REPORT

EPL 21266 – BI-ANNUAL MONITORING REPORT
JUNE – NOVEMBER 2023

S2-FGJV-ENV-REP-0095

Rev A

JANUARY 2024

ABSTRACT

This document provides a summary of surface- and ground-water quality and associated information for monitoring conducted as part the Snowy 2.0 project, across monitoring locations pertaining to Environmental Protection Licence (EPL) 21266.

Revision Record

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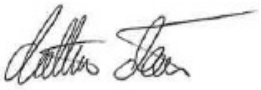
A ccountable:	Name: Ellen Porter Job Title: Environment Manager Signed: PP  Date: 22/01/2024
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A	29/06/2023	Issued for information
B	06/07/2023	Revised to incorporate SHL comments

CONTENTS

1. INTRODUCTION

Snowy 2.0 was declared State Significant Infrastructure and Critical State Significant Infrastructure by the NSW Minister for Planning under the provisions of the NSW Environmental Planning and Assessment Act 1979 and is defined in Clause 9 of Schedule 5 of the State Environmental Planning Policy (State and Regional Development) 2011.

An Infrastructure Approval No. SSI 9208 based on the Environmental Impact Statement (EIS) submitted for the Snowy 2.0 Exploratory Works was received on February 7, 2019.

An Environment Protection Licence No. 21266 (EPL - 21266) under Section 55 of the Protection of the Environment Operations Act 1997 (NSW) was issued to Snowy Hydro Ltd (Snowy Hydro) on May 9, 2019, by the New South Wales Environment Protection Authority (NSW EPA) for land based extractive activities at Lobs Hole and Talbingo Reservoir in Kosciuszko National Park.

Webuild, Clough, and Lane have formed the Future Generation Joint Venture (Future Generation) and have been engaged by Snowy Hydro to deliver both Stage 2 of Exploratory Works and Snowy 2.0 Main Works. As required by EPL - 21266 Future Generation have undertaken a monthly monitoring program to assess the influence of the Snowy 2.0 Main Works project on groundwater and receiving surface water quality across the Project, specifically the work sites of Talbingo, Lobs Hole, Tantangara, Marica and Rock Forest.

This report has been prepared by Melanie Kleine, an environmental consultant for Future Generation. Melanie holds a Bachelor of Environmental Science, and has over 5 years' experience in environmental assessment, management and reporting across various construction and infrastructure projects.

This report has been reviewed by Dr Ellen Porter, Environmental Manager for Future Generation. Ellen holds a PhD in Organic Geochemistry, is a Certified Environmental Practitioner (no. 1080), and has 12 years' experience in the field of environmental assessment, monitoring and reporting. Therefore, this report has been prepared by and reviewed by suitably qualified and experienced persons fulfilling the requirement of condition R4.3 of EPL 21266.

1.1. Purpose

The purpose of this report is to provide a six (6) monthly update of surface water and groundwater monitoring undertaken for the Snowy 2.0 project in accordance with Condition R4.2 of EPL 21266.

Section 2, Condition P1.2 of EPL 21266 identifies the points required for monitoring, these points are presented on **Figures 1.1** – **1.5** of **Appendix A** and listed in Table 1-1 below.

Table 1-1: EPL21266 Location Names, Co-Ordinates, and Description

Name	X	Y	Location	Sample Type	Description
EPL1	148.413	-35.792	Lobs Hole	Groundwater	Wallace Creek Bridge
EPL2	148.413	-35.792	Lobs Hole	Groundwater	Wallace Creek Bridge
EPL4	148.415	-35.788	Lobs Hole	Groundwater	Lobs Hole Portal Access
EPL5	148.416	-35.785	Lobs Hole	Surface Water	Yarrangobilly River, upstream of the exploratory tunnel and construction pad
EPL6	148.412	-35.793	Lobs Hole	Surface Water	Wallaces Creek, upstream of the confluence of Yarrangobilly River and Wallaces Creek
EPL8	148.401	-35.789	Lobs Hole	Surface Water	Yarrangobilly River, downstream of Lick Hole Gully
EPL9	148.387	-35.782	Lobs Hole	Surface Water	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir
EPL10	148.38	-35.773	Lobs Hole	Reservoir Water	Talbingo Reservoir, upstream of Lobs Hole STP/PWTP diffuser outlet and water intake point
EPL11	148.375	-35.771	Lobs Hole	Reservoir Water	Talbingo Reservoir, downstream of Lobs Hole STP/PWTP diffuser outlet
EPL12	148.414	-35.789	Lobs Hole	Surface Water	Yarrangobilly River, immediately downstream of portal pad
EPL14	148.405	-35.794	Lobs Hole	Surface Water	Yarrangobilly River, downstream of road construction areas
EPL15	148.404	-35.792	Lobs Hole	Surface Water	Yarrangobilly River, downstream of road construction areas
EPL16	148.393	-35.785	Lobs Hole	Surface Water	Yarrangobilly River, downstream of road construction areas
EPL24	148.389	-35.78	Lobs Hole	Surface Water	Yarrangobilly River tributary (Watercourse 2), directly downstream of road
EPL25	148.415	-35.788	Lobs Hole	Groundwater	Portal Access
EPL26	148.488	-35.794	Marica	Surface Water	Eucumbene River, downstream of Marica Road
EPL27	148.488	-35.794	Marica	Surface Water	Eucumbene River, upstream of Marica Road

EPL28	148.654	-35.748	Tantangara	Reservoir Water	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River. Variable location dependent on tide and reservoir levels.
EPL29	148.661	-35.793	Tantangara	Reservoir Water	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River
EPL30	148.652	-35.801	Tantangara	Surface Water	Kellys Plain Creek, downstream of accommodation camp and laydown areas
EPL31	148.648	-35.806	Tantangara	Surface Water	Kellys Plain Creek, upstream of accommodation camp and laydown areas
EPL32	148.659	-35.79	Tantangara	Reservoir Water	Tantangara Reservoir, Tantangara Intake. Downstream of construction works
EPL33	148.664	-35.795	Tantangara	Surface Water	Murrumbidgee River, downstream of Tantangara reservoir outlet
EPL34	148.633	-35.865	Tantangara	Surface Water	Nungar Creek, upstream of Tantangara Road
EPL35	148.633	-35.865	Tantangara	Surface Water	Nungar Creek, downstream of Tantangara Road
EPL36	148.668	-35.952	Rock Forest	Surface Water	Camerons Creek, upstream of works in Rock Forest
EPL37	148.675	-35.948	Rock Forest	Surface Water	Camerons Creek, downstream of works in Rock Forest
EPL38	148.653	-35.769	Tantangara	Reservoir Water	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities
EPL39	148.639	-35.761	Tantangara	Reservoir Water	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works
EPL40	148.623	-35.755	Tantangara	Reservoir Water	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works
EPL41	148.381	-35.772	Talbingo	Reservoir Water	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir
EPL42*	148.375	-35.772	Talbingo	Discharge Point	Diffuser outlet discharging into Talbingo Reservoir from Lobs Hole STP/PWTP
EPL43*	148.381	-35.772	Talbingo	Volume Outflow	Lobs Hole STP/PWTP Final Volume Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.
EPL44*	148.417	-35.787	Lobs Hole	Volume Inflow – PWTP	Lobs Hole (MAT Portal) PWTP Inflow Volume Monitoring Point
EPL45*	148.393	-35.783	Talbingo	Volume Inflow – Ex-Camp STP	Lobs Hole Ex-Camp STP Inflow Volume Monitoring Point

EPL46*	148.657	-35.795	Tantangara	Discharge Point	Diffuser outlet discharging into Tantangara Reservoir from Tantangara STP / PWTP
EPL47	148.392	-35.783	Talbingo	Volume Inflow – Main Camp STP	Talbingo Main Camp STP Inflow Monitoring Point
EPL48	148.656	-35.802	Tantangara	Volume Inflow STP	Tantangara STP Inflow Volume Monitoring Point
EPL49	148.65	-35.791	Tantangara	Volume Inflow PWTP	Tantangara PWTP Inflow Volume Monitoring Point
EPL50	148.651	-35.791	Tantangara	Volume Outflow	Tantangara STP/PWTP final effluent quality and volume monitoring point
EPL51	148.66	-35.794	Tantangara	Surface Water	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet.
EPL52^	148.338	-35.778	Lobs Hole	Surface Water	Talbingo Reservoir, upstream of GF01 emplacement area
EPL53^	148.391	-35.774	Lobs Hole	Surface Water	Talbingo Reservoir upstream East of GF01 emplacement area
EPL54^	148.389	-35.775	Lobs Hole	Surface Water	Talbingo Reservoir Upstream West of GF01 emplacement area
EPL55^	148.387	-35.778	Lobs Hole	Surface Water	Yarrangobilly River, Surface Water Downstream of GF01 emplacement area
EPL56^	148.391	-35.774	Lobs Hole	Groundwater	Ground Water Upstream East from GF01 emplacement area
EPL57^	148.389	-35.775	Lobs Hole	Groundwater	Ground Water Upstream West from GF01 emplacement area
EPL58^	148.389	-35.777	Lobs Hole	Groundwater	Ground Water Downstream from GF01 emplacement area
EPL59^	148.644	-35.761	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB1
EPL60^	148.644	-35.760	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB2
EPL61^	148.648	-35.76	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB3
EPL62^	148.649	-35.762	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB4
EPL63^	148.649	-35.763	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB5
EPL64^	148.64	-35.767	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB6
EPL65^	148.648	-35.7641	Tantangara	Surface Water	Tantangara Leachate Basin Tan-SW-SB7
EPL66^	148.651	-35.763	Tantangara	Surface Water	Tantangara Leachate Basin Downstream East from Tantangara emplacement area Tan-SW-DSE
EPL67^	148.642	-35.760	Tantangara	Surface Water	Nungar Creek Surface Water Downstream West from Tantangara emplacement area Tan-SW-DSW

EPL68^	148.644	-35.760	Tantangara	Groundwater	Ground Water Downstream East from Tantangara emplacement area Tan-GW-DSE
EPL 69^	148.650	-35.763	Tantangara	Groundwater	Ground Water Downstream West from Tantangara emplacement area Tan-GW-DSW
EPL 70^	148.645	-35.770	Tantangara	Groundwater	Ground Water Upstream from Tantangara emplacement area Tan-GW-US
EPL71^	148.470	-35.788	Marica	Surface Water	Surface water downstream from Marica emplacement area MAR-SW-US
EPL72^	148.466	-35.788	Marica	Groundwater	Groundwater upstream from Marica emplacement area MAR-GW-US
EPL73^	148.453	-35.787	Marica	Groundwater	Groundwater downstream from Marica emplacement area MAR-GW-DS
EPL76^	148.667	-35.949	Rock Forest	Surface Water	Groundwater Sediment Basin 1 from Rock Forest emplacement area RF-SW-SB1
EPL77^	148.668	-35.950	Rock Forest	Surface Water	Groundwater Sediment Basin 2 from Rock Forest emplacement area RF-SW-SB2
EPL78^	148.668	-35.951	Rock Forest	Surface Water	Groundwater Sediment Basin 3 from Rock Forest emplacement area RF-SW-SB3
EPL79^	148.666	-35.952	Rock Forest	Surface Water	Groundwater Sediment Basin 4 from Rock Forest emplacement area RF-SW-SB4

*these EPL points do not require any water quality monitoring for the purposes of EPL21266

^ GPS Coordinates are a guide only, ground truthing is required and sampling locations will be determined based on conditions in field.

1.2. Conditions of Report

As per Section 6, Condition R4.3 of EPL 21266 this report must include the information listed in **Table 1.2**.

Table 1-2: EPL 21266 Environmental Monitoring Report Requirements

Environmental Monitoring Report requirement	Report Section
Results of all water quality monitoring undertaken in the preceding six (6) month period	Appendix B, Appendix C
Results of all weather monitoring undertaken in the preceding six (6) month period	Section 2
Assessment of historical trends in all water sampling data for each monitoring point inclusive of the current six (6) month period	Section 3

Identification of instances where the water quality objective triggers for each relevant pollutant were exceeded at receiving water locations and/or where the predicted discharge water quality was exceeded at sediment basin discharge points;	Section 3, Appendix C, Appendix D
Include details of any actions taken by the Licensee in response to exceedances identified including but not limited to: **i. additional monitoring** **ii. remedial actions; and** **iii. activation of trigger, action, response plans (TARPs);**	Sections 3 and 4
Recommendations for future actions in relation to monitoring and/or management	Section 4

1.3. EPL Variations in Reporting Period

During this reporting period of June to November 2023 there has been one variation to EPL 21266. An EPL variation was issued on 06 July 2023 which included:

- clarification of reporting with regards to Environmental Monitoring and Spoil Reporting (R4.2-R4.4, and R4.5-R4.7, respectively);
- remaining actions of Pollution Reduction Programmes (U1.1 and U2.2);
- additional monitoring points (detailed in Table 1-1); and
- additional operating conditions (O5.7 and O5.8).

1.4. Project Updates

This bi-annual monitoring update includes June – November 2023 EPL sampling rounds. This period included significant progress of the Main Works package of the Snowy 2.0 Project. A summary of construction activities at each site is outlined below.

1.4.1. Talbingo – (Talbingo Adit Portal / Talbingo Intake / Main Camp / Ex Camp / GF01)

- Line drilling works are ongoing.
- Trail blasts completed.
- Stage 2 bench 1 excavation & ground support is completed.
- Bench 3 excavation completed.
- Bench 5 excavation & ground support ongoing.
- MC81 & MC82 access road excavation and ground support ongoing.
- TBM 2.2 have installed 151 rings during the period, totaling 476 permanent rings.

1.4.2. Lobs Hole – (Mat Portal / Main Yard / ECVT / Ravine Road)

- Pad F – Training centre buildings completed.
- Fill and spoil processing is ongoing from D&B tunnels to GF01.
- 350mm tunnel dewatering pipeline works along the mine trail road works on hold FGJV working on ERS comments for IFC.
- TransGrid pad (Pad F7) extension works completed.
- Main precast shed erection completed, roofing completed and walls ongoing.

- ECVT- TBM 1 have installed a total of 1,460 permanent, completing ECVT01 tunnel and TBM1 modification works ongoing for IPS construction.
- Asphalt laying of Ravine Road was completed.

1.4.3. Marica

- Camp expansion, 3 buildings construction and commissioning completed.
- Marica Trail widening between CH0 – CH4700 ongoing.
- Road maintenance works are in progress.
- Weighbridge commissioning completed.
- Drain works ongoing at cut 6.

1.4.4. Tantangara

- Camp road, general maintenance works ongoing.
- Sink hole remediation works completed from Rig 1/Rig 2 and from the surface on top the TBM.
- Slurry Treatment Plant commissioning completed and ready to use.
- TBM conversion to closed mode completed and ready for mining.
- Pre-consolidation from TBM3 and surface completed.

1.4.5. Trunk Services

- Maintenance of ERSED controls ongoing.
- Winterisation of works including filling of pits to minimize water ingress.
- HDD drilling recommencement in Spring.
- Ongoing monitoring and inspections completed for Gooandra Trail.
- Road maintenance works.

1.4.6. Rock Forest

- Storage of materials including delivery of segments 24/7
- Sediment basin expansion completed
- SHL subcontractor expansion works ongoing

2. WEATHER MONITORING RESULTS

2.1. Weather Stations

There are several weather stations along the alignment of the Project that report real-time data. These include:

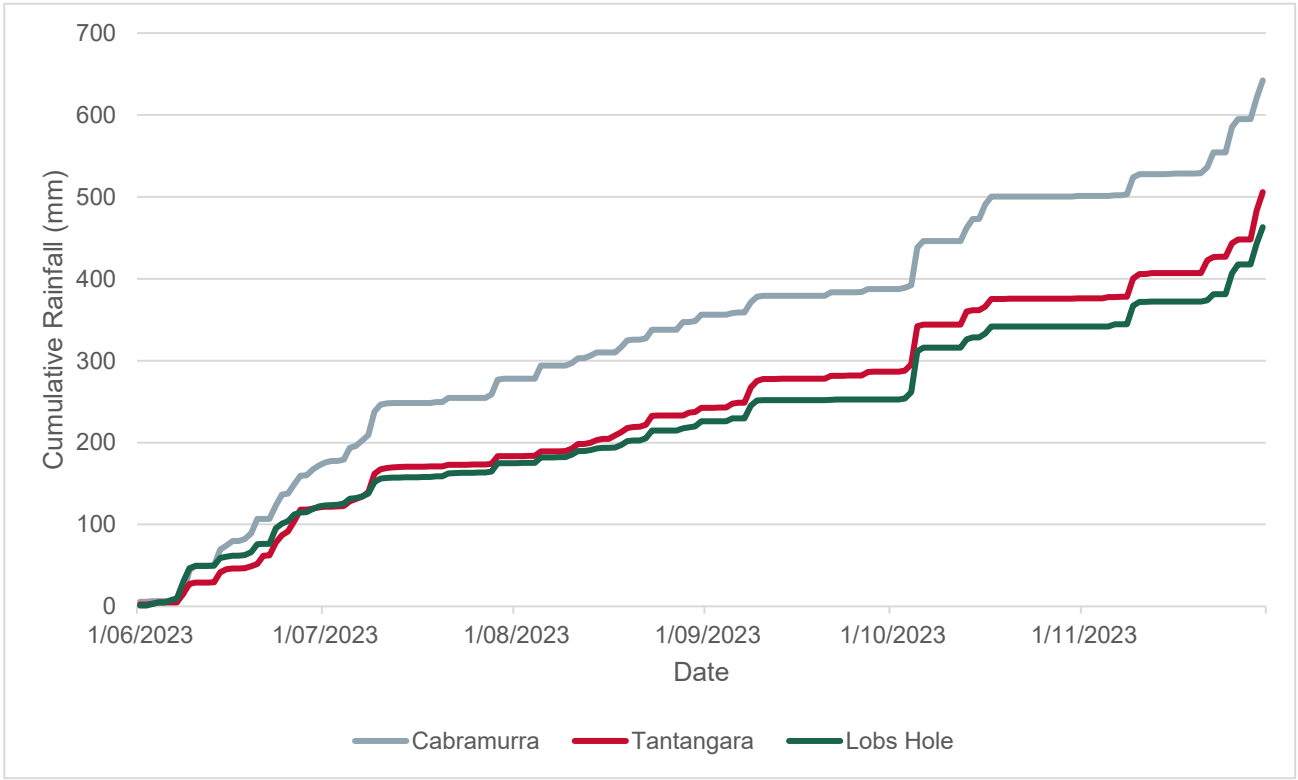
- "Lobs Hole" - an automatic weather station managed by Future Generation in Lobs Hole Main Yard.
- "Cabramurra" - an automatic weather station located near the lookout in the Cabramurra township managed by the Bureau of Meteorology (BoM)
- "Tantangara" - an automatic weather station managed by Future Generation in Tantangara construction site.

The Tantangara and Lobs Hole gauges are in sub-alpine environments, with elevations of approximately 1200 m and 600 m, respectively. Cabramurra records substantially higher annual rainfall amount than the lower-elevation gauges at Lobs Hole and Tantangara. Tantangara and Lobs Hole weather stations record actual onsite conditions at the respective construction sites, while Cabramurra weather station, at 1470 m is representative of conditions at Marica which has an elevation of 1480 m and is approximately 15 km north of the Cabramurra Station.

2.2. Rainfall Data

The cumulative rainfall between June and November 2023 is presented in **Figure 2-1.**

Figure 2-1: **Cumulative Rainfall across Lobs Hole, Tantangara and Cabramurra**



At each of the three rainfall recording sites (Tantangara, Lobs Hole, and Cabramurra), the highest volume of rain that fell in a single day are as follows:

- 50.2 mm at Lobs Hole – 05 October 2023
- 30.0 mm at Cabramurra (Marica) – 09 June 2023
- 46.8 mm at Tantangara – 05 October 2023

On the five-day time scale, the heaviest precipitation events were as follows:

- Lobs Hole: 63.4 mm between the 2 and 6 October 2023;
- Cabramurra (Marica): 66.4 mm between 25 and 29 November 2023; and
- Tantangara: 57.6 mm between 2 and 6 October 2023

Table 2-1: Recorded rainfall (mm) across Snowy 2.0 worksites. Long Term Average (LTA) rainfall data from BOM. Lobs Hole average rainfall taken from Tumbarumba total weather station. Tantangara taken from Adaminaby Alpine Tourist Park Weather Station

	Tantangara		Cabramurra (Marica)		Lobs Hole	
Month	Monthly (mm)	LTA	Monthly	LTA	Monthly	LTA
June	120.8	57.8	172.0	124.5	122.0	102.3
July	62.8	53.8	106.0	113.8	53.0	103.6
August	59	59.7	78.2	127.7	51.0	106.2
September	43.8	60.1	31.4	120.0	26.4	90.0
October	89.6	67.8	113.4	109.4	89.2	95.2
November	129.8	58.9	141.2	122.9	121.4	77.0

Following the trends outlined in the previous Bi-annual Monitoring Report, the Summer and Autumn rainfall produced generally much higher than average rainfall for the region (**Table 2-1**).

2.3. Temperature Data

Figure 2-1 to **igure 2-3**: Lobs Hole - Minimum and Maximum Temperatures

show temperature maximum and minimums across the project at Lobs Hole and Cabramurra weather stations.

