



**NGH**

**UGL**

# **Pre-construction Water Quality Monitoring Report**

## **Event 3 2022**

**October 2022**

**Project Number: 22-013**



## Document verification

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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) will 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.

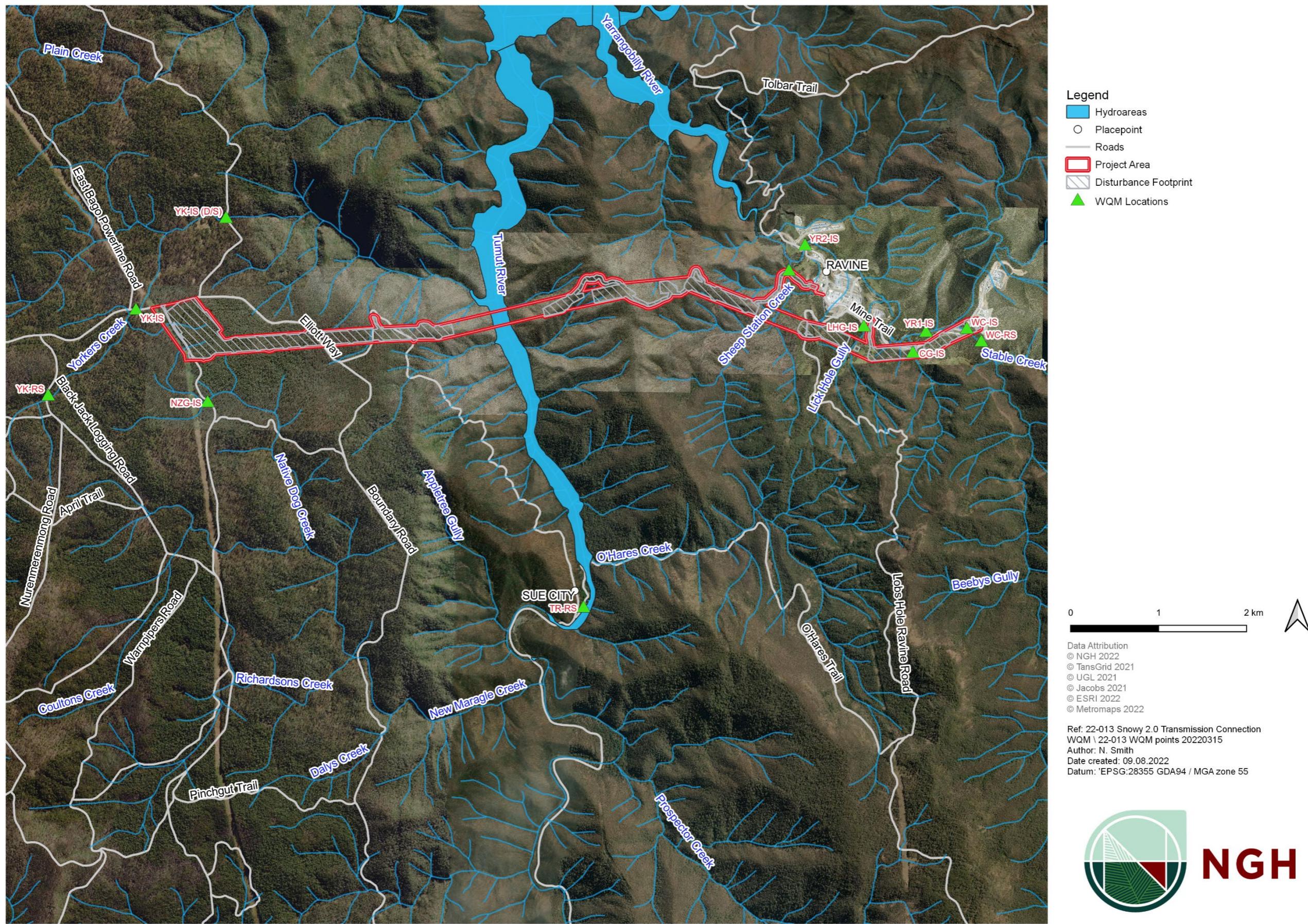


Figure 2-1 WQM locations

## 3. Monitoring event observations and results

Water quality results for each site and 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 3-1 to Figure 3-9. Field data and observations are provided in Appendix B.

### 3.1. Event 3

NGH conducted the first and second rounds of sampling in March (Event 1) and April (Event 2) 2022. Reports for each event were prepared following receipt of the laboratory results (NGH 2022a and 2022b). The results of Event 1 and Event 2 have been compared in this report to the results of Event 3.

NGH Environmental Scientist, Nicola Smith, conducted monitoring event UGL representative/s on 30 May 2022 (western sites in Bago State Forest) and 10 June 2022 (Lobs Hole). The weather was cold, overcast with snowfall. Data from the Tumbarumba weather station (Station ID 072043) indicates that the day was calm with a low of 0.5°C and a high of 8.0°C. Generally, water flow was observed to be turbid with no hydrocarbon sheen, and no odours were present. The banks of each channel were well vegetated with the vegetation matrix weedier in some locations. 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. Flow was observed to have increased in all channels as a result of the wet weather.

The sites at Lobs Hole and Talbingo Reservoir could not be sampled on the 31 May 2022 or soon thereafter. This was due to the snowfall and the wet weather causing ongoing road closures of the Ravine Road from the Gatehouse down to Lobs Hole.

