Appendix E

Water management plan and sea level rise assessment

Barker Inlet Power Station

Stormwater Management Plan

Coffey

September 2017

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Document History and Status

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1 Introduction

1.1 Background

In 2010 AGL received development approval for the development of the Torrens Island Energy Park, located to the north east of the existing Torrens Island Power Station (TIPS). The then proposed development comprised of gas turbines and a LNG facility.

Tonkin Consulting previously provided advice regarding water management for the proposed Torrens Island Energy Park (Ref: 20100228LA2/DWS/DWS, August 2010) as part of the development application. The report made recommendations for stormwater and wastewater management including water quality.

These facilities were never built and now AGL are looking at options for the construction of a new power station. The proposed development is known as the Barker Inlet Power Station (BIPS) and involves the expansion of the existing operations to replace the TIPS A Station which will be mothballed in 2019. The BIPS will use reciprocating engines, not gas turbines as previously proposed. The LNG facility is no longer required.

AGL are in the process of evaluating two options for the BIPS expansion (refer Figure 1-) and require a water management report to support the development approval application.

This report describes the overall water management strategy proposed for the site. The management strategy aims to minimise the volume of stormwater discharged and addresses environmental concerns regarding stormwater pollution, sea level rise flooding and wastewater generation from the site. It presents an assessment of the water requirements, wastewater production, stormwater and flood management at the site. Both the construction and operation aspects have been considered.

Site layouts are still being developed. The following water management plan sets out general principles that should be applied to management of surface water from the site.

1.2 Existing Site Conditions and Environment

The development site is located on land that has been cleared and is mostly undeveloped apart from some roads and carpark areas. The terrain of the site is generally flat with no evidence of surface flow paths.

The underlying surface geology consists of the St Kilda Formation which can be described as light-grey shelly stranded beach ridge deposits and shelly silts and sands overlain in places by modern intertidal and swamp deposits at depth. Regional groundwater is shown to be between 1.5 to 2.5m below ground surface based on the soil bore logs and monitoring wells on the site (Coffey Environments, 2009).

Rainfall data from the Bureau of Meteorology Station No 023018 shows that Torrens Island receives an average rainfall of 430mm per annum. The majority of this rainfall occurs between late autumn and the middle of spring (May to October). Based on the underlying geology described above, it is likely that most of this rainfall infiltrates the soil profile to either dissipate through evaporation/evapotranspiration or percolates to the underlying groundwater table when the profile has an excess of moisture.

The existing reserves, roads and carpark areas drain to grated inlet pits which connect to underground stormwater drains known as DRAIN1 and DRAIN2. Both drains outfall to the Angas Inlet. Stormwater runoff from the existing TIPS catchment drains to an oil/water separator before connecting into DRAIN2.

1.3 EPA Requirements

Torrens Island is surrounded by the Barker Inlet and Port River coastal waterways. The Adelaide Coastal Waters Study (2007) has shown that these waterways and Adelaide's coastal environment overall has been significantly degraded by the cumulative discharge of treated wastewater, stormwater and industrial discharges, in particular the loss of over 5000ha of seagrass. Suspended solids and nutrients have been identified as being the main causes of this degradation. The study recommends an overall reduction of 50% for suspended solids and 75% for nitrogen (based on 2003 levels), to start to improve Adelaide's coastal waters.

To reduce the level of pollution entering the coastal waters, the EPA aims to ensure that new developments do not increase stormwater flows above pre-development levels and at the same time minimise the level of pollutants in the stormwater that is discharged. The EPA provided stormwater quality improvement objectives in 2010 as shown in Table 1-1.

Table 1-1 EPA Stormwater Quality Performance Objectives (2010)

Pollutant	2010 best practice performance objectives
Suspended solids (SS)	80% retention of the typical urban annual load with no treatment
Total phosphorus (TP)	50% retention of the typical urban annual load with no treatment
Total nitrogen (TN)	50% retention of the typical urban annual load with no treatment
Litter	70% retention of typical urban annual load with no treatment
Flows	Maintain discharges for the 1.5 ARI at pre-development levels

These targets have been reviewed with the most recent South Australian guidelines provided in Table 1-2 (DEWNR, 2013).

Table 1-2 DEWNR Stormwater Performance Targets

Pollutant	Current best practice performance targets
Total suspended solids (SS)	80% reduction of the untreated urban annual load
Total phosphorus (TP)	60% reduction of the untreated urban annual load
Total nitrogen (TN)	45% reduction of the untreated urban annual load
Litter	90% reduction of the untreated urban annual load
Flows	Maintain discharges to within the capacity of the existing receiving stormwater infrastructure

These reviewed targets have been used for the development of strategies for this plan.

1.4 Legislative Requirements

The following documents are relevant for water management at the proposed BIPS site:

- Environment Protection Act 1993
- Stormwater pollution prevention - Code of Practice for the building and construction industry (EPA, 1999)
- The Environmental Protection (Water Quality) Policy (2015)
- EPA Guidelines Fire Protection services pipework systems – wastewater removal (2003)
- EPA Guidelines Bunding and spill management (2016)
- Land Not Within a Council Area (Metropolitan) Development Plan
- Coast Protection Board Policy Document (2016)

The Environmental Protection (Water Quality) Policy (2015) states that

> *‘A person must not discharge a class 1 pollutant into any waters or onto land in a place from which it is reasonably likely to enter any waters (including by processes such as seepage or infiltration or carriage by wind, rain, sea spray or stormwater or by the rising of the water table).’*

Class 1 pollutants that are likely to come off the site include oils and grease which are possible contaminants on the roadways and hardstand areas.

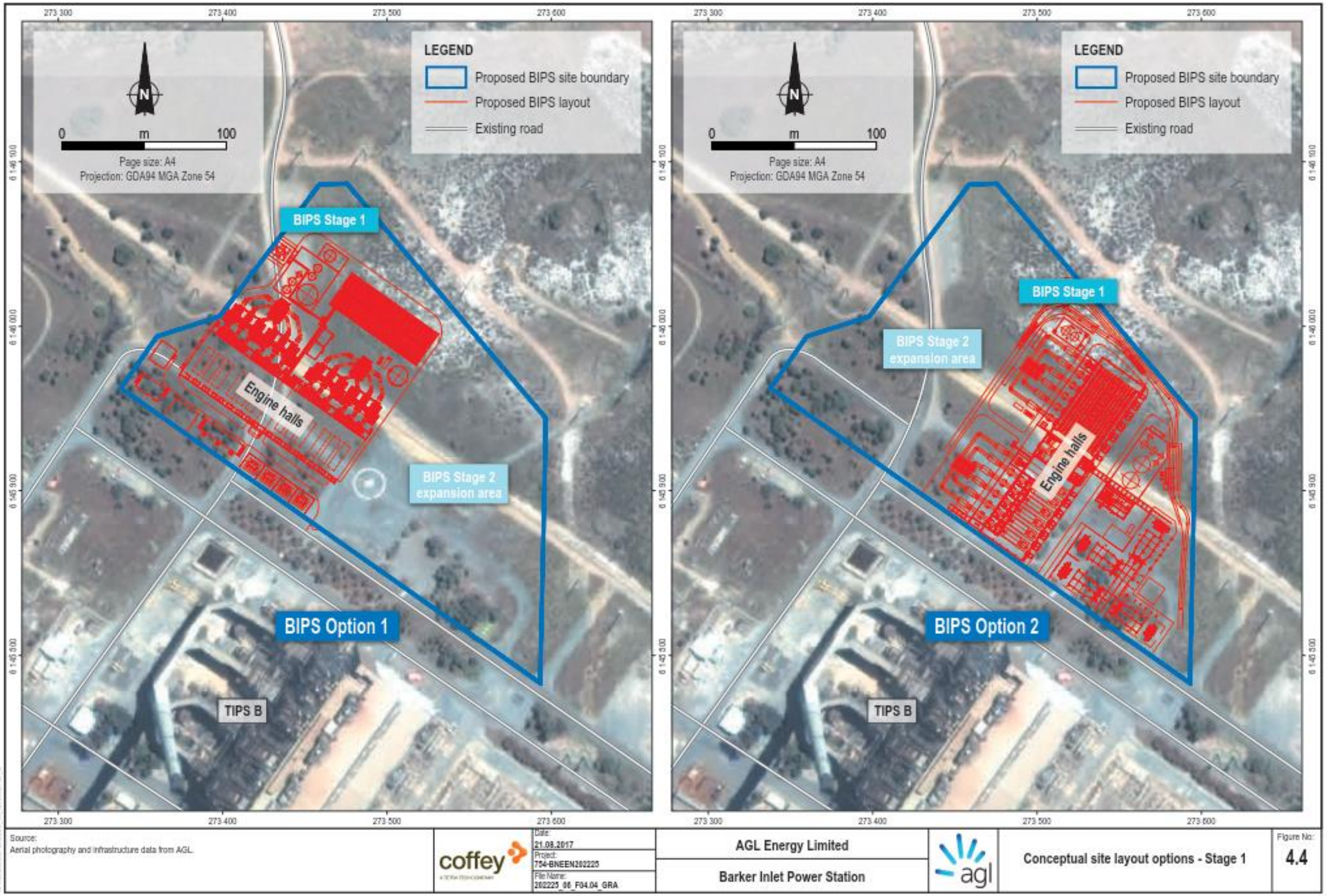

Figure 1-1 Concept site layout options Stage 1 (Coffey, 2017)

2 Proposed Development and Water Operations

2.1 Proposed Infrastructure

AGL proposes to develop up to 420 MW of additional peaking generation over a two stage development. Each stage will consist of 12 reciprocating gas engines capable of 210MW. The new configuration would also have the option of diesel firing should market conditions be more suitable or if emergency conditions arise.

Two options for development of the site are currently being considered by AGL. While each option involves a different layout, the components of each proposal are similar with similar overall site areas. As a result, it is envisaged that the general principles to be applied for management of runoff for each option will also be similar. Option 1, was selected for more detailed analysis as a part of this investigation, as a detailed breakdown of areas occupied by each site component were available. These are provided in Table 2-1.

Table 2-1 BIPS Option 1 Site Elements

Site Element	Approximate Area (m^2)
Power house (enclosed facility)	4,300
Tank yard and unloading area	900
Reagent tank yard	200
Radiator area (assumed to be gravel)	1,500
Asphalt Roads and hardstand areas (assumed to include SCR units, unloading zone and other supporting infrastructure)	9,100
Exhaust gas silencer area (assumed to be gravel)	2,500
Total	**18,500**

Note: these areas are approximate at this stage and will be subject to final design.

The tank yards and unloading area will include:

- Used/service lube oil tank
- Sludge tank
- Clean lube oil tank
- Light Fuel Oil (LFO) storage tank
- SCR reagent tank
- LFO unloading pump unit
- Lube Oil unloading pump unit
- Sludge transfer pump

Other supporting infrastructure within the site includes:

- Exhaust gas silencer
- Oil/water separators
- Water treatment container
- Treated water tank
- Fire/raw water tank
- Fire pump station

- Step-up transformers

2.2 Operational Water Generation and Requirements

During operation of the plant, water would be required at the plant for uses as follows:

- Maintenance of equipment - It is anticipated that a small amount of water would be required for maintenance and cleaning of equipment. This water is likely to be demineralised water sourced from the power station.
- Staff uses - Water would be required for staff facilities including hand washing, kitchen and toilet flushing. However, these uses are expected to be small as the plant won't usually be staffed. Water for staff uses will be sourced from a potable supply such as the two main town water storage tanks.
- Firefighting - Water for firefighting is likely to be sourced from the two main town water storage tanks on the adjacent TIPS site. The tanks each have a capacity of 2250kL and are supplied from the SA Water mains system.
- Landscaping - Any landscaping will only use native plants and therefore ongoing irrigation is unlikely to be required.

It is anticipated that wastewater from the proposed facility could be generated by the following activities:

- Wastewater generated by staff working at the BIPS.
- Washdown of equipment. As the new plant is going to be enclosed and run on gas, washdown will be infrequent and limited to specific maintenance activities. This is not covered further.
- Stormwater runoff from roof, roads and hardstand areas (covered in Section 4).
- Firefighting associated with natural gas fires and deluge systems for buildings and equipment throughout the site. The water will be of poor quality, potentially containing silt, oils, grease and hydrocarbons.
- Accidental spills of liquid wastes from storage tanks or trucks.

3 Wastewater Management

3.1 Staff wastewater

The BIPS staff wastewater will be directed to the existing TIPS sewerage system. Any personnel working at the BIPS will come from the existing plant and therefore there isn't going to be an increase in wastewater overall.

3.2 Spills within a bunded area

The BIPS site will include liquid storage tank yards and unloading zones where there is potential for spills or leakages to occur. There may also be some washdown activities within the engine hall. These areas will need to be bunded in accordance with the Bunding and Spill Management Guidelines (EPA, 2016) to prevent contamination of receiving waterways.

A spill management plan would be developed and implemented to minimise the likelihood of spills occurring and their associated impact.

Any spill within these areas will be directed to and treated with an onsite class 1 separator achieving a concentration of less than 5mg/L of oil under standard test conditions and having an emergency shutoff and alarm system. The separator is not to be connected to the stormwater or sewer drainage system. Bund drain valves are not to be installed and pump controls should be located outside the bunded area.

Treated wastewater could possibly be pumped to the bio-retention basin (refer Section 4.2) provided testing shows that it meets the EPA water quality criteria. Otherwise it will need to be removed and treated either off site or at the existing TIPS process water system.

3.3 Spills outside of a bunded area

Although low risk, it is possible that liquid wastes could be produced through accidental spills outside of a bunded area. These could be from trucks transporting liquid. Should any spills occur outside of the bunded area, the liquid would be directed to the stormwater system.

A spill control system should be installed downstream of the gross pollutant trap (GPT) (refer Section 4.2). A float actuated shut off valve would prevent hydrocarbon spills continuing downstream to the bio-retention basin (refer Section 4.2) and Angas Inlet. The spilled liquid would be diverted into a storage chamber for removal and treatment offsite. The size of the chamber will be dependent on the spill management procedure and the response time of a vacuum truck to remove the liquid waste.

The outlet to the Angas Inlet is currently protected by a containment boom. Whilst it is recommended that this remain, it should be used as a last resort only and every effort should be made to ensure that spills are contained prior to reaching the outlet.

3.4 Fire Water

Firewater would be managed in accordance with the EPA Guidelines for fire protection services pipework systems —wastewater removal (2003).

Fire water that falls within bunded areas will be managed in accordance with Section 3.2.

Fire water that drains to the stormwater system will continue through to the bio-retention basin. Depending on the quality of the fire water, the float actuated shut off valve within the oil-spill control system (see Section 3.3) may be triggered, thereby filling up the spill storage chamber. It is unlikely that this chamber will be big enough to contain all of the firewater and therefore any overflow would be directed to the bio-retention basin. A shut-off valve on the outlet of the bio-retention basin would prevent the fire water from progressing down to the Angas Inlet.

The water captured in the bio-retention basin should be assessed and disposed of off-site or at the existing TIPS process water system.

4 Stormwater Management Strategy

The following sections outline the methods for managing stormwater such that the receiving waterways are protected from potential site contaminants, sediments and an increase in runoff volumes. Runoff from areas of the site will be managed to meet current best practice water quality targets as defined in Section 1.3.

4.1 Catchment Types

4.1.1 Roads and hardstand

Stormwater from roadways and hardstand areas will be directed, using kerb and gutter or concrete spoon drains to the underground drain via inlet pits. The drainage system would grade towards the stormwater treatment train as shown on the Stormwater Management Plan in Appendix A and discussed in Section 4.2 below. The drain will have a flat grade to reduce the invert of the downstream treatment system.

Some of the BIPS areas will first be directed to an oil/water separator before discharge to the stormwater system.

The runoff could contain silt, suspended solids and attached pollutants, hydrocarbons and heavy metals which would mainly be sourced from vehicles and machinery traversing the site.

4.1.2 Gravel

It is anticipated that limited runoff will be generated from the gravel areas as they will act in a similar manner to the existing site conditions. In the areas nominated to be gravel, it is proposed that a single sized gravel layer be used and underlain with a sandy sub-grade material. Rainfall falling on the gravel surface will retain water onsite to infiltrate rather than quickly running off. This will reduce erosion and the generation of suspended solids when runoff does occur. Runoff that does occur will be collected by the stormwater drainage system and directed to the stormwater treatment train.

4.1.3 Roofs

Runoff from roofed buildings is considered ‘clean’ and can be directed straight to the bio-retention basin. As the site is typically unmanned, and other operational water uses identified in Section 2 are small, it is unlikely that there would be sufficient demand for roof water reuse to warrant installation of rainwater tanks.

4.1.4 Bunded Areas

Rainfall on bunded areas will be contained by the bund and will evaporate over short time frames. When an undesirable build-up of stormwater occurs the water will be directed to the onsite Class 1 separator (see Section 3.2). The bunded area is not to be connected to the stormwater or sewer drainage system. Bund drain valves are not to be installed and pump controls should be located outside the bunded area.

Treated runoff could possibly be pumped to the bio-retention basin (see Section 4.2) provided testing shows that it meets the EPA water quality criteria. Otherwise it will need to be removed and treated off site.

Where possible the bunded areas should be roofed to minimise the volume of contaminated runoff.

4.2 Stormwater Treatment Train

The underground drainage system will be directed to the stormwater treatment train which is as follows:

- Gross pollutant trap (GPT) to capture trash, course and fine sediments
- Spill control system to capture hydrocarbon-based pollutants from accidental spills
- A bio-retention basin to allow settlement and nutrient uptake of TP, TN and any remaining SS

The bio-retention basin will be designed to reduce direct stormwater discharges to the Angas Inlet. The water from the basin will dissipate through evaporation and infiltration thereby efficiently removing suspended solids and attached pollutants and minimising the volume of stormwater that is discharged directly to the waterway by up to 50 to 98 percent (depending on the infiltration rate). Any outflows from the basin will be controlled by a valve and will be connected to an existing drain located close to the site of the basin.

