

Pre-construction Water Quality Monitoring Report

Event 19 2023

Project Number: 22-013



Document verification

Project Title: Event 19 2023

Project Number: 22-013

Project File Name: 22-013 Water Quality Monitoring Field and Laboratory Report Event 19 Final V1

Revision	Date	Prepared by	Reviewed by	Approved by
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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 objective 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.

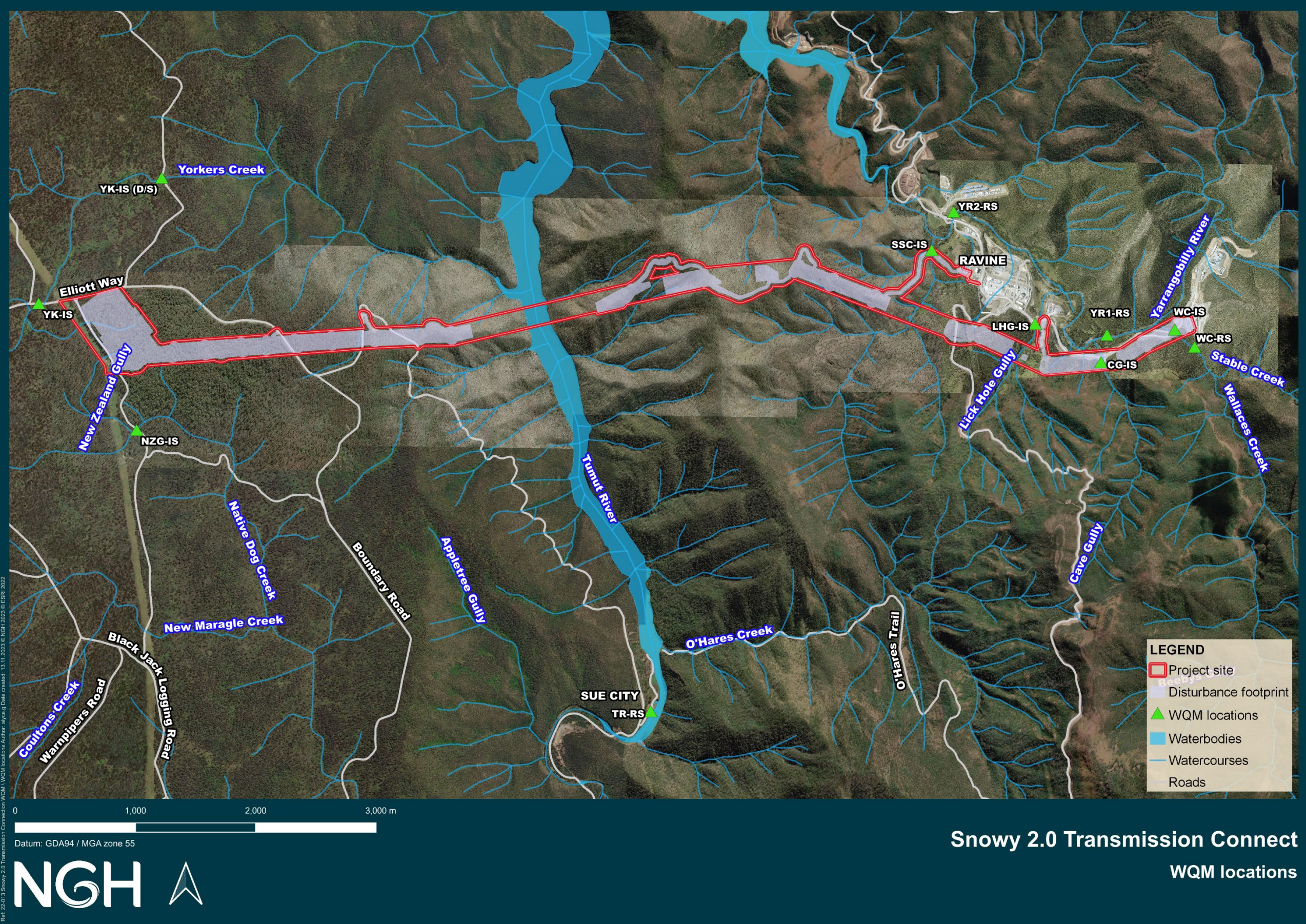


Figure 2-1 WQM locations

3. Monitoring event observations and results

Images for Wallaces Creek, Yarrangobilly River and New Zealand Gully are provided as Figure 3-1 to Figure 3-3. 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 3-4 to Figure 3-33. Field data and observations are provided in Appendix B.

3.1. Event 19

NGH has conducted 19 monthly sampling events since March 2022 (Event 1). Reports for each event were prepared following receipt of the laboratory results (NGH 2022a – 2023i). The results of Event 1 through to Event 18 have been compared in this report to the results of Event 19.

NGH Environmental Scientists, Nicola Smith and Martin Wyburn, conducted the Event 19 monitoring with a UGL representative on 27 and 28 September 2023. The weather was overcast and slightly windy on the 27 September, and warm and sunny on the 28 September. Data from the Cabramurra SMHEA automatic weather station on 27 September 2023 (Station ID 072161) indicates that morning winds were from the west with speeds of 20 km/hr. During the afternoon, winds were from the west with speeds of 20 km/hr. Temperatures on the day included a low of 8.1°C and a high of 13.7°C. Data from the Tumbarumba weather station for 28 September 2023 (Station ID 072043) indicates that the weather was calm with temperatures ranging from a low of 3.5°C to a high of 24.0°C.

Clear flows were observed at most locations. However, cloudy flows were noted at LHG-IS, YK-IS (D/S), YK-IS and YK-RS. No hydrocarbon sheen or odours were noted. 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, the Yorkers Creek impact site and the Yorkers Creek reference site. Water was observed to have moderate to fast flows. Water levels within Talbingo Reservoir have replenished since the last sampling event, however the water level at the Sheep Station Creek site had decreased.



Figure 3-1 Wallaces Creek (WC-RS)

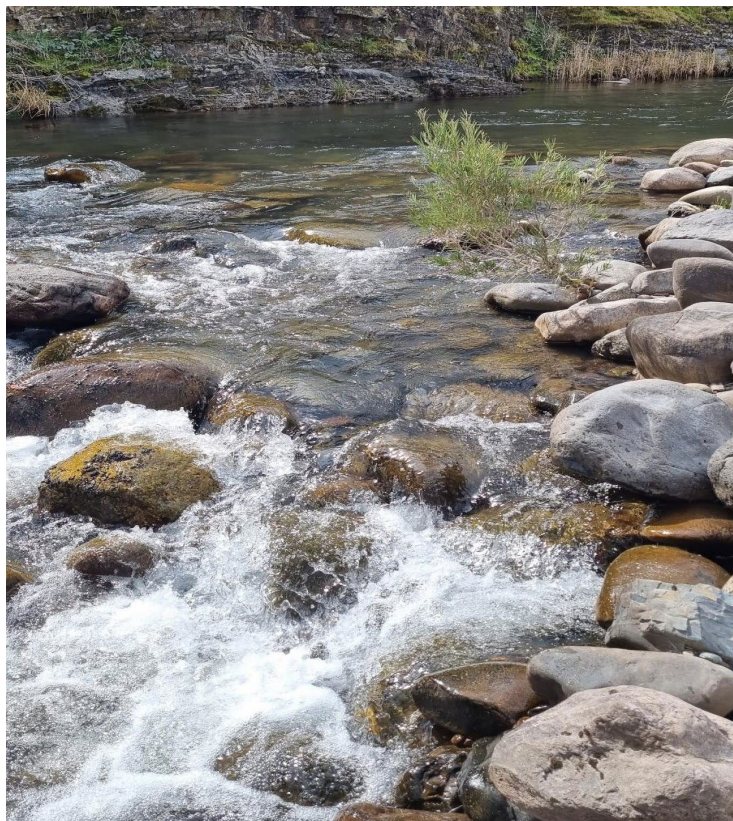


Figure 3-2 Yarrangobilly River (YR2-RS)



Figure 3-3 New Zealand Gully (NZG-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 laboratory result was returned for a physical or chemical stressor above the DGV are provided in Table 3-1.

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

Site identification	Analyte	DGV	Result	Comment
WC-RS	Aluminium mg/L	0.027	0.04	The results for Aluminium have slightly decreased, when compared with results for Event 18.
	Chromium mg/L	0.0001	0.004	Results for Chromium are elevated, which is atypical of this sampling location.
	Total Phosphorus mg/L	0.02	0.04	The results for Total Phosphorus have increased, when compared with results for Event 18.
CG-IS	Aluminium	0.027	0.06	The results for Aluminium have remained

Site identification	Analyte	DGV	Result	Comment
	mg/L			consistent with results for Event 18.
	Chromium mg/L	0.00001	0.003	The results for Chromium are elevated, which is atypical for this location.
	Zinc mg/L	0.0024	0.004	Results for Zinc are consistent with prior sampling events.
LHG-IS	Aluminium mg/L	0.027	0.07	The results for Aluminium have decreased compared with results for Event 18.
	Lead mg/L	0.001	0.005	Results for Lead and Zinc have remained consistent with the results from Event 18.
	Zinc mg/L	0.0024	0.004	Results for Chromium have increased compared to results from Event 18..
	Chromium mg/L	0.00001	0.003	The results for Copper have remained consistent with the results from Event 18.
	Copper mg/L	0.001	0.002	
WC-IS	Aluminium mg/L	0.027	0.04	Results for Aluminium have decreased when compared with Event 18.
	Chromium mg/L	0.00001	0.003	Results for Chromium are elevated, when compared to Event 18.
YK-IS (D/S)	Aluminium mg/L	0.027	0.34	Results for Aluminium are consistent with Event 18.
	Chromium mg/L	0.00001	0.007	Results for Chromium have increased, when compared to Event 18. Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream. Sample taken upstream of culvert.
NZG-IS	Aluminium mg/L	0.027	0.19	Results for Aluminium and Lead have remained consistent, when compared with Event 18.
	Lead mg/L	0.001	0.004	The results for Total Phosphorus have increased, when compared to Event 18.
	Total Phosphorus mg/L	0.02	0.04	Located within Bago State Forest. Sample taken upstream of timber supported unsealed track bridge. Banks heavily vegetated, shallow channel.

Site identification	Analyte	DGV	Result	Comment
YK-RS	Aluminium mg/L	0.027	0.69	Results for Aluminium have decreased slightly, when compared to Event 18.
	Copper mg/L	0.001	0.002	Copper, Lead and Total Phosphorous are elevated, compared with previous sampling events.
	Lead mg/L	0.001	0.004	Results for Zinc have decreased, when compared to Event 18.
	Total Phosphorus mg/L	0.02	0.08	Results for Iron have remained consistent, when compared to Event 18.
	Zinc mg/L	0.002	0.003	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream.
	Iron mg/L	0.3	0.53	Sample taken downstream of culvert under unsealed track. Flow through culvert is restricted upstream causing a wetland environment.
YK-IS	Aluminium mg/L	0.027	0.49	Results for Aluminium have remained consistent when compared with Event 18.
	Iron mg/L	0.3	0.32	Iron has slightly increased when compared to Event 18 (0.31 to 0.32).
	Copper mg/L	0.001	0.002	Results for Copper and Total Phosphorus are both elevated, when compared to Event 18, which is atypical of this site.
	Total Phosphorus mg/L	0.02	0.11	
YR1-RS	Aluminium mg/L	0.027	0.06	Results for Aluminium have decreased, when compared with Event 18.
	Chromium mg/L	0.00001	0.002	Results for Chromium are elevated, which is atypical of this location.
	Total Phosphorus mg/L	0.02	0.38	The results for Total Phosphorus are elevated, when compared to Event 18.
YR2-RS	Aluminium mg/L	0.027	0.06	Result for Aluminium have decreased, when compared to Event 18.
SSC-IS	Aluminium mg/L	0.027	0.25	Result for Aluminium have decreased since Event 18.
	Chromium mg/L	0.00001	0.002	Results for Chromium and Copper are elevated, which is atypical of this location. Results for Total Nitrogen and Total Phosphorus

Site identification	Analyte	DGV	Result	Comment
	Copper mg/L	0.001	0.002	have increased significantly, when compared to Event 18.
	Total Nitrogen mg/L	0.25	5	
	Total Phosphorus mg/L	0.02	0.04	
TR-RS	Lead mg/L	0.001	0.02	Result for Lead have increased since Event 18, which is atypical of this site.
	Total Phosphorous mg/L	0.02	0.003	Results for Total Phosphorous have increased, when compared to Event 18.

Dissolved Oxygen (DO%) at LHG-IS was below the 90 - 110 assigned DGV (refer to Figure 3-6).

Water temperatures ranged from 9.7 degrees Celsius at NZG-IS to 16.2 degrees Celsius at TR-RS, refer to Figure 3-4 and Figure 3-5.