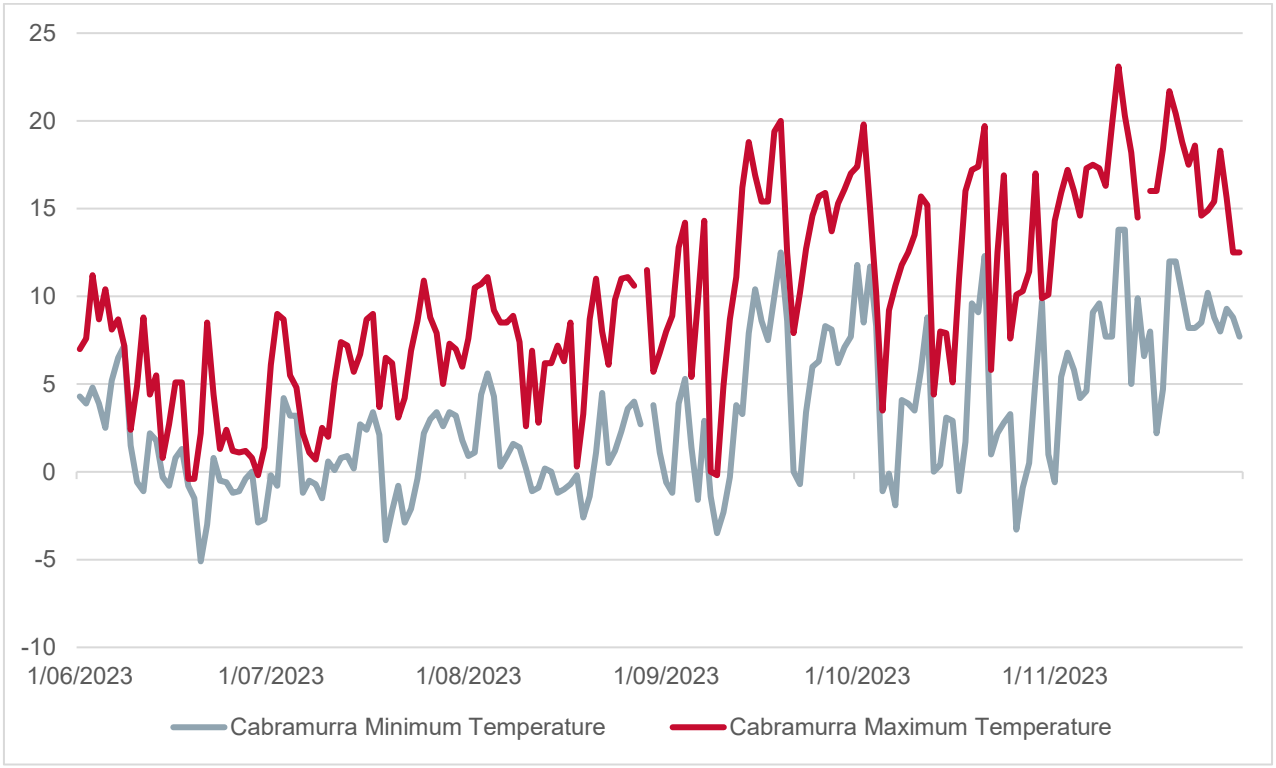


Figure 2-2: Cabramurra (Marica) - Minimum and Maximum Temperatures

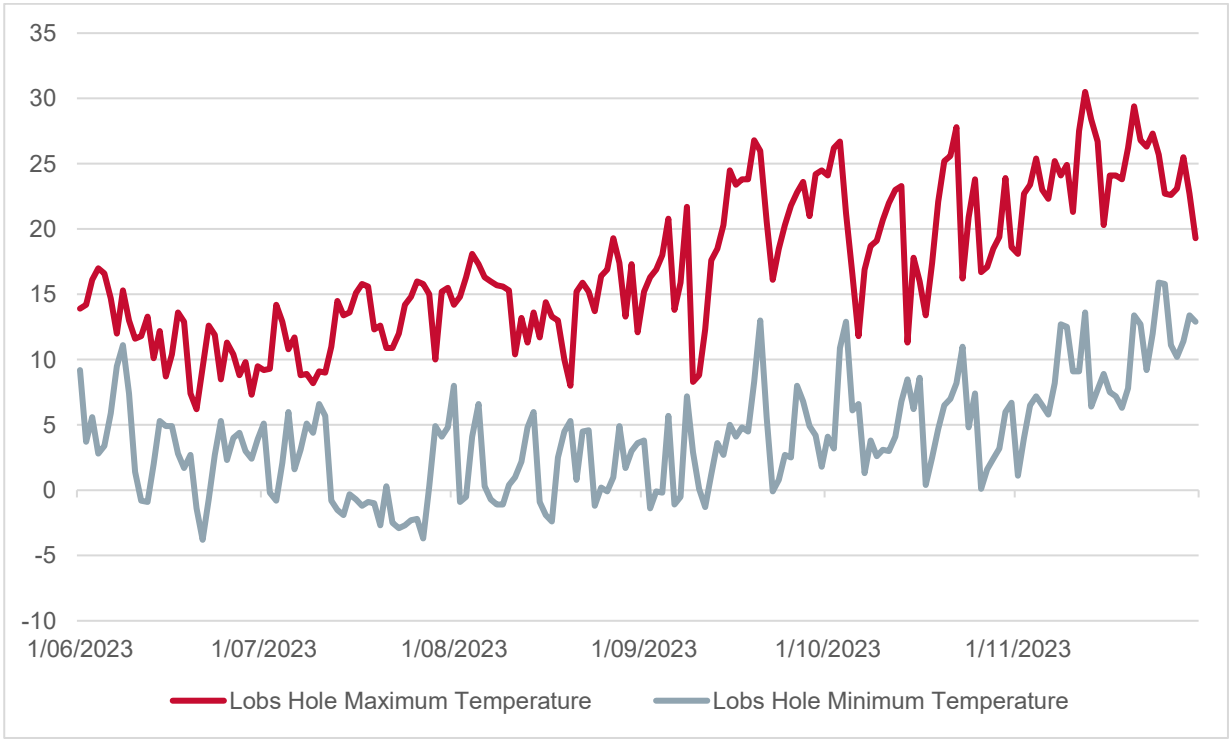


Figure 2-3: Lobs Hole - Minimum and Maximum Temperatures

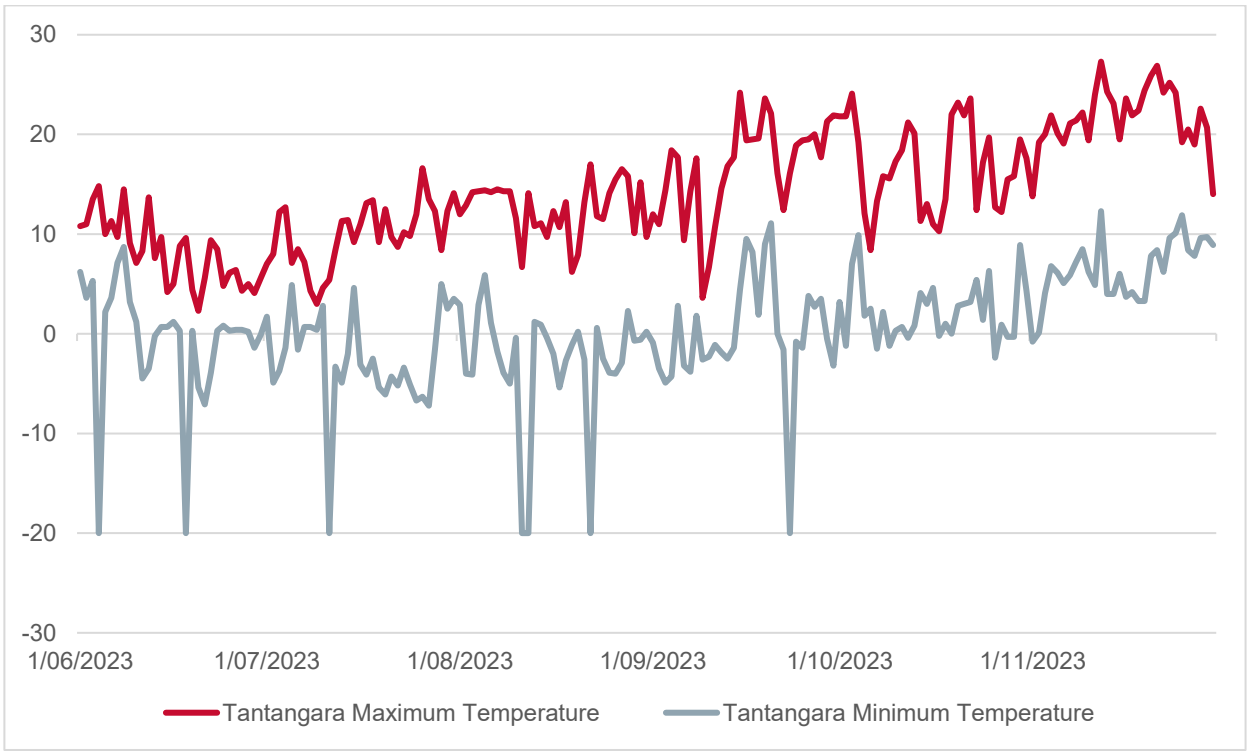


Figure 2-4: Tantangara - Minimum and Maximum Temperatures

3. MONITORING RESULTS

3.1. December 2022 – May 2023 Water Quality Monitoring

Water Quality Monitoring results are provided in **Appendix B** and **C** for monthly EPL monitoring rounds. The sampling work was performed in accordance with:

- S2-FGJV-ENV-PLN-0010 Water Management Plan – Snowy 2.0 Main Works
- AS 5667:1 - Water quality- Sampling: Guidance on the design of sampling programs and the preservation and handling of samples;
- AS 5667:4 - Water quality - Sampling: Guidance on the sampling of lakes, natural and man made;
- AS 5667:6 - Water quality - Sampling: Guidance on the sampling of rivers and streams; and
- AS 5667:11 - Water quality- Sampling: Guidance on the sampling of groundwater.

3.2. In situ Monitoring

Under Section 6 Condition R4.1, the EPA must be notified of any *in situ* pollution concentrations that exceed, or are outside the range of, relevant water quality trigger values within licenced premises (Condition R4.1 a) or at the designated EPL monitoring points (Condition R4.1 b).

Table 3-1: Number of Concentrations Exceeding or Outside the Range of Water Quality Objectives for Monthly EPL Monitoring

Water Quality Objectives	DO (%)	EC (µS/cm)	pH	Turbidity (NTU)	Comment
Range	90-110	>350 surface / groundwater >30 reservoirs	6.5-8	>25	
2023					
June	18	13	5	6	The exceedances in DO are related to changes in water temperature upstream and downstream and periods of heavy rainfall. DO results are consistent with historical results for EPL 10 and EPL11. There were only a few EC exceedances for the month. pH exceedances are minor and are unlikely to be the result of background impacts. Turbidity exceedances are reflective of rainfall events effecting runoff.
July	19	9	1	16	The DO exceedances are minor in surface waterways. The DO was recorded outside the range on a few occasions in the reservoir likely due to an algal bloom. There are some EC exceedances for groundwater, however within the historical variation for EPL points. pH and turbidity variations are reflective of historical variations and heavy rainfall conditions.
Aug	24	16	21	8	The DO and pH remain within the historical variations for most locations. Most upstream data is comparable with EPL results. EC exceedances are reflective of historical variations in data. Some turbidity exceedances are reflective of rainfall events. Variations and exceedances are reflective of natural historical changes.
Sep	26	11	10	9	The DO and pH variations are consistent with historical and upstream data. The EC exceedances were found at upstream locations only. Most turbidity results were minor, below 40 NTU and consistent with historical data. EPL 24 recorded an NTU of 100, reflective of conditions following a rain event.
Oct	20	6	6	29	There were a few exceedances for DO and turbidity due to runoff from rainfall events. Generally, exceedances were minor and mostly related to upstream

Nov	21	18	20	27	The DO and turbidity variations are consistent with historical and upstream data with pH and EC also remaining within historical variations.

All *in situ* monitoring results are presented in **Appendix B** – Field Monitoring Data.

Dissolved Oxygen and Electrical Conductivity was variable for the last 6 months, with Electrical Conductivity being considerably low for most months. The Dissolved Oxygen was high but reflective of the change in season from low to high temperatures and the presence of heavier rainfall.

After rainfall, it is expected that the waterbodies (rivers and reservoirs) within the project would see an increase in Electrical Conductivity concentrations, which is consistent with the in-situ monitoring results for the 6-month period. Turbidity is also known to vary significantly following a rain event, with sampling in June, July, October and November occurring during or directly following a significant rain event, which would account for the higher turbidity readings. pH is also variable within the project EPL sampling locations with exceedances generally marginally lower than the WQO.

Throughout the reporting period, rainfall events above the design criteria were experienced at all sites (Figure 2-1), including:

- 6-10 June 2023 (44.6 mm – Lobs Hole, 43.4mm - Marica)
- 23-27 June 2023 (38.2 mm – Lobs Hole, 55.8mm – Tantangara, 52.4mm - Marica)
- 5-9 July 2023 (39.6 mm – Tantangara, 58.8mm – Marica)
- 2-6 October (63.4 mm - Lobs Hole, 57.6 mm – Tantangara, 58.4 mm - Marica)
- 13-17 October (54.4 mm – Tantangara)
- 6-10 November (30.2 mm – Lobs Hole)
- 25-29 November (62.0 mm - Lobs Hole, 56.4 mm – Tantangara, 66.4 mm - Marica)

During high rainfall events which resulted in basin overtopping, water samples were collected for comprehensive water testing and the EPA were notified of the releases in accordance with R4.1 of EPL 21266.

3.3. Groundwater Monitoring

3.3.1. EPL 1, 2, 4, 25

Groundwater sampling was undertaken in August and November 2023 for EPL locations 1, 2, 4 and 25. Groundwater piezometer data is currently being processed for the Q1 and Q2 period. This report will be updated once the groundwater data is finalised.

Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, Laboratory analytes in August and November 2023 were less than, or within, relevant water quality trigger values except for:

- Phosphorus (total);
- Nitrite and Nitrate;
- Nitrogen (total);
- Aluminium (total);
- Arsenic (total);

- Arsenic (dissolved);
- Chromium III +IV (total);
- Chromium III +IV (dissolved);
- Copper (total);
- Copper (dissolved);
- Iron (total);
- Lead (total);
- Manganese (total);
- Nickel (total);
- Nickel (dissolved);
- Silver (total);
- Zinc (total);
- Zinc (dissolved).

The metals exceedances are representative of natural conditions as these metals occur naturally within the project area. The minor metals exceedances for zinc, iron, nickel and copper fall within standard fluctuations in this well, and the iron exceedance remains consistent with previous results. The nutrient exceedances fall within standard variation for these wells.

3.3.2. GF01

Groundwater sampling at GF01 was undertaken monthly during June to November 2023.

Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, Laboratory analytes were less than, or within, relevant water quality trigger values except for:

- Ammonia as N;
- Nitrogen (total);
- Iron;
- Reactive and total phosphorus;
- Aluminium;
- Arsenic;
- Chromium;
- Copper;
- Lead;
- Nickel;
- Silver; and
- Zinc.

GF01 sampling locations are monitored on a weekly basis for in-situ parameters and monthly for comprehensive parameters. Exceedances of Nitrogen, Ammonia, and a number of metals were observed in the leachate basin and nearby surface water at GF01 with some similar exceedances noted upstream at EPL 53. Comprehensive and in situ samples are collected on a weekly basis while an investigation is being undertaken to determine the source of elevated Nitrogen. Other analytes were within the WQO range. The TARP has been triggered for nutrient exceedances.

3.3.3. Main Yard and Lick Hole Gully

Groundwater sampling at Main Yard and Lick Hole Gully was undertaken monthly during October to November 2023. Sampling from June-September wasn't completed due to the groundwater wells (EPL80-EPL83) not being installed and developed.

Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, Laboratory analytes were less than, or within, relevant water quality trigger values except for:

- Nitrogen (total);
- Nitrite + Nitrate as N;
- Total phosphorus;
- Aluminium;
- Arsenic;
- Chromium;
- Copper;
- Iron;
- Lead;
- Nickel;
- Silver; and
- Zinc.

Main Yard (EPL82 and EPL83) and Lick Hole Gully (EPL80 and EPL81) sampling locations are monitored on a weekly basis for in-situ parameters and monthly for comprehensive parameters. Exceedances of Nitrogen, Phosphorous, and a number of metals were also observed in sediment basins and surface water locations within Main Yard and Lick Hole Gully with some similar exceedances noted. Comprehensive and in situ samples are collected on a weekly basis while an investigation is being undertaken to determine the source of elevated Nitrogen. Other analytes were within the WQO range. The TARP has been triggered for nutrient exceedances.

3.4. Surface Water

Surface water monitoring has been split up into:

- Talbingo and Tantangara Reservoirs;
- Lobs Hole;
- Tantangara; and
- Marica and Rock Forest.

3.4.1. Talbingo and Tantangara Reservoirs

Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, laboratory analytes in June to November 2023 were less than, or within, relevant water quality trigger values except for:

- Total Phosphorus
- Nitrite + Nitrate as N;
- Ammonia;
- Nitrogen;
- Aluminium;
- Copper (dissolved);
- Chromium;
- Iron;
- Manganese; and
- Zinc (dissolved).

For Talbingo Reservoir, the in situ samples were generally compliant with the WQOs. Those that did exceed were only minor and remain within historical variation. During the June 2023 monitoring round, EPL41 was sampled during a discharge event with in-situ parameters within WQO, however, comprehensive results indicated a minor exceedance of the WQO for Nitrogen, Aluminium, Chromium, Copper and Zinc. Discharge ceased while the results were being investigated and a TARP raised. No discharge occurred to Talbingo during July, with bi-weekly monitoring ongoing through the remainder of the reporting period. Water was predominantly used for irrigation, and only discharged in August when results indicated it was within WQO.

For Tantangara Reservoir, the in-situ samples were generally compliant with the WQOs. Those that did exceed were only minor and remain within historical variation. It is noted that EPL39 and EPL40 were dry for the month of November 2023, therefore there are no results available for interpretation. Discharges into Tantangara Reservoir during the reporting period were minimal due to water quality objectives not being achieved or the RO Plant not having enough water to need to discharge. Any water that was discharged was within WQO. The reservoir sample locations during the reporting period had minor exceedances that remained within historical variation.

3.4.2. Lobs Hole Surface Water

The predominant water body within the Lobs hole region is the Yarrangobilly River (**Appendix A**). It along with its tributaries constitute the EPL surface water sampling locations within the Lobs Hole area. Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, laboratory analytes between June to November 2023 were less than, or within, relevant water quality trigger values except for:

- Total Phosphorus
- Nitrite + Nitrate as N;
- Ammonia;
- Nitrogen (total);
- Arsenic (dissolved)

- Aluminium (dissolved);
- Chromium (dissolved);
- Iron (dissolved);
- Manganese;
- Nickel (dissolved);
- Zinc (dissolved).

Majority of WQO analytes were within parameters. Exceedances were generally consistent between upstream and downstream results. The more significant exceedances of total Phosphorous at EPL 24 were displaying concentrations that likely originated from biological materials with no evidence of depleted dissolved oxygen, indicating that any eutrophication is unlikely in these water bodies. EPL 24 is often dry and stagnant water which may lead to exceedances of WQOs.

3.4.3. Marica Surface Water

The predominant water body within the Marica are the headwaters of the Eucumbene River (**Appendix A**). Two samples are taken up and downstream of the Snowy 2.0 disturbance areas to make up the EPL sampling locations. Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, sampling results between June and November 2023 were less than, or within, relevant water quality trigger values with the exception of:

- Nitrogen;
- Ammonia as N;
- Phosphorus;
- Aluminium;
- Chromium;
- Iron;
- Lead (dissolved);
- Silver;
- Zinc (dissolved);

The exceedances to the water quality objectives within the Marica surface waters are considered natural in origin and not caused or added to by the ongoing construction works of Snowy 2.0 as results were generally consistent with upstream results. These exceedances did not trigger the need for further sampling, remedial actions, or TARPs.

3.4.4. Tantangara Surface Water

The predominant water bodies within the Tantangara region are the Nungar and Kelly's Plain Creeks (**Appendix A**). They, along with the outflow of the Tantangara Reservoir (behind the dam wall), make up the EPL surface water sampling locations within the Tantangara area. Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, results from monthly EPL sampling between June to November 2023 were less than, or within, relevant water quality trigger values except for:

- Nitrite + Nitrate as N;

- Nitrogen;
- Total Phosphorus;
- Iron (dissolved);
- Aluminium (dissolved);
- Chromium (dissolved);
- Manganese (dissolved); and
- Zinc (dissolved).

Majority of WQO analytes were within parameters. Similarly with the Lobs Hole and Marica surface water EPL sampling points, elevated concentrations above the WQO of metals and nutrients are all likely attributed to natural conditions. Exceedances were generally consistent between upstream and downstream results. Exceedance of ammonia is reflective of conditions following a rain event. The exceedances to the water quality objectives within the Tantangara surface waters are not considered to be caused or added to by the ongoing construction works of Snowy 2.0. These exceedances did not trigger the need for further sampling, remedial actions, or TARPs.

3.4.5. Rock Forest Surface Water

The predominant water body within Rock Forest is Cameron's Creek (**Appendix A**). Two samples are taken, up and downstream of the Snowy 2.0 disturbance areas to make up the EPL sampling locations. Analyte concentrations that exceed, or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, results from June to November 2023 were less than, or within, relevant water quality trigger values with the exception of:

- Ammonia as N;
- Phosphorus;
- Nitrite + Nitrate;
- Nitrogen (total);
- Aluminium (dissolved);
- Arsenic (dissolved);
- Chromium (dissolved);
- Manganese (dissolved);
- Nickel (dissolved);
- Iron (dissolved);
- Zinc (dissolved);

The monitoring results demonstrate that the water quality in the Rock Forest has consistency across multiple EPL monitoring events with the exceedances likely to be related to the decades of agricultural use. High nitrogens are likely caused by remanent cow excrement while increased metals can be attributed to standard natural/background concentrations in the surrounding soils. The accumulation of Iron was probably due to increasing rainfall and runoff. The oil and grease exceedances were evident in upstream and downstream locations, indicating the source of this contaminant being related to laboratory issues or from upstream.

