Spicers Retreats Hotels & Lodges Pty Ltd

Surface Water Investigations for 2nd Round of Annual Monitoring at Amphitheatre and Woodcutters EcoCamps, Main Range National Park, Queensland, Australia.

Scenic Rim Trail – Thornton Trailhead to Spicers Canopy Nature Reserve, Queensland (EPBC 2016/7847)

27 July 2021

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Executive Summary

Moreton Environmental and Health (MEH) was engaged by Spicers Retreats Hotels & Lodges Pty Ltd (Spicers) to provide an annual report on water quality data for impacts of treated wastewater effluent disposal areas at Woodcutters EcoCamp and Amphitheatre View Wilderness EcoCamp, as well as the two creek crossings of Blackfellas and Dalrymple Creeks.

This data collection is designed to ensure monitoring will detect any downstream changes in surface water (SW) and ground water (GW) quality from impacts of the Woodcutters EcoCamp and Amphitheatre View Wilderness EcoCamp and creek crossings in accordance with the Scenic Rim Traill Management Plan, dated 31st March 2019, (O'Hara, 2019).

The Woodcutters site is located mid-slope about 1.8 km west of The Ramparts and about 300 m southwest of Dalrymple Creek. The site is located at an approximate elevation of 890 mAHD (Australian Height Datum) midway between two basalt flows with upper surface elevations of approximately 880 and 905 mAHD respectively.

The creek flows represent-baseflow conditions reported in Surface Water Investigations for Baseline Data Collection Plan at Amphitheatre and Woodcutters EcoCamps, Main Range National Park, Queensland, Australia, dated 5th September 2019, (MEL, 2019b). Ground water was the predominant contribution to streams at the time of the baseline report, with very dry conditions the preceding six months, which clearly demonstrated regional aquifers are some 30 – 100 m below the sites, (See Conceptual Site Models CSM, **Figures 7 and 8 in Figures**). The Surface Water Investigations for 1st Round of Annual Monitoring at Amphitheatre and Woodcutters EcoCamps, Main Range National Park, Queensland, Australia, dated 14th October 2020, (MEH, 2019), also demonstrated dry conditions. Annual rainfall in Main Range National Park in 2019 was 337.1 mm and in 2020 was 1164.7mm, (www.bom.gov.au).

Spices requested two sampling events during the wet season (January to March) and one in the dry season (April to May). MEH sampled ten (10) surface water locations during the 2021 annual monitoring in January, February and May 2021: SW01,02, 03, 04, 05, 06, 07, 08, 09 and 10, results of which are discussed below.

At the Blackfellows creek crossing Total Phosphorus at the potentially impacted site SW08 had a higher median value for the study than the baseline. The difference between the median for the control site, SW01 and the impacted site SW02 is only 20%, which may be due to the natural variation of Phosphorus levels in the creek system. Therefore, further data is required to make solid inferences.

At the unnamed creek, monitoring the potential of impact from Amphitheatre Eco Camp showed that no locations were above the maximum concentrations from the baseline study. The median for the study was greater than the baseline at location SW02, which highlights the potential for surface water impact for oxidised nitrogen (nitrite plus nitrate).

In the Dalrymple creek system monitoring the potential impact from Woodcutters Eco Camp and the Dalrymple creek crossing showed that all the water quality objective parameters were below the maximum concentrations seen in the baseline study. However, median values for the study were above the baseline study median for oxidised nitrogen at SW09,

the control site for Dalrymple creek crossing, and at all three sites for assessment of disposal areas SW04 (control), 03 (SW impact) and 06 (GW impact).

The levels of nutrients in the Dalrymple creek system required further observations of any temporal changes to levels of nutrients, as shown in section 5.5. There were no discernable trends between control sites and impacted site, the relatively high or low levels in nutrient levels shows no differentiation from control or impact sites, and there is no temporal increase in nutrient levels over time.

Levels of dissolved oxygen were below WQO for SW01, SW02, SW07 and SW08 in January and February, this may be due to higher temperatures leading to lower dissolved oxygen levels. Further data is required before inferences are made on impacts.

The comparison of median values is only possible following at least 3.5 years of monitoring (7 events), although inferences can be given following 2 years or 4 events. The levels of nutrients in the Dalrymple creek system demonstrate that the baseline levels are too conservative, and that the potential impacts of background variations in nutrient levels from rouge cattle in the national park requires further consideration.

The metalloid water concentrations for SW01, 02, 03, 04, 05, 06, 07, 08, 09 and 10 in this round of sampling were all below the LOR, with the exception of Zinc at SW10 with a value of 0.041 mg/L, demonstrating low levels of metalloids are naturally occurring from the Basalt bedrock.

Total dissolved salts, total hardness, alkalinity, chloride, major cations and SAR, measured during annual monitoring events of 2021, showed similar values between all locations over time including baseline conditions for this round of sampling; adding weight of evidence that Blackfellows and Dalrymple Creeks and their tributaries are currently predominantly being ground water-fed.

The E. coli levels in all three creek systems ranged from <1 - 710 CFU/100mL, indicating background E. coli levels of 1-1,000 CFU/100mL are consistent with low level E. coli presence in surface waters where cattle have access to surface waters within the Park.

MEH recommends continued monitoring of surface water locations to monitor any potential surface or groundwater impacts from use of the Eco Camps and creek crossings.

There should be a reassessment of baseline study data and the data collected in 2021 in locations SW01, SW02, SW03, SW04, SW05, SW06 relevant to the control site. Surface water and ground water at potentially impacted sites from disposal areas of the Eco camps should be added to the baseline data set.

A re-assessment of the trigger values in the Baseline Data Collection Plan (O'Hara, 2019) should be consider in light of the background levels of nutrients in the creek systems in the national park.

It is important to note that the comparison of median values is only possible following at least 3.5 years of monitoring (7 events), although inferences can be given following 2 years or 4 events.

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1. Introduction

This surface water assessment was conducted at monitoring sites in the Main Range National Park and as part of a 10-year Baseline Data Collection Plan (BDCP) and monitoring program that will:

- determine whether activities associated with the development and operation of the Scenic Rim Trail have an adverse impact on Matters of National Environmental Significance (MNES);
- provide thresholds that will trigger corrective actions by Spicers.

Currently, Moreton Environmental and Health Pty Ltd (MEH) maintains that the following monitoring regime is sufficient for the Environment Protection and Biodiversity Conservation Act 1999 (EPBC) assessment as outlined in the BDCP and is in accordance with the DES Monitoring and Sampling Manual, (Queensland, 2018a) and in accordance with the Scenic Rim Trial Management Plan, dated 31st March 2019, (O'Hara, 2019).

1.1 Objectives

The monitoring study objective is to monitor potential impacts from the disposal of treated effluent and the use of creek crossings.

1.2 Legislation and Guidance for Recycled Water Use

The following legislation and guidance are pertinent to recycled of treated effluent waters.

- *Environmental Protection Act 1994* Qld;
- *Environmental Protection Regulation 2008* (Qld);
- *Environmental Protection (Water) Policy* 2009;
- *Environmental Protection (Water) Policy 2009*, reprinted 29 June 2012 Queensland Government;
- *Australian Drinking Water Guidelines 6, Version 3.1;*
- *Sustainable Planning Act 2009* (Qld);
- *Work Health and Safety Act 2011* (Qld);
- *Public Health Act 2005* and *Public Health Regulation* 2005*;*
- *Water Supply (Safety and Reliability Act)* 2008.
- *Drainage and Plumbing Act 2002* (Qld);
- DEHP, (2012), "*Technical guideline on Wastewater release to Queensland waters*";
- DEHP, (2013)*, "Assessing applications for sewage treatment works*";
- DEHP, (2013), "Code of environmental compliance for certain aspects* of sewage treatment activities (ERA 63)";
- DEHP, (2013), Assessment guideline *Assessing applications for sewage treatment works* EM725 (Version 2);
- AS/NZS 1547:2000, "On site domestic wastewater management";
- *EPA, 2005, "Queensland Water Recycling Guidelines(EPA, 2005);*
- *State of Queensland, (2108) Monitoring and Sampling Manual - Environmental protection (water) policy 2009, (Queensland, 2018b).*

1.3 Rationale

The draft national guidelines (EPA, 2005) note that the sustainable use of recycled water requires adherence to the following three principles:

- Protection of public and environmental health is paramount and should never be compromised.

- Ongoing protection of public and environmental health depends on the implementation of a preventive risk management approach.
- Application of control measures and water quality requirements should be commensurate with the source of recycled water and the intended uses.

The eligibility criteria and standard conditions for sewage treatment works (Environmental Relevant Activity (ERSA) 63) states that treated effluent is permitted to be released to land provided that it is done in accordance with a written procedure that ensures:

- infiltration to ground water and subsurface flows of contaminants to surface waters are prevented;
- surface pondage and run-off of effluent is prevented;
- degradation of soil structure is minimised;
- soil sodicity and the build-up of nutrients and heavy metals in the soil and subsoil are minimised ;
- spray drift or overspray do not carry beyond effluent disposal areas;
- effluent disposal areas are maintained with an appropriate crop in a viable state for transpiration; and
- the crop on the disposal area is harvested and removed from the disposal area.

When weather conditions or soil conditions preclude the release of effluent to land, effluent must be directed to wet weather storage or be lawfully removed from the site.

A conceptual site model of the micro scale of interactions of the disposal of treated effluent on the land with the environment is shown in **Figure 6** in **Figures**.

MEH recommends a Before-After Control-Impact (BACI) study design be used to monitor surface water for impact of wastewater disposal areas in the EcoCamps and the Creek Crossings, twice a year, once in the dry and once in the wet season.

This report is the second monitoring report in a series over ten years, post the baseline report written in September 2019 and following the 1st report in October 2019.

MEH has recommended the water quality at the monitoring points must not vary more than 10% in water quality conditions compared to baseline conditions. The median values will be monitored over the long term (at least 2 years of data) and maximum conditions in any one sampling event, in accordance with the Australian & New Zealand Guidelines for Fresh & Marine Water Quality (https://www.waterquality.gov.au/anz-guidelines/monitoring/study-design/preparation#ecological).

2 Scope and Methodology

To address Spicers' requirements, we propose to complete the following monitoring regime, which MEH maintains is sufficient at the time of writing this report for the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 assessment as outlined in the BDCP, (O'Hara, 2019).

1. Annual monitoring occurring in surface and ground water networks and assessment of changes of concentration of parameters in water quality over time; and
2. Report on the baseline sampling event.

2.1 EPBC baseline data.

MEH recommends the following monitoring program:

a. for the BDCP in the surface and ground waters (if applicable) for the following parameters:
   - ***i.*** E. coli (cfu / 100 mL);
   - ***ii.*** Ammonia (mg/L as N), Total Kjeldahl Nitrogen, Nitrate, Nitrite (mg/L as N);
   - ***iii.*** Total Phosphorus, Ortho Phosphate (mg/L);
   - ***iv.*** Major Anions (Cl, SO4, HCO3, F);
   - ***v.*** Major Cations (Na, K, Ca, Mg);
   - ***vi.*** Total and dissolved metal concentrations (Al, Fe, Mn, As, Cd, Cr, Cu, Ni, Pb, Zn);
   - ***vii.*** Field Parameters of pH, DO (surface water only), ORP (ground water only), Temperature and EC.

2.2 Scope of works

MEH has devised the following scope of works and methodology to monitor any potential impact on waters from the activity of wastewater treatment and irrigation of treated effluent.

At Amphitheatre EcoCamp:

- Assess the potential drainage pathways, both ground and surface water, from the wastewater disposal area at Amphitheatre to the nearest surface water body (ephemeral or permanent);
- Sample surface water if present.

At Woodcutters EcoCamp:

- Assess the potential drainage pathways, both ground and surface water, from the wastewater disposal area at Woodcutters to the nearest surface water body (ephemeral or permanent);
- Sample surface water if present.

Ground water and surface water monitoring points will be selected and/or installed using the following guidance:

- *ANZECC and ARMCANZ (2000), National Water Quality Management Strategy, No. 7, Australian Guidelines for Water Quality Monitoring and Reporting, October 2000, Australian and New Zealand Environment and Conservation Council, and Agriculture and Resource Management and Council of Australia and New Zealand, (ANZECC & ARMCANZ, 2000).*
- *EPA Vic. (2000), Groundwater Sampling Guidelines, EPA Victorian Government,* (EPA, 2000).

Quality Control (QC) samples will be collected and/or analysed in accordance with National Environment Protection Measure (NEPM) guidelines, (NEPC, 2013b). A field duplicate sample was collected per 10 primary samples. Details of MEH quality control and quality assurance procedures can be seen in **Appendix C**.

This report is the second monitoring report since the baseline report was written in September 2019. The first annual monitoring report was issued in October 2019. Since then, Spicer's have opened the two resorts. The sewage treatment plants are treating sewage to Class A, however due to lack of agreement with the Federal Department of Environment, the treated effluent is being trucked out of the camps and the disposal to land has not occurred to date.

Spicers believe the sewage treatment plants will be commissioned and disposal of treated effluent to land will occur soon, meaning that the disposal fields are expected to open in 2021. Therefore, this monitoring round has included the locations associated with monitoring the potential impact of the land disposal areas, to add to baseline data prior to the disposal areas being used as well as reporting on water quality from the creek crossings.

3 Context of the Sites

3.1 Geology and Hydrogeology of the site

John Harbison, a hydrogeologist, further mapped the local geology during a site visit in March 2020 and made inferences on the interactions between surface and ground water at both sites.

3.1.1 Local Geology

The predominant underlying geology of the Main Range National Park is basalt, agglomerate, shale, and dolomite of the Main Range Volcanics of Oligocene to Miocene age. The Geology of the area is shown in **Figure 2** in **Figures**.

For details of the local geology, refer to Moreton Environmental Pty Ltd (MEL) previous report *Surface Water Investigations for Baseline Data Collection Plan at Amphitheatre and Woodcutters EcoCamps, Main Range National Park, Queensland, Australia*. (MEL, 2019a).

3.1.2 Local Streamflow

The geometry of the underlying consolidated rocks is significant for ground water flow. It appears there is geologic control over sub-surface flow and flow is also predominantly to the west.

For details of the local streamflow, refer to MEH previous report *Surface Water Investigations for Baseline Data Collection Plan at Amphitheatre and Woodcutters EcoCamps, Main Range National Park, Queensland, Australia.* (MEL, 2019a).

3.1.3 Ground Water Bore Search

MEL conducted an extended ground water bore search of the region around the sites, government bores within 10 km of the sites and private bores in the Goomburra, Upper Laidley Creek and Tarome areas. These are detailed in Table 1 below. All but two (2) of the ten (10) bores regularly monitored by government staff represent alluvial aquifers, as shown in **Figure 4** in **Figures**.

The bores are mainly near either Allora or Clintonvale and since these aquifers are predominantly alluvial and heavily utilised and water levels are heavily influenced by this use, no analysis or interpretation of these levels has been made in this report. Of the private bores, most have reports on bore yields and water quality (mostly only Electrical Conductivity), but there are almost no comprehensive chemical results for these private bores.

Table 1: Borehole Search

	Easting[1]	Northing[1]	Principal Aquifer(s)	Total depth (m)[2]	SWL (mbgl[3])	Yield (L/s[4])	Quality (EC units[5])
Monitored bores							
RN14310211	447,171	6,901,604	Walloon_Coal_Measures	33	3.51		3,650
RN14321009	439,670	6,913,590	Alluvium	13	3.15		387
RN42230696	405,015	6,898,411	Alluvium	25	6.24		2,150
RN42230701	418,062	6,899,344	Alluvium	14.6	5.6	0.88	494
RN42230702	418,043	6,899,460	MRV[6]	66.1	6.7		830

	Easting[1]	Northing[1]	Principal Aquifer(s)	Total depth (m)[2]	SWL (mbgl[3])	Yield (L/s[4])	Quality (EC units[5])
RN42230745	420,131	6,895,555	Alluvium	21.5	7.51		710
RN42231330	401,452	6,898,533	Alluvium	19.4	8.35		1,397
RN42231331	400,462	6,897,350	Alluvium	18.5	7.14		1,177
RN42231336	424,450	6,894,881	Alluvium	11	7.67		
RN42231337	423,143	6,896,095	Alluvium	14	8.38		1,102
Eastward bores							
RN120241	442,051	6,901,181	MRV	25.91	3	16.25	950
RN134040	442,880	6,902,690	MRV	69	36	0.5	1,200
RN138079	445,098	6,903,718	WCM	27.4	4.6	5.3	740
RN138091	444,119	6,902,883	WCM	39	11.6	1.3	940
RN138104	443,003	6,902,536	MRV	36	27	0.7	450
RN145317	442,259	6,903,003	MRV	94	48	1.25	810
RN154165	443,675	6,902,816	MRV	95	48.7		870
Upper Laidley Bores							
RN129135	439,009	6,910,109	MRV	64	9.5	0.6	975
RN129148	440,469	6,911,781	MRV	54.9	9.8	15.1	660
Goomburra Bores							
RN71848	429,461	6,904,232	MRV	40	24	0.3	430
RN80055	429,510	6,903,784	Alluvium	34	26	1.25	
RN80255	430,109	6,904,987	MRV	29	7	3	
RN80330	429,258	6,903,944	MRV	29	12		
RN108098	434,774	6,904,874	MRV	95	21	1.5	351
RN108285	430,584	6,904,837	MRV	85	8	0.6	628
RN108839	429,446	6,903,667	MRV	52	40	1.2	

Note:

1. **UTM coordinates, Zone 55;*
2. *Meters (m);*
3. *Metres below ground level (mbgl);*
4. *Litres per second (L/s); and*
5. *Electro Conductivity units (EC units).*
6. *MRV = Main Range Volcanics; WCM = Walloon Coal Measures*

From analysis of all the ground water bore records, it is concluded that:

- The local ground water is being used as water supply, mainly from alluvial bores.
- Around Goomburra, the water table is either drawn down considerably by extraction or occurs well below ground level naturally.
- Bore yields are generally moderate at about 1 L/s. While bore yields cannot be directly correlated with measurements of aquifer permeability, it is likely that the volcanic aquifers in the Main Range Volcanics are moderately permeable.

3.2 Water Quality Objectives for Dalrymple and Glengallan Creeks

The Water Quality Objectives (WQO) for Dalrymple and Glengallan Creeks are in Draft stage and the relevant catchments, including Dalrymple and Glengallan Creeks are shown in **Figure 3** in **Figures.** The Dalrymple Creek and the tributary Blackfellows Creek are considered middle Condamine River Water Type; the divide between middle and upper is a red line shown in **Figure 3** in **Figures**.

The draft WQO for Dalrymple Creek are shown below in Table 2 and listed in south eastern catchments waters in the Draft WQO for Condamine River Basin.

Low Flow Conditions are <7.9 m^3/s at gauge 422316A – Condamine River at Cecils Weir, <10.2 m^3/s at gauge 422316A – Condamine River at Cecils Weir.

High Flow Conditions are >7.9 m^3/s at gauge 422316A – Condamine River at Cecils Weir, >10.2 m^3/s at gauge 422316A – Condamine River at Cecils Weir.

Cecils Weir is located downstream in the Condamine River, in the Cecils Plains west of Nangwee and is shown in the top right-hand corner in **Figure 3** in **Figures**.

Table 2 : Water Quality Objectives for Middle Condamine Basin high ecological value

	Date Sampled	Ammonium – N	Oxidised – N	Total N	Filterable P	Total P	Chlorophyll-a	DO	Turbidity	Suspended Solids	pH	EC	Sulfate	Alkalinity
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	%	NTU	mg/L	pH Units	µS/cm	mg/L	mg/L ($CaCO_3$)
WQO Indicator percentiles Low Flow, HEV	**20th**	**3**	2	530	25	80	6	60-110	11	10	7.5	270	3	85
	50th	**6**	3	740	50	140	10		25	20	7.8	320	4	95
	80th	**15**	70	1200	110	260	21		75	60	8.1	430	5	125
WQO Indicator percentiles High Flow, HEV	**20th**	**12**	18	955	115	290	4	60-110	65	50	7.2	200	3	60
	50th	**20**	120	1210	180	470	7		165	140	7.5	240	3	75
	80th	**75**	250	1700	230	750	11		295	305	7.8	290	5	100

3.3 Site Visits

MEH visited the creek crossing sites, on the 22nd of January, 17th of February and 25th of May 2021 to take water samples at the confluence of drainage channels originating in the vicinity of the disposal areas and the creeks, as well as creek crossings.

MEH took field measurements of pH, temperature, conductivity, total dissolved solids, dissolved oxygen and turbidity at ten sites: SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09 and SW10. The sampling rationale for the above locations is shown in Table 3 in section 4.2.

The unnamed creek (Unnamed Creek 1), Dalrymple Creek, Blackfellows Creek and all the surface water locations are shown in **Figure 5** in **Figures**.

In addition, during the baseline assessment, MEH took John Harbison, a hydrogeologist, to further map the local geology and make inferences on the surface water/ground water interactions at both sites. Details of the interactions between surface and ground water at both sites are further discussed in **Section 4.2** of this report.

4 Quality Assurance/Quality Control (QA/QC)

For any given project, all investigation data is potentially subject to sampling and data reduction errors. Data quality objectives (DQO) are therefore established to control the sources of errors and quantify the errors whenever possible. Quality control (QC) procedures are designed to both increase sample data quality and help interpret discrepancies in results.

All work was conducted in accordance with industry-accepted standards and quality assured procedures. Field quality control included rigorous sample collection, decontamination procedures, and sample documentation.

Methodology of the quality assurance (QA) and quality control (QC) are further discussed in this section of the report with further details presented in **Appendix B.** Results are discussed in Section 5.

Laboratory QA and QC procedures included matrix spikes, laboratory duplicates and method blanks. The results of the QC testing are presented in the laboratory reports in **Appendix C** and the results of QC measures implemented on field duplicates are in Table 8 in the **Tables** section of this report.

4.1 Methodology

MEH sampled the surface waters directly into sample containers (new plastic 250ml bottles). This content was then transferred to sample containers with preservatives in them. The original sample containers, not containing preservative, were then refilled with water taken directly from the surface water body. All sample containers were return to the eski and cooled to 4 degrees.

Surface water was placed into sample containers using disposable nitrile gloves and a new pair of nitrile gloves was used for each sample taken. All sample containers were labelled with the surface water location, site reference and date before being placed in a chilled, darkened cooler (maximum temperature of 4°C).

QC samples were collected and/or analysed in accordance with National Environmental Protection Measure (NEPM) guidelines, (NEPC, 2013a). One field duplicate sample was collected per 10 primary samples. Further details of MEH quality control and quality assurance procedures are shown in Quality Assurance and Control (**Appendix B**).

Sampling was completed during the site visit of on the 22nd of January, 17th of February and 25th of May 2021 for all ten sample locations.

The relative difference percentages (RPDs) for field or laboratory duplicates, as shown in Table 8 for nutrients were all below 50%. Therefore, the data is considered acceptable for the purposes of this report.

All surface water sampling locations were recorded, including Easting and Northing coordinates, using a hand-held GPS device.

4.2 Sample water analysis

MEH sampled ten (10) surface water locations during the monitoring events of the 22nd January, 17th February and 25th May 2021: SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09 and SW10.

Explanations for the rationale of why the locations were chosen for continued monitoring over the 10-year period is given below, in Table 3. It should be emphasised that this rationale for surface water sampling encompasses monitoring of surface and groundwater impacts from wastewater disposal areas and impact of creek crossing.

Table 3 : Surface Water Sample Locations and Rationale

Sample ID	Rationale for locations	Rationale for locations	Field Parameters	Lab Analysis	Sampling Event June 2020
SW01	450 m down-gradient of Amphitheatre site at the confluence of the gully Unnamed Creek 1 and 2.	The closest permanent surface water to Amphitheatre site	Temperature, pH, Dissolved Oxygen Total Dissolved Solids, ORP Electrical Conductivity and Turbidity	E. coli (cfu / 100 mL); Ammonia (mg/L as N), Total Kjeldahl Nitrogen, Nitrate, Nitrite (mg/L as N); Total Phosphorus, Ortho Phosphate (mg/L); Major Anions (Cl, SO4, HCO3, F); Major Cations (Na, K, Ca, Mg); Total and dissolved metal concentrations (Al, Fe, Mn, As, Cd, Cr, Cu, Ni, Pb, Zn), Total Suspended Solids.	Not sampled
SW02	40 m upstream of SW001 in Unnamed Creek 2, which is itself a tributary of Dalrymple Creek.	Upstream of SW01 as a background water quality sample. Control site			Not sampled
SW03	380 m down-gradient of Woodcutters EcoCamp on the confluence of a gully and Dalrymple Creek.	The closest permanent surface water to Woodcutters site			Not sampled
SW04	640 m upstream of SW03 and up-gradient of Woodcutters EcoCamp in Dalrymple Creek.	Upstream of SW03 as a background water quality sample. Control site.			Not sampled
SW05	950 m down-gradient of SW01 in Unnamed Creek 1.	This location is considered far enough downstream of SW01 to have potential to be fed by ground water from beneath Amphitheatre site			Not sampled
SW06	950 m down-gradient of SW01 in Unnamed Creek 1.	This location is considered far enough downstream of SW03 to have potential to be fed by ground water from beneath Woodcutters site			Not sampled
SW07	Upstream of creek crossing on Blackfellows Creek	Upstream of creek crossing on Blackfellows Creek. Control site			Sampled
SW08	Downstream of creek crossing on Blackfellows Creek	Downstream of creek crossing on Blackfellows Creek			Sampled
SW09	Downstream of creek crossing on Dalrymple Creek	Upstream of creek crossing on Dalrymple Creek and the most upstream reference on Dalrymple Creek. Upmost control site.			Sampled
SW10	Upstream of creek crossing on Dalrymple Creek	Downstream of creek crossing on Dalrymple Creek and up stream of SW01			Sampled

The investigation was undertaken in accordance with MEH standard operating procedures (SOP_PROC_001-Soil sampling, SOP_PROC_002-Surface Water sampling, SOP_PROC_004-Quality Assurance and Quality Control) as shown in **Appendix B**, which are consistent with Qld Government-approved guidelines and industry standards, including the 2018 Monitoring and Sampling Manual, (Queensland, 2018a).

5 Surface Water Results

The topography of the gully (Unnamed Creek 2) between the site at Amphitheatre and the tributary of the Dalrymple Creek (Unnamed Creek 1) was steep, with the possibility of sub-surface hydraulic connectivity between the site at Amphitheatre and the tributary of the Dalrymple Creek. However, it is unlikely that the connectivity would be direct, or permanently in flow, or necessarily on the surface or sub terrain in any one section. There would be many channels and watercourses between the Amphitheatre site and the tributary of Dalrymple Creek.

The two-creek crossings were sampled up- and down-stream of the crossings.

The surface waters (SW) were sampled by trekking in three (3) routes. Firstly, driving up Winder Trail from Mt Castle Lookout Car Park and trekking into the location of the Blackfellows Creek crossing and sampling SW07 and SW08. The second route involved driving to just past the confluence of Dalrymple and the Unnamed creek, then trekking up Unnamed creek to locations SW05, SW01 and SW02. Lastly, we drove up to Woodcutters Lodge and trekking down the Cascades Trail and sampling in Dalrymple Creek at locations SW10, SW09, SW04, SW03 and SW06. The rationale for these and all other sampling points has been given in Table 3.

BAAM Consulting conducted a baseline surface water monitoring program of the creek crossings in 2018 (BAAM, 2018), prior to MEL conducting further baseline monitoring in 2019 (MEL, 2019a).

The correlation of BAAM report points and MEH sample points are (BAAM, 2018):

BAAM Report point	MEH test point
Reference point 1 upstream	SW07
Test point 1	SW08
Downstream test point 3	SW09

The field sheets of field measurements taken at the surface water monitoring points can be seen in **Appendix A** and all locations are shown in **Figures 9** in **Figures**.

A full summary of Surface Water Sampling Results is shown in Table 7 in **Tables** taken from laboratory results (**Appendix C**). Relevant WQO from Table 2 are compared to field and laboratory results in Table 7, and outlined in Table 4, Table 5 and Table 6 below.

The water flows at Cecils Weir appear to be zero cubic meters per second (Cumecs) or a level of approximately 3.0 m, so low flow at Cecils Creek is assumed and will be compared to the 50th percentile until such time as the data set progresses to sufficient size (14 observations) to make statistical inferences.

As recommended in the monitoring and sampling manual under the environmental protection (water) policy 2009, revised in 2018, (Queensland, 2018a). MEH has recommended the water quality at the monitoring points must not vary more than 10% in water quality conditions compared to baseline conditions. The median values will be monitored over the long term (at least 2 years of data) and maximum conditions in any one sampling event. In addition, to be conservative where limit of reporting (LOR) has been reported as is convention, MEH has calculated median values using half the value of the LOR and approximate E. coli results have been taken as absolute values.

5.1 Blackfellows Creek

In Table 4 is the summary data for Blackfellows Creek, which includes the monitoring points SW07 and SW08 assessing the impact of Blackfellows Creek crossing, with SW07 being upstream and SW08 being downstream of the crossing.

Table 4 : Comparison Water Quality Objectives in Blackfellows Creek

	Date Sampled	Ammonium – N	Oxidised – N	Total N	Filterable P	Total P	DO	Turbidity	Suspended Solids	pH	EC	Sulfate	Alkalinity
Units		µg/L	µg/L	µg/L	µg/L	µg/L	%	NTU	mg/L	pH Units	µS/cm	mg/L	mg/L ($CaCO_3$)
Low Flow 50th percentile HEV WQO		6	3	740	50	140	60-110	25	20	7.8	320	4	95
Median Value baseline		25	340	350	90	100	101.3	2	NA	6.59	85.6	1.5	29
(Minimum) Maximum Value baseline		180	560	1100	110	170	(65)107	5		(5.8)7.3	99	12	33
SW07 control site	22/01/2021	<10	<10	200	60	100	40.2	1.8	<5	5.97	109	2	11
	17/02/2021	<10	50	200	80	90	45.7	1.1	<5	5.43	92	2	14
	25/05/2021	<10	20	<100	60	90	103.2	0	6	5.87	82	2	13
SW07 Median value		5	20	200	70	95	72.5	0.55	2.5	6.04	94	2	14.5
SW08 impact site	22/01/2021	<10	<10	100	70	80	43	1.2	<5	6.15	67	2	11
	17/02/2021	10	510	900	70	140	26.9	2.9	20	5.84	68	2	13
	25/05/2021	<10	20	<100	60	80	141.2	0	<5	5.91	69	1	13
SW08 Median value		5	180	550	70	120	59.5	1.6	2.5	6.03	68.5	2	13

Notes:
NR – not recorded
NA – not applicable
Individual monitoring rounds above maximum or median values for the study above median value for the baseline are in Red

5.1.1 Nitrogen

The nitrogen values, for Ammonium – N and Oxidised – N were consistently above the 50th percentile WQO with values in the baseline study ranging from 10-180 mg/L of Ammonium – N and a median value of 25 µg/L. In the baseline study Total N showed a maximum value of 1100 µg/L above the 50th percentile WQO and a median value of 350 µg/L within the WQO.

The values in the control site SW07 for the two wet season and one dry season monitoring events were <10, <10-50 and <100-200 µg/L resulting in median values of 5, 20 and 200 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values in the potentially impacted site SW08 for the two wet season and one dry season monitoring events were <10-10, 20-510 and <100-900 µg/L resulting in median values of 5, 180 and 550 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values for this round of annual monitoring in SW07 and 08 are below the 50th percentile WQO and the maximum for baseline study for Ammonium – N and Total Nitrogen.

The median values for the study in SW07 and 08 are below the 50th percentile WQO and below the median for baseline study for Ammonium – N and Total Nitrogen.

5.1.2 Phosphorus

The Filterable Phosphorus values were consistently above the 50th percentile WQO value of 50 µg/L in the baseline study with a maximum value of 110 µg/L and a median value of 90 µg/L.