Lobs Hole sites were sampled on 10 June 2022. The day was cold, overcast with snowfall on the ranges. Data from the Cabramurra SMHEA automatic weather station (Station ID 072161) indicates that winds increased in the afternoon to 28km/hr WSW. Temperatures on the day remained low with a minimum of -1.2°C and a high of 1.1°C. Precipitation received was recorded at 13mm.

A sample was collected from Sheep Station Creek (SSC-IS), which was flowing for the first time during the baseline data collection period. Due to the time constraints at Lobs Hole with convoy-out times, safety, and weather constraints beyond the Project boundary on the 10 June 2022, Lick Hole Gully (LHG-IS), Yarrangobilly Creek samples (YR1-IS and YR2-IS) and Talbingo Reservoir (TR-RS) were not sampled.

The flow in all channels was observed to have increased in volume and turbidity (Figure 3-1 to Figure 3-3).

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Figure 3-1 Wallaces Creek reference site (WC-RS)



Figure 3-2 Cave Gully (CG-IS)



Figure 3-3 Sheep Station Creek (SSC-IS)

### 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 3.4 – 10.4 degrees Celsius.

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

Site identification	Analyte	DGV	Result	Comment
CG-IS	Total Dissolved Solids (TDS)	-	270mg/L	Much higher than other samples. Bed material clay. Lower value compared to Event 1 and Event 2 (317mg/L and 293mg/L respectively)
YK-IS (D/S)	Total Phosphorus (TP) mg/L	0.02	0.17mg/L	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream. Sample taken upstream of culvert.

The following time series, Figure 3-4 to Figure 3-12, display physico-chemical water quality through time for monitoring event 1 (March), event 2 (April) and event 3 (May/June). 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 applied.

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

Temperature has decreased at all sites with YK-RS having the lowest temperature recorded for Event 3 of 3.4°C (Figure 3-4).

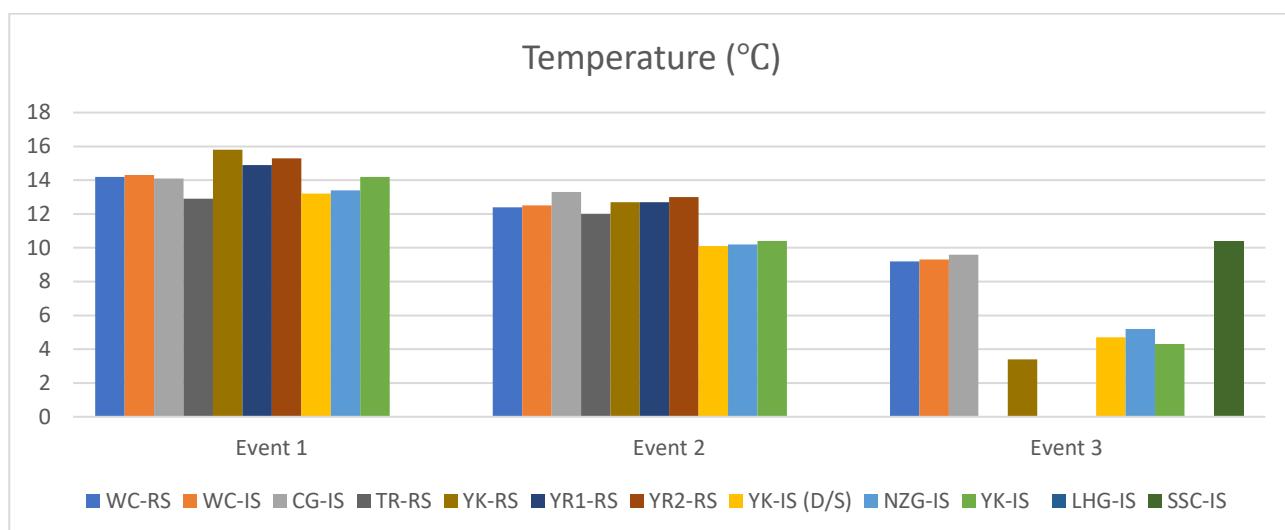


Figure 3-4 Temperature

The majority of measurements for DO (%) across all sites is below the DGV minimum value. The DO (%) for Event 3 is less than for Event 2 at CG-IS, WC-IS and WC-RS, refer to Figure 3-5. For example, the DO (%) at WC-RS is 73.5% for Event 2 and 61.3% for Event 3. The remaining values for the DO (%) for Event 3 are

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above those for Event 2. For example, the DO (%) at YK-IS (D/S) was 65.9% for Event 2 and 84.4% for Event 3.