The exceedances to the water quality objectives within the Rock Forest surface waters are not caused or added to by the ongoing construction works of Snowy 2.0. These exceedances did not trigger the need for further sampling, remedial actions or TARPs.

3.5. Trends

The Mann-Kendall statistical analysis test has been chosen to assess trends within surface water monitoring data. Mann-Kendall is non-parametric test that assesses monotonic trends over time; identified as increasing, decreasing, or showing no significant trend. This test has been selected because it does not assume a specific distribution of the data and is robust against outliers, making it suitable for environmental datasets that may exhibit non-normal behaviour.

In instances where the Mann-Kendall analysis has been inconclusive due to insufficient data, a comparison of key general statistics has been undertaken, including an evaluation of mean, standard deviation, minimum, and maximum values. This comparative analysis has allowed for an assessment of construction monitoring data and whether it falls within the ranges identified in pre-project, baseline data. When calculating the mean value, non-detects have been considered as the detection limit value, rather than half the detection limit value, for a conservative output and thus the mean results in this Report are biased to a higher value.

Detailed Mann-Kendall trend analysis and metric summaries are provided in Appendix A. For each monitoring location, a summary of trends, mean, minimum, maximum and standard deviation is provided.

Surface water

The following decreasing trends were identified:

- Aluminium – EPL 10, 11, 12, 14, 15, 16, 26, 27, 28, 29, 30, 31, 32, 34, 35, 38, 39, 40, and 41
- Arsenic – EPL 41, 50 and 51
- Chromium III + IV – EPL 41, 50, 51, 52 and 55
- Copper – EPL 52
- Iron – EPL 10, 12, 14, 16, 24, 29, 30, 32, 33, 35, 36, 41, 50, 52
- Manganese – EPL 5, 6, 8, 9, 12, 14, 15, 16, 33, 34, 35, 36, 37, 41, 50, 52 and 55
- Nickel – EPL 36, 37, 41, 50, 51, 52 and 55
- Lead – EPL 41, 50, 51, 52 and 55
- Silver - EPL 41, 50, 51, 52 and 55
- Zinc – EPL 51, 52 and 55
- Ammonia – 37, 41, 52 and 55
- Cyanide – EPL 41
- Kjeldahl Nitrogen – EPL 41 and 52
- Nitrate + Nitrite – EPL 41, 50 and 52
- Nitrogen – EPL 41 and 52
- Total Phosphorus – EPL 8, 9, 41, 52 and 55
- Hardness – EPL 28

- Total suspended solids – EPL 5, 8, 9, 10, 11, 12, 14, 16 and 31
- Oil and Grease – EPL 10,11, 12, 14, 16, 24, 31, 33, 35, 36, 37, 41, 50, 51, 52 and 55

The following increasing trends were identified:

- Arsenic – EPL 5, 6, 8, 9, 26, 27, 28, 30, 31, 36, 52 and 55
- Chromium III + IV – EPL 5, 6, 8, 9, 10, 11, 12, 15, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37 and 38
- Copper – EPL 6, 26, 27, 28, 29, 30 and 32
- Iron – EPL 51
- Manganese – EPL 40
- Nickel – EPL 5, 6, 8, 9, 11, 12, 14, 16, 26, 27, 28, 29, 30, 31, 32, 34 and 38
- Lead – EPL 5, 6, 8, 9, 10, 11, 12, 15, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38 and 41
- Silver – EPL 5, 6, 8, 9, 10, 11, 12, 15, 24, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36 and 38
- Zinc – EPL 5, 6, 8, 9, 11, 12, 15, 24, 26, 27, 28, 29, 30, 32, 34, 36 and 37
- Ammonia – EPL 27 and 51
- Kjeldahl Nitrogen – EPL 27 and 51
- Nitrate + Nitrite – EPL 10, 11, 24, 26, 28, 29, 30, 31, 32, 34, 36, 37, 38, 39 and 40
- Nitrogen – EPL 12, 24, 27, 39 and 51
- Total Phosphorus – EPL31, 35 and 40
- Reactive Phosphorus – EPL 29, 32, 39 and 51
- Hardness – EPL 6, 12, 14, 15, 16, 24, 30 and 41
- Total suspended solids – EPL 36 and 37

<u>Groundwater</u>

The following decreasing trends were identified:

- Aluminium – EPL 56, 57 and 58
- Arsenic – EPL 56
- Chromium III + IV – EPL 56, 57 and 58
- Copper – EPL 56, 57 and 58
- Iron – EPL 1, 56, 57 and 58
- Lead – EPL 56, and 57
- Manganese – EPL 1, 56 and 57
- Nickel – EPL 25, 56 and 57
- Silver – EPL 58
- Zinc – EPL 57 and 58

- Ammonia – EPL 56, 57 and 58
- Kjeldahl Nitrogen – EPL 56 and 67
- Nitrate + Nitrite – EPL 56
- Nitrogen – EPL 56 and 57
- Total Phosphorus – EPL 56, 57 and 58
- Hardness – EPL 58
- Total Suspended solids – EPL 57

The following increasing trends were identified:

- Copper – EPL 2
- Lead – EPL 2
- Manganese – EPL 58
- Silver – EPL 1 and 2
- Zinc – EPL 2 and 4
- Nitrogen – EPL 2 and 4

4. DISCUSSION

4.1. EPA Notifiable Events

See below the EPA notified events that triggered TARPs to be enacted onsite.

Table 4-1: Events Triggering TARP Implementation and EPA Notification

Date	Location	Event ID	Event	Outcome
30/06/2023	Marica	S2-FGJV-ENV-INC-2935	Ingress of sediment laden water into creek.	Remove the installed mitre drains and redirect the runoff from the road into the dirty water drain as per the PESCP TARP was enacted and samples were collected.
19/08/2023	Marica	S2-FGJV-ENV-INC-3100	Dirty Runoff entering natural creek at Marica	Sampling couldn't be completed due to no run-off visible during inspection.
04/10/2023	Lobs Hole	S2-FGJV-ENV-INC-3263	Sediment Laden Water Entering Yarrangobilly River	Construction teams to ensure integrity of bridges across site are maintained and any issues rectified.
05/10/2023	Tantangara, Marica and Lobs Hole	S2-FGJV-ENV-INC-3265	Overtopping Sumps and Basins	Conduct basin maintenance activities to maximise basin/sump capacity post rain event, where required.
10/10/2023	Lobs Hole	S2-FGJV-ENV-INC-3298	High Concentration of Nitrogen at EPL 81	Sampling frequency was increased of groundwater and surface water to monitor total Nitrogen concentrations. Potential sources/hotspots were investigated by completing a drilling program.
21/1/2023	Lobs Hole	S2-FGJV-ENV-INC-3331	Elevated Nitrogen in EPL83	Sampling frequency was increased of groundwater and surface water to monitor total Nitrogen concentrations. Potential sources/hotspots were investigated by completing a drilling program.
30/10/2023	Tantangara	S2-FGJV-ENV-INC-3369	Elevated Nitrogen in Groundwater	Sampling frequency was increased to monitor for Total Nitrogen concentrations.
21/11/2023	Lobs Hole and Marica	S2-FGJV-ENV-INC-3521	Sediment Basin Overtopping Event - Lobs Hole & Marica	Basin maintenance to be conducted.

4.2. Recommendations

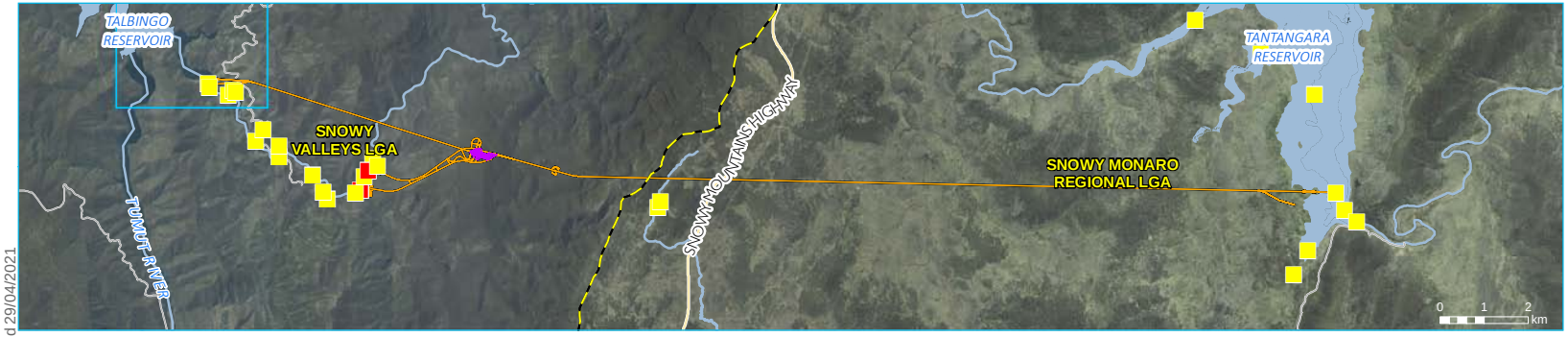
As noted throughout the report, the 6 monthly report for June to November 2023 will be revised with groundwater information once these results have been received.

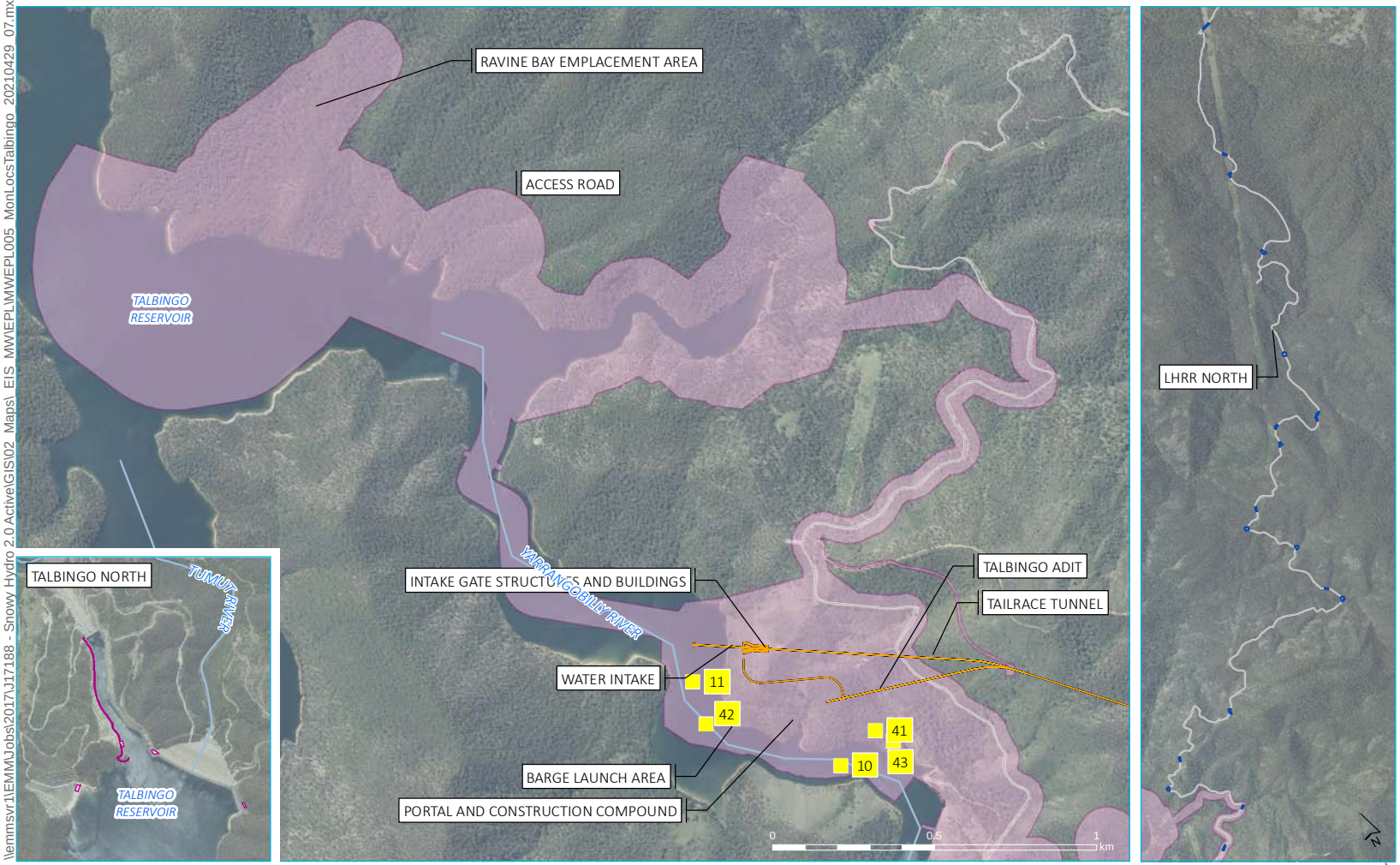
Nutrient exceedances are currently under investigation as to determine the source, with ongoing sampling at the relevant EPL locations and other locations being undertaken in accordance with the

TARP. In accordance with the Surface Water Management Plan, the results from comprehensive water quality monitoring are reviewed and actions implemented at a later time than in situ sampling due to the delay in receiving laboratory results. Considering this, response actions based on the comprehensive monitoring are being undertaken as soon as reasonably practicable. A greater depth of understanding of water quality impacts and impact mechanisms can be gained from the comprehensive monitoring and this information is being applied to establish specific improvements to the water management system. A more efficient method of receiving comprehensive results is being investigated.

Andrew McLeod from SEEC is a qualified CPESC and will continue carrying out ERSED assessments across the project to monitor, review and improve water and ERSED management.

APPENDIX A – SNOWY 2.0 – EPL SAMPLING LOCATIONS





KEY

EPL monitoring point
- Groundwater
- Surface water

Existing environment
- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Power station
- Licence Premise

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

EPL Premise and monitoring point maps - Talbingo Reservoir

Snowy 2.0
Main Works
Figure 1

\\emmsvr1\EMM\Jobs\2017\317188 - Snowy Hydro 2.0 Active\GIS\02_Maps_EIS_MW\EPL\MWEPL005_MonLocsTalbingo_20210429_07.mxd 29/04/2021

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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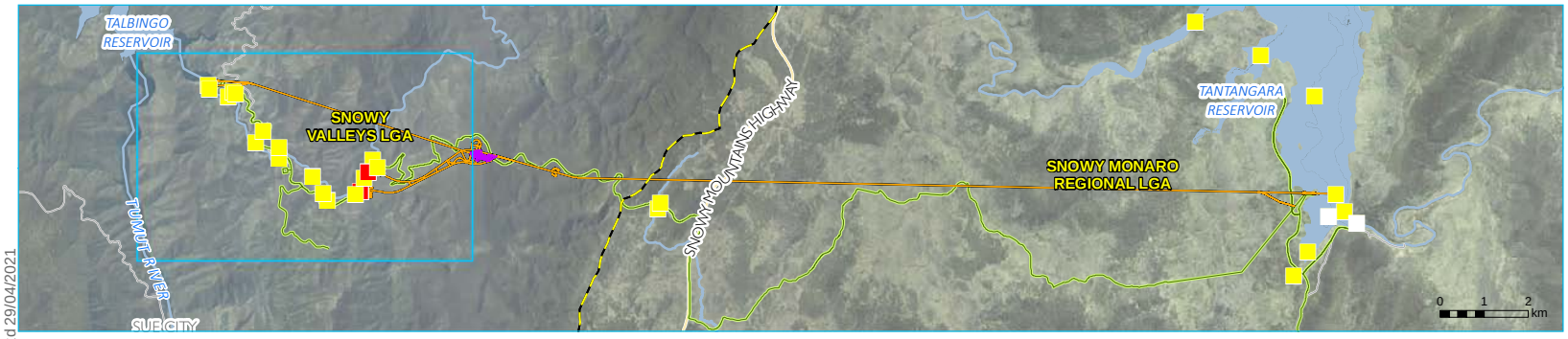

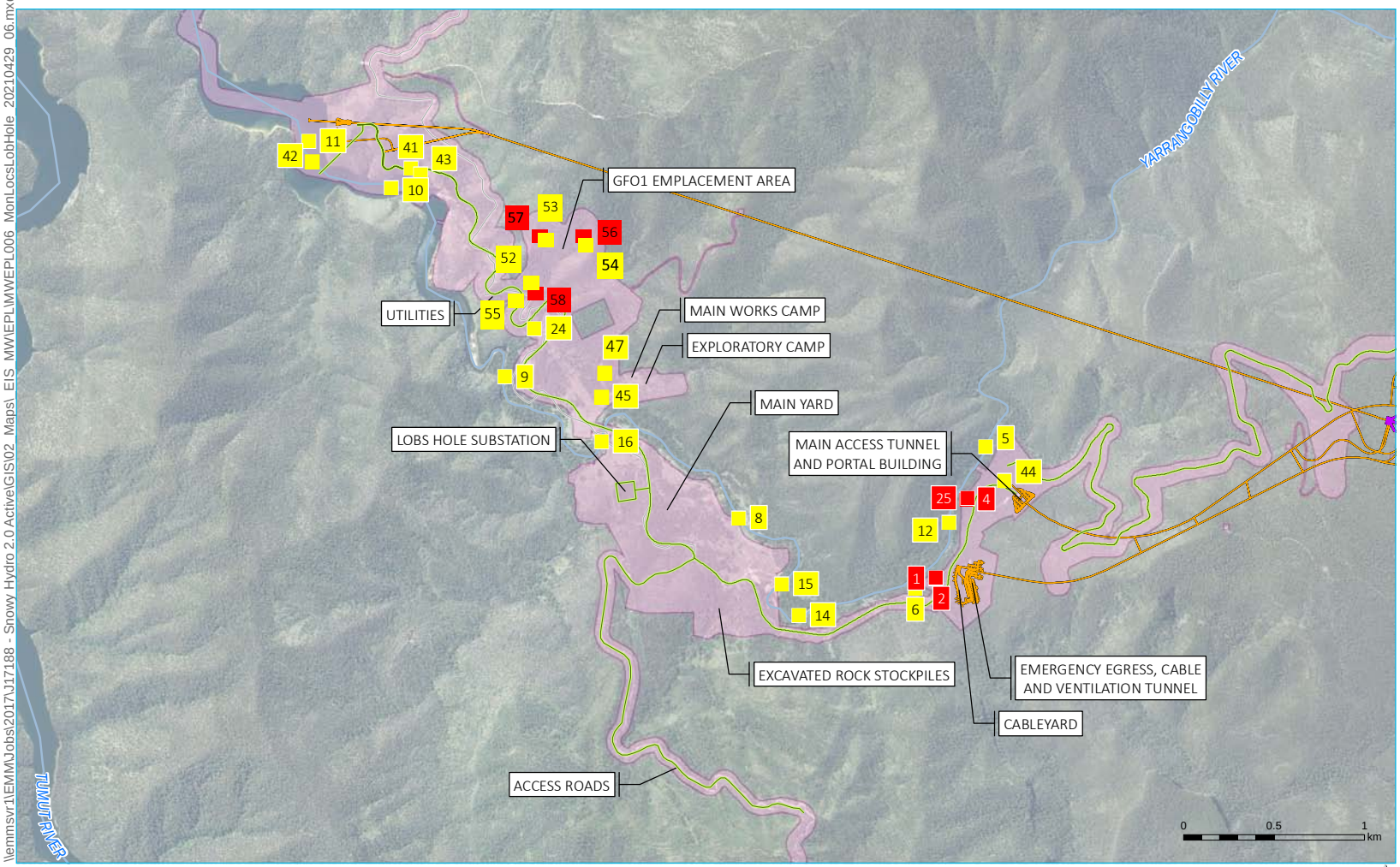

KEY

EPL monitoring point
- Groundwater
- Surface water

Existing environment
- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Licence Premise

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

EPL Premise and monitoring point maps - Lobs Hole

Snowy 2.0
Main Works
Figure 2

\\emmsvr1\EMMJobs\2017\J17188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MWEPLMWEPL006 MonLocsLobHole 20210429 06.mxd 29/04/2021

