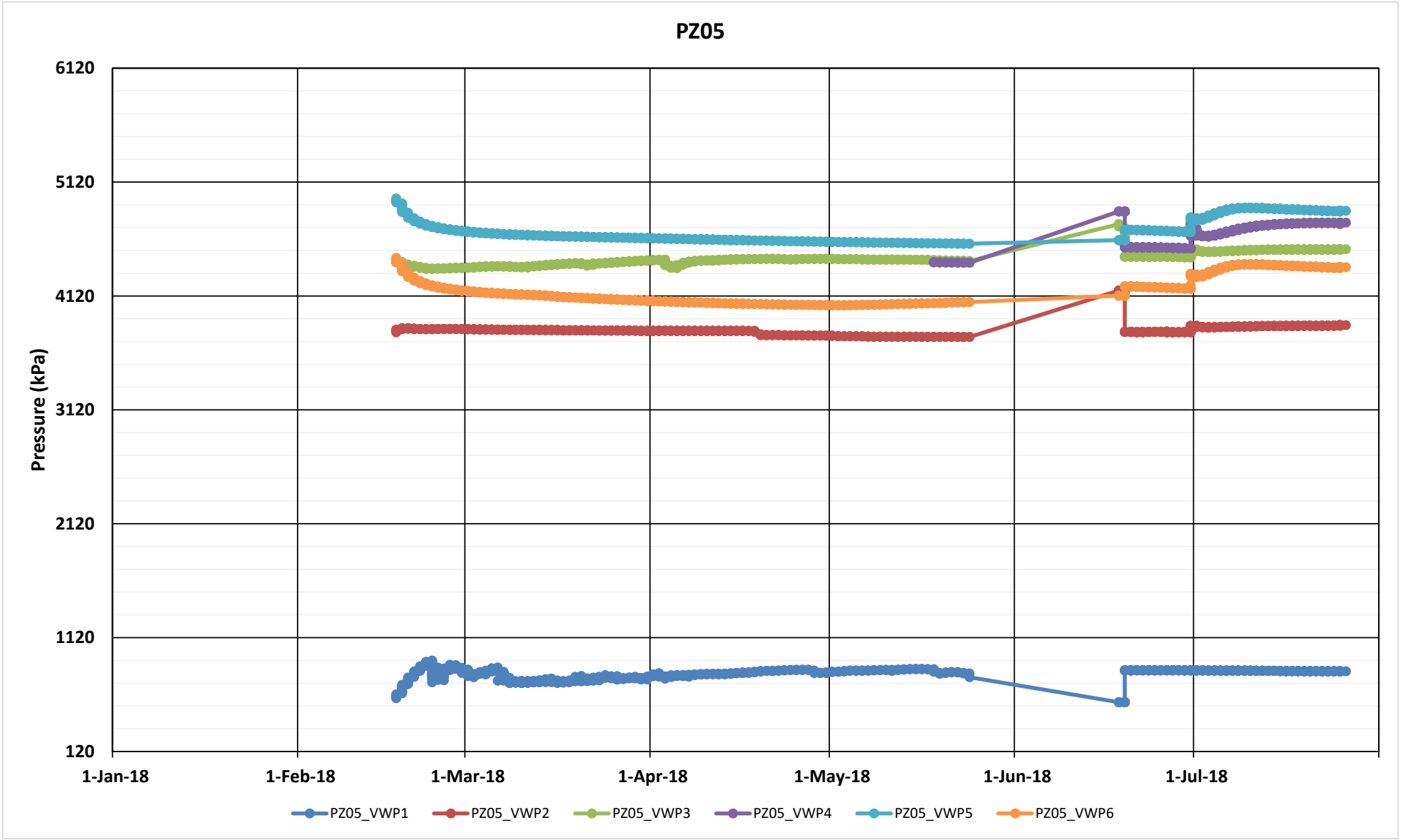

PZ04
Water Level (mAHD)
210
200
190
180
170
160
150
140
130
120
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ04_VWP1
PZ04_VWP2
PZ04_VWP3
PZ04_VWP4
PZ04_VWP5
PZ04_VWP6


PZ04
6120
5120
4120
3120
2120
1120
120
Pressure (kPa)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ04_VWP1
PZ04_VWP2
PZ04_VWP3
PZ04_VWP4
PZ04_VWP5
PZ04_VWP6


PZ05
Temperature (°C)
140
120
100
80
60
40
20
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ05_VWP1
PZ05_VWP2
PZ05_VWP3
PZ05_VWP4
PZ05_VWP5
PZ05_VWP6


PZ05
8000
7000
6000
5000
4000
3000
2000
1000
0
VWP Reading
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ05_VWP1
PZ05_VWP2
PZ05_VWP3
PZ05_VWP4
PZ05_VWP5
PZ05_VWP6


PZ05
Water Level (mAHD)
250
200
150
100
50
0
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ05_VWP1
PZ05_VWP2
PZ05_VWP3
PZ05_VWP4
PZ05_VWP5
PZ05_VWP6


PZ05
6120
5120
4120
3120
2120
1120
120
Pressure (kPa)
1-Jan-18
1-Feb-18
1-Mar-18
1-Apr-18
1-May-18
1-Jun-18
1-Jul-18
PZ05_VWP1
PZ05_VWP2
PZ05_VWP3
PZ05_VWP4
PZ05_VWP5
PZ05_VWP6

Appendix D Leigh Creek Mine Groundwater Bore Survey (FFP, 2017)

As part of the development of the PEPR for the Leigh Creek Mine, a detailed survey of existing groundwater bores across the mining lease was undertaken in July 2016 (FPP, February 2017). The survey of 102 bores was completed with reference to the South Australian Resource Information Geoserver (SARIG) database and the known bores utilised during operations.

The survey categorised the bores into the following types:

- Missing Bores – no trace of the bore installation present. All of the SARIG-nominated bores fell into this category.
- Active/Open Bores – bores that are open and could potentially be pumped from.
- Monitoring Bores – consisting of:
  - the old Upper Series VWPs (Vibrating Wire Piezometers);
  - the old electric piezometers on the Main Series. Almost all have been lost to mining activity;
  - new VWP's that have the piezometers cemented in place; and
  - newly installed open monitoring bores.
- Capped bores – mining production bores used for dewatering that have since been closed (utilising a bentonite cement mix).

Missing Bores

The following bores are not evidenced on the ground (refer TableC-1 below). It is suspected that the majority of these bores are old exploration bore holes/drill holes.

Table D-1: List of Missing Bores

Bore ID	Easting	Northing	RL	Comments
15 (SARIG)	251086.5	6622499.0	197.4	Suspected Exploration Drill hole
653603570	252104.5	6622168.0	200.8	Suspected Exploration Drill hole
653700532	249280.6	6624263.0	191.7	Suspected Exploration Drill hole
653700537	249215.5	6624285.0	192.0	Suspected Exploration Drill hole
653700538	249223.5	6624282.0	191.9	Suspected Exploration Drill hole
653700570	250845.6	6623689.0	98.5	Suspected Exploration Drill hole
653700573	250788.6	6623592.0	141.3	Suspected Exploration Drill hole
653700578	250837.6	6623601.0	126.2	Suspected Exploration Drill hole
653700579	250845.5	6623602.0	126.0	Suspected Exploration Drill hole
653700581	249289.6	6624322.0	192.5	Suspected Exploration Drill hole
653700598	250803.6	6623684.0	91.6	Suspected Exploration Drill hole
653700658	250848.6	6623749.0	86.2	Suspected Exploration Drill hole
653700691	251094.6	6623604.0	78.1	Suspected Exploration Drill hole
653700706	249919.5	6623961.0	193.0	Suspected Exploration Drill hole
653700720	253657.6	6623143.0	192.8	Suspected Exploration Drill hole
653700723	249448.5	6626149.0	127.7	Suspected Exploration Drill hole
653700728	253671.6	6623131.0	192.4	Suspected Exploration Drill hole
653700737	249918.5	6623962.0	193.4	Suspected Exploration Drill hole
653700985	249518.5	6624210.0	186.8	Suspected Exploration Drill hole
653701193	249237.6	6623888.0	196.0	Suspected Exploration Drill hole
653701299	252240.6	6625778.0	188.8	Suspected Exploration Drill hole
653701301	250649.5	6626129.0	173.8	Suspected Exploration Drill hole

Bore ID	Easting	Northing	RL	Comments
653701305	252810.6	6624500.0	149.3	Suspected Exploration Drill hole
653701306	253049.5	6623150.0	219.4	Suspected Exploration Drill hole
653701920	250425.5	6624149.0	123.7	Suspected Exploration Drill hole
653703527	253627.8	6624523.0	205.5	Suspected Exploration Drill hole
653703528	253486.4	6624433.0	204.7	Suspected Exploration Drill hole
653703538	252797.1	6624440.0	172.1	Suspected Exploration Drill hole
653703539	252572.1	6624829.0	140.9	Suspected Exploration Drill hole
653703540	253116.7	6625105.0	196.8	Suspected Exploration Drill hole
653703541	253223.8	6625000.0	203.9	Suspected Exploration Drill hole
653703542	252817.5	6625415.0	176.3	Suspected Exploration Drill hole
653703543	252868.9	6625365.0	175.5	Suspected Exploration Drill hole
653703544	253327.1	6624902.0	208.1	Suspected Exploration Drill hole
653703546	252763.1	6624508.0	162.3	Suspected Exploration Drill hole
653703547	252900.1	6625239.0	171.4	Suspected Exploration Drill hole
653703549	253370.4	6624165.0	206.5	Suspected Exploration Drill hole
7004_A	253199.8	6625039.0	206.9	Known Exploration Drill hole
7009_A	253611.9	6624177.0	187.4	Known Exploration Drill hole
7010_A	253411.5	6623748.0	193.5	Known Exploration Drill hole
7013_A	253778.5	6623614.0	186.1	Known Exploration Drill hole
7015_A	254446.7	6623066.0	210.6	Known Exploration Drill hole
LSP 5437	247947.7	6625111.4	188.6	Lost due to mining activity
LSP 6021	253048.2	6624989.0	207.0	Lost due to mining activity
LSP 6022	252327.1	6625926.6	203.7	Lost due to mining activity
LSP 6027	248371.96	6626160.5	183.5	Lost due to mining activity
LSP 6029	248584.3	6625925.9	128.4	Lost due to mining activity
LSP 6033	248905.1	6626081.0	126.4	Lost due to mining activity
LSP 6037	247718.2	6625325.3	188.9	Lost due to mining activity
LSP 6039	249855.0	6626089.8	139.8	Lost due to mining activity
M2/3-OB2_A	252290.0	6622334.0	200.0	M2/3 Observation Bore – not installed due to first observation bore being dry
M2/3-PB1(U)_A	252295.0	6622143.0	203.1	M2/3 Production Bore – not installed due to first observation bore being dry

Active/Open Bores

These production-sized bores are not listed in the SARIG database. The bores are located in two areas:

1. The Upper Series; mainly along the Upper Series Highwall and the proposed U23 Highwall. The U23 bores were installed as part of the Lower Series development plans; and
2. Around LT01 and LT07 as part of the Lower Series development.

The bores are listed in Table D-2 below.

Table D-2: List of Active/Open Bores

Bore ID	Easting	Northing	Depth	Comments
Active 1	249170.1	6624199.0	194.3	Older Upper Series bore infrastructure
9100	249465.7	6624152.0	194.3	Upper Series Production Bore – Open
9130	249209.0	6624188.0	193.9	Upper Series Production Bore – Open
9140	249963.9	6623871.0	194.3	Upper Series Production Bore – Open
9150	250331.5	6623675.0	195.6	Upper Series Production Bore – Open
9160	250614.1	6623459.5	197.3	Upper Series Production Bore – Open

Bore ID	Easting	Northing	Depth	Comments
9170	250920.9	6623335.9	195.8	Upper Series Production Bore – Open
L7 Pb1	253495.0	6624342.0	204.5	Production bore in Telford Basin Lower Series
LWPB_1	252992.5	6625543.0	202.3	Lower Series Telford Basin Production Bore -Open
LWPB_2	253239.3	6625283.0	205.7	Lower Series Telford Basin Production Bore -Open
LWPB_3	253448.5	6625037.0	209.4	Lower Series Telford Basin Production Bore -Open
U23 HW PB 1	251383.9	6622545.0	195.4	U23 Production Bore – Open - Flow issues due to running sands
U23 HW PB 2	251001.0	6622501.2	200.0	U23 Production Bore – Open - Flow issues due to clays
VWP LS 5 (HW)	252806.1	6624817.0	141.8	Lower Series Development VWP - Phase 2
VWP LS 6 (HW)	252884.8	6624685.0	143.0	Lower Series Development VWP - Phase 2
VWP LS 7	253317.9	6624654.0	200.0	Lower Series Development VWP - Phase 2

Monitoring Bores

The existing monitoring bores at Leigh Creek can be grouped into five sub-categories. These are:

1. The pneumatic piezometers in the Upper Series Highwall – these ceased being monitored in 2015 as they had progressively failed.
2. The VWPs in the Main Series Low wall – installed pre-2010. The majority of these piezometers have been removed by mining activity or destroyed by blasting.
3. The VWPs installed between 2013 and 2015 for the Lower Series development and U23 investigations.
4. Open monitoring wells installed as part of the Lower Series development hydrology investigation between 2013 and 2015. These are effectively cased exploration drill holes.
5. The Telford Tank monitoring bores. These bores were prepared in the mid 1990's following a fuel spill at the former rail siding. Since that time groundwater contamination has been periodically monitored and the location is subject to Detailed Site Investigations being undertaken by Coffey Environments as part of the Voluntary Site Contamination Assessment Proposal.

All of the monitoring bores are listed in Table D-3 below. The only bores that may be of use for future monitoring are the open cased drill holes.

Table D-3: List of Monitoring Bores

Bore Id	Easting	Northing	Depth	Comments
9071P	249240.9	6624271.0	191.7	Upper Series pneumatic piezo infrastructure
9083P	249165.2	6624297.0	192.4	Upper Series pneumatic piezo infrastructure
9084P	249162.8	6624308.0	192.0	Upper Series pneumatic piezo infrastructure
L6/7_OB2	253495.8	6624442.0	204.7	Lower Series Development Observation Bore - Phase 1
L6/7-INV/OBS	253461.0	6624330.0	204.4	Lower Series Development Observation Bore - Bore has been blocked – not usable for sampling
L6/7-OB1	253458.4	6624328.0	204.4	Lower Series Development Observation Bore - Phase 1
LS Ob_lw1	252940.4	6625593.0	201.2	Lower Series Development Observation Bore - Phase 2
LS Ob_lw2	253185.7	6625337.7	203.0	Lower Series Development Observation Bore - Phase 2
LS Ob_lw3	253449.2	6625039.0	209.0	Lower Series Development Observation Bore - Phase 2
LSP 6004	254040.7	6623087.4	204.7	Old piezometer bore – originally drill hole Monitoring

Bore Id	Easting	Northing	Depth	Comments
				ceased in April 2015
LSP 6018	253478.8	6624332.0	203.7	Old piezometer bore – originally drill hole Monitoring ceased in April 2015
M2/3-OB1	252129.0	6622296.0	200.1	Lower Series Development Observation Bore - Phase 1 - Dry due to formation being tight.
U23 VWP 1	251284.5	6622499.0	196.7	Lower Series Development VWP - Phase 2
U23 VWP 2	251087.8	6622502.0	197.4	Lower Series Development VWP - Phase 2
VWP LS 1	253464.3	6624330.0	205.0	Lower Series Development VWP - Phase 1
VWP LS 2	253345.8	6624665.0	208.0	Lower Series Development VWP - Phase 1
VWP LS 3	253343.7	6623977.0	194.1	Lower Series Development VWP - Phase 1
VWP LS 4	253630.0	6624520.0	205.7	Lower Series Development VWP - Phase 1
VWP LS 5 (HW)	252806.1	6624817.0	141.8	Lower Series Development VWP - Phase 2
VWP LS 6 (HW)	252884.8	6624685.0	143.0	Lower Series Development VWP - Phase 2
VWP LS 7	253317.9	6624654.0	200.0	Lower Series Development VWP - Phase 2

Capped Bores

Three production bores associated with the Lower Series Development have been capped. These bores were all capped by Coughlan Drilling prior to the closure of the Leigh Creek Coalfield in December 2015. The bores have all been filled with a bentonite cement mix as per the direction of the Drilling Inspector after a request from Coughlan Drilling. The bores that have been capped are the only production bores that transect the Telford Basin into the Basement. All of the capped bores are listed in Table D-4 below.

Table D-4: List of Capped Bores

Bore Id	Easting	Northing	Depth	Comments
HW_pb01	252695.4	6625007.0	143.0	Capped and filled with a bentonite and cement mix
HW_pb02	252923.7	6624618.0	143.8	Capped and filled with a bentonite and cement mix
L6/7-pb2	253489.4	6624341.0	203.4	Capped and filled with a bentonite and cement mix

Appendix E List of Water Quality Parameters

Table E-1: List of Field Water Quality Parameters

Analyte
Physico-Chemical Parameters
Electrical Conductivity @ 25°C
pH - field
Dissolved Oxygen
Redox Potential
Temperature

Table E-2: List of Laboratory Analyses

Analyte	Analyte
BTEXN	**Total Recoverable Hydrocarbons**
Benzene	>C10 - C16 Fraction
Ethylbenzene	>C10 - C16 Fraction minus Naphthalene (F2)
meta- & para-Xylene	>C10 - C40 Fraction (sum)
Naphthalene	>C16 - C34 Fraction
ortho-Xylene	>C34 - C40 Fraction
Sum of BTEX	C6 - C10 Fraction
Toluene	C6 - C10 Fraction minus BTEX (F1)
Total Xylenes	**Polycyclic Aromatic Hydrocarbons**
Carbon	Acenaphthene
Total Carbon	Acenaphthylene
Total Inorganic Carbon	Anthracene
Total Organic Carbon	Benz(a)anthracene
Hardness	Benzo(a)pyrene
Total Hardness as CaCO3	Benzo(a)pyrene TEQ (zero)
Major Ions	Benzo(b+j)fluoranthene
Calcium	Benzo(g,h,i)perylene
Chloride	Benzo(k)fluoranthene
Fluoride	Chrysene
Magnesium	Dibenz(a,h)anthracene
Potassium	Fluoranthene
Sodium	Fluorene
Sulphate (as SO4)	Indeno(1,2,3,cd)pyrene
Metals (dissolved)	Naphthalene (Ex SVOC)
Aluminium	Phenanthrene
Arsenic	Pyrene
Boron	Total PAHs
Cadmium	**Alkalinity**
Chromium	Bicarbonate Alkalinity as CaCO3
Copper	Carbonate Alkalinity as CaCO3
Iron	Hydroxide Alkalinity as CaCO3
Lead	Total Alkalinity as CaCO3
Manganese	**Physico-Chemical Parameters**
Mercury	Electrical Conductivity @ 25°C
Nickel	pH - Lab
Selenium	Sodium Adsorption Ratio
Thorium	Total Dissolved Solids (Cal,)
Zinc	

Appendix F Soil Vapour Well Construction Logs

VAPOUR BORE LOG

Bore No.: SVMW-01

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 19/12/2017 **To:** 19/12/2017

Drilling Co: Drilling Solutions
Driller: A. Robinson
Drilling Method: Solid Flight Auger
Total Depth (m): 5.25
Diameter (mm): 150

Easting: 0
Northing: 0

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Silty Sandy GRAVEL Reworked natural. black/grey	Dry		Cover			0.0
						Teflon Tubing			
1.00			Silty Sandy GRAVEL Orange Brown. Gravel rounded						1.0
									2.0
						Grout			3.0
									4.0
						Bentonite			
						Sand Pack SS Implant		Sample 4.9 - 5.0	5.0
5.25			VAPOUR POINT SVMW-01 DISCONTINUED AT 5.25m BELOW GROUND LEVEL. GROUNDWATER WAS NOT ENCOUNTERD						6.0
									7.0

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NOTES:

VAPOUR BORE LOG

Bore No.: SVMW-02

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 30/06/2018 **To:** 30/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 3.2
Diameter (mm): 125