Many of the results are recorded as below (<) the limit of detection. To enable calculation of the statistics, the *Limit of Detection Divided by Two (LOD/2) Method* (Cohen and Ryan 1989) has been applied. This data is provided in Appendix A.

The following figures, Figure 3-4 to Figure 3-33 display physico-chemical water quality through time for monitoring events 1 (March 2022) to 19 (September 2023). Where a DGV is available, these values are shown on the graph and have been included for dissolved oxygen (%), conductivity, pH and turbidity.

Although the Talbingo Reservoir is the ultimate catchment for both the Yarrangobilly River and tributaries, and Yorkers Creek and tributaries, the data has been divided into the Talbingo Reservoir catchment, which include the Talbingo Reservoir reference site sampling location and the Yarrangobilly River and its tributaries. These are all located in the Kosciuszko National Park. The Yorkers Creek catchment includes the three sampling locations along Yorkers Creek and New Zealand Gully, which are all located in the Bago State Forest. The confluence of Yorkers Creek with Tumut River (Talbingo Reservoir) is downstream of sampling location TR-RS but upstream of the confluence of the Yarrangobilly River and Tumut River.

Temperatures within the Talbingo Reservoir catchment have generally increased when compared with Event 18. TR-RS and YR1-RS both recorded notable increases in temperature during Event 19, from 8.3°C and 8.8°C during Event 18 to 16.2°C and 14.3°C, respectively, refer to Figure 3-4. Temperatures within the Yorkers Creek catchment have also increased. YK-RS recorded a notable increase in temperature, from 9°C during Event 18 to 16°C during Event 19, refer to Figure 3-5.

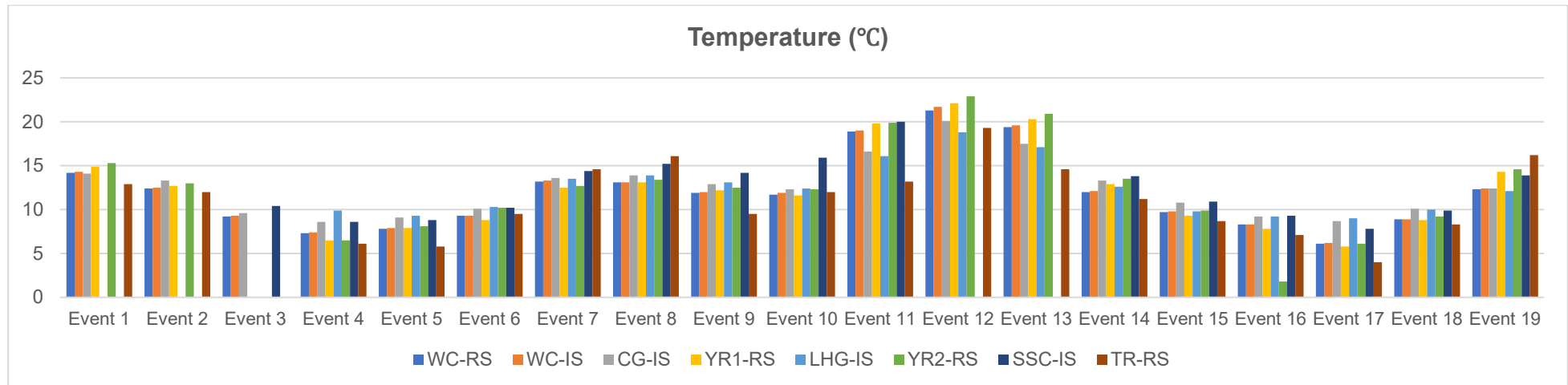


Figure 3-4 Temperature for Talbingo Reservoir catchment

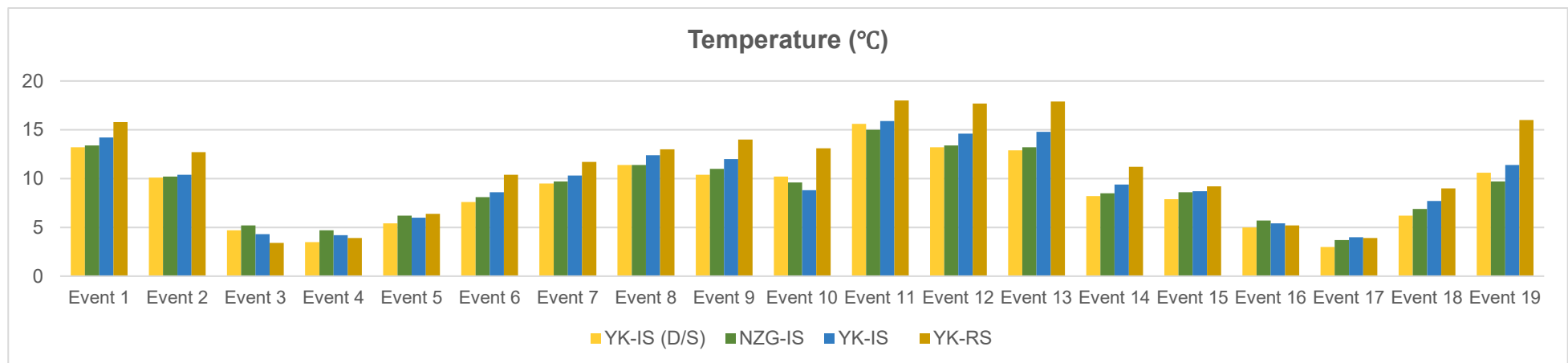


Figure 3-5 Temperature for Yorkers Creek catchment

All DO (%) results for the Talbingo Reservoir catchment, excluding LHG-IS were within the acceptable DGV range (90-110%) for Event 19. TR-RS recorded the highest DO (%) reading of 105.8%. It has recorded the highest reading over the last four events. LHG-IS recorded a reduction in DO (%) from 91.3 during Event 18 to 86.5 during Event 19, refer to Figure 3-6. DO (%) results for the Yorkers Creek catchment were all within the acceptable DGV value (90-110%), refer to Figure 3-7.

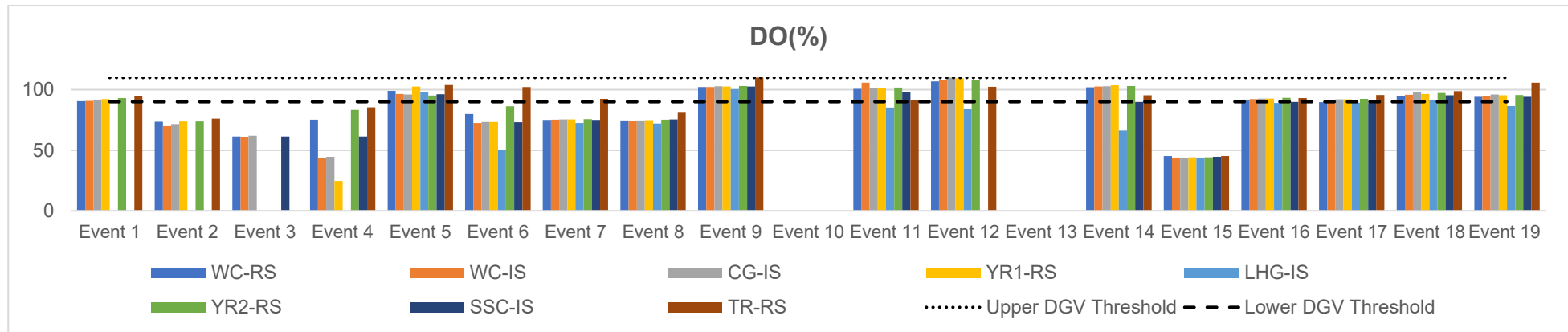


Figure 3-6 Dissolved oxygen (DO%) for Talbingo Reservoir catchment

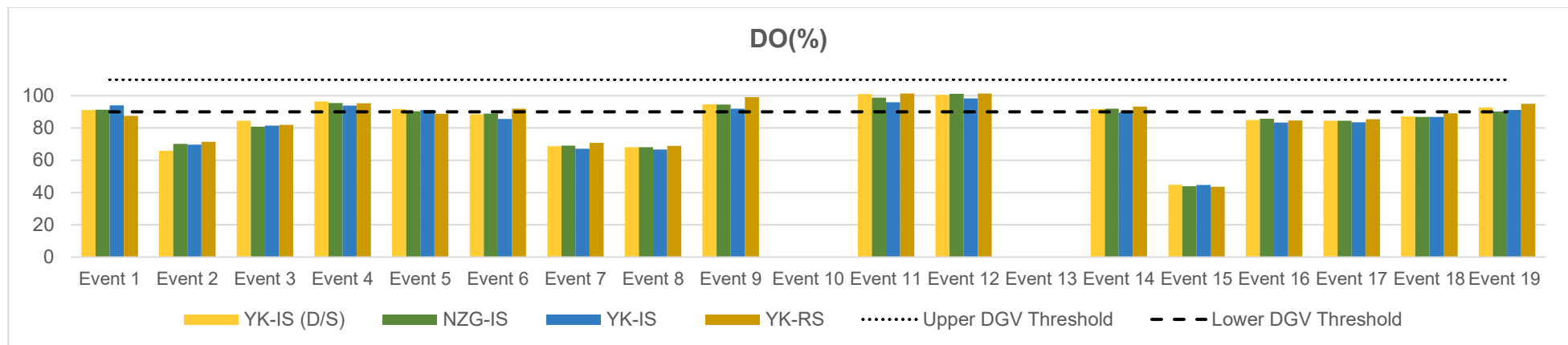


Figure 3-7 Dissolved oxygen (DO%) for Yorkers Creek catchment

The results for DO (ppm) for the Talbingo Reservoir catchment have all decreased in comparison with Event 18, refer to Figure 3-8. The highest reading for DO (ppm) was recorded at TR-RS (9.85 ppm). Results for DO (ppm) within the Yorkers Creek catchment have also decreased since Event 18; the highest reading for DO (ppm) was at YK-IS (D/S) (9.17 ppm), refer to Figure 3-9.

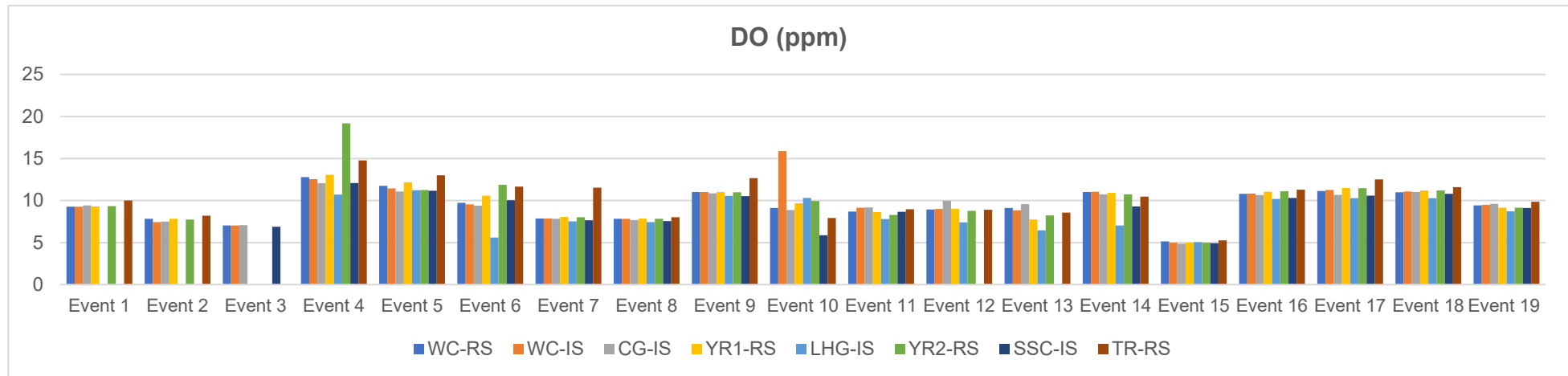


Figure 3-8 Dissolved Oxygen (ppm) for Talbingo Reservoir catchment

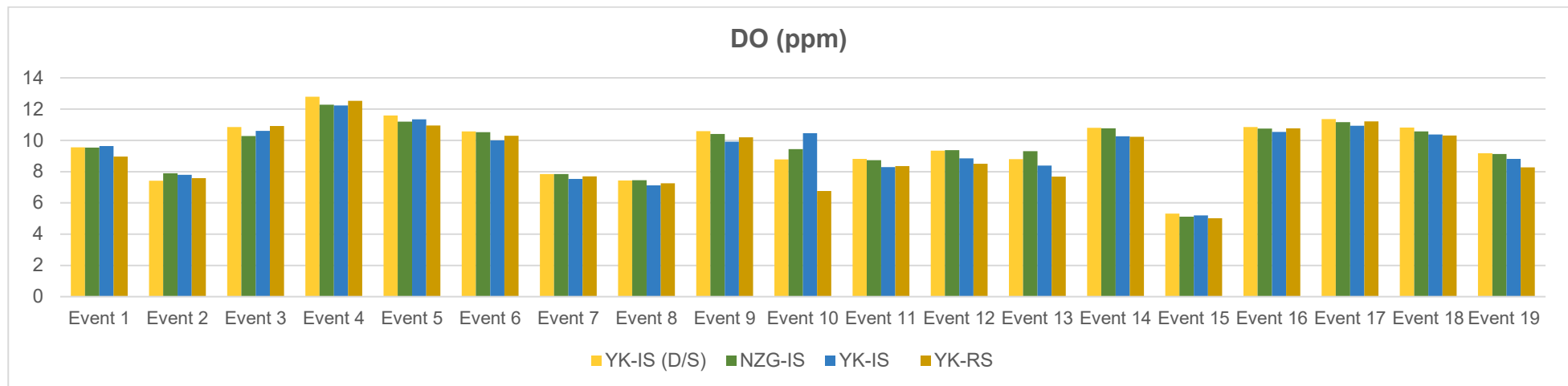


Figure 3-9 Dissolved Oxygen (ppm) for Yorkers Creek catchment

Results for specific conductance within the Talbingo Reservoir catchment have all shown an increase when compared to last four events, except for CG-IS and LHG-IS, which have decreased since Event 18, refer to Figure 3-10. LHG-IS and CG-IS returned elevated results of 529 $\mu\text{S}/\text{cm}$ and 481.4 $\mu\text{S}/\text{cm}$, respectively. Results for specific conductance within the Yorkers Creek catchment for Event 19 have slightly decreased, excluding NZG-IS, which slightly increased from 44.5 $\mu\text{S}/\text{cm}$ during Event 18, to 46.6 $\mu\text{S}/\text{cm}$ during Event 19, refer to Figure 3-11.