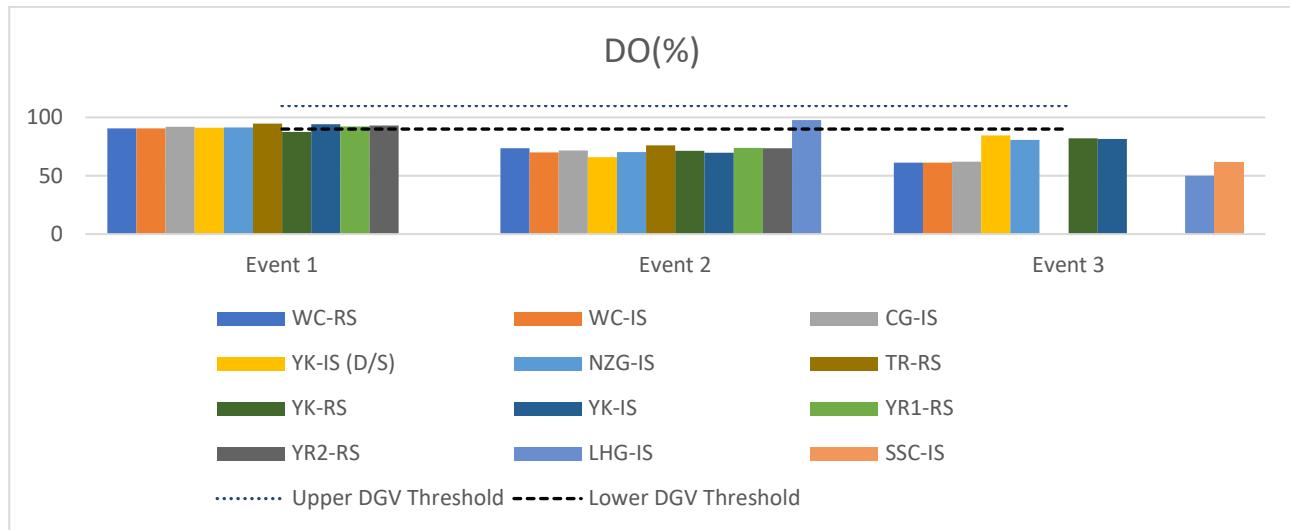


Figure 3-5 Dissolved oxygen (DO%)

The DO (ppm) for CG-IS, WC-IS and WC-RS have decreased from Event 2 to Event 3, refer to Figure 3-6. The DO (ppm) for NZG-IS, YK-IS, YK-IS (D/S) and YK-RS are higher than their DO (ppm) values during Event 1.

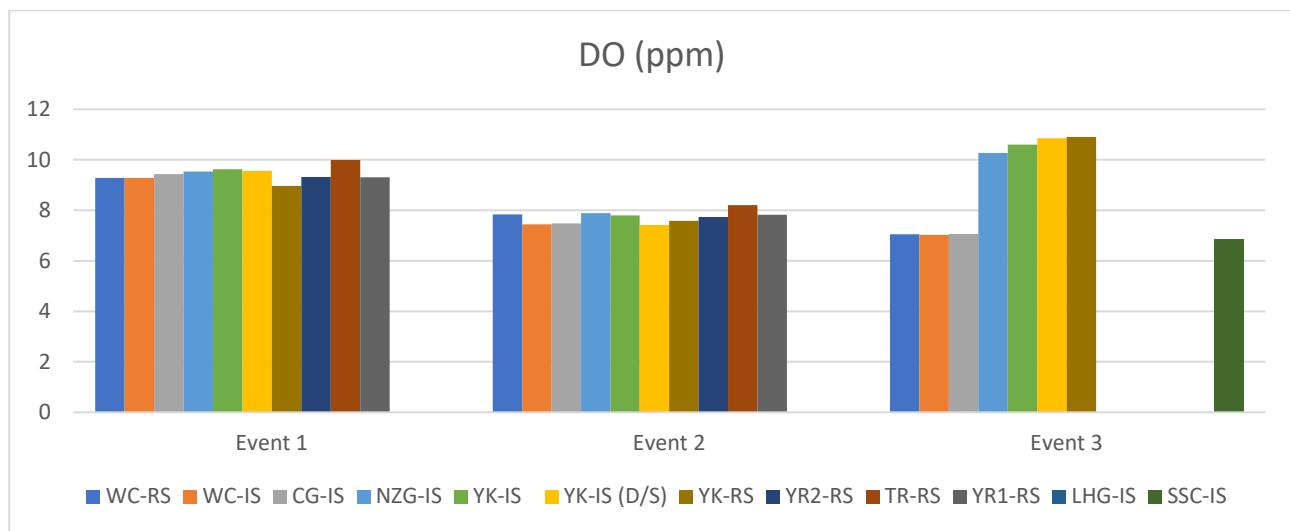
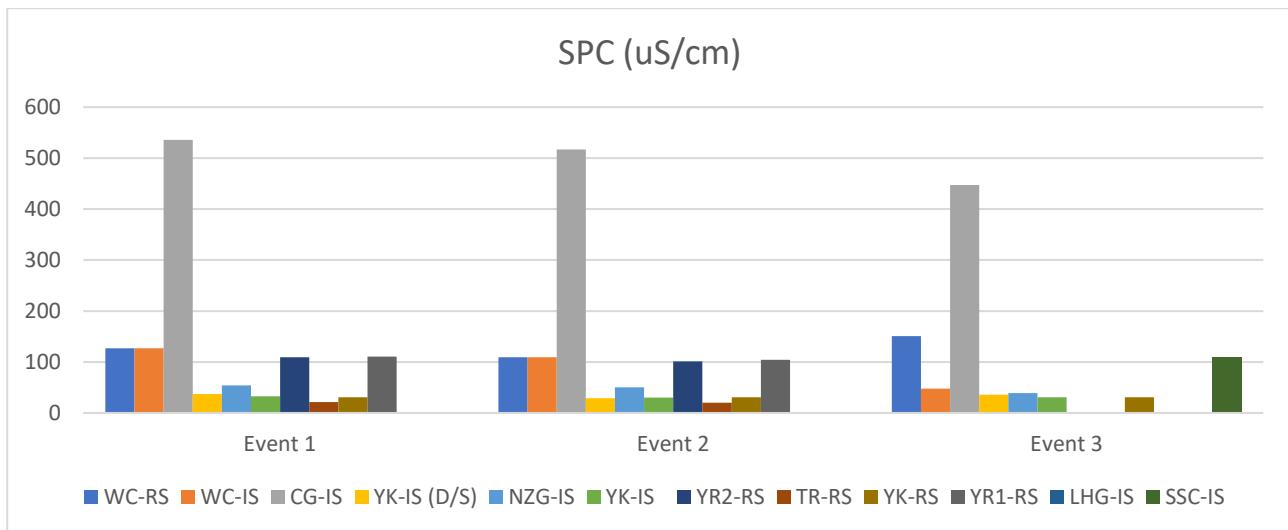
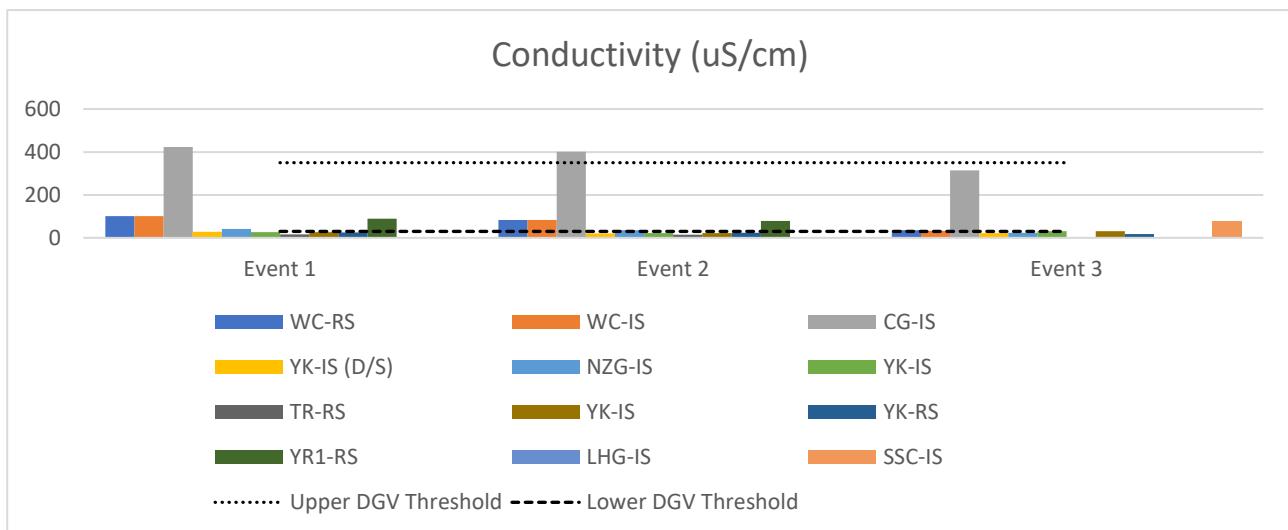