Easting: 0249809
Northing: 6625298

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing **Screen Material:** Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Sandy, Gravelly SILT Natural. Orange brown. Low plasticity Fine to coarse sand Fine gravel	Dry	Cover Teflon Tubing Grout				0.0 1.0
1.20			Silty GRAVEL Fine to medium rounded gravel		Bentonite Sand Pack SS Implant				2.0 3.0
3.20			VAPOUR POINT SVMW-02 DISCONTINUED AT 3.2m BELOW GROUND LEVEL.						4.0 5.0 6.0 7.0

DRAFT

NOTES: Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

VAPOUR BORE LOG

Bore No.: SVMW-03

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 30/06/2018 **To:** 30/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 3.0
Diameter (mm): 125

Easting: 249825
Northing: 6625252

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Sandy, Gravelly SILT Natural. Orange brown, low plasticity. Fine to coarse sand. Fine rounded gravel	Dry	Cover Teflon Tubing Grout Bentonite Sand Pack SS Implant				0.0 1.0 2.0
3.00			VAPOUR POINT SVMW-03 DISCONTINUED AT 3.0m BELOW GROUND LEVEL.						3.0 4.0 5.0 6.0 7.0

DRAFT

NOTES: Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 100 ppm (0.01%)

VAPOUR BORE LOG

Bore No.: SVMW-04

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 29/06/2018 **To:** 29/06/2018

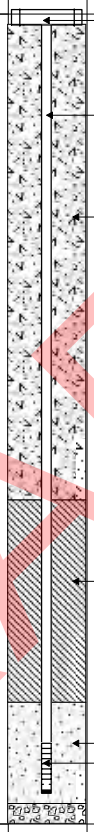
Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 4.0
Diameter (mm): 125

Easting: 250104
Northing: 6625058

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. SILT Grey brown, with some fine to coarse rounded gravels.	Dry					0.0
0.30			Natural. Silty, Sandy GRAVEL Orange brown. Fine to coarse sand. Fine rounded gravel. Hard bar from ~3.3-3.5 Red brown from 3.5						1.0
									2.0
									3.0
4.00			VAPOUR POINT SVMW-04 DISCONTINUED AT 4.0m BELOW GROUND LEVEL.						4.0
									5.0
									6.0
									7.0



DRAFT

NOTES: Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

VAPOUR BORE LOG

Bore No.: SVMW-05

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 30/06/2018 **To:** 30/06/2018

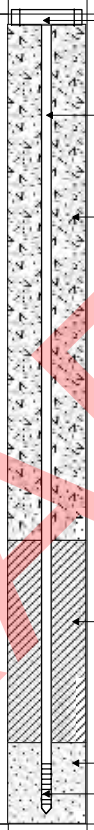
Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 4.0
Diameter (mm): 125

Easting: 249825
Northing: 6625252

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. Silty, Sandy GRAVEL Grey brown. Fine to coarse sand. Fine gravel.	Dry					0.0
0.30			Natural Sandy, Gravelly SILT Brown. Fine to coarse sand. Fine rounded gravel Hard bar from ~3-3.5m						1.0
									2.0
									3.0
4.00			VAPOUR POINT SVMW-05 DISCONTINUED AT 4.0m BELOW GROUND LEVEL.						4.0
									5.0
									6.0
									7.0



DRAFT

NOTES: Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

VAPOUR BORE LOG

Bore No.: SVMW-06	
Page: 1 of 1	

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 29/06/2018 **To:** 29/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 3.0
Diameter (mm): 125

Easting: 250139
Northing: 6625059

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. Silty, Sandy GRAVEL Grey brown. Fine to coarse sand. Fine to medium gravel.	Dry	Cover				0.0
0.48			Natural. GRAVEL Pale brown. Fine. Rounded Some silt. Some fine to coarse sand.		Teflon Tubing Grout Bentonite Sand Pack SS Implant				1.0 2.0
3.00			VAPOUR POINT SVMW-06 DISCONTINUED AT 3.0m BELOW GROUND LEVEL ON HARD LAYER.						3.0 4.0 5.0 6.0 7.0

DRAFT

NOTES: Installed above hard layer. Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

VAPOUR BORE LOG

Bore No.: SVMW-07S	
Page: 1 of 1	

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 29/06/2018 **To:** 29/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 3.0
Diameter (mm): 125

Easting: 250149
Northing: 6625081

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. Silty, Sandy GRAVEL Grey brown. Fine to medium Fine to coarse sand.	Dry	Cover				0.0
0.30			Natural. GRAVEL Pale brown. With some low plasticity silt and fine to coarse sand.		Teflon Tubing Grout Bentonite Sand Pack SS Implant Collapse				1.0 2.0
3.00			VAPOUR POINT SVMW-07_2.7 DISCONTINUED AT 3.0m BELOW GROUND LEVEL ON HARD LAYER						3.0 4.0 5.0 6.0 7.0

NOTES: Installed above hard layer. Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

DRAFT

VAPOUR BORE LOG

Bore No.: SVMW-07D	
Page: 1 of 1	

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 29/06/2018 **To:** 29/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 4.5
Diameter (mm): 125

Easting: 250149
Northing: 6625081

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. Silty, Sandy GRAVEL Grey brown / black, Fine Some fine to coarse sand.	Dry		Cover			0.0
0.30			Natural. GRAVEL Pale brown.Fine. Rounded With some silt and fine to coarse sand. Hard bar from ~3.3-4.0			Teflon Tubing Grout			1.0
									2.0
									3.0
						Bentonite			
						Sand Pack SS Implant			4.0
						Collapse			
4.50			VAPOUR POINT SVMW-07_4.0 DISCONTINUED AT 4.5m BELOW GROUND LEVEL ON HARD LAYER						5.0
									6.0
									7.0

DRAFT

NOTES: Installed below hard layer. Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

VAPOUR BORE LOG

Bore No.: SVMW-08

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 29/06/2018 **To:** 29/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Air Rotary
Total Depth (m): 4
Diameter (mm): 125

Easting: 250202
Northing: 6625101

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. Silty, Sandy GRAVEL Grey brown. Fine Some fine to coarse sand.	Dry		Cover			0.0
						Teflon Tubing			
						Grout			1.0
									2.0
									3.0
						Bentonite			
3.50			Natural. GRAVEL Pale brown.Fine. Rounded With some silt and fine to coarse sand.			Sand Pack			
						SS Implant			
			Hard bar from ~3.0-3.5			Collapse			4.0
4.00			VAPOUR POINT SVMW-08 DISCONTINUED AT 4.0m BELOW GROUND LEVEL ON HARD LAYER.						
									5.0
									6.0
									7.0

DRAFT

NOTES: Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

VAPOUR BORE LOG

Bore No.: SVMW-09

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 18/12/2017 **To:** 18/12/2017

Drilling Co: Drilling Solutions
Driller: A. Robinson
Drilling Method: Solid Flight Auger
Total Depth (m): 5.25
Diameter (mm): 150

Easting: 0
Northing: 0

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Sandy SILT Reworked natural. Grey	Dry		Cover Teflon Tubing			0.0 1.0
2.00			CLAY Pale brown to red brown. Minor fine to coarse sand and fine gravel. Slightly moist from 4 m.	Moist slightly		Grout Bentonite			2.0 3.0 4.0
						Sand Pack SS Implant		Sample 4.9 - 5.0	5.0
5.25			VAPOUR POINT SVMW-09 DISCONTINUED AT 5.25m BELOW GROUND LEVEL. GROUNDWATER WAS NOT ENCOUNTERD						6.0 7.0

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NOTES:

VAPOUR BORE LOG

Bore No.: SVMW-10

Page: 1 of 1

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 19/12/2017 **To:** 19/12/2017

Drilling Co: Drilling Solutions
Driller: A. Robinson
Drilling Method: Solid Flight Auger
Total Depth (m): 5.4
Diameter (mm): 150

Easting: 0
Northing: 0

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing
Screen Material: Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Silty Sandy GRAVEL Reworked natural. Grey brown, sand content fine to coarse, gravel content fine.	Dry		Cover Teflon Tubing Grout			0.0 1.0
2.00			CLAY Orange brown. Minor fine to coarse sand and fine gravel.			Bentonite SS Implant Sand Pack Collapsed		Sample 4.9 - 5.0	2.0 3.0 4.0 5.0
5.40			SOIL VAPOUR POINT SVMW-10 DISCONTINUED AT 5.4 m BELOW GROUND LEVEL GROUNDWATER WAS NOT ENCOUNTERD						6.0 7.0

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NOTES:

VAPOUR BORE LOG

Bore No.: SVMW-11	
Page: 1 of 1	

Client: Leigh Creek Operations
Project: Leigh Creek Baseline
Project No: J1437374
Location: Leigh Creek Coalfield
Date Drilled: 26/06/2018 **To:** 26/06/2018

Drilling Co: Drilling Solutions
Driller: P. McDonald
Drilling Method: Solid Flight Auger
Total Depth (m): 3.6
Diameter (mm): 125

Easting: 250458
Northing: 6625060

Logged by: PS **Checked by:** AS

Casing Material: 0.25in Teflon Tubing **Screen Material:** Stainless Steel Implant

Depth/ Elevation (m)	Water Strikes	Graphic Log	SOIL DESCRIPTION	Moisture	Piezometer Details	Field ID	PID (ppm)	Comment	Depth (m)
			Ground Surface						
0.00			Reworked natural. Sandy SILT Grey /pale grey.	Dry					0.0
1.00			CLAY Pale yellow. With minor sand and gravel.						1.0
3.60			VAPOUR POINT SVMW-11 DISCONTINUED AT 3.6m BELOW GROUND LEVEL.						2.0 3.0 4.0 5.0 6.0 7.0

Cover
Teflon Tubing
Grout
Bentonite
Sand Pack
SS Implant
Collapse

DRAFT

NOTES: Helium Leak Test: Shroud - 9x10^6 ppm (100%), Vapour point - 0 ppm (0%)

Appendix G Soil Vapour Sampling Results

Table G-1: Soil Vapour Analysis Results

Table G.1 - Soil Vapour Analysis Results

Location			SVMW01	SVMW01	SVMW01	SVMW02	SVMW03	SVMW04
Date Sampled			17/04/2018 14:30	22/05/2018 15:00	28/06/2018 16:32	2/07/2018 9:24	2/07/2018 9:31	2/07/2018 12:00
Batch No.			EN1802691	EN1803265	EN1804078	EN1804078	EN1804078	EN1804078
Analyte	**LOR**	**Units**						
Sampling Quality Assurance								
Pressure - As received	0.1	kPaa	**81**	**91.6**	**92.1**	**78.9**	**80.1**	**85.5**
Pressure - Laboratory Atmosphere	0.1	kPaa	**102**	**102**	**101**	**101**	**101**	**101**
Temperature as Received	0.1	°C	**20**	**20**	**21**	**21**	**21**	**21**
Vacuum - As received	0.03	Inches Hg	**6.35**	**3.04**	**2.54**	**6.44**	**6.11**	**4.49**
Petroleum Hydrocarbons in Gaseous Samples								
C10 - C14 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
C6 - C9 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
Total Recoverable Hydrocarbons - NEPM 2013								
>C10 - C16 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
>C10 - C16 Fraction minus Naphthalene (F2)	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
C6 - C10 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
C6 - C10 Fraction minus BTEX (F1)	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
USEPA Air Toxics Method TO15r								
1,1,1,2-Tetrachloroethane	50	ppbv	-	-	<50	<50	<50	<50
1,1,1-Trichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1,2,2-Tetrachloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1,2-Trichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1-Dichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1-Dichloroethene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2,4-Trichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2,4-Trimethylbenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dibromoethane (EDB)	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dichloropropane	50	ppbv	<50	<50	<50	<50	<50	<50
1,3,5-Trimethylbenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,3-Butadiene	50	ppbv	<50	<50	<50	<50	<50	<50
1,3-Dichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,4-Dichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,4-Dioxane	50	ppbv	<50	<50	<50	<50	<50	<50
1-Chloro-2-propene (Allyl chloride)	50	ppbv	<50	<50	<50	<50	<50	<50
2-Butanone (MEK)	50	ppbv	<50	<50	<50	<50	<50	<50
2-Chloro-1,3-butadiene	50	ppbv	-	-	<50	<50	<50	<50
2-Chlorotoluene	50	ppbv	-	-	<50	<50	<50	<50
2-Hexanone (MBK)	50	ppbv	<50	<50	<50	<50	<50	<50
2-isopropyltoluene	50	ppbv	-	-	<50	<50	<50	<50

Table G.1 - Soil Vapour Analysis Results

Location			SVMW01	SVMW01	SVMW01	SVMW02	SVMW03	SVMW04
Date Sampled			17/04/2018 14:30	22/05/2018 15:00	28/06/2018 16:32	2/07/2018 9:24	2/07/2018 9:31	2/07/2018 12:00
Batch No.			EN1802691	EN1803265	EN1804078	EN1804078	EN1804078	EN1804078
Analyte	LOR	Units						
2-Propanone (Acetone)	50	ppbv	<50	<50	<50	<50	**54.8**	<50
4-Ethyltoluene	50	ppbv	<50	<50	<50	<50	<50	<50
4-Methyl-2-pentanone (MIBK)	50	ppbv	<50	<50	<50	<50	<50	<50
Acetonitrile	50	ppbv	-	-	<50	<50	<50	<50
Acrolein	50	ppbv	-	-	<50	<50	<50	<50
Acrylonitrile	50	ppbv	-	-	<50	<50	<50	<50
Benzene	30	ppbv	<30	<30	<30	<30	<30	<30
Benzyl Chloride	50	ppbv	<50	<50	<50	<50	<50	<50
Bromodichloromethane	50	ppbv	<50	<50	<50	<50	<50	<50
Bromoform	50	ppbv	<50	<50	<50	<50	<50	<50
Bromomethane	50	ppbv	<50	<50	<50	<50	<50	<50
Carbon disulfide	50	ppbv	<50	<50	<50	<50	<50	<50
Carbon Tetrachloride	50	ppbv	<50	<50	<50	<50	<50	<50
Chlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
Chloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
Chloroform	50	ppbv	<50	<50	<50	<50	<50	<50
Chloromethane	50	ppbv	<50	<50	<50	<50	<50	<50
cis-1,2-Dichloroethene	5	ppbv	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropylene	50	ppbv	<50	<50	<50	<50	<50	<50
Cyclohexane	50	ppbv	<50	<50	<50	<50	<50	<50
Dibromochloromethane	50	ppbv	<50	<50	<50	<50	<50	<50
Di-isopropyl Ether	50	ppbv	-	-	<50	<50	<50	<50
Ethanol	50	ppbv	-	-	<50	<50	<50	<50
Ethyl tert-Butyl Ether (ETBE)	50	ppbv	-	-	<50	<50	<50	<50
Ethylacetate	50	ppbv	<50	<50	<50	<50	<50	<50
Ethylbenzene	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 11	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 113	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 114	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 12	50	ppbv	<50	<50	<50	<50	<50	<50
Heptane	50	ppbv	<50	<50	<50	<50	<50	<50
Hexachlorobutadiene	50	ppbv	<50	<50	<50	<50	<50	<50
Isooctane	50	ppbv	<50	<50	<50	<50	<50	<50
Isopropyl Alcohol	50	ppbv	<50	<50	<50	<50	<50	<50
Isopropylbenzene	50	ppbv	-	-	<50	<50	<50	<50
meta- & para-Xylene	100	ppbv	<100	<100	<100	<100	<100	<100
Methyl Methacrylate	50	ppbv	-	-	<50	<50	<50	<50

Table G.1 - Soil Vapour Analysis Results

Location			SVMW01	SVMW01	SVMW01	SVMW02	SVMW03	SVMW04
Date Sampled			17/04/2018 14:30	22/05/2018 15:00	28/06/2018 16:32	2/07/2018 9:24	2/07/2018 9:31	2/07/2018 12:00
Batch No.			EN1802691	EN1803265	EN1804078	EN1804078	EN1804078	EN1804078
Analyte	**LOR**	**Units**						
Methyl tert-Butyl Ether (MTBE)	50	ppbv	<50	<50	<50	<50	<50	<50
Methylene chloride	50	ppbv	<50	<50	<50	<50	<50	<50
Naphthalene	19	ppbv	-	-	<19	<19	<19	<19
n-Butylbenzene	50	ppbv	-	-	<50	<50	<50	<50
n-Hexane	50	ppbv	<50	<50	<50	<50	<50	<50
n-Propylbenzene	50	ppbv	-	-	<50	<50	<50	<50
ortho-Xylene	50	ppbv	<50	<50	<50	<50	<50	<50
Propene	50	ppbv	<50	<50	<50	<50	<50	<50
sec-Butylbenzene	50	ppbv	-	-	<50	<50	<50	<50
Styrene	50	ppbv	<50	<50	<50	<50	<50	<50
tert-Amyl Methyl Ether (TAME)	50	ppbv	-	-	<50	<50	<50	<50
tert-Butyl alcohol (TBA)	50	ppbv	-	-	<50	<50	<50	<50
tert-Butylbenzene	50	ppbv	-	-	<50	<50	<50	<50
Tetrachloroethene	50	ppbv	<50	<50	<50	<50	<50	<50
Tetrahydrofuran	50	ppbv	<50	<50	<50	<50	<50	<50
Toluene	50	ppbv	<50	<50	<50	<50	<50	<50
trans-1,2-Dichloroethene	50	ppbv	<50	<50	<50	<50	<50	<50
trans-1,3-Dichloropropylene	50	ppbv	<50	<50	<50	<50	<50	<50
Trichloroethylene (TCE)	1	ppbv	<1	<1	<1	<1	<1	<1
Vinyl Acetate	50	ppbv	<50	<50	<50	<50	<50	<50
Vinyl bromide	50	ppbv	<50	<50	<50	<50	<50	<50
Vinyl chloride	2	ppbv	<2	<2	<2	<2	<2	<2
Petroleum Hydrocarbons in Gaseous Samples (Calc Conc)								
C10 - C14 Fraction	35000	µg/m³	<35000	<35000	<35000	<35000	<35000	<35000
C6 - C9 Fraction	20000	µg/m³	<20000	<20000	<20000	<20000	<20000	<20000
Total Recoverable Hydrocarbons - NEPM 2013 (Calc Conc)								
>C10 - C16 Fraction	40000	µg/m³	<40000	<40000	<40000	<40000	<40000	<40000
>C10 - C16 Fraction minus Naphthalene (F2)	40000	µg/m³	<40000	<40000	<40000	<40000	<40000	<40000
C6 - C10 Fraction	20000	µg/m³	<20000	<20000	<20000	<20000	<20000	<20000
C6 - C10 Fraction minus BTEX (F1)	20000	µg/m³	<20000	<20000	<20000	<20000	<20000	<20000
VOCs by USEPA Method TO15 (Calculated Concentration)								
1,1,1,2-Tetrachloroethane	340	µg/m³	-	-	<340	<340	<340	<340
1,1,1-Trichloroethane	270	µg/m³	<270	<270	<270	<270	<270	<270
1,1,2,2-Tetrachloroethane	340	µg/m³	<340	<340	<340	<340	<340	<340
1,1,2-Trichloroethane	270	µg/m³	<270	<270	<270	<270	<270	<270
1,1-Dichloroethane	200	µg/m³	<200	<200	<200	<200	<200	<200
1,1-Dichloroethene	200	µg/m³	<200	<200	<200	<200	<200	<200