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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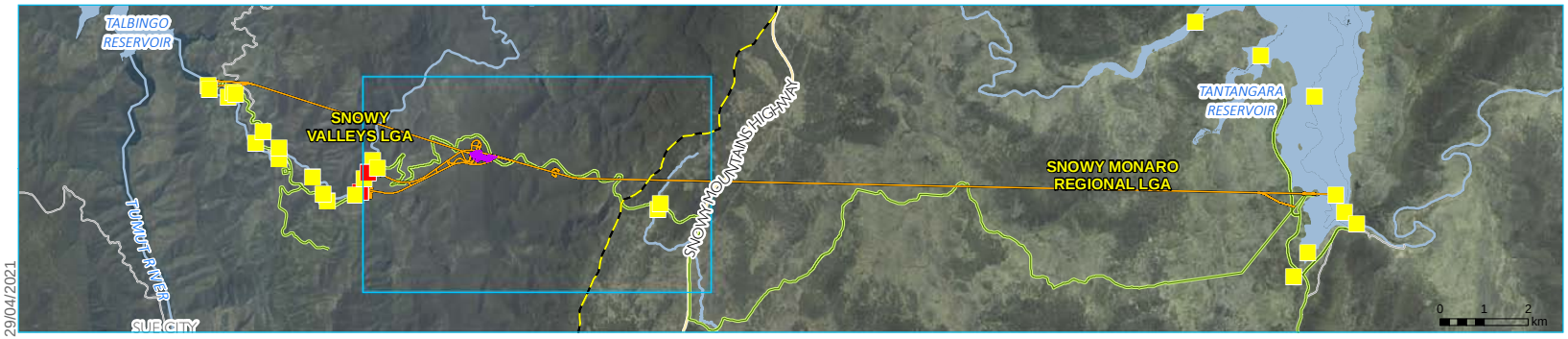
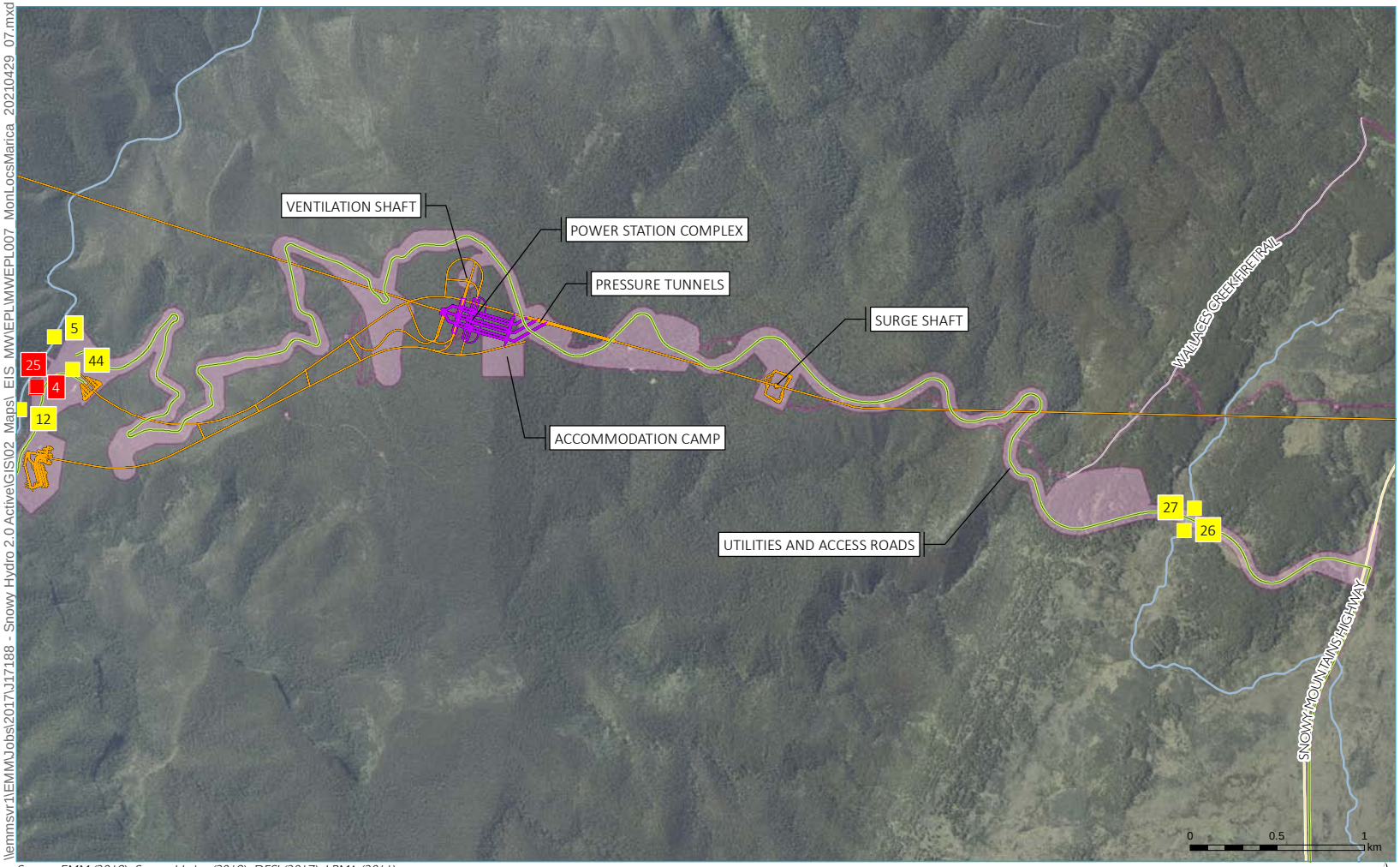




KEY

EPL monitoring point
- Groundwater
- Surface water

Existing environment
- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Licence Premise

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

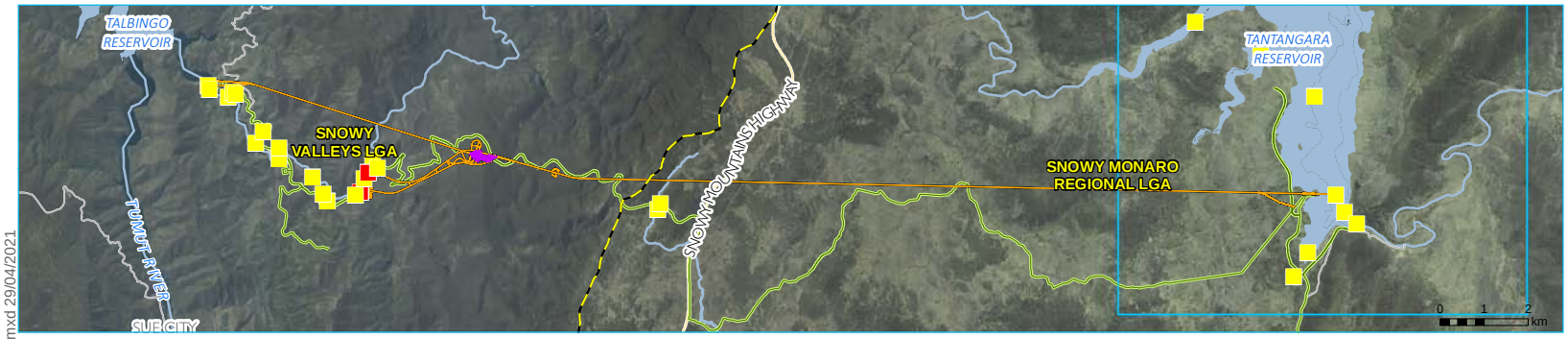
\\emmsvr1\EMMJobs\2017\J17188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MW\EPL\MWEPL007 MonLocsMarica 20210429 07.mxd 29/04/2021

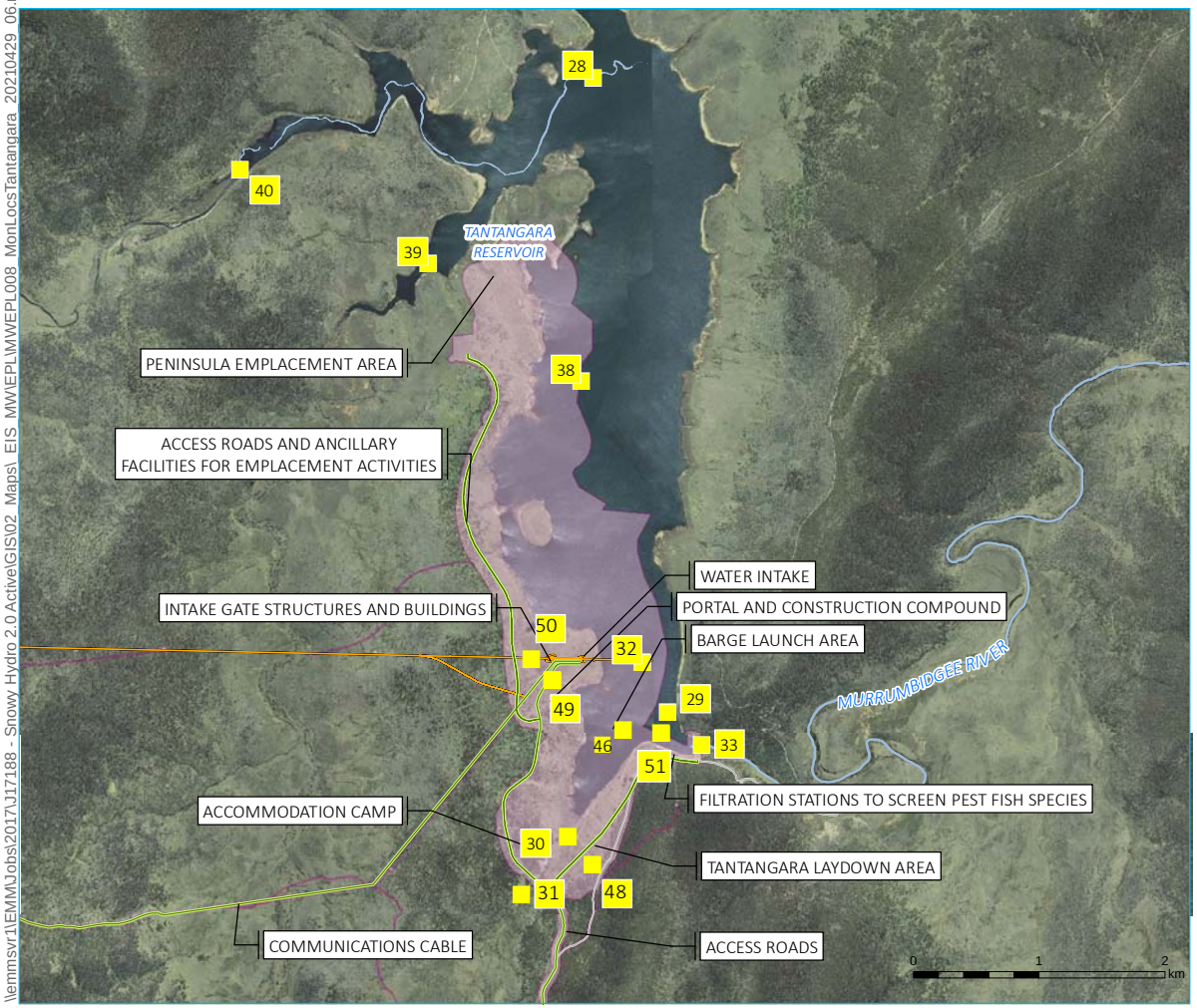
EPL Premise and monitoring point maps - Marica

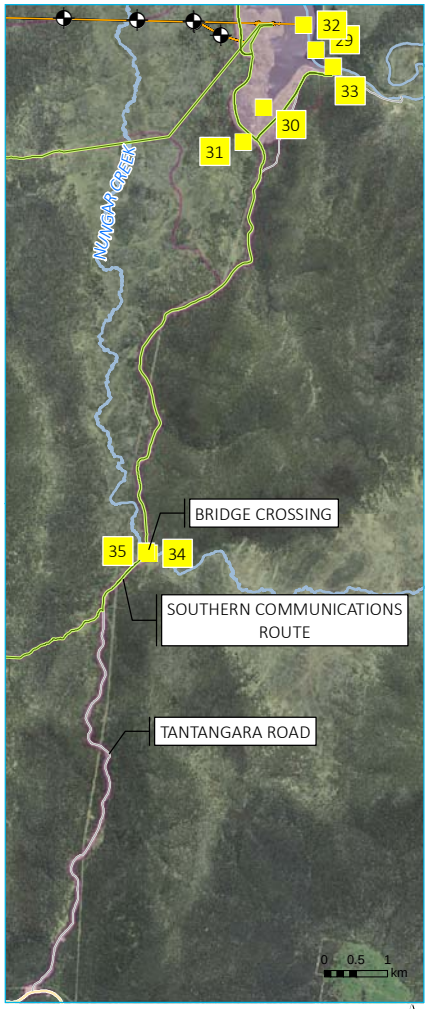
Snowy 2.0
Main Works
Figure 3

snowy 2.0

EMM creating opportunities







KEY

EPL monitoring point
- Groundwater
- Surface water

Existing environment
- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Licence Premise

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

EPL Premise and monitoring point maps - Tantangara Reservoir

Snowy 2.0
Main Works
Figure 4

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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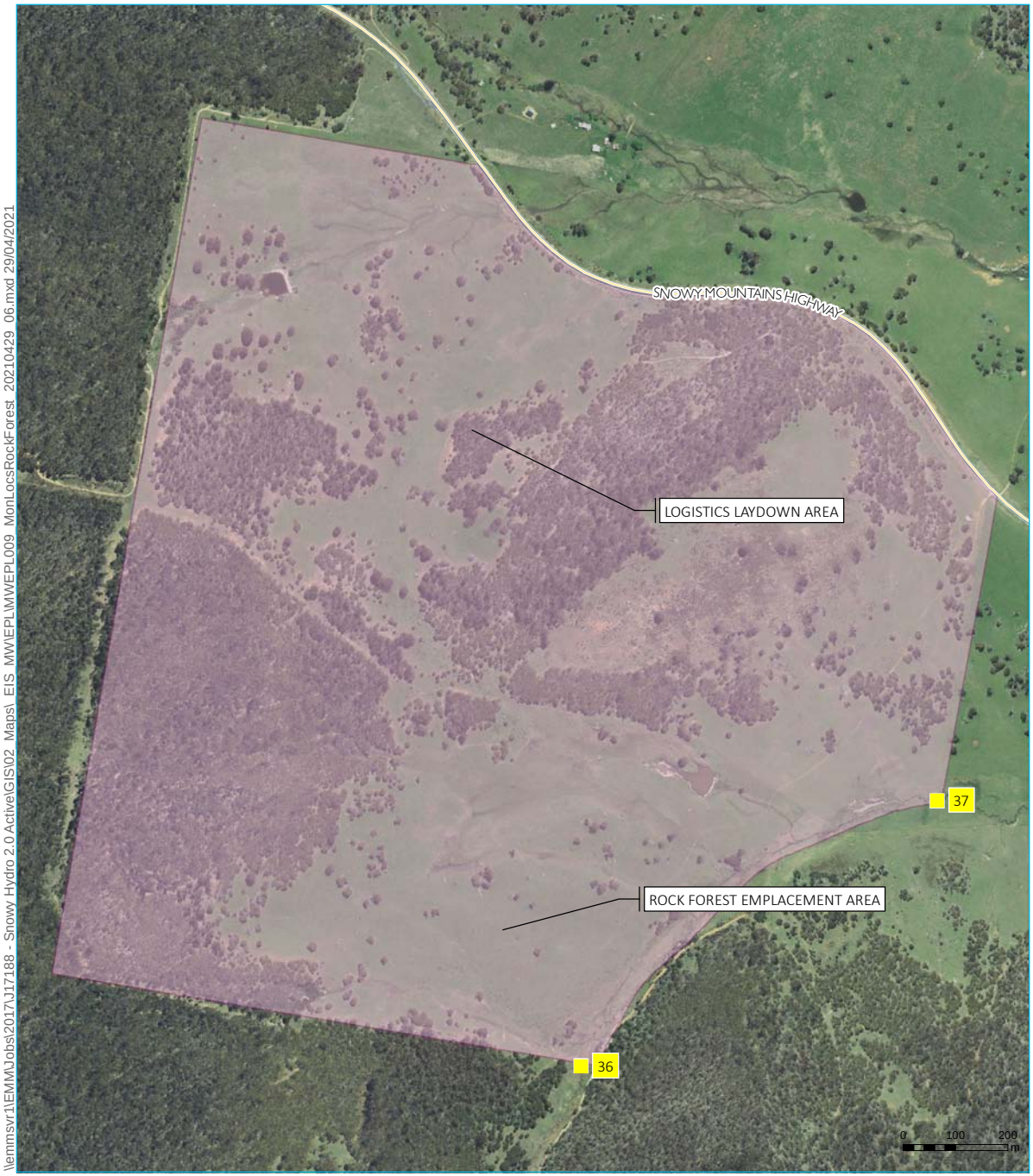

KEY

EPL monitoring point
- Surface water

Existing environment
- Main road
- Local road
- Watercourse

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Utilities
- Licence Premise

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

EPL Premise and monitoring point maps - Rock Forest

Snowy 2.0
Main Works
Figure 5

\\emmsvr1\EMMJobs\2017\J17188 - Snowy Hydro 2.0 Active\GIS\02_Maps_EIS_MW\EPL\MWEPL009_MonLocsRockForest_20210429_06.mxd 29/04/2021

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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snowy 2.0

EMM creating opportunities

APPENDIX B – IN SITU RESULTS TABLES

Future Generation
Webuild • Clough • Lane

June 2023 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring June 2023

Table 1 - Surface Water Quality Data
River and Minor Watercourses

Water Quality Objectives (see note 1)							
Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
-	90 - 110	-	30 - 350	-	6.5 - 8.0	-	2 - 25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
17/6/2023, 9:58 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	7.16	131.3	15.87	65	42	7.32	249	7.5	High flow, cold, clear	This location is upstream of works and is therefore representative of background conditions.
17/6/2023, 10:34 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	7.21	116.9	14.11	57	37	7.62	208	24	High flow, fairly clear, sunny, cold	Minor DO exceedance, most readings within WQO limits. Reflective of natural background conditions for waterways
17/6/2023, 12:29 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	7.75	123.8	14.71	69	45	7.75	204	11.4	Sunny water, dirty water, high flow, cold water	Minor DO exceedance, most readings within WQO limits. Reflective of natural background conditions for waterways
17/6/2023, 1:22 pm	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	8.36	123.8	14.53	66	43	7.85	197	10	Sunny, high flow, cold, clear water	Minor DO exceedance, most readings within WQO limits. Reflective of natural background conditions for waterways
17/6/2023, 10:16 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	7.03	120.5	14.62	66	43	7.39	214	10.8	High flow, sunny, cold, slightly murky water	Minor DO exceedance, most readings within WQO limits. Reflective of natural background conditions for waterways
17/6/2023, 10:51 am	EPL14	Yarrangobilly River, downstream of road construction areas	7.21	113.5	13.71	64	41	7.74	208	11.8	Sunny, high flow, clean water, cold water	Minor DO exceedance, most readings within WQO limits. Reflective of natural background conditions for waterways
17/6/2023, 12:05 pm	EPL15	Yarrangobilly River, downstream of road construction areas	7.71	129	15.38	64	41	7.84	201	0.041	Sunny weather, cold water, high flow, clean water	High DO, low turbidity, due to high flow and natural snow melt.
17/6/2023, 12:46 pm	EPL16	Yarrangobilly River, downstream of road construction areas	7.9	112.1	13.31	65	42	7.90	197	11.5	Sunny, clear water, high flow, cold water, QC	Minor DO exceedance, most readings within WQO limits. Reflective of natural background conditions for waterways
17/6/2023, 1:40 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	10.73	103	11.42	87	56	7.33	135	48.3	Shallow water, turbid, reasonable flow, sunny weather	Elevated turbidity due to low flows and consistent with historical ranges at this locations and are generally representative of background conditions
2/6/2023, 1:38 pm	EPL26	Eucumbene River downstream of Marica Road	8.08	93.7	11.08	27	17	7.38	265	3.1	Clear water, overcast, moderate flow QA-Mar	EC is consistent with historical ranges at this location and are generally representative of background conditions.
2/6/2023, 1:56 pm	EPL27	Eucumbene River upstream of Marica Road	7.96	81.9	9.7	30	20	7.22	199	4.64	Clear water, moderate flow, overcast	This location is upstream of works and is therefore representative of background conditions.
7/6/2023, 11:55 am	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	10.36	70.8	7.92	35	23	7.78	258	21.6	Cloudy weather. Clear fast flowing water. No visible sheen	DO is consistent with historical ranges at this location and are generally representative of background conditions.
7/6/2023, 12:14 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	10.29	84.5	9.47	28	18	7.65	277	8.5	Cloudy weather. Clear water with no visible sheen.	Low DO and Low EC. Readings are reflective of natural background conditions.
7/6/2023, 10:34 am	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	9.5	62.3	7.11	27	18	7.10	319	7.9	Clear sunny day. No visible sheen.	Low DO and Low EC, Readings are reflective and natural background conditions.
7/6/2023, 9:47 am	EPL34	Nungar Creek, upstream of Tantangara Road	8.44	108.2	12.67	16	11	8.65	191	2.9	Clear, sunny day. No visible sheen	This location is upstream of works and is therefore representative of background conditions.
7/6/2023, 10:00 am	EPL35	Nungar Creek, downstream of Tantangara Road	9.78	75.2	3.53	27	18	8.37	212	8.1	Clear sunny day. No visible sheen	Low DO and EC, and high pH and. Downstream conditions are similar to upstream conditions.
2/6/2023, 2:45 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	8.15	80.5	9.49	42	27	7.05	289	17.2	Slightly turbid water, low flow, overcast	This location is upstream of works and is therefore representative of background conditions.
2/6/2023, 2:47 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	8.54	85.4	9.98	45	29	7.22	151	28.7	Slightly turbid. Cattle in paddock upstream. Low flow, overcast. QA-ROK	Low DO and high turbidity. Location near cow paddock with some runoff from disturbed soils from cattle.
25/6/2023, 11:54 am	EPL52	GF01 sediment basin	10.35	90.3	10.09	551	353	7.66	232	49.9	Sunny weather, murky water	High EC and high turbidity due to runoff from high elevation and natural springs running into basin.
25/6/2023, 10:55 am	EPL53	GF01 surface water upstream east	12.59	81.5	8.66	85	55	7.33	221	17.4	Water flowing from spring, clean water, sunny weather	This location is upstream of works and is therefore representative of background conditions.
25/6/2023, 12:31 pm	EPL54	GF01 surface water upstream west	11.3	63.2	6.88	39	25	7.15	214	4.8	Running spring, sunny day, clear water	This location is upstream of works and is therefore representative of background conditions.
18/6/2023, 12:29 pm	EPL55	GF01 surface water downstream	11.82	85.4	9.24	209	136	7.83	238	59.2	Murky water, rainy weather, waterflow	Low DO as is consistent with background condidtions. Sampling point is a natural spring.