The Contamination Assessment (Coffey, 2017) for the site has demonstrated that the underlying soil profile in the vicinity of the proposed bio-retention basin is suitable for stormwater infiltration. The soil profile generally consists of a fine to medium grained sand with no evidence of contamination. Groundwater in the vicinity of the proposed basin is at a level of approximately 1.4mAHD (approximately 2 m below surface level). The basin will need to be shallow to avoid direct interaction with the groundwater such that some infiltration and nutrient uptake is still achieved.

4.3 MUSIC Modelling

Water quality modelling was carried out using the MUSIC (Model for Urban Stormwater Improvement Conceptualisation). By simulating the performance of water quality improvement measures, MUSIC determines if proposed systems can meet specified water quality objectives.

The model was created using the following parameters:

- 81 years of daily rainfall data.
- infiltration values that are consistent with the characteristics of the underlying aquifer located approximately 2m below the existing site surface. The Contamination Assessment report (Coffey, 2017) indicates that the groundwater has a seepage velocity of 0.72 – 7.4 m/yr (0.08 – 0.84 mm/hr).
- Estimated catchment areas calculated from the concept design for Option 1 (refer Table 4-1).
- 12% impervious area from the existing site.
- MUSIC model default pollution loadings for each catchment type (e.g mixed or industrial).

Table 4-1 Stormwater Catchment Areas

Catchment Type	Area (m^2)	Receiving Nodes
Bunded areas for tank storage and unloading zone	1,300	Not part of the stormwater drainage system. Runoff managed in accordance with Section 3.2
Roads and hardstand	8,900	Oil and grit separator, GPT and bio-retention basin
Roofs	4,300	Bio-retention basin
Gravel	4000	Infiltration with any runoff directed to the oil and grit separator, GPT and bio-retention basin
Total	18,500	

Note: these areas are approximate at this stage and will be subject to final design.

4.3.1 Outcomes

MUSIC has been used to simulate water quality treatment devices suitable for implementation within the proposed development.

Runoff from the undeveloped site has been estimated at around 1000m^3/year. Runoff from the proposed development is provided in Table 4-2.

Table 4-2 Stormwater Runoff Characteristics

Catchment Type	Runoff (m^3/yr)	Runoff Water Quality
Roads and Hardstand	3,000	Typically contaminated with suspended solids, hydrocarbon residues, heavy metals and other contaminants associated with suspended solids brought in by vehicles, dust and through erosion of the finished surface.
Roofs	1,500	Water considered clean.
Gravel	160	Gravel areas will be located in non-trafficable areas and would generate low runoff volumes with any runoff produced having low levels of suspended solids.
Total	4,660	

A preliminary bio-retention basin was sized and modelled in MUSIC. The preliminary basin parameters are:

Surface area	730m^2
Extended detention depth	1m
Batter slopes	1V:5H
Filter area	290m^2
Depth of infiltration media	0.5m
Exfiltration rate	0.46 mm/hr

The proposed sediment/bio-retention basin would reduce the runoff that is discharged to the marine environment to a level approaching the predevelopment runoff estimates (approximately 80% assuming 0.46 mm/hr - the average groundwater seepage velocity).

The MUSIC model was used to predict the reductions in pollutants that are discharged through the outfall over the modelling period. The actual results that are achieved will depend on the interaction between the bio-filtration basin and the underlying groundwater table.

A sensitivity analysis of the bio-retention basin’s performance has been determined based on groundwater seepage velocities of 0.72 – 7.4 m/year as documented in the 2017 Contamination Assessment. Use of seepage velocities through the underlying aquifer as an indicator of the likely infiltration rates from the basin is a conservative approach, with the resulting values of infiltration being within the range normally used for such devices in clay soils. However, the likely range of pollutant reductions, based on the range of values considered have been presented in Table 4-3.

Table 4-3 Treatment train pollution reduction estimates

Infiltration Rate (mm/hr)	Volume (% Reduction)	TSS (% Reduction)	TP (% Reduction)	TN (% Reduction)
0.08 (lower bound)	33	93	83	63
0.46 (average)	80	98	95	88
0.84 (upper bound)	93	99	98	96

The results show that the stormwater quality performance objectives identified in Table 1-2 are exceeded, even if a lower bound value for infiltration is adopted. The outflow volume for the lower bound infiltration rate of 0.08 mm/hr exceeds predevelopment volumes. However, given that the discharge is direct to the sea, the increased flows (if they do in fact occur given the conservative value of infiltration) are unlikely to affect drainage system performance outside the site.

The provision of a gross pollutant trap will ensure that the discharge requirements for gross pollutants are met.

4.4 Storm and Sea Level Rise Protection

The Development Plan - Land Not Within a Council Area (Metropolitan) (2016) stipulates that:

- all new developments must allow for sea level rise due to natural subsidence and predicted climate change during the first 100 years of the development.
- The storm tide, stormwater and erosion protection requirements need to be based on an anticipated rate of sea level rise due to global warming of 0.3 metres between 1991 and 2050. Development should also be capable of being protected against a further sea level rise, and associated erosion, of 0.7 metres between 2050 and 2100.
- the standard sea-flood risk level for a development site is defined as the 100-year average return interval extreme sea level (tide, stormwater and associated wave effects combined), plus an allowance for land subsidence for 50 years at that site.

The requirements set out in the Development Plan are consistent with those contained in the current Coast Protection Board Policy, which sets out requirements for protection of coastal development from the effects of high tide and sea level rise.

For the purpose of this assessment we have provided levels for a 100-year tide event but further analysis would be required if the operator considers a higher standard of flood protection is warranted.

An assessment of the impacts of flooding due to extreme tide and sea level rise was carried out for the City of Port Adelaide Enfield in 2005, as part of the Port Adelaide Seawater and Stormwater Flooding Study (Tonkin, 2005). This investigation contained an assessment of the 100 year ARI tide level as well as rates of land subsidence along the Le Fevre Peninsula (adjacent to Torrens Island) and elsewhere. This investigation provided maps of potential tidal inundation for a 100 year ARI event, in combination with various sea level rise and land subsidence scenarios.

Subsequent to the above investigation, the City of Port Adelaide Enfield commissioned a further investigation, the Port Adelaide River Seawall Study (Tonkin, 2013), that examined the requirements for construction of sea defences to protect against the effects of high tide and sea level rise along the Le Fevre Peninsula and Gillman. While Torrens Island lies outside the area proposed to be protected by these defences, data contained within the investigation as to the required height of sea walls (or minimum finished floor levels) for the Inner Harbour are relevant, to Torrens Island, which lies immediately adjacent to this area.

Table 2.1 (extract from the 2013 investigation) is provided below, which sets out the required levels.

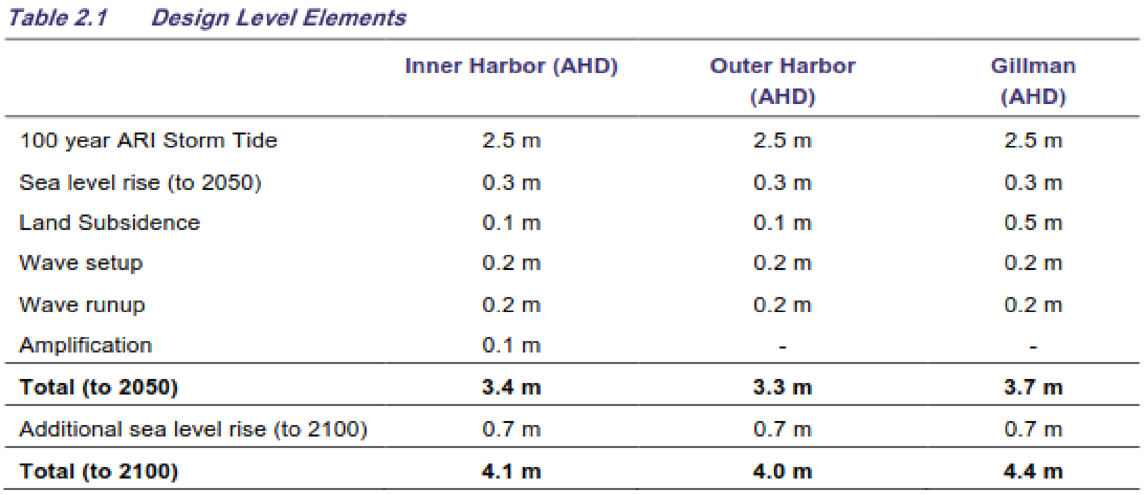

Table 2.1 Design Level Elements

	Inner Harbor (AHD)	Outer Harbor (AHD)	Gillman (AHD)
100 year ARI Storm Tide	2.5 m	2.5 m	2.5 m
Sea level rise (to 2050)	0.3 m	0.3 m	0.3 m
Land Subsidence	0.1 m	0.1 m	0.5 m
Wave setup	0.2 m	0.2 m	0.2 m
Wave runup	0.2 m	0.2 m	0.2 m
Amplification	0.1 m	-	-
Total (to 2050)	**3.4 m**	**3.3 m**	**3.7 m**
Additional sea level rise (to 2100)	0.7 m	0.7 m	0.7 m
Total (to 2100)	**4.1 m**	**4.0 m**	**4.4 m**

(Extracted from Port Adelaide River Seawall Study, Tonkin, 2013)

The general area of the proposed development lies at a level of between approximately 2.8 and 3.0 mAHD, which is below the levels provided above.

Protection of the BIPS from the effects of high tide could occur in one of the following ways to meet the requirements of the Development Plan and current Coast Protection Board Policies:

- The plant is constructed with a minimum floor level of 4.1 mAHD to provide protection from flooding in a 100 year ARI tide event with 1 m sea level rise and land subsidence.
- The plant is constructed with a minimum floor level is 3.4 mAHD to provide protection from a 100 year ARI tide event with 300 mm sea level rise and land subsidence. If this option is selected, then the development must allow for the practical establishment of protection measures against a further sea level rise of 0.7 metres of sea level rise and land subsidence; i.e. the development would need to be able to accommodate the construction of a sea flood protection levee or wall to a level of 4.1 mAHD around the development.
- A sea flood protection levee or sea wall is constructed to a level 3.4 mAHD to provide flooding protection for a 100 year ARI tide and 300 mm sea level rise. The level would need to be designed to be capable of being raised to accommodate for a further sea level rise of 0.7 metres.

It is understood that the design life of the BIPS is 25 years, meaning an end of life aligning with the period 2045 to 2050. It would therefore seem reasonable to adopt an approach aligning with either the second or third dot point above, in which the plant is either set at a level of 3.4 mAHD or protected by banking to a level of 3.4 mAHD, with provision in either scenario to raise levees further if an extension of the plant life is warranted.

If an embankment is constructed, a non-return valve will need to be installed on the outlet to the Angas Inlet so that tide levels don't back up through the storm water system thereby flooding the development. Vehicular access over the embankment would also need to be considered.

5 Construction Period Water Management

5.1 Stormwater Runoff

During the construction period, 2 ha of land would be disturbed in order to construct the facilities, including access roads and the laydown area for construction. The construction site will be managed to ensure that stormwater runoff containing unacceptably high levels of suspended solids will be prevented from entering the marine environment.

A Soil Erosion and Drainage Management Plan (SEDMP) in accordance with the EPA's Code of Practice for the Building and Construction Industry shall be prepared for the site construction period. The plan will include details of how all the stormwater runoff from the site will be contained. Vehicles and equipment leaving the site will need to pass through control points where excess silt material will be removed using shaker bars and wash down facilities, where deemed necessary. It is not intended to transport excavated material from the site unless specifically required for the management of contaminated material. Any contaminated materials will be disposed of in accordance with any guidelines applicable at the time.

Runoff from the site will be directed to temporary holding basins or the bio-retention basin. If significant volumes of runoff are generated it will only be discharged if the water quality meets the EPA requirement for discharge to the marine environment. The works will be suitably staged so that the designed drainage systems are in place to progressively replace the temporary works. Additional management measures, such as hay bales and silt fences, will be used at appropriate locations to reduce the transport of silt and suspended solids.

During the construction period, water may be required for dust suppression. This could be sourced from the temporary holding basins, if available or from external sources.

Disturbed areas are to be re-vegetated upon completion of the construction works.

5.2 Dredging and Groundwater Dewatering Activities

Dredging & dewatering are activities that require a licence under the Environmental Protection Act 1993. There are no proposed plans to undertake dredging within the vicinity of the site for the construction of the above works. Groundwater dewatering will be required for the excavation of footings and foundations on the site and a licence will be sought in accordance with the Act. Water that is defined as clean can only be released from the site following an analysis of the water and an assessment of the likely impact if this water is released.

Initial groundwater testing results indicate that the samples from all eight of the wells tested were within the upper criteria for fresh aquatic ecosystems as listed in the SA EPA Environment Protection (Water Quality) Policy criteria for assessing underground water. Further groundwater quality testing will be carried out during the design phase to confirm the results and assess if there would be any impacts if the water was released to the marine environment. During the dewatering process, water would be filtered through hay bales and then directed to a sedimentation holding basin (possibly the same basin that is to be used for stormwater drainage as tests shows the groundwater is found to be reasonably fresh, refer to Draft Screening Risk Assessment – Phase 2 Environmental Site Assessment – Proposed Torrens Island Energy Park). The water would then evaporate and infiltrate back into the groundwater table. Assuming the groundwater is suitably fresh it could also be used for dust suppression. If the rate of dewatering is likely to exceed the storage capacity and infiltration rate, then the water could be released to the marine environment following testing and receiving appropriate approvals from the EPA.

6 Summary

The mitigation measures recommended in this report aim to minimise the volume of stormwater discharged to the Angas Inlet and addresses environmental concerns regarding stormwater pollution and wastewater generation from the site. The mitigation measures have been summarised below.

Spills and site management

- A spill management plan is to be developed.
- Wastewater collected from bunded areas to be placed through a class 1 separator achieving a concentration of less than 5mg/L of oil and disposed of either at the bio-retention basin if acceptable water quality is achieved or the existing TIPS process water system.
- Bunded areas to be separated from the stormwater system.
- A spill control system with a float actuated shut off valve is installed downstream of the GPT to manage spills outside of a bunded area.
- Firewater is directed to the bio-retention basin. A shut off valve on the basin outlet will prevent discharge to the Angas Inlet.

Stormwater runoff

- No direct drainage discharge from the site to the marine environment.
- Water from plant to be directed to a GPT and spill control system designed to remove any oil and minimise suspended solids and removal of trash before entering the bio-retention basin.
- Bio-retention basin designed to hold the treated stormwater with the majority of the water dispersing through infiltration and evaporation.
- Runoff generated within dedicated bunds is never allowed to be directed to the stormwater drainage system. Water can evaporate or be collected in a dedicated drainage system and treated on or off site.
- Discharges from the bio-filtration basin to the marine environment to be monitored regularly to ensure that EPA water quality requirements are met.

Storm and sea level rise protection

- Provide sea-flood risk protection to the BIPS plant by either setting the plant above a level of 3.4 mAHD or building a sea levee/wall to 3.4 mAHD which is capable of being raised if warranted.

Soil erosion and runoff

- Prepare a soil and drainage management plan identifying the measures to be implemented including a bund around the construction site, installation of sediment filters around stockpiles, wash down bay and/or shaker bars for vehicles going off site.
- Construction of the bio-retention basin as a component of the stormwater treatment system.
- Disturbed areas to be revegetated.
- Groundwater quality testing during detailed design stage to determine the best method for managing dewatered groundwater.
- Discharges from the bio-filtration basin to the marine environment to be monitored continuously to ensure that EPA water quality requirements are met.