Total P values were consistently above the WQO value of 140 µg/L in the baseline study with a maximum value of 170 µg/L and a median value of 100 µg/L.

The values for Filterable Phosphorus in the control site SW07 and the impact site SW08 for the Blackfellows crossing for the two wet season and one dry season monitoring events ranged from 60-80 µg/L, resulting in median values for both of 70 µg/L for the study for both sites. This is above the 50th percentile WQO and below the median and maximum value of the 2019 baseline study.

The values for Total Phosphorus for the two wet season and one dry season monitoring events in the control site SW07 ranged from 90-100 µg/L and for the impacted site SW08 were 80-140 µg/L for the Blackfellows crossing during 2021 monitoring events. This resulted in mean values for the study of 95 µg/L for the control site SW07 and 120 µg/L for the potentially impacted site SW08.

The values for Filterable Phosphorus for SW07 and SW08 during 2021 monitoring events were above the 50th percentile WQO and below the maximum value of the baseline study.

The median values for Filterable Phosphorus for SW07 and SW08 in the study are above the 50th percentile WQO and below the median value of the baseline study.

The values for Total Phosphorus for SW07 and SW08 during 2021 monitoring events were below the 50th percentile WQO and the maximum value of the baseline study.

The median values for Total Phosphorus for SW07 in the study is below the 50th percentile WQO and the median value of the baseline study.

The median values for Total Phosphorus for SW08 in the study is below the 50th percentile WQO although above the median value of the baseline study.

5.1.3 Sulphate and Alkalinity

Sulphate and Alkalinity were within the 50th percentile WQO for all the locations over time in the baseline study with a median of 1.5 mg/L and 29 mg/L respectively.

The Sulphate and Alkalinity values in the control site SW07 for the Blackfellows crossing ranged from 2 and 11 to 14 µg/L respectively during 2021 monitoring events resulted in a median value of 2 and 14.5 µg/L respectively for the study. These values are below the 50th percentile WQO and the median and maximum value of the baseline study.

The Sulphate and Alkalinity values in the potentially impacted site SW08 for the Blackfellows crossing ranged from 1 to 2 and 11 to 13 µg/L respectively during 2021 monitoring events resulting in median values of 2 and 13 µg/L respectively for the study. These values are below the 50th percentile WQO and the median and maximum value of the baseline study.

5.1.4 Field Parameters Dissolved Oxygen, pH, Conductivity

pH values were lower than the 50th percentile WQO in the baseline study, which reflects the slightly acid conditions due to the influence of ground water or surface run-off on surface waters (Brodie, 2002). The median value of pH in Blackfellows Creek in the baseline study was 6.59, which is lower than the 50th percentile WQO of 7.8.

EC in Blackfellows Creek in the baseline study shows fresher water systems than the 50th percentile WQO for the middle Condamine River at low flows and reflects the influence of ground water on surface water systems in this area. The median value was 85.6 µS/cm which was well below the 50th percentile WQO of 320 µS/cm.

DO in Blackfellows Creek in the baseline study was consistently within the 50th percentile WQO of 60-110%, with a median value of 101.3%. Turbidity in the baseline study was consistently below the 50th percentile WQO with a median value of 2 NTUs.

The pH value in the control site SW07 for the Blackfellows crossing during 2021 monitoring events was 5.43 -5.97, being slightly more than a 10% change of the median value from the baseline study and within the 20th and 80th percentile of the WQO. The pH value in the potentially impacted site SW08 for the Blackfellows crossing during 2021 monitoring events was 5.84-6.15, being slightly more than a 10% change of the median value from the baseline study and within the 20th and 80th percentile of the WQO.

The EC value in the control site SW07 for the Blackfellows crossing during 2021 monitoring events were 82-109, which is a fresher value than the median baseline study and within the 20th and 80th percentile of the WQO. The EC value in the potentially impacted site SW08 for the Blackfellows crossing during 2021 monitoring events were 67-69, which is a fresher value than maximum value of baseline study and within the 20th and 80th percentile of the WQO.

The median value of EC for the study at SW07 was 94 µS/cm and median value of EC for the study at SW08 was 68.5 µS/cm. The values for this round and the median values for the study in SW07 and SW08 are well below the 50th percentile WQO. The value for SW08 is fresher than the median value for the baseline study and the value for SW07 is within the median and maximum value for the baseline study. The fresher value at SW08 reflects the higher rainfall in 2021 than 2019.

The DO value in the control site SW07 for the Blackfellows crossing during 2021 monitoring events were ~40-45 in the wet season and 103.2%, in the dry season, resulting in a median value of 72.5% for the study. The DO value in the potentially impacted site SW08 for the Blackfellows crossing during 2021 monitoring events were ~27-43 in the wet season and 141.2%, in the dry season, resulting in a median value of 59.5% for the study.

The DO values during 2021 dry season monitoring events are above the 80th percentile of the WQO and maximum and median values of the baseline study. The DO values during 2021 wet season monitoring events are below the 80th percentile of the WQO and maximum and median values of the baseline study.

The lower DO values during the wet season, reflects the high temperatures leading to lower DO values. Water temperature and salinity can control potential dissolved oxygen

concentrations through their influence on the saturation capacity of water, as temperature and/or salinity increase, saturation capacity is reduced, (Franklin, 2014).

The turbidity value in the control site SW07 and the potentially impacted site SW08 for the Blackfellows crossing during 2021 monitoring events ranged from 0-2.9., which is below the 50th percentile WQO and the maximum values of the baseline study.

The turbidity median values for both sites are also below the 50th percentile WQO and median values of the baseline study.

5.2 Unnamed Creek

In Table 5 is the summary data for Unnamed Creek, a tributary of Dalrymple, which includes the monitoring points SW01, SW02 and SW05 assessing the potential impact of disposal fields at Amphitheatre lodge, with SW05 being the downstream monitoring point detecting the groundwater fed from beneath Amphitheatre lodge and SW01 being the upstream and SW02 being downstream of the gulley connecting the run off from Amphitheatre lodge to the unnamed creek and the Dalrymple river system. Refer to page 7 in Figures, Amphitheatre Groundwater Conceptual Site Model for details on the relationship of surface and groundwater from Amphitheatre Eco Camp into the tributary, Unnamed.

In Table 5 is the summary data for the unnamed Creek 1, which includes SW01, SW02 and SW05, monitoring the impact of wastewater from Amphitheatre site, on surface water, background and ground water respectively.

Table 5 : Comparison Water Quality Objectives in Unnamed Creek 1

	Date Sampled	Ammonium – N	Oxidised – N	Total N	Filterable P	Total P	DO	Turbidity	Suspended Solids	pH	EC	Sulfate	Alkalinity
Units		µg/L	µg/L	µg/L	µg/L	µg/L	%	NTU	mg/L	pH Units	µS/cm	mg/L	mg/L ($CaCO_3$)
Low Flow HEV WQO		6	3	740	50	140	60-110	25	20	7.8	320	4	95
Median Value baseline		30	60	400	80	80	102.5	1.95	NA	6.88	88.5	2	39
(Minimum) Maximum Value baseline		60	1020	1400	100	170	111.7	2.6		7.36	118	4	42
SW01 control site	22/01/2021	<10	40	100	60	60	146.4	0	7	7.01	90	2	25
	17/02/2021	<10	40	100	70	70	55.7	0	<5	6.82	71	2	29
	25/05/2021	<10	50	200	50	70	138	0	78	6.89	65	2	26
SW01 median value		5	45	200	70	70	88.5	0	7	6.85	80.5	2	33.5
SW02 potentially impacted SW site	22/01/2021	<10	50	200	60	60	68.6	0	<5	6.96	99	2	24
	17/02/2021	<10	70	200	70	70	55.5	3.5	<5	6.82	17	2	29
	25/05/2021	20	240	300	50	70	153	0	<5	6.85	71	2	20
SW02 median value		15	65	250	70	70	73.05	0	2.5	6.88	78.5	2	32
	22/01/2021	<10	<10	200	50	60	76.5	0	<5	6.44	114	2	32

	Date Sampled	Ammonium – N	Oxidised – N	Total N	Filterable P	Total P	DO	Turbidity	Suspended Solids	pH	EC	Sulfate	Alkalinity
SW05 potentially impacted GW site	17/02/2021	30	20	300	70	80	69	0	<5	6.41	96	1	38
	25/05/2021	<10	20	<100	50	80	169	0	<5	6.45	85	2	27
SW05 median value		5	20	200	70	80	86.6	0	2.5	6.45	96	2	38

Notes:
NR – not recorded
NA – not applicable
Individual monitoring rounds above maximum or median values for the study above median value for the baseline are in Red

5.2.1.1 Nitrogen

The nitrogen values, for Ammonium – N and Oxidised – N were consistently above the 50th percentile WQO with values in the baseline study with a maximum value of 60 µg/L and 1020 µg/L and median values of 30 µg/L and 60 µg/L for Ammonium – N and Oxidised -N respectively. In the baseline study Total N showed a maximum value of 1400 µg/L above the 50th percentile WQO and a median value of 400 µg/L within the WQO.

The values in the control site SW01 during 2021 monitoring events were <10, 40 - 50 and 100 - 200 µg/L resulting in median values of 5, 45 and 200 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values in the potentially surface water impacted site SW02 during 2021 monitoring events were <10 - 20, 50 - 240 and 200 - 300 µg/L resulting in median values of 15, 65 and 250 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values in the potentially groundwater impacted site SW05 during 2021 monitoring events were <10 - 30, <10 - 20 and <100 - 300 µg/L resulting in median values of 5, 20 and 200 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values during 2021 monitoring events are above the 50th percentile WQO and below the maximum for baseline study for Ammonium – N and Oxidised – N.

The values during 2021 monitoring events are below the 50th percentile WQO and the maximum for baseline study for Total Nitrogen.

The median values for this study are above the 50th percentile WQO and below the median for baseline study for Ammonium – N, Oxidised – N and Total Nitrogen, except for the median value for the study for oxidised-N which has a value 5 µg/L above the median for the baseline study.

5.2.1.2 Phosphorus

The Filterable Phosphorus values were consistently above the 50th percentile WQO value of 50 µg/L in the baseline study with a maximum value of 100 µg/L and a median value of 80 µg/L.

Total P values were consistently above the WQO value of 140 µg/L in the baseline study with a maximum value of 170 µg/L and a median value of 80 µg/L.

The values for Filterable Phosphorus in the control site SW01 and the impact sites SW02 and SW05 for the unnamed creek during 2021 monitoring events were all 50 µg/L which is equal to the 50th percentile WQO and below the maximum value of baseline study.

The values in the control site SW01 for the unnamed creek were 50 - 70 µg/L, the potentially SW impacted site SW02 were 50 - 70 µg/L and for the potentially GW impacted site SW05 were 50 - 70 µg/L during 2021 monitoring events. Resulting in median values for the study of 70 µg/L for the control site SW01, the potentially SW impacted site SW02 and the potentially GW impacted site SW05, which is above the 50th percentile WQO and below the median value of the baseline study.

The values during 2021 monitoring events for Total P for SW01, SW02 and SW05 were 60 - 70, 70 and 80 µg/L respectively, which were below the 50th percentile WQO and below the maximum value of the baseline study for both this round and the mean for the study.

The median values of Total P for SW01, SW02 and SW05 for the study were 70, 70 and 80µg/L respectively, all below the 50th percentile WQO and below the median value of baseline study.

5.2.1.3 Sulphate and Alkalinity

Sulphate and Alkalinity were within the WQO and below the maximum and median values for the baseline study during 2021 monitoring events and the median of the study.

5.2.1.4 Field Parameters Dissolved Oxygen, pH, Conductivity

pH values for all three sites, SW01, SW02 and SW05, were similar during 2021 monitoring events with a range of 6.41 – 7.01, resulting in median values for the study for all three locations ranging from 6.45 – 6.88.

These values are lower than the WQO, which reflects the slightly acid conditions due to the influence of ground water or surface run-off on surface waters (Queensland, 2018c) (Brodie, 2002). The median value of pH in the unnamed Creek is 6.88, which is lower than the WQO of 7.8.

Conductivity (EC) in the unnamed Creek shows fresher water systems than the WQO for the middle Condamine River at low flows and reflects the influence of ground water on surface water systems in this area. The median values of 78.5-96 µS/cm are well below the WQO of 320 µS/cm.

The median values for the study for all locations for Dissolved oxygen in the unnamed Creek was consistently within the WQO of 60-110%, with a median value ranging from 73.05 to 86.6% for the Unnamed Creek. The values during 2021 dry season monitoring event (25 May) were higher than the WQO or the median or maximum values for the study ranging from 138 to 169% for the Unnamed Creek, reflecting the higher rainfall in 2021, higher flows and increased oxygen levels. The values of DO during 2021 wet season monitoring event (January and February) were lower than the WQO in SW01 and SW02 and slightly higher in SW05. The lower values during the wet season reflect high water temperatures leading to reduced DO levels.

Turbidity was consistently below the WQO with median values and values during 2021 monitoring events were zero NTU, with the exception of February event in SW02 with a slightly higher value of 3.5, above the maximum value in the baseline study, however, well below the WQO of 25, reflecting a low maximum baseline study value.

5.3 Dalrymple Creek

In Table 6 is the summary data for Dalrymple Creek, which includes monitoring the impact of surface water run-off and groundwater fed systems from the Woodcutters camp disposal areas, as well as Dalrymple Creek crossing, with SW09 being downstream and SW10 being upstream of the crossing. It should also be noted that SW10 is the upper most sampling point in Dalrymple Creek, which is the ultimate background or control sample for the Dalrymple Creek system

Table 6 : Comparison Water Quality Objectives in Dalrymple Creek

	Date Sampled	Ammonium – N	Oxidised – N	Total N	Filterable P	Total P	DO	Turbidity	Suspended Solids	pH	EC	Sulfate	Alkalinity
Units		µg/L	µg/L	µg/L	µg/L	µg/L	%	NTU	mg/L	pH Units	µS/cm	mg/L	mg/L ($CaCO_3$)
Low Flow HEV WQO		6	3	740	50	140	60-110	25	20	7.8	320	4	95
Median Value baseline		70	135	850	80	75	105.5	3.95	NA	7.28	83.2	1.5	34
Maximum Value baseline		90	970	2000	100	500	76-114	29.9		6.15-7.94	105	5	50
Woodcutters Camp													
SW03 Potential SW impact site	22/01/2021	<10	30	200	80	90	73	2.7	<5	6.04	100	1	31
	17/02/2021	40	70	600	90	90	119.6	1.4	<5	7.3	97	1	35
	25/05/2021	<10	50	200	60	100	182.4	0	<5	7.27	75	2	33
SW03 Median value		7.5	45	200	85	85	95.45	1.4	2.5	6.72	96	1	38.5
SW04 control site	22/01/2021	20	110	300	70	90	78.7	3.8	<5	6.66	88	2	26
	17/02/2021	<10	50	200	80	90	112.7	2.6	<5	7.2	87	1	30
	25/05/2021	20	50	400	60	100	173	1.2	<5	7.01	76	1	25
SW04 Median value		20	95	350	75	90	93.35	1.5	2.5	6.66	87.5	1	33.5
SW06 Potential GW impact site	22/01/2021	<10	50	200	70	90			5			1	39
	17/02/2021	10	20	200	90	90	97.6	0.5	<5	7.38	99	1	38
	25/05/2021	30	40	200	60	60	166	0	<5	7.23	69	1	30
SW06 Median value		10	40	200	70	90	102.3	1	2.5	6.75	85	1	39
Dalrymple Creek Crossing													
SW09 control site	22/01/2021	<10	190	400	60	80	78.7	3.4	<5	7.04	84	1	29
	17/02/2021	10	160	300	80	80	119.6	2.3	<5	7.14	81	1	32
	25/05/2021	<10	40	<100	50	80	173.1	3.3	<5	6.98	79	1	25
SW09 Median value		10	165	350	60	75	110.75	3.35	2.5	7.09	82.5	1	32
SW10 potentially impacted site	22/01/2021	<10	60	300	60	80	74.4	4.1	<5	7.18	92	1	32
	17/02/2021	<10	460	600	70	80	82	3.7	<5	7.04	92	2	35
	25/05/2021	<10	30	200	70	100	154	2.2	9	6.83	74	1	20

	Date Sampled	Ammonium – N	Oxidised – N	Total N	Filterable P	Total P	DO	Turbidity	Suspended Solids	pH	EC	Sulfate	Alkalinity
Units		µg/L	µg/L	µg/L	µg/L	µg/L	%	NTU	mg/L	pH Units	µS/cm	mg/L	mg/L ($CaCO_3$)
SW10 Median value		5	85	300	70	80	84	2.95	2.5	7.08	87	1	33.5

Notes:
NR – not recorded
NA – not applicable
Individual monitoring rounds above maximum or median values for the study above median value for the baseline are in Red

5.3.1.1 Nitrogen

The nitrogen values, for Ammonium – N and Oxidised – N were consistently above the 50th percentile WQO with values in the baseline study with a maximum value of 90 µg/L and 970 µg/L and median values of 70 µg/L and 135 µg/L for Ammonium – N and Oxidised -N respectively. In the baseline study Total N showed a maximum value of 2000 µg/L and a median value of 850 µg/L, both values being above the 50th percentile WQO.

5.3.1.1.1 Assessment of disposal fields from Woodcutters Camp

The values in the control site SW04 for Ammonium – N, Oxidised – N and Total Nitrogen during 2021 monitoring events were <10 - 20, 50 - 110 and 200 - 400 µg/L resulting in median values of 20, 95 and 350 µg/L for respectively.

The values in the potentially SW impacted site SW03 for Ammonium – N, Oxidised – N and Total Nitrogen during 2021 monitoring events were <10 - 40, 30 - 70 and 200 - 600 µg/L resulting in median values of 7.5, 45 and 200 µg/L respectively.

The values in the potentially GW impacted site SW06 for Ammonium – N, Oxidised – N and Total Nitrogen during 2021 monitoring events were <10 - 30, 20 - 50 and 200 µg/L resulting in median values of 10, 40 and 200 µg/L respectively.

The values during 2021 monitoring events are above the 50th percentile WQO except for total nitrogen, which is below the WQO for SW03, SW04 and SW06. The values for SW03, SW04 and SW06 are below the maximum for this round. Median values for the study were below median values in the baseline study for Ammonium – N, Oxidised – N and Total Nitrogen.

5.3.1.1.2 Assessment of Dalrymple Creek crossing

The values in the control site SW09 during 2021 monitoring events were <10 - 10, 40 - 190 and <100 - 400 µg/L resulting in median values of 10, 165 and 350 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values in the potentially impacted site SW10 during 2021 monitoring events were <10, 30 and 200 µg/L resulting in median values of <10 - 5, 30 - 460 and 200 - 600 µg/L for Ammonium – N, Oxidised – N and Total Nitrogen respectively.

The values during 2021 monitoring events are above the 50th percentile WQO, except for total nitrogen which is below the WQO for SW09 and 10. The values for SW09 and 10 are below the maximum during 2021 monitoring events, and median values for the study were below the median value from the baseline study for Ammonium – N, Oxidised – N and Total

Nitrogen with the exception of SW09 where the median value for the study is over the median value from the baseline study.

5.3.1.2 Phosphorus

5.3.1.2.1 Assessment of disposal fields from Woodcutters Camp

The Filterable Phosphorus values were consistently above the 50th percentile WQO value 50 µg/L in the baseline study with a maximum value of 100 µg/L and a median value of 80 µg/L.

The values in the control site SW04 during 2021 monitoring events were 60 - 80 and 90 - 100 µg/L resulting in median values for the study of 75 and 90 µg/L for Filterable and Total Phosphorus respectively.

The values in the potentially SW impacted site SW03 during 2021 monitoring events were 60 – 90 and 90 - 100 µg/L resulting in median values for the study of 85 and 85 µg/L for Filterable and Total Phosphorus respectively.

The values in the potentially GW impacted site SW06 during 2021 monitoring events were 60 - 90 and 60 - 90 µg/L resulting in median values for the study of 70 and 90 µg/L for Filterable and Total Phosphorus respectively.

The values of Filterable P for SW03, SW04 and SW06 were above the 50th percentile WQO and below the maximum value of the baseline study during 2021 monitoring events. The median values of Filterable P for SW03, SW04 and SW06 for the study were all above the median value for the baseline study.

The values of Total P during 2021 monitoring events for SW03, SW04 and SW06 were below the 50th percentile WQO and the maximum value of the baseline study.

The values of Total P for the median for the study for SW03, SW04 and SW06 were below the 50th percentile WQO and above the median value for the baseline study.

5.3.1.3 Sulphate and Alkalinity

Sulphate and Alkalinity were within the WQO and below the maximum during 2021 monitoring events and median values for the study were below the median baseline study, except for SW03 and 06.

5.3.1.4 Field Parameters Dissolved Oxygen, pH, Conductivity for all locations in Dalrymple Creek (both Woodcutters Camp and Dalrymple Creek crossing)

pH values for all five sites, SW03, SW04, SW06, SW09 and SW10 were similar during 2021 monitoring events with a range of 6.04 – 7.30, resulting in median values for the study for all three locations ranging from 6.66 – 6.83, again demonstrating increase in surface water to groundwater ration in the Dalrymple creek this round compared to the median of the study.

These values are lower than the WQO, which reflects the slightly acid conditions due to the influence of ground water or surface run-off on surface waters (Queensland, 2018c) (Brodie, 2002). The median value of pH in the unnamed Creek is 6.88, which is lower than the WQO of 7.8.

Conductivity (EC) in the Dalrymple Creek shows fresher water systems than the WQO for the middle Condamine River at low flows and reflects the influence of ground water on surface

water systems in this area. The median value of 82.5-96 µS/cm is well below the WQO of 320 µS/cm and maximum value for the study of 105.

The median values for the study for all locations for Dissolved Oxygen (DO) in the Dalrymple Creek was consistently within the WQO of 60-110%, with a median value ranging from 84 to 110.75% for the Dalrymple Creek. The values during 2021 monitoring events were higher than the WQO or the maximum values for the study ranging from 73 to 182.4% for the Dalrymple Creek, with higher values during May than January or February reflecting the effect of higher temperatures on dissolved oxygen levels. The higher dissolved oxygen levels in the study compared to baseline reflects the higher rainfall in 2021, higher flows and increased oxygen levels.

Turbidity was consistently below the WQO and maximum values for baseline during 2021 monitoring events ranged from 0 - 3.8 NTUs; with median values for the study ranging from 1.0-3.35 NTU below the WQO and the median value in the baseline study.

5.4 Summary of metalloids, anions, cations and biological parameters in all Creek Systems

The metalloid water concentrations for all locations were all below the Laboratory of Reporting (LOR) for this year's round of sampling with the occasional value being marginally above the LOR for metalloid water concentrations of Aluminium, Manganese, and Iron, reflecting the mineralisation of the waters. The levels of Chromium, Copper and Nickel slightly above the LOR reflect the influence of the Basalt bedrock on the waters. There was only one value of metalloid water concentrations of Zinc an order of magnitude above the LOR, in the baseline study with a value of 0.024 mg/L at SW08. This demonstrates that low levels of metalloids are naturally occurring from the Basalt bedrock.

Continued monitoring of the surface water locations on an annual basis will be adequate to monitor any changes of water quality due to the influence of both overland flow and ground water from the sites.

Other parameters measured during 2021 monitoring events such as total dissolved salts, total hardness, alkalinity, chloride, major cations, SAR can be seen in **Appendix C**. The values are all similar between all locations over time, including baseline conditions and this round of sampling, adding to the weight of evidence that Blackfellows and Dalrymple Creeks and their tributaries are currently predominantly being ground water-fed.

There were levels of E. coli above the LOR in the creeks at all locations in both Creeks with values mostly ranging from <1-14 CFU/100mL in the baseline study, with the exception of one value of 6300 CFU/100mL which is considered an anomaly.

The E. coli levels in all three creek systems ranged from <1 - 710 CFU/100mL. These levels of background E. coli of 1-500 CFU/100mL are consistent with low level E. coli presence in surface waters which cattle have access to within the Park.

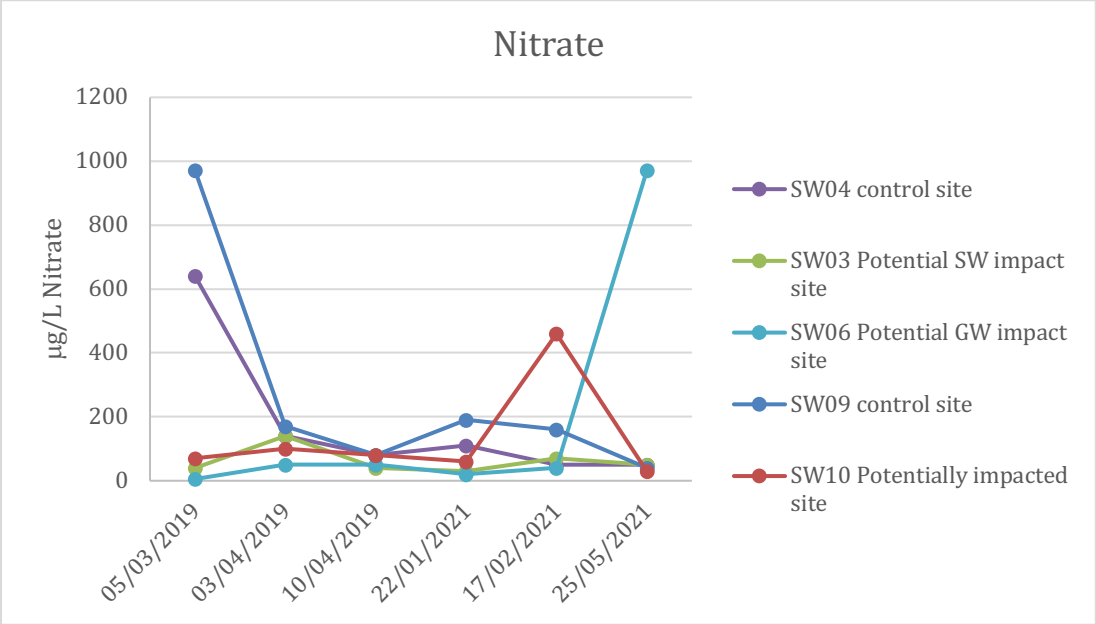
5.5 Changing nutrient levels over time

It is understood that from the data presented in section 5, nutrients Ammonium – N, Oxidised – N, Total N, Filterable P and Total P in Dalrymple Creek system have the potential to be increasing, therefore graphical representation of changes over time are required.

From the data, in Table 7 it can be seen that the main contributor to Nitrogen is Total Kjeldahl Nitrogen and Nitrate Nitrogen and the main contributor to Phosphorus is the

Reactive Phosphorus or Filterable Phosphorus. Therefore, we have graphed these parameters over time.

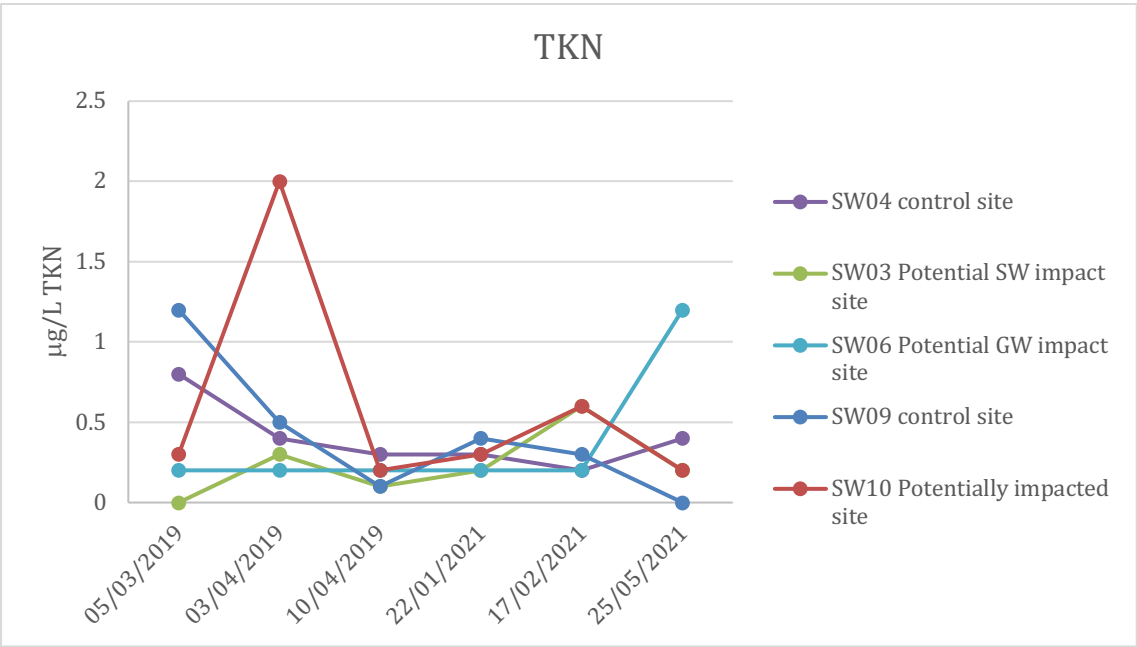
Graph 1 : Changes of Nitrate over time within Dalrymple Creek System



Considering the graph above the following observations are made:

1. There is no discernable trend between control sites and impacted site;
2. The four relatively high results are in SW04, SW06 in 2019 and SW10 and SW06 in 2021; and
3. There is no temporal increase in Nitrate over time.

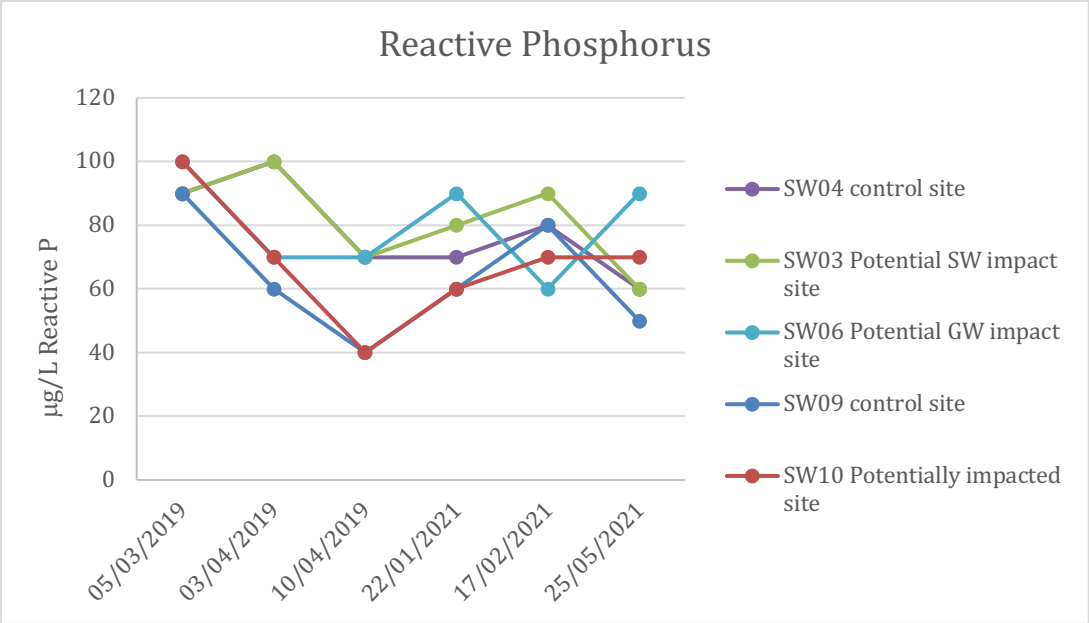
Graph 2 : Changes of Nitrate over time within Dalrymple Creek System



Considering the graph above the following observations are made:

1. There is no discernable trend between control sites and impacted site;
2. The two relatively high results are in SW10 in 2019 and SW10 and SW06 in 2021; and
3. There is no temporal increase in Total Kjeldahl Nitrogen over time.