Table 2 - Reservoir Water Quality Data
Talbingo and Tantangara Reservoirs

	Water Quality Objectives (see note 2)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	90 - 110	-	20 - 30	-	6.5 - 8.0	-	1 - 20

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
21/6/2023, 9:20 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	9.8	98.2	11.13	45	29	8.20	190	6.2	Sample taken in reservoir near RO discharge point	EC is consistent with historical ranges at this location and are generally representative of background conditions. pH observed causes of the elevated pH, this will be monitored.
21/6/2023, 9:00 am	EPL11	Talbingo Reservoir, downstream of outlet	9.98	131.2	14.81	66	43	8.66	170	11.2	Sample taken in reservoir near RO discharge point	EC is consistent with historical ranges at this location and are generally representative of background conditions. pH observed causes of the elevated pH, this will be monitored. Eleavted DO observed at this location for second month respective to EPL10. No observed cause.
20/6/2023, 3:21 pm	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	5.96	101	12.59	18	12	7.49	238	10.5	Cold, sunny, clear water with moderate breeze	This location is upstream of works and is therefore representative of background conditions.
27/6/2023, 11:16 am	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	5.58	77.9	9.8	27	17	7.41	339	0	Sample taken from shoreline at closest point to actual location.	DO is consistent with historical ranges at this location and are generally representative of background conditions.
27/6/2023, 11:45 am	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	5.5	75.5	9.52	27	17	7.30	342	0	Location on shoreline at closest point to actual location.	DO is consistent with historical ranges at this location and are generally representative of background conditions.
27/6/2023, 10:26 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	5.54	79.8	10.05	33	21	7.85	290	0	QA taken here. Sample taken from shoreline closest to sampling location.	DO and EC are consistent with historical ranges at this location and are generally representative of background conditions.
20/6/2023, 3:10 pm	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	6.55	102.5	12.58	19	12	8.69	162	12.7	Clear water, moderate breeze, sunny	This location is upstream of works and is therefore representative of background conditions.
20/6/2023, 3:01 pm	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	6.24	137.3	16.99	19	12	7.97	199	12.4	Cold, clear water, sunny day with moderate breeze	This location is upstream of works and is therefore representative of background conditions.
27/6/2023, 11:23 am	EPL 51	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet	5.59	73.3	6.76	27	18	7.38	344	0	Sample taken from shore closest to actual location.	DO is consistent with historical ranges at this location and are generally representative of background conditions.

Table 3 - Treated Water Quality Data
Talbingo

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	700	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
21/6/2023, 10:00 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	6.97	77.1	9.35	230	150	7.64	234	10.3	Not discharging. No smell. Clear water. Cold, clear, frosty morning.	Results within WQO limits.

Table 4 - Treated Water Quality Data
Tantangara

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	200	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
7/6/2023, 12:53 pm	EPL50	Tantangara STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Tantangara Reservoir.	11.07	60.3	6.64	9	6	7.83	284	7.7	RO Plant	Results within WQO limits.

Table 5 - Groundwater Quality Data
GF01 Surface Water and Groundwater

	Water Quality Objectives (see note 1)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	30 - 350	-	6.5 - 8.0	-	-

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
25/6/2023, 11:40 am	EPL56	GF01 groundwater upstream east	13.28	66.2	6.92	253	165	5.98	265	41.6	Clear water, sunny weather 7.79m depth	This location is upstream of works and is therefore representative of background conditions.
25/6/2023, 12:37 pm	EPL57	GF01 groundwater upstream west	12.12	42.2	4.53	319	207	7.54	190	1000	High turbidity, sunny, cold water	This location is upstream of works and is therefore representative of background conditions.
25/6/2023, 11:06 am	EPL58	GF01 groundwater downstream	11.64	79.9	8.68	238	155	7.27	241	257	Slightly turbid water, no sheen and no odour. SWL: 5.784	Results within WQO limits.

Note 1: Water Quality Objective values for the Yarrangobilly River and Minor Watercourses refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 2: Water Quality Objective values for Talbingo Reservoir are the default trigger values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 3: Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

Note 4: Water Quality Objective values for groundwater reference the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for pH and electrical conductivity.

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July 2023 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring July 2023

Table 1 - Surface Water Quality Data
River and Minor Watercourses

Water Quality Objectives (see note 1)							
Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
-	90 - 110	-	30 - 350	-	6.5 - 8.0	-	2 - 25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
12/7/2023, 10:55 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	8.25	93.7	41	62	41	7.56	249	28.5	Sunny weather, high flow, turbid water	This location is upstream of works and is therefore representative of background conditions.
12/7/2023, 11:37 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	8.63	115.8	13.8	52	34	7.75	210	58.8	High flow, turbid, strong current, sunny weather, road and slope construction adjacent river	High DO and Turbidity from high flow, most analytes were within WQO parameters.
12/7/2023, 12:07 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	9.05	85.3	9.84	70	46	7.76	215	44.3	High flow, murky water, sunny weather strong current	DO is within historical range for this location and high turbidity due to high flow and shallow stream.
11/7/2023, 11:20 am	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	9.28	100.6	11.55	59	39	7.62	253	64.6	High flow, fast current, overcast weather	High Turbidity due to high flows.
12/7/2023, 11:13 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	9.02	82.7	9.56	54	35	7.62	207	26.6	High flow water, murky, strong current	DO is within historical range for this location and high turbidity due to high flow and shallow stream.
11/7/2023, 4:12 pm	EPL14	Yarrangobilly River, downstream of road construction areas	12.22	81.9	8.78	56	36	7.76	226	47.6	Murky water, fast high flow, turbid, QA	DO is within historical range for this location and high turbidity due to high flow and shallow stream.
11/7/2023, 3:43 pm	EPL15	Yarrangobilly River, downstream of road construction areas	11.11	80.4	8.85	53	34	7.56	242	43.6	Fast high flow, cloudy weather	DO is within historical range for this location and high turbidity due to high flow and shallow stream.
11/7/2023, 11:43 am	EPL16	Yarrangobilly River, downstream of road construction areas	9.54	92.8	10.59	57	37	7.74	224	63.1	High flow, fast current, murky water, overcast	High Turbidity due to high flows.
11/7/2023, 3:19 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	14.63	115.4	11.73	69	45	7.61	239	35.2	Murky water, high flow, much vegetation	High DO and high turbidity from high flow and runoff.
15/7/2023, 10:01 am	EPL26	Eucumbene River downstream of Marica Road	7.35	88.6	10.66	31	20	7.46	121	6.5	Downstream from bridge, slow flow, clear water	Low DO due to shallow and slower flow. Most readings within WQO.
15/7/2023, 10:11 am	EPL27	Eucumbene River upstream of Marica Road	8.58	126.02	14.73	223	145	7.96	96	8.2	Upstream, high flow, cold weather, clear water	This location is upstream of works and is therefore representative of background conditions.
14/7/2023, 10:54 am	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	7.29	89.3	10.76	26	17	7.57	155	18.7	Fast flowing stream, downstream heading to reservoir	Low DO and EC generally consistent with background conditions during sampling.
14/7/2023, 10:42 am	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	6.92	78.4	9.54	35	23	7.46	167	15.3	Fast flowing water, upstream from culvert, sunny weather	This location is upstream of works and is therefore representative of background conditions.
14/7/2023, 10:18 am	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	6.79	68.6	8.37	207	135	7.53	155	16	Windy, fast flowing stream, opposite weir	Low DO downstream from reservoir are generally consistent with background readings for July 2023.
14/7/2023, 12:35 pm	EPL34	Nungar Creek, upstream of Tantangara Road	7.95	107.4	12.73	37	24	7.35	207	12.5	Windy, high flow, fast current, upstream flowing under bridge	This location is upstream of works and is therefore representative of background conditions.
14/7/2023, 12:42 pm	EPL35	Nungar Creek, downstream of Tantangara Road	6.6	136.9	16.79	16	10	6.94	208	10.1	Windy, sunny weather, fast flow down stream	High DO and low EC downstream are within historical range for this location and are generally consistent with background conditions.
14/7/2023, 1:27 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	7.7	77.4	9.23	39	26	6.96	215	30.1	Turbid water, slow flow, sunny weather	This location is upstream of works and is therefore representative of background conditions.
14/7/2023, 1:43 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	7.98	76.3	9.04	40	26	7.03	191	46.2	Shallow stream, downstream of property, slightly turbid, sunny weather, QA rok	Low DO and high turbidity Are consistent with background readings for July 2023.
27/7/2023, 7:57 am	EPL52	GF01 sediment basin	2.04	115	15.85	103	657	8.99	119	38.1	Clear water green tinge, ammonia odour, algal bloom	High DO, high pH and turbidity due to runoff of nutrients accumulating in sediment basin. Remainder readings within WQO limits.
6/7/2023, 2:00 pm	EPL53	GF01 surface water upstream east	-	-	-	-	-	-	-	-	Dry site, no flow	-
6/7/2023, 1:32 pm	EPL54	GF01 surface water upstream west	-	-	-	-	-	-	-	-	Dry site, no flow	-
16/7/2023, 1:04 pm	EPL55	GF01 surface water downstream	5.65	72	9.01	767	491	8.02	125	69.8	Clear flowing water, no distinct odours	Low DO, high EC, high pH and high turbidity due to runoff from elevated area with spoil emplacement. Other readings within WQO limits.

Table 2 - Reservoir Water Quality Data
Talbingo and Tantangara Reservoirs

			Water Quality Objectives (see note 2)								
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	
			-	90 - 110	-	20 - 30	-	6.5 - 8.0	-	1 - 20	
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
16/7/2023, 11:49 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	10.33	85	9.52	38	24	7.77	155	6.8	Sunny weather, cloudy water, downstream	DO and EC are consistent with historical ranges at this location.
16/7/2023, 11:36 am	EPL11	Talbingo Reservoir, downstream of outlet	9.87	95	10.75	44	29	7.74	156	10.5	Sunny weather, still and murky water, lots of debris	EC is consistent with historical ranges at this location.
13/7/2023, 11:38 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	8.98	87.2	10.08	115	75	7.79	196	25.3	Sunny weather, dirty water	This location is upstream of works and is therefore representative of background conditions.
13/7/2023, 12:39 pm	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	6.02	84.7	10.53	23	15	7.21	245	11.1	Windy, murky water, near portal and bank,	DO is consistent with historical ranges at this location and are generally representative of background conditions.
13/7/2023, 12:32 pm	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	6.11	100.6	12.47	23	15	7.44	225	9.1	Sunny weather, windy, murky water, far from bank	-
13/7/2023, 12:24 pm	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	6.51	94.4	11.6	22	14	7.36	234	10.6	Sunny weather, murky water, far from bank	-
13/7/2023, 12:16 pm	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	7.17	88	10.64	19	12	7.55	232	10.8	Sunny weather, murky water, near bank	This location is upstream of works and is therefore representative of background conditions.
13/7/2023, 12:00 pm	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	7.12	89.3	10.8	31	20	7.32	222	18.6	Sunny weather, murky water, near bank	This location is upstream of works and is therefore representative of background conditions.
13/7/2023, 12:49 pm	EPL 51	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet	6.12	63	7.41	25	16	7.41	239	14.6	Sunny weather, murky water, near portal	Low DO is consistent with historical ranges at this location. Downstream from outlet. All other readings within WQO limits.

Table 3 - Treated Water Quality Data
Talbingo

			Water Quality Objectives (see note 3)								
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	
			-	-	-	700	-	6.5 - 8.0	-	25	
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
11/7/2023, 11:01 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	8.95	107.7	35	54	35	7.63	211	21.9	Some turbidity	All readings within WQO limits.

Table 4 - Treated Water Quality Data
Tantangara

			Water Quality Objectives (see note 3)								
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	
			-	-	-	200	-	6.5 - 8.0	-	25	
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
13/7/2023, 8:03 am	EPL50	Tantangara STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Tantangara Reservoir.	5.59	87.7	11.03	37	24	7.63	276	51.9	RO Plant- permeate sample	High turbidity from runoff and wave action. Most readings within WQO limits.

Table 5 - Groundwater Quality Data
GF01 Groundwater

			Water Quality Objectives (see note 1)								
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	
			-	-	-	30 - 350	-	6.5 - 8.0	-	-	
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
27/7/2023, 9:21 am	EPL56	GF01 groundwater upstream east	12.55	93	9.9	249	162	8.04	143	230	Murky water, clear weather, SWL 10.87 m	High pH due to natural changes in soil acidity. However, other readings within WQO limits
16/7/2023, 2:40 pm	EPL57	GF01 groundwater upstream west	11	124.3	13.69	306	199	9.62	89	1000	High turbidity, 18.16 m depth	High pH due to natural changes in soil acidity. However, other readings within WQO limits
6/7/2023, 12:37 pm	EPL58	GF01 groundwater downstream	10.31	83.1	335	522	335	7.21	134	90	Clear water, depth 5.68 m	High EC however within historical values upstream of GF01.

Note 1: Water Quality Objective values for the Yarrangobilly River and Minor Watercourses refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 2: Water Quality Objective values for Talbingo Reservoir are the default trigger values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 3: Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

Note 4: Water Quality Objective values for groundwater reference the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for pH and electrical conductivity.

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August 2023 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring August 2023

Table 1 - Surface Water Quality Data
River and Minor Watercourses

Water Quality Objectives (see note 1)							
Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
-	90 - 110	-	30 - 350	-	6.5 - 8.0	-	2 - 25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
3/8/2023, 10:33 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	7.24	85.7	10.34	75	49	8.18	260	2	Clear fast water, turbid, sunny weather, opposite sediment basin, upstream	This location is upstream of works and is therefore representative of background conditions.
15/8/2023, 10:47 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	9.56	115.7	13.19	102	66	8.75	146	5.1	Slow flow, sunny, cold shallow	DO is within historical range for this location. No visible indicators were observed for the slight elevation in pH but this will be monitored and is representative of background for August 2023.
3/8/2023, 1:18 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	12.25	111.1	11.9	83	54	8.28	270	0.6	Fast flowing, shallow depth, near water standpipe	DO and turbidity are within historical range for this location. No visible indicators were observed for the slight elevation in pH but this will be monitored and is representative of background for August 2023.
3/8/2023, 2:06 pm	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	12.26	87.5	9.37	76	50	8.43	280	1.5	Fast flowing, moving past Main camp, clear water, QA	DO and turbidity are within historical range for this location. o visible indicators were observed for the slight elevation in pH but this will be monitored and is representative of background for August 2023.
3/8/2023, 10:16 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	6.84	75.8	9.24	77	50	8.08	249	9.4	High flow, turbid, shallow, near sediment basin, sunny	DO is within historical range for this location. o visible indicators were observed for the slight elevation in pH but this will be monitored and is representative of background for August 2023.
3/8/2023, 12:11 pm	EPL14	Yarrangobilly River, downstream of road construction areas	10.42	92.8	10.37	76	49	8.25	283	1.6	Fast flowing, near spoil embankment, shallow,	Turbidity is within historical range for this location. o visible indicators were observed for the slight elevation in pH but this will be monitored and is representative of background for August 2023.
3/8/2023, 11:59 am	EPL15	Yarrangobilly River, downstream of road construction areas	10.74	75.4	8.35	76	49	8.27	277	1.6	Fast flowing, shallow, near road	DO and turbidity are within historical range for this location. No visible indicators were observed for the slight elevation in pH but this will be monitored.
3/8/2023, 1:36 pm	EPL16	Yarrangobilly River, downstream of road construction areas	11.88	105.1	11.35	75	49	8.4	276	2.1	Fast shallow flow, Pad 2 and bridge, clear appearance, no odour	No visible indicators were observed for the slight elevation in pH but this will be monitored and is representative of background for August 2023.
3/8/2023, 2:49 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	13.19	82.3	8.63	117	76	7.59	242	10	Fast flowing, shallow narrow stream, opposite sediment basin	DO is within historical range for this location.
1/8/2023, 11:21 am	EPL26	Eucumbene River downstream of Marica Road	7.02	126.2	15.31	29	19	7.72	249	4.1	Clear water, cloudy	DO is within historical range for this location and often varies from upstream. The EC is slightly low but is generally representative of background conditions.
1/8/2023, 11:15 am	EPL27	Eucumbene River upstream of Marica Road	7.18	81.5	9.85	31	20	7.78	186	3.5	Clear water, shallow high flow, cold weather	This location is upstream of works and is therefore representative of background conditions.
2/8/2023, 2:17 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	10.83	81.6	9.03	22	14	8.1	260	3.2	Clear water, high flow, downstream	Low DO, EC, and slightly pH turbidity are generally consistent with background conditions during sampling and within range of historical ranges.
2/8/2023, 2:02 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	11.23	101	11.08	22	14	8.08	265	3.8	High flow, clear water, upstream	Low EC, and slightly pH turbidity are generally consistent with background conditions during sampling and within range of historical ranges.
2/8/2023, 3:01 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	9.6	80.6	9.18	20	13	8.14	265	1.2	High flow, deep water, downstream from portal	Low DO, EC, and slightly pH turbidity are generally consistent with background conditions during sampling and within range of historical ranges.
2/8/2023, 3:33 pm	EPL34	Nungar Creek, upstream of Tantangara Road	9.12	80.2	9.24	13	9	8.16	270	2.4	High flow, deep water upstream from bridge	This location is upstream of works and is therefore representative of background conditions.
15/8/2023, 2:18 pm	EPL35	Nungar Creek, downstream of Tantangara Road	7.53	65.2	7.81	14	9	6.96	257	0.3	Clear water fast flow downstream	DO, EC, and turbidity are within historical ranges for this location and are consistent with background water quality.
15/8/2023, 3:23 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	8.73	18.6	2.16	38	25	7.47	263	7.3	Turbid water, upstream, low flow, deep water	This location is upstream of works and is therefore representative of background conditions.
15/8/2023, 3:41 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	9.62	47	5.35	38	25	7.44	163	881	Highly turbid, slow flowing, cows	Low DO is generally consistent with background readings for August 2023. Turbidity is due to highly disturbed areas caused by grazing cattle.
8/8/2023, 2:02 pm	EPL52	GF01 sediment basin	14.22	124.2	12.72	735	471	8.92	248	4.7	Turbid water, sunny	High DO, pH and EC due to runoff of nutrients accumulating in sediment basin. Water was taken for treatment at process water treatment plant.
N/A	EPL53	GF01 surface water upstream east	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
N/A	EPL54	GF01 surface water upstream west	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
8/8/2023, 2:10 pm	EPL55	GF01 surface water downstream	12.88	55.9	5.9	490	318	8.05	267	3.1	Very less flow, sunny	Elevated pH and EC are consistent with readings from the leachate basin in September thought the basin did not overtop. DO is low which is consistent with previous water quality from this location. There were no readings from upstream of this area and investigation at GF01 is ongoing.

Table 2 - Reservoir Water Quality Data
Talbingo and Tantangara Reservoirs

			Water Quality Objectives (see note 2)									
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)		
			-	90 - 110	-	20 - 30	-	6.5 - 8.0	-	1 - 20		
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
6/8/2023, 11:09 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	11.75	108.9	11.8	52	34	7.28	266	2	Cloudy, dirty water	EC is consistent with historical ranges at this location.
6/8/2023, 10:55 am	EPL11	Talbingo Reservoir, downstream of outlet	12.13	64.9	6.97	40	26	7.18	230	1.9	Cloudy, dirty water	EC is consistent with historical ranges at this location. DO is withing historical ranges but will be monitored.
2/8/2023, 9:21 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	6.51	98.2	12.06	18	11	8.24	122	6	Foggy weather, cold water, clear	This location is upstream of works and is therefore representative of background conditions.
2/8/2023, 10:32 am	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	6.34	78.4	9.68	21	13	7.86	274	1.8	Sunny weather, cold water, near portal	DO is consistent with historical ranges at this location and are generally representative of background conditions.
2/8/2023, 10:24 am	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	6.19	89.6	10.73	21	14	7.94	268	2.7	Sunny weather, near discharge point, cold water	DO is consistent with historical ranges at this location and are generally representative of background conditions.
2/8/2023, 10:17 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	6.01	70.3	8.75	20	13	8.07	245	2.2	Sunny, cold water, far from shore	DO and pH are consistent with historical ranges at this location and are generally representative of background conditions.
2/8/2023, 9:44 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	6.39	76.6	9.45	27	18	8.69	165	2.5	Foggy, cold water, sunny	This location is upstream of works and is therefore representative of background conditions.
2/8/2023, 9:58 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	5.41	98.1	12.4	24	16	8.26	224	2	Sunny, cold weather, clear water	This location is upstream of works and is therefore representative of background conditions.
2/8/2023, 10:37 am	EPL 51	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet	6.4	90.9	11.2	21	14	7.78	284	1.8	Sunny weather, cold water, near portal	All readings within WQO limits.

Table 3 - Treated Water Quality Data
Talbingo

			Water Quality Objectives (see note 3)									
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)		
			-	-	-	700	-	6.5 - 8.0	-	25		
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
3/8/2023, 3:05 pm	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	15.17	96.2	9.66	40	26	7.86	267	1.2	No odour, clear, WTP	All readings within WQO limits.

Table 4 - Treated Water Quality Data
Tantangara

			Water Quality Objectives (see note 3)									
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)		
			-	-	-	200	-	6.5 - 8.0	-	25		
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
2/8/2023, 1:07 pm	EPL50	Tantangara STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Tantangara Reservoir.	12.07	109.7	11.81	26	17	8.01	326	1.2	Clean water, RO discharge water	All readings within WQO limits.