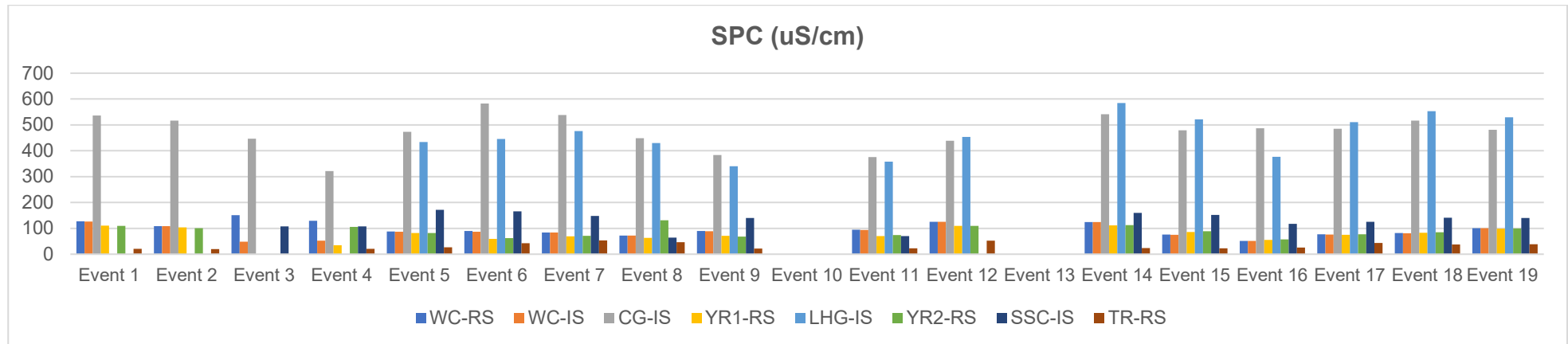


Figure 3-10 Specific Conductance (SPC $\mu\text{S}/\text{cm}$) for Talbingo Reservoir catchment

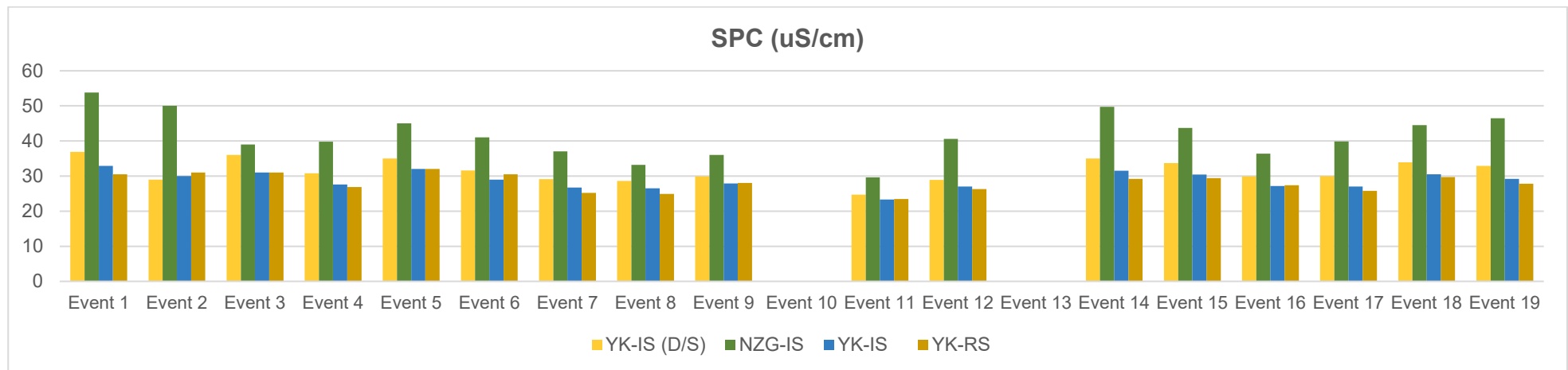


Figure 3-11 Specific Conductance (SPC $\mu\text{S}/\text{cm}$) for Yorkers Creek catchment

Conductivity readings within the Talbingo Reservoir catchment have slightly increased since Event 18, refer to Figure 3-12. Conductivity ($\mu\text{S}/\text{cm}$) results for CG-IS and LHG-IS continues to be notably higher than the other sites, with readings above the upper DGV value ($350 \mu\text{S}/\text{cm}$). Conductivity readings within the Yorkers Creek catchment have increased, refer to Figure 3-13. NZG-IS continues to return the highest reading for this catchment ($32.9 \mu\text{S}/\text{cm}$), with a reading above the lower DGV value ($30 \mu\text{S}/\text{cm}$).

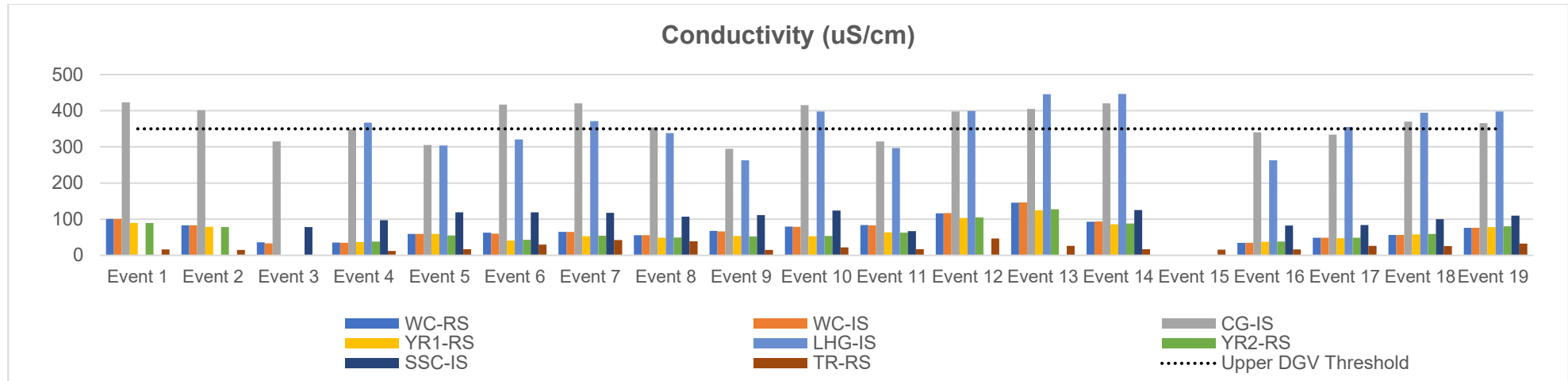


Figure 3-12 Conductivity ($\mu\text{S}/\text{cm}$) for Talbingo Reservoir catchment

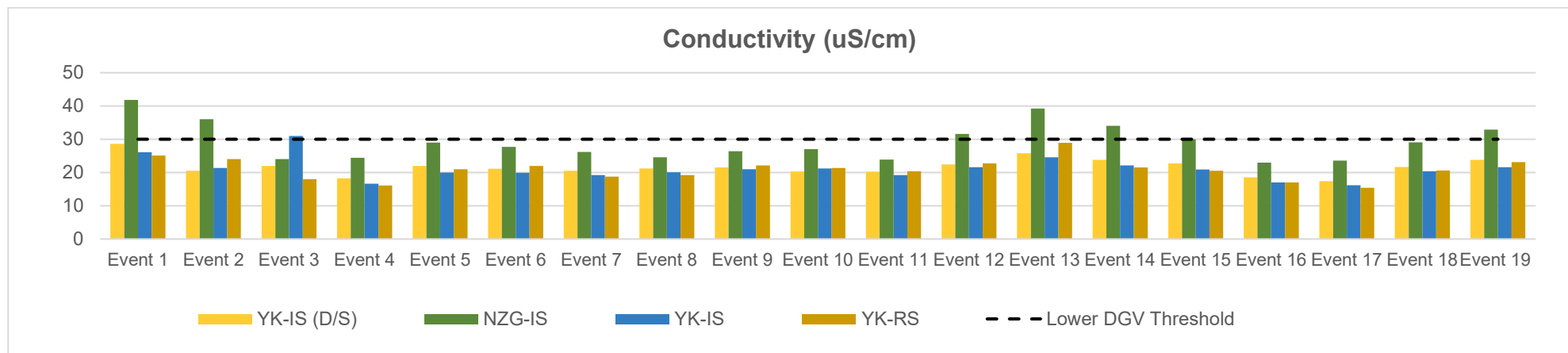


Figure 3-13 Conductivity ($\mu\text{S}/\text{cm}$) for Yorkers Creek catchment

Turbidity values were predominantly below the lower DGV thresholds (2 - 25 NTU) for the Talbingo Reservoir catchment, except for LHG-IS and SSC-IS (16.8 and 2.7 NTU respectively) for Event 19. Turbidity readings within the Talbingo Reservoir catchment have slightly decreased from Event 18 excluding LHG-IS, refer to Figure 3-14.

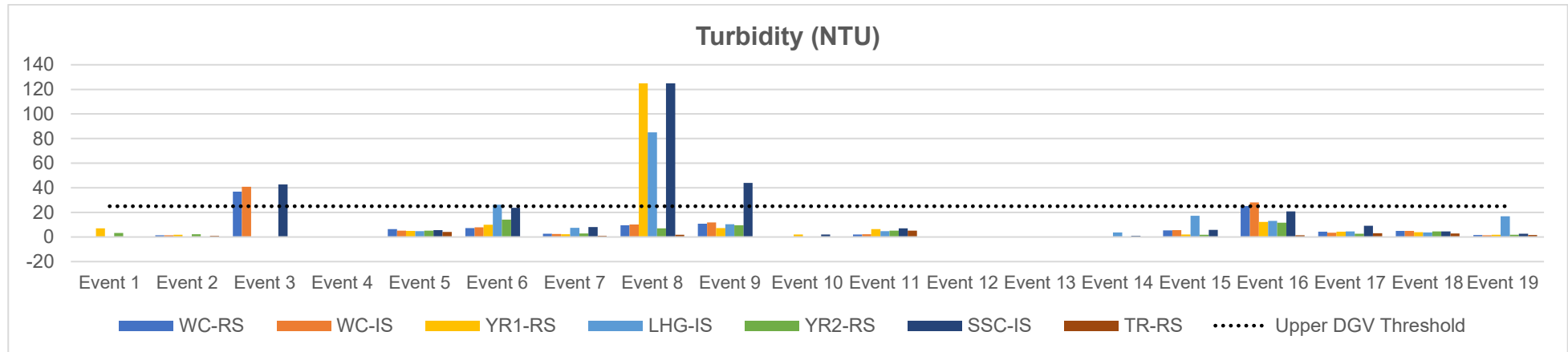


Figure 3-14 Turbidity (NTU) for the Talbingo Reservoir catchment

Turbidity readings within the Yorkers Creek catchment have slightly decreased since Event 18, refer to Figure 3-15. YK-RS registered the highest reading (21.8 NTU).