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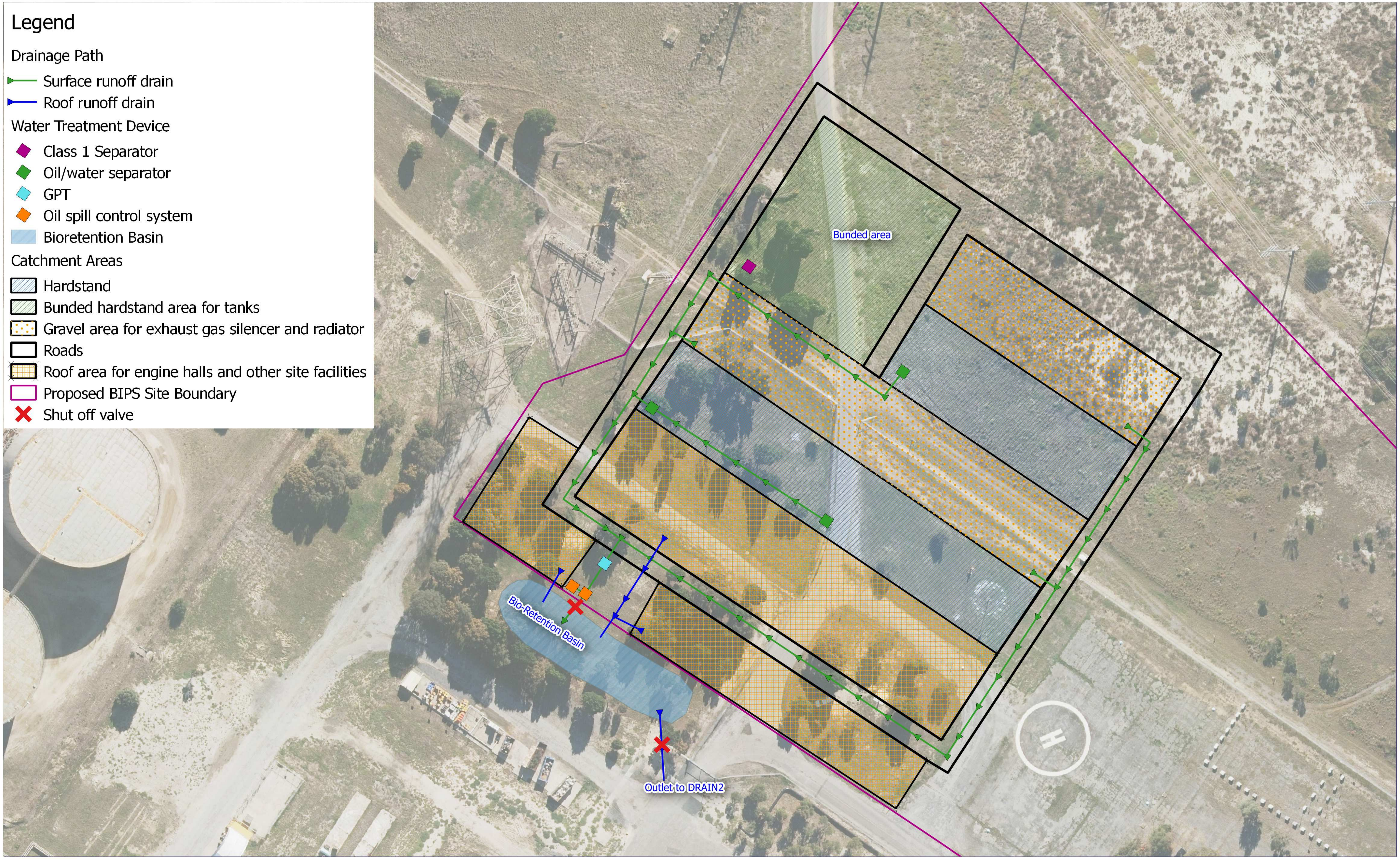
Tonkin Consulting 2005, *Port Adelaide Seawater and Stormwater Flooding Study*, Prepared for the City of Port Adelaide Enfield

Tonkin Consulting 2010, *Torrens Island Energy Park – Water Management Plan*, Prepared for Coffey Environments, South Australia

Tonkin Consulting 2013, *Port Adelaide River Seawall Study*, Prepared for the City of Port Adelaide Enfield

Appendix A

Stormwater Management Plan



Tonkin CONSULTING

a better approach

Job Number:	BIPS SMP
Filename:	BIPS SMP.qgs
Revision:	REVA
Date:	2017-08-30T13:55:27
Drawn:	Samantha West

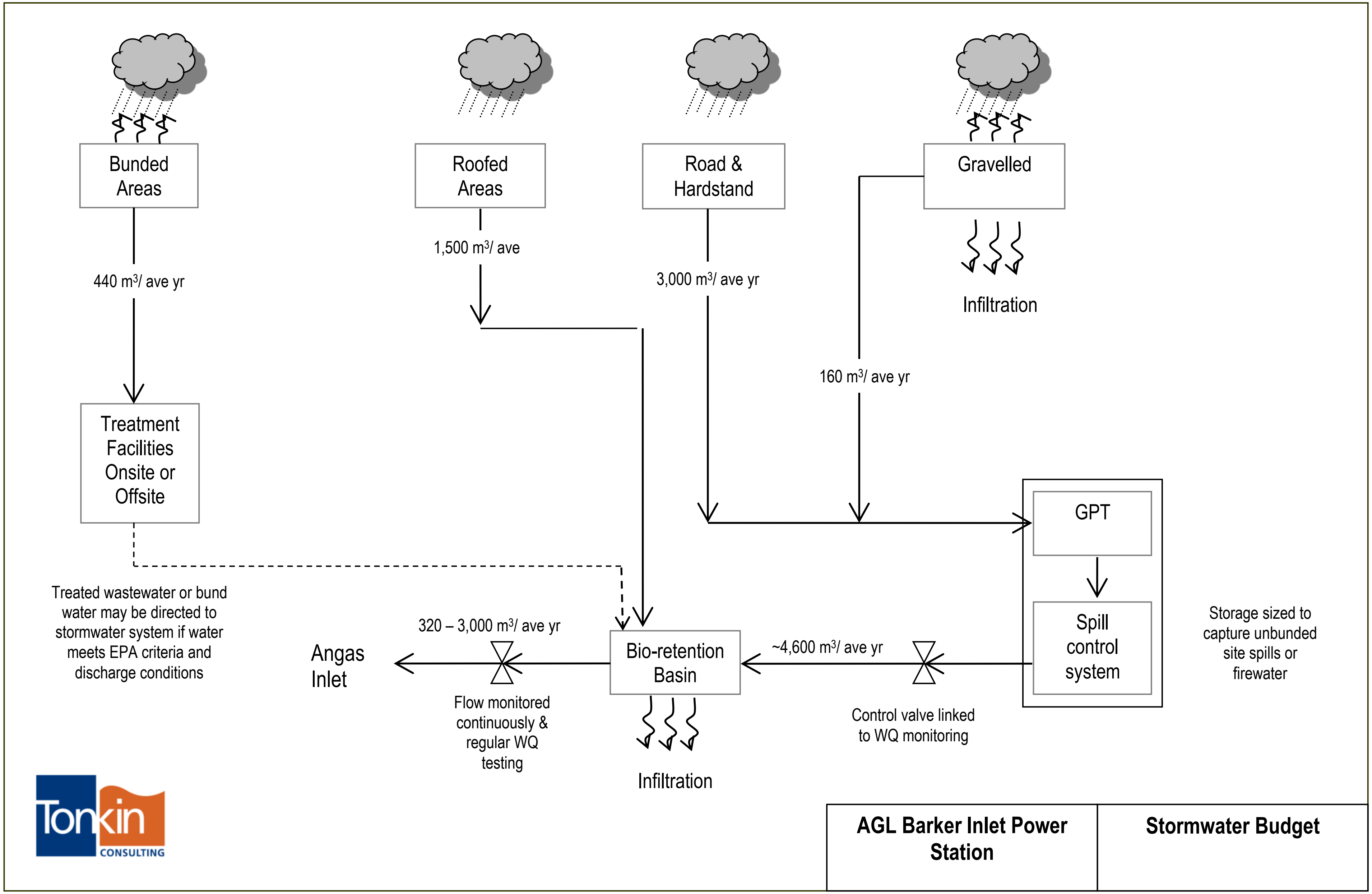
Data Acknowledgement:
Aerial Photo from MetroMaps

Coffey

Barker Inlet Power Station
Stormwater Management Plan - Stage 1

Appendix B

Stormwater Management Flow Diagram


Bunded Areas
Roofed Areas
Road & Hardstand
Gravelled
440 m³/ ave yr
1,500 m³/ ave
3,000 m³/ ave yr
Infiltration
160 m³/ ave yr
Treatment Facilities Onsite or Offsite
GPT
Spill control system
Storage sized to capture unbunded site spills or firewater
Treated wastewater or bund water may be directed to stormwater system if water meets EPA criteria and discharge conditions
320 – 3,000 m³/ ave yr
Angas Inlet
Bio-retention Basin
~4,600 m³/ ave yr
Flow monitored continuously & regular WQ testing
Infiltration
Control valve linked to WQ monitoring
AGL Barker Inlet Power Station
Stormwater Budget

Appendix F

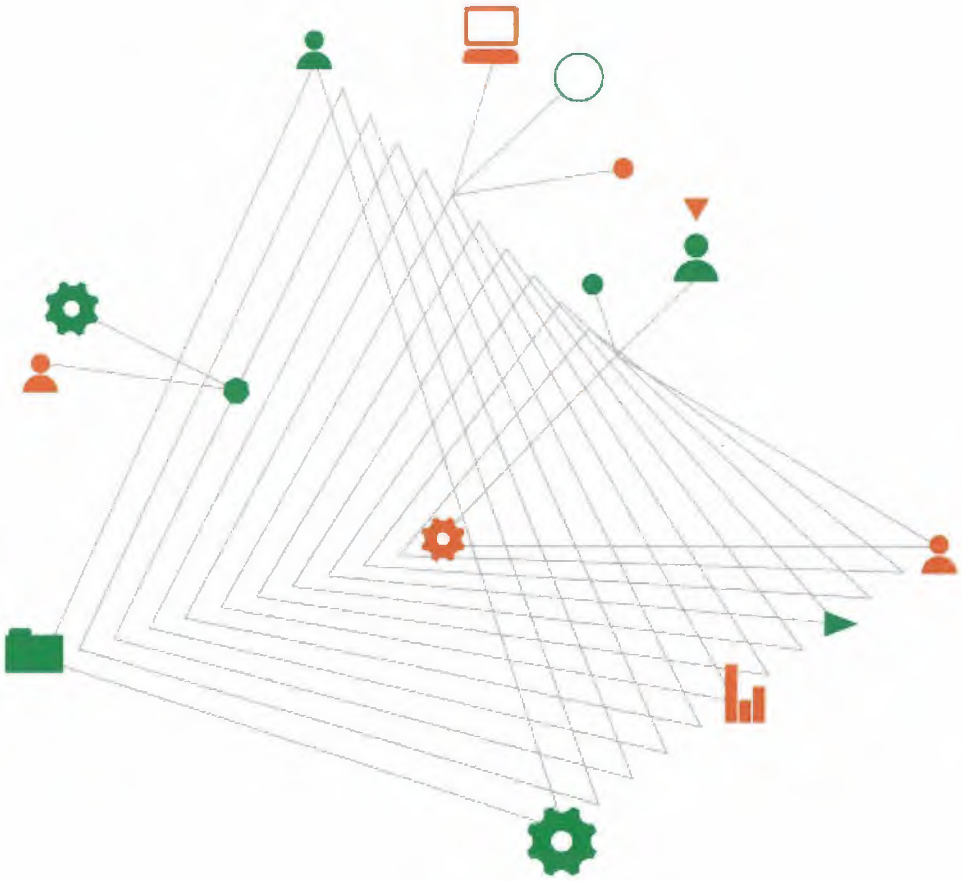
Contamination assessment

AGL Energy Limited

Contamination Assessment

Torrens Island Energy Park

15 June 2017



Experience
comes to life
when it is
powered by
expertise

Contamination Assessment

Prepared for
AGL Energy Limited

Prepared by
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15 June 2017

754-ADLGE205792-R01

Quality information

Revision history

Revision	Description	Date	Author	Reviewer
0	754-ADLGE205792-R01	15/06/2017	Geoffrey Harris	Tony Briggs

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Version 1	1	PDF	AGL Energy Limited	15/062017

Executive summary

Current site status	The site is located on the vacant land adjacent to the north-east of the Torrens Island Power Station. Site conditions are generally flat with numerous tracks, roads, power lines, gas pipelines and other services within and traversing the investigation area. The western area of the site comprises undulating sand hills and is adjacent to a private sanctuary area. The proposed project facilities (BIPS) will be constructed within the same 2.2 ha area that was previously proposed and approved in November 2010. We understand that AGL wish to proceed with the development with some minor changes to the proposed project design. This assessment as well as a geotechnical assessment that Coffey recently completed at the site form part of the planning process to finalise the design and approvals for the proposed expansion. Coffey have previously undertaken environmental investigations at the site in 2009 and 2010. The site investigations include a Phase 1 Environmental Sit Assessment (ESA) comprising a site history assessment and a Phase 2 ESA comprising intrusive soil and groundwater investigation. The site was notified to SA EPA under Section 83A of the EP Act (1993) of site contamination to underground water on the basis of the results of this investigation on 29 May 2017
Objectives	The objectives of the contamination assessment at the Torrens Island Energy Park was to update the groundwater conditions beneath the site.
Scope of works	The scope of work was carried out on the 15 and 16 May 2017 and involved the gauging of existing groundwater monitoring wells (MW1 to MW8) for depth to water and total depth, collection of groundwater quality field parameters at each well location and collection of groundwater samples for chemical analysis.
Environmental values	The beneficial uses assessment (BUA) previously undertaken identified marine ecosystems as the realistic potential beneficial uses of groundwater in the site vicinity.
Conclusions	The results of the investigation have confirmed shallow groundwater levels beneath the site to be between 2 and 4 metres below ground surface (mbgs). Quality conditions of the groundwater are reported to range across the site with chloride at a maximum concentration of 2,300mg/L, sulphate at a maximum concentration of 350mg/L and total dissolved solids (TDS) measurements ranging up to 4,800mg/L. Elevated concentrations of zinc have been confirmed to be reported above the SA EPA former Water Quality EPP 2003, determining that harm to water exists and a Section 83A notification has been issued by AGL on this basis. The elevated concentrations reported are not considered to be a result of any site activity, but a variation of background conditions within the groundwater system. The groundwater analytical results have not reported elevated concentrations of chemicals that would hinder the development of the site for its intended use and there is limited change in groundwater conditions observed from the last monitoring event in 2010.
This sheet is intended to provide a summary only of the assessment of the site. It does not provide a definitive environmental or engineering analysis and is for an introduction only. It should be read in conjunction with the full report. Limitations and assumptions used to reach the conclusions of the executive summary are contained within the report and have not necessarily been included in this executive summary. This report must be read in conjunction with the attached 'Important information about Coffey Environmental Report' included in Section 7.	

Abbreviations

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
ASS	Acid Sulphate Soils
C_6-C_{40}	Hydrocarbon chainlength fraction
DEWNR	Department of Environment, Water and Natural Resources
bgs	below ground surface
COC	Chain of Custody
COPC	Chemical of potential concern
DO	Dissolved Oxygen
EC	Electrical Conductivity
eH	Oxidation/Reduction Potential
ESA	Environmental Site Assessment
Eurofins	Eurofins Environment Testing Australia Pty Ltd, trading as Eurofins MGT
LNAPL	Light Non-aqueous Phase Liquid
LOR	Limit of Reporting
µg/L	micrograms per litre
mg/L	milligrams per litre
MW	Monitoring Well
NATA	National Association of Testing Authorities
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
SA EPA	South Australian Environmental Protection Authority
SASR	South Australia Seabird Rescue
SWL	Standing Water Level
TDS	Total Dissolved Solid
TRH	Total Recoverable Hydrocarbon

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In-text Tables

Appendices

1. Introduction

1.1. Background

AGL Energy Limited (AGL) required a preliminary environmental assessment to be undertaken as part of planning for the Torrens Island Energy Park project, Grand Trunkway, Port Adelaide, South Australia (SA) ('the site').

The proposed project facilities (BIPS) will be constructed within the same 2.2 ha area that was previously proposed and approved (located immediately north west of the existing power station facilities) in November 2010. We understand that AGL wish to proceed with the development with some minor changes to the proposed project design. This assessment as well as a geotechnical assessment that Coffey recently completed at the site (Coffey 2017) form part of the planning process to finalise the design and approvals for the proposed expansion.

Coffey have previously undertaken environmental investigations at the site in 2009 and 2010. The site investigations include a Phase 1 Environmental Site Assessment (ESA) comprising a site history assessment and a Phase 2 ESA comprising intrusive soil and groundwater investigation.

The Phase 1 ESA (Coffey, 2010a) identified the area adjacent to the site to contain registered asbestos disposal areas, which were clearly identified and managed and the possible presence of natural potential acid sulphate soils (PASS) and actual acid sulphate soils (AASS) to exist in the subsurface.

The Phase 2 ESA (Coffey 2010b) included a series of test pits and the drilling, installation and monitoring of eight groundwater monitoring wells across the site that remain present at the site. The results of the Phase 2 ESA reported the shallow groundwater to be encountered beneath the site between 2 and 4 metres below ground surface (mbgs). Chemical analysis conducted on soil and groundwater samples collected did not report the presence of elevated chemicals of potential concern (COPC) including PASS or AASS.

This assessment was performed general accordance with the National Environment Protection Council (NEPC) (1999) *National Environment Protection (Assessment of Site Contamination) Measure* (ASC NEPM) as amended in 2013 and SA EPA (2009) Site Contamination: Guidelines for the Assessment and Remediation of Groundwater Contamination.

1.2. Objectives

The objective of the contamination assessment at the Torrens Island Energy Park was to update the groundwater conditions beneath the site.

2. Site conditions and surrounding environment

A site locality plan is provided as Figure 1. The geoenvironmental setting of the site is summarised as follows (Coffey, 2010b):

- The site was generally flat, currently vacant land with numerous tracks, roads, power lines, gas pipelines and other services within and traversing the investigation area.
- The western area of the site comprises undulating sand hills and is adjacent to a private sanctuary area.
- The southern area of the site contains a heliport, bituminised carpark and store building along the south western boundary. The Project Dolphin Safe and South Australia Seabird Rescue (SASR) facility is located on the south-eastern corner over a bitumen sealed and notified asbestos disposal site. The SASR facilities include office buildings and a 450,000 L above ground lagoon for seabird rehabilitation.
- Adjacent to the northern boundary of the site are two sign posted asbestos stockpiles. A bitumen dump and bituminised area is located south-west of the asbestos disposal area within or very close to the site. There are also dumped remnants of concrete structures and pipes within this vicinity.
- Adjacent land use includes:
    - South-east: a narrow band of mangroves, separating the site from Angas Inlet;
    - South-west: the current Torrens Island Power Station;
    - West: the SEAGAS pipeline, adjacent to mangrove swamps and potential acid sulphate soils;
    - North-west: the ETSA (now SA Power Networks) Mud dump; and
    - North-east: vacant land associated with a sanctuary (towards the central extent of the boundary are two asbestos disposal areas and a disused landfill site and towards the southern end of the boundary are mangrove swamps, with associated potentially acid sulphate soils).
- The Adelaide 1:250,000 scale S.A. Geological Atlas Series Sheet SI 54-9 zones 5 & 6 (Department of Mines Adelaide, 1969) indicates that the regional geology is comprised predominantly of Holocene age marine sands and muds of the St Kilda Formation. In the study area the St Kilda Formation can be described as light-grey shelly stranded beach ridge deposits and shelly silts and sands overlain in places by modern intertidal and swamp deposits.
- The Government of South Australia, (2009) 'Atlas of South Australia' identified that adjacent to the western and north-western boundary of the current Torrens Island Power Stations site is an area of potential acid sulphate soil (mangrove and tidal stream).
- The nearest surface water body is Angas Inlet (tidal river – estuarine environment), located approximately 50 m south-east of the site. Numerous tidal creeks are present approximately 50 m north of the eastern corner of the site, within a mangrove area.
- Information from the Department of Environment, Water and Natural Resources (DEWNR) indicated a total of 129 wells within 1km of the north-western boundary of the current Torrens Island Power Station. 112 of these wells were classified as groundwater monitoring wells with sixteen wells classified as engineering wells) and one well as a water well (SWL of 17.8 mbgs) located on the current Torrens Island Power Station, not currently in use.
- The subsurface geological profile encountered during the geotechnical assessment (Coffey 2017) is described as:

Table 2.1: Subsurface geological profile

Soil material Geological Unit, and description	Depth range (mbgs)
Non Engineered Fill: Sand, very loose to loose, fine to coarse grained.	0.0-1.0
Semaphore Sand: Quartz Sand, very loose to loose, fine to coarse grained.	0.0-5.0
St Kilda Formation: very loose to loose shelly sands and silty sands, and soft to firm clays. Organic matters often found towards top of the formation.	3.5-11.0
Glanville Formation: firm to stiff medium to high plasticity clay and medium to coarse grained sands, very loose to medium dense, with some calcareous gravels.	10.5-14.0
Hindmarsh Clay: high Plasticity silty clay, typically grey green with yellow brown mottling. Typically very stiff to hard consistency.	12.5-19.5

A detailed site layout plan is provided as Figure 2.