Table 5 - Groundwater Quality Data
GF01 Surface Water and Groundwater

			Water Quality Objectives (see note 1)									
			Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)		
			-	-	-	30 - 350	-	6.5 - 8.0	-	-		
Date and Time	**EPL Site ID**	**Location Description**	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**EC (µS/cm)**	**TDS (mg/L)**	**pH**	**Redox (mV)**	**Turbidity (NTU)**	**Field Comments**	**Context**
15/8/2023, 10:11 am	EPL1	Wallace Creek Bridge	14	0	0	105	675	7.94	9	97.4		All readings within WQO limits.
15/8/2023, 9:44 am	EPL2	Wallace Creek Bridge	13.9	0	0	326	212	6.96	150	725	High turbidity	All readings within WQO limits.
4/8/2023, 9:16 am	EPL4	Portal Access	8.22	35.6	4.18	1390	892	7.88	136	1000	Depth 2.699m	EC is within historical rang for groundwater at Lobs Hole.
4/8/2023, 9:35 am	EPL25	Portal Access	11.78	50.9	5.5	550	352	6.89	-24	447	Turbid, smelly water	EC is within historical rang for groundwater at Lobs Hole.
8/8/2023, 3:05 pm	EPL56	GF01 groundwater upstream east	13.65	87.3	9.06	214	139	7.69	268	76.1	10.882m, clear water, sunny weather	All readings within WQO limits.
8/8/2023, 2:42 pm	EPL57	GF01 groundwater upstream west	14.15	106.5	10.93	257	167	8.12	194	1000	Murky water, high turbidity, sunny weather, 16.882m	This location is upstream of works and is therefore representative of background conditions.
8/8/2023, 2:17 pm	EPL58	GF01 groundwater downstream	15.36	16	1.6	400	260	6.25	338	5.4	6.262m, clear water, low turbidity	Investigation on going regarding WQ at GF01.
24/8/2023, 12:33 pm	EPL68	Tantangara groundwater downstream east	13.65	73.7	7.65	23	15	5.97	279	29.4	Clear water, no odour, depth 4.1m	EC is lower than the background for this bore and slightly less than the WQO. This will be monitored.
24/8/2023, 11:54 am	EPL69	Tantangara groundwater downstream west	12.93	90.2	9.51	29	19	6.53	245	14.2	Clear water, some turbidity, no odour, depth 1.2m	EC and pH are lower than the background for this bore and slightly less than the WQO. This will be monitored.
24/8/2023, 11:13 am	EPL70	Tantangara groundwater upstream	13.26	36.4	3.81	121	78	6.53	247	1000	High turbidity greater than 1000 NTU. Spoil emplacement area, cleared area, no odour, depth 4m	All readings within WQO limits.

Note 1: Water Quality Objective values for the Yarrangobilly River and Minor Watercourses refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 2: Water Quality Objective values for Talbingo Reservoir are the default trigger values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 3: Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

Note 4: Water Quality Objective values for groundwater reference the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for pH and electrical conductivity.

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September 2023 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring September 2023

Table 1 - Surface Water Quality Data
River and Minor Watercourses

Water Quality Objectives (see note 1)							
Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
-	90 - 110	-	30 - 350	-	6.5 - 8.0	-	2 - 25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
13/9/2023, 10:30 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	13.15	128.3	13.46	174	113	5.88	261	0	Sunny, clear water	This location is upstream of works and is therefore representative of background conditions.
13/9/2023, 11:05 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	11.16	84.6	9.29	77	50	7.32	219	0	Sunny, clear water, low flow	DO is within historical range for this location.
13/9/2023, 12:00 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	13.23	65.5	6.86	78	51	7.83	197	0	Sunny, clear watwr, high flow	DO is within historical range for this location.
13/9/2023, 01:45 pm	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	15.34	87.3	8.73	80	52	7.8	197	0	Sunny, clear water, high flow	DO is within historical range for this location.
13/9/2023, 10:45 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	12.19	82.1	8.81	81	53	6.76	228	0	Sunny, clear water, medium flow	DO is within historical range for this location.
13/9/2023, 11:25 am	EPL14	Yarrangobilly River, downstream of road construction areas	12.52	77.1	8.2	74	48	7.64	201	0	Sunny, clear water, low flow	DO is within historical range for this location.
13/9/2023, 11:45 am	EPL15	Yarrangobilly River, downstream of road construction areas	13.04	79	8.31	73	48	7.85	196	0	Sunny, clear water, high flow	DO is within historical range for this location.
13/9/2023, 02:15 pm	EPL16	Yarrangobilly River, downstream of road construction areas	15.51	64.4	6.42	79	51	7.83	186	0	Clear water, Sunny, high flow	DO is within historical range for this location.
13/9/2023, 01:55 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	16.47	52.7	5.15	111	72	7.02	198	0	Sunny, clear water, low flow	DO is within historical range for this location.
23/9/2023, 09:32 am	EPL26	Eucumbene River downstream of Marica Road	8.42	118.2	13.86	42	27	7.35	213	0	Sunny, clear water	DO is within historical range for this location.
23/9/2023, 09:25 am	EPL27	Eucumbene River upstream of Marica Road	8.38	225.5	26.44	356	232	8.19	172	0	Sunny, clear water	This location is upstream of works and is therefore representative of background conditions.
16/9/2023, 12:16 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	15.35	81.2	8.13	27	17	7.43	232	34.3	Sunny, clear water, mid flow	Low DO, EC, and slightly evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
16/9/2023, 12:35 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	14.91	97.2	9.81	23	15	7.06	250	28.7	Sunny, clear water, low flow	Low EC and slightly evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
16/9/2023, 12:56 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	13.95	75.1	7.75	23	15	7.64	216	20.9	Sunny, clear water, high flow	Low DO and EC are generally consistent with background conditions during sampling and withing range of historical ranges.
16/9/2023, 01:27 pm	EPL34	Nungar Creek, upstream of Tantangara Road	14.46	75.3	7.68	18	11	7.5	212	27.2	Sunny, clear water, high flow	This location is upstream of works and is therefore representative of background conditions.
16/9/2023, 01:35 pm	EPL35	Nungar Creek, downstream of Tantangara Road	13.78	80.2	8.31	15	10	7.88	180	25.9	Sunny, clear water, high flow	Low DO, EC, and slightly evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
16/9/2023, 02:11 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	15.15	94.8	9.53	47	31	7.09	214	27.8	Sunny, clear water, low flow	This location is upstream of works and is therefore representative of background conditions.
16/9/2023, 02:25 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	16.41	88.9	8.7	52	34	7.27	196	38.6	Sunny, clear water, low flow	Low DO and slightly elevated turbidity are generally consistent with background readings for September 2023.
14/9/2023, 11:05 am	EPL52	GF01 sediment basin	17.05	77.9	7.51	634	406	8.68	176	4.9	Sunny, turbid water	High DO, pH and EC due to runoff of nutrients accumulating in sediment basin. Water was taken for treatement at process water treatement plant.
N/A	EPL53	GF01 surface water upstream east	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
N/A	EPL54	GF01 surface water upstream west	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
14/9/2023, 11:20 am	EPL55	GF01 surface water downstream	16.87	85.8	8.3	289	188	8.07	188	0	Sunny, clear water, low flow	Low DO and slightly elevated pH are consistent with readings from the leachate basin in September thought the basin did not overtop. There were no readings from upstream of this area and investigation at GF01 is ongoing.

Table 2 - Reservoir Water Quality Data
Talbingo and Tantangara Reservoirs

	Water Quality Objectives (see note 2)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	90 - 110	-	20 - 30	-	6.5 - 8.0	-	1 - 20

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
17/9/2023, 09:09 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	15.3	193.2	19.35	88	58	8.26	311	0	Sunny clear water, no odour	Elevated DO, EC, and pH are within historcial ranges for this location.
17/9/2023, 08:55 am	EPL11	Talbingo Reservoir, downstream of outlet	13.51	165.6	17.23	94	61	8.34	312	0	Sunny, clear water	Elevated DO, EC, and pH are within historcial ranges for this location.
20/9/2023, 11:26 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	13.26	171.1	17.93	26	17	6.29	163	53.5	Sunny, turbid water, low water level	This location is upstream of works and is therefore representative of background conditions.
21/9/2023, 10:29 am	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	12.45	194.6	20.74	299	191	7.21	231	44.2	Turbid water, sunny, water level low	High DO and turbidity are within historcial ranges for this location and are generally consisitent with background water quality for September 2023 with low water levels. EC is more elevated than background conditions with no visible impact observed. This will be monitored.
20/9/2023, 01:52 pm	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	14.14	175.3	18.01	42	27	6.66	255	2.7	Sunny, turbid water, low water level	DO is consistent with historical ranges at this location and are generally representative of background conditions.
20/9/2023, 12:11 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	13.52	162.3	16.91	22	14	6.96	178	121	Sunny, turbid water, low water level	High DO and turbidity are within historcial ranges for this location and are generally consisitent with background water quality for September 2023 with low water levels.
20/9/2023, 11:01 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	13.65	195.4	20.29	27	18	7	279	3.5	Sunny, turbid water, low water level	This location is upstream of works and is therefore representative of background conditions.
20/9/2023, 11:12 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	13.21	228.5	23.96	30	19	6.59	289	13.1	Sunny, turbid water, low water level	This location is upstream of works and is therefore representative of background conditions.
20/9/2023, 01:59 pm	EPL 51	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet	13.11	178.7	18.78	23	15	6.94	190	95.7	Sunny, turbid water, low water level	High DO and turbidity are within historcial ranges for this location and are generally consisitent with background water quality for September 2023 with low water levels.

Table 3 - Treated Water Quality Data
Talbingo

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	700	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
17/9/2023, 07:17 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	10.54	154.9	17.25	189	123	8.06	587	0	Sunny, clear water, no odour	Minor elevation in pH will be monitored but is consistent with location.

Table 4 - Treated Water Quality Data
Tantangara

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	200	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
17/9/2023, 06:57 am	EPL50	Tantangara STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Tantangara Reservoir.	12.34	55.7	5.96	19	12	7.06	174	8.8	Sunny, clear water, no odour	All readings within WQO limits.

Table 5 - Groundwater Quality Data
GF01 Surface Water and Groundwater

	Water Quality Objectives (see note 1)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	30 - 350	-	6.5 - 8.0	-	-

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
14/9/2023, 12:10 pm	EPL56	GF01 groundwater upstream east	18.87	12.5	1.16	277	180	7.98	149	688	Sunny, turbid water, no odour, SWL- 10.56	All readings within WQO limits.
14/9/2023, 11:35 pm	EPL57	GF01 groundwater upstream west	19.65	5	0.46	298	194	8.26	66	264	Sunny, turbid water, no odour, SWL - 17.62 m	This location is upstream of works and is therefore representative of background conditions.
14/9/2023, 10:50 pm	EPL58	GF01 groundwater downstream	17.55	66.7	6.36	347	225	6.4	231	29.9	Clear water, sunny, no odour, SWL- 6.42m	Investigation on going regarding WQ at GF01. Readings are consistent with August sample results.
16/9/2023, 11:19 am	EPL68	Tantangara groundwater downstream east	15.09	66.1	6.65	26	17	6.22	310	118	Sunny, turbid water, no odour, SWL- 3.52m	Low EC and pH are consitent with August sample results.
16/9/2023, 10:50 am	EPL69	Tantangara groundwater downstream west	16.21	70	6.88	36	23	6.59	298	40.7	Sunny, clear water, no odour, SWL- 1.79m	All readings within WQO limits.
N/A	EPL70	Tantangara groundwater upstream	-	-	-	-	-	-	-	-		Requires re-developing.

Note 1: Water Quality Objective values for the Yarrangobilly River and Minor Watercourses refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 2: Water Quality Objective values for Talbingo Reservoir are the default trigger values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 3: Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

Note 4: Water Quality Objective values for groundwater reference the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for pH and electrical conductivity.

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August 2023 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring October 2023

Table 1 - Surface Water Quality Data
River and Minor Watercourses

Water Quality Objectives (see note 1)							
Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
-	90 - 110	-	30 - 350	-	6.5 - 8.0	-	2 - 25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
06/10/2023, 10:32 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	10.76	99.2	11	51	33	8.17	208	139	High flow, cloudy	This location is upstream of works and is therefore representative of background conditions.
06/10/2023, 11:03 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	11.47	75.5	8.24	69	45	7.58	223	130	Cloudy, turbid water, high flow	Low DO is within historical range for this location and elevated turbidity is consistent with background conditions for October 2023.
06/10/2023, 11:51 am	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	12.73	83.3	8.83	54	53	8.18	188	136	Cloudy, turbid water, high fow	Low DO is within historical range for this location and elevated turbidity and pH are within historical range and are consistent with background conditions for October 2023.
06/10/2023, 12:12 pm	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	12.95	82.5	8.7	53	34	8.18	187	132	Cloudy, turbid water, high flow	Low DO is within historical range for this location and elevated turbidity and pH are within historical range and are consistent with background conditions for October 2023.
06/10/2023, 10:45 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	11.05	69.9	7.69	50	33	7.81	213	140	Cloudy, high flow, turbid water	Low DO is within historical range for this location and elevated turbidity is consistent with background conditions for October 2023.
06/10/2023, 11:19 am	EPL14	Yarrangobilly River, downstream of road construction areas	12.1	78.2	8.41	53	35	7.5	224	135	Cloudy, high flow, turbid water	Low DO is within historical range for this location and elevated turbidity is consistent with background conditions for October 2023.
06/10/2023, 11:36 am	EPL15	Yarrangobilly River, downstream of road construction areas	12.66	79	8.38	52	34	7.72	214	135	Cloudy, high flow, turbid water	Low DO is within historical range for this location and elevated turbidity is consistent with background conditions for October 2023.
06/10/2023, 12:43 pm	EPL16	Yarrangobilly River, downstream of road construction areas	13.29	72.8	7.62	54	35	8.01	185	127	Cloudy, high flow, turbid water	Low DO is within historical range for this location and elevated turbidity and pH are within historical range and are consistent with background conditions for October 2023.
06/10/2023, 12:27 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	13.74	75.5	7.82	80	52	7.72	195	183	Cloudy, turbid water, low flow	Low DO is within historical range for this location and elevated turbidity is consistent with background conditions for October 2023.
03/10/2023, 01:21 pm	EPL26	Eucumbene River downstream of Marica Road	11.03	42.9	4.72	34	22	7.05	251	61.4	Cloudy, clear water, low flow	These conditions are representative of background conditions for October 2023.
03/10/2023, 01:13 pm	EPL27	Eucumbene River upstream of Marica Road	9.66	10.7	1.21	32	21	6.84	263	62.9	Cloudy, clear water, low flow	This location is upstream of works and is therefore representative of background conditions.
10/10/2023, 12:45 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	14.75	75.1	7.61	27	17	7.6	216	91	Sunny, clear water, high flow	Low DO, EC, and slightly evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
10/10/2023, 12:31 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	14.95	109	11	34	22	7.38	224	90.8	Sunny, clear water, high flow	Elevated turbidity are generally consistent with background conditions during sampling and within historical ranges.
10/10/2023, 01:10 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	17.28	92.8	8.92	23	15	7.78	214	89.2	Sunny, clear water, high flow	Low EC are generally consistent with background conditions during sampling and withing range of historical ranges.
10/10/2023, 01:39 pm	EPL34	Nungar Creek, upstream of Tantangara Road	15.32	96.8	9.7	30	20	7.78	215	86.6	Sunny, clear water, high flow	This location is upstream of works and is therefore representative of background conditions.
10/10/2023, 01:43 pm	EPL35	Nungar Creek, downstream of Tantangara Road	13.93	68.5	7.07	15	10	7.73	209	78.6	Sunny, clear water, high flow	Low DO, EC, and slightly evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
10/10/2023, 02:20 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	16.21	94.2	9.25	51	33	7.47	220	117	Sunny, clear water, low flow	This location is upstream of works and is therefore representative of background conditions.
10/10/2023, 02:34 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	17.76	71.7	6.82	50	33	7.84	205	132	Sunny, low flow, clear water	Low DO and slightly elevated turbidity are generally consistent with background readings for October 2023.
09/10/2023, 10:31 am	EPL52	GF01 sediment basin	16.86	87.9	8.5	316	206	7.74	175	106	Sunny, clear water	High DO, pH and EC due to runoff of nutrients accumulating in sediment basin. Water was taken for treatement at process water treatement plant.
N/A	EPL53	GF01 surface water upstream east	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
N/A	EPL54	GF01 surface water upstream west	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
09/10/2023, 10:42 am	EPL55	GF01 surface water downstream	16.2	101.8	9.99	291	189	7.98	166	94.2	Sunny, clear water	Tubidity is consistent with background for October 2023.

Table 2 - Reservoir Water Quality Data
Talbingo and Tantangara Reservoirs

	Water Quality Objectives (see note 2)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	90 - 110	-	20 - 30	-	6.5 - 8.0	-	1 - 20

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
08/10/2023, 09:11 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	15.08	93.2	9.38	57	37	7.95	376	118	Sunny, clear water	Elevated EC, and turbidity are within historcial ranges and background concentrations for this location for Ocotber 2023.
08/10/2023, 08:57 am	EPL11	Talbingo Reservoir, downstream of outlet	14.08	95.4	9.81	56	37	7.93	412	128	Sunny, clear water	Elevated EC, and turbidity are within historcial ranges and background concentrations for this location for Ocotber 2023.
13/10/2023, 09:55 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	11.06	56	6.17	21	14	6.6	304	121	Sunny, turbid water	This location is upstream of works and is therefore representative of background conditions.
13/10/2023, 10:37 am	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	12.73	73.6	7.8	21	14	6.52	315	128	Sunny, turbid water	DO and EC have decreased since September 2023 and are both within historical range for this location. DO, EC, and turbidity are consistent with background ranges for October 2023.
13/10/2023, 10:30 am	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	12.63	72.3	7.68	21	14	6.57	312	135	Sunny, turbid water	DO and EC have decreased since September 2023 and are both within historical range for this location. DO, EC, and turbidity are consistent with background ranges for October 2023.
13/10/2023, 10:13 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	11.83	88.8	9.61	21	14	6.67	302	125	Sunny, turbid water	DO has decreased since September 2023 and is within historical range for this location. DO and turbidity are consistent with background ranges for October 2023.
13/10/2023, 09:42 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	10.67	85.7	9.52	22	14	7.6	257	102	Sunny, turbid water	This location is upstream of works and is therefore representative of background conditions.
13/10/2023, 09:46 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	9.76	64.3	7.29	21	14	7.13	281	98.8	Sunny, turbid water	This location is upstream of works and is therefore representative of background conditions.
13/10/2023, 10:53 am	EPL 51	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet	12.05	91.7	9.87	21	14	6.43	318	106	Sunny, turbid water	Low pH and elevated turbidity are within histrocial ranges for this location and are generally consisitent with background water quality for October 2023 with low water levels.

Table 3 - Treated Water Quality Data
Talbingo

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	700	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
11/10/2023, 07:55 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	11.57	98.2	10.69	86	56	8.28	629	99.6	Sunny, clear water, no odour	Minor elevation in pH will be monitored but is consistent with location. Turbidity is recorded as elevated, however this is believed to be an error as the water was clear as is evident from photographs taken at the time of sampling. This will be followed up on

Table 4 - Treated Water Quality Data
Tantangara

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	200	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
12/10/2023, 12:54 pm	EPL50	Tantangara STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Tantangara Reservoir.	15.27	96.2	9.65	10	6	7.98	213	63.8	No odour, clear water	Turbidity is recorded as elevated, however this is believed to be an error.

Table 5 - Groundwater Quality Data
GF01 Surface Water and Groundwater

	Water Quality Objectives (see note 1)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	30 - 350	-	6.5 - 8.0	-	-

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
09/10/2023, 10:07 am	EPL56	GF01 groundwater upstream east	13.07	4.5	0.48	231	150	8.1	138	221	Sunny, turbid water, no odour, SWL- 10.685	This location is upgradient of works and is therefore representative of background conditions.
09/10/2023, 09:55 am	EPL57	GF01 groundwater upstream west	13.42	14.7	1.53	267	173	8.06	138	242	Sunny, turbid water, no odour, SWL - 17.61m	This location is upgradient of works and is therefore representative of background conditions.
09/10/2023, 10:25 am	EPL58	GF01 groundwater downstream	15.1	36.2	3.64	238	155	6.62	195	142	Sunny, clear water, no odour, SWL- 6.32m	All readings within WQO limits.
10/10/2023, 11:48 am	EPL68	Tantangara groundwater downstream West	14.9	65.2	6.58	25	18	6.53	235	170	Sunny, clear water, no odour, SWL- 3.65m	EC is slightly low and will be monitored.
10/10/2023, 11:28 am	EPL69	Tantangara groundwater downstream East	13.81	78.3	8.09	35	23	7.05	213	94	Sunny, clear water, no odour, SWL- 2.205m	All readings within WQO limits.
12/10/2023, 10:30 am	EPL70	Tantangara groundwater upstream	14.62	76.7	7.8	95	62	7.06	224	0	Sunny, turbid water, no odour, SWL- 6.38m	This location is upgradient of works and is therefore representative of background conditions.
11/10/2023, 12:17 pm	EPL80	LHG groundwater upstream	19.12	42.7	3.94	827	530	7.19	52	191	Sunny, clear water, no odour, SWL- 20.37m	This location is upgradient of works and is therefore representative of background conditions.
11/10/2023, 11:59 am	EPL81	LHG groundwater downstream	15.81	2.3	0.22	426	277	7.29	162	961	Sunny, turbid water, no odour, SWL- 3.78m	This location is upgradient of works and is therefore representative of background conditions.
11/10/2023, 12:33 pm	EPL82	MY groundwater upstream	20.27	67.8	6.11	636	407	6.39	187	588	Sunny, turbid water, low water flow, no odour, SWL-8.85m	This location is upgradient of works and is therefore representative of background conditions.
11/10/2023, 11:46 am	EPL83	MY groundwater downstream	15.82	66.4	6.57	558	357	7.56	317	1000	Sunny, turbid water, no odour, SWL- 3.63m	This location is upgradient of works and is therefore representative of background conditions.

Note 1: Water Quality Objective values for the Yarrangobilly River and Minor Watercourses refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 2: Water Quality Objective values for Talbingo Reservoir are the default trigger values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 3: Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

Note 4: Water Quality Objective values for groundwater reference the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for pH and electrical conductivity.