Figure 3-6 Dissolved Oxygen (ppm)

Specific conductance at most sites for Event 3 have decreased compared to Event 1 and Event 2. The pattern of specific conductance between sites remains similar with CG-IS having the highest specific conductance, recorded as 447 $\mu$ S/cm for Event 3. This is compared to 536 $\mu$ S/cm and 517 $\mu$ S/cm at CG-IS for Event 1 and Event 2 respectively, refer to Figure 3-7. This is considered likely to be a result of the channel bed material consisting of clay and not gravel.

Figure 3-7 Specific Conductance (SPC) ( $\mu\text{S}/\text{cm}$ )

Conductivity for Event 3, compared to Event 1 and Event 2, has decreased. CG-IS has the highest conductivity measurement of  $315\mu\text{S}/\text{cm}$  for Event 3, refer to Figure 3-8. This is considered likely a result of the channel bed material consisting of sandy clay and not gravel. The pattern between sites is mostly reflective of the pattern for specific conductance, excepting WC-RS.

Figure 3-8 Conductivity ( $\mu\text{S}/\text{cm}$ )

Turbidity values across most sites for Event 3 are above the DGV range of 2 – 25 NTU. The lowest value for Event 3 was 20.28 NTU and taken at YK-RS, which is within the DGV range. The highest value was recorded at CG-IS with a reading of 65.1 NTU. These values are compared to values of 0.07 NTU TR-RS, 0.37 NTU WC-RS and 0.32 at WC-IS in Event 1, and 10 NTU YK-IS, 9.77 NTU YK-RS and 1.49 NTU WC-RS for Event 2, refer to Figure 3-9.