Graph 3 : Changes of Nitrate over time within Dalrymple Creek System



Considering the graph above the following observations are made:

1. There is no discernable trend between control sites and impacted site;
2. There are two relatively low results with drop in levels in SW09 and SW10 in 2019;
3. There is no temporal increase in Reactive Phosphorus over time.

6 Conclusions and recommendations

6.1 Conclusions

MEH was engaged by Spicers to provide water quality data for the influence of disposal areas of Amphitheatre and Woodcutters Eco Camps, as well as two creek crossings of Blackfellows and Dalrymple Creeks.

MEH maintains the current monitoring regime, outlined below, is sufficient for the Environment Protection and Biodiversity Conservation Act 1999 (EPBC) assessment as outlined in the BDCP (O'Hara, 2019) and is in accordance with the DES Monitoring and Sampling Manual, (Queensland, 2018a).

This report is the second monitoring report since the baseline report was written in September 2019. Since this report was written, Spicer's have opened the two resorts, they have commissioned the sewage treatment plants, however, disposal of treated effluent has not occurred to land. However, as there is intention to do this in 2021, MEH recommended monitoring surface water and ground water at relevant surface water sites should resume.

MEH has recommended the water quality at the monitoring points must not vary more than 10% in water quality conditions compared to baseline conditions. The median values will be monitored over the long term (at least 2 years of data) and maximum conditions in anyone sampling event, (https://www.waterquality.gov.au/anz-guidelines/monitoring/study-design/preparation#ecological).

MEH sampled ten (10) surface water locations during monitoring events in 2021 on the 22nd January, 17th February and 25th May 2021: in SW01, 02, 03, 04, 05, 06, 07, 08, 09 and 10.

At the Blackfellows creek crossing only total Phosphorus at the potentially impacted site SW08 had a higher median value for the study than the baseline. The high total Phosphorus concentrations at SW08 for the median of the study requires consideration as to whether the median concentrations in the baseline study were too conservative due to the small data set or that there may be potential for impact at SW08. The difference between the median for the control site, SW01 and the impacted site SW02 is only 20%. Unless there was an order of magnitude of difference between impact sites and control sites this small difference may be due to natural variation of Phosphorus levels in the creek system. Further data is required to make solid inferences. Levels of dissolved oxygen were below WQO for SW07 and 08 in January and February, which may be due to higher temperatures in February leading to lower dissolved oxygen levels. Further data is required before inferences are made.

At the unnamed creek, monitoring the potential of impact from Amphitheatre Eco Camp showed that no locations were above the maximum concentrations from the baseline study. The median for the study was greater than the baseline at location SW02, which highlights the potential for surface water impact for oxidised nitrogen (nitrite plus nitrate). Again, levels of dissolved oxygen were below WQO for SW01 and 02 in February which may also be due to higher temperatures in February leading to lower dissolved oxygen levels, further data is required before inferences are made.

In the Dalrymple creek system monitoring the potential impact from Woodcutters Eco Camp and the Dalrymple creek crossing showed that all the water quality objective parameters were below the maximum concentrations seen in the baseline study. However, median values for the study were above the baseline study median for oxidised nitrogen at SW09,

the control site for Dalrymple creek crossing, and at all three sites for assessment of disposal areas SW04 (control), 03 (SW impact) and 06 (GW impact).

The levels of nutrients in the Dalrymple creek system require further observations of any temporal changes to levels of nutrients. As shown in section 5.5, there is no discernable trend between control sites and impacted site; the relatively high or low levels in nutrient levels shows no differentiation from control or impact sites; and there is no temporal increase in nutrient levels over time.

The comparison of median values is only possible following at least 3.5 years of monitoring (7 events), although inferences can be given following 2 years or 4 events. The levels of nutrients in the Dalrymple creek system demonstrate that the baseline levels are too conservative, and that the potential impacts of background variations in nutrient levels from rouge cattle in the national park requires further consideration.

The metalloid water concentrations for SW01, 02, 03, 04, 05, 06, 07, 08, 09 and 10 in this round of sampling were all below the LOR, with the exception of Zinc at SW10 with a value of 0.041 mg/L, demonstrating low levels of metalloids are naturally occurring from the Basalt bedrock.

Other parameters measured during annual monitoring events of 2021, such as total dissolved salts, total hardness, alkalinity, chloride, major cations and SAR, can be seen in **Appendix C**. The sampling values are all similar between all locations over time including baseline conditions for this round of sampling. This adds to the weight of evidence that Blackfellows and Dalrymple Creeks and their tributaries are currently predominantly being ground water-fed.

The E. coli levels in all three creek systems ranged from <1 - 710 CFU/100mL, indicating background E. coli levels of 1-500 CFU/100mL are consistent with low level E. coli presence in surface waters where cattle have access to surface waters within the Park.

6.2 Recommendations

MEH recommends continued monitoring of surface water locations to monitor any potential impacts from the disposal of treated effluent once the land disposal of treated effluent commences. MEH also recommends the continued monitoring of potential impacts on the use of creek crossings, as well as any influence of overland flow or ground water flow from the sites.

There should be a reassessment of baseline study data and the data collected in 2021 in locations SW01, SW02, SW03, SW04, SW05, SW06 relevant to the control site. Surface water and ground water at potentially impacted sites from disposal areas of the Eco camps should be added to the baseline data set.

A re-assessment of the trigger values in the Baseline Data Collection Plan (O'Hara, 2019) should be consider in light of the background levels of nutrients in the creek systems in the national park.

It should be noted that the comparison of median values is only possible following at least 3.5 years of monitoring (7 events), although inferences can be given following 2 years or 4 events.

7 Disclaimer

This report (the "Report") has been prepared for the exclusive use of the Spicers Retreats Hotels & Lodges Pty Ltd for its own use for the purpose of assessment of surface waters in the land application areas in Amphitheatre and Woodcutters EcoCamps (the “sites”).

The Report must be read in light of:

- The limited readership and purposes for which it was intended.
- Its reliance upon information provided by the client and others which MEH has not verified and over which MEH has no control.
- The limitations and assumptions referred to throughout the Report.
- The cost and other constraints imposed on the Report.
- Other relevant issues which are not within the scope of the Report.

Subject to the limitations referred to above, MEH has exercised all due care in the preparation of the Report and believes that the information, conclusions, interpretations and recommendations of the Report are both reasonable and reliable.

No warranty or representation is made to finance or third parties (express or implied) in respect of the Report, particularly with regard to any commercial investment decision made on the basis of the Report. Use of the Report by Finance or third parties shall be at their own risk and extracts from the Report may only be published with permission of MEH. This disclaimer must accompany every copy of the Report, which is an integral document and must be read in its entirety.

8 Limitations of this report

The outcome of this Report is limited to information supplied for the activities associated with the scope of works only. It is intended that this assessment provide a description of the potential surface or groundwater contamination, and recommendations on how to address and manage any contamination issues at the site.

This Report has been prepared for Spicers Retreats Hotels & Lodges Pty Ltd for its own use and is based on information provided by Spicers Retreats Hotels & Lodges Pty Ltd. MEH takes no responsibility and disclaims all liability whatsoever for any loss or damage that Spicers Retreats Hotels & Lodges Pty Ltd may suffer as a result of using or relying on any such information or recommendations contained in this Report, except that expressly indicated in this Report where MEH has been able to verify the information to its satisfaction. This Report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein.

Should further information become available regarding the conditions at the site, including previously unknown likely sources of contamination, MEH reserves the right to review the Report in the context of the additional information.

The findings, observations and conclusions expressed in this report are not, and should not be considered as an opinion concerning the commercial feasibility of the property or asset.

The Report may contain various remarks about and observations on legal documents and arrangements such as contracts, supply arrangements, leases, licences, permits and authorities. A consulting scientist can make remarks and observations about the technical aspects and implications of those documents and general remarks and observations of a non-legal nature about the context of those documents. However, as a consulting scientist MEH is not qualified, cannot express and should not be taken as in any way expressing any opinion or conclusion about the legal status, validity, enforceability, effect, completeness or effectiveness of those arrangements or documents.

This report has been prepared by **Moreton Environmental and Health Pty Ltd** ABN: 68 169 746 123 in response to and subject to the following limitations:

1. The specific instructions received from Spicers Retreats Hotels & Lodges Pty Ltd;
2. The specific scope of works set out in PO18006, Proposal for the monitoring of ground water dated 16th January 2019;
3. This report may not be relied upon by any third party not named in this report for any purpose except with the prior written consent of **Moreton Environmental and Health Pty Ltd** (which consent may or may not be given at the discretion of **Moreton Environmental and Health Pty Ltd**);
4. This report comprises the formal report, documentation sections, tables, figures and appendices as referred to in the index to this report and must not be released to any third party or copied in part without all the material included in this report for any reason;
5. The report only relates to the site referred to in the scope of works being located at the Scenic Rim Trail – Thornton Trailhead to Spicers Canopy Nature Reserve, Queensland ("the site");
6. The report relates to the site as at the date of the report as conditions may change thereafter due to natural processes and/or site activities;
7. No warranty or guarantee is made in regard to any other use than as specified in the scope of works and only applies to the depth tested and reported in this report;

8. Fill, soil, ground water and rock to the depth tested on the site may be fit for the use specified in this report. Unless it is expressly stated in this report, the fill, soil and/or rock may not be suitable for classification as clean fill if deposited off site; and
9. Our General Limitations set out at the back of the body of this report.

9 References

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10 Glossary and Terms

Acidify addition of acid to lower pH.

AHD Australian Height Datum, equivalent to Mean Sea Level in south-east Queensland

Aquifer rock or sediment in a formation, group of formations, or part of a formation, which is/are saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

Aquifer, confined aquifer that is overlain by a confining bed with significantly lower hydraulic conductivity than the aquifer.

Aquifer, perched region in the unsaturated zone where the soil is locally saturated because it overlies soil or rock of low permeability.

Aquitard a unit of low permeability that can store ground water and also transmit it slowly.

Background natural level of a property/parameter.

Baseline initial value of a measure.

Borehole an uncased well drill hole.

Cobble rock fragment rounded or abraded between 64 and 256 mm in diameter. Cobbles are larger than gravel and smaller than boulders.

Coliform count coliform bacteria are found in the gut of many vertebrates and are commonly associated with decaying organic matter.

Conductivity (EC) electrical conductivity of water is an expression of its ability to conduct an electric current. This property is related to the ionic content of the sample, which is in turn a function of the total dissolved (ionisable) solids (TDS) concentration. An estimate of TDS (mg/L) in fresh water can be obtained by multiplying EC (µS/cm) by 0.65.

Confidence Limits (statistics) an interval so constructed as to have a prescribed probability of containing the true value of an unknown parameter.

Confined Aquifer an aquifer with upper and/or lower boundaries confined by an almost impermeable geological formation, e.g. a clay layer. The water in these aquifers is usually under hydraulic pressure, e.g. artesian or sub-artesian conditions.

Confining layer an aquitard or sparingly permeable layer that confines the limits of an aquifer.

Contaminant generally, any chemical species introduced into the soil or water. More particularly relates to those species that render soil or water unfit for beneficial use.

Contamination is considered to have occurred when the concentration of a specific element or compound is established as being greater than the normally expected (or actually quantified) background concentration.

CSM Conceptual Site Model(s), simplified diagrams /descriptions of physical settings and processes.

Discrete sample samples collected from different locations and depths that will not be composited but analysed individually.

Effective Persons (EPs) are a theoretical number of people to occupy a dwelling for the purposes of estimating influent loads on a wastewater treatment plant.

Electrolytic conductivity (EC) (see **Conductivity**)

Fracture break in the geological formation, e.g. a shear or a fault.

Gleyed soils waterlogged soils. Develop where drainage is poor or the water table is high. A reducing environment exists in the saturated layers, which become mottled greyish-blue or brown because of the content of ferrous iron and organic matter.

Gradational lower boundary between soil layers (horizons) has a gradual transition to the next layer. The solum (soil horizon) becomes gradually more clayey with depth.

Groundwater investigation level (GIL) is the concentration of a ground water parameter at which further investigation (point of extraction) or a response (point of use) is required. Includes Australian water quality guidelines/drinking water guidelines/guidelines for managing risk in recreational water criteria and site-specific derived criteria.

Groundwater, ground water held in the pores of an aquifer.

Head space air space at the top of a soil or water sample.

Hectares (ha) is a measure of area, equivalent to 10,000 meters squared.

Heterogeneous condition of having different characteristics in proximate locations. Non-uniform. (Opposite of **homogeneous**).

Horizon individual soil layer, based on texture and colour, which differs from those above and below.

Humic/Humus referring to organic matter within soil.

Investigation levels and screening levels are the concentrations of a contaminant above which further appropriate investigation and evaluation will be required. Ecological investigation levels (EILs) may also be referred to as soil quality guidelines in relevant references (see NEPM Schedules B5b and B5c).

Laboratory of Reporting (LOR) is the lowest concentration a laboratory technique or procedure can report with the appropriate confidence of accuracy.

Lithosol shallow soils showing minimal profile development and dominated by the presence of weathered rock and rock fragments.

Loam medium textured soil of approximate composition 10-25% clay, 25-50% silt and >50% sand.

Massive refers to the condition of the soil layer in which the layer appears to be as a coherent or solid mass, which is largely devoid of peds.

Metals are elements, compounds, or alloys that are good conductors of both electricity and heat. Common metals analysed are Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn).

Mottled a pattern where soils have masses, blobs or blotches of sub-dominant, varying colours indicating regular water saturation/unsaturation.

National Association of Testing Authorities (NATA), NATA accreditation provides a means of determining, formally recognising and promoting the competence of facilities to perform specific types of testing, inspection, calibration, and other related activities

National Environment Protection Measure (NEPM), NEPMs are broad framework-setting statutory instruments defined in the NEPC Act. They outline agreed national objectives for protecting or managing particular aspects of the environment.

Occupational health and safety (OH&S) is a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment.

Organics chemical compounds comprising atoms of carbon, hydrogen and others (commonly oxygen, nitrogen, phosphorus, sulfur). Opposite is inorganic, referring to chemical species not containing carbon.

Oxidation originally referred only to the addition of oxygen to elements. However, oxidation now encompasses the broader concept of the loss of electrons by electron transfer to other ions.

Parameters population value of a particular characteristic, which is descriptive of the distribution of a random variable.

Perched Aquifer (or water table) a body of water located above an impermeable geological formation. These perched aquifers (or water tables) are nearly always seasonal or periodic.

Permeability property of porous medium relating to its ability to transmit or conduct liquid (usually water) under the influence of a driving force. Also referred to as hydraulic conductivity.

pH logarithmic index for the concentration of hydrogen ions in an aqueous solution, which is used as a measure of acidity.

Plastic soil material, which is in a condition, that allows it to undergo permanent deformation without appreciable volume change or elastic rebound, and without rupture.

Potentiometric Surface water level that represents the standing or total hydraulic standing head. In an aquifer system it represents the levels to which water will rise in tightly cased walls (e.g. a cased borehole).

Precision is a measure of the reproducibility of results under a given set of conditions and is assessed on the basis of agreement between a set of duplicate results obtained from duplicate analyses.

Profile the solum. This includes the soil A and B horizons and is basically the depth of soil to weathered rock.

QA/QC Quality Assurance / Quality Control involves all of the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples, and accuracy and reliability of analytical results. Quality control is the component of QA, which monitors and measures the effectiveness of other procedures by the comparison of these measures to previously decided objectives.

Reducing Conditions can be simply expressed as the absence of oxygen, though chemically the meaning is more complex. For more details refer to OXIDATION.

Relative Percentage Difference (RPD) expresses the precision of results by comparing the difference between the two samples to the average of the two samples.

Representative Sample assumed not to be significantly different than the population of samples available. In many investigations, samples are collected to represent the worst-case situation.

Standing water level (SWL) is depth to ground water (m) below a datum point or reference point, usually from the top of casing or natural surface.

Stratigraphy vertical sequence of geological units.

Subsoil subsurface material comprising the B and C horizons of soils with distinct profiles. They often have brighter colours and higher clay content than topsoils.

Suspended Solids (SS) matter, which is suspended in water, which will not pass through a 0.45 µm filter membrane.

Texture is the size of particles in the soil. Texture is divided into six groups, depending on the amount of coarse sand, fine sand, silt and clay in the soil.

Topsoil part of the soil profile, typically the A1 horizon, containing material, which is usually darker, more fertile and better, structured than the underlying layers.

Total Acidity (TA) difference between the soil CEC and ANC.

Total Actual Acidity (TAA) moles of titratable protons per unit mass of soil displaced by an un-buffered KCl solution, otherwise known as the salt-replaceable acidity.

Toxicity the inherent potential or capacity of a material to cause adverse effects in a living organism.

Transmissivity rate at which water is transmitted through a unit width aquifer under a unit hydraulic gradient.

Unsaturated zone vadose zone. The zone between the land surface and the water table, in which the rock or soil pores contain both air and water.

Upper Confidence Limit (UCL) is the upper confidence Interval of a two-sided estimated interval of a parameter. This interval is expected to include the true value of the parameter with a specified confidence percentage, e.g., 95% of such intervals are expected to include the true values of the estimated parameters.

Water table interface between the saturated zone and unsaturated zones. The surface in an aquifer at which pore water pressure is equal to atmospheric pressure.

FIGURES

Legend

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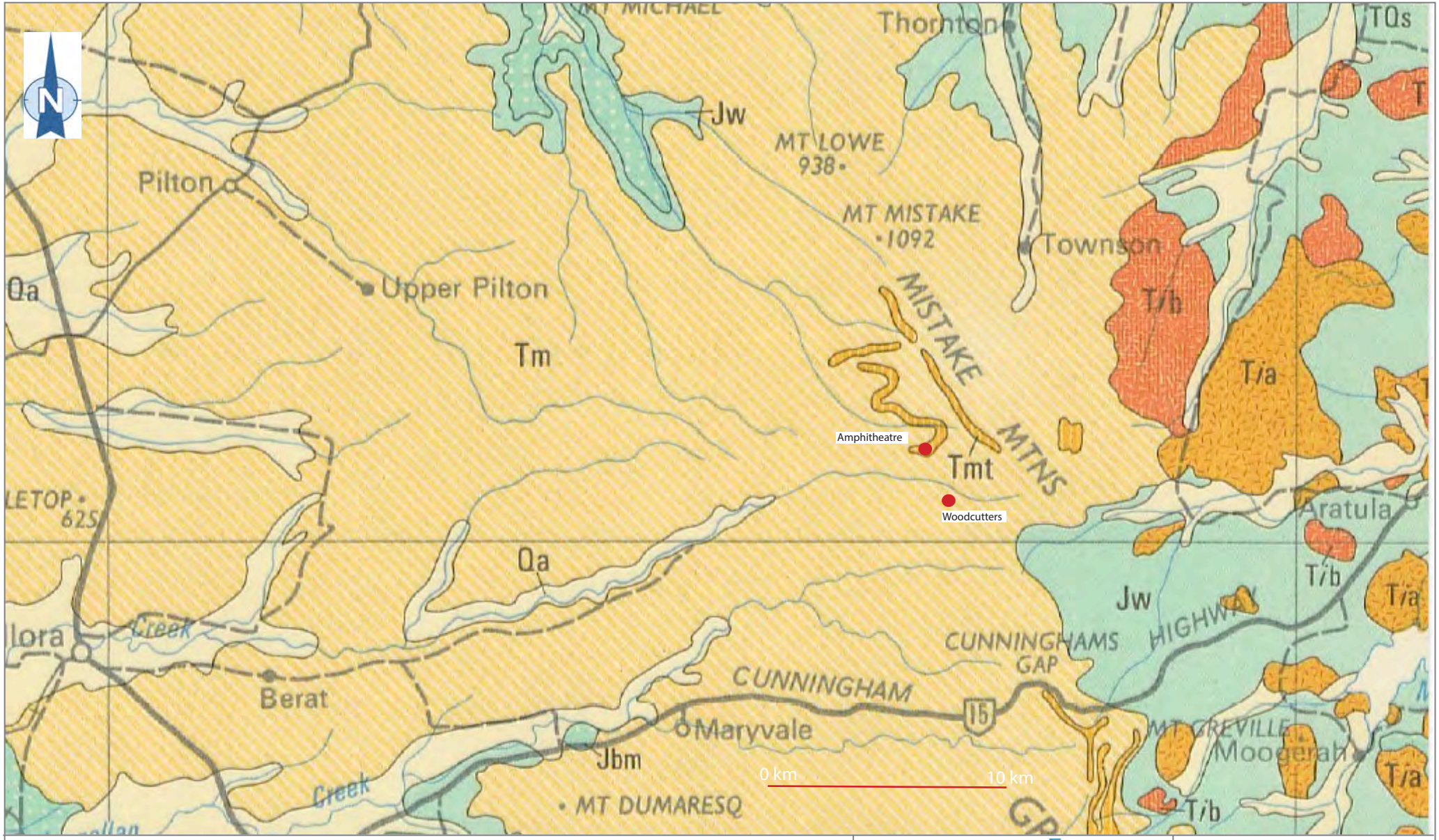
Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Title:	Location Map
		Location:	Main Range National Park, Queensland
Drawn by:	Dan Morton	Source:	Google Earth
Project Manager:	Dan Morton	Scale:	Scale Bar Job No: 18006
		Date:	July 2020 Page : 01



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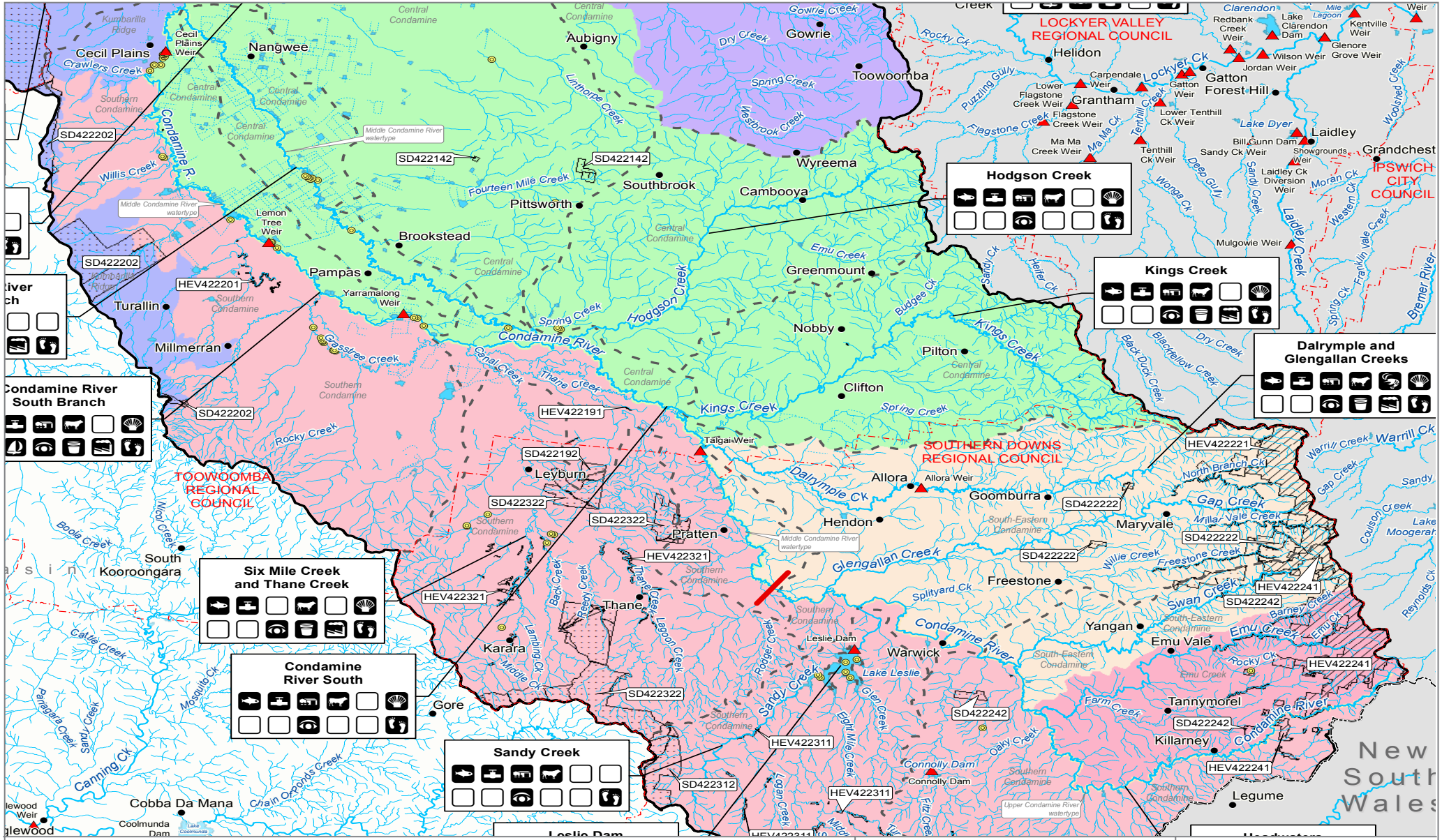
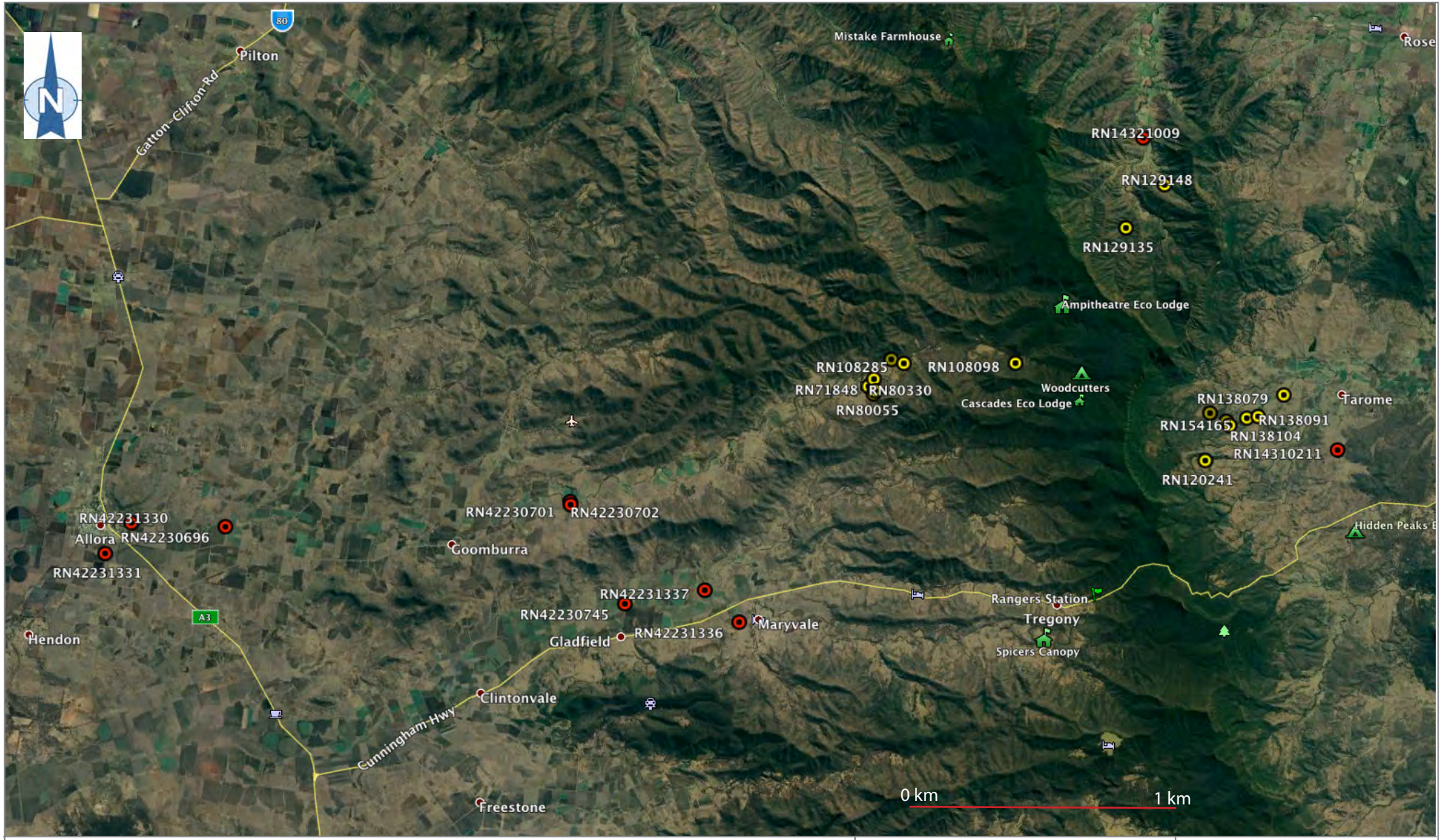
Main Range Volcanics — *Basalt, agglomerate, shale, dolomite*

Flood Plains, river terraces

moreton environmental and health		Title:	Geology
		Location:	Main Range National Park, Queensland
Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Source:	
Drawn by:	Dan Morton	Scale:	Scale Bar — Job No: 18006
Project Manager:	Dan Morton	Date:	July 2020 — Page : 02



moreton environmental and health		Title:	Water Quality Objectives
		Location:	Main Range National Park, Queensland
Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Source:	
Drawn by:	Dan Morton	Scale:	Scale Bar — Job No: 18006
Project Manager:	Dan Morton	Date:	July 2020 — Page : 03



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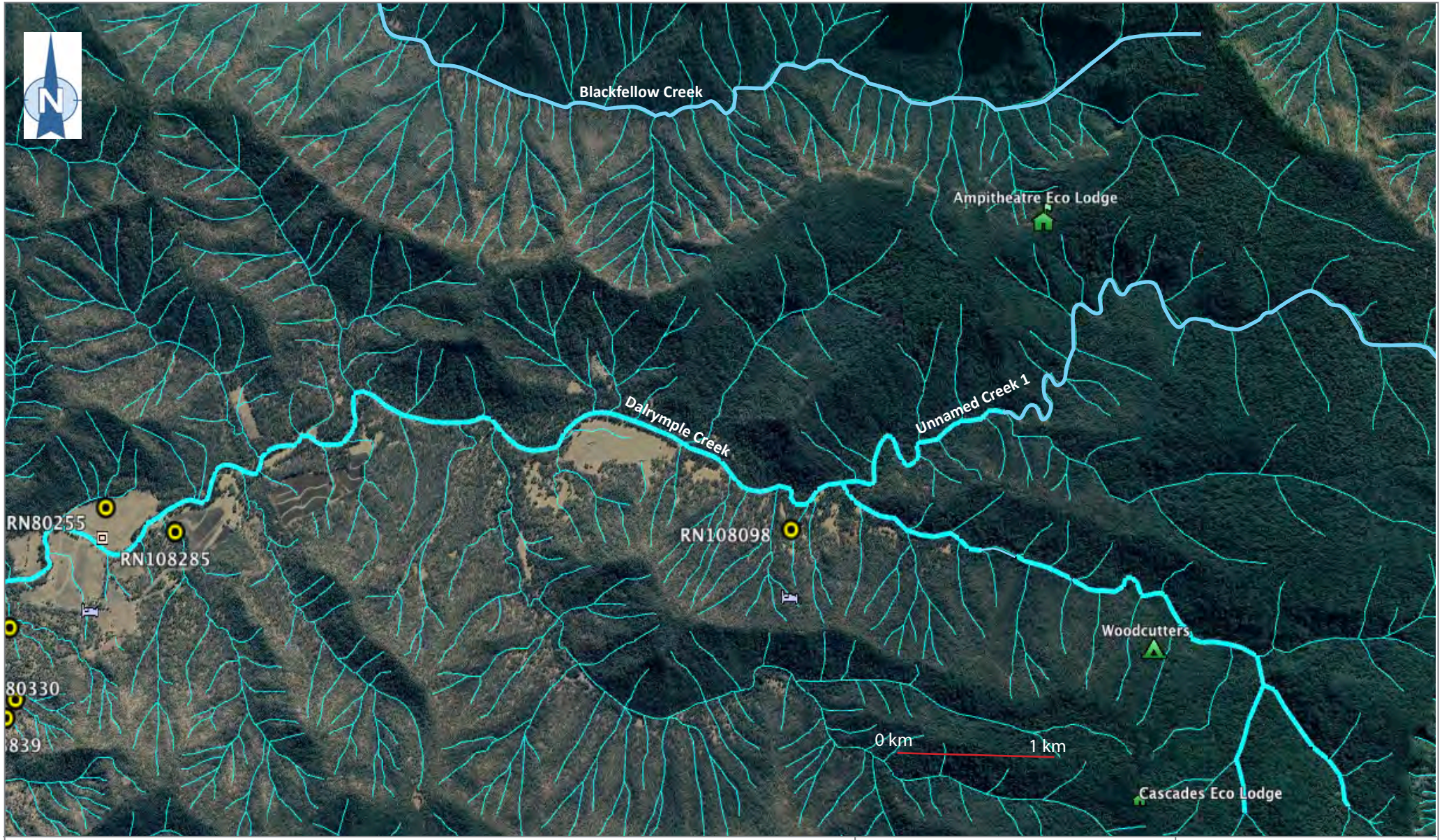
Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Source:	
Drawn by:	Dan Morton	Scale:	Scale Bar
Project Manager:	Dan Morton	Date:	July 2020