3. Preliminary conceptual site model

3.1. Conceptual site model overview

A conceptual site model (CSM) has been formulated during the previous assessments utilising available information to determine the presence of plausible exposure pathways and hence the presence of significant risk to susceptible receptors such as humans, ecosystems or the built environment. For a significant or identifiable risk to exist an exposure pathway must be present which requires each of the following to be identified:

- The presence of substances that may cause harm (SOURCE);
- The presence of a receptor which may be harmed at an exposure point (RECEPTOR); and
- The existence of means of exposing a receptor to the source (EXPOSURE ROUTE).

In the absence of a plausible exposure pathway there is no risk. Therefore, the presence of measurable concentrations of chemical substances does not automatically imply that the site will cause harm. In order for this to be the case a plausible exposure pathway must be present allowing a source to adversely affect a receptor. The nature and importance of both receptors and exposure routes, which are relevant to any particular site, will vary according to its characteristics, intended end-use and its environmental setting.

3.2. Identified sources of contamination

The use of the adjacent land as a power station is the primary source of potential contamination to the subsurface.

Previous assessments undertaken did not report elevated concentrations of COPC including asbestos in soils or AASS.

3.3. Potential transport mechanisms and exposure routes

3.3.1. Preferential pathways

Potential preferential pathways are identified as natural and/or man-made pathways that may result in the preferential migration of future COPC in the liquid and/or gaseous state.

Preferential pathways for the migration of the identified COPC may include:

- Gravelly, sandy fill material beneath the site,;
- Trenches within the area of investigation for underground utilities and services; and
- Groundwater beneath the area of investigation.

3.3.2. Potential exposure routes and transport mechanisms

The main exposure routes that could be feasible in terms of future land use for the site and surrounding land uses are:

- Direct contact with soil and groundwater for construction and maintenance workers conducting sub-surface works;
- Migration through the shallow groundwater.

3.4. Groundwater beneficial use assessment

The screening assessment completed as part of the Phase 2 ESA (Coffey 2010b) has identified the groundwater system beneath the site is required to be protected given the locality of the site to the Port River.

3.5. Potential receptors

Based on the available information, the following key site-specific potential receptors may be considered for this site:

- Current on-site workers;
- Future workers associated with the redevelopment works (construction) and future operation (maintenance and commercial workers);
- Marine water ecosystem of the Port River and associated mangroves.

3.6. Summary of plausible complete exposure pathways

On the basis of the available information, the preliminary CSM in terms of site conditions known prior to this assessment, is provided in the following table:

Table 3.1: Preliminary CSM

Hazard/source of contamination	Key areas affected	Potential transport mechanisms and exposure routes	Key potential receptors
Operation of the adjacent site as a power station	• Whole site area	• Dermal contact & ingestion • Surface water infiltration • Inhalation of dust • Lateral and vertical migration through permeable strata and groundwater	• Current and future workers at the site • Current and future users of the site • Mangrove ecosystems • Marine ecosystems within Port River

4. Field work

4.1. Groundwater monitoring event

A groundwater monitoring event (GME) was undertaken at the site on the 15 May 2017. The scope of work included:

- Gauging of existing groundwater monitoring wells (MW1 to MW8) for depth to water and total well depth using an oil/water interface probe and visual observations for light non aqueous phase liquid (LNAPL) using a new clear disposable bailer at each well;
- Measurement of groundwater quality field parameters (EC, DO, T○, Eh, pH) was undertaken at each well location during purging. Groundwater samples were collected when field water quality parameters stabilised, or three well volumes of water were removed, whichever occurred first;
- Groundwater samples were collected into laboratory prepared containers, preserved for the relevant analyses, and stored in an ice-filled cooler during transport to the selected NATA accredited laboratories for analysis;
- All groundwater samples collected (8) were transported to the laboratories under chain of custody documentation and submitted for chloride, sulphate, pH, total dissolved solids, metals and petroleum hydrocarbons (including silica gel clean-up for TRH) analysis; and
- Quality assurance/quality control procedures during sampling were undertaken in-line with the ASC NEPM (2013).

It is noted that existing monitoring well GW6 could not be located during the current investigation.

Following a review of the groundwater analytical data from the investigation, monitoring wells MW4 and MW5 were resampled for arsenic and zinc analysis on 1 June 2017.

4.2. Site hydrogeological information

4.2.1. Groundwater elevation and LNAPL

Current groundwater gauging data, collected during field activities in the 15 May 2017, is presented in appended Table 1. Groundwater elevation data and interpreted SWL contours are presented on Figure 3. Current groundwater gauging results are summarised as follows:

- No Light Non-Aqueous Phase Liquid (LNAPL) was measured in any monitoring wells;
- Depth to standing water level (SWL) across the area of investigation ranged from approximately 0.9mbgs at MW6 to approximately 3.7mbgs at MW4; and
- Groundwater elevations ranged between 1.097m Australian Height Datum (AHD) at MW1 the western most well to 1.405mAHD at MW4 located in the centre of site.

4.2.2. Groundwater flow and characteristics

Groundwater flow and yield estimates are summarised below:

- Hydraulic conductivity (K) is based on published information from Heath(1983) and ranged between 1 m per day to 10 m per day;
- The hydraulic gradient (i) was calculated to be 0.00061 (MW1 to MW4) to the north and 0.0012 (MW4 to MW6) to the east;

- The effective porosity of the aquifer was estimated from published information from Domenico & Schwartz(1998) and estimated at approximately 0.3 for a medium grained sand;
- Groundwater flow direction is inferred to be to the north and east radially away from MW4; and
- Based on the above values, the seepage velocity of the aquifer during the current assessment was calculated to range between 0.742 and 7.422 metres per year (m/year).

4.2.3. Groundwater quality results

Current groundwater quality parameters, measured during field activities on the 15 May 2017, are presented in appended Table 2. Field purging data sheets are provided in Appendix A.

Groundwater parameters are summarised below:

- Dissolved oxygen (DO) measurements ranged between 0.46mg/L (MW1) and 4.00mg/L (MW5);
- Redox potential (Eh) measurements ranged between -157mV (MW8) and 55mV (MW7);
- Electrical conductivity (EC) measurements ranged between 698µS/cm (MW7) and 9,640µS/cm (MW6) and 454mg/L (MW7) and 6,266mg/L (MW6), confirming groundwater is not suitable for potable and domestic purposes given the average TDS values being greater that 2,000 mg/L (ANZECC 2000);
- Field pH measurements ranged between 7.08 (MW1) to 7.77 (MW5); and
- Temperature measurements ranged between 19.3°C (MW4) and 24.1°C (MW2).

Groundwater quality parameters analysed from the groundwater samples collected, are presented in appended Table 3 and summarised below:

- Laboratory chloride concentrations ranged between 48mg/L (MW2) to 2,300mg/L (MW6);
- Laboratory pH measurements ranged between 7.5 (MW4) to 8.4 (MW2);
- Laboratory sulphate concentrations ranged between 25mg/L (MW7) to 350 mg/L (MW4); and
- Laboratory TDS measurements ranged from 320 mg/L (MW7) to 4,800mg/L (MW6).

5. Analytical results

5.1. Analytical laboratories

All primary and intra-laboratory (duplicate) groundwater samples were submitted to the analytical laboratory Eurofins | mgt Environmental Testing Australia Pty Ltd (Eurofins). All inter-laboratory (triplicate) groundwater samples were submitted to the analytical laboratory Australian Laboratory Services Ltd (ALS). Eurofins and ALS are National Association of Testing Authorities, Australia (NATA) accredited laboratories for the analysis requested.

5.2. Groundwater data

5.2.1. Screening assessment criteria – groundwater

The beneficial uses assessment completed for the site has identified protection of the marine ecosystems associated with Port River is required. As such, the following regulatory criteria has been adopted for assessing groundwater at the site:

- **ASC NEPM (2013)** Groundwater Investigation Levels (GILs) – Marine.

It is noted that the SA EPA (2003) Environment Protection (Water Quality) Policy 2003 (the former Water Quality EPP 2003) has been superseded. Under the current SA EPA framework, as outlined in publication Implementation of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Updated July 2016), the approach to the determination of harm to water remains as set out in their publication Site contamination: How to determine actual or potential harm to water that is not trivial resulting from site contamination (EPA 839/08).

Given the SA EPAs current advice is to assess groundwater quality against water criteria presented in Table 1 in Schedule 2 of the former Water Quality EPP 2003, which was removed from the Policy when it was amended in 2015, the Table 2 contained in Schedule 2 of the 2003 EPP has been adopted to determine harm to water. At the time that the SA EPA release revised determination of harm guidelines, relevant updated criteria should be adopted for the site at the time of groundwater monitoring data review.

A comparative review against the CRC CARE (2011) 'Health Screening Levels (HSLs) for petroleum hydrocarbons' (which have been included within the NEPM 2013) has been conducted for further evaluation of potential risks to human health resulting from intrusion of hydrocarbon vapours emanating from groundwater impacts at the site. Based on groundwater depths and soil type encountered in prior investigations.

The screening assessment criteria are for comparative purposes only and should not be regarded as "clean-up" levels.

Adopted groundwater investigations levels (GILs) and water quality criteria are summarised on the current groundwater analytical results table (appended Table 3).

5.2.2. Data presentation

Groundwater analytical results, including field quality control (QC) data and comparisons to the adopted investigation screening criteria are provided in appended Table 3. Laboratory certificates of analysis and chain of custody documentation are provided in Appendix B.

5.2.3. Analytical results

In summary, the groundwater analytical results from the sampling undertaken at the site on the 15 May 2017, are summarised below:

Concentrations of arsenic in MW5 (53µg/L) exceeded the adopted SA EPP screening level (50µg/L). Arsenic concentrations were reported above the laboratory limit of reporting (LOR) at all groundwater samples collected.

Concentrations of zinc in MW4 (200µg/L), on a raised sand dune central and north-easterly from the Torrens Island Power Station, exceeded adopted screening levels for marine water for the NEPM (2013) (15µg/L) and the SA EPP (50µg/L). Zinc concentrations were reported above the laboratory LOR in MW1 (6µg/L) and MW2 (9µg/L) but below the adopted screening levels. All remaining wells reported concentrations of zinc below the laboratory LOR.

Concentrations of chromium (total) (MW6) and nickel (MW2, MW4, MW5, MW6, MW7 and QC4) were reported above the laboratory LOR, but below the adopted screening guidelines.

No other requested analyte were reported above the laboratory LORs.

The resampling conducted at monitoring wells MW4 for zinc and MW5 for arsenic including replicate samples conducted on 1 June 2017, reported zinc at MW4 above the SA EPP screening level with a maximum concentration reported at 60µg/L and arsenic at MW5 below the SA EPP screening level with a maximum concentration of 16µg/L.

It is considered that the higher concentration values reported in the May sampling event versus the June sampling event may be contributed to the laboratory analytical method and extraction point of water from the sample container within an area containing higher amount of dissolved solids or the groundwater samples collected in June were field filtered more thoroughly thus removing more solids from the sample.

5.3. Quality of analytical data

Coffey has reviewed the outcomes and findings of both the field and laboratory quality control (QC) components of the groundwater sampling assessment works (appended in Table 3). Trip blank and equipment rinsate analytical results are presented in appended Table 3. The calculated relative percentage difference (RPD) between the replicate (duplicate and triplicate) pairs and the primary sample was found to be acceptable for all analytes.

All laboratory QC was reported within the acceptable criteria.

Results from the trip blanks reported concentrations of volatile analytes below the laboratory LOR, indicating there has been no cross contamination between samples during the transportation process (from the site to the laboratory).

Results for the equipment rinsate, taken on each day of sampling, reported all analytes below the laboratory LOR, indicating no cross contamination is likely to have occurred between the sampling equipment and the samples collected during the current groundwater sampling.

Coffey considers that the groundwater samples are acceptable for the purposes of the current assessment.

6. Conclusions

The results of the investigation have confirmed shallow groundwater levels beneath the site to be between 2 and 4mbgs. Quality conditions of the groundwater are reported to range across the site with chloride at a maximum concentration of 2,300mg/L, sulphate at a maximum concentration of 350mg/L and TDS measurements ranging up to 4,800mg/L.

Elevated concentrations of zinc have been confirmed to be reported above the SA EPA former Water Quality EPP 2003, determining that harm to water exists and a Section 83A notification has been issued by AGL on this basis. The elevated concentrations reported are not considered to be a result of any site activity, but a variation of background conditions within the groundwater system.

The groundwater analytical results have not reported elevated concentrations of chemicals that would hinder the development of the site for its intended use and there is limited change in groundwater conditions observed from the last monitoring event in 2010.

All conclusions and findings presented in this report must be read in conjunction with the attached 'Important Information About your Coffey Environmental Report' included in Section 7 of this report.

7. Important information about your Coffey Environmental Report

1. Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

2. Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination posed in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

3. Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

4. Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

5. Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

6. Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

7. Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

8. Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

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9. Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

8. References

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SA EPA (2009) *Site Contamination: Guidelines for the Assessment and Remediation of Groundwater Contamination*

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SA EPA (2016) *Implementation of the National Environment Protection (Assessment of Site Contamination) Measure 1999* (Updated July 2016)

Tables

Table 1
Groundwater Gauging Results
AGL Torrens Island Power Station

Well ID	Date Measured	Total Well Depth	Top-of Casing Elevation	Depth to Water	Depth to LNAPL	NAPL Thickness	Product Gravity	Hydraulic Equivalent	Corrected Depth to Water	Corrected Water Elevation	Comments
		(mbtoc)	(mAHD)	(mbtoc)	(mbtoc)	(m)		(m)	(mbtoc)	(mAHD)	
MW1	15-May-17	4.815	3.376	2.279	-	-	-	-	2.279	1.097	Clear and the slightly cloudy water.
MW2	15-May-17	4.424	4.094	2.891	-	-	-	-	2.891	1.203	Clear water. Roots in well (cleared).
MW3	15-May-17	4.352	3.304	2.028	-	-	-	-	2.028	1.276	Clear water.
MW4	15-May-17	5.832	5.692	4.287	-	-	-	-	4.287	1.405	Clear water. Brown colour water at 7L. Dry at 16L.
	1-Jun-17	5.839		4.321	-	-	-	-	4.321	1.371	Pale brown water.
MW5	15-May-17	4.989	4.678	3.280	-	-	-	-	3.280	1.398	Very cloudy turbid brown and then grey water. Blocked initially (cleared). Dry at 19L.
	1-Jun-17	5.004		3.313	-	-	-	-	3.313	1.365	Organic odour, dry at 18L.
MW6	15-May-17	3.943	2.759	1.661	-	-	-	-	1.661	1.098	Very cloudy to cloudy turbid water, with black sediments and greenish colouration. Hydrogen sulfide odour.
MW7	15-May-17	3.889	3.415	2.159	-	-	-	-	2.159	1.256	Cloudy grey (sand) water. Cleared roots from well.
MW8	15-May-17	3.331	3.370	1.999	-	-	-	-	1.999	1.371	Well blocked with roots (unblock). Very cloudy turbid brown sandy water.

Notes:

MW = Monitoring Well
ID = Identification
mbtoc = metres below top of casing
mAHD = metres above Australian Height Datum
m = metres
* = data used from 2016
WQP = Water Quality Probe
LNAPL = Light Non Aqueous Phase Liquid
HC odour = Hydrocarbon Odour

Equipment

Heron

Table 2
Groundwater Field Quality Parameters
AGL Torrens Island Power Station

Well ID	Date Measured	Dissolved Oxygen	Electrical Conductivity	Total Dissolved Solids*	pH	Redox Potential	Temperature	Total Purge Volume	Comments
		(mg/L)	(µS/cm)	(mg/L)		(mV)	(°C)	(L)	
MW1	16-May-17	0.46	5,950	3,868	7.08	-61.0	22.9	51	Clear and the slightly cloudy water.
MW2	16-May-17	0.57	832	541	7.43	-41.0	24.1	44	Clear water. Roots in well (cleared).
MW3	16-May-17	1.24	1,932	1,256	7.48	-108.0	22.6	48	Clear water.
MW4	15-May-17	2.00	2,050	1,333	7.23	-78.0	19.3	16	Clear water. Brown colour water at 7L. Dry at 16L.
	1-Jun-17	1.38	1,856	1,206	7.15	-73.0	22.0	40	Pale brown water.
MW5	15-May-17	4.00	2,480	1,612	7.77	24.0	23.5	19	Very cloudy turbid brown and then grey water. Blocked initially (cleared). Dry at 19L.
	1-Jun-17	3.82	2,189	1,423	7.64	-121.0	20.5		Organic odour, dry at 18L.
MW6	16-May-17	1.06	9,640	6,266	7.14	-175.0	23.0	48	Very cloudy to cloudy turbid water, with black sediments and greenish colouration. Hydrogen sulfide odour.
MW7	16-May-17	0.87	698	454	7.56	55.0	20.3	36	Cloudy grey (sand) water. Cleared roots from well.
MW8	16-May-17	1.23	3,080	2,002	7.24	-157.0	23.6	40	Well blocked with roots (unblock). Very cloudy turbid brown sandy water.