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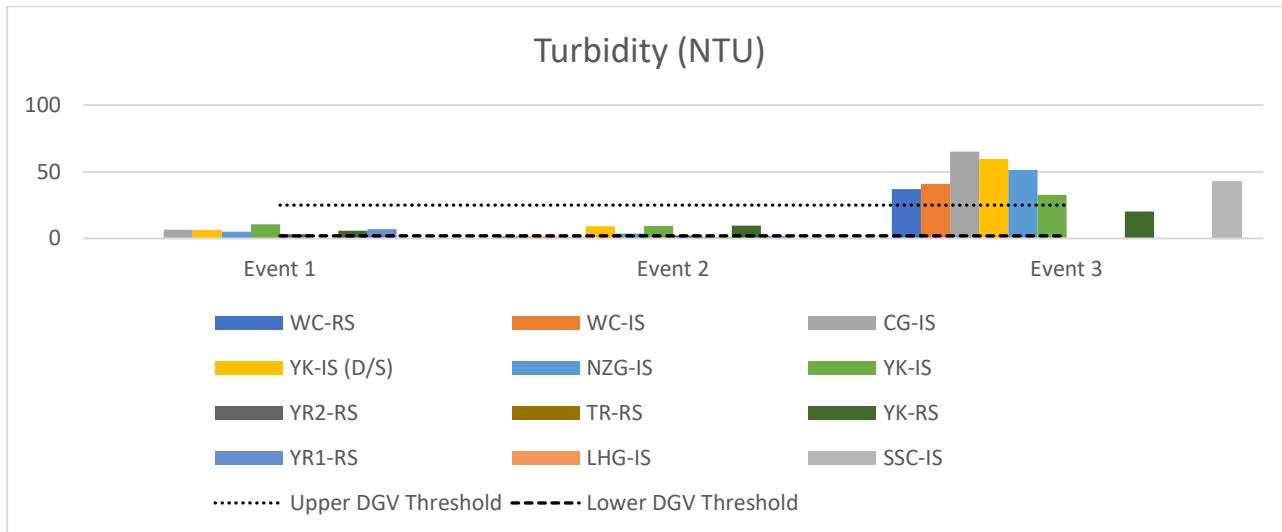


Figure 3-9 Turbidity (NTU)

The pattern of total suspended solids across all sites reflects the data collected for turbidity. For Event 3, the highest value was recorded at CG-IS of 104mg/L and the lowest value at YK-RS and YK-IS of 3mg/L, refer to Figure 3-10.

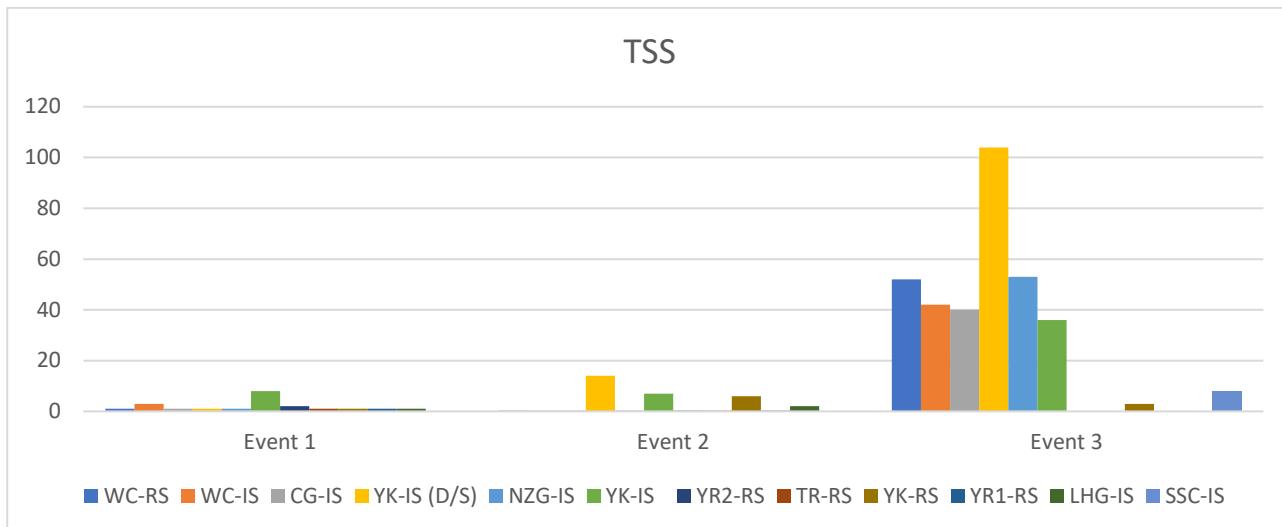


Figure 3-10 Total Suspended Solids

The pH for all sites has predominantly remained within the DGV of 6.5 – 8 pH units, refer to Figure 3-11.