Title: Bore Search

Location: Main Range National Park, Queensland

Job No: 18006

Page : 04



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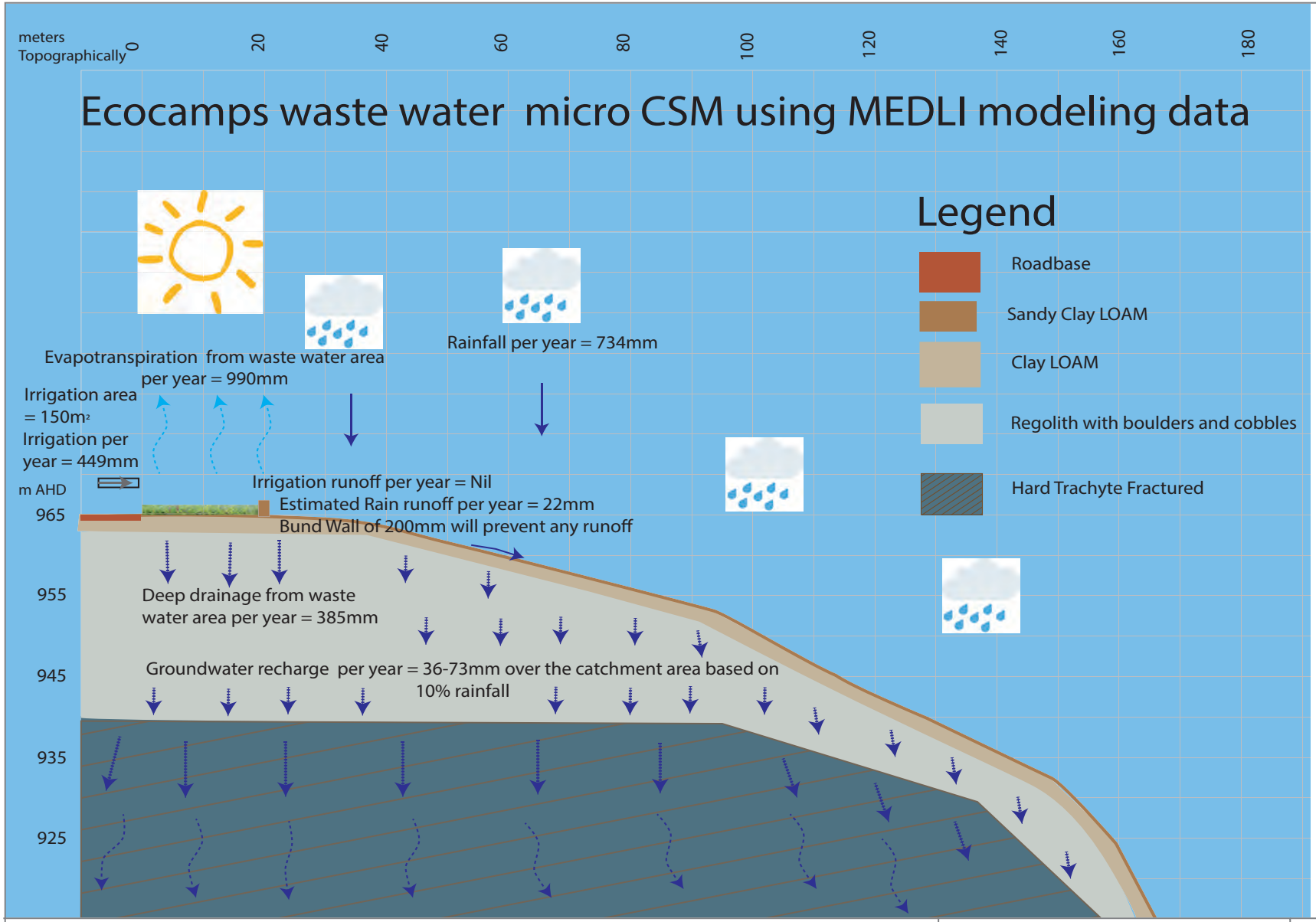
Client: Spicers Retreats Hotels & Lodges Pty Ltd	Source:
Drawn by: Dan Morton	Scale: Scale Bar Job No: 18006
Project Manager: Dan Morton	Date: July 2020 Page : 05

Title: Creeks and Watercourses

Location: Main Range National Park, Queensland



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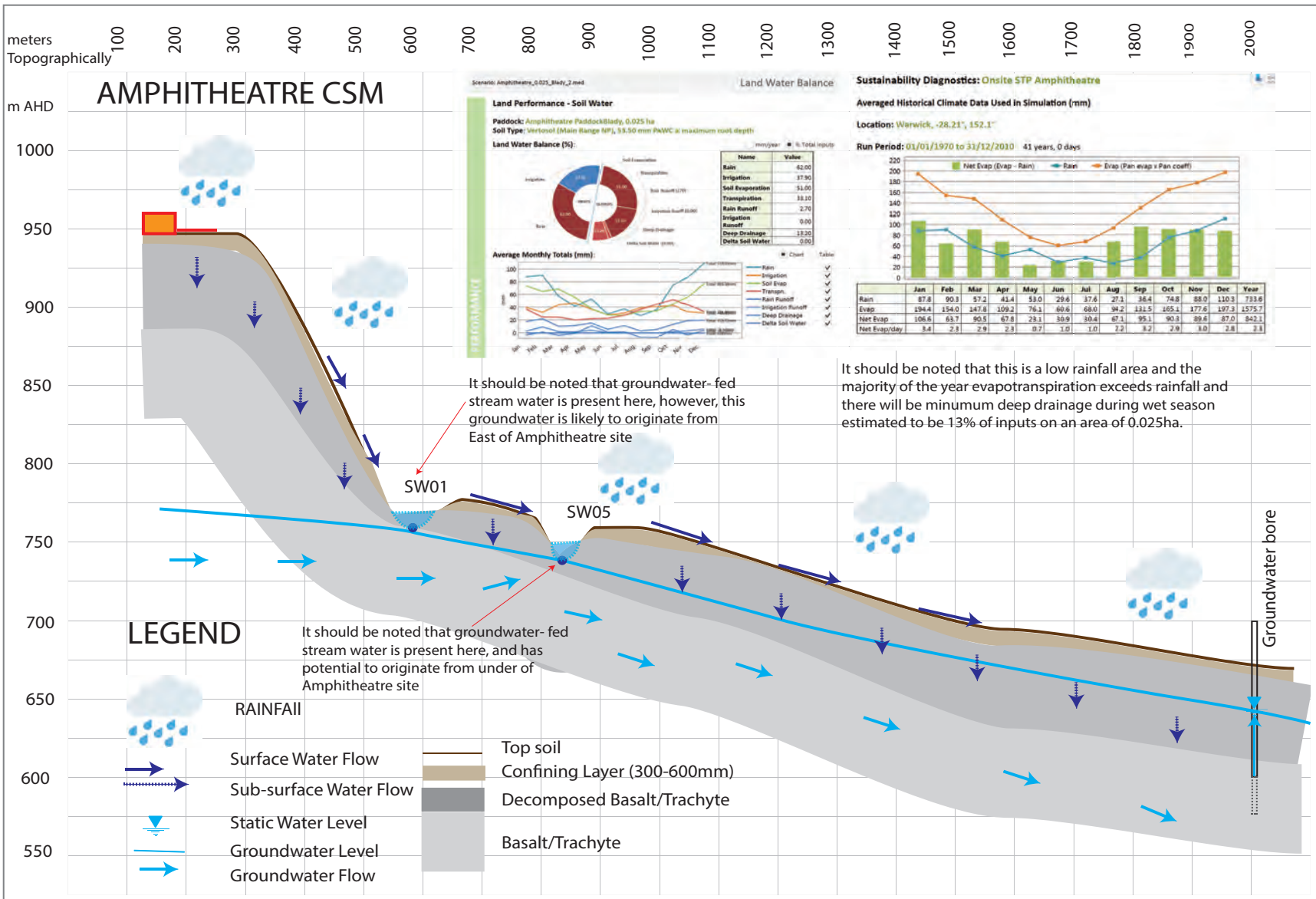
Client: Spicers Retreats Hotels & Lodges Pty Ltd	Source:
Drawn by: Dan Morton	Scale: Scale Bar Job No: 18006
Project Manager: Dan Morton	Date: July 2020 Page : 06

Title: EcoCamps Waste Water Micro CSM using MEDLI Data

Location: Main Range National Park, Queensland



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Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Title:	Amphitheatre Groundwater Conceptual Site Model
Drawn by:	Dan Morton	Location:	Main Range National Park, Queensland
Project Manager:	Dan Morton	Source:	
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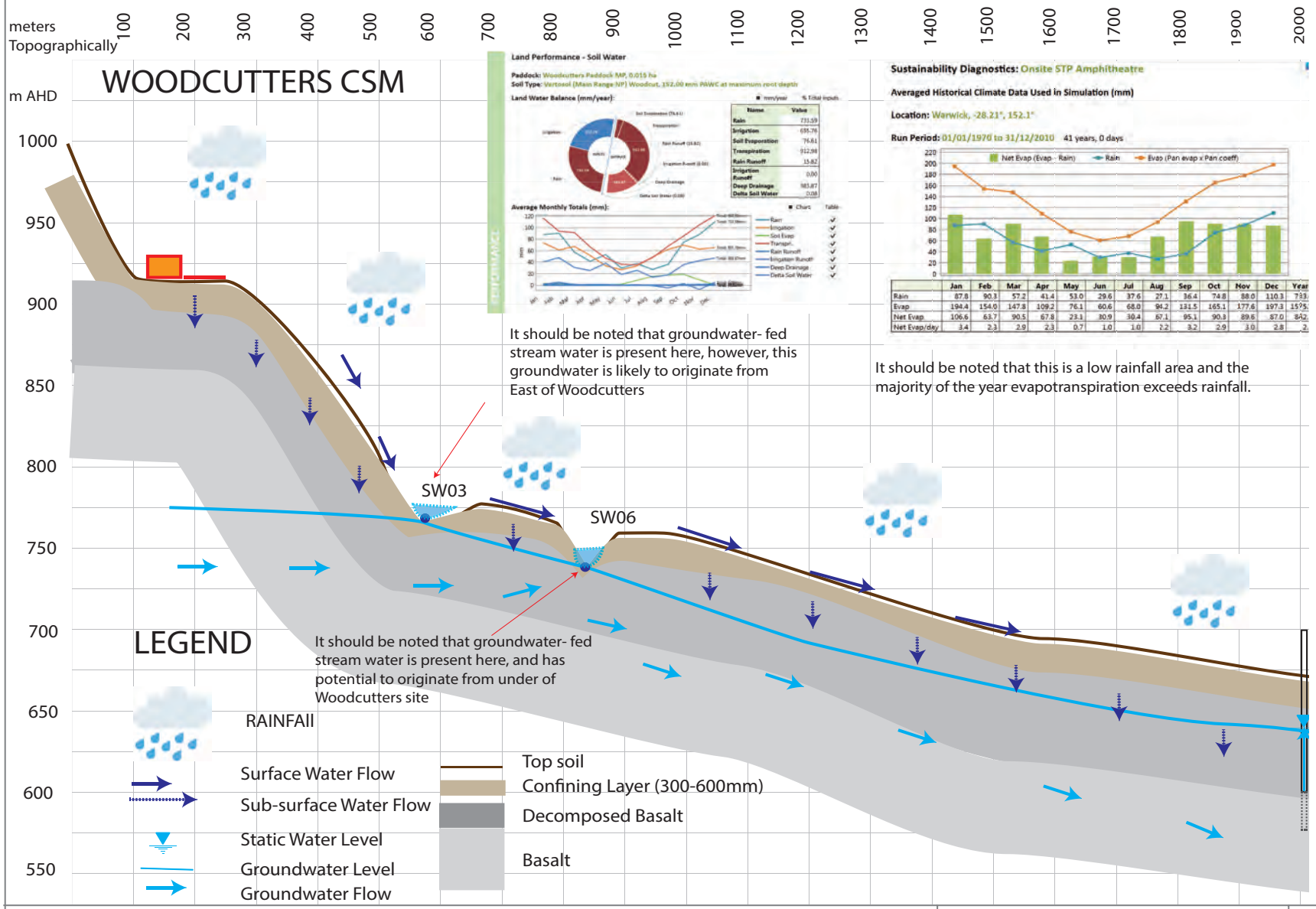
		Job No:	18006
		Date:	July 2020
		Page :	07

WOODCUTTERS CSM



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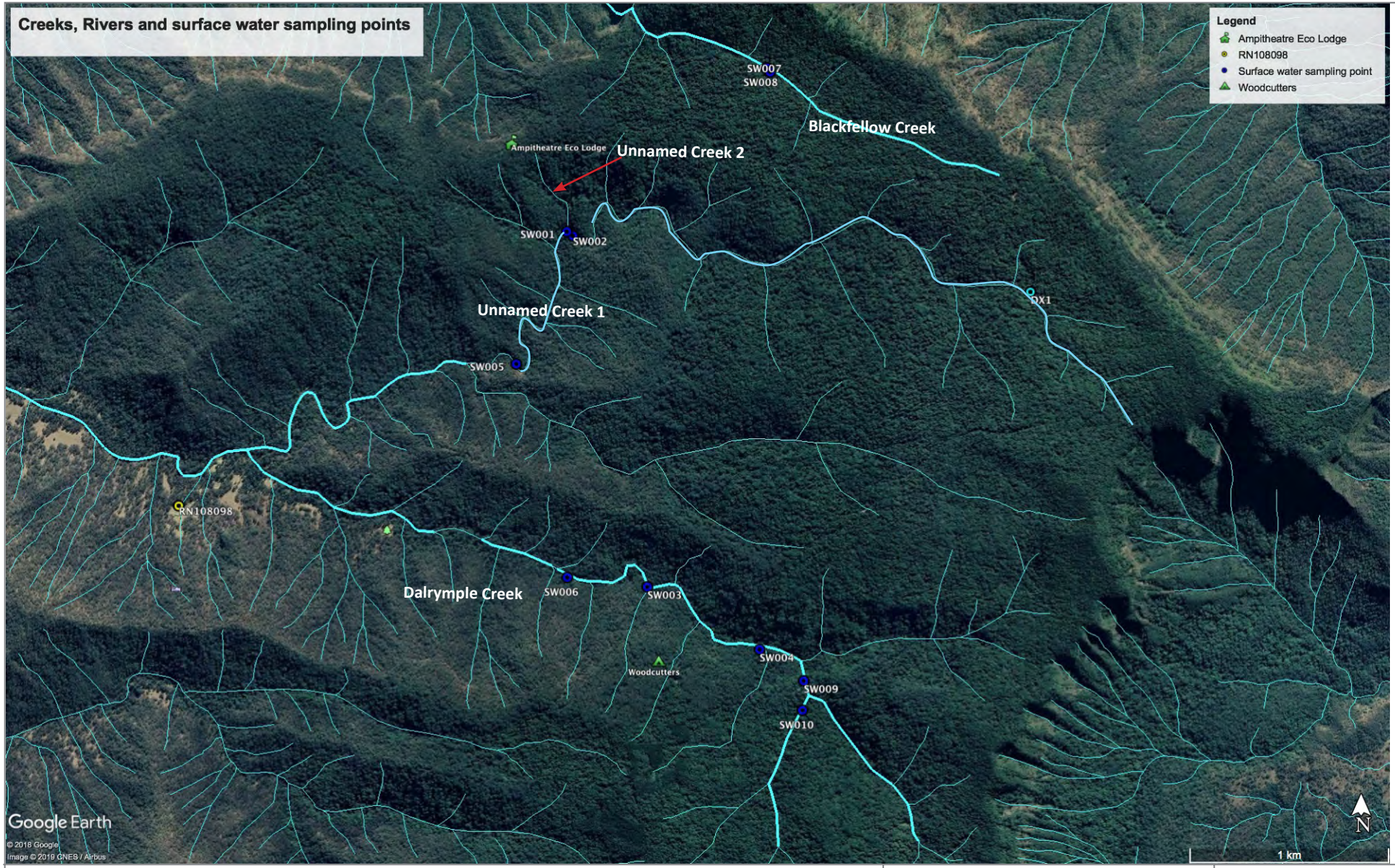
Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Title:	Woodcutters Groundwater Conceptual Site Model
Drawn by:	Dan Morton	Location:	Main Range National Park, Queensland
Project Manager:	Dan Morton	Source:	
		Scale:	Scale Bar
		Job No:	18006
		Date:	July 2020
		Page :	08



Legend

SW01

Surface Water Monitoring Point

Resource Groundwater Bore

moreton environmental and health

Client:	Spicers Retreats Hotels & Lodges Pty Ltd	Source:	
Drawn by:	Dan Morton	Scale:	Scale Bar Job No: 18006
Project Manager:	Dan Morton	Date:	July 2020 Page : 09

Title: Recommended Surface Water Sampling

Location: Main Range National Park, Queensland

TABLES

Table 7 : Summary of Surface Water Sampling Results

Table 7: Water Analysis 2019 - 2021

Matrix: WATER

Workgroup: EB1905575

Project name/number: 18006_Scenic Rim Trail

Analyte grouping/Analyte	CAS Numbe	Unit	LOR	WQO														
										DUP01&02								
Sample Type:					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
ALS Sample Number:					EB2101893	EB2104379	EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407
Sample Date:					22/01/2021	17/02/2021	03/04/201	10/04/201	25/06/202	22/01/2021	17/02/2021	25/05/2021	03/04/201	10/04/201	25/06/202	22/01/2021	17/02/2021	25/05/2021
sample ID (1st):					DUP01	DUP01	SW07	SW07	SW07	SW07	SW07	SW07	SW08	SW08	SW08	SW08	SW08	SW08
Site:				Assessment			Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:
Purchase Order:				Project	18006	20007	18006	18006	18006	18006	20007	20007	18006	18006	18006	0	20007	20007
			LOR	Creek System			Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:	Blackfellow:
Analyte grouping/Analyte	CAS Numbe	Unit		WQO														
Field Parameters																		
Temperature		**•C**					13.96	17.3	8.96	16.38	16.38	11.8	13.9	16.63	8.84	16.33	16.15	11.74
pH		**pH units**		7.5-8.1			6.76	6.35	6.11	5.97	5.43	5.87	6.41	5.78	6.38	6.15	5.84	5.91
Dissolved Oxygen - %		**%**		60-110			101.3	66.7	78.3	40.2	45.7	103.2	99.5	45.3	73.7	43	26.9	141.2
Total Dissolved Solids		**mg/L**					0.058	0.061	0.048			41	0.047	0.028	0.04			35
ORP		**mV**					247	179	169	164.6		180	237	191	153	153.8	174.3	181
EC		**µS/cm**		335			89	99	96	109	92	82	72	46	81	67	68	69
Turbidity		**NTUs**		90			2.6	0	0	1.8	1.1	0	2	0	6	1.2	2.9	0
EP025: Oxygen - Dissolved (DO)																		
Dissolved Oxygen								**9.6**						**9.7**				
Dissolved Oxygen - % Saturation				60-110				**105**						**107**				
EA005P: pH by PC Titrator																		
pH Value		**pH Unit**	0.01	7.5-8.1	**----**	**----**	**7.68**	**7.34**	**6.69**	**6.60**	**6.90**	**7.20**	**7.54**	**6.85**	**6.62**	**6.60**	**6.91**	**7.18**
EA006: Sodium Adsorption Ratio (SAR)																		
Sodium Adsorption Ratio			0.01		**----**	**----**	**0.65**	**0.8**	**0.88**	**0.88**	**0.88**	**0.77**	**0.7**	**0.8**	**0.96**	**0.88**	**0.77**	**0.77**
EA010P: Conductivity by PC Titrator																		
Electrical Conductivity @ 25°C		**µS/cm**	1		**----**	**----**	**94**	**95**	**71**	**70**	**71**	**69**	**93**	**94**	**70**	**70**	**71**	**69**
Calculated TDS & Total Suspended Solids dried at 104 ± 2°C																		
Total Dissolved Solids (Calc.)		**mg/L**	1		**----**	**----**	**61**	**62**	**46**	**46**	**46**	**45**	**60**	**61**	**46**	**46**	**46**	**45**
Suspended Solids (SS)		**mg/L**	**5**		**----**	**----**				<5	<5	**6**				<5	**20**	<5
EA065: Total Hardness as CaCO3																		
Total Hardness as CaCO3		**mg/L**	1		**----**	**----**	**29**	**24**	**16**	**16**	**16**	**16**	**25**	**24**	**13**	**16**	**16**	**16**
ED037P: Alkalinity by PC Titrator																		
Hydroxide Alkalinity as CaCO3	**DMO-210-001**	**mg/L**	1		**----**	**----**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	**3812-32-6**	**mg/L**	1		**----**	**----**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	**71-52-3**	**mg/L**	1		**----**	**----**	**31**	**33**	**15**	**11**	**14**	**13**	**26**	**27**	**13**	**11**	**13**	**13**
Total Alkalinity as CaCO3		**mg/L**	1		**----**	**----**	**31**	**33**	**15**	**11**	**14**	**13**	**26**	**27**	**13**	**11**	**13**	**13**
ED041G: Sulfate (Turbidimetric) as SO4 2- DAED045G: Chloride																		
Sulfate as SO4 - Turbidimetric	**14808-79-8**	**mg/L**	1		**----**	**----**	**1**	**1**	**3**	**2**	**2**	**2**	**2**	**12**	**3**	**2**	**2**	**1**
Chloride	**16887-00-6**	**mg/L**	1		**----**	**----**	**11**	**11**	**11**	**10**	**11**	**11**	**12**	**11**	**12**	**10**	**10**	**11**
ED093F: Dissolved Major Cations																		
Calcium	**7440-70-2**	**mg/L**	1		**----**	**----**	**5**	**3**	**3**	**3**	**3**	**3**	**5**	**3**	**2**	**3**	**3**	**3**
Magnesium	**7439-95-4**	**mg/L**	1		**----**	**----**	**4**	**4**	**2**	**2**	**2**	**2**	**3**	**4**	**2**	**2**	**2**	**2**
Sodium	**7440-23-5**	**mg/L**	1		**----**	**----**	**8**	**9**	**8**	**8**	**8**	**7**	**8**	**9**	**8**	**8**	**7**	**7**
Potassium	**7440-09-7**	**mg/L**	1		**----**	**----**	**1**	**1**	**<1**	**1**	<1	<1	**1**	**1**	**<1**	<1	<1	<1
EG020F: Dissolved Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01		**----**	**----**				**0.11**	**0.11**	**0.06**				**0.09**	**0.10**	**0.08**
Arsenic	**7440-38-2**	**mg/L**	0.001		**----**	**----**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	**7440-43-9**	**mg/L**	0.0001		**----**	**----**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	**7440-47-3**	**mg/L**	0.001		**----**	**----**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	**7440-50-8**	**mg/L**	0.001		**----**	**----**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 7: Water Analysis 2019 - 2021

										DUP01&02								
Matrix:	WATER		Sample Type:		REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Workgroup:	EB1905575		ALS Sample Number:		EB2101893	EB2104379	EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407
Project name/number:	18006_Scenic Rim Trail		Sample Date:		22/01/2021	17/02/2021	03/04/2019	10/04/2019	25/06/2020	22/01/2021	17/02/2021	25/05/2021	03/04/2019	10/04/2019	25/06/2020	22/01/2021	17/02/2021	25/05/2021
			sample ID (1st):		DUP01	DUP01	SW07	SW07	SW07	SW07	SW07	SW07	SW08	SW08	SW08	SW08	SW08	SW08
			Site:	Assessment			Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows
			Purchase Order:	Project	18006	20007	18006	18006	18006	18006	20007	20007	18006	18006	18006	0	20007	20007
			LOR	Creek System			Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows	Blackfellows
Analyte grouping/Analyte	CAS Numbe	Unit		WQO														
Lead	7439-92-1	mg/L	0.001		----	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001		----	----				**0.012**	**0.021**	**0.004**				**0.012**	**0.018**	**0.005**
Nickel	7440-02-0	mg/L	0.001		----	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	mg/L	0.005		----	----	<0.005	<0.005	<0.005	**0.009**	**0.006**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05		----	----				**0.16**	**0.37**	**0.06**				**0.17**	**0.40**	**0.08**
EG020T: Total Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01		----	----				**0.25**	**0.18**	**0.13**				**0.15**	**0.12**	**0.15**
Arsenic	7440-38-2	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001
Copper	7440-50-8	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001		----	----				**0.025**	**0.026**	**0.008**				**0.014**	**0.025**	**0.012**
Nickel	7440-02-0	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
Zinc	7440-66-6	mg/L	0.005		<0.005	<0.005	**0.006**	<0.005	<0.005	<0.005	<0.005	<0.005	**0.024**	<0.005	0.006	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05		----	----				**0.48**	**0.51**	**0.17**				**0.28**	**0.48**	**0.25**
EK040P: Fluoride by PC Titrator																		
Fluoride	16984-48-8	mg/L	0.1		----	----	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nutrients																		
Ammonia as N	7664-41-7	mg/L	0.01	40	----	----	**0.01**	**0.04**	**<0.01**	<0.01	<0.01	<0.01	**0.01**	**0.18**	**<0.01**	<0.01	**0.01**	<0.01
Nitrite as N	14797-65-0	mg/L	0.01		----	----	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Nitrate as N	14797-55-8	mg/L	0.01		----	----	<0.01	**0.04**	**0.01**	<0.01	**0.05**	**0.02**	**0.34**	**0.56**	**0.01**	<0.01	**0.51**	**0.02**
Nitrite + Nitrate as N		mg/L	0.01	0.275	**0.10**	**0.03**	<0.01	**0.04**	**0.02**	<0.01	**0.05**	**0.02**	**0.34**	**0.56**	**0.02**	<0.01	**0.51**	**0.02**
Total Kjeldahl Nitrogen as N		mg/L	0.1		**0.2**	**0.1**	**0.2**	**0.2**	**<0.1**	**0.2**	**0.1**	<0.1	**0.2**	**0.5**	**0.6**	**0.1**	**0.4**	<0.1
Total Nitrogen as N		mg/L	0.1	1.51	**0.3**	**0.1**	**0.2**	**0.2**	**<0.1**	**0.2**	**0.2**	<0.1	**0.5**	**1.1**	**0.6**	**0.1**	**0.9**	<0.1
Total Phosphorus as P		mg/L	0.01	0.56	**0.08**	**0.10**	**0.1**	**0.1**	**0.06**	**0.10**	**0.09**	**0.09**	**0.1**	**0.17**	**0.26**	**0.08**	**0.14**	**0.08**
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	0.13	----	----	**0.11**	**0.08**	**0.03**	**0.06**	**0.08**	**0.06**	**0.1**	**0.08**	**0.03**	**0.07**	**0.07**	**0.06**
EN055: Ionic Balance																		
Total Anions		meq/L	0.01		----	----	**0.95**	**0.99**	**0.67**	**0.54**	**0.63**	**0.61**	**0.9**	**1.1**	**0.66**	**0.54**	**0.58**	**0.59**
Total Cations		meq/L	0.01		----	----	**0.95**	**0.9**	**0.66**	**0.69**	**0.66**	**0.62**	**0.87**	**0.9**	**0.61**	**0.66**	**0.62**	**0.62**
MW006: Faecal Coliforms & E.coli by MF																		
Escherichia coli		CFU/100mL	1		----	----		**~3**	**~2**	**220**	**240**	**~9**		**~6**	**~40**	**350**	**400**	**25**

Table 7: Water Analysis 2019 - 2021

Matrix: WATER
Workgroup: EB1905575
Project name/number: 18006_Scenic Rim Trail

environmental and health

Analyte grouping/Analyte	CAS Number	Unit	LOR	WQO														
Sample Type:					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
ALS Sample Number:					EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407	EB1905575	EB1908685
Sample Date:					03/04/201	10/04/201	25/06/202	22/01/2021	17/02/2021	25/05/2021	03/04/201	10/04/201	25/06/202	22/01/2021	17/02/2021	25/05/2021	05/03/201	03/04/201
sample ID (1st):					SW09	SW09	SW09	SW09	SW09	SW09	SW10	SW10	SW10	SW10	SW10	SW10	SW03	SW03
Site:				Assessment	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Woodcutte	Woodcutte
Purchase Order:				Project	18006	18006	18006	18006	20007	20007	18006	18006	18006	18006	20007	20007	18006	18006
			LOR	Creek System	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple
Analyte grouping/Analyte	CAS Number	Unit		WQO														
Field Parameters																		
Temperature		**•C**			14.45	16.75	9.31	17.32	17.55	12.37	14.09	16.78	9.37	17.28	17.34	12.04	18.5	14.55
pH		**pH units**		7.5-8.1	7.25	6.54	7.49	7.04	7.14	6.98	7.3	6.65	7.11	7.18	7.04	6.83	6.6	6.83
Dissolved Oxygen - %		**%**		60-110	108.1	79.5	113.4	78.7	119.6	173.1	114	74	86	74.4	82	154	88	102.9
Total Dissolved Solids		**mg/L**			0.057	0.032	0.055			39	0.053	0.029	0.056			37	77	0.062
ORP		**mV**			275	197	148	144.6	162.1	176	262	193	148	145.4	157.7	169.8	234	277
EC		**µS/cm**		335	87	52	110	84	81	79	82	48	112	92	92	74	163	95
Turbidity		**NTUs**		90	3.7	2.8	4	3.4	2.3	3.3	29.9	0	0.3	4.1	3.7	2.2		1.4
EP025: Oxygen - Dissolved (DO)																		
Dissolved Oxygen						**9.6**						**9.6**						
Dissolved Oxygen - % Saturation				60-110		**107**						**104**						
EA005P: pH by PC Titrator																		
pH Value		**pH Unit**	0.01	7.5-8.1	**7.76**	**7.59**	**7.24**	**7.25**	**7.59**	**7.57**	**7.75**	**7.45**	**7.31**	**7.28**	**7.67**	**7.50**	**7.49**	**7.87**
EA006: Sodium Adsorption Ratio (SAR)																		
Sodium Adsorption Ratio			0.01		**0.54**	**0.63**	**0.54**	**0.46**	**0.48**	**0.55**	**0.56**	**0.63**	**0.54**	**0.46**	**0.44**	**0.58**	**0.54**	**0.49**
EA010P: Conductivity by PC Titrator																		
Electrical Conductivity @ 25°C		**µS/cm**	1		**102**	**103**	**96**	**90**	**88**	**78**	**95**	**95**	**96**	**97**	**97**	**73**	**114**	**109**
Calculated TDS & Total Suspended Solids dried at 104 ± 2°C																		
Total Dissolved Solids (Calc.)		**mg/L**	1		**66**	**67**	**62**	**58**	**57**	**51**	**62**	**62**	**62**	**63**	**63**	**47**	**74**	**71**
Suspended Solids (SS)		**mg/L**	**5**					<5	<5	<5				<5	<5	**9**		
EA065: Total Hardness as CaCO3																		
Total Hardness as CaCO3		**mg/L**	1		**31**	**30**	**31**	**31**	**29**	**22**	**29**	**30**	**31**	**31**	**36**	**20**	**42**	**38**
ED037P: Alkalinity by PC Titrator																		
Hydroxide Alkalinity as CaCO3	**DMO-210-001**	**mg/L**	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	**3812-32-6**	**mg/L**	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	**71-52-3**	**mg/L**	1		**32**	**38**	**35**	**29**	**32**	**25**	**32**	**36**	**39**	**32**	**35**	**20**	**44**	**42**
Total Alkalinity as CaCO3		**mg/L**	1		**32**	**38**	**35**	**29**	**32**	**25**	**32**	**36**	**39**	**32**	**35**	**20**	**44**	**42**
ED041G: Sulfate (Turbidimetric) as SO4 2- DAED045G: Chloride																		
Sulfate as SO4 - Turbidimetric	**14808-79-8**	**mg/L**	1		**5**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**1**	**1**	**2**
Chloride	**16887-00-6**	**mg/L**	1		**9**	**9**	**9**	**8**	**8**	**9**	**10**	**9**	**9**	**8**	**8**	**9**	**11**	**10**
ED093F: Dissolved Major Cations																		
Calcium	**7440-70-2**	**mg/L**	1		**6**	**4**	**6**	**6**	**5**	**4**	**5**	**4**	**6**	**6**	**6**	**3**	**7**	**7**
Magnesium	**7439-95-4**	**mg/L**	1		**4**	**5**	**4**	**4**	**4**	**3**	**4**	**5**	**4**	**4**	**5**	**3**	**6**	**5**
Sodium	**7440-23-5**	**mg/L**	1		**7**	**8**	**7**	**6**	**6**	**6**	**7**	**8**	**7**	**6**	**6**	**6**	**8**	**7**
Potassium	**7440-09-7**	**mg/L**	1		**2**	**2**	**1**	**1**	**1**	<1	**1**	**2**	**1**	**2**	**2**	<1	**2**	**2**
EG020F: Dissolved Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01					**0.12**	**0.10**	<0.01				**0.17**	**0.09**	<0.01		
Arsenic	**7440-38-2**	**mg/L**	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	**7440-43-9**	**mg/L**	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	**7440-47-3**	**mg/L**	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	**7440-50-8**	**mg/L**	0.001		**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	**<0.001**	<0.001	<0.001	<0.001	<0.001	<0.001

