



**NGH**



# Pre-construction Water Quality Monitoring Report

**Event 2 April 2022**

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**Project Number: 22-013**



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## 1. Introduction

In 2020 Snowy Hydro Limited (Snowy Hydro) obtained approval (application number SSI 9208 and EPBC 2018/8322) to expand the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme), by linking the existing Tantangara and Talbingo reservoirs through a series of underground tunnels and constructing a new underground hydro-electric power station (referred to as 'Snowy 2.0').

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as TransGrid and the Proponent) is currently going through the process of development approval to construct a substation and overhead transmission lines (the Project) to facilitate the connection of Snowy 2.0 to the existing electrical transmission network. The Project location is approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW). UGL has been engaged on behalf of the Proponent to undertake the Project.

The purpose of the pre-construction water quality monitoring is to address the requirements of the Environmental Impact Statement (EIS) (Jacobs 2020) that was prepared by the Proponent under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* to assess the environmental impacts of the proposed Project. Subsequently, an Amendment Report (TransGrid 2021b) was submitted with the Response to Submissions (TransGrid 2021a) to the Department of Planning and Environment (DPE) with updated mitigation measures for the Project.

The objectives of the pre-construction surface water quality monitoring is to collect baseline data prior to Project construction works. Baseline data will be compared to ANZG (2018) guidelines to characterise the existing surface water quality. The data will be compared to the water quality objectives (WQO) for the Project area.

## 2. Program and methodology

The Pre-construction Water Quality Monitoring Program and Methodology (the Program) (NGH 2022) has been prepared to detail the WQOs for the Project, the location of the monitoring locations and the methodology for water sampling.

The Project area within Kosciuszko National Park is an area of high conservation value. Therefore, the water quality objectives for physical and chemical stressors includes **no change beyond natural variability** (ANZG 2018). The Default Guideline Values (DGV) for Upland Rivers has been provided for physical and chemical stressors and is detailed in the Program (NGH 2022).

The location of the sampling points in relation to the Project footprint is provided in Figure 2-1.

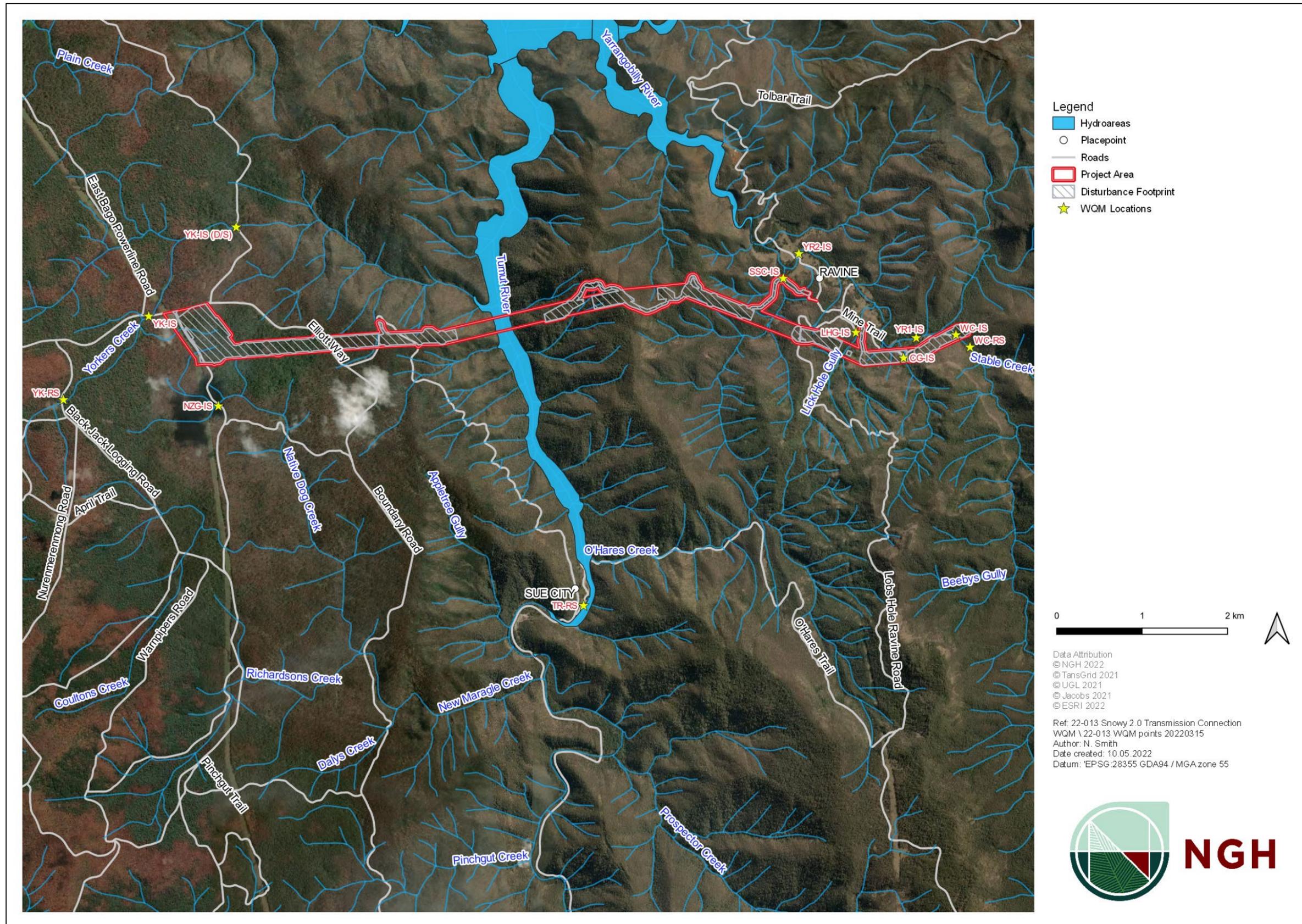


Figure 2-1 WQM locations

### 3. Monitoring Event observations and results

Water quality results for each site are provided in Appendix A. Results are highlighted where they exceed the default guideline value (refer to the Program (NGH 2022)). Table 3-1 identifies exceedances of the DGVs for metals, cyanide and nutrients. Physico-chemical results have been provided in Figure 3-2 to Figure 3-10. Field data and observations are provided in Appendix B.

#### 3.1. Event 2

NGH conducted the first round of sampling (Event 1) in March 2022 and prepared the field and laboratory report (NGH 2022a). The results of Event 1 have been compared in this report to the results of Event 2.

NGH Environmental Scientist, Nicola Smith, conducted the monitoring Event with a UGL representative on 27 and 28 April 2022. The weather was overcast with some light rainfall throughout the day on 28 April with 3 millimetres of rainfall recorded at the Tumbarumba weather station. Data from the Tumbarumba weather station (Station ID 072043) indicates that the days were calm with a low of 6.5°C on 27 April and a high of 19.5°C on 28 April. Evidence of bank erosion from hooved animals was observed at the New Zealand Gully site and the Yorkers Creek impact site and Yorkers Creek reference site.

Generally, water flow was observed to be clear with no hydrocarbon sheen and no odours were present. The banks of each channel were well vegetated with the vegetation matrix including more weed species in some locations. However, a hydrocarbon or tannin sheen was observed on the sediment within the channel adjacent to the sampling location WC-RS, which is adjacent to a clean water drain into the creek, refer to Figure 3-1.