Notes:

ID = identification

MW = Monitoring Well

EC = Electrical Conductivity

mV = milli Volts

mg/L = milligrams per litre

µS = microSiemens

cm = centimetres

L = litres

* = Total dissolved solids calculated by EC x 0.65

Equipment

TPS90 FLMv

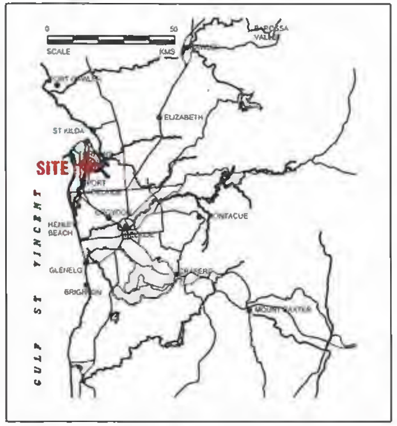
Table 3
Groundwater Analytical Results
AGL Torrens Island Power Station

							Field_ID	MW01	MW02	MW03	MW04	MW04	QC05	QC5A	MW05	MW05	QC6	QC6A	MW06	MW07	QC4	RPD	QC4A	RPD	MW08	QC1	QC2	QC3
							Sampled_Date	16/05/2017	16/05/2017	16/05/2017	15/05/2017	1/06/2017	1/06/2017	1/06/2017	15/05/2017	1/06/2017	1/06/2017	1/06/2017	15/05/2017	16/05/2017	16/05/2017		16/05/2017		16/05/2017	15/05/2017	15/05/2017	16/05/2017
							Matrix_Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	%	WATER	%	WATER	WATER	WATER	WATER
							Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal		Normal		Normal	Trip_B	Rinsate	Rinsate
							Sample Comments					Resample	Field_D of MW04	Field_T of MW04		Resample	Field_D of MW05	Field_T of MW05			Field_D of MW07	RPD Between MW07 and QC4	Field_T of MW07	RPD Between MW07 and QC4A				
Chem_Group	ChemName	Units	LOR	NEPM 2013 HSL D 2m to	NEPM 2013 HSL D 4m to	NEPM 2013 GILs, Marine	SAEPP Marine																					
TRH (NEPM 2013)	C6 - C10	µg/L	20					<20	<20	<20	<20	-	-	-	<20	-	-	-	<20	<20	<20	NA	<20	NA	<20	<20	<20	<20
	C6-C10 less BTEX (F1)	µg/L	20	6,000	6,000			<20	<20	<20	<20	-	-	-	<20	-	-	-	<20	<20	<20	NA	<20	NA	<20	<20	<20	<20
	C10-C16	µg/L	50					<50	<50	<50	<50	-	-	-	<50	-	-	-	<50	<50	<50	NA	-	NA	<50	-	<50	<50
	C10-C16 less NAPHTHALENE (F2)	µg/L	50					<50	<50	<50	<50	-	-	-	<50	-	-	-	<50	<50	<50	NA	-	NA	<50	-	<50	<50
	C16-C34	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	-	NA	<100	-	<100	<100
	C34-C40	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	-	NA	<100	-	<100	<100
TRH (NEPM 2013) Silica Gel Cleanup	TRH >C10-C16 (after silica gel clean-up)	µg/L	50					<50	<50	<50	<50	-	-	-	<50	-	-	-	<50	<50	<50	NA	<100	NA	<50	-	-	-
	TRH >C16-C34 (after silica gel clean-up)	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	<100	NA	<100	-	-	-
	TRH >C34-C40 (after silica gel clean-up)	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	<100	NA	<100	-	-	-
TPH (NEPM 1999)	C6 - C9	µg/L	20					<20	<20	<20	<20	-	-	-	<20	-	-	-	<20	<20	<20	NA	<20	NA	<20	<20	<20	<20
	C10 - C14	µg/L	50					<50	<50	<50	<50	-	-	-	<50	-	-	-	<50	<50	<50	NA	-	NA	<50	-	<50	<50
	C15 - C28	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	-	NA	<100	-	<100	<100
	C29 - C36	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	-	NA	<100	-	<100	<100
	C10 - C36 (Sum of total)	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	-	NA	<100	-	<100	<100
TPH (NEPM 1999) Silica Gel Cleanup	TPH C10-C14 Fraction after Silica Cleanup	µg/L	50					<50	<50	<50	<50	-	-	-	<50	-	-	-	<50	<50	<50	NA	<50	NA	<50	-	-	-
	TPH C15-C28 Fraction after Silica Cleanup	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	<100	NA	<100	-	-	-
	TPH C29-C36 Fraction after Silica Cleanup	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	<50	NA	<100	-	-	-
	TRH C10-C36 (Total) (after silica gel clean up)	µg/L	100					<100	<100	<100	<100	-	-	-	<100	-	-	-	<100	<100	<100	NA	<50	NA	<100	-	-	-
BTEX	Benzene	µg/L	1	5000	5000	500	300	<1	<1	<1	<1	-	-	-	<1		-	-	<1	<1	<1	NA	<1	NA	<1	<1	<1	<1
	Ethylbenzene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<2	NA	<1	<1	<1	<1
	Toluene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<2	NA	<1	<1	<1	<1
	Xylene (m & p)	µg/L	2					<2	<2	<2	<2	-	-	-	<2	-	-	-	<2	<2	<2	NA	<2	NA	<2	<2	<2	<2
	Xylene (o)	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<2	NA	<1	<1	<1	<1
	Xylene Total	µg/L	3					<3	<3	<3	<3	-	-	-	<3	-	-	-	<3	<3	<3	NA	<2	NA	<3	<3	<3	<3
Metals	Arsenic (Filtered)	µg/L	1				50	1	11	5	8	-	-	-	53	16	16	15	31	3	3	0	3	0	10	-	<1	<1
	Cadmium (Filtered)	µg/L	0.2			0.7	2	<0.2	<0.2	<0.2	<0.2	-	-	-	<0.2	-	-	-	<0.2	<0.2	<0.2	NA	<0.1	NA	<0.2	-	<0.2	<0.2
	Chromium (Filtered)	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	2	<1	<1	NA	<1	NA	<1	-	<1	<1
	Copper (Filtered)	µg/L	1			1.3	10	<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Lead (Filtered)	µg/L	1			4.4	5	<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Mercury (Filtered)	µg/L	0.1			0.1	0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-	-	-	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	-	<0.1	<0.1
	Nickel (Filtered)	µg/L	1			7	15	<1	2	<1	2	-	-	-	2	-	-	-	3	1	2	17	<1	NA	<1	-	<1	<1
	Zinc (Filtered)	µg/L	5			15	50	8	9	<5	200	56	58	60	<5	-	-	-	<5	<5	<5	NA	<5	NA	<5	-	<5	<5
PAH	Acenaphthene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Acenaphthylene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Anthracene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Benzo(a)anthracene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Benzo(a)pyrene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<0.5	NA	<1	-	<1	<1
	Benzo(g,h,i)perylene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Benzo(k)fluoranthene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Chrysene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Benzo(b+j)fluoranthene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Dibenz(a,h)anthracene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Fluoranthene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Fluorene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Naphthalene	µg/L	1			50		<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	<10	<10	<10
	Phenanthrene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Pyrene	µg/L	1					<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<1	NA	<1	-	<1	<1
	Total PAHs	µg/L	1				3	<1	<1	<1	<1	-	-	-	<1	-	-	-	<1	<1	<1	NA	<0.5	NA	<1	-	<1	<1
Inorganics	Chloride	mg/L	1					1000	48	530	85	-	-	-	300	-	-	-	2300	78	-	NA	-	NA	560	-	-	-
	pH (Lab)	pH_Units	0.1					8.3	8.4	8.3	7.5	-	-	-	8.1	-	-	-	7.7	8	-	NA	-	NA	8.3	-	-	-
	Sulphate	mg/L	5					310	54	65	350	-	-	-	110	-	-	-	92	25	-	NA	-	NA	220	-	-	-
	TDS	mg/L	10					2700	400	1300	1200	-	-	-	1300	-	-	-	4800	320	-	NA	-	NA	1600	-	-	-

Notes:
MW = Groundwater Monitoring Well, QC = Quality control sample
'-' = Analysis not requested
LOR = Limit of Reporting (= Method Detection Limit)
* guideline value from WHO 2011
NL = Not Limiting
NE = Not Established

Adopted Screening Criteria
NEPM (2013) Groundwater Health Screening Level (HSL) D (Commercial/Industrial), sand 2m to <4m
NEPM (2013) Groundwater Health Screening Level (HSL) D (Commercial/Industrial), sand 4m to <8m
NEPM (2013) Groundwater Investigation Level (GIL) - Marine
SAEPA (2003) – Environment Protection (Water Quality) Policy and Explanatory Report – Marine

Figures



GENERAL AREA MAP

REGIONAL AREA MAP

© Bing Maps, downloaded 31.05.17

0 2 4 6 8 10
SCALE 1:200000 (A3) KILOMETRES

LOCAL AREA MAP

© Google Earth Pro, image captured 07.01.16

0 150 300 450 600 750
SCALE 1:15000 (A3) METRES

LOCAL AREA

GENERAL AREA LAND USE: VACANT LAND

GENERAL HYDROGEOLOGY OF LOCALITY
1. SOIL TYPE: FINE TO MEDIUM SANDS

2. DEPTH TO AQUIFER: ~2.0 mBGS

3. AQUIFER USAGE: UNKNOWN

POTENTIALLY SENSITIVE RECEPTORS: PORT RIVER ECO-SYSTEM

revision

no.	description	drawn	approved	date
A	ORIGINAL ISSUE	JO	FM	31/05/2017

drawn	JO
approved	FM
date	31/05/2017
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client:	AGL ENERGY LIMITED
project:	AGL TORRENS ISLAND ENERGY PARK TORRENS ISLAND, ADELAIDE, SOUTH AUSTRALIA
title:	SITE LOCALITY PLAN
project no: 754-ADLGE205792-R01	figure no: FIGURE 1	rev: A

PLOT DATE 31/05/2017 4:14:29 PM DWG FILE \\FS02.CORP.COFFEY.COM\AUDATA\GEOSERVICES\PROJECT\GEOTECHNICS\754-ADLGE205792 - AGL TORRENS ISLAND\07 DRAWINGS\R01\754-ADLGE205792-R01-001 D.XO

LEGEND

⊕ MW ⊕ GW	GROUNDWATER MONITORING WELL LOCATION
▨	KNOWN ASBESTOS DUMP

AERIAL IMAGE SOURCE GOOGLE EARTH PRO, CAPTURED 07 01.16

revision

no.	description	drawn	approved	date
A	ORIGINAL ISSLE	JO	FM	31/05/2017

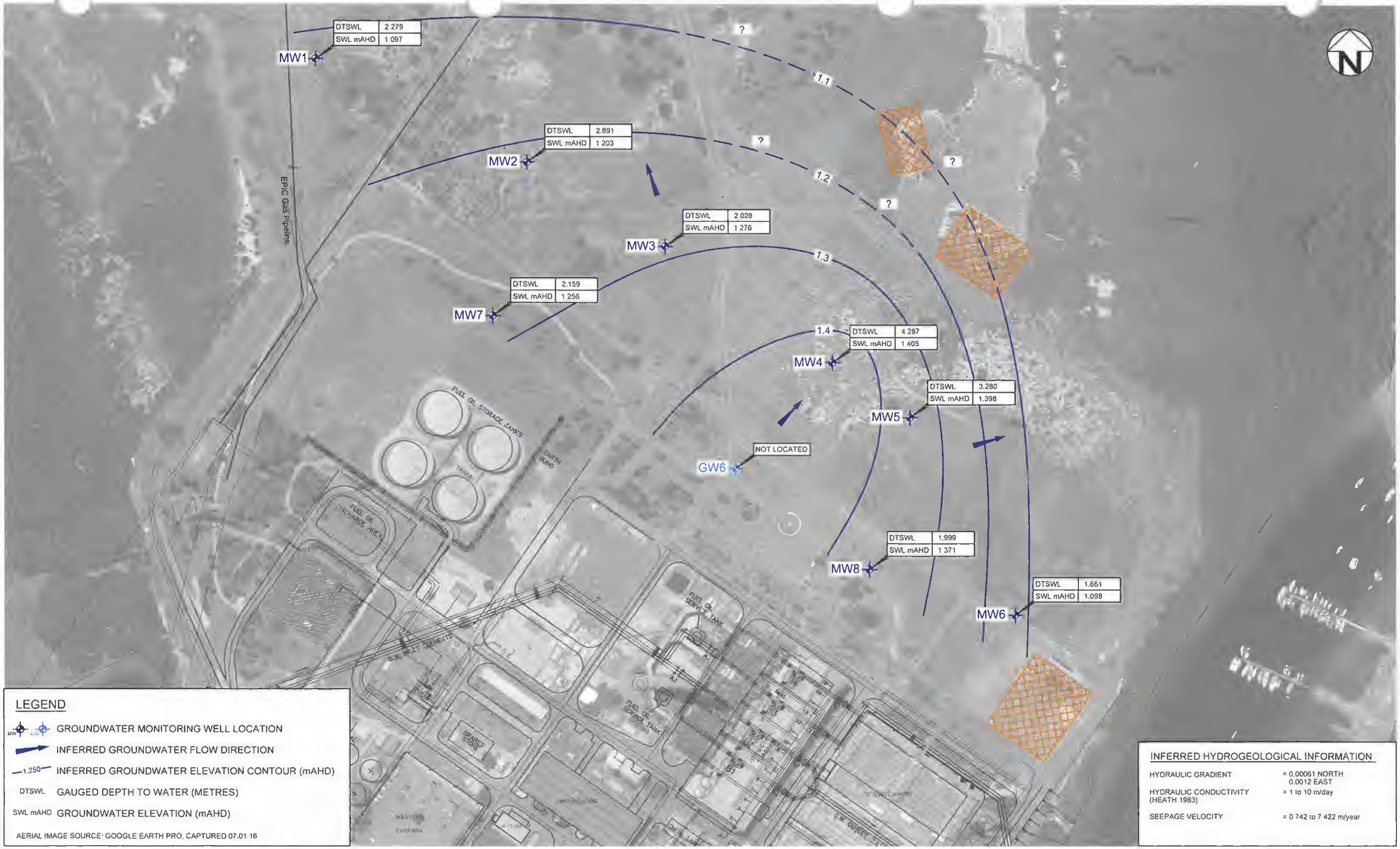
0 30 60 90 120 150
SCALE 1:3000 (A3) METRES

drawn	JO
approved	FM
date	31/05/2017
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client:	AGL ENERGY LIMITED
project:	AGL TORRENS ISLAND ENERGY PARK TORRENS ISLAND, ADELAIDE, SOUTH AUSTRALIA
title:	DETAILED SITE LAYOUT PLAN (MAY 2017)
project no:	754-ADLGE205792-R01
figure no.	FIGURE 2
rev:	A

PLOT DATE 31/05/2017 4:14:34 PM DWG FILE \\WESWFS02.CORP.COFFEY.COM.AU\DATA$\GEOSERVICES\PROJECTS\GEOTECHNICS\754-ADLGE205792 - AGL TORRENS ISLAND\07 DRAWINGS\R01\754-ADLGE205792-R01-D01.DWG



LEGEND

MW ⌖ GW ⌖	GROUNDWATER MONITORING WELL LOCATION
➤	INFERRED GROUNDWATER FLOW DIRECTION
—1.250—	INFERRED GROUNDWATER ELEVATION CONTOUR (mAHD)
DTSWL	GAUGED DEPTH TO WATER (METRES)
SWL mAHD	GROUNDWATER ELEVATION (mAHD)

AERIAL IMAGE SOURCE: GOOGLE EARTH PRO, CAPTURED 07.01 16

INFERRED HYDROGEOLOGICAL INFORMATION

HYDRAULIC GRADIENT	= 0.00061 NORTH 0.0012 EAST
HYDRAULIC CONDUCTIVITY (HEATH 1983)	= 1 to 10 m/day
SEEPAGE VELOCITY	= 0 742 to 7 422 m/year

no.	description	drawn	approved	date
A	ORIGINAL ISSUE	JO	FM	31/05/2017

revision

0 30 60 90 120 150
SCALE 1:3000 (A3) METRES

drawn	JO
approved	FM
date	31/05/2017
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client:	AGL ENERGY LIMITED
project:	AGL TORRENS ISLAND ENERGY PARK TORRENS ISLAND, ADELAIDE, SOUTH AUSTRALIA
title:	GROUNDWATER CONTOUR PLAN (MAY 2017)
project no:	754-ADLGE205792-R01
figure no:	FIGURE 3
rev:	A

PLOT DATE 31/05/2017 4 14.37 PM DWG FILE \\KESWFS02.CORP COFFEY COM AU\DATA$\GEOSERVICES\PROJECTS\GEOTECHNICS\754-ADLGE205792 - AGL TORRENS ISLAND\07 DRAWINGS\R01\754-ADLGE205792 R01-D01 DWG

Appendix A - Field data sheets

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Well Gauging Form

PAGE 1 OF 1

PROJECT NAME: AGL Torrens Island Energy Park - CLE **PROJECT NUMBER:** 754-ADLSE205714

FIELD PERSONNEL: GH **DATE:** 15+16/5/17

PROJECT MANAGER: FM

FIELD EQUIPMENT:

Equipment Used: IP IP Serial Number: PURPLE

REFER TO SOPs WHEN GAUGING WELLS:

SOP - Monitoring Well Gauging and SOP – Decontamination of Sampling Equipment

Time of Day	Well ID	Well Diameter	Total Well Depth note 1	Depth to PSH (NAPL) [A]	Depth to Groundwater [B]	PSH Thickness [B-A]	Height of Well Stick-Up	COMMENTS (notes 2 & 3) ODOUR, COLOUR, SHEEN, NAPL (and its colour), REMEDIATION SYSTEM, etc
		mm	m	mBTOC	mBTOC	mm	m	
10:10am	MW08	50	~~1.829~~ 3.381	16/5/17	~~3.2331~~ 1.999	Measured 16/5/17	0.64	Well Blocked. Unblocked on 16/5/17
10:25am	MW06	50	3.943		1.661		0.77	
10:34am	MW05	50	4.989		3.280		0.72	
10:46am	MW04	50	5.832		4.287		0.61	
11:28am	MW03	50	4.352		2.028		0.7	
11:40am	MW02	50	4.424		2.891		0.745	Roots In Well - ~~&~~ Cleared 16/5/17
11:52am	MW01	50	4.815		2.279		0.65	
12:40pm	MW07	50	~~2.236~~ 3.889 on 16/5/17 once cleared		2.159/2.162 on 16/5/17		0.795	Blocked - Unblock on 16/5/17. Roots in Well

coffey

Groundwater Sampling Form (A) - General

PAGE 1 OF 8

PROJECT NAME: AGL TORRENS ISLAND ENERGY PARK - SME
PROJECT NUMBER: 754-ADLCE205794
FIELD PERSONNEL: CW
DATE: 16/5/17
PROJECT MANAGER: FM