Table 7: Water Analysis 2019 - 2021

Matrix:	WATER		Sample Type:		REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Workgroup:	EB1905575		ALS Sample Number:		EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2016997	EB2101893	EB2104379	EB2114407	EB1905575	EB1908685
Project name/number:	18006_Scenic Rim Trail		Sample Date:		03/04/201	10/04/201	25/06/202	22/01/2021	17/02/2021	25/05/2021	03/04/201	10/04/201	25/06/202	22/01/2021	17/02/2021	25/05/2021	05/03/201	03/04/201
			sample ID (1st):		SW09	SW09	SW09	SW09	SW09	SW09	SW10	SW10	SW10	SW10	SW10	SW10	SW03	SW03
			Site:	Assessment	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Woodcutte	Woodcutte
			Purchase Order:	Project	18006	18006	18006	18006	20007	20007	18006	18006	18006	18006	20007	20007	18006	18006
			LOR	Creek System	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple
Analyte grouping/Analyte	CAS Numb	Unit		WQO														
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001					**0.003**	**0.005**	**0.001**				**0.003**	**0.005**	<0.001		
Nickel	7440-02-0	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.006**	**<0.001**	**0.001**	**0.001**	<0.001	<0.001	<0.001
Zinc	7440-66-6	mg/L	0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.005**	**0.041**	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05					**0.10**	**0.11**	<0.05				**0.12**	**0.12**	<0.05		
EG020T: Total Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01					**0.22**	**0.16**	**0.24**				**1.09**	**0.20**	**0.40**		
Arsenic	7440-38-2	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	<0.001	**0.003**	**<0.001**	**0.002**	<0.001	**0.001**	<0.001	<0.001
Copper	7440-50-8	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001					**0.006**	**0.006**	**0.009**				**0.069**	**0.006**	**0.032**		
Nickel	7440-02-0	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.005**	**<0.001**	**0.003**	<0.001	**0.002**	<0.001	<0.001
Zinc	7440-66-6	mg/L	0.005		**0.006**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**<0.005**	<0.005
Iron	7439-89-6	mg/L	0.05					**0.22**	**0.18**	**0.26**				**1.31**	**0.19**	**0.49**		
EK040P: Fluoride by PC Titrator																		
Fluoride	16984-48-8	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nutrients																		
Ammonia as N	7664-41-7	mg/L	0.01	40	**0.02**	**0.09**	**<0.01**	<0.01	**0.01**	<0.01	<0.01	**0.07**	**<0.01**	<0.01	<0.01	<0.01	0.01	<0.01
Nitrite as N	14797-65-0	mg/L	0.01		<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	14797-55-8	mg/L	0.01		**0.97**	**0.17**	**0.08**	**0.19**	**0.16**	**0.04**	**0.07**	**0.1**	**0.08**	**0.06**	**0.46**	**0.03**	**0.04**	**0.14**
Nitrite + Nitrate as N		mg/L	0.01	0.275	**0.97**	**0.17**	**0.10**	**0.19**	**0.16**	**0.04**	**0.07**	**0.1**	**0.10**	**0.06**	**0.46**	**0.03**	**0.04**	**0.14**
Total Kjeldahl Nitrogen as N		mg/L	0.1		**0.2**	**0.3**	**<0.1**	**0.2**	**0.1**	<0.1	**0.2**	**1.9**	**0.1**	**0.2**	**0.1**	**0.2**	**<0.1**	**0.2**
Total Nitrogen as N		mg/L	0.1	1.51	**1.2**	**0.5**	**0.1**	**0.4**	**0.3**	<0.1	**0.3**	**2**	**0.2**	**0.3**	**0.6**	**0.2**	**<0.1**	**0.3**
Total Phosphorus as P		mg/L	0.01	0.56	**0.07**	**0.07**	**0.06**	**0.08**	**0.08**	**0.08**	**0.08**	**0.5**	**0.05**	**0.08**	**0.08**	**0.10**	**0.06**	**0.08**
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	0.13	**0.09**	**0.06**	**0.04**	**0.06**	**0.08**	**0.05**	**0.1**	**0.07**	**0.04**	**0.06**	**0.07**	**0.07**	**0.09**	**0.1**
EN055: Ionic Balance																		
Total Anions		meq/L	0.01		**1**	**1.05**	**0.97**	**0.82**	**0.88**	**0.77**	**0.94**	**0.99**	**1.05**	**0.88**	**0.97**	**0.67**	**1.21**	**1.16**
Total Cations		meq/L	0.01		**0.98**	**1.01**	**0.96**	**0.92**	**0.86**	**0.71**	**0.91**	**1.01**	**0.96**	**0.94**	**1.02**	**0.66**	**1.24**	**1.12**
MW006: Faecal Coliforms & E.coli by MF																		
Escherichia coli		CFU/100mL	1			**~6**	**~3**	**73**	**710**	**15**		**12**	**~3**	**40**	**12**	**9**	**~7**	

Table 7: Water Analysis 2019 - 2021

Matrix:	WATER	Sample Type:				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Workgroup:	EB1905575	ALS Sample Number:				EB1909312	EB2101893	EB2104379	EB2114407	EB1905575	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2101893	EB2104379
Project name/number:	18006_Scenic Rim Trail	Sample Date:				10/04/2019	22/01/2021	17/02/2021	25/05/2021	05/03/2019	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	03/04/2019	10/04/2019	22/01/2021	17/02/2021
		Client sample ID (1st):				SW03	SW03	SW03	SW03	SW04	SW04	SW04	SW04	SW04	SW04	SW06	SW06	SW06	SW06	SW06	SW06	SW06	SW06
		Site:		Assessment		Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte
		Purchase Order:		Project		18006	18006	20007	20007	18006	18006	18006	18006	20007	20007	18006	18006	18006	20007	20007	18006	18006	20007
		LOR		Creek System		Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple
Analyte grouping/Analyte	**CAS Numb**	**Unit**		**WQO**																			
Field Parameters																							
Temperature		•C				17.28	17.95	18.8	12.26	18.7	14.57	17.15	17.16	17.58	12.2	15.01	17.48		20.61				
pH		pH units		7.5-8.1		6.15	6.04	7.3	7.27	6.6	6.54	6.66	6.66	7.2	7.01	5.32	6.26		7.38				
Dissolved Oxygen - %		%		60-110		62.1	73	119.6	182.4	76	107	79.7	78.7	112.7	173	107	59.9		97.6				
Total Dissolved Solids		mg/L				0.037			44	97	0.062	0.036			38	0.068	0.044						
ORP		mV				209	182.2	153.7	167.1	230	262	187	154.6	161.6	176.1	299	201		148.6				
EC		µS/cm			335	60	100	97	75	134	96	58	88	87	76	105	71		99				
Turbidity		NTUs			90	0	2.7	1.4	0		1.5	0	3.8	2.6	1.2	1.9	1.5		0.5				
EP025: Oxygen - Dissolved (DO)																							
Dissolved Oxygen						**9.1**						**9.6**					**9.5**						
Dissolved Oxygen - % Saturation				60-110		**99**						**105**					**105**						
EA005P: pH by PC Titrator																							
pH Value		**pH Unit**	0.01	7.5-8.1		**7.55**	**7.25**	**7.67**	**7.57**		**7.29**	**7.87**	**7.64**	**7.21**	**7.57**	**7.55**		**7.92**	**7.6**	**7.26**	**7.65**		
EA006: Sodium Adsorption Ratio (SAR)																							
Sodium Adsorption Ratio			0.01			**0.57**	**0.60**	**0.56**	**0.48**		**0.56**	**0.49**	**0.6**	**0.62**	**0.48**	**0.55**		**0.52**	**0.57**	**0.55**	**0.51**		
EA010P: Conductivity by PC Titrator																							
Electrical Conductivity @ 25°C		**µS/cm**	1			**113**	**100**	**95**	**84**		**116**	**109**	**105**	**89**	**88**	**79**		**119**	**118**	**113**	**103**		
Calculated TDS & Total Suspended Solids dried at 104 ± 2°C																							
Total Dissolved Solids (Calc.)		**mg/L**	1			**73**	**65**	**62**	**55**		**75**	**71**	**68**	**58**	**57**	**51**		**77**	**77**	**73**	**67**		
Suspended Solids (SS)		**mg/L**	**5**				<5	<5	<5					<5	<5	<5				**5**	<5		
EA065: Total Hardness as CaCO3																							
Total Hardness as CaCO3		**mg/L**	1			**37**	**34**	**29**	**29**		**38**	**38**	**33**	**31**	**29**	**22**		**45**	**37**	**40**	**36**		
ED037P: Alkalinity by PC Titrator																							
Hydroxide Alkalinity as CaCO3	DMO-210-001	**mg/L**		1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	3812-32-6	**mg/L**		1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	71-52-3	**mg/L**		1		**44**	**31**	**35**	**33**		**37**	**38**	**42**	**26**	**30**	**25**		**42**	**50**	**39**	**38**		
Total Alkalinity as CaCO3		**mg/L**		1		**44**	**31**	**35**	**33**		**37**	**38**	**42**	**26**	**30**	**25**		**42**	**50**	**39**	**38**		
ED041G: Sulfate (Turbidimetric) as SO4 2- DAED045G: Chloride																							
Sulfate as SO4 - Turbidimetric	14808-79-8	**mg/L**		1		**1**	**1**	**1**	**2**	**<1**		**2**	**1**	**2**	**1**	**1**		**2**	**1**	**1**	**1**		
Chloride	16887-00-6	**mg/L**		1		**9**	**9**	**8**	**9**		**11**	**10**	**9**	**9**	**8**	**9**		**10**	**10**	**10**	**9**		
ED093F: Dissolved Major Cations																							
Calcium	7440-70-2	**mg/L**		1		**5**	**7**	**5**	**5**		**7**	**7**	**5**	**6**	**5**	**4**		**8**	**5**	**8**	**6**		
Magnesium	7439-95-4	**mg/L**		1		**6**	**4**	**4**	**4**		**5**	**5**	**5**	**4**	**4**	**3**		**6**	**6**	**5**	**5**		
Sodium	7440-23-5	**mg/L**		1		**8**	**8**	**7**	**6**		**8**	**7**	**8**	**8**	**6**	**6**		**8**	**8**	**8**	**7**		
Potassium	7440-09-7	**mg/L**		1		**2**	**2**	**2**	<1		**2**	**2**	**2**	**1**	**1**	<1		**2**	**2**	**1**	**1**		
EG020F: Dissolved Metals by ICP-MS																							
Aluminium	7429-90-5	mg/L	0.01				**0.08**	**0.10**	**0.09**					**0.11**	**0.11**	**0.09**				**0.11**	**0.09**		
Arsenic	7440-38-2	**mg/L**	0.001			<0.001	<0.001	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Cadmium	7440-43-9	**mg/L**	0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Chromium	7440-47-3	**mg/L**	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Copper	7440-50-8	**mg/L**	0.001			<0.001	<0.001	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	<0.001	<0.001				

Table 7: Water Analysis 2019 - 2021

Analyte grouping/Analyte	CAS Number	Unit	LOR	WQO														
Matrix: WATER				Sample Type:	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Workgroup: EB1905575				ALS Sample Number:	EB1909312	EB2101893	EB2104379	EB2114407	EB1905575	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1908685	EB1909312	EB2101893	EB2104379
Project name/number: 18006_Scenic Rim Trail				Sample Date:	10/04/2019	22/01/2021	17/02/2021	25/05/2021	05/03/2019	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	03/04/2019	10/04/2019	22/01/2021	17/02/2021
				sample ID (1st):	SW03	SW03	SW03	SW03	SW04	SW04	SW04	SW04	SW04	SW04	SW06	SW06	SW06	SW06
			Site:	Assessment	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte	Woodcutte
			Purchase Order:	Project	18006	18006	20007	20007	18006	18006	18006	18006	20007	20007	18006	18006	18006	20007
			LOR	Creek System	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple	Dalrymple
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001			**0.002**	**0.005**	**0.001**				**0.002**	**0.004**	**0.001**			**0.016**	**0.006**
Nickel	7440-02-0	mg/L	0.001		<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	**0.001**	**0.002**
Zinc	7440-66-6	mg/L	0.005		<0.005	<0.005	**0.008**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.006**
Iron	7439-89-6	mg/L	0.05			**0.08**	**0.10**	**0.06**				**0.08**	**0.09**	**0.06**			**0.12**	**0.10**
EG020T: Total Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01			**0.18**	**0.16**	**0.14**				**0.20**	**0.20**	<0.01			**0.20**	**0.11**
Arsenic	7440-38-2	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	mg/L	0.001		<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001			**0.006**	**0.006**	**0.004**				**0.005**	**0.005**	<0.001			**0.022**	**0.006**
Nickel	7440-02-0	mg/L	0.001		<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001	**0.001**	<0.001
Zinc	7440-66-6	mg/L	0.005		<0.005	<0.005	**0.013**	<0.005	**<0.005**	<0.005	<0.005	<0.005	<0.005	<0.005	**0.007**	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05			**0.17**	**0.16**	**0.12**				**0.18**	**0.15**	<0.05			**0.23**	**0.14**
EK040P: Fluoride by PC Titrator																		
Fluoride	16984-48-8	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nutrients																		
Ammonia as N	7664-41-7	mg/L	0.01	40	**0.04**	<0.01	**0.04**	<0.01	0.02	<0.01	**0.04**	**0.02**	<0.01	**0.02**	<0.01	**0.05**	<0.01	**0.01**
Nitrite as N	14797-65-0	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	14797-55-8	mg/L	0.01		**0.04**	**0.03**	**0.07**	**0.05**	**0.64**	**0.14**	**0.08**	**0.11**	**0.05**	**0.05**	<0.01	**0.05**	**0.05**	**0.02**
Nitrite + Nitrate as N		mg/L	0.01	0.275	**0.04**	**0.03**	**0.07**	**0.05**	**0.64**	**0.14**	**0.08**	**0.11**	**0.05**	**0.05**	<0.01	**0.05**	**0.05**	**0.02**
Total Kjeldahl Nitrogen as N		mg/L	0.1		**0.1**	**0.2**	**0.5**	**0.2**	**0.2**	**0.3**	**0.2**	**0.2**	**0.2**	**0.3**	**0.2**	**0.2**	**0.2**	**0.2**
Total Nitrogen as N		mg/L	0.1	1.51	**0.1**	**0.2**	**0.6**	**0.2**	**0.8**	**0.4**	**0.3**	**0.3**	**0.2**	**0.4**	**0.2**	**0.2**	**0.2**	**0.2**
Total Phosphorus as P		mg/L	0.01	0.56	**0.07**	**0.09**	**0.09**	**0.10**	**0.06**	**0.1**	**0.08**	**0.09**	**0.09**	**0.10**	**0.08**	**0.17**	**0.09**	**0.09**
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	0.13	**0.07**	**0.08**	**0.09**	**0.06**	**0.09**	**0.1**	**0.07**	**0.07**	**0.08**	**0.06**	**0.1**	**0.07**	**0.07**	**0.09**
EN055: Ionic Balance																		
Total Anions		meq/L	0.01		**1.15**	**0.89**	**0.94**	**0.95**	**1.05**	**1.08**	**1.11**	**0.81**	**0.84**	**0.77**	**1.16**	**1.3**	**1.08**	**1.03**
Total Cations		meq/L	0.01		**1.14**	**1.08**	**0.93**	**0.84**	**1.16**	**1.12**	**1.06**	**1.00**	**0.86**	**0.71**	**1.29**	**1.14**	**1.18**	**1.04**
MW006: Faecal Coliforms & E.coli by MF																		
Escherichia coli		CFU/100mL	1		**<1**	**430**	**260**	**10**	**1**		**14**	**46**	**140**	**~10**		**<1**	**63**	**~200**

Table 7: Water Analysis 2019 - 2021

Matrix: WATER

Workgroup: EB1905575

Project name/number: 18006_Scenic Rim Trail

Site:

Purchase Order:

Analyte grouping/Analyte	CAS Number	Unit	LOR	WQO														
Sample Type:					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
ALS Sample Number:					EB2114407	EB1905575	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1905575	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1908685
Sample Date:					25/05/2021	05/03/2019	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	05/03/2019	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	03/04/2019
sample ID (1st):					SW06	SW01	SW01	SW01	SW01	SW01	SW01	SW02	SW02	SW02	SW02	SW02	SW02	SW05
				Assessment	Woodcutter	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat
				Project	20007	18006	18006	18006	18006	20007	20007	18006	18006	18006	18006	20007	20007	18006
				Creek System	Dalrymple	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed
Field Parameters																		
Temperature		**•C**			12.6	18.5	15.03	17.58	17.147	17.76	11.17	18.5	15.35	18.38	17.2	17.72	11.18	16.36
pH		**pH units**		7.5-8.1	7.23	6.6	7.24	6.58	7.01	6.82	6.89	6.1	7.3	6.9	6.96	6.82	6.85	7.36
Dissolved Oxygen - %		**%**		60-110	166	75	102	66.9	146.4	55.7	138	70	105	76.1	68.6	55.5	153	111.7
Total Dissolved Solids		**mg/L**			36	90	0.059	0.036			33	85	0.056	0.038			35	0.064
ORP		**mV**			168	235	272	200	146.4	159.7	166	267	266	194	146.3	169.2	173	253
EC		**µS/cm**		335	69	118	91	58	90	71	65	115	86	61	99	17	71	99
Turbidity		**NTUs**		90	0		2.4	0	0	0	0		2.6	0	0	3.5	0	1.5
EP025: Oxygen - Dissolved (DO)																		
Dissolved Oxygen								**9.6**						**9.3**				
Dissolved Oxygen - % Saturation				60-110				**105**						**102**				
EA005P: pH by PC Titrator																		
pH Value		**pH Unit**	0.01	7.5-8.1	**7.63**	**7.55**	**7.7**	**7.62**	**6.74**	**7.50**	**7.43**	**7.33**	**7.8**	**7.25**	**7.02**	**7.46**	**7.40**	**7.9**
EA006: Sodium Adsorption Ratio (SAR)																		
Sodium Adsorption Ratio			0.01		**0.48**	**0.62**	**0.6**	**0.68**	**0.78**	**0.56**	**0.61**	**0.56**	**0.62**	**0.71**	**0.70**	**0.59**	**0.55**	**0.56**
EA010P: Conductivity by PC Titrator																		
Electrical Conductivity @ 25°C		**µS/cm**	1		**88**	**105**	**106**	**111**	**94**	**90**	**75**	**105**	**103**	**108**	**94**	**86**	**75**	**113**
Calculated TDS & Total Suspended Solids dried at 104 ± 2°C																		
Total Dissolved Solids (Calc.)		**mg/L**	1		**57**	**68**	**69**	**72**	**61**	**58**	**49**	**68**	**67**	**70**	**61**	**56**	**49**	**73**
Suspended Solids (SS)		**mg/L**	**5**		<5				**7**	<5	**78**				<5	<5	<5	
EA065: Total Hardness as CaCO3																		
Total Hardness as CaCO3		**mg/L**	1		**29**	**31**	**34**	**33**	**31**	**29**	**18**	**38**	**31**	**30**	**31**	**26**	**22**	**38**
ED037P: Alkalinity by PC Titrator																		
Hydroxide Alkalinity as CaCO3	**DMO-210-001**	**mg/L**	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	**3812-32-6**	**mg/L**	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	**71-52-3**	**mg/L**	1		**30**	**40**	**38**	**41**	**25**	**29**	**26**	**38**	**35**	**36**	**24**	**29**	**20**	**41**
Total Alkalinity as CaCO3		**mg/L**	1		**30**	**40**	**38**	**41**	**25**	**29**	**26**	**38**	**35**	**36**	**24**	**29**	**20**	**41**
ED041G: Sulfate (Turbidimetric) as SO4 2- DAED045G: Chloride																		
Sulfate as SO4 - Turbidimetric	**14808-79-8**	**mg/L**	1		**1**	**<1**	**4**	**1**	**2**	**2**	**2**	**<1**	**2**	**3**	**2**	**2**	**2**	**2**
Chloride	**16887-00-6**	**mg/L**	1		**9**	**12**	**10**	**10**	**11**	**9**	**10**	**11**	**10**	**10**	**11**	**9**	**10**	**11**
ED093F: Dissolved Major Cations																		
Calcium	**7440-70-2**	**mg/L**	1		**5**	**6**	**7**	**5**	**6**	**5**	**4**	**7**	**6**	**4**	**6**	**4**	**4**	**7**
Magnesium	**7439-95-4**	**mg/L**	1		**4**	**4**	**4**	**5**	**4**	**4**	**2**	**5**	**4**	**5**	**4**	**4**	**3**	**5**
Sodium	**7440-23-5**	**mg/L**	1		**6**	**8**	**8**	**9**	**10**	**7**	**6**	**8**	**8**	**9**	**9**	**7**	**6**	**8**
Potassium	**7440-09-7**	**mg/L**	1		<1	**2**	**1**	**2**	**1**	**1**	<1	**2**	**1**	**2**	**1**	**1**	<1	**1**
EG020F: Dissolved Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01		**0.11**				**0.07**	**0.05**	**0.06**				**0.07**	**0.06**	**0.04**	
Arsenic	**7440-38-2**	**mg/L**	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	**7440-43-9**	**mg/L**	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	**7440-47-3**	**mg/L**	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	**7440-50-8**	**mg/L**	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 7: Water Analysis 2019 - 2021

Matrix: WATER
Workgroup: EB1905575
Project name/number: 18006_Scenic Rim Trail

environmental and health

					1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sample Type:					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
ALS Sample Number:					EB2114407	EB1905575	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1905575	EB1908685	EB1909312	EB2101893	EB2104379	EB2114407	EB1908685
Sample Date:					25/05/2021	05/03/2019	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	05/03/2019	03/04/2019	10/04/2019	22/01/2021	17/02/2021	25/05/2021	03/04/2019
sample ID (1st):					SW06	SW01	SW01	SW01	SW01	SW01	SW01	SW02	SW02	SW02	SW02	SW02	SW02	SW05
Site:				Assessment	Woodcutte	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat	Amphitheat
Purchase Order:				Project	20007	18006	18006	18006	18006	20007	20007	18006	18006	18006	18006	20007	20007	18006
			LOR	Creek System	Dalrymple	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed	Unnamed
Analyte grouping/Analyte	CAS Numb	Unit		WQO														
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001		**0.002**				**0.002**	**0.002**	<0.001				**0.001**	**0.003**	<0.001	
Nickel	7440-02-0	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	mg/L	0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05		**0.08**				**0.06**	**0.06**	<0.05				<0.05	**0.05**	<0.05	
EG020T: Total Metals by ICP-MS																		
Aluminium	7429-90-5	mg/L	0.01		**0.12**				**0.10**	**0.09**	**0.14**				**0.09**	**0.14**	**0.09**	
Arsenic	7440-38-2	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001		**0.004**				**0.003**	**0.002**	**0.003**				**0.002**	**0.004**	**0.002**	
Nickel	7440-02-0	mg/L	0.001		<0.001	0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	mg/L	0.005		<0.005	**0.007**	**0.009**	<0.005	<0.005	<0.005	<0.005	**<0.005**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05		**0.12**				**0.09**	**0.07**	**0.12**				**0.08**	**0.11**	**0.07**	
EK040P: Fluoride by PC Titrator																		
Fluoride	16984-48-8	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nutrients																		
Ammonia as N	7664-41-7	mg/L	0.01	40	**0.03**	0.02	<0.01	**0.04**	<0.01	<0.01	<0.01	0.02	**0.01**	**0.06**	<0.01	<0.01	**0.02**	<0.01
Nitrite as N	14797-65-0	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	14797-55-8	mg/L	0.01		**0.04**	**0.06**	**0.03**	**0.29**	**0.04**	**0.04**	**0.05**	**0.06**	**0.04**	**0.51**	**0.05**	**0.07**	**0.24**	<0.01
Nitrite + Nitrate as N		mg/L	0.01	0.275	**0.04**	**0.06**	**0.03**	**0.29**	**0.04**	**0.04**	**0.05**	**0.06**	**0.04**	**0.51**	**0.05**	**0.07**	**0.24**	<0.01
Total Kjeldahl Nitrogen as N		mg/L	0.1		**0.2**	**0.4**	**0.2**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.3**	**0.5**	**0.1**	**0.1**	**0.1**	**0.1**
Total Nitrogen as N		mg/L	0.1	1.51	**0.2**	**0.5**	**0.2**	**0.5**	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**1**	**0.2**	**0.2**	**0.3**	**0.1**
Total Phosphorus as P		mg/L	0.01	0.56	**0.06**	**0.17**	**0.08**	**0.07**	**0.06**	**0.07**	**0.07**	**0.06**	**0.1**	**0.09**	**0.06**	**0.07**	**0.07**	**0.08**
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	0.13	**0.06**	**0.08**	**0.09**	**0.07**	**0.06**	**0.07**	**0.05**	**0.08**	**0.09**	**0.07**	**0.06**	**0.07**	**0.05**	**0.1**
EN055: Ionic Balance																		
Total Anions		meq/L	0.01		**0.87**	**1.14**	**1.12**	**1.12**	**0.85**	**0.87**	**0.84**	**1.07**	**1.02**	**1.06**	**0.83**	**0.87**	**0.72**	**1.17**
Total Cations		meq/L	0.01		**0.84**	**1.03**	**1.05**	**1.1**	**1.09**	**0.91**	**0.62**	**1.16**	**1**	**1.05**	**1.04**	**0.86**	**0.71**	**1.13**
MW006: Faecal Coliforms & E.coli by MF																		
Escherichia coli		CFU/100mL	1		**29**	**~6700**		**10**	**26**	**14**	**~7**	**40**		**~3**	**22**	**~50**	<1	

Table 7: Water Analysis 2019 - 2021

Matrix:	WATER			Sample Type:			REG	REG	REG	REG	REG	REG
Workgroup:	EB1905575			ALS Sample Number:			EB1909312	EB2101893	EB2104379	EB2114407	EB2016997	EB2114407011
Project name/number:	18006_Scenic Rim Trail			Sample Date:			10/04/2019	22/01/2021	17/02/2021	25/05/2021	25/06/2020	25/05/2021
				sample ID (1st):			SW05	SW05	SW05	SW05	DUP01	DUP01
				Site:		Assessment	Amphitheat	Amphitheat	Amphitheat	Amphitheat		
				Purchase Order:		Project	18006	18006	20007	20007	18006	20007
				LOR		Creek System	Unnamed	Unnamed	Unnamed	Unnamed		
Analyte grouping/Analyte	CAS Numbe	Unit			WQO							
Field Parameters												
Temperature		•C					18.54	17.47	18.29	10.87		
pH		pH units			7.5-8.1		6.85	6.44	6.41	6.45		
Dissolved Oxygen - %		%			60-110		86.6	76.5	69	169		
Total Dissolved Solids		mg/L					0.044			43		
ORP		mV					0.07	172.7	173.4	181.6		
EC		µS/cm				335	0	114	96	85		
Turbidity		NTUs				90	0	0	0	0		
EP025: Oxygen - Dissolved (DO)												
Dissolved Oxygen							**9.4**					
Dissolved Oxygen - % Saturation					60-110		**103**					
EA005P: pH by PC Titrator												
pH Value		pH Unit		0.01	7.5-8.1		**7.53**	**7.32**	**7.63**	**7.58**	----	----
EA006: Sodium Adsorption Ratio (SAR)												
Sodium Adsorption Ratio				0.01			**0.64**	**0.61**	**0.49**	**0.48**	----	----
EA010P: Conductivity by PC Titrator												
Electrical Conductivity @ 25°C		µS/cm		1			**120**	**117**	**107**	**86**	----	----
Calculated TDS & Total Suspended Solids dried at 104 ± 2°C												
Total Dissolved Solids (Calc.)		mg/L		1			**78**	**76**	**70**	**56**	----	----
Suspended Solids (SS)		mg/L	5					<5	<5	<5		----
EA065: Total Hardness as CaCO3												
Total Hardness as CaCO3		mg/L		1			**37**	**40**	**38**	**29**	----	----
ED037P: Alkalinity by PC Titrator												
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L		1		<1		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L		1		<1		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L		1			**42**	**32**	**38**	**27**	----	----
Total Alkalinity as CaCO3		mg/L		1			**42**	**32**	**38**	**27**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- DAED045G: Chloride												
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L		1			**1**	**2**	**1**	**2**	----	----
Chloride	16887-00-6	mg/L		1			**11**	**12**	**10**	**10**	----	----
ED093F: Dissolved Major Cations												
Calcium	7440-70-2	mg/L		1			**5**	**8**	**7**	**5**	----	----
Magnesium	7439-95-4	mg/L		1			**6**	**5**	**5**	**4**	----	----
Sodium	7440-23-5	mg/L		1			**9**	**9**	**7**	**6**	----	----
Potassium	7440-09-7	mg/L		1			**2**	**1**	**1**	<1	----	----
EG020F: Dissolved Metals by ICP-MS												
Aluminium	7429-90-5	mg/L	0.01					**0.04**	**0.03**	<0.01		----
Arsenic	7440-38-2	mg/L		0.001		<0.001		<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	mg/L		0.0001		<0.0001		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	mg/L		0.001		<0.001		<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	mg/L		0.001		<0.001		<0.001	<0.001	<0.001	----	----