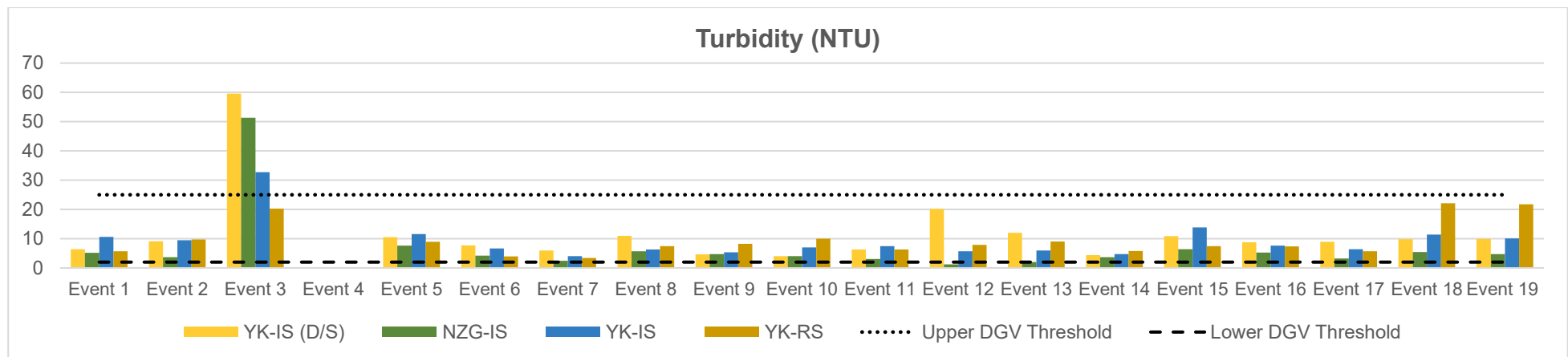


Figure 3-15 Turbidity (NTU) for the Yorkers Creek catchment

Results for total suspended solids (TSS) within the Talbingo Reservoir catchment for Event 19 were below the Limit of Reporting (LOR), with the exception of WC-RS (2 mg/L) and SSC-IS (5 mg/L), refer to Figure 3-17. Similarly, results for WC-RS and CG-IS for Event 19 were below the LOR, refer to Figure 3-18.

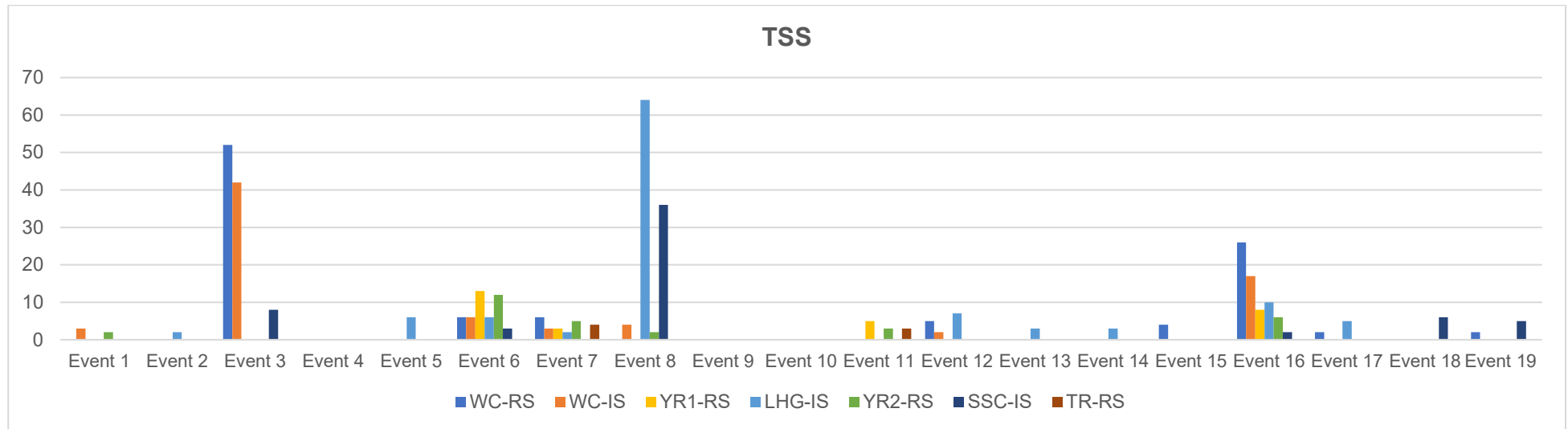


Figure 3-16 Total Suspended Solids for the Talbingo Reservoir catchment

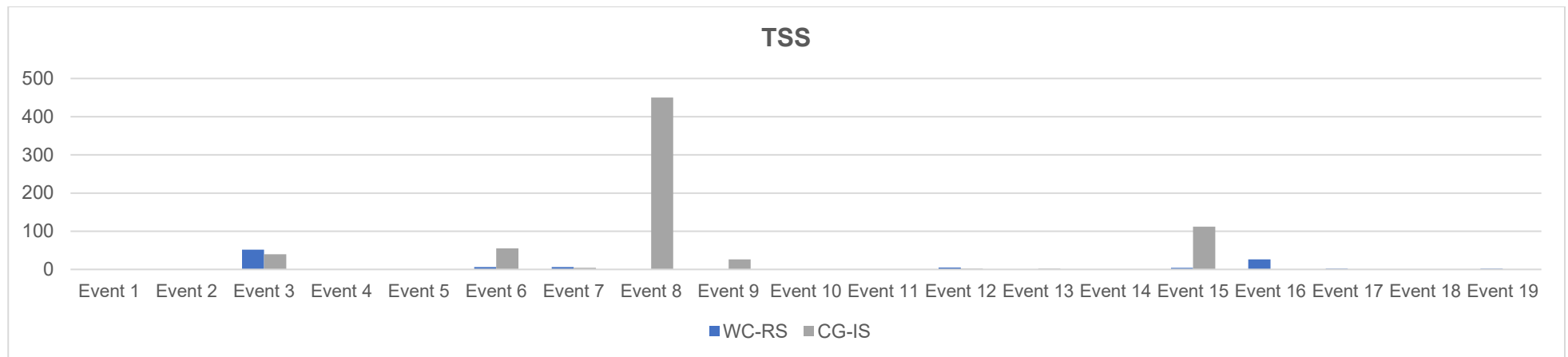


Figure 3-17 Total Suspended Solids for WC-RS and CG-IS, within the Talbingo Reservoir catchment

Results for total suspended solids were all below the LOR within the Yorkers Creek Catchment, refer to Figure 3-19.

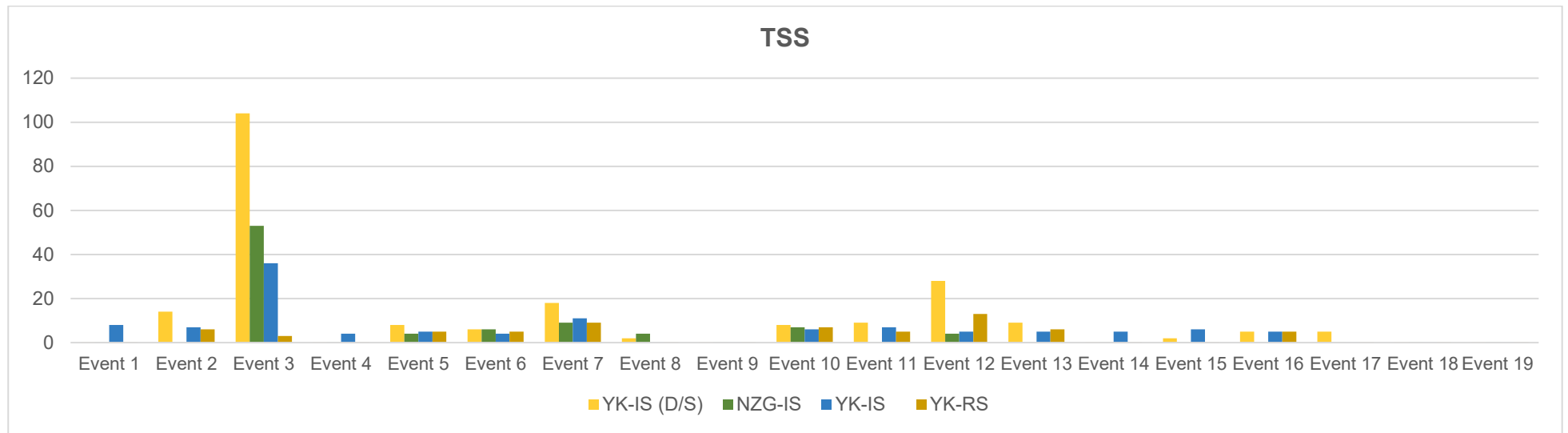


Figure 3-18 Total Suspended Solids for the Yorkers Creek catchment

Values of pH for the Talbingo Reservoir catchment have remained fairly consistent during Event 19. WC-RS, LHG-IS, SSC-IS and TR-RS all recorded a decrease in pH, while WC-IS, CG-IS, YR1-RS and YR2-RS all recorded an increase in pH. All sites had values of pH within the DGV range (6.5 – 8 pH units), refer to Figure 3-20. Values of pH for the Yorkers Creek catchment have decreased at all sites apart from NZG-IS, which registered an increase in pH units, refer to Figure 3-21. All sites had values of pH within the DGV range (6.5 – 8 pH units).

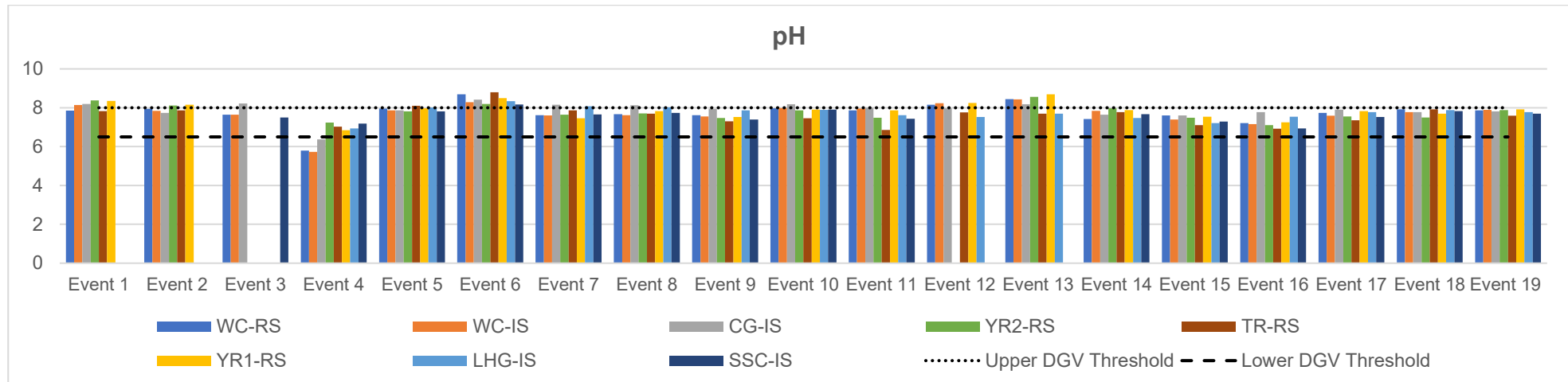


Figure 3-19 Potential of Hydrogen (pH) for Talbingo Reservoir catchment

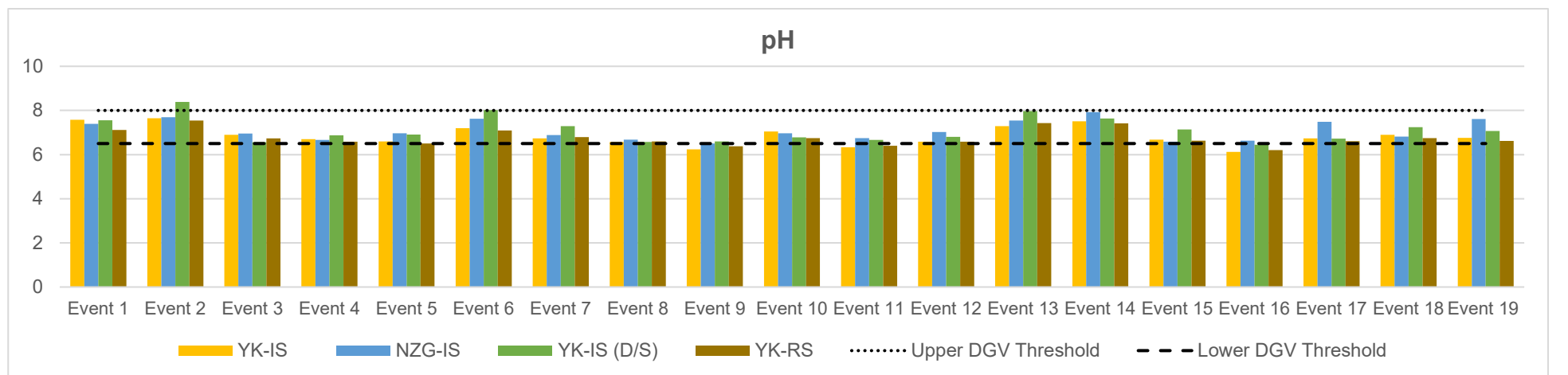


Figure 3-20 Potential of Hydrogen (pH) for Yorkers Creek catchment

The values for oxygen redox potential (ORP) within the Talbingo Reservoir catchment have increased at all sites, with the exception of LHG-IS (3.3 mV), a notable decrease from Event 18 (54.1 mV), refer to Figure 3-22. Within the Yorkers Creek catchment, ORP has increased at YK-IS (D/S) and YK-RS and decreased at NZG-IS and YK-IS, refer to Figure 3-23.