Table G.1 - Soil Vapour Analysis Results

Location			SVMW01	SVMW01	SVMW01	SVMW02	SVMW03	SVMW04
Date Sampled			17/04/2018 14:30	22/05/2018 15:00	28/06/2018 16:32	2/07/2018 9:24	2/07/2018 9:31	2/07/2018 12:00
Batch No.			EN1802691	EN1803265	EN1804078	EN1804078	EN1804078	EN1804078
Analyte	**LOR**	**Units**						
1,2,4-Trichlorobenzene	370	µg/m³	<370	<370	<370	<370	<370	<370
1,2,4-Trimethylbenzene	240	µg/m³	<240	<240	<240	<240	<240	<240
1,2-Dibromoethane (EDB)	380	µg/m³	<380	<380	<380	<380	<380	<380
1,2-Dichlorobenzene	300	µg/m³	<300	<300	<300	<300	<300	<300
1,2-Dichloroethane	200	µg/m³	<200	<200	<200	<200	<200	<200
1,2-Dichloropropane	230	µg/m³	<230	<230	<230	<230	<230	<230
1,3,5-Trimethylbenzene	240	µg/m³	<240	<240	<240	<240	<240	<240
1,3-Butadiene	110	µg/m³	<110	<110	<110	<110	<110	<110
1,3-Dichlorobenzene	300	µg/m³	<300	<300	<300	<300	<300	<300
1,4-Dichlorobenzene	300	µg/m³	<300	<300	<300	<300	<300	<300
1,4-Dioxane	180	µg/m³	<180	<180	<180	<180	<180	<180
1-Chloro-2-propene (Allyl chloride)	160	µg/m³	<160	<160	<160	<160	<160	<160
2-Butanone (MEK)	150	µg/m³	<150	<150	<150	<150	<150	<150
2-Chloro-1,3-butadiene	180	µg/m³	-	-	<180	<180	<180	<180
2-Chlorotoluene	260	µg/m³	-	-	<260	<260	<260	<260
2-Hexanone (MBK)	200	µg/m³	<200	<200	<200	<200	<200	<200
2-isopropyltoluene	270	µg/m³	-	-	<270	<270	<270	<270
2-Propanone (Acetone)	120	µg/m³	<120	<120	<120	<120	**130**	<120
4-Ethyltoluene	240	µg/m³	<240	<240	<240	<240	<240	<240
4-Methyl-2-pentanone (MIBK)	200	µg/m³	<200	<200	<200	<200	<200	<200
Acetonitrile	80	µg/m³	-	-	<80	<80	<80	<80
Acrolein	110	µg/m³	-	-	<110	<110	<110	<110
Acrylonitrile	110	µg/m³	-	-	<110	<110	<110	<110
Benzene	100	µg/m³	<100	<100	<100	<100	<100	<100
Benzyl Chloride	260	µg/m³	<260	<260	<260	<260	<260	<260
Bromodichloromethane	340	µg/m³	<340	<340	<340	<340	<340	<340
Bromoform	520	µg/m³	<520	<520	<520	<520	<520	<520
Bromomethane	190	µg/m³	<190	<190	<190	<190	<190	<190
Carbon disulfide	160	µg/m³	<160	<160	<160	<160	<160	<160
Carbon Tetrachloride	310	µg/m³	<310	<310	<310	<310	<310	<310
Chlorobenzene	230	µg/m³	<230	<230	<230	<230	<230	<230
Chloroethane	130	µg/m³	<130	<130	<130	<130	<130	<130
Chloroform	240	µg/m³	<240	<240	<240	<240	<240	<240
Chloromethane	100	µg/m³	<100	<100	<100	<100	<100	<100
cis-1,2-Dichloroethene	20	µg/m³	<20	<20	<20	<20	<20	<20
cis-1,3-Dichloropropylene	230	µg/m³	<230	<230	<230	<230	<230	<230
Cyclohexane	170	µg/m³	<170	<170	<170	<170	<170	<170

Table G.1 - Soil Vapour Analysis Results

Location			SVMW01	SVMW01	SVMW01	SVMW02	SVMW03	SVMW04
Date Sampled			17/04/2018 14:30	22/05/2018 15:00	28/06/2018 16:32	2/07/2018 9:24	2/07/2018 9:31	2/07/2018 12:00
Batch No.			EN1802691	EN1803265	EN1804078	EN1804078	EN1804078	EN1804078
Analyte	LOR	Units						
Dibromochloromethane	430	µg/m³	<430	<430	<430	<430	<430	<430
Di-isopropyl Ether	210	µg/m³	-	-	<210	<210	<210	<210
Ethanol	90	µg/m³	-	-	<90	<90	<90	<90
Ethyl tert-Butyl Ether (ETBE)	210	µg/m³	-	-	<210	<210	<210	<210
Ethylacetate	180	µg/m³	<180	<180	<180	<180	<180	<180
Ethylbenzene	220	µg/m³	<220	<220	<220	<220	<220	<220
Freon 11	280	µg/m³	<280	<280	<280	<280	<280	<280
Freon 113	380	µg/m³	<380	<380	<380	<380	<380	<380
Freon 114	350	µg/m³	<350	<350	<350	<350	<350	<350
Freon 12	250	µg/m³	<250	<250	<250	<250	<250	<250
Heptane	200	µg/m³	<200	<200	<200	<200	<200	<200
Hexachlorobutadiene	530	µg/m³	<530	<530	<530	<530	<530	<530
Isooctane	230	µg/m³	<230	<230	<230	<230	<230	<230
Isopropyl Alcohol	120	µg/m³	<120	<120	<120	<120	<120	<120
Isopropylbenzene	250	µg/m³	-	-	<250	<250	<250	<250
meta- & para-Xylene	430	µg/m³	<430	<430	<430	<430	<430	<430
Methyl Methacrylate	210	µg/m³	-	-	<210	<210	<210	<210
Methyl tert-Butyl Ether (MTBE)	180	µg/m³	<180	<180	<180	<180	<180	<180
Methylene chloride	170	µg/m³	<170	<170	<170	<170	<170	<170
Naphthalene	100	µg/m³	-	-	<100	<100	<100	<100
n-Butylbenzene	270	µg/m³	-	-	<270	<270	<270	<270
n-Hexane	180	µg/m³	<180	<180	<180	<180	<180	<180
n-Propylbenzene	250	µg/m³	-	-	<250	<250	<250	<250
ortho-Xylene	220	µg/m³	<220	<220	<220	<220	<220	<220
Propene	90	µg/m³	<90	<90	<90	<90	<90	<90
sec-Butylbenzene	270	µg/m³	-	-	<270	<270	<270	<270
Styrene	210	µg/m³	<210	<210	<210	<210	<210	<210
tert-Amyl Methyl Ether (TAME)	210	µg/m³	-	-	<210	<210	<210	<210
tert-Butyl alcohol (TBA)	150	µg/m³	-	-	<150	<150	<150	<150
tert-Butylbenzene	270	µg/m³	-	-	<270	<270	<270	<270
Tetrachloroethene	340	µg/m³	<340	<340	<340	<340	<340	<340
Tetrahydrofuran	150	µg/m³	<150	<150	<150	<150	<150	<150
Toluene	190	µg/m³	<190	<190	<190	<190	<190	<190
Total Xylenes	650	µg/m³	<650	<650	<650	<650	<650	<650
trans-1,2-Dichloroethene	200	µg/m³	<200	<200	<200	<200	<200	<200
trans-1,3-Dichloropropylene	230	µg/m³	<230	<230	<230	<230	<230	<230
Trichloroethylene (TCE)	5	µg/m³	<5	<5	<5.4	<5.4	<5.4	<5.4

Table G.1 - Soil Vapour Analysis Results

Location			SVMW01	SVMW01	SVMW01	SVMW02	SVMW03	SVMW04
Date Sampled			17/04/2018 14:30	22/05/2018 15:00	28/06/2018 16:32	2/07/2018 9:24	2/07/2018 9:31	2/07/2018 12:00
Batch No.			EN1802691	EN1803265	EN1804078	EN1804078	EN1804078	EN1804078
Analyte	**LOR**	**Units**						
Vinyl Acetate	180	µg/m³	<180	<180	<180	<180	<180	<180
Vinyl bromide	220	µg/m³	<220	<220	<220	<220	<220	<220
Vinyl chloride	5.1	µg/m³	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1

Table G.1 - Soil Vapour Analysis Results

Location			SVMW05	SVMW06	SVMW07_4.0	SVMW08	SVMW10	SVMW10
Date Sampled			2/07/2018 14:28	2/07/2018 12:23	2/07/2018 12:41	2/07/2018 13:55	17/04/2018 14:30	22/05/2018 15:00
Batch No.			EN1804078	EN1804078	EN1804078	EN1804078	EN1802691	EN1803265
Analyte	**LOR**	**Units**						
Sampling Quality Assurance								
Pressure - As received	0.1	kPaa	**78.9**	**74.2**	**72.6**	**74.4**	**79.1**	**78.5**
Pressure - Laboratory Atmosphere	0.1	kPaa	**101**	**101**	**101**	**101**	**102**	**102**
Temperature as Received	0.1	°C	**21**	**21**	**21**	**21**	**20**	**20**
Vacuum - As received	0.03	Inches Hg	**6.44**	**7.82**	**8.33**	**7.8**	**6.91**	**6.91**
Petroleum Hydrocarbons in Gaseous Samples								
C10 - C14 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
C6 - C9 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
Total Recoverable Hydrocarbons - NEPM 2013								
>C10 - C16 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
>C10 - C16 Fraction minus Naphthalene (F2)	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
C6 - C10 Fraction	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
C6 - C10 Fraction minus BTEX (F1)	5000	ppbv	<5000	<5000	<5000	<5000	<5000	<5000
USEPA Air Toxics Method TO15r								
1,1,1,2-Tetrachloroethane	50	ppbv	<50	<50	<50	<50	-	-
1,1,1-Trichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1,2,2-Tetrachloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1,2-Trichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1-Dichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,1-Dichloroethene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2,4-Trichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2,4-Trimethylbenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dibromoethane (EDB)	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
1,2-Dichloropropane	50	ppbv	<50	<50	<50	<50	<50	<50
1,3,5-Trimethylbenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,3-Butadiene	50	ppbv	<50	<50	<50	<50	<50	<50
1,3-Dichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,4-Dichlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
1,4-Dioxane	50	ppbv	<50	<50	<50	<50	<50	<50
1-Chloro-2-propene (Allyl chloride)	50	ppbv	<50	<50	<50	<50	<50	<50
2-Butanone (MEK)	50	ppbv	<50	<50	<50	<50	<50	<50
2-Chloro-1,3-butadiene	50	ppbv	<50	<50	<50	<50	-	-
2-Chlorotoluene	50	ppbv	<50	<50	<50	<50	-	-
2-Hexanone (MBK)	50	ppbv	<50	<50	<50	<50	<50	<50
2-isopropyltoluene	50	ppbv	<50	<50	<50	<50	-	-

Table G.1 - Soil Vapour Analysis Results

Location			SVMW05	SVMW06	SVMW07_4.0	SVMW08	SVMW10	SVMW10
Date Sampled			2/07/2018 14:28	2/07/2018 12:23	2/07/2018 12:41	2/07/2018 13:55	17/04/2018 14:30	22/05/2018 15:00
Batch No.			EN1804078	EN1804078	EN1804078	EN1804078	EN1802691	EN1803265
Analyte	LOR	Units						
2-Propanone (Acetone)	50	ppbv	<50	<50	<50	<50	<50	<50
4-Ethyltoluene	50	ppbv	<50	<50	<50	<50	<50	<50
4-Methyl-2-pentanone (MIBK)	50	ppbv	<50	<50	<50	<50	<50	<50
Acetonitrile	50	ppbv	<50	<50	<50	<50	-	-
Acrolein	50	ppbv	<50	<50	<50	<50	-	-
Acrylonitrile	50	ppbv	<50	<50	<50	<50	-	-
Benzene	30	ppbv	<30	<30	<30	<30	<30	<30
Benzyl Chloride	50	ppbv	<50	<50	<50	<50	<50	<50
Bromodichloromethane	50	ppbv	<50	<50	<50	<50	<50	<50
Bromoform	50	ppbv	<50	<50	<50	<50	<50	<50
Bromomethane	50	ppbv	<50	<50	<50	<50	<50	<50
Carbon disulfide	50	ppbv	<50	<50	<50	<50	<50	<50
Carbon Tetrachloride	50	ppbv	<50	<50	<50	<50	<50	<50
Chlorobenzene	50	ppbv	<50	<50	<50	<50	<50	<50
Chloroethane	50	ppbv	<50	<50	<50	<50	<50	<50
Chloroform	50	ppbv	<50	<50	<50	<50	<50	<50
Chloromethane	50	ppbv	<50	<50	<50	<50	<50	<50
cis-1,2-Dichloroethene	5	ppbv	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropylene	50	ppbv	<50	<50	<50	<50	<50	<50
Cyclohexane	50	ppbv	<50	<50	<50	<50	<50	<50
Dibromochloromethane	50	ppbv	<50	<50	<50	<50	<50	<50
Di-isopropyl Ether	50	ppbv	<50	<50	<50	<50	-	-
Ethanol	50	ppbv	<50	<50	<50	<50	-	-
Ethyl tert-Butyl Ether (ETBE)	50	ppbv	<50	<50	<50	<50	-	-
Ethylacetate	50	ppbv	<50	<50	<50	<50	<50	<50
Ethylbenzene	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 11	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 113	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 114	50	ppbv	<50	<50	<50	<50	<50	<50
Freon 12	50	ppbv	<50	<50	<50	<50	<50	<50
Heptane	50	ppbv	<50	<50	<50	<50	<50	<50
Hexachlorobutadiene	50	ppbv	<50	<50	<50	<50	<50	<50
Isooctane	50	ppbv	<50	<50	<50	<50	<50	<50
Isopropyl Alcohol	50	ppbv	<50	<50	<50	<50	<50	<50
Isopropylbenzene	50	ppbv	<50	<50	<50	<50	-	-
meta- & para-Xylene	100	ppbv	<100	<100	**125**	<100	<100	<100
Methyl Methacrylate	50	ppbv	<50	<50	<50	<50	-	-

Table G.1 - Soil Vapour Analysis Results

Location			SVMW05	SVMW06	SVMW07_4.0	SVMW08	SVMW10	SVMW10
Date Sampled			2/07/2018 14:28	2/07/2018 12:23	2/07/2018 12:41	2/07/2018 13:55	17/04/2018 14:30	22/05/2018 15:00
Batch No.			EN1804078	EN1804078	EN1804078	EN1804078	EN1802691	EN1803265
Analyte	**LOR**	**Units**						
Methyl tert-Butyl Ether (MTBE)	50	ppbv	<50	<50	<50	<50	<50	<50
Methylene chloride	50	ppbv	<50	<50	<50	<50	<50	<50
Naphthalene	19	ppbv	<19	<19	<19	<19	-	-
n-Butylbenzene	50	ppbv	<50	<50	<50	<50	-	-
n-Hexane	50	ppbv	<50	<50	<50	<50	<50	<50
n-Propylbenzene	50	ppbv	<50	<50	<50	<50	-	-
ortho-Xylene	50	ppbv	<50	<50	<50	<50	<50	<50
Propene	50	ppbv	<50	<50	<50	<50	<50	<50
sec-Butylbenzene	50	ppbv	<50	<50	<50	<50	-	-
Styrene	50	ppbv	<50	<50	<50	<50	<50	<50
tert-Amyl Methyl Ether (TAME)	50	ppbv	<50	<50	<50	<50	-	-
tert-Butyl alcohol (TBA)	50	ppbv	<50	<50	<50	<50	-	-
tert-Butylbenzene	50	ppbv	<50	<50	<50	<50	-	-
Tetrachloroethene	50	ppbv	<50	<50	<50	<50	<50	<50
Tetrahydrofuran	50	ppbv	<50	<50	<50	<50	<50	<50
Toluene	50	ppbv	**84.5**	<50	**192**	<50	<50	<50
trans-1,2-Dichloroethene	50	ppbv	<50	<50	<50	<50	<50	<50
trans-1,3-Dichloropropylene	50	ppbv	<50	<50	<50	<50	<50	<50
Trichloroethylene (TCE)	1	ppbv	<1	<1	<1	<1	<1	<1
Vinyl Acetate	50	ppbv	<50	<50	<50	<50	<50	<50
Vinyl bromide	50	ppbv	<50	<50	<50	<50	<50	<50
Vinyl chloride	2	ppbv	<2	<2	<2	<2	<2	<2
Petroleum Hydrocarbons in Gaseous Samples (Calc Conc)								
C10 - C14 Fraction	35000	µg/m³	<35000	<35000	<35000	<35000	<35000	<35000
C6 - C9 Fraction	20000	µg/m³	<20000	<20000	<20000	<20000	<20000	<20000
Total Recoverable Hydrocarbons - NEPM 2013 (Calc Conc)								
>C10 - C16 Fraction	40000	µg/m³	<40000	<40000	<40000	<40000	<40000	<40000
>C10 - C16 Fraction minus Naphthalene (F2)	40000	µg/m³	<40000	<40000	<40000	<40000	<40000	<40000
C6 - C10 Fraction	20000	µg/m³	<20000	<20000	<20000	<20000	<20000	<20000
C6 - C10 Fraction minus BTEX (F1)	20000	µg/m³	<20000	<20000	<20000	<20000	<20000	<20000
VOCs by USEPA Method TO15 (Calculated Concentration)								
1,1,1,2-Tetrachloroethane	340	µg/m³	<340	<340	<340	<340	-	-
1,1,1-Trichloroethane	270	µg/m³	<270	<270	<270	<270	<270	<270
1,1,2,2-Tetrachloroethane	340	µg/m³	<340	<340	<340	<340	<340	<340
1,1,2-Trichloroethane	270	µg/m³	<270	<270	<270	<270	<270	<270
1,1-Dichloroethane	200	µg/m³	<200	<200	<200	<200	<200	<200
1,1-Dichloroethene	200	µg/m³	<200	<200	<200	<200	<200	<200

Table G.1 - Soil Vapour Analysis Results

Location			SVMW05	SVMW06	SVMW07_4.0	SVMW08	SVMW10	SVMW10
Date Sampled			2/07/2018 14:28	2/07/2018 12:23	2/07/2018 12:41	2/07/2018 13:55	17/04/2018 14:30	22/05/2018 15:00
Batch No.			EN1804078	EN1804078	EN1804078	EN1804078	EN1802691	EN1803265
Analyte	LOR	Units						
1,2,4-Trichlorobenzene	370	µg/m³	<370	<370	<370	<370	<370	<370
1,2,4-Trimethylbenzene	240	µg/m³	<240	<240	<240	<240	<240	<240
1,2-Dibromoethane (EDB)	380	µg/m³	<380	<380	<380	<380	<380	<380
1,2-Dichlorobenzene	300	µg/m³	<300	<300	<300	<300	<300	<300
1,2-Dichloroethane	200	µg/m³	<200	<200	<200	<200	<200	<200
1,2-Dichloropropane	230	µg/m³	<230	<230	<230	<230	<230	<230
1,3,5-Trimethylbenzene	240	µg/m³	<240	<240	<240	<240	<240	<240
1,3-Butadiene	110	µg/m³	<110	<110	<110	<110	<110	<110
1,3-Dichlorobenzene	300	µg/m³	<300	<300	<300	<300	<300	<300
1,4-Dichlorobenzene	300	µg/m³	<300	<300	<300	<300	<300	<300
1,4-Dioxane	180	µg/m³	<180	<180	<180	<180	<180	<180
1-Chloro-2-propene (Allyl chloride)	160	µg/m³	<160	<160	<160	<160	<160	<160
2-Butanone (MEK)	150	µg/m³	<150	<150	<150	<150	<150	<150
2-Chloro-1,3-butadiene	180	µg/m³	<180	<180	<180	<180	-	-
2-Chlorotoluene	260	µg/m³	<260	<260	<260	<260	-	-
2-Hexanone (MBK)	200	µg/m³	<200	<200	<200	<200	<200	<200
2-isopropyltoluene	270	µg/m³	<270	<270	<270	<270	-	-
2-Propanone (Acetone)	120	µg/m³	<120	<120	<120	<120	<120	<120
4-Ethyltoluene	240	µg/m³	<240	<240	<240	<240	<240	<240
4-Methyl-2-pentanone (MIBK)	200	µg/m³	<200	<200	<200	<200	<200	<200
Acetonitrile	80	µg/m³	<80	<80	<80	<80	-	-
Acrolein	110	µg/m³	<110	<110	<110	<110	-	-
Acrylonitrile	110	µg/m³	<110	<110	<110	<110	-	-
Benzene	100	µg/m³	<100	<100	<100	<100	<100	<100
Benzyl Chloride	260	µg/m³	<260	<260	<260	<260	<260	<260
Bromodichloromethane	340	µg/m³	<340	<340	<340	<340	<340	<340
Bromoform	520	µg/m³	<520	<520	<520	<520	<520	<520
Bromomethane	190	µg/m³	<190	<190	<190	<190	<190	<190
Carbon disulfide	160	µg/m³	<160	<160	<160	<160	<160	<160
Carbon Tetrachloride	310	µg/m³	<310	<310	<310	<310	<310	<310
Chlorobenzene	230	µg/m³	<230	<230	<230	<230	<230	<230
Chloroethane	130	µg/m³	<130	<130	<130	<130	<130	<130
Chloroform	240	µg/m³	<240	<240	<240	<240	<240	<240
Chloromethane	100	µg/m³	<100	<100	<100	<100	<100	<100
cis-1,2-Dichloroethene	20	µg/m³	<20	<20	<20	<20	<20	<20
cis-1,3-Dichloropropylene	230	µg/m³	<230	<230	<230	<230	<230	<230
Cyclohexane	170	µg/m³	<170	<170	<170	<170	<170	<170