Table 7: Water Analysis 2019 - 2021

Matrix:	WATER			**Sample Type:**			**REG**	**REG**	**REG**	**REG**	**REG**	**REG**
Workgroup:	EB1905575			**ALS Sample Number:**			EB1909312	EB2101893	EB2104379	EB2114407	EB2016997	EB2114407011
Project name/number:	18006_Scenic Rim Trail			**Sample Date:**			10/04/2019	22/01/2021	17/02/2021	25/05/2021	25/06/2020	25/05/2021
				Client sample ID (1st):			SW05	SW05	SW05	SW05	DUP01	DUP01
				Site:		**Assessment**	Amphitheat	Amphitheat	Amphitheat	Amphitheat		
				Purchase Order:		**Project**	18006	18006	20007	20007	18006	20007
				LOR		**Creek System**	Unnamed	Unnamed	Unnamed	Unnamed		
Analyte grouping/Analyte	**CAS Numbe**	**Unit**				**WQO**						
Lead	**7439-92-1**	**mg/L**		0.001			<0.001	<0.001	<0.001	<0.001	----	**----**
Manganese	7439-96-5	mg/L	0.001					**0.002**	**0.004**	<0.001		**----**
Nickel	**7440-02-0**	**mg/L**		0.001			<0.001	<0.001	**0.001**	<0.001	**----**	**----**
Zinc	**7440-66-6**	**mg/L**		0.005			<0.005	<0.005	**0.010**	<0.005	**----**	**----**
Iron	7439-89-6	mg/L	0.05					<0.05	<0.05	<0.05		**----**
EG020T: Total Metals by ICP-MS												
Aluminium	7429-90-5	mg/L	0.01					**0.08**	**0.06**	**0.09**		**----**
Arsenic	**7440-38-2**	**mg/L**		0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	**7440-43-9**	**mg/L**		0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	**7440-47-3**	**mg/L**		0.001			<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001
Copper	**7440-50-8**	**mg/L**		0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	**7439-92-1**	**mg/L**		0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001					**0.002**	**0.005**	<0.001		**----**
Nickel	**7440-02-0**	**mg/L**		0.001			<0.001	<0.001	<0.001	<0.001	**<0.001**	<0.001
Zinc	**7440-66-6**	**mg/L**		0.005			<0.005	<0.005	**0.006**	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05					**0.06**	**0.06**	**0.06**		**----**
EK040P: Fluoride by PC Titrator												
Fluoride	**16984-48-8**	mg/L		0.1			<0.1	<0.1	<0.1	<0.1	----	**----**
Nutrients												
Ammonia as N	**7664-41-7**	**mg/L**		0.01	40		**0.05**	<0.01	**0.03**	<0.01	**----**	**----**
Nitrite as N	**14797-65-0**	**mg/L**		0.01			<0.01	<0.01	<0.01	<0.01	----	**----**
Nitrate as N	**14797-55-8**	**mg/L**		0.01			**1.02**	<0.01	**0.02**	**0.02**	**----**	**----**
Nitrite + Nitrate as N		**mg/L**		0.01	0.275		**1.02**	<0.01	**0.02**	**0.02**	**----**	**0.17**
Total Kjeldahl Nitrogen as N		**mg/L**		0.1			**0.4**	**0.2**	**0.3**	<0.1	**----**	<0.1
Total Nitrogen as N		**mg/L**		0.1	1.51		**1.4**	**0.2**	**0.3**	<0.1	**----**	**0.2**
Total Phosphorus as P		**mg/L**		0.01	0.56		**0.08**	**0.06**	**0.08**	**0.08**	**----**	**0.06**
Reactive Phosphorus as P	**14265-44-2**	**mg/L**		0.01	0.13		**0.07**	**0.05**	**0.07**	**0.05**	**----**	**----**
EN055: Ionic Balance												
Total Anions		**meq/L**		0.01			**1.17**	**1.02**	**1.06**	**0.86**	**----**	**----**
Total Cations		**meq/L**		0.01			**1.18**	**1.23**	**1.09**	**0.84**	**----**	**----**
MW006: Faecal Coliforms & E.coli by MF												
Escherichia coli		**CFU/100mL**		1			**<1**	**~33**	<10	<1	**----**	**----**

Table 8 : Quality Control Results of Surface Waters

Table 8: Quality Control on Field Duplicates and Lab Triplica

Lab ID	Date	Sample ID:		pH Value	Total Kjeldahl Nitrogen as N	Total Phosphorus as P
EB19012	14/01/2018	BH06 (0.1)	Primary sample	5.6	2960	
EB19012	14/01/2019	DUP05	Duplicate	5	2610	
B748612	14/01/2018	DUP06	Triplicate	5.79	2887	
			Field (primary and DUP05)	11%	13%	
			Lab (DUP05 and DUP06)	-15%	-10%	
EB19012	15/01/2019	BH11 (1.0)	Primary sample	5.2	4900	
EB19012	15/01/2019	DUP07	Duplicate	5.3	4820	
B748612	14/01/2018	DUP08	Triplicate	5.72	4372	
			Field (primary and DUP07)	-2%	2%	
			Lab (DUP07 and DUP08)	-8%	10%	
EB19012	15/01/2018	BH14 (0.3)	Primary sample	5.7	2070	
EB19012	15/01/2019	DUP09	Duplicate	5.8	2540	
B748612	15/01/2020	DUP10	Triplicate	5.99	2683	
			Field (primary and DUP09)	-2%	-18%	
			Lab (DUP09 and DUP10)	-3%	-5%	
EB19012	15/01/2018	BH16 (0.05)	Primary sample	5.5	1300	
EB19012	15/01/2019	DUP11	Duplicate	5.7	1960	
	15/01/2020	DUP12	Triplicate	6.24	1876	
			Field (primary and DUP11)	-3%	-34%	
			Lab (DUP11 and DUP12)	-9%	4%	
EB21144	25/05/2021	SW07	Primary sample			0.09
EB21144	25/05/2021	DUP01	Duplicate			0.06
B748612	25/05/2021	DUP02	Triplicate			0.08
			Field (primary and DUP05)			43%

APPENDIX A FIELD NOTES

22/1/21

SW07 upstream — DJPS

clear skies, clear water

pH 3.97 — %DO 40.2
mg/L 3.57
ORP 164.6 — 16.58C
EC 109 µS/cm — 1.8 FNU

SW08 Downstream

pH 6.15 — %DO 43
mg 3.8
ORP 153.8 — 16.33
EC 67 — 1.2 FNU

SW03 22/1/21

pH 6.04 EC 100µS
ORP 182.2 2.7 FNU
%DO 73 17.95°C
mg/L DO 6.38

SW04

pH 6.66 EC 88µS
ORP 154.6 3.8 FNU
%DO 78.7 17.16°C
mg/L DO 6.97

SW04 Downstream

pH 7.04 EC 84µS
ORP 144.6 3.4 FNU
%DO 78.7 17.32°C
mg/L DO 6.89

SW10 upstream

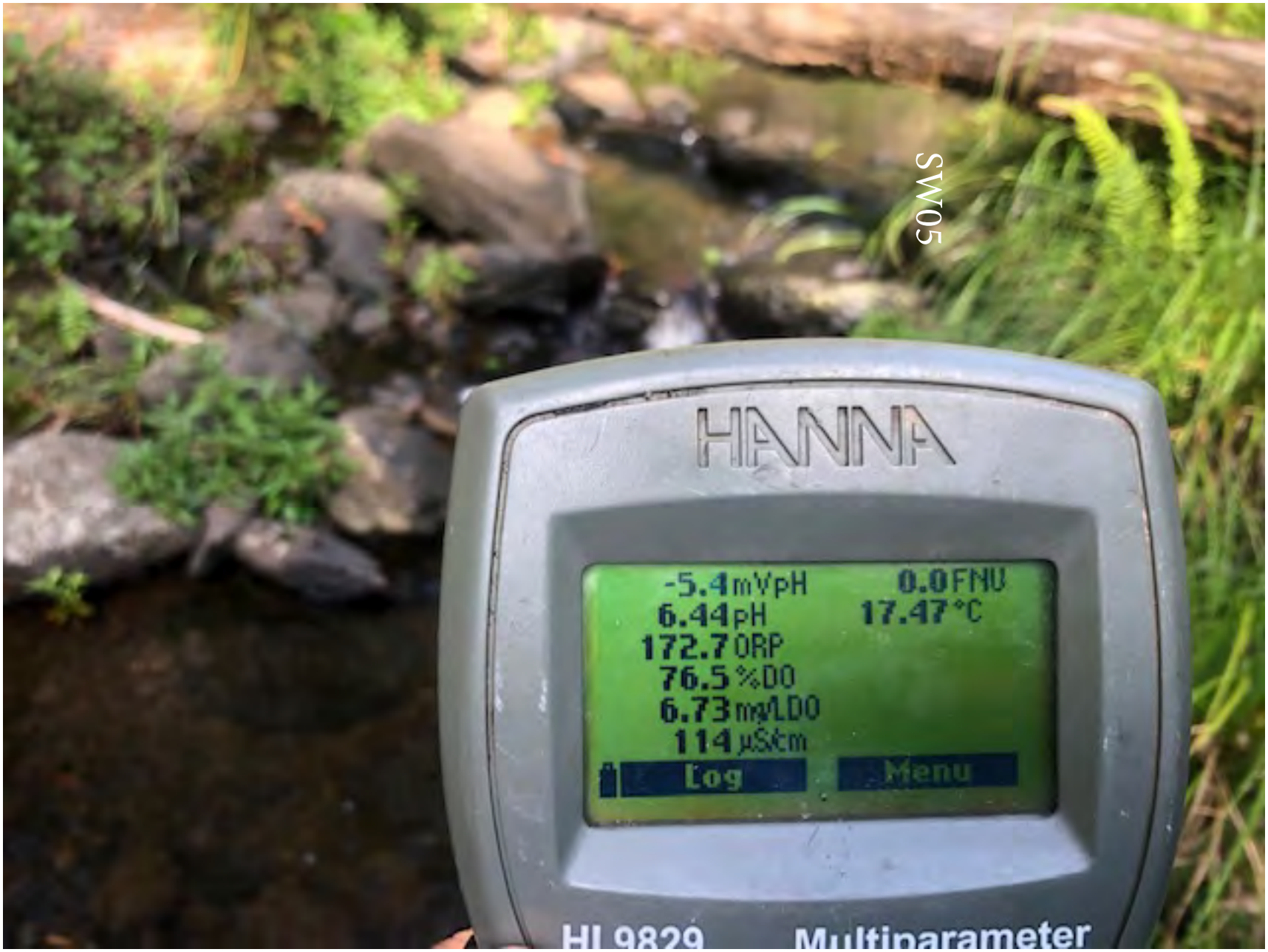
pH 7.18 EC 92µS
ORP 145.4 4.1 FNU
%DO 74.4 17.28°C
mg/L DO 6.54


SW01
HANNA
-36.5 mVpH
7.01 pH
146.4 mVORP
68.0 %DO
6.01 mg/LDO
Log
Menu
HI 9829
Multiparameter


HANNA
90 µS/cm
0.0 FNU
17.17 °C
Log
Menu
HI 9829
Multiparameter


HANNA
-30.0 mVpH
6.90 pH
144.3 mVORP
68.6 %DO
6.06 mgLDO
Menu
HI 9829
Multiparameter


HANNA
99 µS/cm
0.0 FNU
17.20 °C
Log
Menu
HI 9829
Multiparameter


SW05
HANNA
-5.4 mV pH
0.0 FNU
6.44 pH
17.47 °C
172.7 ORP
76.5 %DO
6.73 mg/L DO
114 µS/cm
Log
Menu
HI 9829
Multiparameter

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OBSERVATIONS 20007

SAMPLE ID: SW01	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER Overcast	
FIELD OBSERVATIONS	
Temp °C 17.76	DO mg/L 4.99
pH 6.82	DO % 55.7
pHmv	TDS mg/L 41
ORP mV 159.7	ppt
EC mS/cm 4.71	
NTU F 0.0	

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OBSERVATIONS 20007

UP

SAMPLE ID: SW02	DATE:
OPERATIVE DM	GPS COORDINATES
WEATHER overcast	
FIELD OBSERVATIONS	
Temp °C 17.72	DO mg/L 4.84
pH 6.82	DO % 55.5
pHmv	TDS mg/L 8
ORP mV 169.2	ppt
EC mS/cm 17	
NTU 3.5	

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OBSERVATIONS 20007

SAMPLE ID: SW03	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER Sunny Showers	
FIELD OBSERVATIONS	
Temp °C 18.8	DO mg/L 10.27
pH 7.3	DO % 119.6
pHmv	TDS mg/L 48
ORP mV 153.7	ppt
EC mS/cm 97	
NTU 1.4	

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OBSERVATIONS 20007

SAMPLE ID: SW04	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER cloudy	
FIELD OBSERVATIONS	
Temp °C 17.58	DO mg/L 9.91
pH 7.2	DO % 112.7
pHmv	TDS mg/L 44
ORP mV 161.6	ppt
EC mS/cm 87	
NTU 2.6	

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OBSERVATIONS 20007

SAMPLE ID: SW05	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER Cloudy showers	
FIELD OBSERVATIONS	
Temp °C 18.29	DO mg/L 6.03
pH 6.41	DO % 69.1
pHmv	TDS mg/L 55
ORP mV 173.4	ppt
EC mS/cm 96	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW06	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER Sunny	

FIELD OBSERVATIONS

Temp °C 20.61	DO mg/L 8.06
pH 7.58	DO % 97.6
pHmv	TDS mg/L 54
ORP mV 148.6	ppt
EC mS/cm 95	
NTU 0.5	

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OBSERVATIONS 20007

SAMPLE ID: SW07	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER Cloudy	
FIELD OBSERVATIONS	
Temp °C 16.38	DO mg/L 3.93
pH 5.43	DO % 45.72
pHmv	TDS mg/L 53
ORP mV	ppt
EC mS/cm V 92	
NTU F 11	

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OBSERVATIONS 20007

Dam

SAMPLE ID: SW08	DATE: 17/2/21
OPERATIVE D M	GPS COORDINATES
WEATHER Cloudy	
FIELD OBSERVATIONS	
Temp °C 16.15	DO mg/L 2.37
pH 5.84	DO % 26.9
pHmv	TDS mg/L 41
ORP mV 174.3	ppt
EC ~~m~~S/cm 68	
NTU 2.9	

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OBSERVATIONS 20007

SAMPLE ID: SW04	DATE: 17/2/21
OPERATIVE DM	GPS COORDINATES
WEATHER Sunny	
FIELD OBSERVATIONS	
Temp °C 17.55	DO mg/L 10.48
pH 7.14	DO % 119.6
pHmv	TDS mg/L 47
ORP mV 162	ppt
EC mS/cm 81	
NTU 2.3	

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OBSERVATIONS 20007

UP

SAMPLE ID: SW10	DATE: 17/2/21
OPERATIVE DR	GPS COORDINATES
WEATHER Sunny	
FIELD OBSERVATIONS	
Temp °C 17.52	DO mg/L 7.03
pH 7.04	DO % 82
pHmv	TDS mg/L 52
ORP mV 157.7	ppt
EC mS/cm 92	
NTU 3.7	

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OBSERVATIONS 20007

SAMPLE ID: SW01	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER	
FIELD OBSERVATIONS	
Temp °C 11.17	DO mg/L 13.6
pH 6.89	DO % 138
pHmv -32.5	TDS mg/L 33
ORP mV 166	ppt
EC mS/cm 65	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW02	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER	
FIELD OBSERVATIONS	
Temp °C 21.18	DO mg/L 15.47
pH 6.88	DO % 153
pHmv -31	TDS mg/L 35
ORP mV 173	ppt
EC mS/cm 71	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW 3	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER	
FIELD OBSERVATIONS	
Temp °C 12.26	DO mg/L 18.12
pH 7.27	DO % 182.4
pHmv -53	TDS mg/L 44
ORP mV 167.1	ppt
EC mS/cm	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW 4	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER	
FIELD OBSERVATIONS	
Temp °C 12.2	DO mg/L 17.13
pH 7.01	DO % 173
pHmv -38.3	TDS mg/L 58
ORP mV 176.1	ppt
EC mS/cm 76	
NTU 1.2	

OBSERVATIONS 20007

24/05/2021

SAMPLE ID: SW05	DATE: 24/7/21
OPERATIVE	GPS COORDINATES
WEATHER clear	
FIELD OBSERVATIONS	
Temp °C 10.87	DO mg/L 17.37
pH 6.45	DO % 169
pHmv -9.1	TDS mg/L 43
ORP mV 181.6	ppt
EC mS/cm 85	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW06	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER	
FIELD OBSERVATIONS	
Temp °C 12.6	DO mg/L 16.54
pH 7.23	DO % 166
pHmv -50.6	TDS mg/L 36
ORP mV 168	ppt
EC mS/cm 64	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW07	DATE: 24/5/21
OPERATIVE DM	GPS COORDINATES
WEATHER Cloudy	

FIELD OBSERVATIONS

Temp °C 11.81	DO mg/L 9.53
pH 5.87	DO % 103.2
pHmv 21.3	TDS mg/L 41
ORP mV	ppt
EC mS/cm 82	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SW 08	DATE: 24/05/2021
OPERATIVE DM	GPS COORDINATES
WEATHER cloudy	

FIELD OBSERVATIONS

Temp °C 11.74	DO mg/L 13.83
pH 5.91	DO % 141.2
pHmv 182	TDS mg/L 35
ORP mV 981.	ppt
EC mS/cm 69	
NTU 0.0	

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OBSERVATIONS 20007

SAMPLE ID: SWB9	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER	
FIELD OBSERVATIONS	
Temp °C 12.37	DO mg/L 17.05
pH 6.48	DO % 173.1
pHmv -36.8	TDS mg/L 39
ORP mV 176	ppt
EC mS/cm 79	
NTU 3.3	

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OBSERVATIONS 20007

SAMPLE ID: SW 10	DATE: 24/05/2021
OPERATIVE	GPS COORDINATES
WEATHER Clear skies	
FIELD OBSERVATIONS	
Temp °C 12.04	DO mg/L 15.28
pH 6.83	DO % 154 ~~148~~
pHmv -29.1	TDS mg/L 37
ORP mV 169.8	ppt
EC mS/cm 79	
NTU 2.2	

APPENDIX B QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC)

1. Data Usability

1.1 Introduction

Information generated from environmental investigations requires some statement in regard to the usability of the data[1], and therefore quality assurance (QA) and quality control (QC) are an integral part of the analysis and interpretation of environmental data. QA/QC `used in contaminated sites investigations is briefly reviewed in this section.

Moreton Environmental and Health would like to acknowledge the NSW Auditor Mark Salmon, Principal Scientist in Easterly Point Environmental and colleague, mentor and friend of Dan Morton, originally produced the development of these QAQC procedures.

Quality assurance involves all of the actions, procedures, checks and decisions undertaken to ensure the representativity and integrity of samples, and accuracy and reliability of analytical results (NEPC 2013). Quality control is the component of QA, which monitors and measures the effectiveness of other procedures by the comparison of these measures to previously decided objectives.

There are various components of QA/QC, which address the operation of the laboratories and the routine procedures conducted to achieve a minimum level of quality. Examples of QA components include sample control, data transfer, instrument calibration, staff training, etc. Examples of QC components include the measurement of samples to access the quality of reagents and standards, cleanliness of apparatus, accuracy and precision of methods and instruments, etc. Generally, the National Association of Testing Authorities (NATA) addresses the management of laboratory QA issues through accreditation, or similar, and monitoring of these issues is not addressed on a project-by-project basis.

On a project specific basis, those involved in collecting, assessing or reviewing the relevant data should ensure the minimum level of QA is conducted. Appropriate numbers and types of QC samples should be collected and analysed, both field QC samples and laboratory QC samples. While minimum levels of QA/QC are specified in some guidelines, e.g. (DEC 2006), (Council of Standards Australia 1999), (NEPC 2013), the minimum level required may vary between projects, based on site and project specific aspects. This means that the minimum specified requirements may not be sufficient for a particular project. As described in the NEPM (NEPC 2013):

[1] To avoid confusion with the data quality objectives (DQOs) process, the term data usability is used rather than data quality.

As a general rule, the level of required QC is that which adequately measures the effects of all possible influences upon sample integrity, accuracy and precision, and is capable of predicting their variation with a high degree of confidence.

A common example of where site requirements dictate additional QA and associated QC samples is when site history indicates the use of petrol or volatile solvents, field procedures may need to be more stringently adhered to and additional QC samples may be required, including trip blanks and trip spikes.

2. PARCC parameters

Following receipt of laboratory analytical results, data validation is conducted to determine if the specified acceptance criteria have been met. This is conducted to ensure that all data, and subsequent decisions based on that data, are technically sound. Data quality is typically discussed in terms of precision, accuracy, representativity, comparability and completeness. These are referred to as the PARCC parameters[2]. Field QA/QC and laboratory QC is described below within the PARCC framework.

2.1 Precision

Duplicates

Precision is a measure of the reproducibility of results under a given set of conditions and is assessed on the basis of agreement between a set of duplicate results obtained from duplicate analyses. The precision of a duplicate determination is measured by comparing the difference between the two samples to the average of the two samples, expressed as a relative percentage difference (RPD).

The determination is:

$$RPD = (P-D)/(P+D/2) \times 100$$

P = primary sample

D = duplicate sample

Three types of duplicates are commonly used:

A. field duplicates are used to measure the precision of the sampling and analytical process;

B. inter-laboratory duplicates are used to check on the analytical performance of the primary laboratory; and

C. laboratory duplicates are used to measure the precision of the analytical process.

Field Duplicates

Field duplicates (or blind replicates) are collected from the same location and submitted to the laboratory for analyses, as a primary sample. The sample

[2] The PARCC parameters are sometimes referred to as data quality indicators (DQIs).

nomenclature is such that the laboratory is not aware which sample is a duplicate. The RPD is calculated to determine the degree of repeatability (precision) of results obtained from the duplicate analysis. Where results are below the practical quantification limit (PQLs) or limits of reporting (LORs), i.e. non detects, RPDs cannot be calculated. Where one result is detected, the results are considered to conform when the detected result is less than five times the PQL/LOR.

The PQL/LOR is the lowest concentration of an analyte that can be determined with acceptable precision (repeatability) and accuracy under the test conditions. The PQL/LOR is usually calculated as five times the lower limit of detection (or method detection limit). However, adjustments in PQLs/LORs may be required due to interference from high contaminant concentrations.

As environmental samples can exhibit a high degree of heterogeneity, field duplicates often exceed the acceptance criterion, particularly if the samples are co-collected, for example, because of the potential for losing volatiles during sample splitting. The NSW EPA require that before results which fail the acceptance criterion are described as due to low concentrations or sample heterogeneity, the sample should be re-analysed. This may not be necessary when the analytical results are significantly less than the landuse criteria.

RPDs in general for Field Duplicates will be non-conforming if the RPD is greater than 30% in water or greater than 50% in soil.

Inter-laboratory duplicates

Inter-laboratory duplicates (or split samples) are field duplicates which are sent to a second laboratory and analysed for the same analytes and, as far as possible, by the same methods. These provide a check on the analytical performance of the primary laboratory.

Laboratory Duplicates

Laboratory duplicates (or check samples) are field samples which are split by the laboratory and thereafter treated as separate samples. The RPD is calculated to determine the degree of repeatability (precision) of results obtained from the duplicate analysis.

USEPA (1994) specifies that for inorganics, if the results for laboratory duplicates fall outside of the recommended control limits for a particular analyte, all results for that analyte, in all associated samples of the same matrix, should be qualified as an estimated quantity. For organics, USEPA (1999) does not specify recommended actions for laboratory duplicates.

RPDs in general for Lab Duplicates will be non-conforming if the RPD is greater than 30% in water or greater than 50% in soil.

For volatiles in general for Lab Duplicates will be non-conforming if the RPD is greater than 20% in water and soil.

2.2 Accuracy

Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Inasmuch as the true sample

concentrations are not known, the determination of accuracy is achieved through the analysis of known reference materials or assessed by the analysis of matrix spikes. Spiking of reference material into the actual sample matrix is the preferred technique because it provides a measure of the matrix effects on the analytical recovery.

Accuracy is measured in terms of percentage recovery as defined by:

$$\%R = ((SSR - SR) / SA) \times 100$$

%R = percentage recovery spike

SSR = spiked sample result

SR = sample result

SA = spike added

Matrix spikes/matrix spike duplicates

These are samples prepared in the laboratory by dividing a sample into two aliquots and then spiking each with identical concentrations of specific analytes. The matrix spike (MS) and matrix spike duplicate (MSD) are then analysed separately and the results compared to determine the accuracy and precision of the analytes.

Surrogate spikes

Surrogate spikes provide an indication of analytical accuracy. They are used only for analyses, which use gas chromatography and are compounds which are similar to the organic analytes of interest in chemical composition, extraction and chromatography, but which are not normally found in field samples. Surrogates are generally spiked into all sample aliquots prior to preparation and analysis.

If the surrogate spike recovery does not meet the prescribed DQO, the samples should be re-analysed.

Laboratory control samples

Laboratory control samples (quality control check samples) are laboratory prepared samples of an appropriate clean matrix (i.e. sand or distilled water) which are spiked with known concentrations of specific analytes. The laboratory control sample (LCS) is then analysed and the results are used to assess sample preparation and analytical accuracy, free of matrix effects. Certified reference material (CRM) is another form of LCS, and involves the analysis of a known standard as part of the laboratory batch, e.g. British Columbia sediment samples for analysis of metals.

2.3 Representativity

Representativity refers to the degree to which the samples reflect the site specific conditions. It is primarily dependent on the design and implementation of the sampling program, with representativity of the data being partially ensured by the avoidance of cross-contamination, adherence to sample handling and analytical methods, use of field duplicates, ensuring that samples do not exceed holding times prior to analysis, use of chain-of-custody forms and other appropriate documentation.

There are a number of QC samples which can be collected to assist in the qualification of representativity, including:

Rinsate blanks

Used to determine if sampling equipment has been adequately decontaminated to ensure that cross-contamination between samples has not occurred. The frequency for rinsate blanks is one per piece of equipment per day (AS 4482.1-1997), however it should be noted that cross-contamination will bias samples upwards, and the frequency should therefore be at the investigators discretion.

Trip blanks

Used only when volatile organics are sampled to determine if transport in motor vehicles or similar has resulted in contamination of the samples. For trip blanks, a sufficient number should be analysed to allow the Representativity of the sampling to be determined. However, it should be noted that cross-contamination would bias samples upward, and the frequency should therefore be at the investigators discretion.

Trip spikes

Used only when volatile organics are sampled to attempt to quantify loss of volatiles during the analytical process. For trip spikes, a sufficient number of samples should be analysed to allow qualification of the likely loss of volatiles during the field sampling.

Laboratory blanks

Laboratory blanks (or method blanks, or analysis blanks) are used to verify that contaminants are not introduced into the samples during sample preparation and analysis. The NEPM (NEPC 1999) specifies that laboratory blanks should be conducted at a frequency of “at least one per process batch”. The DQO for laboratory blanks is non-detect at the PQL/LOR.

2.4 Comparability

Comparability is a qualitative parameter designed to express the confidence with which one data set may be compared with another, including established criteria. Using consistent methods and ensuring that PQLs/LORs are below the relevant criteria maintain comparability.

QC sample completeness

Quality control sample completeness is defined as the number of QC samples which should have been analysed, compared to the actual number analysed. If the appropriate number of QC samples are not analysed with each matrix or sample batch, then the data reviewer should use professional judgement to determine if the associated sample data should be qualified.

QC sample frequency and criteria

Based on EPA made or approved guidelines, the following QC samples are required for all contaminated site investigations, unless otherwise specified as part of the data quality objectives (DQOs) process review. All data to be used for validation

should conform as a minimum to the requirements specified, regardless of minimum sample size.

Table 1: Quality Control Samples

Quality control sample	Frequency	Results [1]
Precision		
Field duplicates.	≥ 5%	≤ 30 - 50% [2]
Inter-laboratory duplicates.	≥ 5%	≤ 30 - 50% [2]
Laboratory duplicates.	≥ 10%	Lab specified [3]
Accuracy		
Surrogate spikes.	Organics by GC	70 – 130% [4]
Matrix spikes (MSs).	≥ 1/media type	70 - 130% [5]
Laboratory control samples (LCSs).	≥ 1/lab batch	70 - 130% [6]
Certified reference material (CRM).	LCS for metals	Lab specified [7]
Representativity		
Rinsate samples.	≥ 1/field batch	< LOR
Trip blanks.	≥ 1/field batch (volatiles)	< LOR
Trip spikes.	≥ 1/field batch (volatiles)	70 - 130%, ≤ 30 - 50% [8]
Laboratory blanks.	≥ 1/lab batch	< LOR

Notes:

1. Where results are laboratory specified, the laboratory analytical reports should be consulted for specific information.
2. Relative percentage differences (RPDs) for field duplicates from AS 4482.1 (1997).
3. RPDs for laboratory duplicates specified by the laboratory. Based on the magnitude of the results compared to the level of reporting (LOR), e.g. ALS: result < 10 x LOR = no limit, 10 – 20 x LOR = 0-50%, > 20 x LOR = 0-20%. LabMark: < 5 x LOR = 0-100%, 5 – 10 x LOR = 0-75%, > 10 x LOR = 0-50% or 0-30% for metals.
4. Surrogate recoveries specified by laboratory based on global acceptance criteria or dynamic recovery limits based on statistical evaluation of actual laboratory data.
5. MS recoveries specified by laboratory based on global acceptance criteria.
6. LCS recoveries specified by laboratory based on global acceptance criteria or dynamic recovery limits based on statistical evaluation of actual laboratory data.
7. CRM recoveries specified by laboratory based on global acceptance criteria.
8. Trip spike results are specified as either recoveries or RPDs.

References

- Australian New Zealand Environment and Conservation Council (1996) *Guidelines for the laboratory analysis of contaminated soils*. ANZECC, Canberra, ACT.
- Australian Standard AS 4482.1 (2005) *Guide to the sampling and investigation of potentially contaminated soil, Part 1: Non-volatile and Semi-volatile compounds*. Standards Australia, Homebush, NSW.
- National Environment Protection Council (NEPC) (1999) *National Environmental Protection (Assessment of Site Contamination) Measure, Schedule B(2) Guideline on Data Collection, Sample Design and Reporting*. National Environment Protection Council Service Corporation. Adelaide, SA.
- National Environment Protection Council (NEPC) (1999) *National Environmental Protection (Assessment of Site Contamination) Measure, Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soil*. National Environment Protection Council Service Corporation. Adelaide, SA.
- NSW Environment Protection Authority (1994) *Contaminated Sites: Guidelines for Assessing Service Station Sites*. NSW EPA, Chatswood, NSW.
- NSW Environment Protection Authority (1997) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*. NSW EPA, Chatswood, NSW.
- United States Environmental Protection Agency, Contract Laboratory Program (1994) *National Functional Guidelines for Inorganic Data Review*. USEPA, Washington, DC.
- United States Environment Protection Agency, Contract Laboratory Program (1999) National Functional Guidelines for Organic Data Review. USEPA, Washington, DC.
- Council of Standards Australia (1999). "AS 4482 2-1999 Guide to the sampling and investigation of potentially contaminated soil - Volatile substances.".
- DEC, N. (2006). "Contaminated Sites: Guidelines for the NSW Site Auditor Scheme , Department of Environment and Conservation NSW." Publication DEC 121.
- NEPC (2013). "NEPM Schedule, B1 - Guideline on Investigation Levels for Soil and Groundwater." National Environment Protection Council, Canberra, ACT.