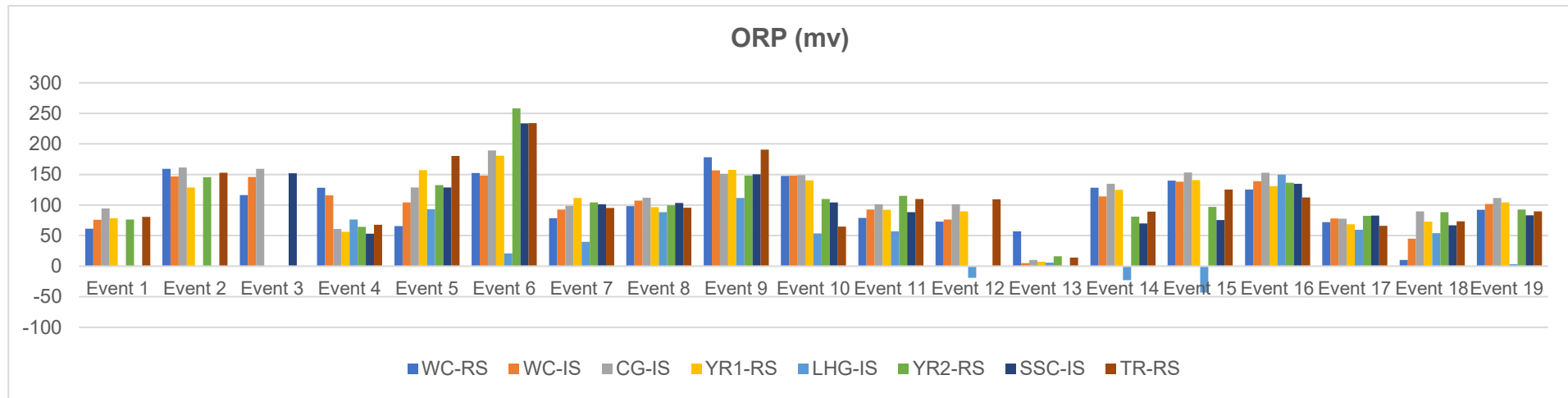


Figure 3-21 Oxygen Redox Potential (ORP) for Talbingo Reservoir catchment

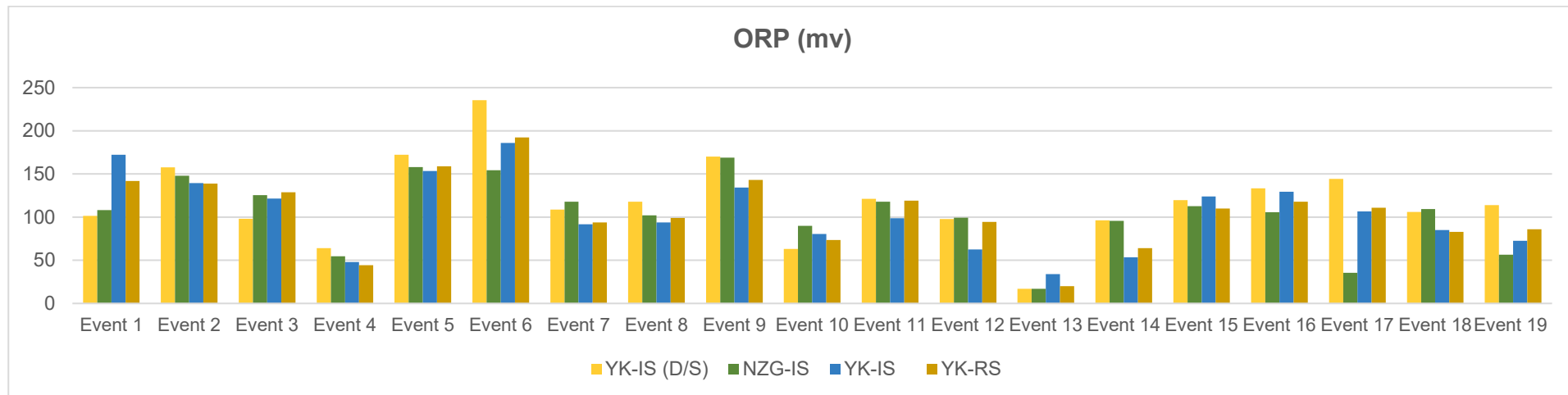


Figure 3-22 Oxygen Redox Potential (ORP) for Yorkers Creek catchment

Within the Talbingo Reservoir Catchment, Nitrogen Oxides (mg/L) were all below the laboratory LOR, refer to Figure 3-24. All results were below the DGV value of 0.15 mg/L. Similarly, results for the Yorkers Creek catchment were below the DGV (0.15 mg/L) across all sites, refer to Figure 3-25.

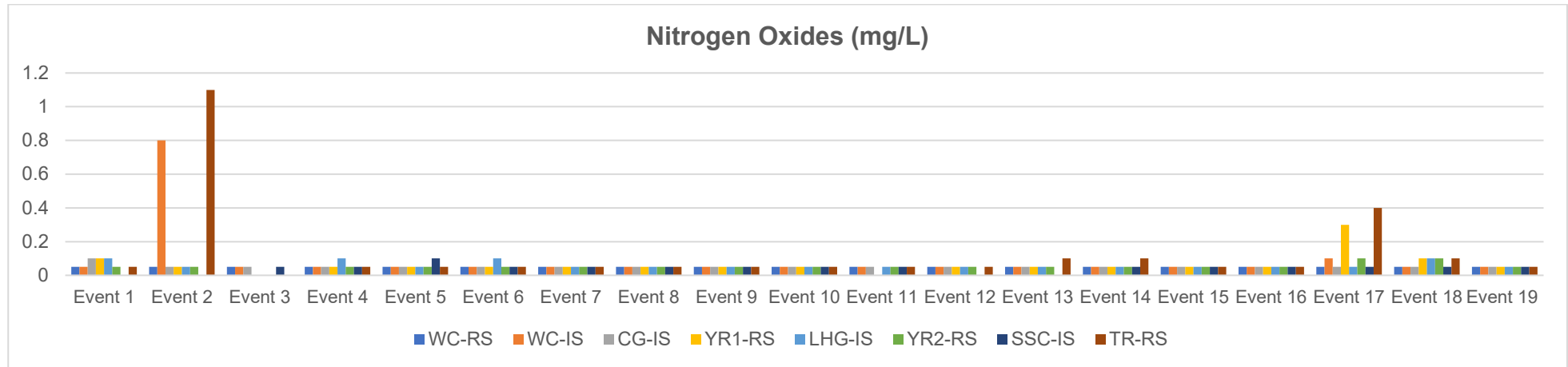


Figure 3-23 Nitrogen Oxides (mg/L) for the Talbingo Reservoir catchment

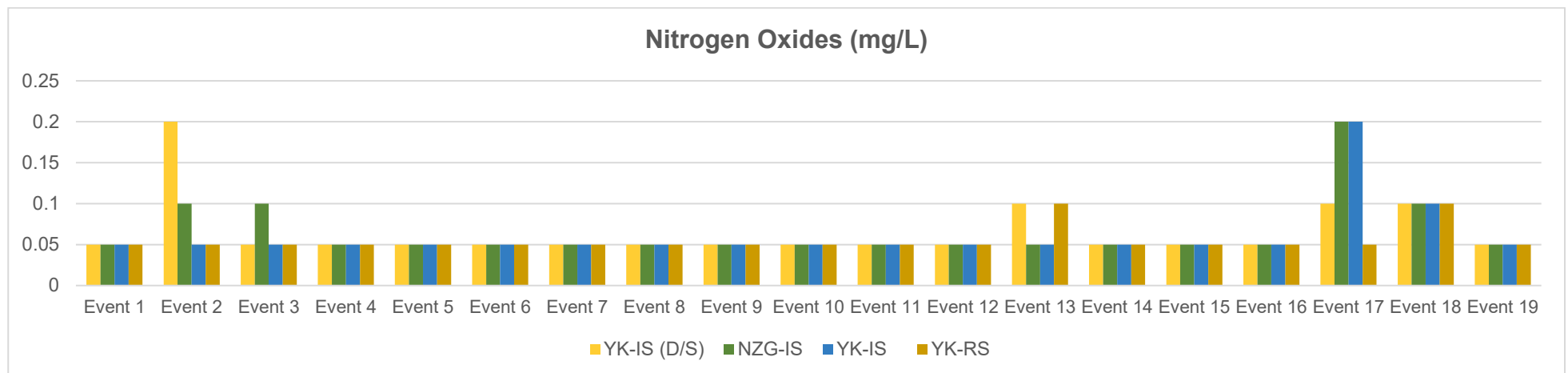


Figure 3-24 Nitrogen Oxides (mg/L) for the Yorkers Creek catchment

Results for Reactive Phosphorous (mg/L) were all below the laboratory's LOR (with the exception of WC-IS and YR1-RS) within the Talbingo Reservoir catchment, refer to Figure 3-26. A peak result of 0.07 mg/L was recorded at YR1-RS. Results for Reactive Phosphorous within the Yorkers Creek catchment were below the LOR, refer to Figure 3-27.