Table G.1 - Soil Vapour Analysis Results

Location			SVMW05	SVMW06	SVMW07_4.0	SVMW08	SVMW10	SVMW10
Date Sampled			2/07/2018 14:28	2/07/2018 12:23	2/07/2018 12:41	2/07/2018 13:55	17/04/2018 14:30	22/05/2018 15:00
Batch No.			EN1804078	EN1804078	EN1804078	EN1804078	EN1802691	EN1803265
Analyte	LOR	Units						
Dibromochloromethane	430	µg/m³	<430	<430	<430	<430	<430	<430
Di-isopropyl Ether	210	µg/m³	<210	<210	<210	<210	-	-
Ethanol	90	µg/m³	<90	<90	<90	<90	-	-
Ethyl tert-Butyl Ether (ETBE)	210	µg/m³	<210	<210	<210	<210	-	-
Ethylacetate	180	µg/m³	<180	<180	<180	<180	<180	<180
Ethylbenzene	220	µg/m³	<220	<220	<220	<220	<220	<220
Freon 11	280	µg/m³	<280	<280	<280	<280	<280	<280
Freon 113	380	µg/m³	<380	<380	<380	<380	<380	<380
Freon 114	350	µg/m³	<350	<350	<350	<350	<350	<350
Freon 12	250	µg/m³	<250	<250	<250	<250	<250	<250
Heptane	200	µg/m³	<200	<200	<200	<200	<200	<200
Hexachlorobutadiene	530	µg/m³	<530	<530	<530	<530	<530	<530
Isooctane	230	µg/m³	<230	<230	<230	<230	<230	<230
Isopropyl Alcohol	120	µg/m³	<120	<120	<120	<120	<120	<120
Isopropylbenzene	250	µg/m³	<250	<250	<250	<250	-	-
meta- & para-Xylene	430	µg/m³	<430	<430	**542**	<430	<430	<430
Methyl Methacrylate	210	µg/m³	<210	<210	<210	<210	-	-
Methyl tert-Butyl Ether (MTBE)	180	µg/m³	<180	<180	<180	<180	<180	<180
Methylene chloride	170	µg/m³	<170	<170	<170	<170	<170	<170
Naphthalene	100	µg/m³	<100	<100	<100	<100	-	-
n-Butylbenzene	270	µg/m³	<270	<270	<270	<270	-	-
n-Hexane	180	µg/m³	<180	<180	<180	<180	<180	<180
n-Propylbenzene	250	µg/m³	<250	<250	<250	<250	-	-
ortho-Xylene	220	µg/m³	<220	<220	<220	<220	<220	<220
Propene	90	µg/m³	<90	<90	<90	<90	<90	<90
sec-Butylbenzene	270	µg/m³	<270	<270	<270	<270	-	-
Styrene	210	µg/m³	<210	<210	<210	<210	<210	<210
tert-Amyl Methyl Ether (TAME)	210	µg/m³	<210	<210	<210	<210	-	-
tert-Butyl alcohol (TBA)	150	µg/m³	<150	<150	<150	<150	-	-
tert-Butylbenzene	270	µg/m³	<270	<270	<270	<270	-	-
Tetrachloroethene	340	µg/m³	<340	<340	<340	<340	<340	<340
Tetrahydrofuran	150	µg/m³	<150	<150	<150	<150	<150	<150
Toluene	190	µg/m³	**318**	<190	**723**	<190	<190	<190
Total Xylenes	650	µg/m³	<650	<650	<650	<650	<650	<650
trans-1,2-Dichloroethene	200	µg/m³	<200	<200	<200	<200	<200	<200
trans-1,3-Dichloropropylene	230	µg/m³	<230	<230	<230	<230	<230	<230
Trichloroethylene (TCE)	5	µg/m³	<5.4	<5.4	<5.4	<5.4	<5	<5

Table G.1 - Soil Vapour Analysis Results

Location			SVMW05	SVMW06	SVMW07_4.0	SVMW08	SVMW10	SVMW10
Date Sampled			2/07/2018 14:28	2/07/2018 12:23	2/07/2018 12:41	2/07/2018 13:55	17/04/2018 14:30	22/05/2018 15:00
Batch No.			EN1804078	EN1804078	EN1804078	EN1804078	EN1802691	EN1803265
Analyte	**LOR**	**Units**						
Vinyl Acetate	180	µg/m³	<180	<180	<180	<180	<180	<180
Vinyl bromide	220	µg/m³	<220	<220	<220	<220	<220	<220
Vinyl chloride	5.1	µg/m³	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1

Table G.1 - Soil Vapour Analysis Results

Location			SVMW10	SVMW11
Date Sampled			2/07/2018 13:55	2/07/2018 16:32
Batch No.			EN1804078	EN1804078
Analyte	**LOR**	**Units**		
Sampling Quality Assurance				
Pressure - As received	0.1	kPaa	**87.9**	**92.1**
Pressure - Laboratory Atmosphere	0.1	kPaa	**101**	**101**
Temperature as Received	0.1	°C	**21**	**21**
Vacuum - As received	0.03	Inches Hg	**3.81**	**2.54**
Petroleum Hydrocarbons in Gaseous Samples				
C10 - C14 Fraction	5000	ppbv	<5000	<5000
C6 - C9 Fraction	5000	ppbv	<5000	<5000
Total Recoverable Hydrocarbons - NEPM 2013				
>C10 - C16 Fraction	5000	ppbv	<5000	<5000
>C10 - C16 Fraction minus Naphthalene (F2)	5000	ppbv	<5000	<5000
C6 - C10 Fraction	5000	ppbv	<5000	<5000
C6 - C10 Fraction minus BTEX (F1)	5000	ppbv	<5000	<5000
USEPA Air Toxics Method TO15r				
1,1,1,2-Tetrachloroethane	50	ppbv	<50	<50
1,1,1-Trichloroethane	50	ppbv	<50	<50
1,1,2,2-Tetrachloroethane	50	ppbv	<50	<50
1,1,2-Trichloroethane	50	ppbv	<50	<50
1,1-Dichloroethane	50	ppbv	<50	<50
1,1-Dichloroethene	50	ppbv	<50	<50
1,2,4-Trichlorobenzene	50	ppbv	<50	<50
1,2,4-Trimethylbenzene	50	ppbv	<50	<50
1,2-Dibromoethane (EDB)	50	ppbv	<50	<50
1,2-Dichlorobenzene	50	ppbv	<50	<50
1,2-Dichloroethane	50	ppbv	<50	<50
1,2-Dichloropropane	50	ppbv	<50	<50
1,3,5-Trimethylbenzene	50	ppbv	<50	<50
1,3-Butadiene	50	ppbv	<50	<50
1,3-Dichlorobenzene	50	ppbv	<50	<50
1,4-Dichlorobenzene	50	ppbv	<50	<50
1,4-Dioxane	50	ppbv	<50	<50
1-Chloro-2-propene (Allyl chloride)	50	ppbv	<50	<50
2-Butanone (MEK)	50	ppbv	<50	<50
2-Chloro-1,3-butadiene	50	ppbv	<50	<50
2-Chlorotoluene	50	ppbv	<50	<50
2-Hexanone (MBK)	50	ppbv	<50	<50
2-isopropyltoluene	50	ppbv	<50	<50

Table G.1 - Soil Vapour Analysis Results

Location			SVMW10	SVMW11
Date Sampled			2/07/2018 13:55	2/07/2018 16:32
Batch No.			EN1804078	EN1804078
Analyte	LOR	Units		
2-Propanone (Acetone)	50	ppbv	<50	<50
4-Ethyltoluene	50	ppbv	<50	<50
4-Methyl-2-pentanone (MIBK)	50	ppbv	<50	<50
Acetonitrile	50	ppbv	<50	<50
Acrolein	50	ppbv	<50	<50
Acrylonitrile	50	ppbv	<50	<50
Benzene	30	ppbv	<30	<30
Benzyl Chloride	50	ppbv	<50	<50
Bromodichloromethane	50	ppbv	<50	<50
Bromoform	50	ppbv	<50	<50
Bromomethane	50	ppbv	<50	<50
Carbon disulfide	50	ppbv	<50	<50
Carbon Tetrachloride	50	ppbv	<50	<50
Chlorobenzene	50	ppbv	<50	<50
Chloroethane	50	ppbv	<50	<50
Chloroform	50	ppbv	<50	<50
Chloromethane	50	ppbv	<50	<50
cis-1,2-Dichloroethene	5	ppbv	<5	<5
cis-1,3-Dichloropropylene	50	ppbv	<50	<50
Cyclohexane	50	ppbv	<50	<50
Dibromochloromethane	50	ppbv	<50	<50
Di-isopropyl Ether	50	ppbv	<50	<50
Ethanol	50	ppbv	<50	<50
Ethyl tert-Butyl Ether (ETBE)	50	ppbv	<50	<50
Ethylacetate	50	ppbv	<50	<50
Ethylbenzene	50	ppbv	<50	<50
Freon 11	50	ppbv	<50	<50
Freon 113	50	ppbv	<50	<50
Freon 114	50	ppbv	<50	<50
Freon 12	50	ppbv	<50	<50
Heptane	50	ppbv	<50	<50
Hexachlorobutadiene	50	ppbv	<50	<50
Isooctane	50	ppbv	<50	<50
Isopropyl Alcohol	50	ppbv	<50	<50
Isopropylbenzene	50	ppbv	<50	<50
meta- & para-Xylene	100	ppbv	<100	<100
Methyl Methacrylate	50	ppbv	<50	<50

Table G.1 - Soil Vapour Analysis Results

Location			SVMW10	SVMW11
Date Sampled			2/07/2018 13:55	2/07/2018 16:32
Batch No.			EN1804078	EN1804078
Analyte	**LOR**	**Units**		
Methyl tert-Butyl Ether (MTBE)	50	ppbv	<50	<50
Methylene chloride	50	ppbv	<50	<50
Naphthalene	19	ppbv	<19	<19
n-Butylbenzene	50	ppbv	<50	<50
n-Hexane	50	ppbv	<50	<50
n-Propylbenzene	50	ppbv	<50	<50
ortho-Xylene	50	ppbv	<50	<50
Propene	50	ppbv	<50	**207**
sec-Butylbenzene	50	ppbv	<50	<50
Styrene	50	ppbv	<50	<50
tert-Amyl Methyl Ether (TAME)	50	ppbv	<50	<50
tert-Butyl alcohol (TBA)	50	ppbv	<50	<50
tert-Butylbenzene	50	ppbv	<50	<50
Tetrachloroethene	50	ppbv	<50	<50
Tetrahydrofuran	50	ppbv	<50	<50
Toluene	50	ppbv	<50	<50
trans-1,2-Dichloroethene	50	ppbv	<50	<50
trans-1,3-Dichloropropylene	50	ppbv	<50	<50
Trichloroethylene (TCE)	1	ppbv	<1	<1
Vinyl Acetate	50	ppbv	<50	<50
Vinyl bromide	50	ppbv	<50	<50
Vinyl chloride	2	ppbv	<2	<2
Petroleum Hydrocarbons in Gaseous Samples (Calc Conc)				
C10 - C14 Fraction	35000	µg/m³	<35000	<35000
C6 - C9 Fraction	20000	µg/m³	<20000	<20000
Total Recoverable Hydrocarbons - NEPM 2013 (Calc Conc)				
>C10 - C16 Fraction	40000	µg/m³	<40000	<40000
>C10 - C16 Fraction minus Naphthalene (F2)	40000	µg/m³	<40000	<40000
C6 - C10 Fraction	20000	µg/m³	<20000	<20000
C6 - C10 Fraction minus BTEX (F1)	20000	µg/m³	<20000	<20000
VOCs by USEPA Method TO15 (Calculated Concentration)				
1,1,1,2-Tetrachloroethane	340	µg/m³	<340	<340
1,1,1-Trichloroethane	270	µg/m³	<270	<270
1,1,2,2-Tetrachloroethane	340	µg/m³	<340	<340
1,1,2-Trichloroethane	270	µg/m³	<270	<270
1,1-Dichloroethane	200	µg/m³	<200	<200
1,1-Dichloroethene	200	µg/m³	<200	<200

Table G.1 - Soil Vapour Analysis Results

Location			SVMW10	SVMW11
Date Sampled			2/07/2018 13:55	2/07/2018 16:32
Batch No.			EN1804078	EN1804078
Analyte	**LOR**	**Units**		
1,2,4-Trichlorobenzene	370	µg/m³	<370	<370
1,2,4-Trimethylbenzene	240	µg/m³	<240	<240
1,2-Dibromoethane (EDB)	380	µg/m³	<380	<380
1,2-Dichlorobenzene	300	µg/m³	<300	<300
1,2-Dichloroethane	200	µg/m³	<200	<200
1,2-Dichloropropane	230	µg/m³	<230	<230
1,3,5-Trimethylbenzene	240	µg/m³	<240	<240
1,3-Butadiene	110	µg/m³	<110	<110
1,3-Dichlorobenzene	300	µg/m³	<300	<300
1,4-Dichlorobenzene	300	µg/m³	<300	<300
1,4-Dioxane	180	µg/m³	<180	<180
1-Chloro-2-propene (Allyl chloride)	160	µg/m³	<160	<160
2-Butanone (MEK)	150	µg/m³	<150	<150
2-Chloro-1,3-butadiene	180	µg/m³	<180	<180
2-Chlorotoluene	260	µg/m³	<260	<260
2-Hexanone (MBK)	200	µg/m³	<200	<200
2-isopropyltoluene	270	µg/m³	<270	<270
2-Propanone (Acetone)	120	µg/m³	<120	<120
4-Ethyltoluene	240	µg/m³	<240	<240
4-Methyl-2-pentanone (MIBK)	200	µg/m³	<200	<200
Acetonitrile	80	µg/m³	<80	<80
Acrolein	110	µg/m³	<110	<110
Acrylonitrile	110	µg/m³	<110	<110
Benzene	100	µg/m³	<100	<100
Benzyl Chloride	260	µg/m³	<260	<260
Bromodichloromethane	340	µg/m³	<340	<340
Bromoform	520	µg/m³	<520	<520
Bromomethane	190	µg/m³	<190	<190
Carbon disulfide	160	µg/m³	<160	<160
Carbon Tetrachloride	310	µg/m³	<310	<310
Chlorobenzene	230	µg/m³	<230	<230
Chloroethane	130	µg/m³	<130	<130
Chloroform	240	µg/m³	<240	<240
Chloromethane	100	µg/m³	<100	<100
cis-1,2-Dichloroethene	20	µg/m³	<20	<20
cis-1,3-Dichloropropylene	230	µg/m³	<230	<230
Cyclohexane	170	µg/m³	<170	<170

Table G.1 - Soil Vapour Analysis Results

Location			SVMW10	SVMW11
Date Sampled			2/07/2018 13:55	2/07/2018 16:32
Batch No.			EN1804078	EN1804078
Analyte	**LOR**	**Units**		
Dibromochloromethane	430	µg/m³	<430	<430
Di-isopropyl Ether	210	µg/m³	<210	<210
Ethanol	90	µg/m³	<90	<90
Ethyl tert-Butyl Ether (ETBE)	210	µg/m³	<210	<210
Ethylacetate	180	µg/m³	<180	<180
Ethylbenzene	220	µg/m³	<220	<220
Freon 11	280	µg/m³	<280	<280
Freon 113	380	µg/m³	<380	<380
Freon 114	350	µg/m³	<350	<350
Freon 12	250	µg/m³	<250	<250
Heptane	200	µg/m³	<200	<200
Hexachlorobutadiene	530	µg/m³	<530	<530
Isooctane	230	µg/m³	<230	<230
Isopropyl Alcohol	120	µg/m³	<120	<120
Isopropylbenzene	250	µg/m³	<250	<250
meta- & para-Xylene	430	µg/m³	<430	<430
Methyl Methacrylate	210	µg/m³	<210	<210
Methyl tert-Butyl Ether (MTBE)	180	µg/m³	<180	<180
Methylene chloride	170	µg/m³	<170	<170
Naphthalene	100	µg/m³	<100	<100
n-Butylbenzene	270	µg/m³	<270	<270
n-Hexane	180	µg/m³	<180	<180
n-Propylbenzene	250	µg/m³	<250	<250
ortho-Xylene	220	µg/m³	<220	<220
Propene	90	µg/m³	<90	**356**
sec-Butylbenzene	270	µg/m³	<270	<270
Styrene	210	µg/m³	<210	<210
tert-Amyl Methyl Ether (TAME)	210	µg/m³	<210	<210
tert-Butyl alcohol (TBA)	150	µg/m³	<150	<150
tert-Butylbenzene	270	µg/m³	<270	<270
Tetrachloroethene	340	µg/m³	<340	<340
Tetrahydrofuran	150	µg/m³	<150	<150
Toluene	190	µg/m³	<190	<190
Total Xylenes	650	µg/m³	<650	<650
trans-1,2-Dichloroethene	200	µg/m³	<200	<200
trans-1,3-Dichloropropylene	230	µg/m³	<230	<230
Trichloroethylene (TCE)	5	µg/m³	<5.4	<5.4

Table G.1 - Soil Vapour Analysis Results

Location			SVMW10	SVMW11
Date Sampled			2/07/2018 13:55	2/07/2018 16:32
Batch No.			EN1804078	EN1804078
Analyte	**LOR**	**Units**		
Vinyl Acetate	180	µg/m³	<180	<180
Vinyl bromide	220	µg/m³	<220	<220
Vinyl chloride	5.1	µg/m³	<5.1	<5.1

Appendix H Groundwater Sampling SOP

Leigh Creek Energy

Groundwater Monitoring Procedure

ISG Demonstration Plant

Leigh Creek Energy Limited
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Document	Groundwater Monitoring Procedure
Date	08 August 2018
Prepared by	Damian Newham Senior Hydrogeologist

Revision History

Rev	Date	Purpose	Prepared	Reviewed	Authorised
0	25/02/2016	Issued for use	MLW	GAB	MLW
01	09/08/2018	Issued for use	DN	AM	JH

LCK acknowledge the Adnyamathanha people, the traditional owners of the land on which our operations occur and pay our respects to their Elders past and present.

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Purpose

The purpose of this procedure is to provide guidance on the collection of groundwater quality and water level data to fulfil the requirements of the Environmental Impact Report (EIR) and the Statement of Environmental Objectives (SEO), associated with Leigh Creek Energy (LCK) ISG Pre-Commercial Demonstration (PCD) project.

This procedure applies to groundwater monitoring and sampling of the local wells and of the wells installed by LCK at the Playford 1 and the PCD facilities as part of the PCD project.

The procedure focusses on the technical aspects of measuring water levels and obtaining groundwater samples from the wells that are part of LCK's groundwater monitoring program, as detailed in LCK's document "*Groundwater and Soil Vapour Monitoring Plan, version 2.02*" (LCK, August 2018). The Groundwater and Soil Vapour Monitoring Plan (GSVMP) includes discussion on data management and reporting and a Sampling and Analysis Quality Plan (SAQP). This information is not repeated in this procedure.

1 Scope

This procedure has been specifically designed for all groundwater monitoring associated with the Leigh Creek Energy Project (LCEP) PCD project within the Petroleum Exploration Licence 650 (PEL 650) and relates to LCK's work processes including:

- LCK employees and all activities undertaken by LCK;
- Contractors, sub-contractors and their employees working on LCK premises or on activities supervised by LCK; and
- Visitors to LCK premises.

Australian Standards (AS 5667:1998) are available for water sampling and have been referred to for the methodologies developed in this procedure.