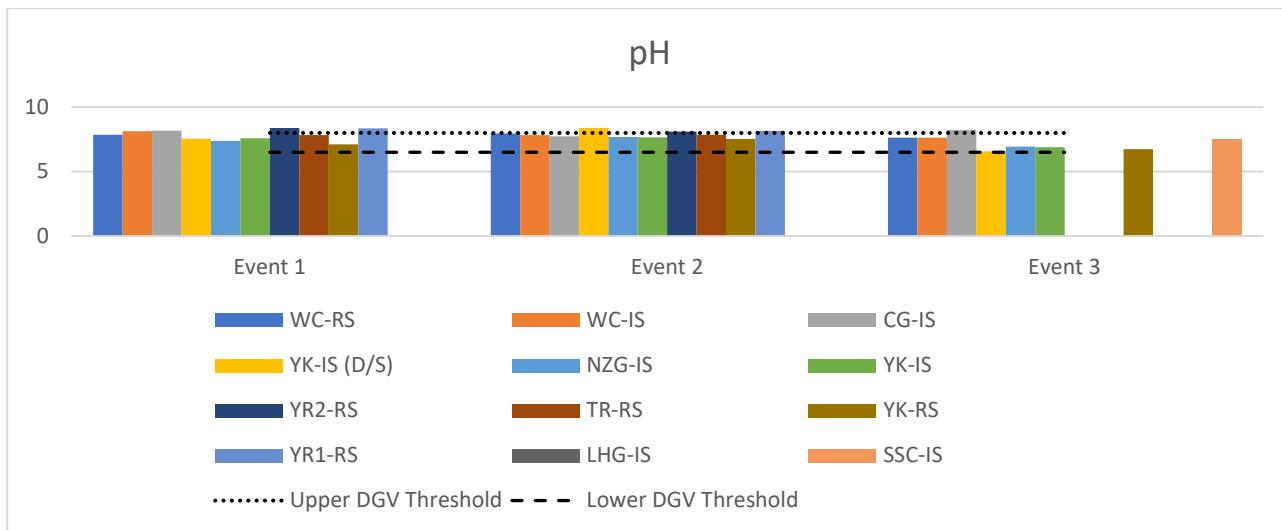


Figure 3-11 Potential of Hydrogen (pH)

The values for the oxygen redox potential during Event 3 have decreased slightly from Event 2 except for CG-IS and WC-IS, which have remained relatively stable. The range of ORP (mV) values for Event 3 are 98.2mV at YK-IS (D/S) to 159.2mV at CG-IS, refer to Figure 3-12.

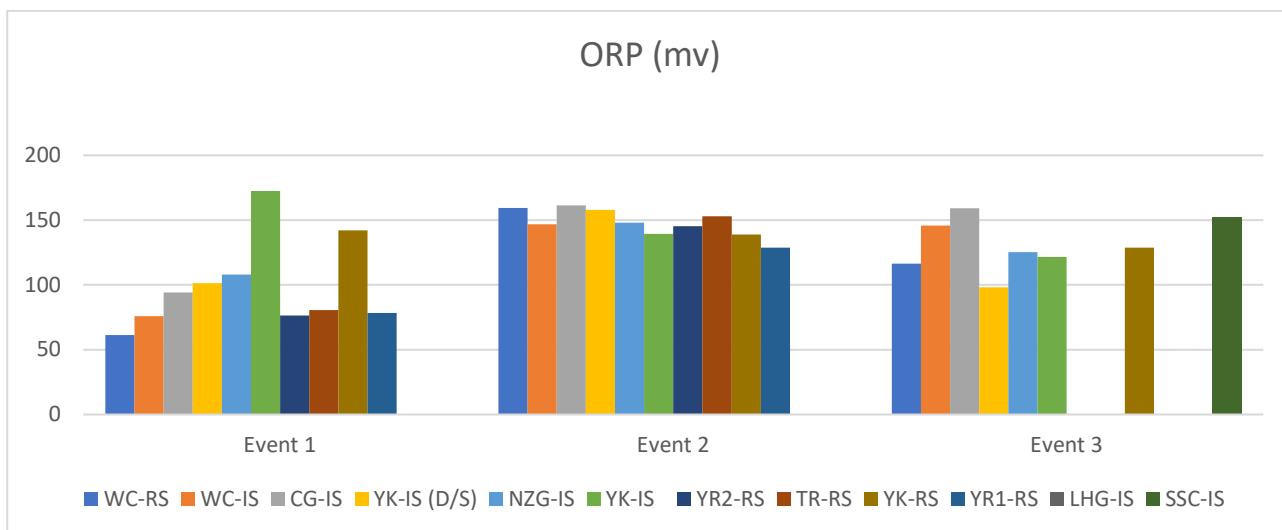


Figure 3-12 Oxygen Redox Potential (ORP)

### 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 WQM site YK-IS on 30 May 2022. DUP01 was analysed for metals and metalloids. The duplicate sample has been compared against the YK-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%. A field duplicate sample (DUP01) was taken on 10 June 2022 from the WQM site WC-RS. The duplicate sample has been compared against the YK-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%.
- A water blank was supplied by the laboratory. The water blank sample was analysed for metals and metalloids. There were no exceedances of the sample results above the LORs.

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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 demonstrate a marked decrease in water temperature, especially for the channels at higher altitude (Bago State Forest), with the seasonal change in temperatures from autumn to winter. Most results for Event 3 show a similar pattern to Events 1 and 2 with changes likely attributed to the change in temperature. As a result of recent snow and rainfall, the turbidity and total suspended solids in all channels were reported to be greater than the results for Event 1 and Event 2.

Laboratory results are mostly consistent for each site between Event 1, Event 2 and Event 3 with the majority of analytes reported below the Limit of Reporting. Where there were exceedances for Event 1 and Event 2 at some sites, these are not reflected for Event 3. For example, the only exceedance in the laboratory results beyond total suspended solids was for total phosphorus at YK-IS (D/S) with a result of 0.17 mg/L, which is above the DGV of 0.02 mg/L. All results and statistics are provided in Appendix A.