Figure 3-1 Photograph of sheen on ponded water and sediment within the channel of Wallaces Creek (WC-RS)

Sheep Station Creek (SSC-IS) was dry and therefore, no sample was collected. Lick Hole Gully (LHG-IS) is a marsh environment with lots of in-channel aquatic vegetation and large woody debris (LWD). Fine sediment particles on the channel bed entered suspension easily when disturbed. Flow at LHG-IS was too shallow for a probe at approximately 2 centimetres (cm) to 3 cm in depth. However, laboratory sample bottles were filled using the lid of the bottle. Refer to Table 3-1 and Appendix A for results of the chemical analytes, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS). All other channels were flowing with similar flow depths to those observed in Event 1.

### 3.1.1. Results

The results indicate that the water quality in the locations where samples were taken generally meets the DGVs for Upland Rivers with a 99% species protection level for toxicants. Locations where a physical or chemical stressor was above the DGV are provided in Table 3-1.

Water temperatures ranged from 10.1 – 13.3°C.

Table 3-1 Results above the DGV for Upland Rivers with 99% species protection level

Site identification	Analyte	DGV	Result	Comment
WC-RS	Total Nitrogen (TN) mg/L	0.25	3.0	
CG-IS	Total Dissolved Solids (TDS) mg/L	-	317	Much higher than other samples. Bed material clay.
YR1-IS	Aluminium mg/L	0.027	0.3	
LHG-IS	Total Dissolved Solids (TDS) mg/L	-	348	Much higher than other samples. Bed material clay, marsh environment.
YK-RS	Aluminium mg/L	0.027	0.35	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream. Sample taken downstream of culvert under unsealed track. Flow through culvert is restricted upstream causing a wetland environment.
	Iron mg/L	0.3	0.45	
YK-IS	Aluminium mg/L	0.027	0.41	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream.
	Iron mg/L	0.3	0.49	

Site identification	Analyte	DGV	Result	Comment
	Total Nitrogen (TN) mg/L	0.25	2.0	Sampling site is adjacent to Elliot Way. Water observed to be cloudy with evidence of bank disturbance from wildlife and pest animals. Results are elevated compared to YK-RS.
YK-IS (D/S)	Aluminium mg/L	0.027	0.26	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream. Sample taken upstream of culvert.
	Iron mg/L	0.3	0.39	
	Total Nitrogen (TN) mg/L	0.25	2.0	Al and Fe results are less than those from YK-RS and YK-IS, both located upstream.
NZG-IS	Aluminium mg/L	0.027	0.14	Located within Bago State Forest.
	Total Nitrogen (TN) mg/L	0.25	3.0	Sample taken upstream of timber supported unsealed track bridge. Banks heavily vegetated, deep channel.

The following time series, Figure 3-2 to Figure 3-10, display physico-chemical water quality through time for monitoring Event 1 (March) and Event 2 (April). Where a DGV is available, these values are shown on the graph and have been included for dissolved oxygen (%), conductivity, pH and turbidity. Many of the results are recorded as below (<) the limit of detection. To account for this in the statistics and enable these figures to be graphed, the *Limit of Detection Divided by Two (LOD/2) Method* (Cohen and Ryan 1989) has been used.

Any exceedances of the DGV for metals, nutrients and cyanide are in Table 3-1.

Temperature has decreased at all sites, refer Figure 3-2.

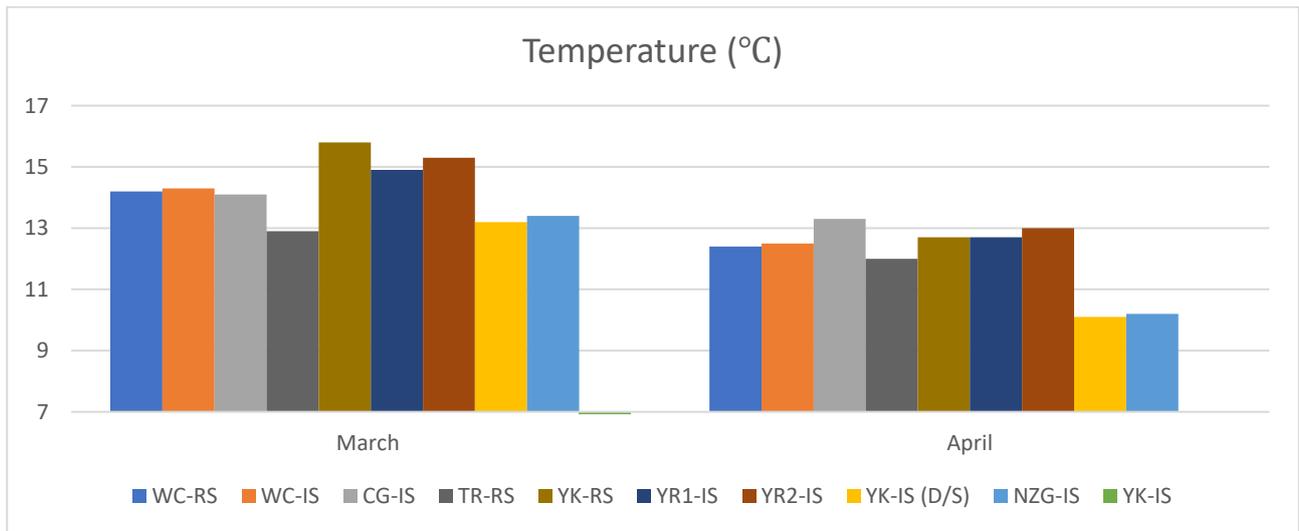


Figure 3-2 Temperature

The majority of measurements for DO (%) across all sites is not within the DGV range. The DO (%) for Event 2 is less than for Event 1, refer to Figure 3-3. For example, the DO at TR-RS is 94.6% for Event 1 and 76% for Event 2. This decrease correlates with the temperature decrease.

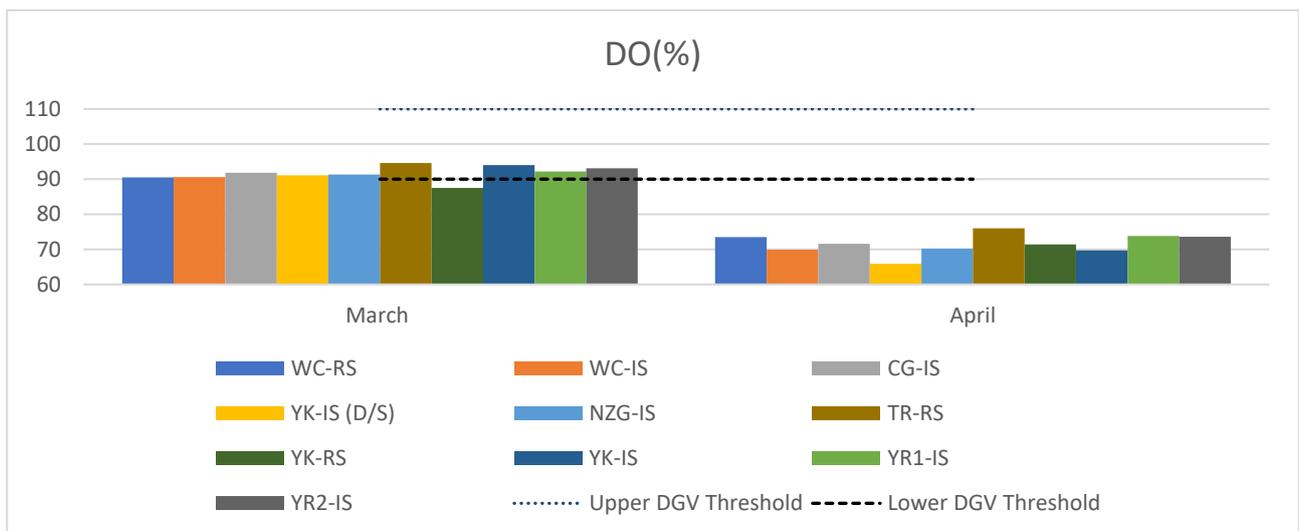


Figure 3-3 Dissolved oxygen (DO%)

The DO (ppm) across all sites has decreased from Event 1 to Event 2, refer to Figure 3-4.