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November 2023 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring November 2023

Table 1 - Surface Water Quality Data
River and Minor Watercourses

Water Quality Objectives (see note 1)							
Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
-	90 - 110	-	30 - 350	-	6.5 - 8.0	-	2 - 25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
16/11/2023, 11:32 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	20.16	119.3	10.8	113	74	7.42	209	92.1	Cloudy, no odour, low flow, clear water	This location is upstream of works and is therefore representative of background conditions.
16/11/2023, 12:35 pm	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	18.5	106.8	10	109	71	7.49	216	80.9	Cloudy, clear water, low flow, no odour	Elevated turbidity is consistent with background conditions for November 2023.
16/11/2023, 02:55 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	23.04	108.2	9.27	120	78	8.48	152	77.1	Low flow, cloudy, no odour, clear water, high volume spoil emplacement upstream	Elevated turbidity and pH are within historical range and are consistent with background conditions for November 2023.
16/11/2023, 03:15 pm	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	23.28	105.7	9.02	113	74	8.31	188	76.5	Cloudy, low flow, no odour, clear water	Elevated turbidity and pH are within historical range and are consistent with background conditions for November 2023.
16/11/2023, 11:52 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	19.58	181.1	16.6	110	71	7.43	217	107	Cloudy, no odour, clear water, low flow	High DO is within historical range for this location and elevated turbidity is consistent with background conditions for November 2023.
16/11/2023, 12:53 pm	EPL14	Yarrangobilly River, downstream of road construction areas	19.44	111.3	10.23	108	70	8.23	162	75.6	Cloudy, low flow, no odour,clear water	High DO is within historical range for this location and elevated turbidity and pH is consistent with background conditions for November 2023.
16/11/2023, 01:14 pm	EPL15	Yarrangobilly River, downstream of road construction areas	19.77	173.7	15.86	109	71	7.98	198	73.4	Low flow, cloudy, clear water, no odour	High DO is within historical range for this location and elevated turbidity is consistent with background conditions for November 2023.
16/11/2023, 03:53 pm	EPL16	Yarrangobilly River, downstream of road construction areas	21.75	99.9	8.77	112	73	7.38	196	94.3	Cloudy, low flow, clear water	Elevated turbidity is consistent with background conditions for November 2023.
16/11/2023, 01:30 pm	EPL17	Lick Hole Gully upstream	21	174.6	15.54	529	339	8.02	196	99.2	Very low flow, cloudy, clear water, no odour	High DO and EC is within historical range for this location and elevated turbidity and pH is consistent with background conditions for November 2023.
16/11/2023, 03:34 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	19.08	94.7	8.76	218	142	6.22	233	152	Cloudy, very low flow, clear water, no odour	Low pH is within historical range for this location and elevated turbidity is consistent with background conditions for November 2023.
17/11/2023, 08:25 am	EPL26	Eucumbene River downstream of Marica Road	10.61	136.8	15.22	43	28	7.52	190	97.2	Clear water, cloudy, low flow	These conditions are representative of background conditions for November 2023.
17/11/2023, 08:11 am	EPL27	Eucumbene River upstream of Marica Road	11.16	82.6	9.16	58	38	7.67	188	106	Cloudy, clear water, low flow	This location is upstream of works and is therefore representative of background conditions.
15/11/2023, 01:52 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	20.2	166	15.03	31	20	8.41	199	100	Sunny day, low flow of water, water seems clear, presence of animals close	High DO, pH, and evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
15/11/2023, 01:40 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	21.3	164.8	14.6	30	19	8.41	216	119	Sunny day, low flow, clear water, presence of animals close	High DO, pH, and evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
15/11/2023, 01:13 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	20.26	128	11.58	30	20	8.36	223	77.8	Sunny day, clear water, high flow	High DO, pH, and evelated turbidity are generally consistent with background conditions during sampling and within historical ranges.
15/11/2023, 12:39 pm	EPL34	Nungar Creek, upstream of Tantangara Road	20.52	92.9	8.36	26	17	8.52	217	84.1	Sunny day, water is clear, low flow, there are animals near	This location is upstream of works and is therefore representative of background conditions.
15/11/2023, 12:46 pm	EPL35	Nungar Creek, downstream of Tantangara Road	20.11	163.5	14.83	24	16	5.52	211	89.5	Sunny day, clean water, low flow	High DO, pH, and slightly evelated turbidity with low EC are generally consistent with background conditions during sampling and within historical ranges.
15/11/2023, 11:02 am	EPL36	Camerons Creek, upstream of works in Rock Forest	17.12	111.5	10.75	70	46	7.98	229	134	Low flow, sunny day, water is a bit turbidity	This location is upstream of works and is therefore representative of background conditions.
15/11/2023, 11:19 am	EPL37	Camerons Creek, downstream of works in Rock Forest	19.96	119.1	10.83	62	40	8.26	218	180	Sunny day, low flow, water looks turbidity, there are animals near.	Slightly elevated DO, pH, and turbidity are generally consistent with background readings for November 2023.
25/11/2023, 10:38 am	EPL52	GF01 sediment basin	19.86	94.1	8.57	336	218	8.82	143	461	Raining, turbid water, no odour	High pH and turbidity due to runoff accumulating in sediment basin. Water was taken for treatement at process water treatement plant.
N/A	EPL53	GF01 surface water upstream east	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
N/A	EPL54	GF01 surface water upstream west	-	-	-	-	-	-	-	-	No water flow	Dry site, no flow
25/11/2023, 10:2 5am	EPL55	GF01 surface water downstream	19.39	83.2	7.65	194	126	6.93	179	281	Turbid water, low flow, no odour, raining	Low DO and eleveted tubidity is consistent with low flow condidtions and is generally consistent with background conditions for November 2023.
17/11/2023, 09:04 am	EPL71	Surface water downstream of Marica emplacement	10.54	77.7	8.66	41	27	7.07	213	223	Turbid water, low flow, cloudy, no odour	This is the fisrt sampling in this location and will be monitored.

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Table 2 - Reservoir Water Quality Data
Talbingo and Tantangara Reservoirs

	Water Quality Objectives (see note 2)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	90 - 110	-	20 - 30	-	6.5 - 8.0	-	1 - 20

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
26/11/2023, 07:51 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	19.03	99	9.17	75	48	7.45	194	123	Cloudy day, no smell, the water is clear, rain overnight	Elevated EC, and turbidity are within historcial ranges and background concentrations due to recent rainfall for this location for November 2023.
26/11/2023, 08:06 am	EPL11	Talbingo Reservoir, downstream of outlet	19.4	82.8	7.62	62	40	7.05	211	96.9	Cloudy day, clear water, any smell, rain overnight	Low DO with elevated EC, and turbidity are within historcial ranges and background concentrations due to recent rainfall for this location for November 2023.
21/11/2023, 02:37 pm	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	22.3	80	6.96	31	21.2	7.11	-22.7	62.1	-	This location is upstream of works and is therefore representative of background conditions.
21/11/2023, 12:19 pm	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	19.1	78.9	7.29	44.9	32.8	7.8	-99.8	7.12	-	Low DO and slighlty elevated EC and are both within historical range for this location. DO and EC are consistent with background ranges for November 2023.
21/11/2023, 01:06 pm	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	22.8	75.2	6.47	55.4	37.6	7.07	-21.5	3.84	-	Low DO and slighlty elevated EC and are both within historical range for this location. DO and EC are consistent with background ranges for November 2023.
21/11/2023, 01:46 pm	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	20.8	77.7	6.96	34.3	24.3	7.32	-24.5	6.63	-	Low DO and slighlty elevated EC and are both within historical range for this location. DO and EC are consistent with background ranges for November 2023.
21/11/2023, 01:50 pm	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	-	-	-	-	-	-	-	-	Dry location	Water level very low for this location.
21/11/2023, 01:50 pm	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	-	-	-	-	-	-	-	-	Dry location	Water level very low for this location.
21/11/2023, 12:30 pm	EPL 51	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet	19.6	78	7.14	26.5	19.2	7.52	-36.6	2.54	-	Low DO is within histrocial ranges for this location and is generally consisitent with background water quality for November 2023 with low water levels.

Table 3 - Treated Water Quality Data
Talbingo

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	700	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
19/11/2023, 06:44 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	18.33	109.5	10.29	108	70	7.71	207	92.2	Sunny, clear water, no odour	Turbidity is recorded as elevated, however this is believed to be an error as the water was clear as is evident from photographs taken at the time of sampling. This will be followed up on

Table 4 - Treated Water Quality Data
Tantangara

	Water Quality Objectives (see note 3)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	200	-	6.5 - 8.0	-	25

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
17/11/2023, 10:50 am	EPL50	Tantangara STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Tantangara Reservoir.	17.59	73.8	7.04	162	105	6.51	199	122	Clear water, no odour	Turbidity is recorded as elevated, however this is believed to be an error as water appeared clear at the time of sampling.

Table 5 - Groundwater Quality Data
GF01 Surface Water and Groundwater

	Water Quality Objectives (see note 1)							
	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)
	-	-	-	30 - 350	-	6.5 - 8.0	-	-

Date and Time	EPL Site ID	Location Description	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)	Turbidity (NTU)	Field Comments	Context
03/11/2023, 04:12 pm	EPL1	Wallace Creek Bridge	19.96	158.3	14.35	1220	780	8	-93	217	Sunny, rotten egg odour, clear water, SWL- 4.315m	EC is within historical range for groundwater at Lobs Hole.
03/11/2023, 04:00 pm	EPL2	Wallace Creek Bridge	19.27	156.8	14.44	520	333	6.59	9	435	Sunny, no odour, clear water, SWL- 3.325m	EC is within historical range for groundwater at Lobs Hole.
03/11/2023, 03:28 pm	EPL4	Portal Access	19.94	179.9	16.31	1250	802	8.07	-195	0	Sunny, rotten egg odour, muddy water, covered with mud, turbidity very high, SWL-3.802m	Elevated EC and pH are generally consistent with and within background range for November 2023.
03/11/2023, 03:42 pm	EPL25	Portal Access	18.63	59.3	5.54	471	306	7.46	100	405	Sunny, turbid water, no odour, SWL- 4.115m	EC is within historical rang for groundwater at Lobs Hole.
21/11/2023, 11:55 am	EPL56	GF01 groundwater upstream east	16.92	42.1	4.07	256	166	7.63	99	485	Cloudy, turbid water, no odour, high volume spoil emplacement downtream, SWL- 10.815m	All readings within WQO limits.
21/11/2023, 11:33 am	EPL57	GF01 groundwater upstream west	17.13	43.7	4.2	314	204	7.96	39	292	Cloudy, turbid water, no odour, SW-18.276m	All readings within WQO limits.
21/11/2023, 12:36 am	EPL58	GF01 groundwater downstream	18.74	3.6	0.34	270	176	5.98	188	301	Cloudy, turbid watet, high volume spoil emplacement upstream, no odour, SWL-8.427m	pH is low an will be monitored.
19/11/2023, 11:33 am	EPL68	Tantangara groundwater downstream West	14.3	87.5	8.95	24.5	20	5.69	-35.2	17.5	-	EC is slightly low with pH and will be monitored. pH is but is consistent with upgradient conditions.
19/11/2023, 11:09 am	EPL69	Tantangara groundwater downstream East	14.2	72.7	7.45	42.6	34.8	5.96	-17	14.3	Approx 2 m of wire needs to be removed. Review bore log. Sunny day, clear water	pH is low an will be monitored but is consistent with upgradient conditions.
19/11/2023, 10:48 am	EPL70	Tantangara groundwater upstream	14.2	72.6	7.46	77.3	63.4	6.25	-19.8	54.4	Sunny day, turbid water, will require purging	This location is upgradient of works and is therefore representative of background conditions.
13/11/2023, 11:22 am	EPL 72	Marica groundwater upstream	20.54	79.6	7.16	43	28	8.3	180	57.7	First sample after purging	This location is upgradient of works and is therefore representative of background conditions.
13/11/2023, 11:30 pm	EPL73	Marica groundwater downstream	15.54	104.8	10.44	62	40	7.82	228	51.6	First sample after purging	All readings within WQO limits.
21/11/2023, 03:36 am	EPL80	LHG groundwater upstream	21.33	60.9	5.38	935	599	6.6	28	146	Clear water, no odour, cloudy, SWL- 20.448m	This location is upgradient of works and is therefore representative of background conditions.
21/11/2023, 03:27 am	EPL81	LHG groundwater downstream	20.4	88.2	7.95	531	340	6.72	-32	773	Cloudy, turbid watet, no odour, SWL- 4.063m	Elevated EC is consistent with background conditions for November 2023.
18/11/2023, 10:53 am	EPL82	MY groundwater upstream	19.73	87.1	7.94	724	464	5.78	171	0	Sunny, turbid water, no odour, high NTU, slow recharge, SWL- 8.832m	This location is upgradient of works and is therefore representative of background conditions.
21/11/2023, 03:01 pm	EPL83	MY groundwater downstream	20.69	63.4	5.68	535	342	6.07	124	114	Clear water, cloudy, no odour, SWL-3.965m	Elevated EC and lower pH are consistent with background conditions for November 2023.

Note 1: Water Quality Objective values for the Yarrangobilly River and Minor Watercourses refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 2: Water Quality Objective values for Talbingo Reservoir are the default trigger values for physical and chemical stressors in south-east Australia (freshwater lakes and reservoirs) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ ARMCANZ (2000).

Note 3: Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

Note 4: Water Quality Objective values for groundwater reference the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for pH and electrical conductivity.

APPENDIX C – LABORATORY RESULTS TABLES

Snowy Hydro 2.0 Main Works EPL Sampling: 01 - 30 June 2023

Environmental Protection Licence No:	21266
Licensee:	Snowy Hydro Limited
Licensee address:	PO Box 332, Cooma, NSW 2630
Premises:	Snowy 2.0 Pumped Hydro Power Station Talbingo and Tantangara, Kosciuszko National Park and Rock Forest, Kosciuzko NSW 2642
EPA Public Register:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21266&id=21266&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued

Monthly water sampling and analysis is performed as part of the Snowy 2.0 Approval Conditions, Environmental Protection Licence No 21266 - Variation 6 June 2023, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

A map showing the location of each of the EPL named sampling points is avaliable on the Snowy 2.0 Project website.

Surface Water Results: Marica has slight exceedances of Ammonia though is representative of background conditions with upstream and downstream values showing similar results. Rock Forest has exceedances in Nitrogen, Ammonia, Phosphorus, Aluminium, and Iron but the concentrations are similar upstream indicating the exceedances are representative of background conditions. The exceedances likely result from agricultural activities. Tantangara surface water quality is generally within WQO for June and is representative of background conditions.
A few minor exceedances of metals and nutrients occured at Lobs Hole in June though were generally representative of background conditions with similar exceedances observed at upstream locations.
There were greater exceedances of Nitrogen and Ammonia and EPL24 which are consistent with historical data for the location.
Reservoir Results: Tantangara and Talbingo Reservoirs displayed minor exceedances for nutrients however, these remain consistent with previous months of monitoring and are also present in the upstream sampling locations.
Discharge Results: There was elevated Nitrogen at EPL 41 however discharge of treated water to Talbingo was ceased and an investigation undertaken to reduce Nitrogen concentrations. There was some exeedances of Alumium, Chromium, Copper and Zinc at EPL 41. Most of the results for EPL 41 were within WQO levels. The BOD for EPL 50 was not tested by the external NATA accredited laboratory, so there was no result established for BOD. A review is underway with external laboratory to identify why BOD wasn't tested. Tantangara was not dicharging at the time of sampling due to not meeting the WQO.
GF01 Results: There were exceedances for Ammonia and Nitrogen at all groundwater bores, however the elevated concentrations respective to background conditions at EPL 56 is being investigated. Exceedances of metals including zinc, aluminum, and iron were also found at all GF01 bores, which is indicative of background concentrations as greater exceedances were identified upstream of the placement area.
Exceedances of Nitrogen, Ammonia, and a number of metals were observed in sediment basin and surface water at GF01 with some similar exceedances noted upstream at EPL 53. Significant exceedances of Nitrogen were observed in the sediment basin water which is being investigated.

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Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01-30 June 2023 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL56	EPL57	EPL58
				25/06/2023	25/06/2023	25/06/2023
Physiochemical						
pH	pH Unit	-	6.5-8	7.97	7.80	6.22
Electrical Conductivity	µS/cm	-	30-350	156.0	309.0	279.0
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	173.0	190.0	241.0
Temperature	°C	-	No Water Quality Objective Value	13.3	12.4	11.6
Dissolved Oxygen	% saturation	-	No Water Quality Objective Value	66.2	42.2	11.7
Turbidity	NTU	-	No Water Quality Objective Value	41.6	1000	64.0
Laboratory analytes						
TSS	mg/L	5	No Water Quality Objective Value	54	8690	390
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	60	137	116
Nutrients						
Ammonia as N	µg/L	5	13	170	200	60
Nitrite + Nitrate as N (Nox)	µg/L	10	15	4480	<10	<10
Kjeldahl Nitrogen Total	µg/L	100	No Water Quality Objective Value	600	400	200
Nitrogen (Total)	µg/L	100	250	5100	400	200
Reactive Phosphorus	µg/L	10	15	<10	10	<10
Phosphorus (Total)	µg/L	10	20	<10	1030	120
Inorganics						
Cyanide Total	µg/L	4	4	<4	<4	<4
Hydrocarbons						
Oil and Grease	mg/L	5	5	5	8	<5
Metals						
Aluminium (dissolved)	µg/L	5	27	38	66	15
Aluminium (total)	µg/L	5	No Water Quality Objective Value	832	23600	5200
Arsenic (dissolved)	µg/L	0.2	0.8	0.2	4	0.2
Arsenic (total)	µg/L	0.2	No Water Quality Objective Value	1	11	2
Chromium (III+VI) (dissolved)	µg/L	0.2	0.01	2	0	<0.2
Chromium (III+VI) (total)	µg/L	0.2	No Water Quality Objective Value	4	44	13
Copper (dissolved)	µg/L	0.5	1	26	7	12
Copper (total)	µg/L	0.5	No Water Quality Objective Value	182	39	176
Iron (dissolved)	µg/L	2	300	28	70	6
Iron (total)	µg/L	2	No Water Quality Objective Value	1140	28200	7500
Lead (dissolved)	µg/L	0.1	1	2	0	0
Lead (total)	µg/L	0.1	No Water Quality Objective Value	11	70	59
Manganese (dissolved)	µg/L	0.5	1,200	9	220	37
Manganese (total)	µg/L	0.5	No Water Quality Objective Value	33	980	338
Nickel (dissolved)	µg/L	0.5	8	2	5	1
Nickel (total)	µg/L	0.5	No Water Quality Objective Value	4	121	19
Silver (dissolved)	µg/L	0.1	0.02	<0.1	<0.1	<0.1
Silver (total)	µg/L	0.1	No Water Quality Objective Value	<0.1	0	1
Zinc (dissolved)	µg/L	1	2.4	6	2	7
Zinc (total)	µg/L	1	No Water Quality Objective Value	8	98	71

* Water Quality Objective values for groundwater refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

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Monthly EPL Sampling: 01 - 30 June 2023 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40	EPL51
				21/06/2023	21/06/2023	20/06/2023	27/06/2023	27/06/2023	27/06/2023	20/06/2023	20/06/2023	27/06/2023
Field												
pH	pH Unit	-	6.5-8	8.20	8.66	7.49	7.41	7.30	7.85	8.69	7.97	7.38
Electrical Conductivity	µS/cm	-	20-30	45.0	66.0	18.0	27.0	27.0	33.0	19.0	19.0	9.0
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	190	170	238	339	342	290	162	199	344
Temperature	°C	-	No Water Quality Objective Value	9.80	9.98	5.96	5.58	5.50	5.54	6.55	6.24	5.59
Dissolved Oxygen	% saturation	-	90-110	98.2	131.2	101.0	77.9	75.5	79.8	102.5	137.3	73.3
Turbidity	NTU	-	1-20	6.2	11.2	10.5	0.0	0.0	0.0	12.7	12.4	0.0
Laboratory analytes												
Total suspended solids	mg/L	5	No Water Quality Objective Value	<5	7.00	6.00	6.00	<5	<5	8.00	6.00	7.00
Hardness as $CaCO_3$ (filtered)	mg/L	1	No Water Quality Objective Value	10.0	10.0	<1	2.00	2.00	5.00	<1	<1	5.00
Nutrients												
Ammonia as N	µg/L	10	10	90.0	80.0	<10	<10	<10	<10	20.0	20.0	<10
Nitrite + Nitrate as N (NOx)	µg/L	10	10	20	30	<10	<10	<10	<10	20.0	<10	<10
Kjeldahl Nitrogen Total	µg/L	100	No Water Quality Objective Value	100.0	100.0	200.0	300.0	300.0	300.0	500.0	200.0	200.0
Nitrogen (Total)	µg/L	100	350	100.0	100.0	200.0	300.0	300.0	300.0	500.0	200.0	200.0
Reactive Phosphorus	µg/L	10	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus (Total)	µg/L	10	10	<10	<10	20.0	20.0	20.0	20.0	370.0	90.0	20.0
Inorganics												
Cyanide Total	µg/L	4	7	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons												
Oil and Grease	mg/L	1	5	<2	<2	<1	<1	<1	<1	<1	<1	<1
Metals												
Aluminium (dissolved)	µg/L	10	55	32.0	25.0	36.0	62.0	<10	<10	20.0	20.0	<10
Arsenic (dissolved)	µg/L	0.2	13	0.20	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (III+VI) (dissolved)	µg/L	0.2	1	0.20	0.30	<0.2	<0.2	0.20	<0.2	0.30	<0.2	<0.2
Copper (dissolved)	µg/L	0.5	14	2.30	3.80	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron (dissolved)	µg/L	0.05	300	32.0	26.0	<0.05	0.10	0.12	0.10	0.06	0.06	0.11
Lead (dissolved)	µg/L	0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese (dissolved)	µg/L	0.5	1,900	4.20	2.50	10.2	2.00	1.90	3.70	9.10	9.50	1.20
Nickel (dissolved)	µg/L	0.5	11	<0.5	<0.5	<0.5	<0.5	2.40	<0.5	<0.5	<0.5	<0.5
Silver (dissolved)	µg/L	0.1	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc (dissolved)	µg/L	1	8	5.00	2.00	1.00	<1	<1	<1	2.00	6.00	<1
Biological												
Faecal Coliforms	CFU/100mL	1	10/100^	<1	<1	60.0	–	–	–	–	–	14.0
Biochemical Oxygen Demand	mg/L	2	1/5^	2.00	<2	<2	<2	<2	<2	<2	<2	<2

* Water Quality Objective values for Talbingo and Tantangara Reservoir refer to the default trigger values for physical and chemical stressors in south-east Australia (fresh lakes and reservoirs) for the protection of 95% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

** Algal blooms can present as feacal coliforms - green tinge noted in Talbingo Resevroir water at time of sampling.

^ 90th percentile concentration limits / 100 percentile concentration limits

\- Sample not required at this location.