APPENDIX C LABORATORY CERTIFICATE OF ANALYSIS

CHAIN OF CUSTODY

ALS Laboratory: ***please tick*** →

☐ **Sydney**: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
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☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne**: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth**: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	**Moreton Environmental and Health Pty Ltd**	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT **(List due date):** ☐ Non Standard or urgent TAT **(List due date):**
OFFICE:	**Sheldon**		
PROJECT:	**20007_Scenic Rim Trail**	**ALS QUOTE NO.:**	
ORDER NUMBER:	**20007**		
PROJECT MANAGER:	**Dan Morton**	**CONTACT PH: 0400 823 993**	
SAMPLER:	**Dan Morton**	**SAMPLER MOBILE: 0400 823 993**	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed): dan@morenv.com.au			
Email Invoice to (will default to PM if no other addresses are listed): karen@morenv.com.au			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	**RECEIVED BY:**	**RELINQUISHED BY:**	**RECEIVED BY:**
Dan Mortoon	***Pack 'n' Send Capalaba***	***Pack 'n' Send Capalaba***	***ALS Brisbane***
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)

Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION										Additional Information
LAB ID	**SAMPLE ID**	**DATE / TIME**	**MATRIX**	**TYPE & PRESERVATIVE** *(refer to codes below)*	**TOTAL BOTTLES**	EA025H TSS	MW006 (Ec) E.coli by Membrane Filtration	W-01T 7 metals (Total) + W-01 7 Metals (Dissolved) and EG020F (Additional Dissolved Metals Al, Fe, Mn) + EG020T (Additional Total Metals Al, Fe, Mn)	Extended Water Suite B NT - 14	W-01T 7 metals (Total only) plus TN and TP				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SW01	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW02	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW03	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW04	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW05	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW06	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW07	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW08	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW09	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	SW10	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**4**	**1**	**1**	**1**	**1**					
	DUP01	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**2**					**1**				
	DUP02	**17/2/21**	**Water**	**None, Samples kept at 4°C**	**2**					**1**				**Send to Eurofins**
				TOTAL	**44**	**10**	**10**	**10**	**10**	**2**	**0**	**0**	**0**	

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

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐ **Brisbane:** 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth:** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

1/2

CLIENT:	Moreton Environmental	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	Sheldon		
PROJECT:	18006_Scenic Rim Trail	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER** (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:	18006		**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes No N/A; Free Ice / frozen ice bricks present upon receipt? Yes No N/A; Random Sample Temperature on Receipt: °C; Other comment:
PROJECT MANAGER:	Dan Morton	**CONTACT PH:** 0400 823 993	
SAMPLER:	Dan Morton	**SAMPLER MOBILE:** 0400 823 993	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed): dan@morenv.com.au			
Email Invoice to (will default to PM if no other addresses are listed): karen@morenv.com.au			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Dan Mortoon	*Pack 'n' Send Capalaba*	*Pack 'n' Send Capalaba*	*ALS Brisbane*
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Amy (ALS) 25/01/21 8:20

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	EA025H TSS	MW006 (Ec) E.coli by Membrane Filtration	W-01T 7 metals (Total) + W-01 7 Metals (Dissolved) and EG020F (Additional Dissolved Metals Al, Fe, Mn) + EG020T (Additional Total Metals Al, Fe, Mn)	Extended Water Suite B NT - 14	W-01T 7 metals (Total only) plus TN and TP				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	SW01	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
2	SW02	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
3	SW03	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
4	SW04	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
5	SW05	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
6	SW06	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
7	SW07	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
8	SW08	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
9	SW09	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
10	SW10	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
11	DUP01	22/01/2021	Water	None, Samples kept at 4°C	2					1				
12	DUP02	22/01/2021	Water	None, Samples kept at 4°C	2					1				
				TOTAL	44	10	10	10	10	2	0	0	0	

MICRO LAB

Date/Time: 25.1.21 11:00

Chilled: (Yes) / No

Temp: 2.4

Correction: 2.4

Final Temp:

Send to Eurofins

789760

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

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney:** 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
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☐ **Brisbane:** 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth:** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 8331 2158 E: launceston@alsenviro.com

1/6

CLIENT:	Moreton Environmental and Health Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	Sheldon		
PROJECT:	20007_Scenic Rim Trail	**ALS QUOTE NO.:**	
ORDER NUMBER:	20007		
PROJECT MANAGER:	Dan Morton	**CONTACT PH: 0400 823 993**	
SAMPLER:	Dan Morton	**SAMPLER MOBILE: 0400 823 993**	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed): dan@morenv.com.au			
Email Invoice to (will default to PM if no other addresses are listed): dan@morenv.com.au			

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Dan Mortoon	*Pack 'n' Send Capalaba*	*Pack 'n' Send Capalaba*	DALE K *ALS Brisbane*
DATE/TIME: 24/5/21	DATE/TIME:	DATE/TIME:	DATE/TIME: 1730 24/5/21

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Amy (ALS) 26/05/21 8:40.

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA025H TSS	MW006 (Ec) E.coli by Membrane Filtration	W-01T 7 metals (Total) + W-01 7 Metals (Dissolved) and EG020F (Additional Dissolved Metals Al, Fe, Mn) + EG020T (Additional Total Metals Al, Fe, Mn)	Extended Water Suite B NT - 14	W-01T 7 metals (Total only) plus TN and TP					
	SW01	24/5/21 25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW02	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW03	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW04	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW05	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW06	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW07	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW08	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW09	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	SW10	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1						
	DUP01	25/5/21	Water	None, Samples kept at 4°C	2					1					
	DUP02	25/5/21	Water	None, Samples kept at 4°C	2					1					Send to Eurofins
				TOTAL:	44	10	10	10	10	2	0	0	0		

MICRO LAB

26/5/21 2PM MC

Chilled: Yes No

Temp: 4.1 0.3 4.4

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

#798326

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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NATA # 1261
Site # 23736

Newcastle
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Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	Moreton Environmental
Contact name:	Dan Morton
Project name:	20007_SCENIC RIM TRAIL
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	May 26, 2021 2:00 PM
Eurofins reference	798326

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.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Alana Wadsworth on phone : or by email: alanawadsworth@eurofins.com

Results will be delivered electronically via email to Dan Morton - dan@morenv.com.au.

Global Leader - Results you can trust

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ABN: 50 005 085 521 www.eurofins.com.au EnviroSales@eurofins.com

Australia

Melbourne
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NATA # 1261
Site # 1254 & 14271

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

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NATA # 1261
Site # 23736

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Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	Moreton Environmental
Contact name:	Dan Morton
Project name:	18006_SCENIC RIM TRAIL
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Jan 25, 2021 11:00 AM
Eurofins reference	769760

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.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Ryan Gilbert on phone : or by email: RyanGilbert@eurofins.com

Results will be delivered electronically via email to Dan Morton - dan@morenv.com.au.

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Moreton Environmental
Address: 220 Avalon Road
Sheldon
QLD 4157

Project Name: 18006_SCENIC RIM TRAIL

Order No.: 18006
Report #: 769760
Phone: 0400 823 993
Fax:

Received: Jan 25, 2021 11:00 AM
Due: To Be Advised
Priority: 5 Day
Contact Name: Dan Morton

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Phosphate total (as P)	Total Nitrogen (as N)	Metals M7
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X
Sydney Laboratory - NATA Site # 18217								
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	DUP02	Jan 22, 2021		Water	B21-Ja31142	X	X	X
Test Counts						1	1	1

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ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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NATA # 1261 Site # 25079

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IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Moreton Environmental
Address: 220 Avalon Road
Sheldon
QLD 4157

Project Name: 20007_SCENIC RIM TRAIL

Order No.: 20007
Report #: 798326
Phone: 0400 823 993
Fax:

Received: May 26, 2021 2:00 PM
Due: Jun 3, 2021
Priority: 6 Day
Contact Name: Dan Morton

Eurofins Analytical Services Manager : Alana Wadsworth

Sample Detail						Phosphate total (as P)	Total Nitrogen (as N)	Metals M7
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	
Sydney Laboratory - NATA Site # 18217								
Brisbane Laboratory - NATA Site # 20794								X
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	DUP02	May 25, 2021		Water	B21-My53066	X	X	X
Test Counts						1	1	1

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2101893**	Page	: 1 of 9
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 18006_Scenic Rim Trail	Date Samples Received	: 22-Jan-2021 15:50
Order number	: 18006	Date Analysis Commenced	: 22-Jan-2021
C-O-C number	: ----	Issue Date	: 01-Feb-2021 16:52
Sampler	: DAN MORTON		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 11		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Liz Heizmann	Microbiology Laboratory Technician	Brisbane Microbiological, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for sample SW07 (EB2101893-007). However, the difference is within experimental variation of the methods.
- MW006 is ALS's internal code and is equivalent to AS4276.7.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	SW01	SW02	SW03	SW04	SW05
				Sampling date / time	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00
					EB2101893-001	EB2101893-002	EB2101893-003	EB2101893-004	EB2101893-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**6.74**	**7.02**	**7.25**	**7.21**	**7.32**
EA006: Sodium Adsorption Ratio (SAR)									
^ Sodium Adsorption Ratio	----	0.01	-		**0.78**	**0.70**	**0.60**	**0.62**	**0.61**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**94**	**94**	**100**	**89**	**117**
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L		**61**	**61**	**65**	**58**	**76**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**7**	<5	<5	<5	<5
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**31**	**31**	**34**	**31**	**40**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**25**	**24**	**31**	**26**	**32**
Total Alkalinity as CaCO3	----	1	mg/L		**25**	**24**	**31**	**26**	**32**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**2**	**2**	**1**	**2**	**2**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**11**	**11**	**9**	**9**	**12**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**6**	**6**	**7**	**6**	**8**
Magnesium	7439-95-4	1	mg/L		**4**	**4**	**4**	**4**	**5**
Sodium	7440-23-5	1	mg/L		**10**	**9**	**8**	**8**	**9**
Potassium	7440-09-7	1	mg/L		**1**	**1**	**2**	**1**	**1**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.07**	**0.07**	**0.08**	**0.11**	**0.04**
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	EB2101893-001	EB2101893-002	EB2101893-003	EB2101893-004	EB2101893-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.002**	**0.001**	**0.002**	**0.002**	**0.002**
Iron	7439-89-6	0.05	mg/L	**0.06**	<0.05	**0.08**	**0.08**	<0.05
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.10**	**0.09**	**0.18**	**0.20**	**0.08**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	**0.002**	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.003**	**0.002**	**0.006**	**0.005**	**0.002**
Iron	7439-89-6	0.05	mg/L	**0.09**	**0.08**	**0.17**	**0.18**	**0.06**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.2**	<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	**0.02**	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.04**	**0.05**	**0.03**	**0.11**	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.04**	**0.05**	**0.03**	**0.11**	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.1**	**0.1**	**0.2**	**0.2**	**0.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.1**	**0.2**	**0.2**	**0.3**	**0.2**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.06**	**0.06**	**0.09**	**0.09**	**0.06**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.06**	**0.06**	**0.08**	**0.07**	**0.05**
EN055: Ionic Balance								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	EB2101893-001	EB2101893-002	EB2101893-003	EB2101893-004	EB2101893-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø **Total Anions**	----	0.01	meq/L	**0.85**	**0.83**	**0.89**	**0.81**	**1.02**
ø **Total Cations**	----	0.01	meq/L	**1.09**	**1.04**	**1.08**	**1.00**	**1.23**
MW006: Faecal Coliforms & E.coli by MF								
Escherichia coli	----	1	CFU/100mL	**26**	**22**	**430**	**46**	**~33**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	EB2101893-006	EB2101893-007	EB2101893-008	EB2101893-009	EB2101893-010
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.26	6.60	6.60	7.25	7.28
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	----	0.01	-	0.55	0.88	0.88	0.46	0.46
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	113	70	70	90	97
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	73	46	46	58	63
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	5	<5	<5	<5	<5
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	40	16	16	31	31
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	39	11	11	29	32
Total Alkalinity as CaCO3	----	1	mg/L	39	11	11	29	32
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	2	2	1	1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	10	10	10	8	8
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	8	3	3	6	6
Magnesium	7439-95-4	1	mg/L	5	2	2	4	4
Sodium	7440-23-5	1	mg/L	8	8	8	6	6
Potassium	7440-09-7	1	mg/L	1	1	<1	1	2
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.11	0.11	0.09	0.12	0.17
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	<0.001	<0.001	0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW06	SW07	SW08	SW09	SW10
				Sampling date / time	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00
Compound	CAS Number	LOR	Unit		EB2101893-006	EB2101893-007	EB2101893-008	EB2101893-009	EB2101893-010
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.009**	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L		**0.016**	**0.012**	**0.012**	**0.003**	**0.003**
Iron	7439-89-6	0.05	mg/L		**0.12**	**0.16**	**0.17**	**0.10**	**0.12**
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.20**	**0.25**	**0.15**	**0.22**	**1.09**
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.002**
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Nickel	7440-02-0	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	**0.003**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L		**0.022**	**0.025**	**0.014**	**0.006**	**0.069**
Iron	7439-89-6	0.05	mg/L		**0.23**	**0.48**	**0.28**	**0.22**	**1.31**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.05**	<0.01	<0.01	**0.19**	**0.06**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.05**	<0.01	<0.01	**0.19**	**0.06**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.2**	**0.2**	**0.1**	**0.2**	**0.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.2**	**0.2**	**0.1**	**0.4**	**0.3**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.09**	**0.10**	**0.08**	**0.08**	**0.08**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.07**	**0.06**	**0.07**	**0.06**	**0.06**
EN055: Ionic Balance									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00	22-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	EB2101893-006	EB2101893-007	EB2101893-008	EB2101893-009	EB2101893-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø **Total Anions**	----	0.01	meq/L	**1.08**	**0.54**	**0.54**	**0.82**	**0.88**
ø **Total Cations**	----	0.01	meq/L	**1.18**	**0.69**	**0.66**	**0.92**	**0.94**
MW006: Faecal Coliforms & E.coli by MF								
Escherichia coli	----	1	CFU/100mL	**63**	**220**	**350**	**73**	**40**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DUP01	----	----	----	----
				Sampling date / time	22-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2101893-011	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.10**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.2**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**0.3**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.08**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2101893**	Page	: 1 of 9
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 18006_Scenic Rim Trail	Date Samples Received	: 22-Jan-2021
Order number	: 18006	Date Analysis Commenced	: 22-Jan-2021
C-O-C number	: ----	Issue Date	: 01-Feb-2021
Sampler	: DAN MORTON		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 11		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Liz Heizmann	Microbiology Laboratory Technician	Brisbane Microbiological, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3481263)									
EB2101745-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.51	6.51	0.00	0% - 20%
EB2101893-009	SW09	EA005-P: pH Value	----	0.01	pH Unit	7.25	7.33	1.10	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3481264)									
EB2101745-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	2040	2040	0.00	0% - 20%
EB2101893-009	SW09	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	90	90	0.00	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3476972)									
EB2101765-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	19	22	14.4	No Limit
EB2101893-010	SW10	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 3481265)									
EB2101745-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	203	201	1.29	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	203	201	1.29	0% - 20%
EB2101893-009	SW09	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	29	26	9.47	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	29	26	9.47	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3476604)									
EB2101803-012	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
EB2101893-003	SW03	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	1	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3476605)									
EB2101803-012	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	798	800	0.248	0% - 20%
EB2101916-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	18500	18400	0.129	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3477322)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093F: Dissolved Major Cations (QC Lot: 3477322) - continued									
EB2101893-004	SW04	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	8	7	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.00	No Limit
EB2101826-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	45	46	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	20	21	0.00	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	768	772	0.543	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3477320)									
EB2101893-004	SW04	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	<0.001	<0.001	0.00	No Limit
		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: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	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
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.11	0.10	0.00	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.08	0.08	0.00	No Limit
EB2101826-001	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	<0.001	<0.001	0.00	No Limit
		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: Manganese	7439-96-5	0.001	mg/L	0.027	0.027	0.00	0% - 20%
		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	0.046	0.046	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.24	0.25	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3477323)									
EB2101893-007	SW07	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	<0.001	<0.001	0.00	No Limit
		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: Manganese	7439-96-5	0.001	mg/L	0.012	0.012	0.00	0% - 50%
		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	0.009	0.008	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.11	0.10	11.7	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.16	0.15	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3477323) - continued									
ET2100358-001	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	<0.001	<0.001	0.00	No Limit
		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: Manganese	7439-96-5	0.001	mg/L	0.197	0.194	1.36	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.004	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.017	0.017	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 3477424)									
EB2101893-004	SW04	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.20	0.19	6.68	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.18	0.17	0.00	No Limit
EB2101806-022	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.009	0.009	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.087	0.087	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.017	0.017	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.05	0.03	39.2	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.38	0.38	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3481266)									
EB2101745-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EB2101893-009	SW09	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3481423)									
EB2101888-007	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	<0.01	0.00	No Limit
EB2101893-009	SW09	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3476603)									
EB2101803-012	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3476603) - continued									
EB2101893-003	SW03	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3481422)									
EB2101888-007	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB2101893-009	SW09	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.19	0.19	0.00	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3481740)									
EB2101893-001	SW01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.2	0.00	No Limit
EB2101893-011	DUP01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3481739)									
EB2101893-001	SW01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	0.00	No Limit
EB2101893-011	DUP01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.08	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3476606)									
EB2101893-003	SW03	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.08	0.08	0.00	No Limit
EB2101916-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	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
EA005P: pH by PC Titrator (QCLot: 3481263)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98.0	102
				----	7 pH Unit	101	98.0	102
EA010P: Conductivity by PC Titrator (QCLot: 3481264)								
EA010-P: Electrical Conductivity @ 25°C	----	----	µS/cm	----	220 µS/cm	102	91.0	107
				----	12890 µS/cm	102	91.0	107
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3476972)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	951 mg/L	107	88.0	112
				<5	1000 mg/L	96.5	88.0	112
ED037P: Alkalinity by PC Titrator (QCLot: 3481265)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.7	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3476604)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	85.0	118
				<1	100 mg/L	96.1	85.0	118
ED045G: Chloride by Discrete Analyser (QCLot: 3476605)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.9	90.0	115
				<1	1000 mg/L	104	90.0	115
ED093F: Dissolved Major Cations (QCLot: 3477322)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	110	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	96.7	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.6	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.4	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3477320)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	104	79.0	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	103	88.0	116
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.3	88.0	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.3	87.0	113
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	110	88.0	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.3	89.0	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.3	89.0	120
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	89.0	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	108	87.0	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.5	82.0	114
EG020F: Dissolved Metals by ICP-MS (QCLot: 3477323)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3477323) - continued								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	79.0	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	88.0	116
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.4	88.0	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.5	87.0	113
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	107	88.0	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.4	89.0	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	99.5	89.0	120
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.8	89.0	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	87.0	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	82.0	114
EG020T: Total Metals by ICP-MS (QCLot: 3477424)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	105	80.0	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.2	88.0	112
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.0	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	106	89.0	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	105	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.2	84.0	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.5	82.0	118
EK040P: Fluoride by PC Titrator (QCLot: 3481266)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	0.5 mg/L	100	80.0	117
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3481423)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	99.6	83.5	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3476603)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	98.8	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3481422)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	90.4	85.7	111
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3481740)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	1 mg/L	90.4	70.1	108
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3481739)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.442 mg/L	103	79.2	105
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3476606)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	96.4	81.7	117

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	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3476604)							
EB2101893-001	SW01	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	104	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3476605)							
EB2101893-001	SW01	ED045G: Chloride	16887-00-6	400 mg/L	116	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3477320)							
EB2101815-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	109	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	107	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	106	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	99.2	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	107	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	105	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	99.2	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3477323)							
EB2101893-008	SW08	EG020A-F: Arsenic	7440-38-2	1 mg/L	97.7	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	92.8	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	99.3	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	98.8	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	97.4	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	99.2	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	110	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 3477424)							
EB2101806-023	Anonymous	EG020A-T: Arsenic	7440-38-2	5 mg/L	109	70.0	130
		EG020A-T: Cadmium	7440-43-9	1.25 mg/L	98.9	70.0	130
		EG020A-T: Chromium	7440-47-3	5 mg/L	103	70.0	130
		EG020A-T: Copper	7440-50-8	5 mg/L	99.6	70.0	130
		EG020A-T: Lead	7439-92-1	5 mg/L	102	70.0	130
		EG020A-T: Manganese	7439-96-5	5 mg/L	103	70.0	130
		EG020A-T: Nickel	7440-02-0	5 mg/L	100	70.0	130
		EG020A-T: Zinc	7440-66-6	5 mg/L	99.7	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3481266)							
EB2101745-003	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	90.4	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3481423)							
EB2101888-008	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	91.1	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3476603)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3476603) - continued							
EB2101893-001	SW01	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	100	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3481422)							
EB2101888-008	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	81.0	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3481740)							
EB2101893-002	SW02	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.6	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3481739)							
EB2101893-002	SW02	EK067G: Total Phosphorus as P	----	1 mg/L	104	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3476606)							
EB2101893-001	SW01	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	104	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2101893**	Page	: 1 of 10
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Telephone	: +61-7-3243 7222
Project	: 18006_Scenic Rim Trail	Date Samples Received	: 22-Jan-2021
Site	: ----	Issue Date	: 01-Feb-2021
Sampler	: DAN MORTON	No. of samples received	: 11
Order number	: 18006	No. of samples analysed	: 11

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

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	----	----	----	27-Jan-2021	22-Jan-2021	**5**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Method Blanks (MB)					
Conductivity by PC Titrator	0	20	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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	22-Jan-2021	×
EA006: Sodium Adsorption Ratio (SAR)							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓

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
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**25-Jan-2021**	29-Jan-2021	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	05-Feb-2021	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**23-Jan-2021**	19-Feb-2021	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**23-Jan-2021**	19-Feb-2021	✓

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	21-Jul-2021	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**22-Jan-2021**	**28-Jan-2021**	21-Jul-2021	✓	**28-Jan-2021**	21-Jul-2021	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓

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
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**23-Jan-2021**	24-Jan-2021	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**22-Jan-2021**	**----**	----	----	**27-Jan-2021**	19-Feb-2021	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**22-Jan-2021**	**28-Jan-2021**	19-Feb-2021	✓	**28-Jan-2021**	19-Feb-2021	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**22-Jan-2021**	**28-Jan-2021**	19-Feb-2021	✓	**28-Jan-2021**	19-Feb-2021	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**23-Jan-2021**	24-Jan-2021	✓

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
MW006: Faecal Coliforms & E.coli by MF							
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**22-Jan-2021**	**----**	----	----	**22-Jan-2021**	23-Jan-2021	✓

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)							
Alkalinity by PC Titrator	ED037-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Conductivity by PC Titrator	EA010-P	0	20	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	11	**9.09**	**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
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Calculated TDS (from Electrical Conductivity)	EA016	WATER	In house: Calculation from Electrical Conductivity (APHA 2510 B) using a conversion factor specified in the analytical report. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2101893**

Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dan@morenv.com.au	E-mail	: ALSEnviro.Brisbane@alsglobal.com
Telephone	: ----	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 18006_Scenic Rim Trail	Page	: 1 of 3
Order number	: 18006	Quote number	: EB2017MORENV0003 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: DAN MORTON		

Dates

Date Samples Received	: 22-Jan-2021 15:50	Issue Date	: 22-Jan-2021
Client Requested Due Date	: 01-Feb-2021	Scheduled Reporting Date	: **01-Feb-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: 5.1°C, 8.8°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 11 / 11

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
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- **Sample "DUP02" has been forwarded to Eurofins, as requested. Please note that this will incur a freight forwarding fee.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

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	Sampling date / time	Sample ID	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - MW006 (Ec) E.coli by Membrane Filtration	WATER - NT-14 Extended Water Suite B	WATER - W-01 7 Metals	WATER - W-01T 7 metals (Total)
EB2101893-001	22-Jan-2021 00:00	SW01	✓	✓	✓	✓	✓	✓	✓
EB2101893-002	22-Jan-2021 00:00	SW02	✓	✓	✓	✓	✓	✓	✓
EB2101893-003	22-Jan-2021 00:00	SW03	✓	✓	✓	✓	✓	✓	✓
EB2101893-004	22-Jan-2021 00:00	SW04	✓	✓	✓	✓	✓	✓	✓
EB2101893-005	22-Jan-2021 00:00	SW05	✓	✓	✓	✓	✓	✓	✓
EB2101893-006	22-Jan-2021 00:00	SW06	✓	✓	✓	✓	✓	✓	✓
EB2101893-007	22-Jan-2021 00:00	SW07	✓	✓	✓	✓	✓	✓	✓
EB2101893-008	22-Jan-2021 00:00	SW08	✓	✓	✓	✓	✓	✓	✓
EB2101893-009	22-Jan-2021 00:00	SW09	✓	✓	✓	✓	✓	✓	✓
EB2101893-010	22-Jan-2021 00:00	SW10	✓	✓	✓	✓	✓	✓	✓
EB2101893-011	22-Jan-2021 00:00	DUP01							✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - NT-11 Total Nitrogen and Total Phosphorus
EB2101893-011	22-Jan-2021 00:00	DUP01	✓

Proactive Holding Time Report

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

Requested Deliverables

DAN MORTON

- *AU Certificate of Analysis - NATA (COA)	Email	dan@morenv.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dan@morenv.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dan@morenv.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	dan@morenv.com.au
- Chain of Custody (CoC) (COC)	Email	dan@morenv.com.au
- EDI Format - ENMRG (ENMRG)	Email	dan@morenv.com.au
- EDI Format - XTab (XTAB)	Email	dan@morenv.com.au

KAREN

- A4 - AU Tax Invoice (INV)	Email	karen@morenv.com.au

1/2

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: Moreton Environmental
OFFICE: Sheldon
PROJECT: 18006_Scenic Rim Trail
ORDER NUMBER: 18006
PROJECT MANAGER: Dan Morton — CONTACT PH: 0400 823 993
SAMPLER: Dan Morton — SAMPLER MOBILE: 0400 823 993
COC emailed to ALS? (YES / NO) — EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed): dan@morenv.com.au
Email Invoice to (will default to PM if no other addresses are listed): karen@morenv.com.au

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

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

RELINQUISHED BY: *Dan Mortoon* — DATE/TIME:
RECEIVED BY: *Pack 'n' Send Capalaba* — DATE/TIME:
RELINQUISH... *Pack* — DATE/TIME:

FOR L... Custody... Free ice... receipt?... Random... Other c... N/A N/A

Environmental Division
Brisbane
Work Order Reference
EB2101893

Telephone : + 61-7-3243 7222

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be liste...
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

LAB ID (ALS USE ONLY)	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA025H TSS	MW006 (Ec) E.coli by Membrane Filtration	W-01T 7 metals (Total) + W-01 7 Metals (Dissolved) and EG020F (Additional Dissolved Metals Al, Fe, Mn) + EG020T (Additional Total Metals Al, Fe, Mn)	Extended Water Suite B NT - 14	W-01T 7 metals (Total only) plus TN and TP				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	SW01	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
2	SW02	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
3	SW03	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
4	SW04	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
5	SW05	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
6	SW06	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
7	SW07	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
8	SW08	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
9	SW09	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
10	SW10	22/01/2021	Water	None, Samples kept at 4°C	4	1	1	1	1					
11	DUP01	22/01/2021	Water	None, Samples kept at 4°C	2					1				
12	DUP02	22/01/2021	Water	None, Samples kept at 4°C	2					1				Send to Eurofins
				TOTAL	44	10	10	10	10	2	0	0	0	

MICRO LAB

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2104379**	Page	: 1 of 9
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 20007_Scenic Rim Trail	Date Samples Received	: 17-Feb-2021 17:50
Order number	: 20007	Date Analysis Commenced	: 18-Feb-2021
C-O-C number	: ----	Issue Date	: 24-Feb-2021 15:41
Sampler	: DAN MORTON		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 11		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Liz Heizmann	Microbiology Laboratory Technician	Brisbane Microbiological, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- Microbiological Comment: Accordance with ALS work instruction, membrane filtration result for EB2104379-05,-06 and -08 is estimated, where there are overgrown non-typical colonies on the filtered membrane that may have inhibited the growth of the target organisms. It may be informative to record this fact.
- Microbiological Comment: Membrane filtration result for EB2104379-05 is reported <10 CFU/100mL where the filtered sample at 100mL was overgrown and therefore the presumptive colonies were confirmed at 10mL sample filtered and confirmation of suspected organisms were not detected.
- MW006 is ALS's internal code and is equivalent to AS4276.7.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00
Compound	CAS Number	LOR	Unit	EB2104379-001	EB2104379-002	EB2104379-003	EB2104379-004	EB2104379-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.50	7.46	7.67	7.57	7.63
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	----	0.01	-	0.56	0.59	0.56	0.48	0.49
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	90	86	95	88	107
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	58	56	62	57	70
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	<5	<5
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	29	26	29	29	38
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	29	29	35	30	38
Total Alkalinity as CaCO3	----	1	mg/L	29	29	35	30	38
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	2	1	1	1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	9	9	8	8	10
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	5	4	5	5	7
Magnesium	7439-95-4	1	mg/L	4	4	4	4	5
Sodium	7440-23-5	1	mg/L	7	7	7	6	7
Potassium	7440-09-7	1	mg/L	1	1	2	1	1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.05	0.06	0.10	0.11	0.03
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.002	<0.001	0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00
Compound	CAS Number	LOR	Unit	EB2104379-001	EB2104379-002	EB2104379-003	EB2104379-004	EB2104379-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.008**	<0.005	**0.010**
Manganese	7439-96-5	0.001	mg/L	**0.002**	**0.003**	**0.005**	**0.004**	**0.004**
Iron	7439-89-6	0.05	mg/L	**0.06**	**0.05**	**0.10**	**0.09**	<0.05
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.09**	**0.14**	**0.16**	**0.20**	**0.06**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.013**	<0.005	**0.006**
Manganese	7439-96-5	0.001	mg/L	**0.002**	**0.004**	**0.006**	**0.005**	**0.005**
Iron	7439-89-6	0.05	mg/L	**0.07**	**0.11**	**0.16**	**0.15**	**0.06**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	**0.04**	<0.01	**0.03**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.04**	**0.07**	**0.07**	**0.05**	**0.02**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.04**	**0.07**	**0.07**	**0.05**	**0.02**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.1**	**0.1**	**0.5**	**0.2**	**0.3**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.1**	**0.2**	**0.6**	**0.2**	**0.3**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.07**	**0.07**	**0.09**	**0.09**	**0.08**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.07**	**0.07**	**0.09**	**0.08**	**0.07**
EN055: Ionic Balance								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00
Compound	CAS Number	LOR	Unit	EB2104379-001	EB2104379-002	EB2104379-003	EB2104379-004	EB2104379-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø **Total Anions**	----	0.01	meq/L	**0.87**	**0.87**	**0.94**	**0.84**	**1.06**
ø **Total Cations**	----	0.01	meq/L	**0.91**	**0.86**	**0.93**	**0.86**	**1.09**
MW006: Faecal Coliforms & E.coli by MF								
Escherichia coli	----	1	CFU/100mL	**14**	**~50**	**260**	**140**	<10