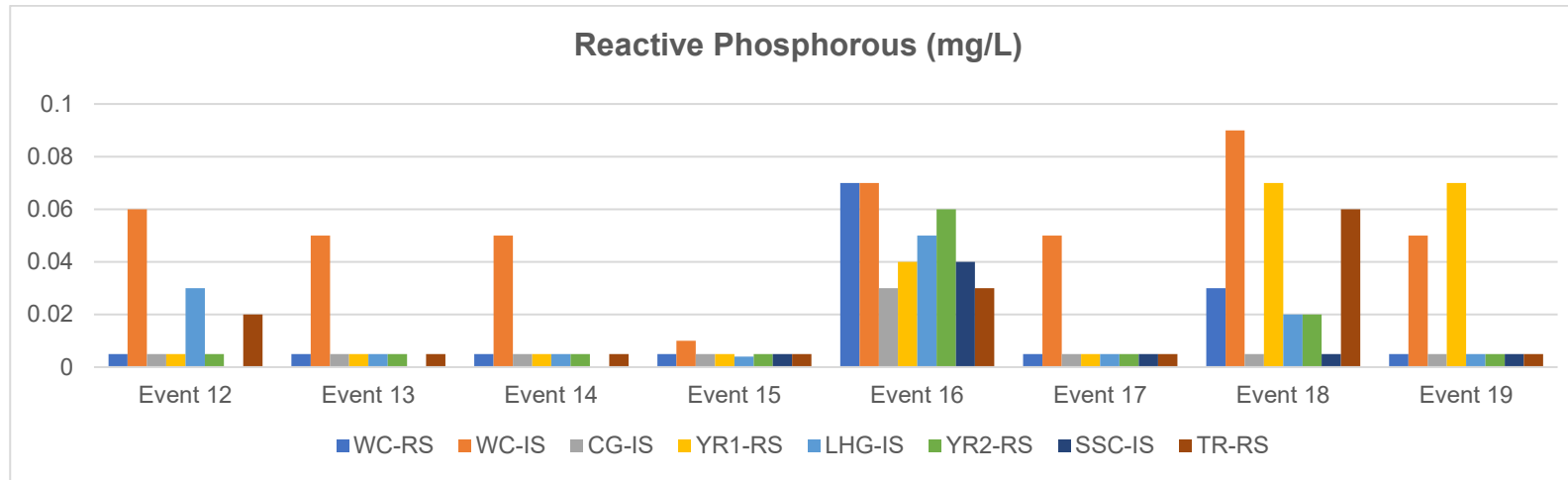


Figure 3-25 Reactive Phosphorous (mg/L) for the Talbingo Reservoir catchment

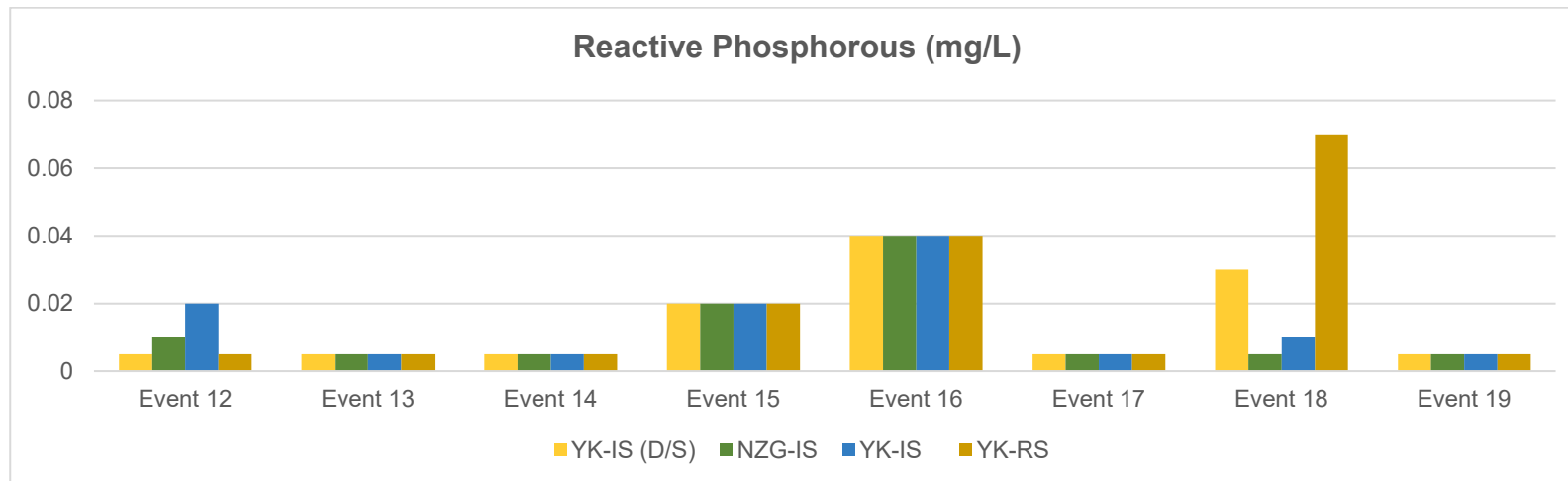


Figure 3-26 Reactive Phosphorous (mg/L) for the Yorkers Creek catchment

Total Hardness (CaCO_3 , mg/L) within the Talbingo Reservoir catchment has remained consistent, with results varying from very soft at TR-RS (8 mg/L) to hard at LHG-IS (296 mg/L), refer to Figure 3-28. Results for Total Hardness (CaCO_3 , mg/L) within the Yorkers Creek catchment were all below the laboratory's LOR, except for NZG-IS. NZG-IS recorded a decrease when compared to Event 18 (8 to 16 mg/L), refer to Figure 3-29.

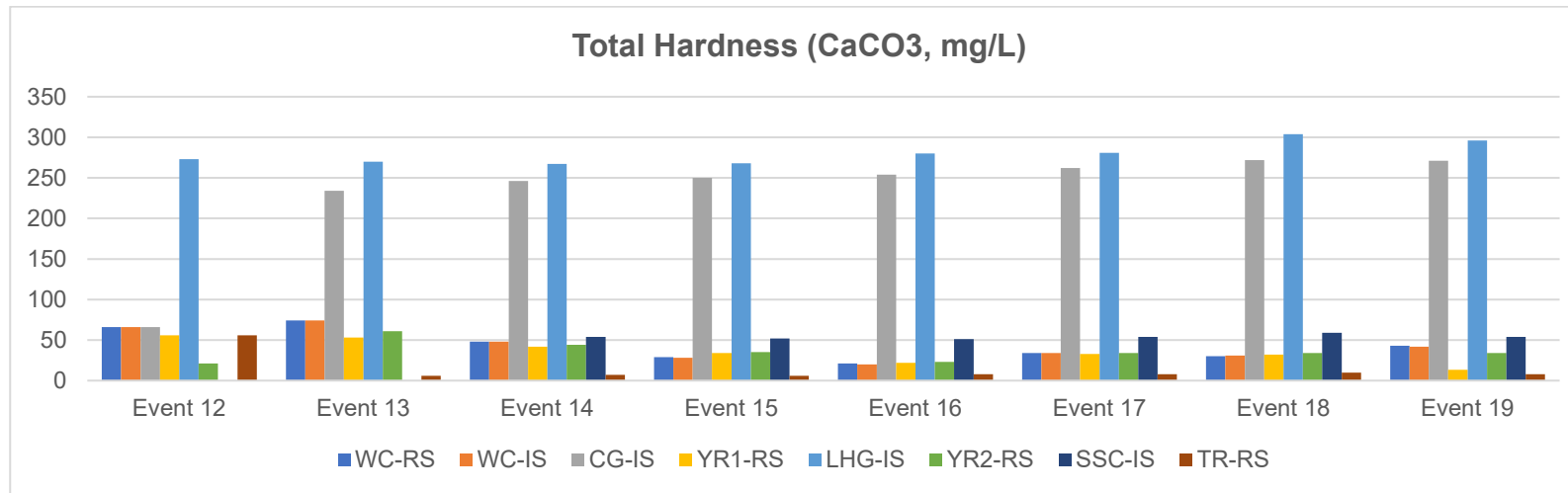


Figure 3-27 Total Hardness (CaCO_3) for the Talbingo Reservoir catchment

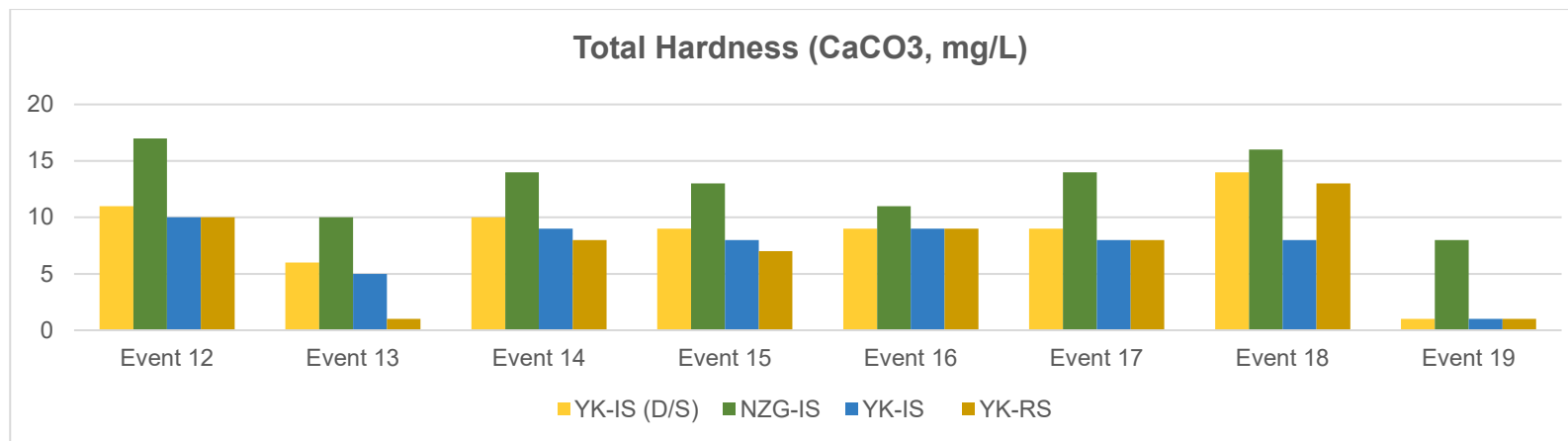


Figure 3-28 Total Hardness (CaCO_3) for the Yorkers Creek catchment

Results for Total Kjeldahl Nitrogen (TKN, mg/L) were below the LOR for all sites within the Talbingo Reservoir, excluding SSC-IS, which recorded 5 TKN (mg/L), refer to Figure 3-30. TKN results for the Yorkers Creek catchment were below the LOR for all sites, refer to Figure 3-31.

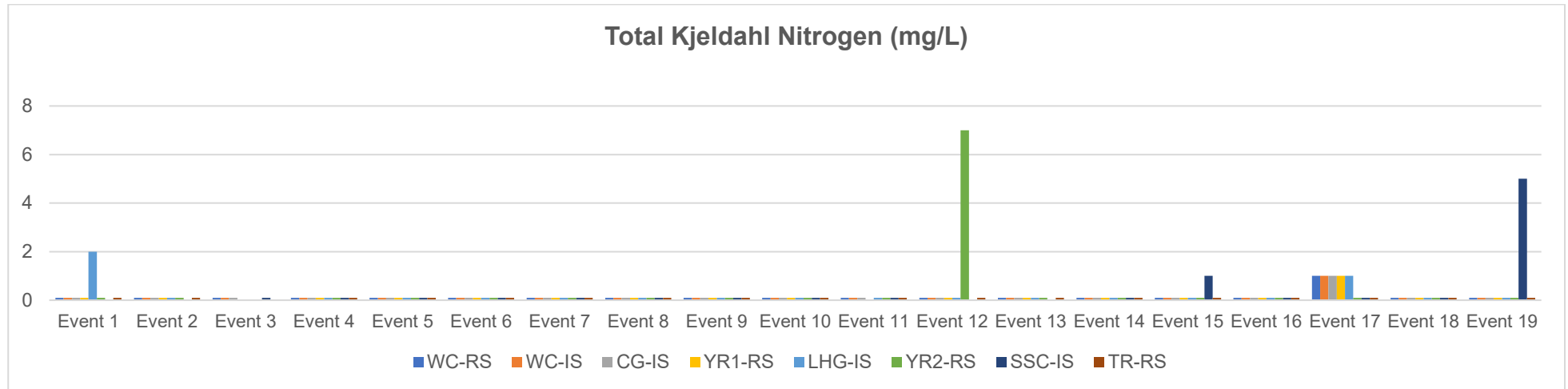


Figure 3-29 Total Kjeldahl Nitrogen (TKN) for the Talbingo Reservoir catchment

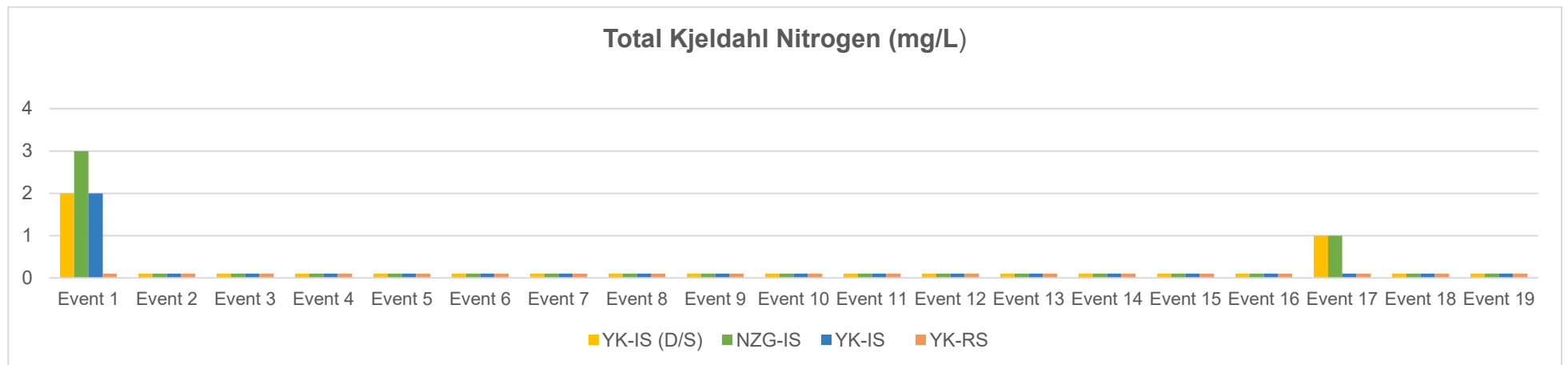


Figure 3-30 Total Kjeldahl Nitrogen (TKN) for the Yorkers Creek catchment

Ammonia (mg/L) levels were below the LOR for all sites within the Talbingo Reservoir and Yorkers Creek catchments for Event 19, refer to Figure 3-32 and Figure 3-33.