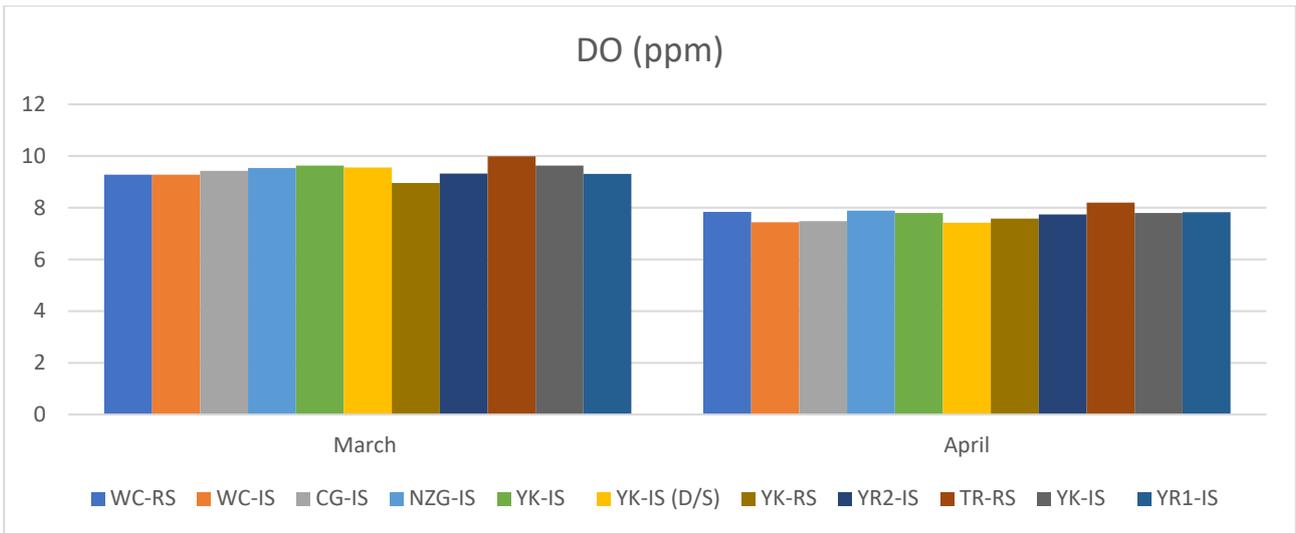


Figure 3-4 Dissolved Oxygen (ppm)

Specific conductance between sites remains relatively stable. CG-IS has the highest specific conductance of 536 $\mu$ S/cm and 517 $\mu$ S/cm for Event 1 and Event 2 respectively, refer to Figure 3-5. This is likely a result of the channel bed material being a clay and not gravel.

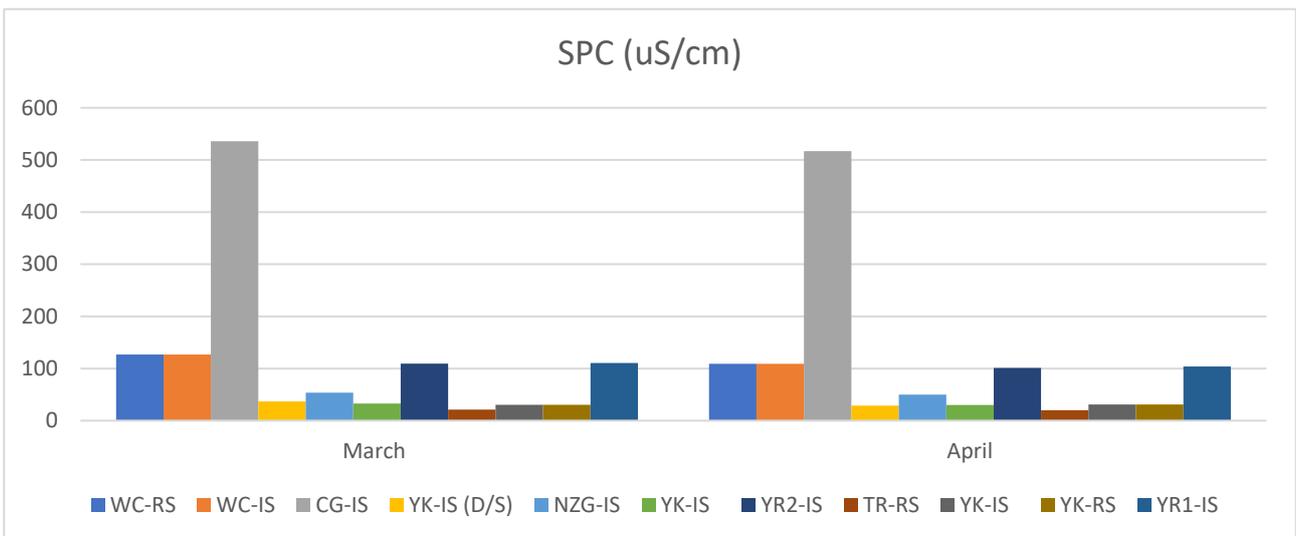


Figure 3-5 Specific Conductance (SPC ( $\mu$ S/cm))

Conductivity from Event 1 to Event 2 has decreased. CG-IS has the highest conductivity measurement of 423.6 $\mu$ S/cm and 401.2 $\mu$ S/cm for Event 1 and Event 2 respectively, refer to Figure 3-6. This is likely a result of the channel bed material being a sandy clay and not gravel.

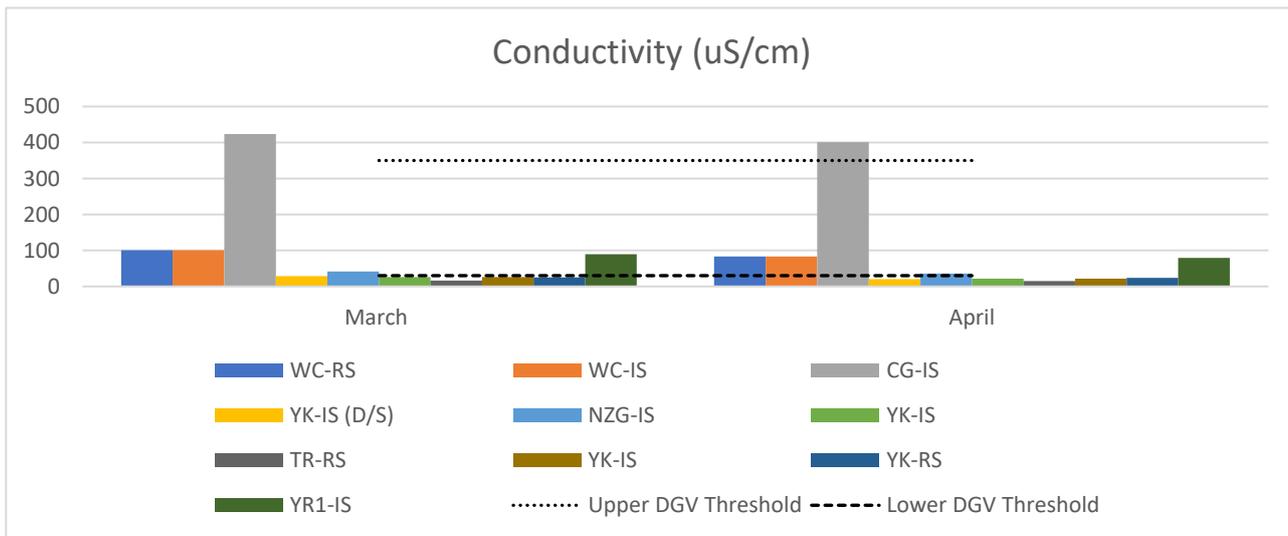


Figure 3-6 Conductivity (µS/cm)