2 Terminology and Definitions

The following definitions relate to this procedure:

Table 2-1: Terms and Definitions

Term	Definition
ALS	Australian Laboratory Services - Primary analytical laboratory for groundwater water samples
Decon 90	Sterilising detergent used to decontaminate sampling equipment
EIR	Environmental impact report
Eurofins	Secondary analytical laboratory
Groundwater monitoring	Comprises the following activities: • Measurement of groundwater levels (i.e. depth to water). • Measurement of field water quality parameters. • Sampling of groundwater wells.
ISG	In situ gasification. In situ (underground) conversion of coal into an energy-rich product gas
LCEP	Leigh Creek Energy Project

Term	Definition
LCK	Leigh Creek Energy Ltd
PCD	Pre-Commercial Demonstration

3 Roles and Responsibilities

All appropriately trained and/or qualified LCK employees, contractors and visitors undertaking groundwater monitoring on PEL 650 are required to comply with this procedure.

The roles and responsibilities specific to groundwater monitoring and sampling are outlined in the table below.

Table 3-1: Roles and Responsibilities

Role	Responsibilities
General Manager - Operations	• Ensure that all accountabilities below are actioned by the relevant people.
Environment Manager	• Make available all policies and procedures and update them as required. • Ensure all well monitoring activities are delegated to appropriate personnel. • Provide training and support for all persons responsible for the achievement of this procedure. • Review records of well monitoring data on a regular basis for compliance. • Report well monitoring data to relevant government authorities as required.
Senior Hydrogeologist	• Ensure that well monitoring activities are undertaken in a timely manner and in accordance with this procedure. • Report any non-compliances to the Environment Manager and follow through with ensuring that these are dealt with in an appropriate manner as detailed in this procedure.
All personnel are expected to:	• Only undertake groundwater monitoring, if appropriately trained/qualified and approved by the General Manager Operations. • Adhere to this procedure. • Report instances of breaches of this procedure to their site manager.

4 EIR and SEO Commitments

LCK has made the following commitments regarding groundwater in EIR and the SEO for the ISG Pre-Commercial Demonstration project:

- No sustained change to background groundwater quality at the boundary of the gasifier buffer zone (i.e. containment is achieved).

5 Procedure

The following process is required to be followed for groundwater monitoring for the LCEP.

5.1 Health and Safety

Prior to undertaking any groundwater monitoring, relevant health and safety plans need to be reviewed and, if required, amended, in accordance with LCK's Health and Safety policy and procedures.

5.2 Preparation

The following is a list of activities that need to be undertaken prior to site groundwater monitoring.

Items to be considered include the following:

- Review monitoring schedule and sampling location plan and identify required sample locations (including QA/QC requirements) and sampling methodology;
- Review the analyte list and ensure appropriate laboratory bottles/containers and accessories are available for sample collection (e.g. filters and vacuum pump, telescopic sampling pole and bottle, bailers, nitrile gloves, field sheets etc.);
- Organise LCK accommodation, site access and vehicle availability;
- Hire equipment to be booked in advance: water chemistry meter, water level meter (if required), gauges etc. Ensure standard calibration fluids are provided;
- Record calibration certificates or any manual calibrations undertaken;
- Review relevant health and safety plans;
- Travel to site and undertake appropriate approvals/notifications for travel and site access; and
- Pre-label sample bottles where possible.

5.3 Monitoring Methodology Selection

The groundwater monitoring network comprises local wells and PCD wells installed to different depths within different formations. Given the depth of the wells and the relative permeabilities of the formations, different monitoring/sampling methods have been adopted, as per Table 5-1.

Table 5-1: Groundwater Monitoring and Sampling Methodology Selection

Bore depth (m bgl)	Formation	Sampling	Water Level
<20	Telford Gravels	Waterra valve and tubing - 4 purge (minimum) volume removal	Water level dipper
80 (including Stone Hut Windmill bore 6537-2318)	Main Series Overburden	Hydrasleeve – grab sample	Sonic water level meter
~500	Main Series Coal	Wireline activated bore hole fluid sampler (BHFS) – grab sample	Sonic water level meter
Landowner bore with pump (Unknown depths)	Telford Gravels	Sample via pump activation	Water level dipper

5.4 Equipment Required

The following equipment is required to collect groundwater samples for laboratory analysis:

- Groundwater monitoring well location map;

- Water level (dip) meter;
- Water level (sonic) meter;
- Drager X-am 5000 gas meter;
- Water chemistry meter (pH, EC, DO, Temp, ORP) and calibration liquids;
- Pre-prepared sample bottles provided by ALS (primary laboratory) and Eurofins (secondary laboratory) including eskies and ice bricks;
- Laboratory prepared trip blanks and field and rinsate water (volatile, semi-volatile and metals water)
- nitrile gloves (blue gloves);
- new hydrasleeves (for 80m Bore sampling);
- writing implements (pens/waterproof markers);
- Decon 90 and fresh water;
- Buckets (x2);
- Bottle holder frame;
- Vacuum pump and filters (Stericups 0.45µm);
- Wireline winch trailer;
- LCK01 vehicle (with drum winch) – pre book with Site Manager.

5.5 Water Chemistry Probe Calibration

The water chemistry probes will be pre-calibrated and have an accompanying calibration certificate. At the beginning of each day of sampling and if erroneous values are suspected, follow the manufacturers calibration procedure provided with the equipment and using appropriate calibration liquids.

5.6 Water Level Measurement Methodology

The following methodologies can be used to measure groundwater level within a well and is to be undertaken prior to any sample collection:

1. **Water Level Dip Meter**

- Review historical water levels to have an idea of historical depth to water;
- ensure the water level meter is clean and decontaminated/disinfected with Decon 90;
- switch on the water level meter and check the batteries by pressing the black button on the control panel;
- slowly lower the sensor and tape down the well in a controlled manner;
- when the meter beeps pull the tape up and lower very slowly to the beeping point again;
- take the reading on the tape from the top of the casing and record on the field sheets along with the date, time and well number;
- It is good practice to measure depth to base of hole annually; and
- decontaminate and disinfect the sensor with Decon90 and rinse thoroughly with fresh water.

2. **Water Level Sonic Meter**

- Not for use where water levels are <30m bgl;
- review historical water levels to have an idea of historical depth to water;
- switch on by pressing the red button (you will hear audible ‘puffs’ from the unit);
    - If water level <150m, set depth toggle to normal (Nml on the display);
    - If water level >150m, set depth toggle to deep (Dp on the display);

- the temperature has been pre-set to 35.5 °C, as this has been calibrated to wireline water level measurements. The temperature adjustment relates to the temperature of the air inside the well casing which affects water level measurement. For more information regarding the temperature and depth settings refer to the manufactures operating manual in the case;
- point the open tube down the bore hole or the head works port, hold steady and press the red button;
- the display will indicate the water level measurement; and
- record details on the field sheet along with the date, time and well number.

5.7 Sampling - Regional Bores with Pumps

The following methodology is required to collect groundwater samples for laboratory analysis:

- Identify sample location;
- Record site details and comments on field sheets;
- Wear disposable nitrile gloves and replace as required when changing equipment and/or if gloves are dirty and between sample locations;
- Measure and record depth to water level as above;
- Start the pump and allow to run from the tap or pipe for three to five minutes;
- Ensure all probes have been calibrated;
- Ensure probes and the probe containers are decontaminated with Decon90 and rinsed with fresh running well water;
- Collect a sample of fresh running well water and insert water chemistry meter probes;
- Allow the readings to stabilize and record results on the field sheet;
- Fill all necessary sample bottles with fresh running well water ensuring there are no air bubbles and tightly replace the lid; and
- Label the sample bottles with sample location, time and date and name of person collecting the sample.

Always ensure that the area is left clean, all waste is removed, all pumps are switched off and landowner's gates are closed before leaving.

5.8 Sampling - Shallow (<20m) Groundwater Well

- Identify sample location;
- Record site details and comments on field sheets;
- Wear disposable nitrile gloves and replace as required when changing equipment and/or if gloves are dirty and between sampling locations;
- Measure and record depth to water level as above;
- Calculate purge volume (PV (L) = h x π x d^2/4 x 1000 (h = height of water column (m) and d = inner diameter of casing (m));
- If water level logger is installed:
    - Disconnect logger security D-shackle from its mount and remove the cable by hand and remove logger from cable/cord.
- Bores are installed with dedicated Waterra valves and LDPE tubing which is installed upside down at the end of sampling to avoid clogging of the valve. Slowly lift the tubing while pushing the valve end down the bore to install the correct way around;
- Insert water chemistry meter probes into the bucket and begin purging groundwater by pumping (using an up and down motion with your arm) the tubing to activate the Waterra

valve. Measure water quality parameters every one half a purge volume and record on the field sheet;

- Repeat purge volume removal for a minimum of 4 times and until water quality parameters stabilise. Parameters are considered stable when three consecutive readings of at least three parameters are within the following ranges (pH ±0.1, EC ±5%, DO ±10%, ORP ±10mV and Temp ±0.2°C);
- Once parameters have stabilised, a length (~2.5m) of smaller diameter LDPE tube needs to be inserted into the top of the main tube (~2.1m inserted) to reduce flow rates and eliminate sample aeration suitable for volatile sample collection (refer http://www.waterra.com VOC sampling for more information);
- Set up bottles in bottle rack, fit a new pair of nitrile gloves and avoid touching any surfaces to reduce possibility of contamination;
- Pump the tubing assembly and fill laboratory containers as required. Avoid contact between the tubing outlet and the laboratory containers, especially where preservatives are present in the containers;
- Pre-filter sample where required;
- Store collected samples in an esky with cooling media;
- Once all sample bottles are filled, remove smaller diameter LDPE and dispose;
- Slowly pull out the tubing while pushing the outlet end down the tubing to store valve at the top of the bore casing; and
- Reinstall the logger and cap where required.

5.9 Sampling - 80m Groundwater Well

- Identify sample location;
- Record site details and comments on field sheets;
- Wear disposable nitrile gloves and replace as required when changing equipment and/or if gloves are dirty and between sampling locations;
- Measure and record depth to water level as above;
- Where water level loggers are installed:;
    - Disconnect logger security D-shackle from its mount;
    - Carefully connect logger cable D-shackle to the winch on vehicle LCK01. The D-shackle will fit through the vent-like holes in the reel flange which is facing the vehicle cabin. Activate the winch to remove the logger. Take care and use slow constant rate to remove logger and watch for logger at the surface. Removed the logger from the cable;
- Fit a fresh pair of nitrile gloves and install Hydrasleeve to logger cable with the D-shackle;
- Lower to sampling midpoint of screen interval (logger cable length set to ~70mbgl).
- Slowly lift the hydrasleeve via the vehicle winch;
- Set up bottles in bottle rack, fit a new pair of nitrile gloves and avoid touching any surfaces to reduce possibility of contamination;
- Disconnect the Hydrasleeve from the cable and insert tube supplied with the Hydrasleeve;
- Fill laboratory containers as required. Avoid contact between the tubing outlet and the laboratory containers, especially where preservatives are present in the containers;
- Pre-filter sample where required;
- Store collected samples in an esky with cooling media;
- Once all sample bottles are filled, dispose of Hydrasleeve; and
- Reinstall the logger and cap where required.

5.10 Sampling - Deep (~500m) Groundwater Well

The wireline borehole fluid sampler (BHFS) is for sampling the deep (~500m) monitoring bores (which include MW01, MW02, MW03, MW04 and MW05 located around the demonstration site and P1M1, P1M2 and P1M3 located at the background site PCD01). The BHFS can be used for shallow bores; however more efficient sampling methodologies are available for shallower depth bores.

The BHFS must be cleaned with Decon 90 and rinsed with fresh water prior to any sampling being undertaken.

1. **Unsealed bores**

- Identify sample location;
- Record site details and comments on field sheets;
- Wear disposable nitrile gloves and replace as required when changing equipment and/or if gloves are dirty and between sampling locations;
- Measure and record depth to water level with sonic water level meter;
- Arrange vehicle in position to allow wireline and its associated sheaves to align above the bore head;
- Perform BHFS pre-checks as follows:
    - Check grease is not synthetic hydrocarbon based (use Jet-Lube PFPE or similar);
    - Ensure BHFS connector head is greased appropriately;
    - Check all wireline and winch connectors and components;
    - Fill decontamination bath with 5% Decon 90/water mixture and test operation;
    - Remove the sample chamber, base hub and cap the appropriate tools. Inspect BHFS connector heads, seals and sampling tap for damage and assess operational status. Decontaminate, lubricate, repair and/or replace as required;
    - Reassemble and final decontamination of BHFS assembly and exposed wireline post decontamination bath and all accessories and equipment (e.g. BHFS holder, sheaves);
    - Collect rinsate sample after initial decontamination and at the end of each day's use;
    - Connect BHFS and test operation of winch and BHFS inlet valve mechanism;
    - Ensure the sampling tap and inlet valve are in the closed position;
    - Place on BHFS holder.
- Lift BHFS above the casing and lower BHFS inlet to top of casing;
- Set measuring readout to zero;
- Measure stickup manually;
- Lower BHFS inlet to natural surface level inside the bore (using stickup measurement) and re-set measuring readout to zero;
- Activate wireline bath pump and slowly lower BHFS to required sample depth at a rate of 10-15m/min, constantly monitoring the depth readout and wireline tension;
- Bores P1M1, P1M2 and P1M3 have a screen and riser pipe assembly. The riser pipe causes a diameter reduction at the top of the riser. At each bore's corresponding top of riser, slow descent to avoid damaging the base of the BHFS. Monitor wireline tension to ensure the BHFS is not fouling at the diameter restriction;
- At the sample depth, open the BHFS inlet valve via the switch on the control box;
- With the BHFS valve in the open position, allow 10mins for the sample chamber to fill;
- Close the BHFS valve using the control box switch;
- Begin the ascent using the winch in reverse, again at a rate of 10-15m/min;

- Additionally, bores P1M1, P1M2 and P1M3 have a reduction point at the top of screen to riser pipe junction. At each bore's corresponding top of screen, slow the ascent to avoid damaging the top of the BHFS. Note: this is a different depth to the reduction at top of the riser
- Monitor both the measuring readout and load on the winch and wireline to identify if the assembly is jamming;
- Monitor wireline auto feeding mechanism. Wireline damage can occur if misaligned;
- When the BHFS is at the surface, observe the measuring readout to check for errors associated with the cable/winch/measuring system;
- Remove end cap and open the inlet valve mechanism using the control box;
- Open the sampling tap slowly and fill laboratory containers as required. Avoid contact between the sampling outlet and the laboratory containers, especially where preservatives are present in the containers;
- Pre-filter sample where required;
- Collect sample to measure field parameters and record on the field sheet;
- The sample chamber holds one litre and should have enough sample to fill all bottles and allow for field measurement; however, another sample collection run will be required if not enough water is present in the chamber;
- Repeat as required to fill containers and/or where sampling for QA purposes;
- Store collected samples in an esky with cooling media; and
- Perform decontamination;
- Rinsate sample collection (after final sample collection for each day); and
- Pack up as required.

2. Sealed Bore

- Identify sample location;
- Switch on gas meter (Drager X-am 5000) and place adjacent the bore for occupational monitoring of gases;
- Check well head pressure gauge and record;
- Check and record ambient gas concentrations (CH_4, O_2, SO_2, CO, H_2S) from the gas meter. The gas meter will activate (audible beeping) to provide an alert if the atmosphere contains gases above pre-set guidelines (Drager X-am 5000 Technical Manual);
- Record site details and comments on field sheet;
- Wear disposable nitrile gloves and replace as required when changing equipment and/or if gloves are dirty and between sample locations;
- Measure and record depth to water level with sonic water level meter;
- Arrange vehicle in position to allow wireline and its associated sheaves to align above the bore head;
- Perform BHFS pre-checks as follows:
    - Check grease is not synthetic-hydrocarbon based (use Jet-Lube PFPE or similar);
    - Ensure BHFS connector head is greased appropriately;
    - Check all wireline and winch connectors and components;
    - Fill decontamination bath;
    - Remove the sample chamber, base hub and cap the appropriate tools. Inspect BHFS connector heads, seals and sampling tap for damage and assess operational status. Decontaminate, lubricate, repair and/or replace as required;
    - Reassemble and final decontamination of BHFS assembly, exposed wireline post decontamination bath and all accessories and equipment (e.g. BHFS holder, sheaves);
    - Collect Rinsate after initial decontamination;

  - Connect BHFS and test operation of winch and BHFS inlet mechanism;
  - Ensure the sampling tap and inlet valve are in the closed position;
  - Place on BHFS holder.

- Install lubricator assembly base plate;
- Install BHFS into upper lubricator assembly and assemble to base plate;
- Pump up the hydraulic gland slowly, checking smooth movement of wireline until you cannot pull the wireline through;
- Open the isolation valve and monitor for leaks using the gas meter;
- Proceed only if no leaks are evident;
- If leaks are evident or gas meter alert activated, close the isolation valve and rectify leak(s);
- Set measuring readout to zero;
- Measure approximate stickup of BHFS in the lubricator from ground level;
- Release gland pressure slowly until BHFS can slide under its own weight and hold gland at this pressure;
- Lower BHFS inlet to natural surface level inside the bore (using stickup measurement) and re-set measuring readout to zero
- Activate wireline bath pump and slowly lower BHFS to required sample depth at a rate of 10-15m/min, constantly monitoring the depth readout and wireline tension;
- At the sample depth, open the BHFS inlet valve via the switch on the control box;
- With the BHFS valve in the open position, allow 5-10mins for the sample chamber to fill;
- Close the BHFS valve using the control box switch;
- Begin the ascent using the winch in reverse, again at a rate of 10-15m/min;
- Monitor both the measuring readout and load on the winch and wireline to identify if the assembly is jamming;
- Monitor wireline auto feeding mechanism. Wireline damage can occur if misaligned;
- When the BHFS is at the surface, observe the measuring readout to check for errors associated with the cable/winch/measuring system;
- Close the isolation vale;
- With isolation valve closed check pressure within the headworks. Proceed only if pressure is zero;
- If pressure persists, slowly vent while monitoring for gas concentrations;
- Proceed only if the pressure reduces to zero and without meter alert activation;
- If the pressure is reducing within the wellhead but the gas trigger levels are exceeded, cease venting and move from site until gas levels reduce;
- Once the wellhead pressure is zero, separate the lubricator and lift the upper section clear, exposing the base of the BHFS assembly;
- Fit new nitrile gloves;
- Remove end cap and open the inlet valve mechanism using the control box;
- Open the sampling tap slowly and fill laboratory containers as required. Avoid contact between the sampling outlet and the laboratory containers, especially where preservatives are present in the containers;
- Pre-filter sample where required;
- Collect sample to measure field parameters and record on the field sheet;
- The sample chamber holds one litre and should have enough sample to fill all bottles and allow for field measurement; however, another sample collection run will be required if not enough water is present in the chamber;
- Repeat as required to fill containers and/or where sampling for QA purposes;
- Store collected samples in an esky with cooling media;

- With the isolation valve in the left in the closed position, remove the lubricator base plate, pull the BHFS clear of the upper lubricator and remove from the wireline head; and
- Perform decontamination of all components (lubricator and BHFS);
- Rinsate sample collection (after final sample collection for each day); and
- Pack up as required.

5.11 Preparing Samples for Transport

The following methodology is required to transport the samples to the laboratory for analysis:

- ensure the sample bottle lids are fitted tightly to the bottles;
- complete Chain of Custody Form to be sent with the samples;
- place sample bottles in an insulated laboratory container (esky) with ice packs. Place the chain of custody in a plastic sleeve and include inside the esky;
- complete the courier paper work and stick to the top of the esky and label the outside of the esky with “Keep Chilled” and an “ALS” address label (primary laboratory samples); and
- seal the esky by applying the “Security seal” labels.

All primary laboratory samples are to be delivered to ALS at Unit 3, 1 Burma Road, Pooraka SA 5095. Secondary laboratory samples are to be delivered to Eurofins at 9 Main Terrace, Richmond SA.

Notify the Environment Manager when all groundwater monitoring tasks are complete.

6 Review

This procedure will be reviewed biannually, after a major change in operation or after a significant incident relating to this procedure.

7 References

AS/NZS 5667.11:1998 Water Quality - Sampling - Guidance on sampling of groundwaters.

Environment Protection Act, 1993

EPA Guidelines: Regulatory monitoring and testing Groundwater sampling, June 2007.

Leigh Creek Energy (2018) Environmental Impact Report, ISG Demonstration Plant.

Leigh Creek Energy (2017) Statement of Environmental Objectives, ISG Demonstration Plant.