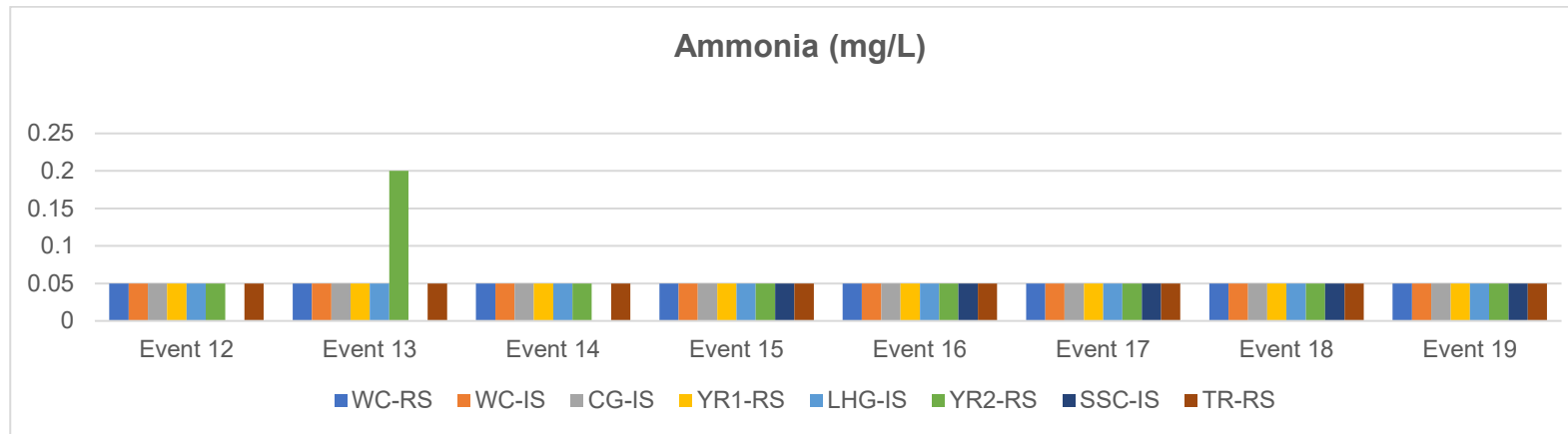


Figure 3-31 Ammonia (mg/L) for the Talbingo Reservoir catchment

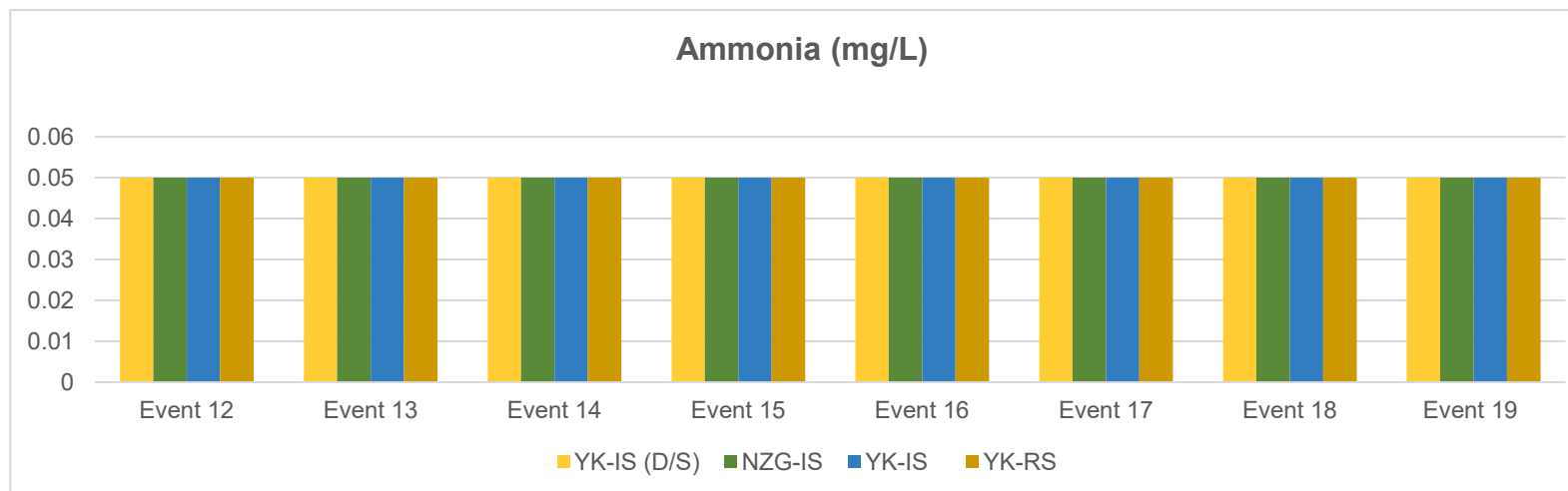


Figure 3-32 Ammonia (mg/L) for the Yorkers Creek catchment

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 TR-RS on 28 September 2023. DUP01 was analysed for metals and metalloids. The duplicate sample has been compared against the TR-RS sample by Relative Percentage Difference (RPD) and has returned within an acceptable range (less than 30% for inorganic or less than 5 times the laboratory LOR). Results for Lead (Pb) and Manganese (Mn) returned a result of 33%, slightly above the acceptable range, but is less than 5 times the LOR, therefore the results were deemed negligible.
- 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.

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

Water temperatures for Event 19 have increased across both catchments when compared to water temperatures for Event 18. This continues the trend an increase in temperature and can be attributed to seasonal changes.

Results for DO (%) have remained consistent across both catchments during Event 19. DO (ppm) have decreased across both catchments for Event 19.

Similarly, specific conductance ($\mu\text{S}/\text{cm}$) and conductivity readings have remained consistent across both catchments when compared with results for Event 18. NZG-IS was one outlier that saw a notable increase. The pattern between sites is mostly reflective of the pattern for specific conductance.

pH has generally remained consistent within the Talbingo Reservoir catchment. pH results for the Yorkers Creek catchment generally decreased, with the exception of NZG-IS, which recorded an increase in pH. All sites had values of pH within the DGV range (6.5 – 8 pH units).

Turbidity (NTU) readings have decreased across both the Talbingo Reservoir catchment and the Yorker's Creek catchment, excluding LHG-IS, which increased.

The values for oxygen redox potential (ORP) within the Talbingo Reservoir catchment increased at all sites except for LHG-IS. Within the Yorkers Creek catchment, ORP has increased at YK-IS (D/S) and YK-RS, and decreased at YK-IS and NZG-IS.

Results for TSS were below the laboratory LOR, except for WC-RS (2 mg/L) and SSC-IS (5 mg/L).

Nitrogen Oxides (mg/L) were all below the laboratory LOR within both catchments. Results for all sites were below the DGV (0.15 mg/L).

Reactive Phosphorous (mg/L) were below the laboratory LOR at all sites within the Talbingo Reservoir catchment, with the exception of WC-IS and YR1-RS. Similarly, results for Reactive Phosphorous were below the LOR for all sites within the Yorkers Creek catchment.

Total Hardness (CaCO_3) remained consistent within the Talbingo Reservoir catchment for Event 19, varying from very soft at TR-RS (8 mg/L) to hard at LHG-IS (296 mg/L). Within the Yorkers Creek catchment, results were all below the laboratory's LOR, except for NZG-IS. NZG-IS recorded a decrease when compared to Event 18 (8 to 16 mg/L).

Results for Total Kjeldahl Nitrogen (TKN, mg/L) were below the laboratory LOR for both catchments, with the exception of SSC-IS (5 mg/L). Results for Ammonia were also below the laboratory LOR for both catchments.

Laboratory results for Event 19 were generally consistent with the results of the previous monitoring events, with most analytes reported below the Limit of Reporting. Results exceeded the DGV for:

- Aluminium (0.027 mg/L) at all sites, excluding TR-RS
- Chromium (0.00001 mg/L) at WC-RS, WC-IS, CG-IS, YR1-RS, LHG-IS, SSC-IS and YK-IS (D/S)
- Iron (0.3 mg/L) at YK-RS and YK-IS
- Total Nitrogen (0.25 mg/L) at SSC-IS
- Total Phosphorus (0.02 mg/L) at WC-RS, YR1-RS, YK-RS, YK-IS, SSC-IS, TR-RS and NZG-IS
- Zinc (0.0024 mg/L) at CG-IS, LHG-IS and YK-RS
- Lead (0.001 mg/L) at LHG-IS, NZG-IS, TR-RS and YK-RS.

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*.
- NGH Pty Ltd. 2022c. *Pre-construction Water Quality Monitoring Report: Event 3 May and June 2022*.
- NGH Pty Ltd. 2022d. *Pre-construction Water Quality Monitoring Report: Event 4 June 2022*.
- NGH Pty Ltd. 2022e. *Pre-construction Water Quality Monitoring Report: Event 5 July 2022*.
- NGH Pty Ltd. 2022f. *Pre-construction Water Quality Monitoring Report: Event 6 August 2022*.
- NGH Pty Ltd. 2022g. *Pre-construction Water Quality Monitoring Report: Event 7 October 2022*.
- NGH Pty Ltd. 2022h. *Pre-construction Water Quality Monitoring Report: Event 8 October 2022*.
- NGH Pty Ltd. 2022i. *Pre-construction Water Quality Monitoring Report: Event 9 November 2022*.
- NGH Pty Ltd. 2022j. *Pre-construction Water Quality Monitoring Report: Event 10 December 2022*.
- NGH Pty Ltd. 2023a. *Pre-construction Water Quality Monitoring Report: Event 11 January 2023*.
- NGH Pty Ltd. 2023b. *Pre- construction Water Quality Monitoring Report: Event 12 February 2023*.
- NGH Pty Ltd. 2023c. *Pre- construction Water Quality Monitoring Report: Event 13 March 2023*.
- NGH Pty Ltd. 2023d. *Pre- construction Water Quality Monitoring Report: Event 14 April 2023*.
- NGH Pty Ltd. 2023e. *Pre- construction Water Quality Monitoring Report: Event 15 June 2023*.
- NGH Pty Ltd. 2023f. *Pre- construction Water Quality Monitoring Report: Event 16 June 2023*.
- NGH Pty Ltd. 2023g. *Pre- construction Water Quality Monitoring Report: Event 16 June 2023*.
- NGH Pty Ltd. 2023h. *Pre- construction Water Quality Monitoring Report: Event 17 June 2023*.
- NGH Pty Ltd. 2023i. *Pre- construction Water Quality Monitoring Report: Event 18 June 2023*.
- 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

S&P 500 Constituents - 2024		Company Name		Sector		Market Cap		Revenue		Profit		EPS		Dividend		P/E Ratio		Beta		Volatility		Liquidity		Growth		ESG Score		Risk Rating		Overall Rating	
Symbol	Company Name	Industry	Market Cap (\$B)	Revenue (\$B)	Profit (\$B)	EPS (\$)	Dividend (\$)	P/E Ratio	Beta	Volatility (%)	Liquidity Ratio	Growth Rate (%)	ESG Score	Risk Rating	Overall Rating																
Tech	Apple	Technology	3000	380	100	15.00	0.50	25.00	1.2	15.0	1.5	10.0	A	Low	High																
	Microsoft	Technology	2800	250	80	12.00	0.75	20.00	1.1	12.0	1.4	8.0	A	Low	High																
	Amazon	Technology	2500	370	70	10.00	0.00	25.00	1.3	18.0	1.6	12.0	B	Medium	High																
	Google	Technology	2200	280	90	14.00	0.20	20.00	1.0	10.0	1.3	7.0	A	Low	High																
	Facebook	Technology	2000	250	60	11.00	0.40	22.00	1.1	14.0	1.4	9.0	B	Medium	High																
	Twitter	Technology	1800	150	30	8.00	0.10	18.00	0.9	8.0	1.2	6.0	C	High	Medium																
	LinkedIn	Technology	1600	120	25	7.00	0.05	16.00	0.8	7.0	1.1	5.0	C	High	Medium																
	Slack	Technology	1400	100	20	6.00	0.00	14.00	0.7	6.0	1.0	4.0	D	Very High	Low																
	Zoom	Technology	1200	80	15	5.00	0.00	12.00	0.6	5.0	0.9	3.0	D	Very High	Low																
	Zoom	Technology	1200	80	15	5.00	0.00	12.00	0.6	5.0	0.9	3.0	D	Very High	Low																
Healthcare	Johnson & Johnson	Healthcare	350	80	20	4.00	0.20	15.00	0.8	8.0	1.2	5.0	A	Low	High																
	Pfizer	Healthcare	300	70	18	3.50	0.15	14.00	0.7	7.0	1.1	4.0	A	Low	High																
	Merck	Healthcare	280	65	16	3.20	0.10	13.00	0.6	6.0	1.0	3.0	A	Low	High																
	Novartis	Healthcare	260	60	15	3.00	0.05	12.00	0.5	5.0	0.9	2.0	A	Low	High																
	Roche	Healthcare	240	55	14	2.80	0.00	11.00	0.4	4.0	0.8	1.0	A	Low	High																
	Abbott	Healthcare	220	50	13	2.60	0.00	10.00	0.3	3.0	0.7	0.0	A	Low	High																
	Amgen	Healthcare	200	45	12	2.40	0.00	9.00	0.2	2.0	0.6	-0.5	A	Low	High																
	Moderna	Healthcare	180	40	11	2.20	0.00	8.00	0.1	1.0	0.5	-1.0	B	Medium	High																
	Vertex	Healthcare	160	35	10	2.00	0.00	7.00	0.0	0.0	0.4	-1.5	C	High	Medium																
	Vertex	Healthcare	160	35	10	2.00	0.00	7.00	0.0	0.0	0.4	-1.5	C	High	Medium																
Financial	Wells Fargo	Financial	250	150	10	1.50	0.00	10.00	0.9	9.0	1.1	2.0	B	Medium	High																
	Citigroup	Financial	230	140	9	1.40	0.00	9.00	0.8	8.0	1.0	1.0	B	Medium	High																
	Bank of America	Financial	210	130	8	1.30	0.00	8.00	0.7	7.0	0.9	0.0	B	Medium	High																
	JPMorgan Chase	Financial	190	120	7	1.20	0.00	7.00	0.6	6.0	0.8	-0.5	B	Medium	High																
	Goldman Sachs	Financial	170	110	6	1.10	0.00	6.00	0.5	5.0	0.7	-1.0	C	High	Medium																
	JP Morgan Chase	Financial	150	100	5	1.00	0.00	5.00	0.4	4.0	0.6	-1.5	C	High	Medium																
	Bank of America	Financial	130	90	4	0.90	0.00	4.00	0.3	3.0	0.5	-2.0	D	Very High	Low																
	Citigroup	Financial	110	80	3	0.80	0.00	3.00	0.2	2.0	0.4	-2.5	D	Very High	Low																
	Wells Fargo	Financial	90	70	2	0.70	0.00	2.00	0.1	1.0	0.3	-3.0	D	Very High	Low																
	JP Morgan Chase	Financial	70	60	1	0.60	0.00	1.00	0.0	0.0	0.2	-3.5	D	Very High	Low																
Consumer Goods	Procter & Gamble	Consumer Goods	300	60	15	3.00	0.10	10.00	0.8	8.0	1.1	3.0	A	Low	High																
	Unilever	Consumer Goods	280	55	14	2.80	0.05	9.00	0.7	7.0	1.0	2.0	A	Low	High																
	Johnson																														