WELL ID: MW01
METER ID& TYPE : TPS 90 FLMV
TOTAL WELL DEPTH: 4.815
SCREEN INTERVAL:
EQUIPMENT USED: BAILER ☑ WATERRA ☐ OTHER
WELL DIAMETER: 50
WELL STICK-UP: 0.65

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

4.815 m - 2.279 = 2.536 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 17 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
12:30		17	1.06			5.02		7.11		-13		23		✓ →	✓				- TEMP. SENSOR OFF
12:40		34	0.89			~~0.88~~	4.73	7.03		-11		22.4		✓					- MUCKED ABOUT TILL TEMP. BACK ON-LINE
12:47		51	0.46			5.95		7.08		-61		22.9			✓				
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

coffey

Groundwater Sampling Form (A) - General

PAGE 2 OF 5

PROJECT NAME: AGL TORRENS ISLAND ENERGY PARK - GW **PROJECT NUMBER:** 754-ADLGE205794

FIELD PERSONNEL: CF **DATE:** 16/5/17

PROJECT MANAGER: FM

WELL ID: MW02 **METER ID& TYPE :** TPS FQ FLMV **TOTAL WELL DEPTH:** 4.424 **SCREEN INTERVAL:**

EQUIPMENT USED: BAILER ☑ **WATERRA** ☐ **OTHER** **WELL DIAMETER:** 50 **WELL STICK-UP:** 0.745

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

4.424 m - 2.891 = 1.533 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 11 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or [✓ µS/cm])		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
1:29		11		1.54		806		7.12		-7		23.8				✓			- ROOTS IN WELL
1:37		22		0.74		824		7.35		-25		24.1			✓				
1:45		33		0.63		828		7.37		-37		24.0		✓					
		44		0.51		832		7.43		-41		24.[illegible]		✓					
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

coffey

Groundwater Sampling Form (A) - General

PAGE 3 OF 8

PROJECT NAME: AGL Torrens Island Energy Park - GME

PROJECT NUMBER: 754-ADLGE205794

FIELD PERSONNEL: GH

DATE: 16/5/17

PROJECT MANAGER: FM

WELL ID: MW03

METER ID& TYPE : TPS 90 FLW

TOTAL WELL DEPTH: 4.352

SCREEN INTERVAL:

EQUIPMENT USED: **BAILER** ☑ **WATERRA** ☐ **OTHER**

WELL DIAMETER: 50

WELL STICK-UP: 0.7

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

4.352 m - 2.028 = 2.324 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME

15 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or [✓ µS/cm])		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
2:07		16		1.73		2040		7.41		-78		22.8		✓					
2:14		32		1.16		2113		7.47		-105		22.8		✓					
2:19		48		1.24		1932		7.48		-108		22.6		✓					
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

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Groundwater Sampling Form (A) - General

PAGE 4 OF 8

PROJECT NAME: AGL Torrens Island Energy Park - GME

PROJECT NUMBER: 754-ADLGE05794

FIELD PERSONNEL: GH

DATE: 15/5/17

PROJECT MANAGER: FM

WELL ID: UW04

METER ID& TYPE : TPS 90 FLMV

TOTAL WELL DEPTH: 5.833

SCREEN INTERVAL:

EQUIPMENT USED: **BAILER** ☑ **WATERRA** ☐ **OTHER**

WELL DIAMETER: 50

WELL STICK-UP: 0.61

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

5.833 m - 4.287 = 1.546 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME

11 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or [✓ µS/cm])		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
2:48		11		1.30		2032		7.17		-70		15.6		✓					- SOME RUSTY COLOUR WATER AT 7L
2:57		16		2.00		2080		7.23		-78		19.3		✓					- DRY @ 16L
STABILISATION CRITERIA (3 readings within following ranges)				**± 10%**		**± 3%**		**± 0.1 unit**		**± 10mV**		**± 0.2°C**							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

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Groundwater Sa pling Form (A) - General

PAGE 5 OF 8

PROJECT NAME: AGL TORRENS ISLAND ENERGY PARK - SAE
PROJECT NUMBER: 754-ADLGE205794
FIELD PERSONNEL: GH
DATE: 15/5/17
PROJECT MANAGER: FM

WELL ID: MW05
METER ID& TYPE : TPS 90 FLM
TOTAL WELL DEPTH: 4.989
SCREEN INTERVAL:
EQUIPMENT USED: **BAILER** ☑ **WATERRA** ☐ **OTHER**
WELL DIAMETER: 50
WELL STICK-UP: 0.72

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

4.989 m - 3.280 = 1.709 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 12 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY ([✓ mS] or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
2:08		12L		3.30		2.33		7.67		52		23.7					✓	✓	-BROWN RUST COLOUR WATER TO START &
2:16		19L		4.17		2.48		7.74		24		23.5							THEN GRAY SANDS
																			-BLOCKED EVENTUALLY
																			-GETTING 1/2 BAILS
																			-DRY @19L
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

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Groundwater Sampling Form (A) - General

PAGE 6 OF 8

PROJECT NAME: AGL Torrens Island Energy Park - GME
PROJECT NUMBER: 754-ADLGE205794
FIELD PERSONNEL: GH
DATE: 15/5/17
PROJECT MANAGER: FM

WELL ID: MW06
METER ID& TYPE: TPS90 FLMV
TOTAL WELL DEPTH: 3.943
SCREEN INTERVAL:
EQUIPMENT USED: **BAILER** ☑ **WATERRA** ☐ **OTHER**
WELL DIAMETER: 50
WELL STICK-UP: 0.77

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

3.943 m - 1.661 = 2.282 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 16 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY ([✓ mS] or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
																	~~✓~~		BLACK SEDIMENTS + H2S ODOUR
1:15pm		16		1.04		9.50		7.07		-128		23.3				~~B~~	✓	✓	STILL BLACK / GREEN
1:25pm		32		0.84		9.93		7.09		-172		23.3				✓		✓	
1:35pm		48		1.06		9.64		7.14		-175		23.0				✓		✓	
STABILISATION CRITERIA (3 readings within following ranges)				**± 10%**		**± 3%**		**± 0.1 unit**		**± 10mV**		**± 0.2°C**							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

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Groundwater Sampling Form (A) - General

PAGE 7 OF 8

PROJECT NAME: AGL Torrens Island Energy Park - GME
PROJECT NUMBER: 754-ADLGE205794
FIELD PERSONNEL: GH
DATE: 16/5/17
PROJECT MANAGER: FM

WELL ID: MW07
METER ID& TYPE: TPS90 FLMV
TOTAL WELL DEPTH: 3.889
SCREEN INTERVAL:
EQUIPMENT USED: BAILER ☑ WATERRA ☐ OTHER
WELL DIAMETER: 50
WELL STICK-UP: 0.795

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

3.889 m - 2.159 = 1.73 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME

12 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or [✓ µS/cm])		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
9:32a		12		0.81		735		7.59		70		20.3*				✓			- CLEARED ROOTS WITH METAL BAILER
10:18a		24		0.89		702		7.49		58		20.3*				✓			- GREY WATER
10:25a		36		0.87		698		7.56		55		20.3*				✓			* TEMP HAD TO BE
																			RECALIBRATED AS READING -ve
																			- SOME SAND IN WATER
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		±3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☑ N ☐ DUPLICATE ID: QC4

TRIPLICATE COLLECTED: Y ☑ N ☐ TRIPLICATE ID: QC4A

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☑ N ☐

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Groundwater Sampling Form (A) - General

PROJECT NAME: AGL Torrens Island Energy Park - SME
PROJECT NUMBER: 754-ADLGE205794
FIELD PERSONNEL: SH
DATE: 16/5/17
PROJECT MANAGER: FM

WELL ID: MW08
METER ID& TYPE: TPS90 FLMV
TOTAL WELL DEPTH: 3.331
SCREEN INTERVAL:
EQUIPMENT USED: BAILER ☑ WATERRA ☐ OTHER
WELL DIAMETER: 50
WELL STICK-UP: 0.64

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

3.331 m - 1.999 = 1.332 m

5/17

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 10 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY [✓ mS] or µS/cm		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one: Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	COMMENTS ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE						
2:50		10		2.93		2.93		7.30		-140		22.8					✓	✓	- Brown sandy water - well blocked
2.55		20		1.48		2.97		7.28		-149		23.2					✓	✓	got unblocked & let sit & then single
3:03		30		1.45		3.07		7.24		-148		23.2					✓	✓	purge
				1.23		3.08		7.24		-157		23.6					✓	✓	
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID:

TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID:

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

coffey

FIELD EQUIPMENT CALIBRATION DETAILS

Job/Site Details:	
Project Name: AGL Torrens Island Energy Park	Project Number: 754-ADLGE205792
Fieldwork Date(s): 15+16 /5/17	Work Completed By: SH
Type of Work (eg. ESA, GME, etc): GME	

NB When completing service calibration details, refer to the calibration certificate which accompanies the equipment.

Photoionisation Detector (PID):			
Equipment Description:		Equipment ID:	
Calibration Frequency Required by Manufacturer:		Last Service Date:	Calibrated by :
Challenge Gas Standard:		Gas Batch #:	Gas Expiry date:
Field Challenge Details:			
1) Date/Time:	4) Date/Time:	7) Date/Time:	10) Date/Time:
2) Date/Time:	5) Date/Time:	8) Date/Time:	11) Date/Time:
3) Date/Time:	6) Date/Time:	9) Date/Time:	12) Date/Time:

Lower Explosive Level Meter (LEL):			
Equipment Description:		Equipment ID:	
Calibration Frequency Required by Manufacturer:		Last Service Date:	Calibrated by :
Challenge Gas Standard:		Gas Batch #:	Gas Expiry date:
Field Challenge Details:		☐ Tick if recorded elsewhere on Hot Work Permit (No.____________)	
1) Date/Time:	4) Date/Time:	7) Date/Time:	10) Date/Time:
2) Date/Time:	5) Date/Time:	8) Date/Time:	11) Date/Time:
3) Date/Time:	6) Date/Time:	9) Date/Time:	12) Date/Time:

Water Quality Meter:		
Equipment Description: TPS 90 FLMV	Equipment ID: BLUE	
Calibration Frequency Required by Manufacturer: Weekly	Last Service Date: 4/5/17	Calibrated by : Joe (Thermo Fisher)
Calibration Standards: EC, pH, Temp,		

Field Calibration Record

Date Calibrated	DO Probe	Conductivity	pH 4.0	pH 6.88	Temperature
4/5/17	✓	✓	✓	✓	✓

Interface Probe (IP) :			
Equipment Description: Heron		Equipment ID: PURPLE	
Calibration Frequency Required by Manufacturer: work / doesn't work		Last Service Date: –	Calibrated by : T
Field Challenge Details: Works / Doesn't work			
1) Date/Time: 15/5/17	4) Date/Time:	7) Date/Time:	10) Date/Time:
2) Date/Time:	5) Date/Time:	8) Date/Time:	11) Date/Time:
3) Date/Time:	6) Date/Time:	9) Date/Time:	12) Date/Time:

coffey

Groundwater Sampling Form (A) - General

PAGE 1 OF 2

PROJECT NAME: AGL - TORRENS ISLAND EME
PROJECT NUMBER: 754-ADLGE 205792
FIELD PERSONNEL: MARNEL + STEFAN + G. HARRIS
DATE: 1/6/17
PROJECT MANAGER: FEDERICA MELLORS

WELL ID: MW04
METER ID& TYPE : TPS90 FLMV
TOTAL WELL DEPTH:
SCREEN INTERVAL:
EQUIPMENT USED: **BAILER** ☑ **WATERRA** ☐ **OTHER**
WELL DIAMETER: 50
WELL STICK-UP:

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

5.839 m - 4.321 = 1.518 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 10 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or [✓ µS/cm])		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
10:50am		10		1.76		1824		6.98		18		21.4		✓ →	✓				No odour, Pale brown
11:10am		20		1.90		1788		7.02		~~0~~ -6		20.6		✓	→	✓			
11:35am		30		1.61		1812		7.06		-40		20.1		✓ →	✓				
12:00pm		40		1.38		1856		7.15		-73		22		✓ →	✓				
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☑ N ☐ DUPLICATE ID: QC5

TRIPLICATE COLLECTED: Y ☑ N ☐ TRIPLICATE ID: QC5A

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

coffey

Groundwater Sampling Form (A) - General

PAGE 2 OF 2

PROJECT NAME: AGL - Torrens Island GME

PROJECT NUMBER: 754-ADLGE205792

FIELD PERSONNEL: Marner + Stefan + G. Harris

DATE: 1/6/17

PROJECT MANAGER: Rebecca Meeres

WELL ID: MW05

METER ID& TYPE : TPS90

TOTAL WELL DEPTH:

SCREEN INTERVAL:

EQUIPMENT USED: **BAILER** ☑ **WATERRA** ☐ **OTHER**

WELL DIAMETER: 50

WELL STICK-UP:

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

5.004 m - 3.313 = 1.691 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME 11 L

WELL HEADSPACE PID READING

PID READING

PPM:

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or [✓ µS/cm])		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
12.30		10		1.64		2052		7.48		-146		20.2		✓ →	✓				Organic Odour
		18		3.82		2189		7.64		-121		20.5					✓	✓	DRY AT 18L
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☑ N ☐ DUPLICATE ID: QC6

TRIPLICATE COLLECTED: Y ☑ N ☐ TRIPLICATE ID: QC6A

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle)

HAS THIS FORM BEEN COMPLETED IN FULL? Y ☐ N ☐

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Calibration Record for TPS Water Quality Meter

Date Calibrated	DO Probe	Conductivity	pH - 4.0	pH - 6.88	Temperature	Name
1/6/17	✓	✓	✓	✓	15.2°C	

Appendix B - Certificates of analysis and chain of custody documentation

eurofins | mgt

Melbourne
3-5 Kingston Town Close
Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 18217

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**Coffey Environments Pty Ltd SA**
Contact name:	Felicia Mellors
Project name:	AGL
Project ID:	754-ADLGE205792
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	May 17, 2017 8:47 AM
Eurofins | mgt reference:	**546443**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 12 degrees Celsius.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☑ Sample containers for volatile analysis received with zero headspace.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Onur Mehmet on Phone : (+61) (3) 8564 5026 or by e.mail: OnurMehmet@eurofins.com

Results will be delivered electronically via e.mail to Felicia Mellors - Felicia_Mellors@coffey.com.

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Coffey Environments Pty Ltd SA
Worldpark 33 Richmond Rd
Keswick
SA 5035

Attention: **Felicia Mellors**

Report **546443-W**
Project name AGL
Project ID 754-ADLGE205792
Received Date May 17, 2017

Client Sample ID			**MW06**	**MW05**	**MW04**	**QC1**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**M17-My16088**	**M17-My16089**	**M17-My16090**	**M17-My16091**
Date Sampled			**May 15, 2017**	**May 15, 2017**	**May 15, 2017**	**May 15, 2017**
Test/Reference	LOR	Unit				
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	-	-	< 0.02
Chloride	1	mg/L	2300	300	85	-
pH	0.1	pH Units	7.7	8.1	7.5	-
Sulphate (as SO4)	5	mg/L	92	110	350	-
Total Dissolved Solids	10	mg/L	4800	1300	1200	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	128	130	80	69
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH C6-C10	0.02	mg/L	-	-	-	< 0.02
Volatile Organics						
Naphthalene[N02]	0.01	mg/L	-	-	-	< 0.01
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	MW06 Water M17-My16088 May 15, 2017	MW05 Water M17-My16089 May 15, 2017	MW04 Water M17-My16090 May 15, 2017	QC1 Water M17-My16091 May 15, 2017
Polycyclic Aromatic Hydrocarbons						
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	97	91	90	-
p-Terphenyl-d14 (surr.)	1	%	86	96	92	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.031	0.053	0.006	-
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	-
Chromium (filtered)	0.001	mg/L	0.002	< 0.001	< 0.001	-
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	-
Nickel (filtered)	0.001	mg/L	0.003	0.002	0.002	-
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.20	-

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	QC2 Water M17-My16092 May 15, 2017	MW07 Water M17-My16093 May 16, 2017	MW01 Water M17-My16094 May 16, 2017	MW02 Water M17-My16095 May 16, 2017
Chloride	1	mg/L	-	76	1000	48
pH	0.1	pH Units	-	8.0	8.3	8.4
Sulphate (as SO4)	5	mg/L	-	25	310	54
Total Dissolved Solids	10	mg/L	-	320	2700	400

Client Sample ID			**QC2**	**MW07**	**MW01**	**MW02**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**M17-My16092**	**M17-My16093**	**M17-My16094**	**M17-My16095**
Date Sampled			**May 15, 2017**	**May 16, 2017**	**May 16, 2017**	**May 16, 2017**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	110	129	122	107
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	108	139	124	98
p-Terphenyl-d14 (surr.)	1	%	121	144	124	97
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	-	< 0.05	< 0.05	< 0.05
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	-	< 0.1	< 0.1	< 0.1

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**QC2** **Water** **M17-My16092** **May 15, 2017**	**MW07** **Water** **M17-My16093** **May 16, 2017**	**MW01** **Water** **M17-My16094** **May 16, 2017**	**MW02** **Water** **M17-My16095** **May 16, 2017**
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	-	< 0.05	< 0.05	< 0.05
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	0.003	0.001	0.011
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	0.002
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.006	0.009