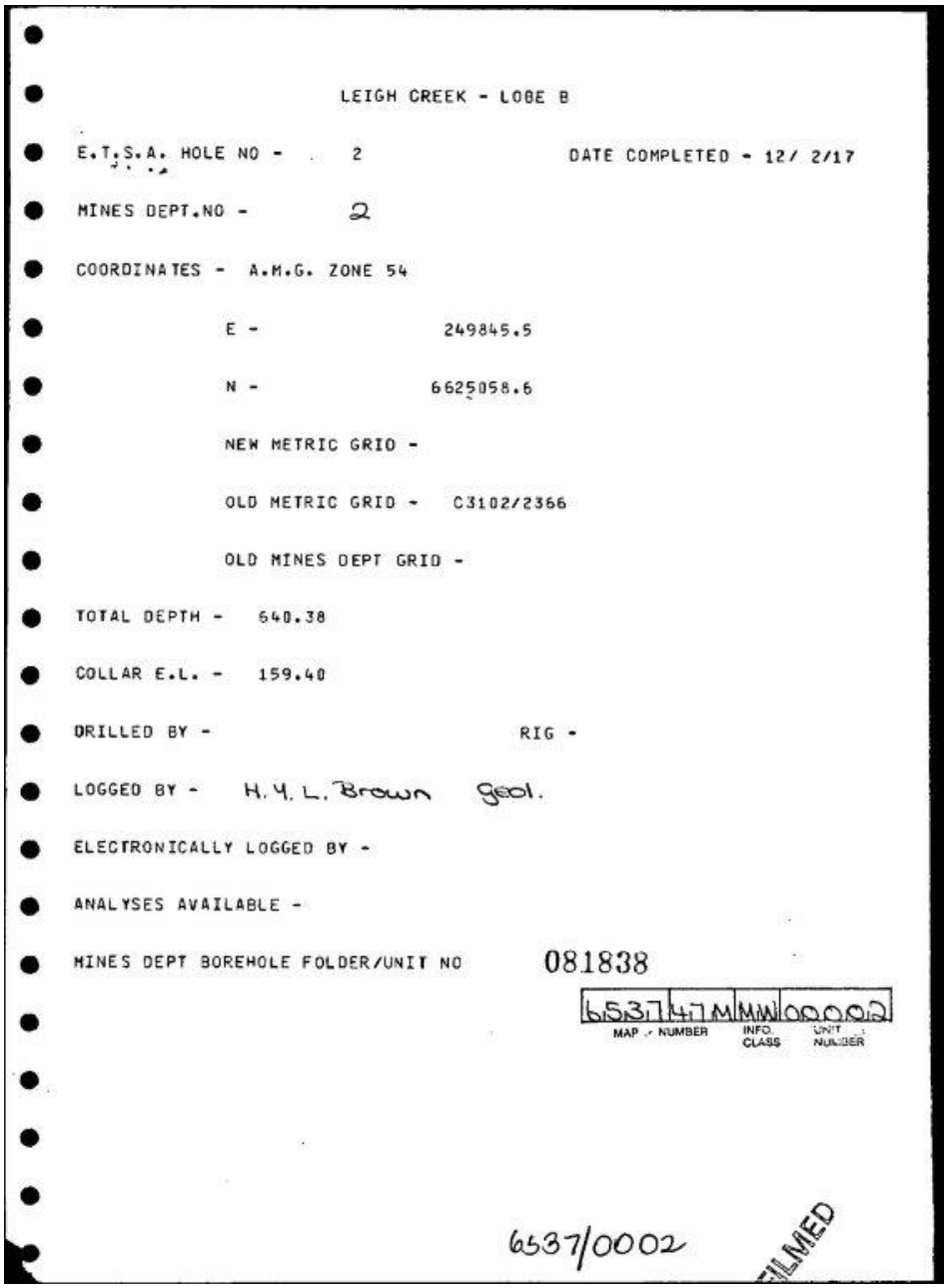
Leigh Creek Environmental Policy 2017.

Natural Resource Management Act, 2004

Petroleum and Geothermal Energy Act, 2000.

Appendix I Assessment of Alinta Drill Hole 2

Drill hole 2 (ETSA Bore 2 or 35484) was drilled in 1917, with recorded field coordinates (in AMG Zone 54) as E:249845.5 and N:6625058.6.



LEIGH CREEK - LOBE B

E.T.S.A. HOLE NO - 2 DATE COMPLETED - 12/ 2/17

MINES DEPT.NO - 2

COORDINATES - A.M.G. ZONE 54

E - 249845.5

N - 6625058.6

NEW METRIC GRID -

OLD METRIC GRID - C3102/2366

OLD MINES DEPT GRID -

TOTAL DEPTH - 640.38

COLLAR E.L. - 159.40

DRILLED BY - RIG -

LOGGED BY - H.Y.L. Brown geol.

ELECTRONICALLY LOGGED BY -

ANALYSES AVAILABLE -

MINES DEPT BOREHOLE FOLDER/UNIT NO 081838

6537 47 MW 0002

MAP NUMBER INFO. CLASS UNIT NUMBER

6537/0002

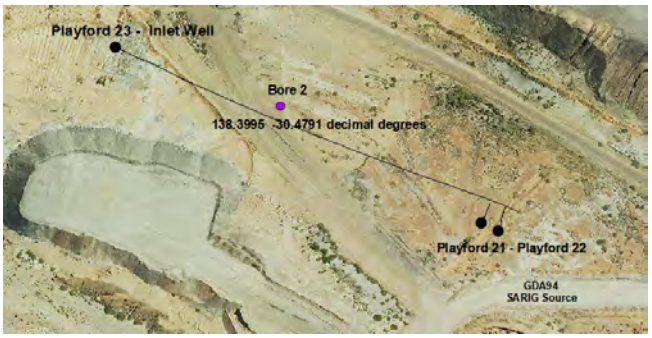
FILMED

The location of this drill hole in the SARIG database is considered inaccurate, most likely due to inaccurate conversion of coordinates from the 1917 coordinate system to current system. Using the Geodetic calculator from Geoscience Australia, different coordinates are obtained, as presented below.

Table E-1: Drill Hole 2 coordinates

	Original (1917)	SARIG	Geoscience Australia
Datum	A.M.G Zone 54	GDA94, Zone 54	GDA94, Zone 54
Easting	249845.5	249967.875	249846.4
Northing	6625058.6	6625237	6625070.3

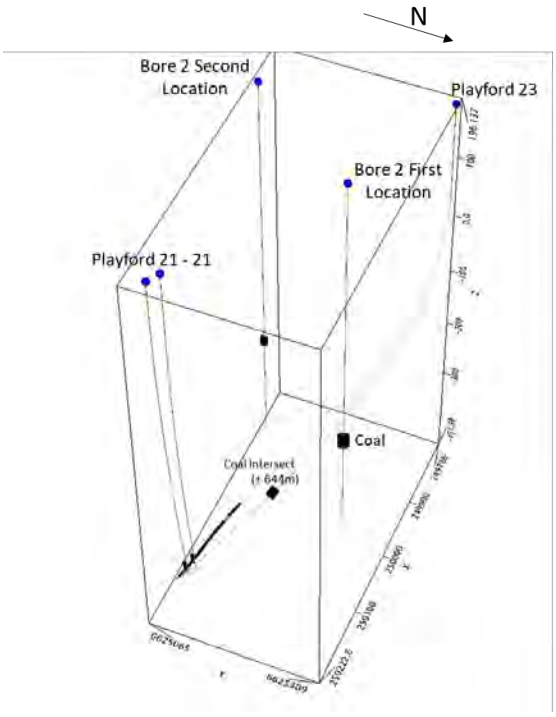
The drill hole is located most likely to the south of the SARIG location, outside the gasifier buffer zone (the more accurate coal depths indicate a more southerly location). It is unlikely to present a potential preferential migration pathway for ISG by-products generated in the gasifier chamber, as the Inlet Well (Playford 23) has been cased and grouted more than 100m past any potential location of drill hole 2.



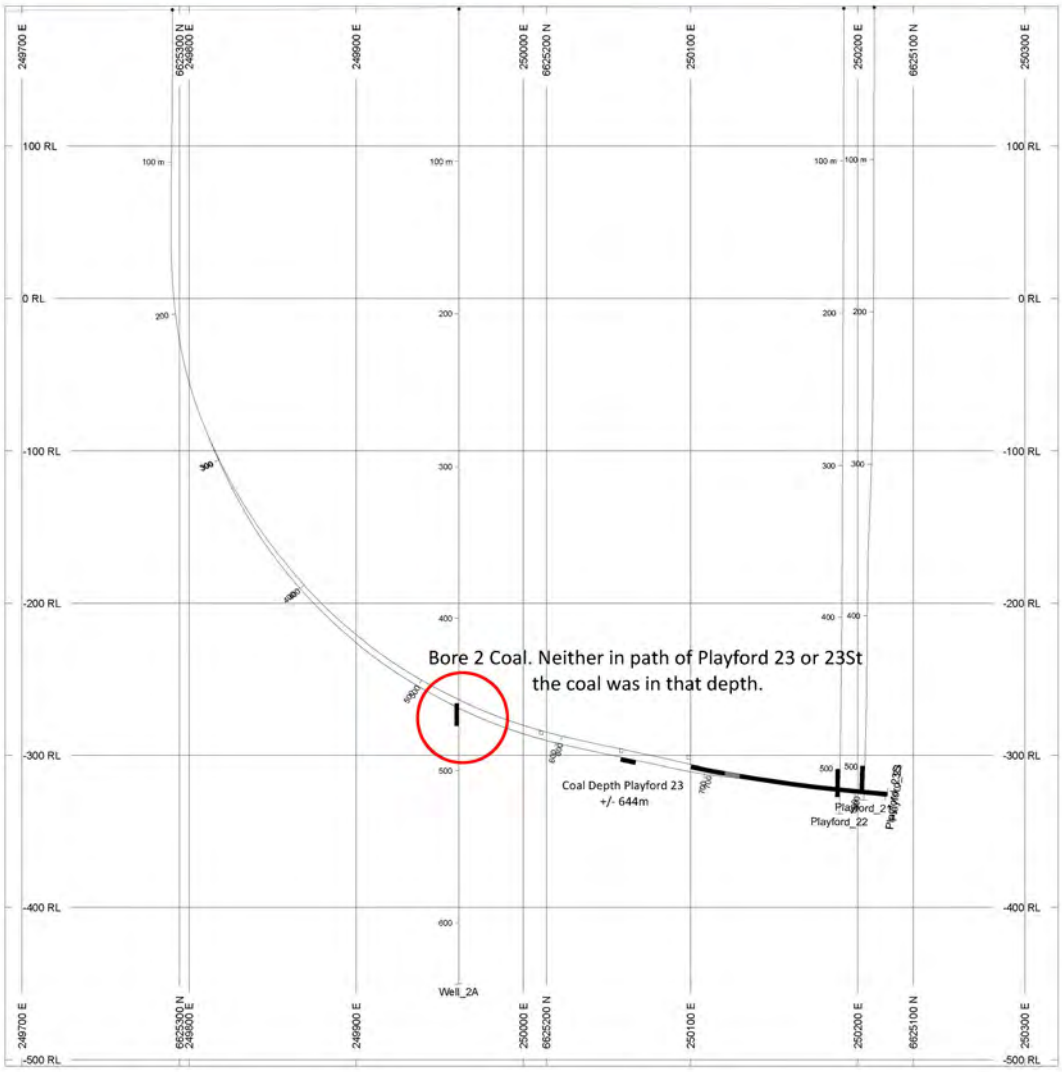
Location of Drill hole 2 as per SARIG

Corrected location of Drill hole 2

To have more confidence about the real position, the well was drawing in 3D with the coal data in drill hole 2 and the intersection with the coal in Playford 23 to compare the coal depth. LCK has more confidence in the second location because Playford 23 did not encounter coal at the depth that drill hole 2 did, as the image and map below show it.



Playford 23
Well_2A
+57.6 m


Bore 2 Coal. Neither in path of Playford 23 or 23St
the coal was in that depth.
Coal Depth Playford 23
+/- 644m
Playford_22
Well_2A
100 RL
0 RL
-100 RL
-200 RL
-300 RL
-400 RL
-500 RL

Appendix J SA Government Agency Consultation Submissions

J.1 Submissions on GSVMP version 1.0

DEM-ERD Comments received: 04 July 2018

Leigh Creek Energy ISG Pre-Commercial Demonstration Plant

Document: **Groundwater and Soil Vapour Monitoring Plan**
Version: v1.0
Document Date: 6 June 2018

#	DEM-ERD QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
1	Figure 2-2: can this be updated to show the exact proposed location of the gasifier and subsequent 100m buffer. DEM-ERD understand this location is now known with greater accuracy.	Updated figure has been included in version 2.0 of the GSVMP.	Y
2	Section 3, page 11 – last paragraph – Can LCK provide groundwater composition comparisons between the Playford-1 site and the PCD facility site to verify that composition at Playford 1 are applicable to the PCD facility site as baselines as stated within the document?	Updated Piper and Durov diagrams that include Playford 1 and PCD water quality information to demonstrate that the baseline date is representative for both sites have been included in version 2.0 of the GSVMP.	Y
3	Suggest updating relevant sections following most recent rounds of groundwater sampling including Table 3-5.	Updated table has been included in version 2.0 of the GSVMP.	Y
4	Figure 3-6 shows the location of surveyed bores however only provides the location of abandoned bores. It is suggested that this map should present all bores including active bores as these also possibly present a pathway to surface.	Figure 3-6 (now Figure 3-7) has been updated to include the Alinta exploration bores and the LCK bores (geological and groundwater bores) within 1000m of the gasifier.	Y
5	Page 26, first paragraph below dot points where it outlines that a summary of exceedances of guideline/trigger levels are presented in Table 3-7. It Is worth reiterating and highlighting that these exceedances have been derived from within the naturally occurring groundwater at the site and are not due to LCK operations.	This has been reiterated in the version 2.0 of the GSVMP.	Y
6	In Table 3-7 - to minimise confusion, it is suggested that LCK name the 'Gasifier Operational Well' the 'Gasifier Operational Monitoring Well' to	Updated table has been included in version 2.0 of the GSVMP.	Y

#	DEM-ERD QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
	align with other references to this well within the document. Please clarify within this table in which formation this well was completed within, as has been defined for the other locations (eg Main Series Coal)? It is also assumed that by having no reference to BTEX under the Gasifier Operational Monitoring Well that BTEX above trigger values were not experienced? Please clarify.	Assumption regarding absence of BTEX in Gasifier Operational Monitoring Well is correct. BTEX levels in MW02 are below detection limit. For completeness, a row has been inserted for BTEXN and TRH/TPH fractions, together with explanation of symbols used in the table.	
7	Page 30, 2nd paragraph – grammatical error 'sustained change' and also suggest clarifying here within the text that the gasifier buffer zone boundary is 100m.	Updated words have been included in version 2.0 of the GSVMP.	Y
8	Please clarify whether the 100m buffer zone is both horizontal and vertical to the gasifier location (eg non-compliance if COPC above trigger values migrate 100m directly above gasifier chamber)	The buffer zone is 100m laterally and 75m vertically. These distances are based on estimates of groundwater flow and geotechnical assessments of possible fracture propagations due to gasification process. However, it is considered that the primary direction of migration of groundwater impacts is laterally, given the considered low vertical permeability of the formations. Lateral migration is essential, as reflected in the location and distribution of the sentinel wells. If non-compliances are detected within the sentinel wells, the installation of a monitoring well e.g. 75m above the gasifier chamber could be considered.	Y
9	Table 4-2, shows the details of all groundwater bores within the monitoring network, it is suggested that the location of these bores be presented together on a single map to show the location of the Playford 1 wells and the local wells in comparison with the PCD facility site. This can then be tied back to the data and well locations presented in Appendix B.	Table and figures with details/location of all wells has been included in Section 3.1, as it is considered useful to present this data as soon as possible in the monitoring plan.	Y
10	Table 4-2, describes the purpose of the Gasifier Operational Monitoring well (Playford 12) as a sentinel well, it is our understanding that this should not be the case.	Noted. Playford 12 is located as close as possible to the gasifier to provide early indication of lateral migration of COPCs from the gasifier chamber into the surrounding formations. As such, it can be	Y

#	DEM-ERD QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
		considered a sentinel well. However, the nomination of this well has been changed to "operational monitoring" to avoid confusion.	
11	Figure 4-1, suggest providing the downhole locations, deviation lines and coal intersects for all wells, some are missing (e.g. Playford 13). It is also suggested that this map be updated to show the most recent estimates of the gasifier location and subsequent buffer zone as recently provided to DEM-ERD.	Updated figure has been included in version 2.0 of the GSVMP.	Y
12	Page 40, under groundwater sampling it is outlined that sampling is undertaken in line with LCK's Groundwater Sampling Standard Operating SOP – suggest providing this as an appendices to this document for completeness.	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	N
13	Page 42, defines the 'compliance assessment timeframe' as 'three years after shutdown of the gasifier' – suggest rewording for clarity to 'three years monitoring after shutdown of PCD gasifier (subject to review at three years that shows no exceedances of control limits in past …#… sampling events) or similar.	Updated words have been included in version 2.0 of the GSVMP.	Y
14	Page 42, defines the following control limit for pressure – the control limit is an inward pressure gradient from the sentinel wells towards the gasifier chamber three years after shutdown. This should be reworded as follows (or similar) to meet the SEO criteria - the control limit is an inward pressure gradient from the sentinel wells towards the gasifier chamber at all times, as expressed by weekly (averaged) pressure gradient maps (for discussion).	Updated words have been included in version 2.0 of the GSVMP.	Y
15	Page 43 and Table 4-4, – It has been outlined that sentinel well sampling at the PCD facility to date is not representative of baseline conditions as demonstrated at the Playford-1 site. Whilst it may be deemed acceptable to use the baseline data from the Playford-1 well site to determine control parameters within the deeper sentinel wells at the PCD facility, is	Recent groundwater analysis results indicate that there are some differences between water quality from PCD main series overburden (MO) wells and water quality from well P1M1. Shallow MO wells (to 80m) are more saline and have lesser natural hydrocarbon levels that P1M1. E.g. benzene concentrations are below LOR for the shallow wells.	Y

#	DEM-ERD QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
	it deemed that this data would also be representative of sentinel wells within the main series overburden at 80m depth?	From a water quality perspective, the shallow Main Series Overburden (at 80m depth) has been treated as separate unit in the updated version of the GSVMP.	
16	Section 4.8, first paragraph reword – 'Sustainable' to 'sustained'	Updated words have been included in version 2.0 of the GSVMP.	Y
17	Section 4.8, outlines contingency and corrective actions – with respect to non-compliance with groundwater quality triggers it is suggested that a corrective action during operation of the gasifier could be to reduce the pressure within the gasifier, as per the corrective actions for groundwater pressure non-compliance.	Updated words have been included in version 2.0 of the GSVMP.	Y
18	Page 52 first paragraph below Table 5-3, this seems to be outlining the monitoring timeline for the groundwater wells not the soil vapour wells?	Monitoring timeline and frequencies have been included in table form in version 2.0 of the GSVMP.	Y
19	Page 53 under control limits, it is mentioned that there is not yet a comprehensive set of background data to undertake statistical analysis for soil vapour monitoring. How many more monitoring events are required to determine adequate background and do LCK intend to ensure background is determined prior to operation?	In theory, at least six (6) sampling events would be required to undertake meaningful statistical analysis. Ideally, twelve (12) events would be welcomed. However, soil vapour sampling to date indicates that concentrations of COPCs are below the detection limit. The compliance criteria will therefore most likely be the detection limits. The revised GSVMP will include more discussions on this item.	Y
21	Section 6, outlines reporting requirements both internally and externally to DEM-ERD. DEM-ERD suggest for completeness that LCK also outline the reporting requirements outlined in Section 3.2 of the SEO, within the Monitoring Plan.	Updated words have been included in version 2.0 of the GSVMP.	Y
21	Plots in Appendix B3 present results below LOR as negative values? Is this a commonly accepted practice and does this skew statistics (eg 95% and UCL).	Negative values to represent values below LOR have only been adopted for plotting/graphing. The statistical calculations are based on values above the LOR/detection limits. Updated words have been included in version 2.0 of the GSVMP.	Y

DEW Water Science Response Document last updated: 16 July 2018

Leigh Creek Energy ISG Pre-Commercial Demonstration Plant

Document: **Groundwater and Soil Vapour Monitoring Plan**
Version: v1.0
Document Date: 6 June 2018

General Comments

- There are no major comments - they are largely editorial or clarification required.
- If this document is to become an operational document then a majority of the background information could be removed from the document and references to the information made to the relevant EIR or other document.
- To consider adding a glossary for the document.
- Document to contain a table linking the LCK well nomenclature with a unit number, which is the primary state identification for water wells. This would enable information on the wells to be queried using the Groundwater Data web application.
- Are the dimensions of the gasifier chamber to be measured / confirmed on completion of the trial? What are the likely variances in dimensions of the gasifier? This could impact on the placement of compliance monitoring wells.
- Names of government department will need to be updated – DEWNR is now Department for Environment and Water (DEW).