APPENDIX B OBSERVATIONS AND FIELD DATA

27 September : Overcast, no wind

2019

J13 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	12.3	94.0	9.43	100.5	76.1	7.87	92.4	1.6
	Comment	Clear, medium flow								
WC-IS	Month	NO	12.4	94.7	9.48	100.5	76.3	7.82	101.6	1.3
	Comment	Clear, medium fast flow								
CG-IS	Month	NO	12.4	96.1	9.60	481.4	366.0	7.82	111.4	0.0
	Comment	Clear, water vegetation, slight flow								
YR1-RS	Month	14.3	95.3	94.5	98.2	78.1	7.92	104	104.5	1.8
	Comment	NO	14.3	95.3	9.15	98.2	78.1	7.92	Clear, medium fast flow	

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	12.1	86.5	8.71	529	398.2	7.77	3.3	16.8
	Comment	high density aquatic vegetation slightly turbid, slight flow								
YR2-RS	Month	NO	14.6	95.6	9.14	99.9	80.0	7.88	92.7	1.9
	Comment	fast flow, medium level								
SSC-IS	Month	NO	13.9	94.0	9.13	139.8	110.1	7.69	83.4	2.7
	Comment	low water level, small flow increased woody and leaf debris								
TR-RS	Month	NO	16.2	105.8	9.85	38.7	32.2	7.59	89.5	1.7
	Comment	clear, slight green colouration moderate flow and level <u>DUP01</u>								
YK-IS (D/S)	Month	10.6 NO	92.8 10.6	94.7 92.8	32.9 9.17	23.8 32.9	7.07 23.8	7.07	113.9	9.9
	Comment	slight turbidity, slow flow woody debris								

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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)
NZG-IS	Month	NO	9.7	90.2	9.13	46.5	32.9	7.61	56.6	4.7
	Comment	clear, slight flow, animal track evident on bank								
YK-IS	Month	NO	11.4	91.2	8.82	29.2	21.6	6.76	72.5	10.1
	Comment	slight turbidity / opaqueness deposits of mica on bank slow flow								
YK-RS	Month	NO	16.0	95.0	8.27	27.8	23.1	6.62	85.9	21.8
	Comment	turbid / opaqueness, low level sandy deposits in middle of stream								

APPENDIX C LABORATORY CERTIFICATES

NGH Environmental
35 Kincaid Street
Wagga Wagga NSW 2650
Attention: Nicola Smith

Tuesday, November 14, 2023



NATA Accredited Laboratory
Number: 9597
Accredited for compliance with ISO/IEC
17025 - Testing

LABORATORY ANALYSIS REPORT

Report Number: 2309-0088

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For all enquiries related to this report please quote document number: 2309-0088

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0252	WC-RS 27.09.23 12.43pm	Aluminium (dissolved)	0.04 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	13.5 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	43 mg/L	LTM-W-038	2
		Iron (dissolved)	0.02 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	2.16 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.04 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	6 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2

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LABORATORY ANALYSIS REPORT

Report Number: 2309-0088

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0252	WC-RS 27.09.23 12.43pm	Total Suspended Solids	2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0253	WC-IS 27.09.23 12.52pm	Aluminium (dissolved)	0.04 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	13.3 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	42 mg/L	LTM-W-038	2
		Iron (dissolved)	0.02 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	2.13 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0253	WC-IS 27.09.23 12.52pm	Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	15 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0254	CG-IS 27.09.23 1.08pm	Aluminium (dissolved)	0.06 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	99.1 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	271 mg/L	LTM-W-038	2
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	5.63 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0254	CG-IS 27.09.23 1.08pm	Nickel (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	155 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0255	YR1-RS 27.09.23 1.18pm	Aluminium (dissolved)	0.06 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	13.3 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	42 mg/L	LTM-W-038	2
		Iron (dissolved)	0.03 mg/L	APHA 3030 B/3120 B	0.01

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0255	YR1-RS 27.09.23 1.18pm	Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	2.08 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.07 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.38 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	3 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0256	LHG-IS 27.09.23 1.35pm	Aluminium (dissolved)	0.07 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	108 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.0000

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0256	LHG-IS 27.09.23 1.35pm	Copper (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	296 mg/L	LTM-W-038	2
		Iron (dissolved)	0.05 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.005 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	6.34 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.012 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	144 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0257	YR2-RS 27.09.23 1.57pm	Aluminium (dissolved)	0.06 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1

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Water	Client	29-September-2023

<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>
23Sep-0257	YR2-RS 27.09.23 1.57pm				
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	13.7 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	34 mg/L	LTM-W-038	2
		Iron (dissolved)	0.04 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.02 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	10 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

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Water	Client	29-September-2023

<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>
23Sep-0258	SSC-IS 27.09.23 2.09pm	Aluminium (dissolved)	0.25 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	12.9 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	54 mg/L	LTM-W-038	2
		Iron (dissolved)	0.09 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	5.36 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	5 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.04 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	5 mg/L	LTM-W-034	0.2

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Water	Client	29-September-2023

<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>
23Sep-0258	SSC-IS 27.09.23 2.09pm	Total Suspended Solids	5 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0259	TR-RS 28.09.23 12.52pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	3.04 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	8 mg/L	LTM-W-038	2
		Iron (dissolved)	0.02 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01

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Water	Client	29-September-2023

<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>
23Sep-0259	TR-RS 28.09.23 12.52pm	Phosphorus, Total	0.03 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	11 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0260	YK-IS(d/s) 28.09.23 1.13pm	Aluminium (dissolved)	0.34 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	0.007 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	<2 mg/L	LTM-W-038	2
		Iron (dissolved)	0.26 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000

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Water	Client	29-September-2023

<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>
23Sep-0260	YK-IS(d/s) 28.09.23 1.13pm	Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.02 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	9 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0261	NZG-IS 28.09.23 1.36pm	Aluminium (dissolved)	0.19 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	3.04 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	8 mg/L	LTM-W-038	2
		Iron (dissolved)	0.14 mg/L	APHA 3030 B/3120 B	0.01

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0261	NZG-IS 28.09.23 1.36pm	Lead (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.04 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0262	YK-IS 28.09.23 1.52pm	Aluminium (dissolved)	0.49 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000

NGH Environmental
35 Kincaid Street
Wagga Wagga NSW 2650
Attention: Nicola Smith

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LABORATORY ANALYSIS REPORT

Report Number: 2309-0088

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For all enquiries related to this report please quote document number: 2309-0088

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0262	YK-IS 28.09.23 1.52pm	Copper (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	<2 mg/L	LTM-W-038	2
		Iron (dissolved)	0.32 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.11 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0263	YK-RS 28.09.23 2.03pm	Aluminium (dissolved)	0.69 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1

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		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0263	YK-RS 28.09.23 2.03pm				
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	<2 mg/L	LTM-W-038	2
		Iron (dissolved)	0.53 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.007 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.08 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.002

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		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0264	DUP01 28.09.23 12.52pm	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Iron (dissolved)	0.02 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
23Sep-0265	Water Blank 27.09.23	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002

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		29-September-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	Client	29-September-2023

<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>
23Sep-0265	Water Blank 27.09.23				
		Total Hardness as CaCO ₃	<2 mg/L	LTM-W-038	2
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 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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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>			
		29-September-2023			
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>			
Water	Client	29-September-2023			
<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				

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*

CLIENT:		NGH Pty Ltd		ANALYTES REQUIRED Complete & tick as required																									
CONTACT:		Nicola Smith		E-mail		nicola.s@nghconsulting.com.au		Total Nitrogen		Total Phosphorus		Cyanide		Total Suspended Solids		Total Dissolved Solids		Dissolved Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)		Total hardness		Ammonia		Reactive Phosphorus					
ADDRESS:		35 Kincaid Street Wagga Wagga NSW 2650 ABN: 31 124 444 622		DATE SAMPLED		TIME SAMPLED		CONTAINER TYPE		NUMBER OF CONTAINERS		Total Nitrogen		Total Phosphorus		Cyanide		Total Suspended Solids		Total Dissolved Solids		Dissolved Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)		Total hardness		Ammonia		Reactive Phosphorus	
TELEPHONE:		0410 411 660		27/9/23		12:43		SAR		3		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				27/9/23		12:52		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				27/9/23		1:08		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				27/9/23		1:18		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				27/9/23		1:35		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				27/9/23		1:57		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				27/9/23		2:09		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				28/9/23		12:52		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				28/9/23		1:13		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				28/9/23		1:36		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				28/9/23		1:52		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				28/9/23		2:03		"		"		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				28/9/23		12:52		"		1		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				-		-		"		3		✓		✓		✓		✓		✓		✓		✓		✓		✓	
				-		-		"		3		✓		✓		✓		✓		✓		✓		✓		✓		✓	

RELINQUISHED BY:	NAME	SIGNATURE	ORGANISATION	DATE	TIME
Mode of Transport Include Consignment Note # if applicable	Martin Wagg	<i>[Signature]</i>	NGH Pty Ltd	29/9/23	9:20AM
RECEIVED BY:	Delivery				
	J. Maybury	<i>[Signature]</i>		29/9/23	9:20

APPENDIX D RPD TABLE

	Event 12	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 13	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 14	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 15	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 16	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 17	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 18	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 19	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002

RPD % $\frac{|(X_2 - X_1)|}{((X_2 + X_1)/2)}$

How to calculate the Relative Percent Difference (RPD)

The basic equation for RPD is

$$RPD = \frac{|R1 - R2|}{\left(\frac{R1 + R2}{2}\right)} \times 100,$$

where

R1 is sample 1, and

R2 is sample 2.

R1 and R2 are your sample and duplicate values. Basically, this equation has you calculate the RPD by dividing the difference between the sample and duplicate by the average of the two. Using absolute value signs ensures the RPD doesn't end up as a negative percentage, which wouldn't make sense when looking for a percent difference.

The equation you plug into Excel looks like this:

$$=ABS((B3-C3)/AVERAGE(B3:C3)*100)$$

ABS stands for Absolute Value. Using the cell labels in the equation, as seen above (B3, C3), allows you to use the equation down for all your sample/duplicate pairs so you don't have to write a new equation each time. You can do this by clicking on the cell with the equation in it, then click and drag the bottom right corner of the cell down for the rest of your samples.

APPENDIX E CALIBRATION CERTIFICATES

Multi Parameter Water Meter

Instrument **YSI Pro DSS**
Serial No. **15J101503**



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:			

Certificate of Calibration

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
2. pH 7.00		pH 7.00		393774	pH 7.02
3. pH 4.00		pH 4.00		399527	pH 3.98
4. ORP		235.6 mV		A405006/B398193	235.4 mV
5. SPC		2760uS/cm		385789	2764 uS/cm
6. D.O		0%		391223	-0.20%
7. Turbidity		100 NTU		396426	99.60 NTU
8. Temp		22.0 °C		MultiTherm	22.0 °C

Calibrated by: Guido Camera

Calibration date: **20/09/2023**

Next calibration due: **18/03/2024**