Turbidity across the sites has remained in within the DGV range of 2 – 25 NTU. The lowest readings were from the Event 1 with turbidity values as low as 0.07 NTU TR-RS, 0.37 NTU WC-RS and 0.32 at WC-IS. YK-IS had two measurements around 10 NTU across the two Events. The turbidity at YK-IS (D/S) had a notable increase from 6.42 NTU in Event 1 to 9.1 NTU in Event 2. Similarly, YK-RS went from 5.71 NTU in Event 1 to 9.77 NTU in Event 2, refer to Figure 3-7.

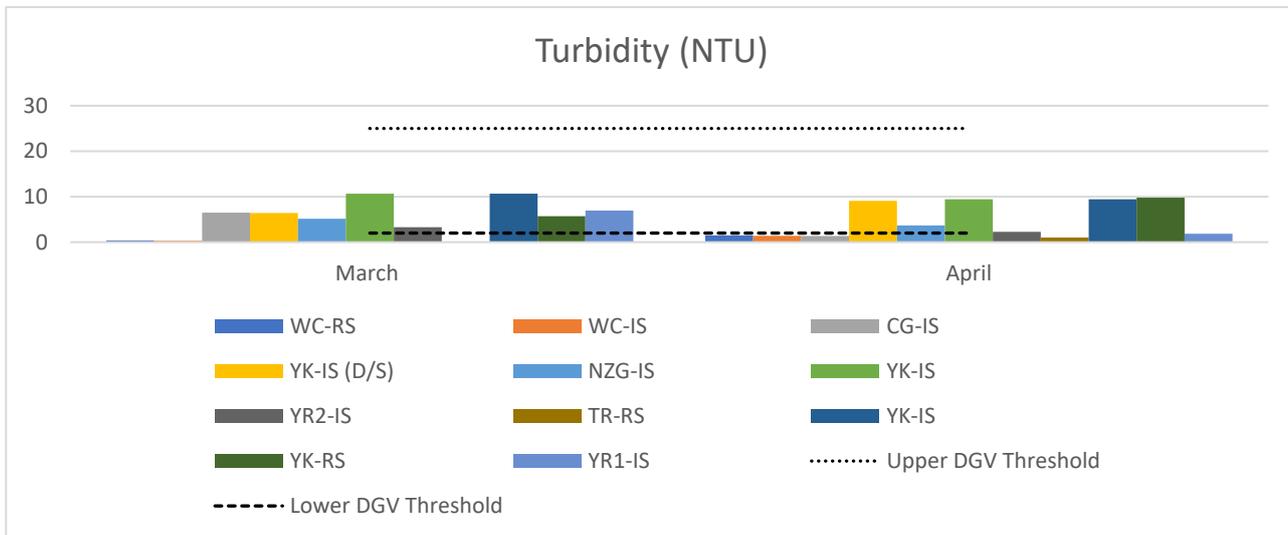


Figure 3-7 Turbidity (NTU)

The pattern of total suspended solids across all sites reflects the data collected for turbidity, with the highest value for YK-IS in Event 1 of 10.66mg/L and YK-RS for Event 2 with 9.77mg/L. Refer to Figure 3-8.

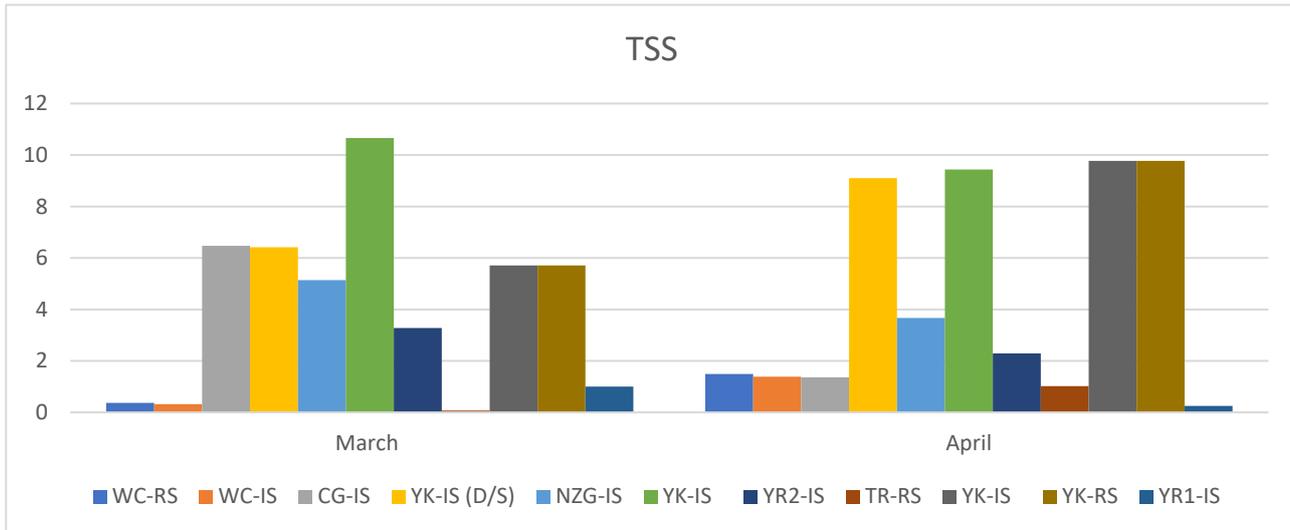


Figure 3-8 Total Suspended Solids

The pH for all sites has predominantly remained within the DGV of 6.5 – 8 pH units. However, there have been seven exceedances above 8 pH units across the two Events. The highest of these exceedances is 8.39 pH units, refer to Figure 3-9.