## 5. References

- 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 1 April 2022*.
- NGH Pty Ltd. 2022b. *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

*Values coloured blue and italicised are half the limit of reporting for statistical use (LOR/2)*

## APPENDIX B OBSERVATIONS AND FIELD DATA

28/6/22 - sunny, slight breeze

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	No	7.3	-	12.78	-	35.3	5.8	128.4	-
WC-RS	Comment	Fast flowing, clear, no obnoxious odour or taste.								
WC-IS	Month	No	7.4	-	12.55	-	35.0	5.73	115.9	-
WC-IS	Comment	Fast flowing, as above & slightly turbid								
CG-IS	Month	No	8.6	-	12.06	-	349.0	6.37	61.1	-
CG-IS	Comment	Fast flowing, clear, no obnoxious odour or taste. Aquatic plants moss, etc.								
YR1-IS	Month	No	6.5	-	13.05	-	36.9	6.84	56.3	-
YR1-IS	Comment	Slightly more turbid visually than usual fast flow.								

WB  
Metals  
cyanide  
TN

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)
LHG-IS	Month	No	9.9	—	10.71	366.9 → 366.9	366.9	6.93	76.3	—
	Comment	<p>No odour, more water than usual able to take a sample ready clear.</p>								
YR2-IS	Month	No	6.5	—	13.18	38/4 → 38.4	38.4	7.24	645	—
	Comment	<p>Fast flowing, large rapids, no odour, not clear.</p>								
SSC-IS	Month	No	8.6	—	12.09	96.9 → 96.9	96.9	7.19	53.1	—
	Comment	<p>Flowing. Water level half of what it was in event 3. Milky-ness to water observed No odour 14.78</p>								
TR-RS	Month	No	6.1	—	10.79	10.79	10.79	7.03	67.6	—
	Comment	<p>Clear, cold. No odour.</p>								
YK-IS (D/S)	Month	No	3.5	—	96.4	12.79	30.8	18.2	6.87	640
	Comment	<p>Not as clear as previous event 1 + 2 fast flowing, no odour</p>								

(mg/L) check after readings have been mS/cm. - m

To provide  
details  
and is  
prove  
also need  
to check  
sample  
data called  
B/C sample

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	NO	4.7	95.4	12.28	39.8	24.4	6.67	546	-
NZG-IS	Comment	Clear, sandy bed erosion on banks - see, horses No odour, debris from events 1 + 2.								
	Month	NO	4.2	93.8	12.23	27.6	16.16	6.70	48.1	-
YK-IS	Comment	Milkyness to flow No odour. Erosion on banks - horses - evidence = hoof marks + poo.								
	Month	NO	3.9	95.3	12.53	26.9	16.1	6.58	44.2	-
YK-RS	Comment	Evidence of horses Clear, fast flowing, debris from events 1 + 2 No g odour.								

Add Metromaps to QGIS.

Now have project area.

determine which pts might need to be

removed into impact zones.

## APPENDIX C LABORATORY CERTIFICATES

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**Attention: Nicole Isles**

Friday, August 19, 2022


**NATA Accredited Laboratory  
Number: 9597**

Accredited for compliance with  
ISO/IEC 17025 - Testing

## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 09/07/2022**

**Report Number:2205-0097**
**Page 1 of 7**
*For all enquiries related to this report please quote document number: 2205-0097*

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		31-May-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	N. Smith	31-May-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22May-0311	YK-DS 30.05.22 2.31pm	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)	<0.01 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	0.17 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	44 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	104 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.010 mg/L	APHA 3030 B/3120 B	0.002
22May-0312	YK-IS 30.05.22 2.31pm				

**NGH Environmental**  
**Suite 1/39 Fitzmaurice Street**  
**Wagga Wagga NSW 2650**  
**Attention: Nicole Isles**

Friday, August 19, 2022


**NATA Accredited Laboratory  
Number: 9597**

Accredited for compliance with  
ISO/IEC 17025 - Testing

## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 09/07/2022**

**Report Number:2205-0097**
**Page 2 of 7**
*For all enquiries related to this report please quote document number: 2205-0097*

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		31-May-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	N. Smith	31-May-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22May-0312	YK-IS 30.05.22 2.31pm	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)	<0.01 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	0.08 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	46 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	36 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
22May-0313	YK-RS 30.05.22 2.31pm				

**NGH Environmental**  
**Suite 1/39 Fitzmaurice Street**  
**Wagga Wagga NSW 2650**  
**Attention: Nicole Isles**

Friday, August 19, 2022


**NATA Accredited Laboratory  
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## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 09/07/2022**

**Report Number:2205-0097**

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*For all enquiries related to this report please quote document number: 2205-0097*

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		31-May-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	N. Smith	31-May-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22May-0313	YK-RS 30.05.22 2.31pm	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)	<0.01 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	0.05 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	40 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	3 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.010 mg/L	APHA 3030 B/3120 B	0.002
22May-0314	NZG-IS 30.05.22 2.31pm				

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## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 09/07/2022**

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		31-May-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	N. Smith	31-May-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22May-0314	NZG-IS 30.05.22 2.31pm	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)	<0.01 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	0.12 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B	0.002
		Total Dissolved Solids	48 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	53 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
22May-0315	DUP01 30.05.22 2.31pm				

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## **REPLACEMENT LABORATORY ANALYSIS REPORT**

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		31-May-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	N. Smith	31-May-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22May-0315	DUP01 30.05.22 2.31pm	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
		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
22May-0316	Water Blank 30.05.22 2.31pm	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)	<0.01 mg/L	APHA 3030 B/3120 B	0.01