#	Science Comment (to identify relevant section / paragraph and consider required actions)	Leigh Creek Energy Response	Addressed in GSVMP v2.0? (Y/N)
1	Section 2, figure 2.1, pgs. 5 and 6 – it would be useful to display the historical alignment of the Leigh Creek on figure 2.1	A suitable map showing the historical alignment of Leigh Creek is still being sourced. If available, the figure will be updated.	Not yet
2	Section 2.2, pg. 7 – 1st sentence after table 2.1 – If all of the monitoring wells for the PCD have been drilled and constructed – have the roads been constructed?	All monitoring wells have been drilled and constructed. Unsealed access tracks to the drilling locations have been created. No permanent roads have been constructed.	N
3	Figures 2.2, 4.1 and 5.1 – why are there 2 gasifier and 2 gasifier buffer zone boundaries? This has not been discussed in the text.	At the time of version 1.0 of the GSVMP, two different locations for the gasifier chambers were still considered by LCK. This has now	Y

#	Science Comment (to identify relevant section / paragraph and consider required actions)	Leigh Creek Energy Response	Addressed in GSVMP v2.0? (Y/N)
		been resolved and the updated figures in version 2.0 of the GSVMP show only one gasifier location.	
4	Section 2.3, 1st paragraph, pg 9 – The text refers to the Main Series Coal seam depth of approximately 540m. This is not reflected in figure 2.3 which is displaying the depth at approximately 470m.	Figure 2.3 is for a schematic for illustration purposes only and is based on the formations at the Playford 1 site. This is explained in version 2 of the GSVMP.	Y
5	Figure 2.3, pg. 10 – editorial – units of measure to be displayed on the various axes.	Units have been added to the figure	Y
6	Table 3.1, pg. 11 – the base of the well screen interval for well Palyford 4 is deeper than the well depth.	Depth of well has been corrected.	Y
7	Figure 3.1, pg. 12 – editorial – to consider adding depth values for the top and base of the type section.	Depth values have been added	Y
8	Section 3.1, pg. 12 – The description of the main series coal states a thickness of 20m, yet the gasifier chamber is only estimated to be 15m high. Is this correct?	Thickness of the Main Series coal at the PCD Facility ranges from 6 to 36 metres, with an average of 19 metres. The specified height of the gasifier chamber is approximate only.	N
9	Section 3.2.2, pg. 15 • The description of the Telford Gravels should be relevant, primarily, to the PCD site. • 3rd paragraph – the upper series overburden is listed 2x as a groundwater system.	More PCD-specific descriptions have been included in version 2.0 of the GSVMP.	Y
10	Section 3.4, pg. 17, 2nd paragraph –where referring to pressure changes caused by the gasifier to consider edit of text by replacing 'will be' by 'are anticipated to be'	Updated words have been included in version 2.0 of the GSVMP.	Y
11	Figure 3.5, pg 21 – the figure legend on pg 20 needs to be displayed with the figure.	Updated in version 2.0 of the GSVMP	Y
12	Section 3.7, pg. 27, last dot point – have the mining production bores been 'capped' or decommissioned? If the latter, replace the term closed with decommissioned.	The only information that is available is that the bores were 'closed' using a bentonite cement mix. The term 'decommissioned' has been adopted in version 2.0 of the GSVMP.	Y

#	Science Comment (to identify relevant section / paragraph and consider required actions)	Leigh Creek Energy Response	Addressed in GSVMP v2.0? (Y/N)
13	Section 3.9, pg. 26, 2nd last paragraph – the text refers the 'likely' aquifer that the neighbouring wells are extracting groundwater from. Why has this not been confirmed? A potentiometric surface for the shallow groundwater system has not been provided – therefore it is not known / confirmed that it is all flowing towards the Telford Basin.	As these wells are located outside the Telford Basin and several kilometres from the PCD facility, they have not been incorporated in LCK's groundwater monitoring program.	N
14	Section 4 – background water quality – There is no discussion as to whether the baseline water sampling has stabilised at the recently drilled water wells at the PCD site, nor what baseline values are to be used.	Baseline water sampling at PCD facility stabilised immediately, as the installed wells were swabbed upon completion. Updated words have been added to version 2 of the GSVMP.	Y
15	Section 4.2.2 – Document should contain a complete list of water quality parameters that are to be measured in the PCD.	A complete list of parameters has been included as an Appendix in version 2.0 of the GSVMP.	Y
	The 2nd paragraph refers to the sampling that will be undertaken. Results of all sampling undertaken prior to the commencement of activities is to be reported and provided to the regulators.	Appendix B of the GSVMP presents the groundwater analysis results for all sampling events undertaken to date. It is not the intent of LCK to prepare a separate report on the groundwater sampling events prior to commencement of the activities. If required, such report can be prepared and submitted; however, it is not feasible to do so within the timeframe for commencement of the activities.	Y
16	Section 4.3, pg. 32 – the text refers to 3 types of monitoring wells yet table 4.2 has 4 types of wells. 'Shallow' wells are not discussed in the text.	'Shallow' wells are the same type as 'water table' wells. Updated words have been included in version 2.0 of the GSVMP.	Y
17	Section 4.3, pg. 33, last sentence – not all of the wells present in table 4.2 are displayed on figures 4.1 or 4.2.	Additional figures have been included to show location of all wells	Y
18	Table 4.2, pg. 35 – Is the monitoring purpose of well MW02 sentinel or operational monitoring?	Purpose of MW02 is for gasifier operational monitoring. Updated words have been included in version 2.0 of the GSVMP.	Y

#	Science Comment (to identify relevant section / paragraph and consider required actions)	Leigh Creek Energy Response	Addressed in GSVMP v2.0? (Y/N)
19	Figure 4.1, pg. 36 – the figure legend to include symbols for the drillholes beneath ground surface and the structural lines.	Legend on the figure has been updated.	Y
20	Figure 4.2, pg. 37 – the legend to include a symbol the PCD operational areas. (red areas)	Legend on the figure has been updated.	Y
21	Section 4.4.1, pg. 38 – section should reference the complete list of water quality parameters that are to be measured.	A complete list of parameters has been included as an Appendix in version 2.0 of the GSVMP.	Y
22	Section 4.4, – table 4.2 presents monitoring wells by groups (eg: gasifier, piezometer wells, etc), purpose and type. Details for the monitoring parameters, frequency, duration and method, should be provided as per the well groupings in table 4.2 and consistent for all monitoring types.	Updated words have been included in version 2.0 of the GSVMP. Relevant tables have been updated. With respect to monitoring parameters, the water quality parameters are identical for all groups.	Y
23	Section 4.4.1, pg. 38 – monitoring parameters for well types water table and shallow wells is not clear.	Updated words have been included in version 2.0 of the GSVMP. Relevant tables have been updated. With respect to monitoring parameters, the water quality parameters are identical for all groups.	Y
24	Section 4.4.2, pg. 38 – details are required as to what is considered a ‘sustained increase in pressure’.	Updated words have been included in version 2.0 of the GSVMP.	Y
25	Section 4.5 – is the Groundwater sampling SOP to be available?	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	N
26	Section 4.6.2, pg. 41, definition for sustainable change – At present the definition reads very general and should consider providing specific details relevant to this activity. It needs to be very clear to both the operators and regulators what is considered a sustained change.	A more detailed definition is provided further in the document.	Y
27	Table 4.4, pg. 44 – Naphthalene is listed 2x in the table with different control limits.	Naphthalene is a compound that is included in analysis of both volatile organic compounds (typically through purge and trap	Y

#	Science Comment (to identify relevant section / paragraph and consider required actions)	Leigh Creek Energy Response	Addressed in GSVMP v2.0? (Y/N)
		GC/MS analysis) and semivolatile organic compounds (through solvent extraction GC/MS analysis). Therefore, naphthalene is reported twice, once with BTEXN compounds and once with PAHs. The detection limit for naphthalene is different for volatile and semivolatile analysis, as are the concentrations. Therefore, two different control limits have been calculated. For clarity purposes, the naphthalene compound under the PAHs has been renamed "Naphthalene (exclusive to SVOCs)".	
28	Section 4.7, pg. 44 – additional information is required as to what is considered an increasing trend and how it is to be determined.	Updated words have been included in version 2.0 of the GSVMP.	Y
29	Section 4.8, pg. 45, 1st dot point – Details are required on the resampling of relevant wells, namely in what time frame.	Updated words have been included in version 2.0 of the GSVMP.	Y
30	Section 6 – It is recommended that all groundwater related data is to be provided to the regulators in digital format.	Noted. The mechanism of provided digital data to DEM-ERD is to be determined.	Y

SA EPA Comments received: 17 July 2018

Leigh Creek Energy ISG Pre-Commercial Demonstration Plant

Document: **Groundwater and Soil Vapour Monitoring Plan**
Version: v1.0
Document Date: 6 June 2018

#	EPA QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
1	General – It is not clear whether the operation needs a Drainage and Discharge permit or Water Affecting Activity permit under the Natural Resources Management Act 2004	WAA permit applied for 23/7/18	N
2	General – There is variance with the wording used in this monitoring plan related to the objective: • The objective and assessment criteria refer to 'No sustained change to background groundwater quality…' (page 29) • The statement on page 26 states 'no deterioration of existing groundwater quality' • Reference on page 39 is made to '…show that groundwater quality has not been adversely impacted..' These statements can all be interpreted differently. It is recommended that there is consistency in statements relating to groundwater quality objectives.	Noted. Updated words have been included in version 2.0 of the GSVMP.	Y
3	Section 3, page 11, Table 3-1, Playford 1 row – How many VWPs are proposed, and what are the proposed depths?	Updated table has been included in version 2.0 of the GSVMP.	Y
4	Section 3, page 11, Table 3-1, Playford 4 row – Typo: The well screen base (539.5m) is deeper than the hole (539m)	Correct well depth has been included in version 2.0 of the GSVMP.	Y

#	EPA QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
5	Section 3.2.2, paragraph 2, page 15 – Is there any evidence that 'Extensive exploration and drilling within the basin has resulted in enhancing a hydraulic connection between the different aquifer units? If wells were constructed appropriately, there should be no cross-contamination between aquifers.	There is no evidence as such that this has occurred. To avoid confusion, this sentence has been removed from version 2.0 of the GSVMP.	Y
6	Section 3.3, page 16 – Table 3-4 does not align with Table 3-3 with regard to the assessment of aquifer potential in Table 3-4.	Not clear where the misalignment is.	N
7	Section 3.5.2, page 20, sub-dot points 1 and 2– Are hydrocarbon concentrations reported as TPH or TRH?	Concentrations are as TRH. Updated words have been included in version 2.0 of the GSVMP.	Y
8	Section 3.9, Table 3-7, page 27 – It is suggested that this table include a note as to why TPH/TRH concentrations (exceedances) are not included.	Updated words have been included in version 2.0 of the GSVMP.	Y
9	Section 4.2.1, page 30, paragraph 2, third sentence – Has the extent of the radius of influence of the gasifier on surrounding groundwater been modelled? If so, what distances of influence are anticipated?	Groundwater modelling was undertaken to estimate the recovery/inflow in the Main Series Coal wells at the PCD Facility, which will be open hole above, through and below the coal. This was to provide guidance on how long these wells may take to recover to ambient water level if left undisturbed. Modelling indicated that this recovery may take ~300 days. Groundwater modelling to determine the radius of influence has not been undertaken. The radius of influence will be determined by the monitoring of pressure in the surrounding VWPs and monitoring and sampling of the gasifier operational monitoring well.	N
10	Section 4.2.1, page 31, paragraph 3 – This paragraph reports a number of groundwater changes that are expected to occur over time. How have these changes been 'determined'? Has a groundwater model been constructed to model the changes at site? If so, this must be provided to regulators. If not, it must be justified why a groundwater model has not been undertaken.	Groundwater modelling to determine the radius of influence has not been undertaken. The radius of influence will be determined by the monitoring of pressure in the surrounding VWPs and monitoring and sampling of the gasifier operational monitoring well.	N

#	EPA QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
		A memo was provided to DEM-ERD earlier in 2018, outlining LCK's justifications why numerical groundwater modelling was not required.	
11	Section 4.2.2, page 31, paragraph 2 – Has the chemistry of groundwater in the PCD facility area been assessed by sampling and laboratory analysis for a range of chemicals? It is essential that this work is undertaken, reported and provided to regulators prior to commencement of site activities.	Groundwater sampling has been undertaken at the PCD facility. Results are incorporated in version 2.0 of the GSVMP.	Y
12	Section 4.3, page 32, paragraph 2 – 'At this stage, compliance monitoring wells have not yet been installed' – Will these be installed and monitored pre-commissioning as per Table 4-3? It is essential that work is undertaken, reported and provided to regulators prior to commencement of site activities.	It is not the intent to install compliance wells at the extent of the gasifier buffer zone at this stage. This will be undertaken as part of the corrective actions if non-compliances are observed at the sentinel wells.	Y
13	Section 4.3, page 32, paragraph 2, sentence 3 – '…compliance monitoring wells may be installed…' must be changed to '…compliance monitoring wells will be installed…'	Updated words have been included in version 2.0 of the GSVMP.	Y
14	Section 4.3, page 33 – It is unclear where VWP's will be installed in groundwater monitoring wells. Will the deeper VWP be grouted in the bottom of the well? How will the shallow VWP be installed?	It is no longer the intent to install VWPs in the groundwater monitoring wells. The installation was considered some time ago, with VWPs installed and grouted at two different levels outside the casing. However, this idea has now been abandoned, as it was not very feasible/practicable. Relevant words have been removed from version 2.0 of the GSVMP.	Y
15	Figure 4-1, page 36 – the black lines must be included in the legend	Legend of figure has been updated.	Y
16	Figure 4-2, page 37 – the red shapes around MW12 and MW19 must be included in the legend	Legend of figure has been updated.	Y
17	Section 4.4.2, page 38, dot point 1 – '…sustained increase in pressure…' must be defined	Updated words have been included in version 2.0 of the GSVMP.	Y

#	EPA QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
18	Section 4.5, page 40 – It is recommended that LCK's Groundwater Sampling Standard Operating Procedure (SOP) is provided as an Appendix to the GSVMP	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	Y
19	Section 4.5, page 40, 'Groundwater sampling – water table wells' section: • Bailers are not a low flow sampling method. They could be considered a 'last resort' sampling method, with issues with obtaining a representative sample especially for volatiles • Peristaltic pumps also have issues with obtaining a representative sample, especially for volatiles	Updated words have been included in version 2.0 of the GSVMP.	Y
20	Section 4.6.2, page 41, dot point 2 – typo, 'sustainable' should be 'sustained'	Updated words have been included in version 2.0 of the GSVMP.	Y
21	Section 4.6.2, page 42, dot point 2 – Justify that three years after shutdown of PCD gasifier is an appropriate compliance assessment timeframe, in particular in the context of a low groundwater flow environment and the fact that impacts may not yet be observed.	Updated words have been included in version 2.0 of the GSVMP, to reflect that the monitoring requirements will be reviewed and discussed with the relevant SA Government Agencies prior to any amendments.	Y
22	Section 4.6.4, page 44, Table 4-4: • It would be useful to display how many samples these control limits are based on	Details on sample numbers are provided in the appendices	N
	• Naphthalene is listed twice, and has different LOR's	Naphthalene is a compound that is included in analysis of both volatile organic compounds (typically through purge and trap GC/MS analysis) and semivolatile organic compounds (through solvent extraction GC/MS analysis). Therefore, naphthalene is reported twice, once with BTEXN compounds and once with PAHs. The detection limit for naphthalene is different for volatile and semivolatile analysis, as are the concentrations. Therefore, two different control limits have been calculated. For clarity purposes, the naphthalene compound under the PAHs has been renamed "Naphthalene (exclusive to SVOCs)".	Y

#	EPA QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
23	Section 4.7, General – Increasing trends should be defined, including how many sample events they are based on	Updated words have been included in version 2.0 of the GSVMP.	Y
24	Section 4.8, page 45, dot point 1 – Recommend specifying time frame within which resampling will be completed, following undertaking of initial sample and receipt of results	Updated words have been included in version 2.0 of the GSVMP.	Y
25	Section 5.1, page 47, dot point 1 – This are only limited mentions/discussion of soil chemistry. No objectives are linked to soil chemistry. No sampling locations are proposed. It is recommended that this be clarified in the GSVMP.	It is correct that there are no soil chemistry related Environmental Objectives and Assessment Criteria in the SEO. It is LCK's intent to undertake soil sampling at selected locations within the PCD Facility to establish a baseline condition with respect to soil quality. A separate report of soil quality will be prepared. As this is outside the scope of the groundwater and soil vapour monitoring program, any reference to this sampling program has been removed from version 2.0 of the GSVMP.	Y
26	Section 5.2, Table 5-2, page 47 – What is the rationale for the 5-7m depth of soil vapour monitoring, given that the objective refers to surface or sub-surface environment? Are surface or nearer-surface monitoring intervals proposed? If not, how does the 5-7m depth relate to the concentration (risk) at surface?	The actual depth of the soil vapour monitoring wells depends on the Telford Gravels lithology encountered at each location. Updated words/explanation have been included in version 2.0 of the GSVMP.	Y
27	Section 5.3, page 50, dot point 3 – This methodology refers to a 5m probe installation, however Table 5-2 refers to a 5-7m depth. This must be clarified.	The provided methodology is based on a 5 metres deep probe. Actual depth of the probes varied and depended on the encountered lithology. Table 5-2 has been updated with actual bore depths.	Y
28	Section 5.5, page 52, last paragraph – This paragraph refers to groundwater quality, however the section is a discussion on soil vapour – this paragraph must be re-written to refer to soil vapour.	Updated words have been included in version 2.0 of the GSVMP.	Y
29	Section 5.6.2, page 53, Table 5-4 – how will analytes with no control limits be assessed?	Control limits have been developed for analytes that are indicator compounds for ISG by-products.	Y

#	EPA QUESTIONS AND COMMENTS	LCK RESPONSE	Addressed in GSVMP v2.0? (Y/N)
		Analytes with no control limits will be assessed through trend analysis. If required, additional control limits can be calculated.	
30	Section 5.7, page 53, dot point 1 – define increasing trends, including how many samples constitute a trend	Updated words have been included in version 2.0 of the GSVMP.	Y
31	Section 5.7, page 53, dot point 2 – Is gas monitored at the surface? Soil vapour wells are proposed to assess 5-7mbgl.	Gas will be monitored at the surface using PIDs and LELs. The actual depth of the soil vapour wells depended on the encountered lithology, as explained further in version 2.0 of the GSVMP.	Y
32	Prior to gasifier operation and following completion of all groundwater and soil vapour monitoring wells, it is recommended that a report is provided to regulators details baseline groundwater and soil vapour conditions at the site	Appendix B of the GSVMP presents the groundwater analysis results for all sampling events undertaken to date. Appendix C presents the soil vapour monitoring data. It is not the intent of LCK to prepare a separate report on the groundwater sampling events prior to commencement of the activities. If required, such report can be prepared and submitted; however, it is not feasible to do so within the timeframe for commencement of the activities.	N

J.2 Submissions on GSVMP version 2.01

DEM-ERD Comments received: 9 August 2018

Leigh Creek Energy ISG Pre-Commercial Demonstration Plant

Document: **Groundwater and Soil Vapour Monitoring Plan**
Version: 2.01
Document Date: 1 August 2018

Note: DEM-ERD also provided questions and comments on LCK's response to queries from DEW Water Sciences and EPA.