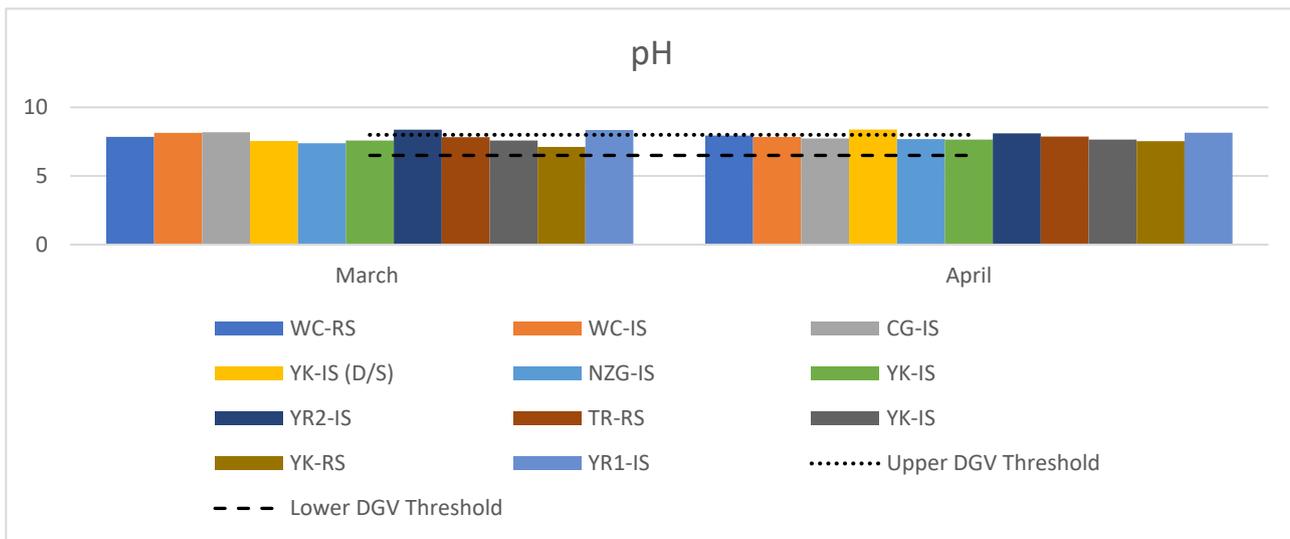


Figure 3-9 Potential of Hydrogen (pH)

The measurements of the oxygen redox potential during Event 1 were quite staggered with the lowest reading from WC-RS of 61.2mV and a high from YK-IS of 172.4mV. During Event 2, the ORP range was reduced with a low of 138.9mV at YK-RS and a high of 161.4mV at CG-IS, refer to Figure 3-10.

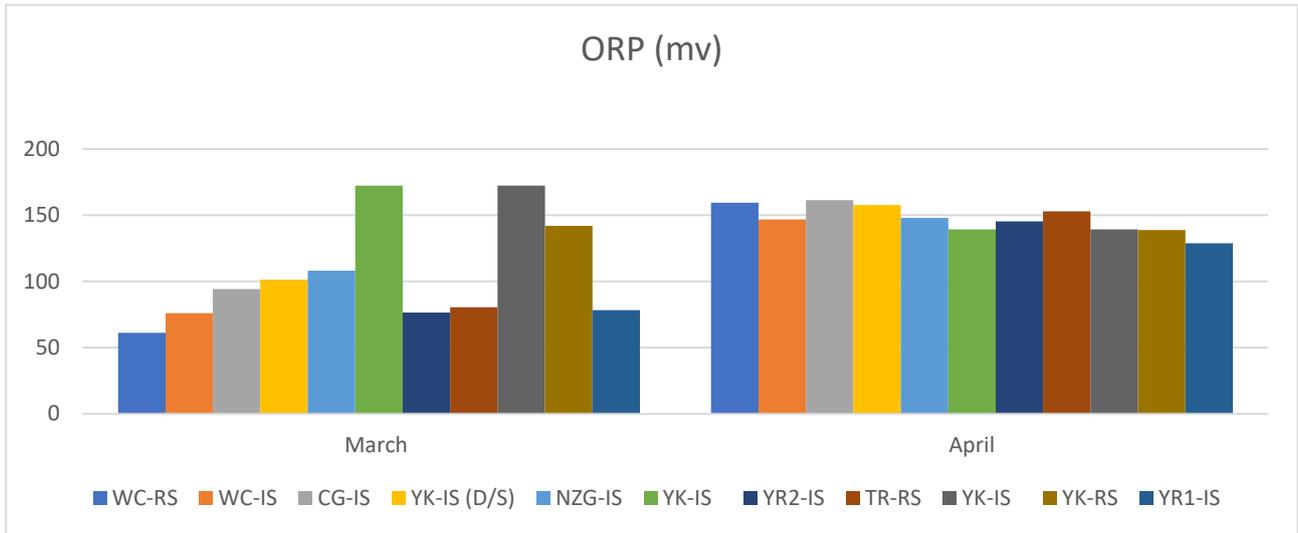


Figure 3-10 Oxygen Redox Potential (ORP)

### 3.1.2. Quality Assurance / Quality Control

A Quality Assurance and Quality Control (QA/QC) program was undertaken as part of this investigation including:

- A field duplicate sample, at a rate of one per 20 samples, was taken (DUP01) from the surface WQM WC-IS. DUP01 was analysed for metals and metalloids. The duplicate sample has been compared against the WC-IS sample by Relative Percentage Difference (RPD) and has returned within an acceptable range or less than 30% for inorganic or less than 5 times the laboratory limit of reporting (LOR). The RPD was 0%, except for Manganese with a RPD value of 67%.
- A water blank was supplied by the laboratory. The water blank sample was analysed for metals and metalloids, cyanide and total nitrogen. There were no exceedances of the sample results above the LORs.

NGH consider the QA/QC program to have been effective and the data reliable and representative to achieve the objectives of the investigation.

Refer to Appendix C for the laboratory analysis certificate, Appendix D for the RPD Table and Appendix E for the calibration certificates.

## 4. Conclusion

The results shown (refer Figure 3-2 to Figure 3-10) are generally consistent between Events 1 and 2 with some seasonal variation associate with a decrease in temperature.

Laboratory results are mostly consistent for each site between Event 1 and Event 2 with the majority of results below the Limit of Reporting. Where there were exceedances for Event 1 at some sites, these are not reflected for Event 2. For example, Total Nitrogen for YK-IS (D/S) was 2mg/L for Event 1 and <LOR for Event 2 and Aluminium was 0.41mg/L for Event 1 at YK-IS and <LOR for Event 2. All results and statistics are provided in Appendix A.

## 5. References

Cohen, M.A. and Ryan, P.B. 1989. Observations Less than the Analytical Limit of Detection: A New Approach. *Journal of the Air and Waste Management Association*. 39:3, 328-329

Jacobs Pty Ltd. 2020. *Snowy 2.0 Transmission Connection Project EIS*.

NGH Pty Ltd. 2022. *Pre-construction Water Quality Monitoring Program and Methodology*.

NGH Pty Ltd. 2022a. *Pre-construction Water Quality Monitoring Report: Event 2 April 2022*.

TransGrid. 2021a. *Snowy 2.0 Transmission Connection Project Submissions Report*.

TransGrid. 2021b. *Snowy 2.0 Transmission Connection Project Amendment Report*.