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**MW03** **Water** **M17-My16096** **May 16, 2017**	**MW08** **Water** **M17-My16097** **May 16, 2017**	**QC3** **Water** **M17-My16098** **May 16, 2017**	**QC4** **Water** **M17-My16099** **May 16, 2017**
Chloride	1	mg/L	530	560	-	-
pH	0.1	pH Units	8.3	8.3	-	-
Sulphate (as SO4)	5	mg/L	65	220	-	-
Total Dissolved Solids	10	mg/L	1300	1600	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	134	100	99	99
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02

Client Sample ID			MW03	MW08	QC3	QC4
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M17-My16096	M17-My16097	M17-My16098	M17-My16099
Date Sampled			May 16, 2017	May 16, 2017	May 16, 2017	May 16, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	107	135	70	51
p-Terphenyl-d14 (surr.)	1	%	115	124	68	56
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	-	< 0.05
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	-	< 0.05
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.005	0.010	< 0.001	0.003
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
TRH C6-C10 less BTEX (F1)	Melbourne	May 17, 2017	14 Day
- Method: LM-LTM-ORG-2010			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	May 19, 2017	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Melbourne	May 17, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	May 17, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Volatile Organics	Melbourne	May 17, 2017	7 Days
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	May 17, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Chloride	Melbourne	May 17, 2017	28 Day
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
pH	Melbourne	May 17, 2017	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as SO4)	Melbourne	May 17, 2017	28 Day
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Total Dissolved Solids	Melbourne	May 17, 2017	7 Day
- Method: LM-LTM-INO-4110 (Total Dissolved Solids @ 178°C - 182°C)			
Metals M8 filtered	Melbourne	May 17, 2017	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Eurofins | mgt Suite B4			
Polycyclic Aromatic Hydrocarbons	Melbourne	May 19, 2017	7 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	May 19, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Melbourne	May 19, 2017	7 Day
- Method: LM-LTM-ORG2010			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Melbourne	May 19, 2017	7 Day
- Method: TRH C6-C36 (Silica Gel Cleanup) - MGT 100A			

Company Name: Coffey Environments Pty Ltd SA
Address: Worldpark 33 Richmond Rd
Keswick
SA 5035

Project Name: AGL
Project ID: 754-ADLGE205792

Order No.:
Report #: 546443
Phone: 08 8375 4400
Fax: 08 8375 4499

Received: May 17, 2017 8:47 AM
Due: May 24, 2017
Priority: 5 Day
Contact Name: Felicia Mellors

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Chloride	pH	Sulphate (as SO4)	Total Dissolved Solids	Metals M8 filtered	TRH (after Silica Gel cleanup)	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 18217													
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	MW06	May 15, 2017		Water	M17-My16088	X	X	X	X	X	X	X	
2	MW05	May 15, 2017		Water	M17-My16089	X	X	X	X	X	X	X	
3	MW04	May 15, 2017		Water	M17-My16090	X	X	X	X	X	X	X	
4	QC1	May 15, 2017		Water	M17-My16091								X
5	QC2	May 15, 2017		Water	M17-My16092					X		X	
6	MW07	May 16, 2017		Water	M17-My16093	X	X	X	X	X	X	X	
7	MW01	May 16, 2017		Water	M17-My16094	X	X	X	X	X	X	X	
8	MW02	May 16, 2017		Water	M17-My16095	X	X	X	X	X	X	X	
9	MW03	May 16, 2017		Water	M17-My16096	X	X	X	X	X	X	X	

Company Name: Coffey Environments Pty Ltd SA
Address: Worldpark 33 Richmond Rd
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SA 5035

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Sample Detail						Chloride	pH	Sulphate (as SO4)	Total Dissolved Solids	Metals M8 filtered	TRH (after Silica Gel cleanup)	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 18217													
10	MW08	May 16, 2017		Water	M17-My16097	X	X	X	X	X	X	X	
11	QC3	May 16, 2017		Water	M17-My16098					X		X	
12	QC4	May 16, 2017		Water	M17-My16099					X	X	X	
Test Counts						8	8	8	8	11	9	11	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

**NOTE: pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
ug/L: micrograms per litre
ppb: Parts per billion
org/100mL: Organisms per 100 millilitres
MPN/100mL: Most Probable Number of organisms per 100 millilitres
mg/L: milligrams per litre
ppm: Parts per million
%: Percentage
NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/L	< 1			1	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids	mg/L	< 10			10	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Volatile Organics							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Chloride	%	105			70-130	Pass	
Sulphate (as SO4)	%	128			70-130	Pass	
Total Dissolved Solids	%	95			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	80			70-130	Pass	
TRH C10-C14	%	79			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	90			70-130	Pass	
Toluene	%	85			70-130	Pass	
Ethylbenzene	%	78			70-130	Pass	
m&p-Xylenes	%	84			70-130	Pass	
Xylenes - Total	%	84			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	%	108			70-130	Pass	
LCS - % Recovery							
Volatile Organics							
Naphthalene	%	103			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	88			70-130	Pass	
TRH C6-C10	%	80			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	84			70-130	Pass	
Acenaphthylene	%	84			70-130	Pass	
Anthracene	%	85			70-130	Pass	
Benz(a)anthracene	%	86			70-130	Pass	
Benzo(a)pyrene	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	%	77			70-130	Pass	
Benzo(g.h.i)perylene	%	71			70-130	Pass	
Benzo(k)fluoranthene	%	96			70-130	Pass	
Chrysene	%	91			70-130	Pass	
Dibenz(a.h)anthracene	%	72			70-130	Pass	
Fluoranthene	%	84			70-130	Pass	
Fluorene	%	85			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	%	76			70-130	Pass	
Naphthalene	%	81			70-130	Pass	
Phenanthrene	%	86			70-130	Pass	
Pyrene	%	86			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	83			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	98			80-120	Pass	
Cadmium (filtered)	%	97			80-120	Pass	
Chromium (filtered)	%	95			80-120	Pass	
Copper (filtered)	%	96			80-120	Pass	
Lead (filtered)	%	99			80-120	Pass	
Mercury (filtered)	%	99			70-130	Pass	
Nickel (filtered)	%	97			80-120	Pass	
Zinc (filtered)	%	97			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Chloride	B17-My15303	NCP	%	119			70-130	Pass	
Sulphate (as SO4)	B17-My10089	NCP	%	115			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M17-My15253	NCP	%	90			70-130	Pass	
TRH C10-C14	M17-My18858	NCP	%	127			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M17-My15253	NCP	%	88			70-130	Pass	
Toluene	M17-My15253	NCP	%	90			70-130	Pass	
Ethylbenzene	M17-My15253	NCP	%	85			70-130	Pass	
m&p-Xylenes	M17-My15253	NCP	%	90			70-130	Pass	
o-Xylene	M17-My15253	NCP	%	87			70-130	Pass	
Xylenes - Total	M17-My15253	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	M17-My15253	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Volatile Organics				Result 1					
Naphthalene	M17-My15253	NCP	%	71			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M17-My16076	NCP	%	111			70-130	Pass	
Acenaphthylene	M17-My16076	NCP	%	111			70-130	Pass	
Anthracene	M17-My16076	NCP	%	111			70-130	Pass	
Benz(a)anthracene	M17-My16076	NCP	%	108			70-130	Pass	
Benzo(a)pyrene	M17-My16076	NCP	%	104			70-130	Pass	
Benzo(b&j)fluoranthene	M17-My16076	NCP	%	96			70-130	Pass	
Benzo(g.h.i)perylene	M17-My16076	NCP	%	96			70-130	Pass	
Benzo(k)fluoranthene	M17-My16076	NCP	%	115			70-130	Pass	
Chrysene	M17-My16076	NCP	%	114			70-130	Pass	
Dibenz(a.h)anthracene	M17-My16076	NCP	%	86			70-130	Pass	
Fluoranthene	M17-My16076	NCP	%	103			70-130	Pass	
Fluorene	M17-My16076	NCP	%	113			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	M17-My16076	NCP	%	93			70-130	Pass	
Naphthalene	M17-My16076	NCP	%	105			70-130	Pass	
Phenanthrene	M17-My16076	NCP	%	115			70-130	Pass	
Pyrene	M17-My16076	NCP	%	105			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M17-My18858	NCP	%	123			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	M17-My16097	CP	%	98			70-130	Pass	
Cadmium (filtered)	M17-My16097	CP	%	98			70-130	Pass	
Chromium (filtered)	M17-My16097	CP	%	102			70-130	Pass	
Copper (filtered)	M17-My16097	CP	%	69			70-130	Fail	Q08
Lead (filtered)	M17-My16097	CP	%	101			70-130	Pass	
Mercury (filtered)	M17-My16097	CP	%	64			70-130	Fail	Q08
Nickel (filtered)	M17-My16097	CP	%	98			70-130	Pass	
Zinc (filtered)	M17-My16097	CP	%	98			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
pH	M17-My16592	NCP	pH Units	4.4	4.4	pass	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	M17-My16458	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M17-My16458	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M17-My16458	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M17-My15241	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	M17-My16458	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M17-My16458	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M17-My16458	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Dissolved Solids	M17-My16096	CP	mg/L	1300	1400	9.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Chloride	M17-My16097	CP	mg/L	560	520	7.5	30%	Pass	
Sulphate (as SO4)	M17-My16097	CP	mg/L	220	220	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	M17-My16097	CP	mg/L	0.010	0.009	3.0	30%	Pass	
Cadmium (filtered)	M17-My16097	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	M17-My16097	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	M17-My16097	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	M17-My16097	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	M17-My16097	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	M17-My16097	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	M17-My16097	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M17-My16099	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M17-My16099	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M17-My16099	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M17-My16099	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M17-My16099	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M17-My16099	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	M17-My16099	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C10	M17-My16099	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Volatile Organics				Result 1	Result 2	RPD			
Naphthalene	M17-My16099	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CHA..N-OF-CUSTODY AND ANALYSIS REQUE..

Page 1 of ___ 102365

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Consigning Office: ADELAIDE (KESWICK)
Report Results to: FELICIA MELLORS | Mobile: | Email: Felicia.Mellors @coffey.com
Invoices to: | Phone: (08) 8355 4400 | Email: @coffey.com

Project No: 754-ADLGE20579 #2 | Task No: LAB
Project Name: AGL | Laboratory: EUROFINS
Sampler's Name: GEOFF HARRIS | Project Manager: FELICIA MELLORS
Special Instructions: ANY QUESTIONS PLEASE CALL GEOFF H. 0408003628.

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	TRH/BTEX/PAHS	(B4)(Silica Gel)	METALS (M8)	pH	TDS	Chloride	Sulphate							NOTES
	MW06	15/5/17	PM	WATER	2V, 1A, 2P		✓	✓	✓	✓	✓	✓								
	MW05						✓	✓	✓	✓	✓	✓								
	MW04						✓	✓	✓	✓	✓	✓								
	QC1				1V		✓													TRH C6-C9 ONLY No Silica Gel
	QC2				2V, 1A, 1P		✓	✓												No Silica Gel
	MW07	16/5/16	AM	WATER	2V, 1A, 2P		✓	✓	✓	✓	✓	✓								
	MW01						✓	✓	✓	✓	✓	✓								
	MW02		PM				✓	✓	✓	✓	✓	✓								
	MW03						✓	✓	✓	✓	✓	✓								
	MW08						✓	✓	✓	✓	✓	✓								
	QC3				2V, 1A, 1P		✓	✓												No Silica Gel
	QC4		AM				✓	✓												

RELINQUISHED BY GEOFF HARRIS		RECEIVED BY	
Name:	Date: 16/5/17	Name: Pathmal	Date: 16/05
Coffey Environments	Time: 4:20pm	Company: Eurofins MGT	Time: 4:30pm
Name:	Date:	Name:	Date: 17/5
Company:	Time:	Company: ff	Time: 8:47am

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☐
All Documentation is in Proper Order ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No. 54443

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock Bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative, OP - Other Preservative

GOWANS PRINTING (02) 9735 3545

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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Phone : +61 8 9251 9600
NATA # 1261 Site # 18217

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name: **Coffey Environments Pty Ltd SA**

Contact name: Felicia Mellors
Project name: AGL
Project ID: 754-ADLGE205792
COC number: Not provided
Turn around time: 1 Day
Date/Time received: May 30, 2017 4:25 PM
Eurofins | mgt reference: **548303**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ All samples have been received as described on the above COC.
☑ COC has been completed correctly.
☑ Attempt to chill was evident.
☑ Appropriately preserved sample containers have been used.
☑ All samples were received in good condition.
☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.
☑ Sample containers for volatile analysis received with zero headspace.
☒ Some samples have been subcontracted.
N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Onur Mehmet on Phone : (+61) (3) 8564 5026 or by e.mail: OnurMehmet@eurofins.com

Results will be delivered electronically via e.mail to Felicia Mellors - Felicia_Mellors@coffey.com.

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Coffey Environments Pty Ltd SA
Worldpark 33 Richmond Rd
Keswick
SA 5035

Attention: **Felicia Mellors**

Report	**548303-W**
Project name	AGL
Project ID	754-ADLGE205792
Received Date	May 30, 2017

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**MW05** **Water** **M17-My30910** **May 15, 2017**	**MW04** **Water** **M17-My30911** **May 15, 2017**
Heavy Metals				
Arsenic (filtered)	0.001	mg/L	0.056	-
Zinc (filtered)	0.005	mg/L	-	0.18

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals (filtered)	Melbourne	May 31, 2017	180 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

Company Name: Coffey Environments Pty Ltd SA
Address: Worldpark 33 Richmond Rd
Keswick
SA 5035

Project Name: AGL
Project ID: 754-ADLGE205792

Order No.:
Report #: 548303
Phone: 08 8375 4400
Fax: 08 8375 4499

Received: May 30, 2017 4:25 PM
Due: May 31, 2017
Priority: 1 Day
Contact Name: Felicia Mellors

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Arsenic (filtered)	Zinc (filtered)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MW05	May 15, 2017		Water	M17-My30910	X	
2	MW04	May 15, 2017		Water	M17-My30911		X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

**NOTE: pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
ug/L: micrograms per litre
ppb: Parts per billion
org/100mL: Organisms per 100 millilitres
MPN/100mL: Most Probable Number of organisms per 100 millilitres
mg/L: milligrams per litre
ppm: Parts per million
%: Percentage
NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	99			80-120	Pass	
Zinc (filtered)	%	100			80-120	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

' Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Enviro Sample Vic

From: Mellors, Felicia <Felicia.Mellors@coffey.com>
Sent: Tuesday, 30 May 2017 4:25 PM
To: Onur Mehmet; Enviro Sample Vic
Subject: RE: Check samples

Yes, can we please confirm the result first and then if it is confirmed as per below, we will rerun.

Regards

Felicia Mellors
Senior Environmental Scientist

t: +61 8 8375 4523
f: +61 8 8375 4499
m: +61 424 653 591

A TETRA TECH COMPANY

From: Onur Mehmet [mailto:OnurMehmet@eurofins.com]
Sent: Tuesday, 30 May 2017 3:53 PM
To: Mellors, Felicia <Felicia.Mellors@coffey.com>; EnviroSampleVic@eurofins.com
Subject: RE: Check samples
Importance: High

Hi Felicia,

30/5
4:25p
548303

Just to confirm you need the following repeated.

COFFEY SA	MW05	MW04
AGL (754-ADLGE205792)	M17-My16089	M17-My16090
Heavy Metals		
Arsenic (filtered)	0.053	
Zinc (filtered)		0.2

25

↑ 50ml metals bottles.

Onur Mehmet
Phone : +61 3 8564 5026
Email : OnurMehmet@eurofins.com

From: Mellors, Felicia [mailto:Felicia.Mellors@coffey.com]
Sent: Tuesday, 30 May 2017 3:15 PM
To: Onur Mehmet

Subject: Check samples
Importance: High

Hi Onur
Can we please have the zinc result for MW4 and the arsenic results for MW5 checked on the attached batch.
If we can rerun the samples asap that would be appreciated.
Thanks

Regards

Felicia Mellors
Senior Environmental Scientist

Level 1, 33 Richmond Road
Keswick, SA 5035, Australia

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NATA # 1261 Site # 18217

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**Coffey Environments Pty Ltd SA**
Contact name:	Felicia Mellors
Project name:	AGL-TORRENS IS GME
Project ID:	754-ADLEN205792
COC number:	110800
Turn around time:	1 Day
Date/Time received:	Jun 2, 2017 10:26 AM
Eurofins | mgt reference:	**548558**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☑ Sample containers for volatile analysis received with zero headspace.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Onur Mehmet on Phone : (+61) (3) 8564 5026 or by e.mail: OnurMehmet@eurofins.com

Results will be delivered electronically via e.mail to Felicia Mellors - Felicia_Mellors@coffey.com.