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	SW06	SW07	SW08	SW09	SW10
				Sampling date / time	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00
					EB2104379-006	EB2104379-007	EB2104379-008	EB2104379-009	EB2104379-010
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**7.65**	**6.90**	**6.91**	**7.59**	**7.67**
EA006: Sodium Adsorption Ratio (SAR)									
^ **Sodium Adsorption Ratio**	----	0.01	-		**0.51**	**0.88**	**0.77**	**0.48**	**0.44**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**103**	**71**	**71**	**88**	**97**
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L		**67**	**46**	**46**	**57**	**63**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		<5	<5	**20**	<5	<5
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**36**	**16**	**16**	**29**	**36**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**38**	**14**	**13**	**32**	**35**
Total Alkalinity as CaCO3	----	1	mg/L		**38**	**14**	**13**	**32**	**35**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**1**	**2**	**2**	**1**	**2**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**9**	**11**	**10**	**8**	**8**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**6**	**3**	**3**	**5**	**6**
Magnesium	7439-95-4	1	mg/L		**5**	**2**	**2**	**4**	**5**
Sodium	7440-23-5	1	mg/L		**7**	**8**	**7**	**6**	**6**
Potassium	7440-09-7	1	mg/L		**1**	<1	<1	**1**	**2**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.09**	**0.11**	**0.10**	**0.10**	**0.09**
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	**0.001**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00
Compound	CAS Number	LOR	Unit	EB2104379-006	EB2104379-007	EB2104379-008	EB2104379-009	EB2104379-010
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	**0.006**	**0.006**	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.006**	**0.021**	**0.018**	**0.005**	**0.005**
Iron	7439-89-6	0.05	mg/L	**0.10**	**0.37**	**0.40**	**0.11**	**0.12**
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.11**	**0.18**	**0.12**	**0.16**	**0.20**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.006**	**0.026**	**0.025**	**0.006**	**0.006**
Iron	7439-89-6	0.05	mg/L	**0.14**	**0.51**	**0.48**	**0.18**	**0.19**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.01**	<0.01	**0.01**	**0.01**	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.02**	**0.05**	**0.51**	**0.16**	**0.46**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.02**	**0.05**	**0.51**	**0.16**	**0.46**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.2**	**0.1**	**0.4**	**0.1**	**0.1**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.2**	**0.2**	**0.9**	**0.3**	**0.6**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.09**	**0.09**	**0.14**	**0.08**	**0.08**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.09**	**0.08**	**0.07**	**0.08**	**0.07**
EN055: Ionic Balance								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00	17-Feb-2021 00:00
Compound	CAS Number	LOR	Unit	EB2104379-006	EB2104379-007	EB2104379-008	EB2104379-009	EB2104379-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø **Total Anions**	----	0.01	meq/L	**1.03**	**0.63**	**0.58**	**0.88**	**0.97**
ø **Total Cations**	----	0.01	meq/L	**1.04**	**0.66**	**0.62**	**0.86**	**1.02**
MW006: Faecal Coliforms & E.coli by MF								
Escherichia coli	----	1	CFU/100mL	**~200**	**240**	**400**	**710**	**12**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DUP01	----	----	----	----
				Sampling date / time	17-Feb-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2104379-011	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.03**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.1**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**0.1**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.10**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2104379**	Page	: 1 of 7
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 20007_Scenic Rim Trail	Date Samples Received	: 17-Feb-2021
Order number	: 20007	Date Analysis Commenced	: 18-Feb-2021
C-O-C number	: ----	Issue Date	: 24-Feb-2021
Sampler	: DAN MORTON		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 11		

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Accreditation No. 825
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Liz Heizmann	Microbiology Laboratory Technician	Brisbane Microbiological, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3521756)									
EB2101185-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.72	7.76	0.517	0% - 20%
EB2104379-002	SW02	EA005-P: pH Value	----	0.01	pH Unit	7.46	7.45	0.134	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3521755)									
EB2101185-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	24200	24300	0.422	0% - 20%
EB2104379-002	SW02	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	86	86	0.00	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3525597)									
EB2104379-001	SW01	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
EB2104447-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	1190	1180	0.676	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3521754)									
EB2101185-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1050	1050	0.177	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1050	1050	0.177	0% - 20%
EB2104379-002	SW02	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	29	27	8.11	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	29	27	8.11	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3521464)									
EB2104405-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	2	0.00	No Limit
EB2104379-001	SW01	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	2	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3521467)									
EB2104405-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2	2	0.00	No Limit
EB2104379-001	SW01	ED045G: Chloride	16887-00-6	1	mg/L	9	9	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 3521914)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093F: Dissolved Major Cations (QC Lot: 3521914) - continued									
EB2104379-001	SW01	ED093F: Calcium	7440-70-2	1	mg/L	5	5	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	7	7	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.00	No Limit
EB2104379-010	SW10	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	5	5	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3521913)									
EB2104379-001	SW01	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	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	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: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	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
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.06	0.00	No Limit
EB2104379-010	SW10	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	<0.001	<0.001	0.00	No Limit
		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: Manganese	7439-96-5	0.001	mg/L	0.005	0.005	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
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.09	0.09	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.12	0.11	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 3521648)									
EB2104319-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.1 µg/L	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<1 µg/L	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	3 µg/L	0.003	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<1 µg/L	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<1 µg/L	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	12 µg/L	0.012	0.00	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<1 µg/L	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	1240 µg/L	1.21	2.26	0% - 20%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	80 µg/L	0.07	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	100 µg/L	0.09	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 3521648) - continued									
EB2104379-006	SW06	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.11	0.11	0.00	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.14	0.13	8.57	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3521757)									
EB2101185-002	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.0	1.0	0.00	0% - 50%
EB2104379-002	SW02	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3522582)									
EB2104379-001	SW01	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB2104519-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.05	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3521466)									
EB2104405-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB2104379-001	SW01	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3522583)									
EB2104379-001	SW01	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.00	No Limit
EB2104519-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3523228)									
EB2104379-001	SW01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.2	0.00	No Limit
EB2104379-011	DUP01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3523227)									
EB2104379-001	SW01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.06	0.00	No Limit
EB2104379-011	DUP01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.10	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3521465)									
EB2104535-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB2104379-001	SW01	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.07	0.07	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
EA005P: pH by PC Titrator (QCLot: 3521756)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.0	102
				----	7 pH Unit	100	98.0	102
EA010P: Conductivity by PC Titrator (QCLot: 3521755)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	220 µS/cm	101	91.0	107
				<1	12890 µS/cm	97.0	91.0	107
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3525597)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	103	88.0	112
				<5	1000 mg/L	94.6	88.0	112
				<5	951 mg/L	106	87.2	116
ED037P: Alkalinity by PC Titrator (QCLot: 3521754)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	103	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3521464)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	85.0	118
				<1	100 mg/L	92.5	85.0	118
ED045G: Chloride by Discrete Analyser (QCLot: 3521467)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	90.0	115
				<1	1000 mg/L	106	90.0	115
ED093F: Dissolved Major Cations (QCLot: 3521914)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.7	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.7	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.3	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3521913)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	79.0	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100	88.0	116
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.2	88.0	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	87.0	113
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.8	88.0	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.9	89.0	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.5	89.0	120
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.9	89.0	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.0	87.0	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	82.0	114
EG020T: Total Metals by ICP-MS (QCLot: 3521648)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 3521648) - continued								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	106	80.0	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.9	88.0	112
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.0	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.8	89.0	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.9	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.7	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	107	88.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	111	84.0	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.8	82.0	118
EK040P: Fluoride by PC Titrator (QCLot: 3521757)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	0.5 mg/L	100	80.0	117
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3522582)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	101	83.5	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3521466)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.5	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3522583)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.3	85.7	111
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3523228)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	1 mg/L	84.6	70.1	108
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3523227)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.442 mg/L	95.6	79.2	105
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3521465)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	107	81.7	117

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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3521464)							
EB2104379-002	SW02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	102	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3521467)							
EB2104379-002	SW02	ED045G: Chloride	16887-00-6	400 mg/L	112	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3521913)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3521913) - continued							
EB2104379-002	SW02	EG020A-F: Arsenic	7440-38-2	1 mg/L	97.4	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	98.5	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	98.1	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	97.4	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	97.7	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	100	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	102	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 3521648)							
EB2104319-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	95.1	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.7	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	74.1	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	85.2	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	98.9	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	96.5	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	94.5	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	96.8	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3521757)							
EB2101185-003	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	91.4	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3522582)							
EB2104379-002	SW02	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	99.5	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3521466)							
EB2104379-002	SW02	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	98.1	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3522583)							
EB2104379-002	SW02	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	93.4	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3523228)							
EB2104379-002	SW02	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	90.7	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3523227)							
EB2104379-002	SW02	EK067G: Total Phosphorus as P	----	1 mg/L	104	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3521465)							
EB2104379-002	SW02	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	104	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2104379**	Page	: 1 of 10
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Telephone	: +61-7-3243 7222
Project	: 20007_Scenic Rim Trail	Date Samples Received	: 17-Feb-2021
Site	: ----	Issue Date	: 24-Feb-2021
Sampler	: DAN MORTON	No. of samples received	: 11
Order number	: 20007	No. of samples analysed	: 11

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

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	----	----	----	20-Feb-2021	18-Feb-2021	**2**

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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**20-Feb-2021**	18-Feb-2021	×
EA006: Sodium Adsorption Ratio (SAR)							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**23-Feb-2021**	17-Mar-2021	✓

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
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**20-Feb-2021**	17-Mar-2021	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**23-Feb-2021**	24-Feb-2021	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**23-Feb-2021**	17-Mar-2021	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**20-Feb-2021**	03-Mar-2021	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**19-Feb-2021**	17-Mar-2021	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**19-Feb-2021**	17-Mar-2021	✓

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**23-Feb-2021**	17-Mar-2021	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**23-Feb-2021**	16-Aug-2021	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**17-Feb-2021**	**22-Feb-2021**	16-Aug-2021	✓	**22-Feb-2021**	16-Aug-2021	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**20-Feb-2021**	17-Mar-2021	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**20-Feb-2021**	17-Mar-2021	✓

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
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**19-Feb-2021**	19-Feb-2021	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**17-Feb-2021**	**----**	----	----	**20-Feb-2021**	17-Mar-2021	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**17-Feb-2021**	**22-Feb-2021**	17-Mar-2021	✓	**22-Feb-2021**	17-Mar-2021	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**17-Feb-2021**	**22-Feb-2021**	17-Mar-2021	✓	**22-Feb-2021**	17-Mar-2021	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**19-Feb-2021**	19-Feb-2021	✓

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
MW006: Faecal Coliforms & E.coli by MF							
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**17-Feb-2021**	**----**	----	----	**18-Feb-2021**	18-Feb-2021	✓

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)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Conductivity by PC Titrator	EA010-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	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
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Calculated TDS (from Electrical Conductivity)	EA016	WATER	In house: Calculation from Electrical Conductivity (APHA 2510 B) using a conversion factor specified in the analytical report. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

CHAIN OF CUSTODY

-ALS Laboratory: please tick →

24/2

☐ **Sydney:** 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ **Newcastle:** 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ **Brisbane:** 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth:** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Moreton Environmental and Health Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date):
OFFICE:	Sheldon		☐ Non Standard or urgent TAT (List due date):
PROJECT:	20007_Scenic Rim Trail	**ALS QUOTE NO.:**	
ORDER NUMBER:	20007		
PROJECT MANAGER:	Dan Morton	**CONTACT PH:** 0400 823 993	
SAMPLER:	Dan Morton	**SAMPLER MOBILE:** 0400 823 993	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A
Free ice/frozen ice bricks present upon receipt Yes No N/A
Random Sample Temperature on Receipt °C
Other comments:

Email Reports to (will default to PM if no other addresses are listed): dan@morenv.com.au

Email Invoice to (will default to PM if no other addresses are listed): karen@morenv.com.au

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Dan Mortoon	*Pack 'n' Send Capalaba*	*Pack 'n' Send Capalaba*	*ALS Brisbane*
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME: B.C 17.2.21 8.50

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract su Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle req								
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	EA025H TSS	MW006 (Ec) E.coli by Membrane Filtration	W-01T 7 metals (Total) + W-01 7 Metals (Dissolved) and EG020F (Additional Dissolved Metals Al, Fe, Mn) + EG020T (Additional Total Metals Al, Fe, Mn)	Extended Water Suite B NT - 14	W-01T 7 metals (Total only) plus TN and TP					
1	SW01		Water	None, Samples kept at 4°C	4	1	1	1	1						
2	SW02		Water	None, Samples kept at 4°C	4	1	1	1	1						
3	SW03		Water	None, Samples kept at 4°C	4	1	1	1	1						
4	SW04		Water	None, Samples kept at 4°C	4	1	1	1	1						
5	SW05		Water	None, Samples kept at 4°C	4	1	1	1	1						
6	SW06		Water	None, Samples kept at 4°C	4	1	1	1	1						
7	SW07		Water	None, Samples kept at 4°C	4	1	1	1	1						
8	SW08		Water	None, Samples kept at 4°C	4	1	1	1	1						
9	SW09		Water	None, Samples kept at 4°C	4	1	1	1	1						
10	SW10		Water	None, Samples kept at 4°C	4	1	1	1	1						
11	DUP01		Water	None, Samples kept at 4°C	2					1					
	DUP02		Water	None, Samples kept at 4°C	2					1					
				TOTAL	44	10	10	10	10	2	0	0	0		

Environmental Division
Brisbane
Work Order Reference
EB2104379

Telephone : +61-7-3243 7222

MICRO LAB

Send to Eurofins

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114407**	Page	: 1 of 9
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 20007_Scenic Rim Trail	Date Samples Received	: 25-May-2021 17:30
Order number	: 20007	Date Analysis Commenced	: 26-May-2021
C-O-C number	:	Issue Date	: 01-Jun-2021 19:05
Sampler	: DAN MORTON		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 11		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Nibi Karl	Microbiologist	Brisbane Microbiological, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for sample SW04(EB2114407-004). However, the difference is within experimental variation of the methods.
- MW006 is ALS's internal code and is equivalent to AS4276.7.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	SW01	SW02	SW03	SW04	SW05
				Sampling date / time	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00
					EB2114407-001	EB2114407-002	EB2114407-003	EB2114407-004	EB2114407-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**7.43**	**7.40**	**7.57**	**7.55**	**7.58**
EA006: Sodium Adsorption Ratio (SAR)									
^ **Sodium Adsorption Ratio**	----	0.01	-		**0.61**	**0.55**	**0.48**	**0.55**	**0.48**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**75**	**75**	**84**	**79**	**86**
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L		**49**	**49**	**55**	**51**	**56**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**78**	<5	<5	<5	<5
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**18**	**22**	**29**	**22**	**29**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**26**	**20**	**33**	**25**	**27**
Total Alkalinity as CaCO3	----	1	mg/L		**26**	**20**	**33**	**25**	**27**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**2**	**2**	**2**	**1**	**2**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**10**	**10**	**9**	**9**	**10**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**4**	**4**	**5**	**4**	**5**
Magnesium	7439-95-4	1	mg/L		**2**	**3**	**4**	**3**	**4**
Sodium	7440-23-5	1	mg/L		**6**	**6**	**6**	**6**	**6**
Potassium	7440-09-7	1	mg/L		<1	<1	<1	<1	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.06**	**0.04**	**0.09**	**0.09**	<0.01
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114407-001	EB2114407-002	EB2114407-003	EB2114407-004	EB2114407-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	**0.001**	**0.001**	<0.001
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	**0.06**	**0.06**	<0.05
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.14**	**0.09**	**0.14**	<0.01	**0.09**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.003**	**0.002**	**0.004**	<0.001	<0.001
Iron	7439-89-6	0.05	mg/L	**0.12**	**0.07**	**0.12**	<0.05	**0.06**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	**0.02**	<0.01	**0.02**	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.05**	**0.24**	**0.05**	**0.05**	**0.02**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.05**	**0.24**	**0.05**	**0.05**	**0.02**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.1**	**0.1**	**0.2**	**0.3**	<0.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.2**	**0.3**	**0.2**	**0.4**	<0.1
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.07**	**0.07**	**0.10**	**0.10**	**0.08**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.05**	**0.05**	**0.06**	**0.06**	**0.05**
EN055: Ionic Balance								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW01	SW02	SW03	SW04	SW05
			Sampling date / time	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114407-001	EB2114407-002	EB2114407-003	EB2114407-004	EB2114407-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø **Total Anions**	----	0.01	meq/L	**0.84**	**0.72**	**0.95**	**0.77**	**0.86**
ø **Total Cations**	----	0.01	meq/L	**0.62**	**0.71**	**0.84**	**0.71**	**0.84**
MW006: Faecal Coliforms & E.coli by MF								
Escherichia coli	----	1	CFU/100mL	**~7**	<1	**10**	**~10**	<1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114407-006	EB2114407-007	EB2114407-008	EB2114407-009	EB2114407-010
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.63	7.20	7.18	7.57	7.50
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	----	0.01	-	0.48	0.77	0.77	0.55	0.58
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	88	69	69	78	73
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	57	45	45	51	47
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	6	<5	<5	9
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	29	16	16	22	20
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	30	13	13	25	20
Total Alkalinity as CaCO3	----	1	mg/L	30	13	13	25	20
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	2	1	1	1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	9	11	11	9	9
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	5	3	3	4	3
Magnesium	7439-95-4	1	mg/L	4	2	2	3	3
Sodium	7440-23-5	1	mg/L	6	7	7	6	6
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	<1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.11	0.06	0.08	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114407-006	EB2114407-007	EB2114407-008	EB2114407-009	EB2114407-010
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.002**	**0.004**	**0.005**	**0.001**	<0.001
Iron	7439-89-6	0.05	mg/L	**0.08**	**0.06**	**0.08**	<0.05	<0.05
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.12**	**0.13**	**0.15**	**0.24**	**0.40**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	**0.001**	**0.001**
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**0.002**
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	**0.004**	**0.008**	**0.012**	**0.009**	**0.032**
Iron	7439-89-6	0.05	mg/L	**0.12**	**0.17**	**0.25**	**0.26**	**0.49**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.03**	<0.01	<0.01	<0.01	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.04**	**0.02**	**0.02**	**0.04**	**0.03**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.04**	**0.02**	**0.02**	**0.04**	**0.03**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.2**	<0.1	<0.1	<0.1	**0.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.2**	<0.1	<0.1	<0.1	**0.2**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.06**	**0.09**	**0.08**	**0.08**	**0.10**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.06**	**0.06**	**0.06**	**0.05**	**0.07**
EN055: Ionic Balance								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW06	SW07	SW08	SW09	SW10
			Sampling date / time	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00	25-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114407-006	EB2114407-007	EB2114407-008	EB2114407-009	EB2114407-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø **Total Anions**	----	0.01	meq/L	**0.87**	**0.61**	**0.59**	**0.77**	**0.67**
ø **Total Cations**	----	0.01	meq/L	**0.84**	**0.62**	**0.62**	**0.71**	**0.66**
MW006: Faecal Coliforms & E.coli by MF								
Escherichia coli	----	1	CFU/100mL	**29**	**~9**	**25**	**15**	**9**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DUP01	----	----	----	----
				Sampling date / time	25-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114407-011	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.17**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.1	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**0.2**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.06**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114407**	Page	: 1 of 9
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 20007_Scenic Rim Trail	Date Samples Received	: 25-May-2021
Order number	: 20007	Date Analysis Commenced	: 26-May-2021
C-O-C number	:	Issue Date	: 01-Jun-2021
Sampler	: DAN MORTON		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 11		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Nibi Karl	Microbiologist	Brisbane Microbiological, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 3706222)									
EB2114407-001	SW01	EA005-P: pH Value	----	0.01	pH Unit	7.43	7.40	0.4	0% - 20%
EB2114459-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.27	6.17	1.6	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 3706221)									
EB2114407-001	SW01	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	75	74	0.0	0% - 20%
EB2114459-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	366	370	1.4	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3702862)									
EB2113565-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	31	35	11.4	No Limit
EB2114393-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	39	35	10.8	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3702863)									
EB2114407-008	SW08	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
EB2114502-008	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	13	15	14.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 3706220)									
EB2114407-001	SW01	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	26	31	16.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	26	31	16.9	0% - 20%
EB2114459-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	5	4	22.8	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	5	4	22.8	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3698129)									
EB2114404-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1160	1170	0.5	0% - 20%
EB2114361-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	103	105	1.5	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3698133)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3698133) - continued									
EB2114407-009	SW09	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	1	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3698130)									
EB2114404-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	404	408	1.0	0% - 20%
EB2114407-009	SW09	ED045G: Chloride	16887-00-6	1	mg/L	9	9	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 3698534)									
EB2114407-001	SW01	ED093F: Calcium	7440-70-2	1	mg/L	4	4	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	3	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EB2114407-010	SW10	ED093F: Calcium	7440-70-2	1	mg/L	3	3	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	3	3	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3698533)									
EB2114407-001	SW01	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.06	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EB2114407-010	SW10	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 3698730)									
EB2114380-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.008	0.007	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020T: Total Metals by ICP-MS (QC Lot: 3698730) - continued									
EB2114380-001	Anonymous	EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.290	0.278	4.1	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.018	0.016	8.5	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.103	0.100	3.5	0% - 50%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.54	0.52	4.7	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.71	1.64	4.4	0% - 20%
EB2114394-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.03	0.02	47.5	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 3698732)									
EB2114408-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.204	0.204	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.020	0.020	0.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	1.25	1.49	17.6	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	2.81	2.99	6.2	0% - 20%
EB2114408-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.040	0.036	8.4	0% - 20%
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.032	0.032	0.0	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.034	0.034	0.0	0% - 20%
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.241	0.237	1.6	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.025	0.024	0.0	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.047	0.047	0.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	34.4	31.8	7.7	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	37.4	35.6	4.9	0% - 20%
EK040P: Fluoride by PC Titrator (QC Lot: 3706219)									
EB2114407-001	SW01	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EB2114459-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3706513)									
EB2113887-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.54	0.51	4.6	0% - 20%
EB2114407-005	SW05	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3698128)									
EB2114404-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EB2114361-005	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3698132)									
EB2114419-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.20	0.20	0.0	0% - 20%
EB2114407-009	SW09	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3706514)									
EB2113887-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	380	361	5.1	0% - 20%
EB2114407-005	SW05	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.03	41.7	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3704684)									
EB2114407-001	SW01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.1	0.0	No Limit
EB2114407-011	DUP01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3704683)									
EB2114407-001	SW01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.07	0.0	No Limit
EB2114407-011	DUP01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	16.3	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3698124)									
EB2114361-005	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EB2112733-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.05	0.04	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3698131)									
EB2114407-009	SW09	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.05	0.06	18.3	No Limit

Method Blank (MB) and Laboratory Control Sample (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 Sample (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 (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 3706222)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.0	102
				----	7 pH Unit	100	98.0	102
EA010P: Conductivity by PC Titrator (QCLot: 3706221)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2100 µS/cm	97.5	91.0	107
				<1	24800 µS/cm	96.6	91.0	107
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3702862)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	106	88.0	112
				<5	1000 mg/L	93.7	88.0	112
				<5	951 mg/L	99.8	87.2	116
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3702863)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	104	88.0	112
				<5	1000 mg/L	93.5	88.0	112
				<5	951 mg/L	105	87.2	116
ED037P: Alkalinity by PC Titrator (QCLot: 3706220)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	50 mg/L	98.5	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3698129)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.0	85.0	118
				<1	100 mg/L	93.1	85.0	118
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3698133)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.5	85.0	118
				<1	100 mg/L	92.9	85.0	118
ED045G: Chloride by Discrete Analyser (QCLot: 3698130)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.7	90.0	115
				<1	1000 mg/L	108	90.0	115
ED093F: Dissolved Major Cations (QCLot: 3698534)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	103	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.1	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.2	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.7	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3698533)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.4	79.0	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	116
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	88.0	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	105	87.0	113

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3698533) - continued								
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.9	88.0	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.8	89.0	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	89.0	120
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.4	89.0	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	108	87.0	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.6	82.0	114
EG020T: Total Metals by ICP-MS (QCLot: 3698730)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.8	80.0	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	112
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	89.0	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.1	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.6	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.1	88.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.8	84.0	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	82.0	118
EG020T: Total Metals by ICP-MS (QCLot: 3698732)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	80.0	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	103	88.0	112
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	89.0	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.1	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	88.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.3	84.0	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	107	82.0	118
EK040P: Fluoride by PC Titrator (QCLot: 3706219)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	103	80.0	117
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3706513)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	105	83.5	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3698128)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3698132)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3706514)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	105	85.7	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3704684)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	1 mg/L	91.5	70.1	108
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3704683)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.442 mg/L	102	79.2	105
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3698124)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	81.7	117
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3698131)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	109	81.7	117

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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3698129)							
EB2114369-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	95.8	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3698133)							
EB2114407-010	SW10	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	98.0	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3698130)							
EB2114369-004	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	102	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3698533)							
EB2114407-002	SW02	EG020A-F: Arsenic	7440-38-2	1 mg/L	96.7	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	98.9	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	98.0	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	95.2	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	93.4	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	99.8	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	103	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 3698730)							
EB2114380-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	100	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	99.2	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	109	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	107	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	105	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	106	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 3698730) - continued							
EB2114380-002	Anonymous	EG020A-T: Nickel	7440-02-0	1 mg/L	98.4	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	96.7	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 3698732)							
EB2114407-007	SW07	EG020A-T: Arsenic	7440-38-2	1 mg/L	93.6	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	95.8	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	107	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	108	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	107	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	105	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	97.2	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	92.4	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3706219)							
EB2114407-002	SW02	EK040P: Fluoride	16984-48-8	5 mg/L	98.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3706513)							
EB2113887-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	# Not Determined	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3698128)							
EB2114369-004	Anonymous	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	94.4	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3698132)							
EB2114407-010	SW10	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	96.9	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3706514)							
EB2113887-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	80 mg/L	93.8	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3704684)							
EB2114407-002	SW02	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	95.2	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3704683)							
EB2114407-002	SW02	EK067G: Total Phosphorus as P	----	1 mg/L	102	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3698124)							
EB2113553-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	110	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3698131)							
EB2114407-010	SW10	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	102	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114407**	Page	: 1 of 10
Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Telephone	: +61-7-3243 7222
Project	: 20007_Scenic Rim Trail	Date Samples Received	: 25-May-2021
Site	: ----	Issue Date	: 01-Jun-2021
Sampler	: DAN MORTON	No. of samples received	: 11
Order number	: 20007	No. of samples analysed	: 11

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.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	EB2113887--002	Anonymous	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)		Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
SW01,	SW02,	----	----	----	29-May-2021	26-May-2021	**3**
SW03,	SW04,						
SW05,	SW06,						
SW07,	SW08,						
SW09,	SW10						

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: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
SW01,	SW02,	**25-May-2021**	**----**	----	----	**29-May-2021**	26-May-2021	×
SW03,	SW04,							
SW05,	SW06,							
SW07,	SW08,							
SW09,	SW10							

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
EA006: Sodium Adsorption Ratio (SAR)							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**27-May-2021**	01-Jun-2021	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	08-Jun-2021	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**26-May-2021**	22-Jun-2021	✓

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
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**26-May-2021**	22-Jun-2021	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	21-Nov-2021	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Natural (EG020A-T)							
SW04	**25-May-2021**	**28-May-2021**	21-Nov-2021	✓	**28-May-2021**	21-Nov-2021	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
SW01, SW02, SW03, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**25-May-2021**	**28-May-2021**	21-Nov-2021	✓	**28-May-2021**	21-Nov-2021	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓

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
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**26-May-2021**	27-May-2021	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**25-May-2021**	**----**	----	----	**29-May-2021**	22-Jun-2021	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**25-May-2021**	**28-May-2021**	22-Jun-2021	✓	**28-May-2021**	22-Jun-2021	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10, DUP01	**25-May-2021**	**28-May-2021**	22-Jun-2021	✓	**28-May-2021**	22-Jun-2021	✓

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
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**26-May-2021**	27-May-2021	✓
MW006: Faecal Coliforms & E.coli by MF							
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)							
SW01, SW02, SW03, SW04, SW05, SW06, SW07, SW08, SW09, SW10	**25-May-2021**	**----**	----	----	**26-May-2021**	26-May-2021	✓

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)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	3	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	26	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	6	40	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Conductivity by PC Titrator	EA010-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	**5.26**	**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
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Calculated TDS (from Electrical Conductivity)	EA016	WATER	In house: Calculation from Electrical Conductivity (APHA 2510 B) using a conversion factor specified in the analytical report. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2114407**

Client	: **MORETON ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MR DAN MORTON	Contact	: Customer Services EB
Address	: 220 AVALON ROAD SHELDON QLD, AUSTRALIA 4157	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dan@morenv.com.au	E-mail	: ALSEnviro.Brisbane@alsglobal.com
Telephone	: ----	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 20007_Scenic Rim Trail	Page	: 1 of 3
Order number	: 20007	Quote number	: EB2017MORENV0003 (EN/222)
C-O-C number	:	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: DAN MORTON		

Dates

Date Samples Received	: 25-May-2021 17:30	Issue Date	: 25-May-2021
Client Requested Due Date	: 01-Jun-2021	Scheduled Reporting Date	: **01-Jun-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 2	Temperature	: 6.9°C & 7.6°C - Ice present
Receipt Detail	: ESKY	No. of samples received / analysed	: 11 / 11

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
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- **Sample "DUP02" has been forwarded to Eurofins, as requested. Please note that this will incur a freight forwarding fee.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

Method Sample ID	Sample Container Received	Preferred Sample Container for Analysis
Total Metals by ICP-MS - Suite A : EG020A-T		
SW04	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - Nitric Acid; Unfiltered

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	Sampling date / time	Sample ID	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - MW006 (Ec) E.coli by Membrane Filtration	WATER - NT-14 Extended Water Suite B	WATER - W-01 7 Metals	WATER - W-01T 7 metals (Total)
EB2114407-001	25-May-2021 00:00	SW01	✓	✓	✓	✓	✓	✓	✓
EB2114407-002	25-May-2021 00:00	SW02	✓	✓	✓	✓	✓	✓	✓
EB2114407-003	25-May-2021 00:00	SW03	✓	✓	✓	✓	✓	✓	✓
EB2114407-004	25-May-2021 00:00	SW04	✓	✓	✓	✓	✓	✓	✓
EB2114407-005	25-May-2021 00:00	SW05	✓	✓	✓	✓	✓	✓	✓
EB2114407-006	25-May-2021 00:00	SW06	✓	✓	✓	✓	✓	✓	✓
EB2114407-007	25-May-2021 00:00	SW07	✓	✓	✓	✓	✓	✓	✓
EB2114407-008	25-May-2021 00:00	SW08	✓	✓	✓	✓	✓	✓	✓
EB2114407-009	25-May-2021 00:00	SW09	✓	✓	✓	✓	✓	✓	✓
EB2114407-010	25-May-2021 00:00	SW10	✓	✓	✓	✓	✓	✓	✓
EB2114407-011	25-May-2021 00:00	DUP01							✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - NT-11 Total Nitrogen and Total Phosphorus
EB2114407-011	25-May-2021 00:00	DUP01	✓

Proactive Holding Time Report

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

Requested Deliverables

DAN MORTON

- *AU Certificate of Analysis - NATA (COA)	Email	dan@morenv.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dan@morenv.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dan@morenv.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	dan@morenv.com.au
- A4 - AU Tax Invoice (INV)	Email	dan@morenv.com.au
- Chain of Custody (CoC) (COC)	Email	dan@morenv.com.au
- EDI Format - XTab (XTAB)	Email	dan@morenv.com.au

1/6

CHAIN OF CUSTODY

ALS Laboratory: *please tick* →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Moreton Environmental and Health Pty Ltd
OFFICE:	Sheldon
PROJECT:	20007_Scenic Rim Trail
ORDER NUMBER:	20007
PROJECT MANAGER:	Dan Morton — CONTACT PH: 0400 823 993
SAMPLER:	Dan Morton — SAMPLER MOBILE: 0400 823 993
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed): dan@morenv.com.au	
Email Invoice to (will default to PM if no other addresses are listed): dan@morenv.com.au	

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

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

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY: DANE K
Dan Morton	Pack 'n' Send Capalaba	Pack 'n' Send Capalaba	ALS Brisbane
DATE/TIME: 24/5/21	DATE/TIME:	DATE/TIME:	DATE/TIME: 1730 25/5/21

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W) SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA025H TSS	MW006 (Ec) E.coli by Membrane Filtration	W-01T 7 metals (Total) + W-01 7 Metals (Dissolved) and EG020F (Additional Dissolved Metals Al, Fe, Mn) + EG020T (Additional Total Metals Al, Fe, Mn)	Extended Water Suite B NT - 14	W-01T 7 metals (Total only) plus TN and TP				Additional Information
	SW01	~~25/5/21~~ 24/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW02	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW03	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW04	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW05	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW06	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW07	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW08	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW09	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	SW10	25/5/21	Water	None, Samples kept at 4°C	4	1	1	1	1					
	DUP01	25/5/21	Water	None, Samples kept at 4°C	2					1				
	DUP02	25/5/21	Water	None, Samples kept at 4°C	2					1				Send to Eurofins
				TOTAL	44	10	10	10	10	2	0	0	0	

Environmental Division Brisbane
Work Order Reference
EB2114407
Telephone : +61-7-3243 7222

MICRO LAB

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