# APPENDIX A EVENT DATA TABLE

22-013 Pre-construction WQM		Sheen/oil/grease	Temp. (°C)	Dissolved Oxygen (DO %)	DO (ppm)	Specific EC (SPC uS/cm)	EC (uS/cm)	pH	Redox (mV)	Turbidity (NTU)	Al (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Cyanide (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Ni (mg/L)	TN (mg/L)	TP (mg/L)	Ag (mg/L)	TDS mg/L	TSS (mg/L)	Zn (mg/L)	
Site	DGV	No	-	90-110	-	-	30-350	6.5-8	-	2-25	0.027	0.0008	0.00006	0.00001	0.001	0.004	0.3	0.001	1.2	0.00006	0.008	0.25	0.02	0.00002	-	0.25 (adopted)	0.0024	
WC-RS	March	No	14.2	90.5	9.28	126.8	100.7	7.85	61.2	0.37	0.01	0.00015	0.00001	0.000005	0.0001	0.001	0.03	0.0005	0.011	0.000015	0.0005	3	0.005	0.00001	12	1	0.001	
	April	No but on sediment	12.4	73.5	7.84	109	83.1	7.95	159.4	1.49	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.001	0.000015	0.0005	0.1	0.005	0.00001	1	0.25	0.001	
	Min		12.40	73.50	7.84	109.00	83.10	7.85	61.20	0.37	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	1.00	0.25	0.00	
	Max		14.20	90.50	9.28	126.80	100.70	7.95	159.40	1.49	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.00	0.00	3.00	0.01	0.00	12.00	1.00	0.00	
	Mean		13.30	82.00	8.56	117.90	91.90	7.90	110.30	0.93	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	1.55	0.01	0.00	6.50	0.63	0.00	
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	St. Dev		1.27	12.02	1.02	12.59	12.45	0.07	69.44	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	2.05	0.00	0.00	7.78	0.53	0.00
WC-IS	March	No	14.3	90.6	9.28	126.7	100.8	8.14	76	0.32	0.01	0.00015	0.00001	0.000005	0.0001	0.001	0.03	0.0005	0.011	0.000015	0.0005	0.1	0.005	0.00001	80	3	0.001	
	April	No	12.5	69.9	7.44	109	83.3	7.84	146.8	1.39	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.002	0.000015	0.0005	0.8	0.005	0.00001	63	0.25	0.001	
	Min		12.50	69.90	7.44	109.00	83.30	7.84	146.80	1.39	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.80	0.01	0.00	63.00	0.25	0.00	
	Max		12.50	69.90	7.44	109.00	83.30	7.84	146.80	1.39	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.80	0.01	0.00	63.00	0.25	0.00	
	Mean		12.50	69.90	7.44	109.00	83.30	7.84	146.80	1.39	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.80	0.01	0.00	63.00	0.25	0.00	
	Count		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	St. Dev		1.27	14.64	1.30	12.52	12.37	0.21	50.06	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.49	0.00	0.00	12.02	1.94	0.00
CG-IS	March	No	14.1	91.8	9.43	536	423.6	8.19	94.3	6.47	0.01	0.00015	0.00001	0.000005	0.005	0.001	0.005	0.0005	0.002	0.000015	0.0005	0.1	0.005	0.00001	317	1	0.001	
	April	No	13.3	71.6	7.48	517	401.2	7.73	161.4	1.36	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.001	0.000015	0.0005	0.1	0.005	0.00001	293	0.25	0.001	
	Min		13.30	71.60	7.48	517.00	401.20	7.73	94.30	1.36	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	293.00	0.25	0.00	
	Max		14.10	91.80	9.43	536.00	423.60	8.19	161.40	6.47	0.02	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	317.00	1.00	0.00	
	Mean		13.70	81.70	8.46	526.50	412.40	7.96	127.85	3.92	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	305.00	0.63	0.00	
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	St. Dev		0.57	14.28	1.38	13.44	15.84	0.33	47.45	3.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.97	0.53	0.00
YR1-IS	March	No	14.9	92.2	9.31	110.7	89.3	8.35	78.3	6.94	0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.06	0.0005	0.003	0.000015	0.0005	0.1	0.005	0.00001	69	1	0.001	
	April	No	12.7	73.8	7.83	104	79.2	8.15	128.8	1.85	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.001	0.000015	0.0005	0.1	0.005	0.00001	50	0.25	0.001	
	Min		12.70	73.80	7.83	104.00	79.20	8.15	78.30	1.85	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	50.00	0.25	0.00	
	Max		14.90	92.20	9.31	110.70	89.30	8.35	128.80	6.94	0.03	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.10	0.01	0.00	69.00	1.00	0.00	
	Mean		13.80	83.00	8.57	107.35	84.25	8.25	103.55	4.40	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.10	0.01	0.00	59.50	0.63	0.00	
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	St. Dev		1.56	13.01	1.05	4.74	7.14	0.14	35.71	3.60	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.44	0.53	0.00
LHG-IS	March	No	Flow too shallow								0.01	0.00015	0.00001	0.000005	0.0001	0.001	0.02	0.0005	0.001	0.000015	0.0005	2	0.005	0.00001	348	1	0.001	
	April	No	Flow too shallow								0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.002	0.000015	0.0005	0.1	0.005	0.00001	353	2	0.001	
	Min										0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	348.00	1.00	0.00	
	Max										0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	2.00	0.01	0.00	353.00	2.00	0.00	
	Mean										0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	1.05	0.01	0.00	350.50	1.50	0.00	
	Count										2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	St. Dev										0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	1.34	0.00	0.00	3.54	0.71	0.00	
YR2-IS	March	No	15.3	93.1	9.32	109.4	89.2	8.38	76.5	3.28	0.01	0.00015	0.00001	0.000005	0.0001	0.001	0.06	0.0005	0.003	0.000015	0.0005	0.1	0.005	0.00001	74	2	0.001	
	April	No	13	73.6	7.74	101	78.3	8.11	145.4	2.29	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.002	0.000015	0.0005	0.1	0.005	0.00001	39	0.25	0.001	
	Min		13.00	73.60	7.74	101.00	78.30	8.11	76.50	2.29	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	39.00	0.25	0.00	
	Max		15.30	93.10	9.32	109.40	89.20	8.38	145.40	3.28	0.02	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.10	0.01	0.00	74.00	2.00	0.00	
	Mean		14.15	83.35	8.53	105.20	83.75	8.25	110.95	2.79	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.10	0.01	0.00	56.50	1.13	0.00	
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	St. Dev		1.63	13.79	1.12	5.94	7.71	0.19	48.72	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.75	1.24	0.00