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## REPLACEMENT LABORATORY ANALYSIS REPORT

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>		
		31-May-2022		
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>		
Water	N. Smith	31-May-2022		
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>
		Date/Time sample taken		<u>Limit of Reporting</u>
22May-0316	Water Blank 30.05.22 2.31pm	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	17 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

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

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## **REPLACEMENT LABORATORY ANALYSIS REPORT**

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<b><u>Facility:</u></b>	<b><u>Order #</u></b>	<b><u>Date Analysis Commenced</u></b>			
Water	N. Smith	31-May-2022			
<b><u>EAL ID</u></b>	<b><u>Client ID.</u></b>	<b><u>Test</u></b>	<b><u>Result (units)</u></b>	<b><u>Method Reference</u></b>	<b><u>Limit of Reporting</u></b>
	Date/Time sample taken				



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

<i>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</i>
---

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## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 12/07/2022**

**Report Number: 2206-0046**
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*For all enquiries related to this report please quote document number: 2206-0046*

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		14-June-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	Client	14-June-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22Jun-0103	WC-RS 10.06.22	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
		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	0.08 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	52 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
22Jun-0104	WC-IS 10.06.22				

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## REPLACEMENT LABORATORY ANALYSIS REPORT

### This Report Replaces Report Sent on 12/07/2022

**Report Number: 2206-0046**
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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>	
		14-June-2022	
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>	
Water	Client	14-June-2022	
<u>EAL ID</u>	<u>Client ID.</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
	Date/Time sample taken		
22Jun-0104	WC-IS 10.06.22		
	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
	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	0.02 mg/L	LTM-W-030 0.01
	Silver (dissolved)	<0.00002 mg/L	* APHA 3030 E/3120 B 0.002
	Total Dissolved Solids	41 mg/L	LTM-W-035 2
	Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034 2
	Total Suspended Solids	42 mg/L	APHA 2540 D 0.2
	Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B 0.002
22Jun-0105	DUP01 10.06.22		

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## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 12/07/2022**

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		14-June-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	Client	14-June-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22Jun-0105	DUP01 10.06.22	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
22Jun-0106	CG-IS 10.06.22	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**

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		14-June-2022			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	Client	14-June-2022			
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
		Date/Time sample taken			
22Jun-0106	CG-IS 10.06.22	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
		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	270 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	2
		Total Suspended Solids	40 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
22Jun-0107	SSC-IS 10.06.22	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

**NGH Environmental**  
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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>	
		14-June-2022	
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>	
Water	Client	14-June-2022	
<u>EAL ID</u>	<u>Client ID.</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
	Date/Time sample taken		
22Jun-0107	SSC-IS 10.06.22		
	<b>Lead (dissolved)</b>	<0.001 mg/L	APHA 3030 B/3120 B 0.01
	<b>Manganese (dissolved)</b>	<0.001 mg/L	APHA 3030 B/3120 B 0.001
	<b>Mercury</b>	<0.00003 mg/L	Analysis by ALS Melbourne (acc no: 992)
	<b>Nickel (dissolved)</b>	<0.001 mg/L	APHA 3030 B/3120 B 0.01
	<b>Nitrogen, total</b>	<0.2 mg/L	* APHA 4500-Norg B + 4110 B 2
	<b>Nitrate/Nitrite as N</b>	<0.1 mg/L	LTM-W-014 0.1
	<b>Phosphorus, Total</b>	<0.01 mg/L	LTM-W-030 0.01
	<b>Silver (dissolved)</b>	<0.00002 mg/L	* APHA 3030 E/3120 B 0.002
	<b>Total Dissolved Solids</b>	84 mg/L	LTM-W-035 2
	<b>Total Kjeldahl Nitrogen</b>	<0.2 mg/L	LTM-W-034 2
	<b>Total Suspended Solids</b>	8 mg/L	APHA 2540 D 0.2
	<b>Zinc (dissolved)</b>	<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 Street**  
**Wagga Wagga NSW 2650**  
**Attention: Nicole Isles**

Friday, August 19, 2022



**NATA Accredited Laboratory  
Number: 9597**

Accredited for compliance with  
ISO/IEC 17025 - Testing

## **REPLACEMENT LABORATORY ANALYSIS REPORT**

### **This Report Replaces Report Sent on 12/07/2022**

**Report Number:2206-0046**

**Page 6 of 6**

*For all enquiries related to this report please quote document number: 2206-0046*

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>	
Water	Client	14-June-2022	
<u>EAL ID</u>	<u>Client ID.</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
	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

Instrument  
Serial No.**YSI Pro DSS**  
**20F162071**Air-Met Scientific Pty Ltd  
1300 137 067

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

Instrument  
Serial No.**YSI Pro DSS**  
**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	2.762mS
2. Temp		19.0°C		MultiTherm	18.7°C
3. pH 4		pH 4.00		380327	pH 3.99
4. pH 7		pH 7.00		377399	pH 7.1
6. ORP mV		242.2mV		380834/378285	241.9mV
7. DO		0.00ppm		371864	0.00ppm
8. Turbidity		50NTU		381916	51.0 NTU

Calibrated by:

**Evan Weller**

Calibration date:

**2/06/2022**

Next calibration due:

**2/07/2022**