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
DEM – ERD Questions			
4	Figure 3-6 shows the location of surveyed bores however only provides the location of abandoned bores. It is suggested that this map should present all bores including active bores as these also possibly present a pathway to surface.	This is actually figure 3-8 in version 2.02. This figure now shows an Alinta Geological bore (drillhole 2) directly between the inlet and outlet well drill pads. We need to see further discussion within the text to explain the potential migration pathways (or lack thereof) presented by the location of the geological bores that have not been mined.	Y
	Figure 3-6 (now Figure 3-7) has been updated to include the Alinta exploration bores and the LCK bores (geological and groundwater bores) within 1000m of the gasifier.	Figure 3-6 (now Figure 3-10) has been updated to include the Alinta exploration bores and the LCK bores (geological and groundwater bores) within 1000m of the gasifier. Additional words have been included in version 2.02 of the GSVMP regarding the potential migration pathways presented by these geological bores. Drill hole 2 (ETSA Bore 2 or 35484) was drilled in 1917, with recorded field coordinates (in AMG Zone 54) as E: 249845.5 and N:6625058.6. The location of this drill hole in the SARIG database is considered inaccurate, most likely due to inaccurate conversion of coordinates from the 1917 coordinate system to current system.	

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
		The drill hole is located most likely to the south of the SARIG location, outside the gasifier buffer zone (the more accurate coal depths indicate a more southerly location). It is unlikely to present a potential preferential migration pathway for ISG by-products generated in the gasifier chamber, as the Inlet Well (Playford 23) has been cased and grouted more than 100m past any potential locations of Bore 2. LCK will undertake surface gas monitoring at the SARIG location, to confirm that there is no such pathway to the surface.	
8	Please clarify whether the 100m buffer zone is both horizontal and vertical to the gasifier location (eg non-compliance if COPC above trigger values migrate 100m directly above gasifier chamber)	DEM-ERD suggest a 100m diameter sphere around the gasifier would be simpler.	Y
	The buffer zone is 100m laterally and 75m vertically. These distances are based on estimates of groundwater flow and geotechnical assessments of possible fracture propagations due to gasification process. However, it is considered that the primary direction of migration of groundwater impacts is laterally, given the considered low vertical permeability of the formations. Lateral migration is essential, as reflected in the location and distribution of the sentinel wells. If non-compliances are detected within the sentinel wells, the installation of a monitoring well e.g. 75m above the gasifier chamber could be considered.	The following definition of the buffer zone has been adopted in v2.02 of the GSVMP: The **gasifier buffer** is a sphere around the gasifier chamber, which is defined: • laterally, by a 100m radius around the gasifier chamber. This distance has been determined based on geological investigations (which confirmed the absence of significant faulting within this distance from the gasifier) and estimate of groundwater migration (i.e. 100-year time travel based on groundwater movement of 1m/year), as discussed in the EIR. • vertically, 100m above the top of the gasifier chamber. This distance is based on formation integrity testing, which determined that, for a 30 m (wide) gasifier chamber, the overall height of the combined collapsed and fractured zones would be likely to extend to a height above the coal seam in the order of 60 - 75 m. This is the maximum predicted extent of rock alteration	

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
		due to cave-in filling the chamber after gasifier decommissioning, with the overlying layers remaining intact due to filling of the void by way of bulking of the rock mass (LCK, April 2018).	
12	Page 40, under groundwater sampling it is outlined that sampling is undertaken in line with LCK's Groundwater Sampling Standard Operating SOP – suggest providing this as an appendix to this document for completeness.	This SOP is required prior to any approval for opertion of the gasifier and should be made an appendix to the GSVMP report.	Y
	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	The Groundwater Sampling SOP is attached in Appendix H of version 2.02 of the GSVMP.	
19	Page 53 under control limits, it is mentioned that there is not yet a comprehensive set of background data to undertake statistical analysis for soil vapour monitoring. How many more monitoring events are required to determine adequate background and do LCK intend to ensure background is determined prior to operation?	This doesnt appear to have been adopted. Control limits are instead NEPM HIL's and HSL's. The adopted criteria under the SEO is no sustained change in COPC's. Therefore given background COPC levels have been assessed as below detection limit, the control limits should be no sustained change to background (detection limits) COPC's.	Y
	In theory, at least six (6) sampling events would be required to undertake meaningful statistical analysis. Ideally, twelve (12) events would be welcomed. However, soil vapour sampling to date indicates that concentrations of COPCs are below the detection limit. The compliance criteria will therefore most likely be the detection limits. The revised GSVMP will include more discussions on this item	References to the NEPM HILs and HSLs have been removed from v2.02 of the GSVMP. The detection limits of the COPCs have been adopted as control limits.	
DEW Water Science Comments			
25	Section 4.5 – is the Groundwater sampling SOP to be available?	This SOP is required prior to any approval for opertion of the gasifier and should be made an appendix to the GSVMP report	Y

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	The Groundwater Sampling SOP is attached in Appendix H of version 2.02 of the GSVMP.	
EPA Comments			
6	Section 3.3, page 16 – Table 3-4 does not align with Table 3-3 with regard to the assessment of aquifer potential in Table 3-4.	Please see Table 3-4 Upper Series Overburden Aquifer Potential. Aquifer potential should be 'poor' rather than 'good' if understood correctly?	Y
	Not clear where the misalignment is.	Aquifer potential should be 'good', as average hydraulic conductivity is 0.002 cm/s, which below 0.01 but above 0.001. Scale in Table 3-3 goes from high on the left to low on the right. Similarly, the relative permeability is "semi-pervious".	
9	Section 4.2.1, page 30, paragraph 2, third sentence – Has the extent of the radius of influence of the gasifier on surrounding groundwater been modelled? If so, what distances of influence are anticipated?	Is it worth outlining that an external groundwater modelling consultant (GHD) determined that due to low permeabilities numerical hydrogeological modelling, either dual or single-phase, of the trial gasification is not useful or meaningful at this stage.	Y
	Groundwater modelling was undertaken to estimate the recovery/inflow in the Main Series Coal wells at the PCD Facility, which will be open hole above, through and below the coal. This was to provide guidance on how long these wells may take to recover to ambient water level if left undisturbed. Modelling indicated that this recovery may take ~300 days. Groundwater modelling to determine the radius of influence has not been undertaken. The radius of influence will be determined by the monitoring of pressure in the surrounding VWPs and monitoring and sampling of the gasifier operational monitoring well.	Additional explanation is included in v2.02 of the GSVMP. Groundwater modelling was undertaken to estimate the recovery/inflow in the Main Series Coal wells at the PCD Facility, which will be open hole above, through and below the coal. This was to provide guidance on how long these wells may take to recover to ambient water level if left undisturbed. Modelling indicated that this recovery may take ~300 days. An external groundwater modelling consultant (GHD) was engaged to determine whether or not there is a need for detailed numerical groundwater of the trial gasification, whether saturated flow only, unsaturated/saturated groundwater flow or dual phase liquid/gas flow. The consultant's conclusions were that:	

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
		"Given the low permeability of the material surrounding the gasification zone, including the target coal seams, groundwater and gas flow will be constrained to discrete pathways such as the gasification cavern and overlying fracture zone, as yet unidentified open fracture zones, or failures of bore casing or grout. Groundwater flow and drawdown within the surrounding and overlying coal and overburden will be negligible during the trial and post-closure period and is unlikely to be detectible outside the fracture zone immediately above the chamber. *Consequently, numerical hydrogeological modelling, either dual or single-phase, of the trial gasification is not useful or meaningful at this stage. It may be useful to construct and calibrate a simple model posttrial, based on measured and modelled fracturing, if testing of the trial gasification identifies a significant transition zone between the cavern and surrounding impermeable material. It would be appropriate to use saturated flow modelling unless the cavern was to be allowed to refill by inflow over a long time, rather than filled on completion. The latter is usually preferable to maximise on-site containment while the chamber cools."*	
10	Section 4.2.1, page 31, paragraph 3 – This paragraph reports a number of groundwater changes that are expected to occur over time. How have these changes been 'determined'? Has a groundwater model been constructed to model the changes at site? If so, this must be provided to regulators. If not, it must be justified why a groundwater model has not been undertaken.	As above, suggest expanding on why modelling is not required or feasible and that this was assessed and reported on by an external consultant.	Y
	Groundwater modelling to determine the radius of influence has not been undertaken. The radius of influence will be determined by the monitoring of pressure in the surrounding VWPs and monitoring and sampling of the gasifier operational monitoring well.	Additional explanation is included in v2.02 of the GSVMP. Groundwater modelling was undertaken to estimate the recovery/inflow in the Main Series Coal wells at the PCD Facility, which will be open hole above, through and below the coal. This was to provide guidance on how long these wells may take to recover to ambient water	

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
	A memo was provided to DEM-ERD earlier in 2018, outlining LCK's justifications why numerical groundwater modelling was not required.	level if left undisturbed. Modelling indicated that this recovery may take ~300 days. An external groundwater modelling consultant (GHD) was engaged to determine whether or not there is a need for detailed numerical groundwater modelling of the trial gasification, whether saturated flow only, unsaturated/saturated groundwater flow or dual phase liquid/gas flow. The consultant's conclusions were that: "*Given the low permeability of the material surrounding the gasification zone, including the target coal seams, groundwater and gas flow will be constrained to discrete pathways such as the gasification cavern and overlying fracture zone, as yet unidentified open fracture zones, or failures of bore casing or grout. Groundwater flow and drawdown within the surrounding and overlying coal and overburden will be negligible during the trial and post-closure period and is unlikely to be detectible outside the fracture zone immediately above the chamber.* *Consequently, numerical hydrogeological modelling, either dual or single-phase, of the trial gasification is not useful or meaningful at this stage. It may be useful to construct and calibrate a simple model posttrial, based on measured and modelled fracturing, if testing of the trial gasification identifies a significant transition zone between the cavern and surrounding impermeable material. It would be appropriate to use saturated flow modelling unless the cavern was to be allowed to refill by inflow over a long time, rather than filled on completion. The latter is usually preferable to maximise on-site containment while the chamber cools."*	
18	Section 4.5, page 40 – It is recommended that LCK's Groundwater Sampling Standard Operating Procedure (SOP) is provided as an Appendix to the GSVMP	This SOP is required prior to any approval for opertion of the gasifier and should be made an appendix to the GSVMP report.	Y

#	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEM-ERD QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	The Groundwater Sampling SOP is attached in Appendix H of version 2.02 of the GSVMP.	

DEW Water Science Response Document received: 13 August 2018

Leigh Creek Energy ISG Pre-Commercial Demonstration Plant

Document: **Groundwater and Soil Vapour Monitoring Plan**
Version: v2.01
Document Date: 1 August 2018

General Comments

- Additional comments have only been made regarding previous comments (GSVMP version 1) where required.

#	Priority Response	DEW QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEW QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
Existing Comments				
1	L	Section 2, figure 2.1, pgs. 5 and 6 – it would be useful to display the historical alignment of the Leigh Creek on figure 2.1.	This comment was made to enhance the figure to support document text. Considered a Low priority.	N
		A suitable map showing the historical alignment of Leigh Creek is still being sourced. If available, the figure will be updated.	No further response.	
2	-	Section 2.2, pg. 7 – 1st sentence after table 2.1 – If all of the monitoring wells for the PCD have been drilled and constructed – have the roads been constructed?	DEW comment was not addressed in GSVMP version 2, but comment is considered addressed.	Y
		All monitoring wells have been drilled and constructed. Unsealed access tracks to the drilling locations have been created. No permanent roads have been constructed.	No further response.	
13	H	Section 3.9, pg. 26, 2nd last paragraph – the text refers the 'likely' aquifer that the neighbouring wells are extracting groundwater from. Why has this not been confirmed?	This is now section 3.10. A potentiometric surface has not been presented for the shallow water table groundwater system for the region surrounding the Telford Basin. Therefore, there is some	Y

#	Priority Response	DEW QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	DEW QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
		A potentiometric surface for the shallow groundwater system has not been provided – therefore it is not known / confirmed that it is all flowing towards the Telford Basin.	question as to the validity of the statement 'Such groundwater will be moving towards the Telford Basin…'. LCK to consider removing or re-wording the statement.	
		As these wells are located outside the Telford Basin and several kilometres from the PCD facility, they have not been incorporated in LCK's groundwater monitoring program.	LCK has removed the statement from v2.02 of the GSVMP.	
15	L	The 2nd paragraph refers to the sampling that will be undertaken. Results of all sampling undertaken prior to the commencement of activities is to be reported and provided to the regulators.	The intent of the comment was not for LCK to generate an additional report but rather to provide the data (in electronic format) to the regulators.	Y
		It is not the intent of LCK to prepare a separate report on the groundwater sampling events prior to commencement of the activities. If required, such report can be prepared and submitted; however, it is not feasible to do so within the timeframe for commencement of the activities.	Noted. The electronic format of providing data to the regulators will be discussed and agreed upon shortly.	
25	-	Section 4.5 – is the Groundwater sampling SOP to be available?	DEW comment was not addressed in GSVMP version 2, but comment is considered addressed.	Y
		Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	The Groundwater Sampling SOP is attached in Appendix H of version 2.02 of the GSVMP.	

#	Priority Response	DEW QUESTIONS AND COMMENTS on GSVMP 2.01	LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
New Comments				
31	H	Section 1.5. pg 4 and section 4.1, pg 41 – why is there a difference in the lateral and vertical dimensions of the gasifier boundary? Footnote (1) to table 4.1, which is an extract from the ISG Demonstration Plant SEO, states that the buffer zone is a 100m radius around the gasifier.	The following definition of the buffer zone has been adopted in v2.02 of the GSVMP: The **gasifier buffer** is a sphere around the gasifier chamber, which is defined: • laterally, by a 100m radius around the gasifier chamber. This distance has been determined based on geological investigations (which confirmed the absence of significant faulting within this distance from the gasifier) and estimate of groundwater migration (i.e. 100-year time travel based on groundwater movement of 1m/year), as discussed in the EIR. • vertically, 100m above the top of the gasifier chamber. This distance is based on formation integrity testing, which determined that, for a 30 m (wide) gasifier chamber, the overall height of the combined collapsed and fractured zones would be likely to extend to a height above the coal seam in the order of 60 - 75 m. This is the maximum predicted extent of rock alteration due to cave-in filling the chamber after gasifier decommissioning, with the overlying layers remaining intact due to filling of the void by way of bulking of the rock mass (LCK, April 2018).	Y
32	M	Table 3.1, pgs 11-13 – not all of the water wells are in the State groundwater database. Entries are created in the groundwater database on submission of the well completion reports to the department. Validation of the water wells is required.	TO LCK's knowledge, there are no other water wells within the immediate vicinity of the PCD facility. No additional wells were identified during community consultation sessions. LCK can undertake a census of water wells if the environmental objectives regarding groundwater are compromised/not achieved.	Y

#	Priority Response	DEW QUESTIONS AND COMMENTS on GSVMP 2.01	LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
33	L	Figure 3.1, pg 14 – What is the yellow line on the map? A symbol needs to be added to the map legend.	Yellow line is the outline of the Telford Basin. Symbol has been added to the figure in v2.02 of the GSVMP.	Y
34	M	Section 3.3.1, pg 20, 3rd paragraph – Reference to DEWNR needs to be updated to the new department name - Department for Environment and Water (DEW).	Updated references have been included in v2.02 of the GSVMP.	Y
35	H	Section 3.6.2, pg 30, 2nd dot point – the range of salinities presented in the dot point differ to the range of salinities in the following table (3.9). Clarification is required.	The range in the dot point has been corrected based on the results in the table.	Y
36	M	Section 3.6.3, pg 33, 2nd dot point – The range of salinities presented in the dot point (3940-41900 mg/L) are significantly different to those presented in the previous version of the GSVMP (6060-75600 mg/L). The range has extended at the lower end of the scale but why has it been reduced at the upper end of the scale?	A mistake was made in v1.0 of the GSVMP, whereby the range of 6,060 – 75,600 mg/L was in fact the range for Electrical Conductivity (i.e. 6,060 to 75,600 µS/cm). The values in v2.0 and v2.02 of the GSVMP are correct.	Y
37	L	Section 3.8, pg 34 and Figure 3.10, pg 35 – To note that not all of the Alinta geological bores are located in the former mine pits but are located outside of the 100m gasifier buffer.	Updated references have been included in v2.02 of the GSVMP.	Y
38	L	Appendix 9 – NEPM item – definition text is displayed on the next table row. LOR and PCD are abbreviations used in the report but are not in the table.	Table 9.1 has been updated in v2.92 of the GSVMP.	Y

SA EPA Comments received: 13 August 2018

Leigh Creek Energy ISG Pre-Commercial Demonstration Plant

Document: **Groundwater and Soil Vapour Monitoring Plan**
Version: v2.10
Document Date: 1 August 2018

#	EPA QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	EPA QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
1	General – It is not clear whether the operation needs a Drainage and Discharge permit or Water Affecting Activity permit under the Natural Resources Management Act 2004	CK could state in the GSVMP that the WAA permit has been applied for.	Y
	WAA permit applied for 23/7/18	Updated words have been included in v2.02 of the GSVMP.	
6	Section 3.3, page 16 – Table 3-4 does not align with Table 3-3 with regard to the assessment of aquifer potential in Table 3-4.	Table 3-4 Upper Series Overburden should be Pervious to Semi-Pervious (based on Table 3-3).	Y
	Not clear where the misalignment is.	Aquifer potential should be 'good', as average hydraulic conductivity is 0.002 cm/s, which below 0.01 but above 0.001. Scale in Table 3-3 goes from high on the left to low on the right. Similarly, the relative permeability is "semi-pervious".	
18	Section 4.5, page 40 – It is recommended that LCK's Groundwater Sampling Standard Operating Procedure (SOP) is provided as an Appendix to the GSVMP	EPA agree with DEM comments that this needs finalisation prior to approving the GSVMP and should be made an Appendix to this document. It is EPA position that this SOP should not be too difficult to finalise, and that it is important that the groundwater monitoring methodology (SOP) is agreed between LCK and government.	Y

#	EPA QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	EPA QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
	Groundwater Sampling SOP is being finalised and needs to go through internal and external review. It will be provided separate from the GSVMP.	Groundwater Sampling SOP is attached in Appendix H of version 2.02 of the GSVMP.	
21	Section 4.6.2, page 42, dot point 2 – Justify that three years after shutdown of PCD gasifier is an appropriate compliance assessment timeframe, in particular in the context of a low groundwater flow environment and the fact that impacts may not yet be observed.	EPA still feels as though its point is still valid, and this has not yet been justified.	Y
	Updated words have been included in version 2.0 of the GSVMP, to reflect that the monitoring requirements will be reviewed and discussed with the relevant SA Government Agencies prior to any amendments.	It is not the intent of LCK to stop monitoring after three years. However, it is LCK's intent to review the monitoring program, based on the existing and/or future operations at the PCD facility. If LCK has ceased operations at the PCD facility, it is envisaged that a closure plan will be implemented in accordance with relevant legislation. This closure plan will address ongoing groundwater monitoring requirements, including locations, frequency, parameters and closure completion criteria. If operations at the PCD facility are ongoing (e.g. as part of commercial operations), groundwater monitoring will continue, as specified in the GSVMP for the commercial operations	
29	Section 5.6.2, page 53, Table 5-4 – how will analytes with no control limits be assessed?	Recommend that LCK provide these comments in the text of the GSVMP	Y
	Control limits have been developed for analytes that are indicator compounds for ISG by-products. Analytes with no control limits will be assessed through trend analysis. If required, additional control limits can be calculated.	Updated words have been included in v2.02 of the GSVMP. Control limits for soil vapour COPCs are the detection limit.	
30	Section 5.7, page 53, dot point 1 – define increasing trends, including how many samples constitute a trend.	The EPA can't see where this has been addressed in version 2.0. The text relating to EPA comment has not been changed/added to	Y

#	EPA QUESTIONS AND COMMENTS on GSVMP 1.0 LCKE RESPONSE in GSVMP v2.01	EPA QUESTIONS AND COMMENTS on GSVMP 2.01 LCKE RESPONSE in GSVMP v2.02	Addressed in GSVMP v2.02? (Y/N)
	Updated words have been included in version 2.0 of the GSVMP.	Updated words (similar to the word for the groundwater monitoring) have been included in version 2.0 of the GSVMP.	