22-013 Pre-construction WQM		Sheen/oil/grease	Temp. (°C)	Dissolved Oxygen (DO %)	DO (ppm)	Specific EC (SPC uS/cm)	EC (uS/cm)	pH	Redox (mV)	Turbidity (NTU)	Al (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Cyanide (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Ni (mg/L)	TN (mg/L)	TP (mg/L)	Ag (mg/L)	TDS mg/L	TSS (mg/L)	Zn (mg/L)		
Site	DGV	No	-	90-110	-	-	30-350	6.5-8	-	2-25	0.027	0.0008	0.00006	0.00001	0.001	0.004	0.3	0.001	1.2	0.00006	0.008	0.25	0.02	0.00002	-	0.25 (adopted)	0.0024		
SSC-IS	March	No flow																											
	April	No flow																											
	Min																												
	Max																												
	Mean																												
	Count																												
	St. Dev																												
TR-RS	March	No	12.9	94.6	9.99	21.1	16.2	7.83	80.5	0.07	0.01	0.00015	0.00001	0.000005	0.0001	0.001	0.03	0.0005	0.003	0.000015	0.0005	0.1	0.005	0.00001	43	1	0.001		
	April	No	12	76	8.2	20	15	7.87	153	1.02	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.001	0.000015	0.0005	1.1	0.005	0.00001	12	0.25	0.001		
	Min		12.00	76.00	8.20	20.00	15.00	7.83	80.50	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	12.00	0.25	0.00		
	Max		12.90	94.60	9.99	21.10	16.20	7.87	153.00	1.02	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	1.10	0.01	0.00	43.00	1.00	0.00		
	Mean		12.45	85.30	9.10	20.55	15.60	7.85	116.75	0.55	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.60	0.01	0.00	27.50	0.63	0.00		
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
	St. Dev		0.64	13.15	1.27	0.78	0.85	0.03	51.27	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.71	0.00	0.00	21.92	0.53	0.00		
YK-IS (D/S)	March	No	13.2	91.1	9.56	36.9	28.6	7.55	101.4	6.42	0.26	0.00015	0.00001	0.000005	0.0001	0.001	0.39	0.0005	0.006	0.000015	0.0005	2	0.005	0.00001	22	1	0.001		
	April	No	10.1	65.9	7.42	29	20.5	8.39	157.8	9.1	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.15	0.0005	0.001	0.000015	0.0005	0.2	0.005	0.00001	1	14	0.001		
	Min		10.10	65.90	7.42	29.00	20.50	7.55	101.40	6.42	0.02	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.20	0.01	0.00	1.00	1.00	0.00		
	Max		13.20	91.10	9.56	36.90	28.60	8.39	157.80	9.10	0.26	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.01	0.00	0.00	2.00	0.01	0.00	22.00	14.00	0.00		
	Mean		11.65	78.50	8.49	32.95	24.55	7.97	129.60	7.76	0.14	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	1.10	0.01	0.00	11.50	7.50	0.00		
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
	St. Dev		2.19	17.82	1.51	5.59	5.73	0.59	39.88	1.90	0.17	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	1.27	0.00	0.00	14.85	9.19	0.00		
NZG-IS	March	No	13.4	91.3	9.54	53.8	41.8	7.39	108.1	5.14	0.14	0.00015	0.00001	0.000005	0.0001	0.001	0.21	0.0005	0.005	0.000015	0.0005	3	0.005	0.00001	43	1	0.001		
	April	No	10.2	70.2	7.89	50	36	7.69	148	3.67	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.001	0.000015	0.0005	0.1	0.005	0.00001	52	0.25	0.001		
	Min		10.20	70.20	7.89	50.00	36.00	7.39	108.10	3.67	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	0.01	0.00	43.00	0.25	0.00		
	Max		13.40	91.30	9.54	53.80	41.80	7.69	148.00	5.14	0.14	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.01	0.00	0.00	3.00	0.01	0.00	52.00	1.00	0.00		
	Mean		11.80	80.75	8.72	51.90	38.90	7.54	128.05	4.41	0.08	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	1.55	0.01	0.00	47.50	0.63	0.00		
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
	St. Dev		2.26	14.92	1.17	2.69	4.10	0.21	28.21	1.04	0.09	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	2.05	0.00	0.00	6.36	0.53	0.00		
YK-IS	March	No	14.2	94	9.63	32.9	26.1	7.58	172.4	10.66	0.41	0.00015	0.00001	0.000005	0.0001	0.001	0.49	0.0005	0.011	0.000015	0.0005	2	0.005	0.00001	20	8	0.001		
	April	No	10.4	69.7	7.8	30	21.4	7.65	139.3	9.44	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.2	0.0005	0.001	0.000015	0.0005	0.1	0.005	0.00001	24	7	0.001		
	Min		10.40	69.70	7.80	30.00	21.40	7.58	139.30	9.44	0.02	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.10	0.01	0.00	20.00	7.00	0.00		
	Max		14.20	94.00	9.63	32.90	26.10	7.65	172.40	10.66	0.41	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.01	0.00	0.00	2.00	0.01	0.00	24.00	8.00	0.00		
	Mean		12.30	81.85	8.72	31.45	23.75	7.62	155.85	10.05	0.21	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.01	0.00	0.00	1.05	0.01	0.00	22.00	7.50	0.00		
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
	St. Dev		2.69	17.18	1.29	2.05	3.32	0.05	23.41	0.86	0.28	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.01	0.00	0.00	1.34	0.00	0.00	2.83	0.71	0.00		
YK-RS	March	No	15.8	87.5	8.96	30.5	25.1	7.12	142	5.71	0.35	0.00015	0.00001	0.000005	0.0001	0.001	0.45	0.0005	0.005	0.000015	0.0005	0.1	0.005	0.00001	20	1	0.001		
	April	No	12.7	71.4	7.58	31	24	7.54	138.9	9.77	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.19	0.0005	0.002	0.000015	0.0005	0.1	0.005	0.00001	30	6	0.001		
	Min		12.70	71.40	7.58	30.50	24.00	7.12	138.90	5.71	0.02	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.10	0.01	0.00	20.00	1.00	0.00		
	Max		15.80	87.50	8.96	31.00	25.10	7.54	142.00	9.77	0.35	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.01	0.00	0.00	0.10	0.01	0.00	30.00	6.00	0.00		
	Mean		14.25	79.45	8.27	30.75	24.55	7.33	140.45	7.74	0.18	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.10	0.01	0.00	25.00	3.50	0.00		
	Count		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
	St. Dev		2.19	11.38	0.98	0.35	0.78	0.30	2.19	2.87	0.24	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.07	3.54	0.00		

DO – Dissolved Oxygen; EC – Conductivity; Redox – Oxidation Reduction Potential; TSS – Total Suspended Solids; TDS – Total Dissolved Solids; TN – Total Nitrogen; TP – Total Phosphorus; Al – Aluminium; As – Arsenic; Cd – Cadmium; Cr – Chromium; Cu – Copper; Pb – Lead; Hg – Mercury; Ni – Nickel; Zn – Zinc; Fe – Iron; Ag – Silver; Mn – Manganese.

# APPENDIX B OBSERVATIONS AND FIELD DATA

Yes in sediment & puddle adjacent to channel

22-013 Pre-construction WQM		Grease/oil/sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)
WC-RS	Month 1									
	Month 2	No	12.4	73.5	7.84	0.109	83.1	7.95	159.4	1.49
	Month 3									
	Month 4									
	Month 5									
	Month 6									
WC-IS	Month 1									
	Month 2	No	12.5	69.9	7.44	0.109	83.3	7.84	146.8	1.39
	Month 3									
	Month 4									
	Month 5									
	Month 6									
CG-IS	Month 1									
	Month 2	No	13.3	71.6	7.48	0.517	401.2	7.73	161.4	1.36
	Month 3									
	Month 4									
	Month 5									
	Month 6									
YR1-IS	Month 1									
	Month 2	No	12.7	73.8	7.83	0.104	79.2	8.15	128.8	1.85
	Month 3									
	Month 4									
	Month 5									
	Month 6									
LHG-IS	Month 1									
	Month 2	No	Too shallow for probe.							
	Month 3									
	Month 4									
	Month 5									
	Month 6									
YR2-IS	Month 1									
	Month 2	No	13.0	73.6	7.74	0.101	78.3	8.11	145.4	2.29

0841

0900

09:22 am

0943

~~1050~~

1050

TDS 71 mg/L

71 mg/L

336

67 TDS mg/L

TDS 66 mg/L

22-013 Pre-construction WQM		Grease/oil/sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)	
	Month 3										
	Month 4										
	Month 5										
	Month 6										
* SSC-IS	Month 1	NO FLOW									
	Month 2	NO FLOW									
	Month 3										
	Month 4										
	Month 5										
	Month 6										
TR-RS	Month 1										
	Month 2	NO	12.0	76.0	8.20	0.020	15.0	7.87	153.0	1.02.	
	Month 3										
	Month 4										
	Month 5										
	Month 6										
YK-IS (D/S)	Month 1										
	Month 2	NO	16.37	10.1	65.9	7.42	0.029	20.5	8.39	157.8	9.1
	Month 3										
	Month 4										
	Month 5										
	Month 6										
NZG-IS	Month 1	5.15pm									
	Month 2	NO	10.2	70.2	7.89	0.050	36	7.69	148.00	3.67.	
	Month 3										
	Month 4										
	Month 5										
	Month 6										
YK-IS	Month 1	5.30									
	Month 2	NO	10.4	69.7	7.8	0.030	21.4	7.65	139.3	9.44	
	Month 3										
	Month 4										