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Coffey Environments Pty Ltd SA
Worldpark 33 Richmond Rd
Keswick
SA 5035

Attention:	**Felicia Mellors**
Report	**548558-W**
Project name	AGL-TORRENS IS GME
Project ID	754-ADLEN205792
Received Date	Jun 02, 2017

Client Sample ID			**MW04**	**QC05**	**MW05**	**QC6**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**A17-Jn01021**	**A17-Jn01022**	**A17-Jn01023**	**A17-Jn01024**
Date Sampled			**Jun 01, 2017**	**Jun 01, 2017**	**Jun 01, 2017**	**Jun 01, 2017**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	-	-	0.016	0.016
Zinc (filtered)	0.005	mg/L	0.056	0.058	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals (filtered)	Melbourne	Jun 02, 2017	180 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

Company Name:	Coffey Environments Pty Ltd SA	**Order No.:**		**Received:**	Jun 2, 2017 10:26 AM
Address:	Worldpark 33 Richmond Rd Keswick SA 5035	**Report #:**	548558	**Due:**	Jun 5, 2017
		Phone:	08 8375 4400	**Priority:**	1 Day
		Fax:	08 8375 4499	**Contact Name:**	Felicia Mellors
Project Name:	AGL-TORRENS IS GME				
Project ID:	754-ADLEN205792				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Arsenic (filtered)	Zinc (filtered)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MW04	Jun 01, 2017		Water	A17-Jn01021		X
2	QC05	Jun 01, 2017		Water	A17-Jn01022		X
3	MW05	Jun 01, 2017		Water	A17-Jn01023	X	
4	QC6	Jun 01, 2017		Water	A17-Jn01024	X	
Test Counts						2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
ug/L: micrograms per litre
ppb: Parts per billion
org/100mL: Organisms per 100 millilitres
MPN/100mL: Most Probable Number of organisms per 100 millilitres
mg/L: milligrams per litre
ppm: Parts per million
%: Percentage
NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic (filtered)			mg/L	< 0.001			0.001	Pass	
Zinc (filtered)			mg/L	< 0.005			0.005	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic (filtered)			%	98			80-120	Pass	
Zinc (filtered)			%	97			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Zinc (filtered)	B17-My29977	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

C N-OF-CUSTODY AND ANALYSIS REQU

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coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Consigning Office: ADELAIDE (KESWICK)
Report Results to: FELICIA MELLORS/TONY BRIGGS
Invoices to:
Mobile:
Phone: (08)8375 4400
Email: Felicia.Mellors @coffey.com
Email: Tony.Briggs @coffey.com

Project No: 754-ADLGE205792
Task No: LAB
Project Name: AGL-TORRENS Is. GME
Laboratory: EUROFINS
Sampler's Name: MARCEL + STEFAN + GH
Project Manager: FELICIA MELLOR/TONY BRIGGS
Special Instructions: *24 HOUR TURN-AROUND-TIME*

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	ARSENIC	ZINC	NOTES
	MW04	1/6/17	PM	WATER	IP	24 hr T-A-T		✓	
	QC05	⊥	PM	⊥	⊥	⊥		✓	
	MW05	1/6/17	PM	Water	IP	⊥	✓		
	QC6	⊥	PM	⊥	⊥	⊥	✓		

RELINQUISHED BY GEOFF HARRIS
Name: Date: 1/6/17
Coffey Environments Time: 2:00pm
→
Name: Date:
Company: Time:
→

RECEIVED BY
Name: Parimal Date: 01/06
Company: Eurofins MGT Time: 2pm
Name: Date:
Company: Time:

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☐
All Documentation is in Proper Order ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No. # 548558
Parimal

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock Bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative, OP - Other Preservative

GOWANS PRINTING (02) 9755 3545

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	**EM1706211**		
Client	**COFFEY ENVIRONMENTS PTY LTD**	Laboratory	Environmental Division Melbourne
Contact	MS FELICIA MELLORS	Contact	Bronwyn Sheen
Address	WORLDPARK LEVEL 1, 33 RICHMOND RD KESWICK SA 5035	Address	4 Westall Rd Springvale VIC Australia 3171
E-mail	felicia.mellors@coffey.com	E-mail	bronwyn.sheen@alsglobal.com
Telephone	+61 08 8375 4400	Telephone	+61-3-8549 9636
Facsimile	+61 08 8375 4499	Facsimile	+61-3-8549 9601
Project	754 - ADLGE205792	Page	1 of 2
Order number	----	Quote number	EM2017COFENV0001 (EN/077/17)
C-O-C number	102366	QC Level	NEPM 2013 B3 & ALS QC Standard
Site	AGL TORRENS Is. GME		
Sampler	GEOFF HARRIS		

Dates

Date Samples Received	17-May-2017 08:55	Issue Date	17-May-2017
Client Requested Due Date	23-May-2017	Scheduled Reporting Date	**23-May-2017**

Delivery Details

Mode of Delivery	Carrier	Security Seal	Intact.
No. of coolers/boxes	1	Temperature	5.9°C - Ice Bricks present
Receipt Detail		No. of samples received / analysed	1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - W-02 8 Metals	WATER - W-07 SG TRH/BTEXN/PAH with SG clean up
EM1706211-001	16-May-2017 00:00	QC4A	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

FELICIA MELLORS

- *AU Certificate of Analysis - NATA (COA)	Email	felicia.mellors@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	felicia.mellors@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	felicia.mellors@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	felicia.mellors@coffey.com
- A4 - AU Tax Invoice (INV)	Email	felicia.mellors@coffey.com
- Chain of Custody (CoC) (COC)	Email	felicia.mellors@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	felicia.mellors@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	felicia.mellors@coffey.com

TRACY SVINGOS

- A4 - AU Tax Invoice (INV)	Email	Tracy.Svingos@coffey.com

CERTIFICATE OF ANALYSIS

Work Order : **EM1706211**
Client : **COFFEY ENVIRONMENTS PTY LTD**
Contact : MS FELICIA MELLORS
Address : WORLDPARK LEVEL 1, 33 RICHMOND RD
KESWICK SA 5035
Telephone : +61 08 8375 4400
Project : 754 - ADLGE205792
Order number : ----
C-O-C number : 102366
Sampler : GEOFF HARRIS
Site : AGL TORRENS Is. GME
Quote number : EN/077/17
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 5
Laboratory : Environmental Division Melbourne
Contact : Bronwyn Sheen
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61-3-8549 9636
Date Samples Received : 17-May-2017 08:55
Date Analysis Commenced : 18-May-2017
Issue Date : 23-May-2017 16:46

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

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

- EG020F: Results for EM1706211-001 have been confirmed by re-preparation and re-analysis.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	**QC4A**	----	----	----	----
			Client sampling date / time	16-May-2017 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM1706211-001**	--------	--------	--------	--------
				Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	**0.003**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L	<50	----	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	<100	----	----	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	----	----	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

			Client sample ID	**QC4A**	----	----	----	----
			Client sampling date / time	16-May-2017 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM1706211-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L	<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L	<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	**26.8**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	**59.9**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%	**49.7**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	**54.2**	----	----	----	----
Anthracene-d10	1719-06-8	1	%	**62.3**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	**60.7**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**94.9**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**82.4**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**96.8**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2.4.6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

ALS Environmental

QUALITY CONTROL REPORT

Work Order : **EM1706211**

Page : 1 of 6

Client : **COFFEY ENVIRONMENTS PTY LTD**
Contact : MS FELICIA MELLORS
Address : WORLDPARK LEVEL 1, 33 RICHMOND RD
KESWICK SA 5035
Telephone : +61 08 8375 4400
Project : 754 - ADLGE205792
Order number : ----
C-O-C number : 102366
Sampler : GEOFF HARRIS
Site : AGL TORRENS Is. GME
Quote number : EN/077/17
No. of samples received : 1
No. of samples analysed : 1

Laboratory : Environmental Division Melbourne
Contact : Bronwyn Sheen
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61-3-8549 9636
Date Samples Received : 17-May-2017
Date Analysis Commenced : 18-May-2017
Issue Date : 23-May-2017

ilac-MRA

NATA

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

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 895199)									
EM1706169-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.026	0.027	5.48	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 895200)									
EM1706211-001	QC4A	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 894346)									
EM1706217-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EM1706225-025	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	3220	2930	9.45	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 894346)									
EM1706217-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EM1706225-025	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	3230	2940	9.29	0% - 50%
EP080: BTEXN (QC Lot: 894346)									
EM1706217-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EM1706225-025	Anonymous	EP080: Benzene	71-43-2	1	µg/L	2440	2220	9.42	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 894346) - continued									
EM1706225-025	Anonymous	EP080: Toluene	108-88-3	2	µg/L	5	5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	26	28	6.69	0% - 50%
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	16	17	8.45	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	71	77	7.13	0% - 50%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 895199)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	108	94	108
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	86	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.1	86	110
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	100	87	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.8	87	109
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	87	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	87	107
EG035F: Dissolved Mercury by FIMS (QCLot: 895200)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	97.2	88	117
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 892907)								
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	52700 µg/L	86.0	68	144
EP071SG: C15 - C28 Fraction	----	100	µg/L	<100	101500 µg/L	104	67	133
EP071SG: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP071SG: C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 892907)								
EP071SG: >C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
EP071SG: >C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
EP071SG: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 892904)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	76.1	39	110
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	74.5	40	124
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	78.2	47	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	75.7	51	118
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	87.0	53	119
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	97.4	51	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	91.8	59	123
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	90.9	58	123
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	91.8	52	126
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	92.8	55	123
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	87.8	52	131
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	84.8	57	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	87.8	56	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	87.4	53	123

Sub-Matrix: **WATER**

				Method Blank (MB) Report	*Laboratory Control Spike (LCS) Report*			
					Spike	*Spike Recovery (%)*	*Recovery Limits (%)*	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 892904) - continued								
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	86.6	53	125
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	86.7	53	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 894346)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	95.4	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 894346)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	95.2	65	125
EP080: BTEXN (QCLot: 894346)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	94.1	76	120
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	96.2	76	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	95.6	72	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	98.8	72	130
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	78	128
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	97.6	71	129

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	*SpikeRecovery(%)*	*Recovery Limits (%)*	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020F: Dissolved Metals by ICP-MS (QCLot: 895199)							
EM1706169-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	97.3	85	131
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	104	81	133
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	93.1	71	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	98.1	76	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	96.3	75	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.6	73	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	104	75	131
EG035F: Dissolved Mercury by FIMS (QCLot: 895200)							
EM1706216-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	97.7	70	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 894346)							
EM1706211-001	QC4A	EP080: C6 - C9 Fraction	----	280 µg/L	60.6	43	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 894346)							
EM1706211-001	QC4A	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	65.5	44	122
EP080: BTEXN (QCLot: 894346)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 894346) - continued							
EM1706211-001	QC4A	EP080: Benzene	71-43-2	20 µg/L	85.6	68	130
		EP080: Toluene	108-88-3	20 µg/L	82.8	72	132

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1706211**	Page	: 1 of 5
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS FELICIA MELLORS	Telephone	: +61-3-8549 9636
Project	: 754 - ADLGE205792	Date Samples Receivec	: 17-May-2017
Site	: AGL TORRENS Is. GME	Issue Date	: 23-May-2017
Sampler	: GEOFF HARRIS	No. of samples receivec	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) QC4A	**16-May-2017**	----	----	----	**18-May-2017**	12-Nov-2017	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) QC4A	**16-May-2017**	----	----	----	**18-May-2017**	13-Jun-2017	✓
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071SG) QC4A	**16-May-2017**	**18-May-2017**	23-May-2017	✓	**19-May-2017**	27-Jun-2017	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071SG) QC4A	**16-May-2017**	**18-May-2017**	23-May-2017	✓	**19-May-2017**	27-Jun-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC4A	**16-May-2017**	**18-May-2017**	23-May-2017	✓	**19-May-2017**	27-Jun-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080) QC4A	**16-May-2017**	**18-May-2017**	30-May-2017	✓	**19-May-2017**	30-May-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080) QC4A	**16-May-2017**	**18-May-2017**	30-May-2017	✓	**19-May-2017**	30-May-2017	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) QC4A	16-May-2017	18-May-2017	30-May-2017	✓	19-May-2017	30-May-2017	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		*Count*		*Rate (%)*			*Quality Control Specification*
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	0	3	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	0	3	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	WATER	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

FREIGHT

Page 1 of 1 102366

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Consigning Office: ADELAIDE
Report Results to: FELICIA MELLORS
Mobile:
Email: Felicia . Mellors @coffey.com
Invoices to:
Phone: (08) 8375 4400
Email: @coffey.com

Project No: 754 - ADLGE205792
Task No: LAB
Project Name: AGL TORRENS Is. GME
Laboratory: ALS
Sampler's Name: GEOFF HARRIS
Project Manager: FELICIA MELLORS
Special Instructions:

Lab No.	Sample ID	Sample Date	Time	Matrix *(Soil...etc)*	Container Type & Preservative*	T-A-T *(specify)*
1	QC 4A	16/5/17	PM	WATER	2V, 1A, 1P	STD

Analysis Request Section

Lab No.	W7 SG	W2 (METALS 8)	pH	TDS
1	✓	✓		

NOTES

Environmental Division
Melbourne
Work Order Reference
EM1706211
Telephone : + 61-3-8549 9600

RELINQUISHED BY GEOFF HARRIS		RECEIVED BY	
Name:	Date: 16/5/17	Name: [illegible]	Date: 17/5
Coffey Environments	Time: 4:45pm	Company: ALS	Time: 8:05
Name:	Date:	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved In Good Condition ☐
All Documentation is in Proper Order ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No.

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock Bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative, OP - Other Preservative

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM1707096**

Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS FELICIA MELLORS	Contact	: Bronwyn Sheen
Address	: WORLDPARK LEVEL 1, 33 RICHMOND RD KESWICK SA 5035	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: felicia.mellors@coffey.com	E-mail	: bronwyn.sheen@alsglobal.com
Telephone	: +61 08 8375 4400	Telephone	: +61-3-8549 9636
Facsimile	: +61 08 8375 4499	Facsimile	: +61-3-8549 9601
Project	: 754-ADLGE205792	Page	: 1 of 2
Order number	: ----	Quote number	: EM2017COFENV0001 (EN/077/17)
C-O-C number	: 2679	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 02-Jun-2017 09:15	Issue Date	: 02-Jun-2017
Client Requested Due Date	: 05-Jun-2017	Scheduled Reporting Date	: **05-Jun-2017**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 6.2°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 2 / 2

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS
EM1707096-001	01-Jun-2017 00:00	QC5A	✓
EM1707096-002	01-Jun-2017 00:00	QC6A	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

FELICIA MELLORS

- *AU Certificate of Analysis - NATA (COA)	Email	felicia.mellors@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	felicia.mellors@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	felicia.mellors@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	felicia.mellors@coffey.com
- A4 - AU Tax Invoice (INV)	Email	felicia.mellors@coffey.com
- Chain of Custody (CoC) (COC)	Email	felicia.mellors@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	felicia.mellors@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	felicia.mellors@coffey.com

TONY BRIGGS

- *AU Certificate of Analysis - NATA (COA)	Email	tony.briggs@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tony.briggs@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tony.briggs@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tony.briggs@coffey.com
- Chain of Custody (CoC) (COC)	Email	tony.briggs@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	tony.briggs@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	tony.briggs@coffey.com

TRACY SVINGOS

- A4 - AU Tax Invoice (INV)	Email	Tracy.Svingos@coffey.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1707096**	Page	: 1 of 2
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS FELICIA MELLORS	Contact	: Bronwyn Sheen
Address	: WORLDPARK LEVEL 1, 33 RICHMOND RD KESWICK SA 5035	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 08 8375 4400	Telephone	: +61-3-8549 9636
Project	: 754-ADLGE205792	Date Samples Received	: 02-Jun-2017 09:15
Order number	: ----	Date Analysis Commenced	: 02-Jun-2017
C-O-C number	: 2679	Issue Date	: 05-Jun-2017 12:05
Sampler	: ----		
Site	: ----		
Quote number	: EN/077/17		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

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

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

			Client sample ID	**QC5A**	**QC6A**	----	----	----
			Client sampling date / time	01-Jun-2017 00:00	01-Jun-2017 00:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM1707096-001**	**EM1707096-002**	--------	--------	--------
				Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	**0.015**	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.060**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order : **EM1707096**

Client : **COFFEY ENVIRONMENTS PTY LTD**
Contact : MS FELICIA MELLORS
Address : WORLDPARK LEVEL 1, 33 RICHMOND RD
KESWICK SA 5035
Telephone : +61 08 8375 4400
Project : 754-ADLGE205792
Order number : ----
C-O-C number : 2679
Sampler : ----
Site : ----
Quote number : EN/077/17
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 3

Laboratory : Environmental Division Melbourne
Contact : Bronwyn Sheen
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61-3-8549 9636
Date Samples Received : 02-Jun-2017
Date Analysis Commenced : 02-Jun-2017
Issue Date : 05-Jun-2017

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

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 923351)									
EM1706999-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.014	0.014	0.00	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.040	0.040	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	*Laboratory Control Spike (LCS) Report*			
					Spike	*Spike Recovery (%)*	*Recovery Limits (%)*	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EG020F: Dissolved Metals by ICP-MS (QCLot: 923351)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.4	94	108
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.7	87	107

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	*SpikeRecovery(%)*	*Recovery Limits (%)*	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020F: Dissolved Metals by ICP-MS (QCLot: 923351)							
EM1706999-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	99.2	85	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	96.4	75	131

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1707096**	Page	: 1 of 4
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS FELICIA MELLORS	Telephone	: +61-3-8549 9636
Project	: 754-ADLGE205792	Date Samples Received	: 02-Jun-2017
Site	: ----	Issue Date	: 05-Jun-2017
Sampler	: ----	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container */ Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) QC5A, QC6A	**01-Jun-2017**	**----**	----	----	**02-Jun-2017**	28-Nov-2017	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		*Count*		*Rate (%)*			*Quality Control Specification*
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

URGENT

Page 1 of 1

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Consigning Office: ADELAIDE (KESWICK)
Report Results to: FELICIA MELLORS / TONY BRIGGS
Mobile:
Email: FELICIA . MELLORS @coffey.com
Invoices to:
Phone: (08) 8375 4400
Email: TONY . BRIGGS @coffey.com

Project No: 754-ADLGE205792
Task No: LAB
Project Name: AGL TORRENS IS. CME
Laboratory: ALS
Sampler's Name: C. HARRIS + MARNIE + SEFA
Project Manager: FELICIA MELLORS / TONY BRIGGS
Special Instructions: *24 HOURS TURN-AROUND-TIME *

Analysis Request Section

FREIGHT

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	ARSENIC	ZINC	NOTES
1	QC5A	1/6/17	AM	WATER	1 P	24HR T-AT		/	
2	QC6A	↓	↓	↓	↓	↓	/		

Environmental Division
Melbourne
Work Order Reference
EM1707096
Telephone : + 61-3-8549 9600

RELINQUISHED BY GEOFF HARRIS			RECEIVED BY	
Name:	Date: 1/6/17	→	Name:	Date: 2/6
Coffey Environments	Time: 5 PM		Company: [illegible]	Time: 9-15
Name:	Date:	→	Name:	Date:
Company:	Time:		Company:	Time:

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☐
All Documentation is in Proper Order ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock Bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative, **OP** - Other Preservative

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