TDS 13 mg/L

TDS - 19 mg/L

TDS - 33 mg/L

TDS - 19

1308

13.3.1

22-013 Pre-construction WQM		Grease/oil/sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)
YK-RS	Month 5									
	Month 6									
	Month 1									
	Month 2	NO	12.7	71.4	7.58	0,031	24.0	7.54	138.9	9.77
	Month 3									
	Month 4									
	Month 5									
	Month 6									

TDS 20 mg/L

Overcast in intermittent rain

Date	Comments
27/4	YK-IS (OK) - Fast flowing, clear, sand bed, ~ <del>25</del> <sup>15</sup> cm depth. Overcast, recent rain, deep channel.
Month 1	N7G-IS - flowing, shallow < 5cm depth, sand over mud. evidence of horse v deer, + Kangaroo like vegetated banks. NO odour, clear.
27/4	YK-IS - flowing, shallow, ~ 5cm deep, mud, evidence of bank erosion, vegetated, no odour, bit clayey.
Month 2	<p>← 28/4 WC-RS - Fast flowing, no sheen, no odour, adjacent to formed sediment control. See photos vegetated banks except for sheer eroded area we walk on</p> <p>← sediment sample WC-IS - vegetated banks, u/s of bridge, rock rip rap &amp; geofab sediment control. fast flowing, clear, no odour. <u>DUPOI</u>.</p> <p>YR1-IS - <del>slow</del> flowing, clear, vegetated banks, rock channel.</p>
Month 3	<p>Ch-IS - ~ 10cm depth, flowing, shallow, clay &amp; rock bed, aquatic veg, vegetated banks, incised channel. No odour or sheen.</p> <p>LH-G-IS - Flow too shallow to use probe. Sampled from same location marsh, lines easily disturbed.</p> <p>YR2-IS - Sampled from rock bar. Deepest channel, fast flowing, clear. Veg banks</p>

Wester - overcast, rainy ~ 3mm forecast

22-013 Pre-construction WQM	Grease/oil/sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)
Month 4	TR-RS — bank edges, flowy, cold, clear, wide channel > 1.2m deep. NO sheen, no odour.								
Month 5	YK-RS.— Flowing, ~ 15cm deep, cloudy compared to other sites, no odour, no sheen, visible root punts and piles of bare rock adjacent to channel. Well-vegetated banks, sand bed or clay.								
Month 6									

# APPENDIX C LABORATORY CERTIFICATES

NGH Environmental

Friday, August 19, 2022

Suite 1/39 Fitzmaurice Strret

Wagga Wagga NSW 2650

Attention: Nicole Isles



NATA Accredited Laboratory  
Number: 9597

Accredited for compliance with  
ISO/IEC 17025 - Testing

## REPLACEMENT LABORATORY ANALYSIS REPORT

This Report Replaces Report Sent on 16/06/2022

Report Number:2204-0099

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For all enquiries related to this report please quote document number: 2204-0099

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0276	WC-RS 28.04.22 8.41am	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0277	WC-IS 28.04.22 9.00am
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NGH Environmental

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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0277	WC-IS 28.04.22 9.00am	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	0.8 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	0.8 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	63 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0278	CG-IS 28.04.22 9.22am
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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0278	CG-IS 28.04.22 9.22am	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	293 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0279	YR1-IS 28.04.22 9.43am
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		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0279	YR1-IS 28.04.22 9.43am	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	50 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0280	LHG-IS 28.04.22 10.10am
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NGH Environmental

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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0280	LHG-IS 28.04.22 10.10am	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	353 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0281	YR2-IS 28.04.22 10.50am
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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0281	YR2-IS 28.04.22 10.50am	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	39 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0282	TR-RS 28.04.22 1.08pm
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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0282	TR-RS 28.04.22 1.08pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	1.1 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	1.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	12 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0283	YK-IS (d/s) 27.04.22 4.37pm
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NGH Environmental

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## REPLACEMENT LABORATORY ANALYSIS REPORT

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		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0283	YK-IS (d/s) 27.04.22 4.37pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	0.15 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	0.2 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	14 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0284	NZG-IS 27.04.22 5.15pm
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		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0284	NZG-IS 27.04.22 5.15pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	52 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	<0.5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0285	YK-IS 27.04.22 5.30pm
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NGH Environmental

Friday, August 19, 2022

Suite 1/39 Fitzmaurice Strret

Wagga Wagga NSW 2650

Attention: Nicole Isles



NATA Accredited Laboratory  
Number: 9597

Accredited for compliance with  
ISO/IEC 17025 - Testing

## REPLACEMENT LABORATORY ANALYSIS REPORT

This Report Replaces Report Sent on 16/06/2022

Report Number:2204-0099

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For all enquiries related to this report please quote document number: 2204-0099

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0285	YK-IS 27.04.22 5.30pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	0.20 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	24 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	7 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0286	YK-RS 28.04.22 1.31pm
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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0286	YK-RS 28.04.22 1.31pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	0.19 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	30 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	6 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0287	DUP01 28.04.22
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## REPLACEMENT LABORATORY ANALYSIS REPORT

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For all enquiries related to this report please quote document number: 2204-0099

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-April-2022

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-April-2022

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0287	DUP01 28.04.22	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

22Apr-0288	Water Blank 27.04.22	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic	<0.0003 mg/L	Analysis by Melbourne (acc no: 992)	
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.002
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.002
		Copper (dissolved)	<0.0002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01

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## REPLACEMENT LABORATORY ANALYSIS REPORT

This Report Replaces Report Sent on 16/06/2022

Report Number:2204-0099

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For all enquiries related to this report please quote document number: 2204-0099

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		29-April-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	Client	29-April-2022			
<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
22Apr-0288	Water Blank 27.04.22	Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Manganese (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)	
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.01
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

Note:

\* NATA Accreditation does not cover the performance of this service.

NGH Environmental  
Suite 1/39 Fitzmaurice Strret  
Wagga Wagga NSW 2650  
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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<b>Facility:</b>	<b>Order #</b>	<b>Date Analysis Commenced</b>			
		29-April-2022			
<b>Sample Type</b>	<b>Collected By</b>	<b>Date Received</b>			
Water	Client	29-April-2022			
<b>EAL ID</b>	<b>Client ID.</b>	<b>Test</b>	<b>Result (units)</b>	<b>Method Reference</b>	<b>Limit of Reporting</b>
	Date/Time sample taken				

Signed ..... Michael Glazier, Laboratory Manager.

*All samples analysed as received.  
All soil results are reported on a dry basis.  
The EAL takes no responsibility for the end use of results within this report.  
This report shall not be reproduced except in full.  
This report replaces any previously issued report*

# APPENDIX D RPD TABLE





# APPENDIX E CALIBRATION CERTIFICATES

Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
 Serial No. **20F162071**



Air-Met Scientific Pty Ltd  
 1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH/ORP	✓	
	2. Turbidity	✓	
	3. Conductivity	✓	
	4. D.O	✓	
	5. Temp	✓	
	6. Depth	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

**Bump Test Certificate**

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. COND		2.76mS		377099	2.765mS
2. Temp		20.4°C		MultiTherm	19.5°C
3. pH 4		pH 4.00		380327	pH 3.96
4. pH 7		pH 7.00		377399	pH 6.97
6. ORP mV		239.1mV		380834/378285	239.2mV
7. DO		0.00ppm		371864	0.02ppm
8. Turbidity		50NTU		381916	51.1 NTU

Calibrated by: \_\_\_\_\_ **Gary Needs**

Calibration date: **25/05/2022**

Next calibration due: **24/06/2022**