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Monthly EPL Sampling: 01 - 30 June 2023 - Surface Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL5	EPL6	EPL8	EPL9	EPL12	EPL14	EPL15	EPL16	EPL24	EPL26	EPL27	EPL30	EPL31	EPL33	EPL34	EPL35	EPL36	EPL37	EPL52	EPL53	EPL54	EPL55
				17/06/2023	17/06/2023	17/06/2023	17/06/2023	17/06/2023	17/06/2023	17/06/2023	17/06/2023	17/06/2023	2/06/2023	2/06/2023	7/06/2023	7/06/2023	7/06/2023	7/06/2023	7/06/2023	2/06/2023	2/06/2023	25/06/2023	25/06/2023	25/06/2023	25/06/2023
Field																									
pH	-	-	6.5-8	7.32	7.62	7.75	7.85	7.39	7.74	7.84	7.90	7.33	7.38	7.22	7.78	7.65	7.10	8.65	8.37	7.05	7.22	7.72	7.66	6.55	6.46
Electrical Conductivity	µS/cm	-	30-350	65.0	57.0	69.0	66.0	66.0	64.0	64.0	65.0	87.0	27.0	30.0	35.0	28.0	27.0	16.0	27.0	42.0	45.0	488.0	49.0	27.0	124.0
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	249	208	204	197	214	208	201	197	135	265	199	258	277	319	191	212	289	151	248	221	214	238
Temperature	°C	-	No Water Quality Objective Value	7.16	7.21	7.75	8.36	7.03	7.21	7.71	7.90	10.73	8.08	7.96	10.36	10.29	9.50	8.44	9.78	8.15	8.54	10.35	10.72	10.05	11.31
Dissolved Oxygen	% saturation	-	90-110	131.3	116.9	123.8	123.8	120.5	113.5	129.0	112.1	103.0	93.7	81.9	70.8	84.5	62.3	108.2	75.2	80.5	85.4	62.9	55.4	3.68	60.3
Turbidity	NTU	-	2-25	7.5	24.0	11.4	10.0	10.8	11.8	0.0	11.5	48.3	3.1	4.6	21.6	8.5	7.9	2.9	8.1	17.2	28.7	49.9	17.4	4.8	19.8
Laboratory analytes																									
TSS	mg/L	5	No Water Quality Objective Value	5.00	6.00	<5	6.00	6.00	5.00	6.00	8.00	13.0	<5	6.00	6.00	6.00	<5	<5	<5	12.0	39.0	5.00	<5	5.00	8.00
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	31.0	26.0	33.0	31.0	31.0	31.0	31.0	31.0	30.0	9.00	5.00	13.0	7.00	9.00	<1	<1	11.0	11.0	167.0	19.0	8.00	37.0
Nutrients																									
Ammonia as N	µg/L	10	13	20.0	60.0	150.0	390.0	70.0	20.0	60.0	120.0	220.0	30.0	90.0	<10	<10	<10	<10	<10	20.0	70.0	10.0	30.0	10.00	20.0
Nitrite + Nitrate as N (NOx)	µg/L	10	15	20.0	<10	<10	<10	<10	<10	<10	<10	520.0	20.0	30.0	30.0	<10	<10	<10	<10	80.0	160.0	13700	20.0	20.00	3880.0
Kjeldahl Nitrogen Total	µg/L	100	No Water Quality Objective Value	200.0	400.0	400.0	700.0	400.0	300.0	500.0	300.0	600.0	<100	100.0	100.0	<100	200.0	100.0	100.0	600.0	500.0	1000	100.0	100.0	500.0
Nitrogen (Total)	µg/L	100	250	200.0	400.0	400.0	700.0	400.0	300.0	500.0	300.0	1100.0	<100	100.0	100.0	<100	200.0	100.0	100.0	700.0	700.0	12800	100.0	100.0	3,100
Reactive Phosphorus	µg/L	10	15	<10	<10	<10	<10	<10	<10	<10	50.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus (Total)	µg/L	10	20	30.0	20.0	10.0	20.0	20.0	20.0	20.0	30.0	30.0	<10	<10	30.0	30.0	30.0	20.0	20.0	<10	50.0	10.0	<10	<10	30.0
Inorganics																									
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons																									
Oil and Grease	mg/L	2	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	3	3	<2	<2	<2	<2	<2	4	5	<2	<2	<2	<5
Metals																									
Aluminium (dissolved)	µg/L	10	27	60.0	40.0	60.0	60.0	80.0	40.0	40.0	50.0	60.0	10.0	<10	20.0	<10	20.0	30.0	10.0	130.0	210.0	<10	20.0	<10	10.0
Aluminium (total)	µg/L	10	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	150.0	125.0	<10	255.0
Arsenic (dissolved)	µg/L	1	0.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.2	<1
Arsenic (total)	µg/L	1	No Water Quality Objective Value	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.2	<1
Chromium (III+VI) (dissolved)	µg/L	1	0.01	<1	<1	<1	<1	0.30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	7.40	0.30	<1	0.90
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.90	<0.2	<0.2	0.90
Copper (dissolved)	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.30	<0.5	<1
Copper (total)	µg/L	1	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	<1	<0.5	<0.5	0.60
Iron (dissolved)	µg/L	50	300	60.0	<50	<50	<50	60.0	<50	<50	<50	70.0	<50	<50	50.0	<50	100.0	80.0	60.0	310.0	330.0	<50	<50	<50	12.0
Iron (total)	µg/L	50	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	170.0	112.0	14.00	254.0
Lead (dissolved)	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.30	<1	<1
Lead (total)	µg/L	1	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	<1	0.90	0.40	2.00
Manganese (dissolved)	µg/L	1	1,200	3.00	2.00	1.00	4.00	<1	2.00	2.00	2.00	38.0	2.00	1.00	3.00	<1	1.00	5.00	5.00	14.0	21.0	<1	0.70	<1	<1
Manganese (total)	µg/L	0.5	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15.0	2.50	<0.5	9.00
Nickel (dissolved)	µg/L	1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.60	<0.5	<1	<1
Nickel (total)	µg/L	0.5	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.70	<0.5	<0.5	0.60
Silver (dissolved)	µg/L	1	0.02	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1	<1	<0.1	<1
Silver (total)	µg/L	1	No Water Quality Objective Value	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	<0.1	<1	<0.1	<1
Zinc (dissolved)	µg/L	5	2.4	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	6.00	<5	<5
Zinc (total)	µg/L	5	No Water Quality Objective Value	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	2.00	<1	2.00

* Water Quality Objective values for surface water refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 30 June 2023 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49	EPL 50
				21/06/2023							7/06/2023
Flow Rate											
Inflow#	**ML/day**	-	-	-	0.0303	0.00	0.09588	0.0031959	0.1542	0.2234	-
Outflow#	**ML/day**	-	4.32 (EPL 43 / 50)	-	-	-	-	-	-	-	-
Field											
pH	**pH Unit**	-	6.5-8.5	7.64	-	-	-	-	-	-	7.83
Electrical Conductivity	**µS/cm**	-	700 (EPL 41) / 200 (EPL 50)	230.0	-	-	-	-	-	-	9.00
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	234.0	-	-	-	-	-	-	284.00
Temperature	**°C**	-	15	6.97	-	-	-	-	-	-	11.07
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	11.1	-	-	-	-	-	-	60.30
Turbidity	**NTU**	-	<25	10.3	-	-	-	-	-	-	7.70
Laboratory analytes											
Total suspended solids	**mg/L**	5	5/10	<5	-	-	-	-	-	-	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	22.0	-	-	-	-	-	-	<1
Nutrients											
Ammonia as N	**µg/L**	5	200/2000^	440.0	-	-	-	-	-	-	<10
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	800.0	-	-	-	-	-	-	100.0
Nitrogen (Total)	**µg/L**	10	350/-^	2500	-	-	-	-	-	-	200.0
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<10	-	-	-	-	-	-	<10
Phosphorus (Total)	**µg/L**	5	100/300^	10.00	-	-	-	-	-	-	30.00
Inorganics											
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-	-	-	-	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	2/5^	<2	-	-	-	-	-	-	<2
Metals											
Aluminium (dissolved)	**µg/L**	5	55	437.0	-	-	-	-	-	-	<10
Arsenic (dissolved)	**µg/L**	0.2	13	0.20	-	-	-	-	-	-	<1
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	17.6	-	-	-	-	-	-	<1
Copper (dissolved)	**µg/L**	0.5	14	1.60	-	-	-	-	-	-	<1
Iron (dissolved)	**µg/L**	2	300	30.0	-	-	-	-	-	-	<50
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	-	-	-	-	-	-	<1
Manganese (dissolved)	**µg/L**	0.5	1,900	3.60	-	-	-	-	-	-	<1
Nickel (dissolved)	**µg/L**	0.5	11	<0.5	-	-	-	-	-	-	<1
Silver (dissolved)	**µg/L**	0.01	0.05	<0.1	-	-	-	-	-	-	<1
Zinc (dissolved)	**µg/L**	1	8	5.00	-	-	-	-	-	-	<5
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-	-	-	-	<1
Biological Oxygen Demand	**mg/L**	<5	5	<2	-	-	-	-	-	-	-

Note: Treated water was not being discharged at Talbingo ot Tantangara Reservoirs at the time of EPL sampling.
There is no 100th percentile limit for Nitrogen (Total).

* Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

\- Samples not required

^ 90 Percentile concentration limit/100 Percentile limit

Inflows to STP and CWTP do not directly correspond to outflow at RO as much of the water is reused on site

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 30 June 2023 - Treated Water

Date	EPL 43 *	EPL 50 ^	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49
	Discharge volume (Megalites)		Daily volume readings (Megalitres)				
1/06/2023	1.07	-		0.04	0.13	0.07	0.24
2/06/2023	0.00	-		0.07	0.18	0.07	0.18
3/06/2023	0.19	-		0.05	0.14	0.04	0.15
4/06/2023	0.31	-		0.05	0.09	0.04	0.20
5/06/2023	-	-		0.05	0.20	0.09	0.28
6/06/2023	0.18	-		0.05	0.15	0.07	0.51
7/06/2023	-	-		0.05	0.14	0.04	0.19
8/06/2023	0.47	-		0.05	0.13	0.10	0.23
9/06/2023	0.26	-		0.05	0.18	0.07	0.11
10/06/2023	-	-		0.05	0.17	0.07	0.26
11/06/2023	0.15	-		0.06	0.18	0.08	0.09
12/06/2023	-	-		0.05	0.16	0.07	0.32
13/06/2023	0.15	0.79		0.05	0.16	0.07	0.27
14/06/2023	-	-		0.05	0.12	0.07	0.36
15/06/2023	0.39	-		0.05	0.14	0.07	0.33
16/06/2023	0.79	-		0.06	0.17	0.06	0.33
17/06/2023	1.59	0.67		0.05	0.12	0.07	0.32
18/06/2023	0.51	-		0.05	0.15	0.06	0.35
19/06/2023	0.58	-		0.05	0.17	0.07	0.17
20/06/2023	1.14	-		0.06	0.16	0.07	0.23
21/06/2023	-	-		0.06	0.16	0.07	0.20
22/06/2023	-	-		0.06	0.15	0.06	0.16
23/06/2023	-	-		0.08	0.16	0.08	0.16
24/06/2023	-	0.43		0.06	0.13	0.06	0.19
25/06/2023	-	-		0.05	0.14	0.07	0.47
26/06/2023	-	-		0.05	0.13	0.07	0.21
27/06/2023	-	-		0.07	0.21	0.06	0.22
28/06/2023	-	-		0.06	0.17	0.09	0.19
29/06/2023	-	-		0.05	0.11	0.06	0.24
30/06/2023	-	-		0.07	0.17	0.08	0.35

Note: The EPL discharge volume limit for EPL 43 and 50 is 4.32 megalitres per day. Compliance with this criteria was met during the reporting month.

EPL 44 volume inflows were not recorded in June 2023 due to the technology upgrades.

* The maximum flow rate capacity for Lobs Hole STP/PWTP during the reporting month was 18 L/s.

^ The maximum flow rate capacity for Tantangara STP/PWTP during the reporting month was 9 L/s.

\- Water not discharged on this day

-- Flow meter non-operational. Water volumes are considered to be similar daily flows to those recorded for each respective plant as works progressed at the same rate.

Snowy Hydro 2.0 Main Works EPL Sampling: 01 - 30 July 2023

Environmental Protection Licence No:	21266
Licensee:	Snowy Hydro Limited
Licensee address:	PO Box 332, Cooma, NSW 2630
Premises:	Snowy 2.0 Pumped Hydro Power Station Talbingo and Tantangara, Kosciuszko National Park and Rock Forest, Kosciuzko NSW 2642
EPA Public Register:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21266&id=21266&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued

Monthly water sampling and analysis is performed as part of the Snowy 2.0 Approval Conditions, Environmental Protection Licence No 21266 - Variation 6 June 2023, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

A map showing the location of each of the EPL named sampling points is provided after the results tables.

Surface Water Results: There was exceedances of Turbidity and Dissolved Oxygen was outside the WQO for many EPL's. The turbidity was likely due to runoff from heavy rainfall periods during winter causing high flow upstream and downstream. DO outside WQO parameters can be caused by changes in temperature and fluctuations of naturally occuring bacteria. There were higher Ammonia readings for EPL's across most sites except Marica. This could be due to runoff from heavy rainfall and natural springs as it was also recorded upstream of the Project works. A few minor exceedances of metals and nutrients occured at Lobs Hole in June though were generally representative of background conditions with similar exceedances observed at upstream locations.There were some exceedances of dissolved metals, but most metal levels within WQO parameters.
Reservoir Results: Tantangara and Talbingo Reservoirs displayed minor exceedances for nutrients however, these remain consistent with previous months of monitoring and are also present in the upstream sampling locations. This was most likely due to runoff from natural springs and natural river flows into the resevior as there was minimal dicharge at Tantangara and no discharge from the plant at Talbingo.
Discharge Results: A TARP was raised during the previous month due to exceeding levels of Nitrogen for EPL 41 at Talbingo. Ongoing bi-weekly monitoring was conducted over the monthly period, with changes in the operation of the Reverse Osmosis plant to reduce levels of nitrogen. Water from the Reverse Osmosis plant was tested and re-used on site in accordance with the Project Water Re-use Procedure. No discharge to Talbingo occurred in July. Nitrogen exceeded the WQO at Tantangara at the time of sampling however discharge had ceased to enable further treatment of water prior to discharge.
Groundwater (GF01) Results: Exceedances of Nitrogen, Ammonia, and a number of metals were observed in sediment basin and surface water at GF01 with some similar exceedances noted upstream at EPL 53. Significant exceedances of Nitrogen were observed in the sediment basin water which is being investigated.

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01-30 July 2023 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL56	EPL57	EPL58
Physiochemical				22/07/2023	1/07/2023	1/07/2023
pH	**pH Unit**	-	6.5-8	7.87	8.13	6.55
Electrical Conductivity	**µS/cm**	-	30-350	290	296	398
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	145	71	192
Temperature	**°C**	-	No Water Quality Objective Value	5.88	14.77	15.26
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	39.8	23.6	51.3
Turbidity	**NTU**	-	No Water Quality Objective Value	304	>1000	73.2
Laboratory analytes						
TSS	**mg/L**	5	No Water Quality Objective Value	79	1,330	23
Hardness as CaCO3	**mg/L**	1	No Water Quality Objective Value	112	131	67
Nutrients						
Ammonia as N	**µg/L**	5	13	90	70	280
Nitrite + Nitrate as N (Nox)	**µg/L**	10	15	120	<10	8080
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	<100	<100	1200
Nitrogen (Total)	**µg/L**	10	250	100	100	9300
Reactive Phosphorus	**µg/L**	1	15	<10	<10	<10
Phosphorus (Total)	**µg/L**	5	20	160	1740	20
Inorganics						
Cyanide Total	**µg/L**	4	4	4	4	4
Hydrocarbons						
Oil and Grease	**mg/L**	5	5	<1	<2	<1
Metals						
Aluminium (dissolved)	**µg/L**	5	27	<5	20	7
Aluminium (total)	**µg/L**	5	No Water Quality Objective Value	90	16700	830
Arsenic (dissolved)	**µg/L**	1	0.8	0.7	3.4	368
Arsenic (total)	**µg/L**	1	No Water Quality Objective Value	1.6	11	0.6
Chromium (III+VI) (dissolved)	**µg/L**	1	0.01	0.2	<0.2	0.6
Chromium (III+VI) (total)	**µg/L**	1	No Water Quality Objective Value	6.7	26.6	1.6
Copper (dissolved)	**µg/L**	1	1	1.5	<0.5	13.3
Copper (total)	**µg/L**	1	No Water Quality Objective Value	66.2	41.3	83.6
Iron (dissolved)	**µg/L**	50	300	<2	<2	<2
Iron (total)	**µg/L**	50	No Water Quality Objective Value	75	22400	201
Lead (dissolved)	**µg/L**	1	1	<0.1	<0.1	1
Lead (total)	**µg/L**	1	No Water Quality Objective Value	0.4	79.4	7.1
Manganese (dissolved)	**µg/L**	5	1,200	35.2	171	9.8
Manganese (total)	**µg/L**	5	No Water Quality Objective Value	35.2	171	9.8
Nickel (dissolved)	**µg/L**	1	8	<0.5	3.5	2
Nickel (total)	**µg/L**	1	No Water Quality Objective Value	15	139	2.6
Silver (dissolved)	**µg/L**	5	0.02	<0.01	<0.01	<0.01
Silver (total)	**µg/L**	5	No Water Quality Objective Value	0.13	<0.1	0.03
Zinc (dissolved)	**µg/L**	5	2.4	3	<1	9
Zinc (total)	**µg/L**	5	No Water Quality Objective Value	48	98	8

* Water Quality Objective values for groundwater refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

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Future Generation
Webuild • Clough • Lane

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 30 July 2023 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40	EPL51
Field				16/7/23	16/7/23	13/7/23	13/7/23	13/7/23	13/7/23	13/7/23	13/7/23	13/7/23
pH	**pH Unit**	-	6.5-8	7.77	7.74	7.79	7.21	7.44	7.36	7.55	7.32	7.41
Electrical Conductivity	**µS/cm**	-	20-30	38	44	115	23	23	22	19	31	25
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	155	156	196	245	225	234	232	222	239
Temperature	**°C**	-	No Water Quality Objective Value	10.33	9.87	8.98	6.02	6.11	6.51	7.17	7.12	6.12
Dissolved Oxygen	**% saturation**	-	90-110	85	95	87.2	84.7	100.6	94.4	88	89.3	63
Turbidity	**NTU**	-	1-20	6.8	10.5	25.3	11.1	9.1	10.6	10.8	18.6	14.6
Laboratory analytes												
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	<5	<5	<5	<5	<5	<5	<5	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	7	7	<1	2	2	2	2	<1	2
Nutrients												
Ammonia as N	**µg/L**	5	10	200	180	10	30	10	<10	20	20	<10
Nitrite + Nitrate as N (NOx)	**µg/L**	10	10	20	20	<10	<10	<10	<10	<10	<10	<10
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	300	400	100	200	200	200	200	100	100
Nitrogen (Total)	**µg/L**	10	350	300	400	100	200	200	200	200	100	100
Reactive Phosphorus	**µg/L**	1	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus (Total)	**µg/L**	5	10	20	50	60	50	50	40	60	40	60
Inorganics												
Cyanide Total	**µg/L**	4	7	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons												
Oil and Grease	**mg/L**	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Metals												
Aluminium (dissolved)	**µg/L**	5	55	16	7	15	19	33	28	20	15	32
Arsenic (dissolved)	**µg/L**	0.2	13	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper (dissolved)	**µg/L**	0.5	14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron (dissolved)	**µg/L**	2	300	26	18	58	82	82	62	38	32	81
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	1.9	1.7	0.8	1.1	1.2	0.9	1.1	1	1.2
Nickel (dissolved)	**µg/L**	0.5	11	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Silver (dissolved)	**µg/L**	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zinc (dissolved)	**µg/L**	1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1
Biological												
Faecal Coliforms	**CFU/100mL**	1	10/100^	<2	<2	<2	<2	<2	<2	<2	<2	<2
Biochemical Oxygen Demand	**mg/L**	2	1/5^	<2	<2	<2	<2	<2	<2	<2	<2	<2

* Water Quality Objective values for Talbingo and Tantangara Reservoir refer to the default trigger values for physical and chemical stressors in south-east Australia (fresh lakes and reservoirs) for the protection of 95% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

** Algal blooms can present as feacal coliforms - green tinge noted in Talbingo Resevroir water at time of sampling.

^ 90th percentile concentration limits / 100 percentile concentration limits

\- Sample not required at this location.

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Future Generation
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Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 30 July 2023 - Surface Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL5	EPL6	EPL8	EPL9	EPL12	EPL14	EPL15	EPL16	EPL24	EPL26	EPL27	EPL30	EPL31	EPL33	EPL34	EPL35	EPL36	EPL37	EPL52	EPL53	EPL54	EPL55
Field				12/07/23	12/7/23	12/07/23	11/07/23	12/07/23	11/07/23	11/07/23	11/07/23	11/07/23	15/07/23	15/07/23	14/07/23	14/07/23	14/07/23	14/07/23	14/07/23	14/07/23	14/07/23	16/07/23			6/07/23
pH	-	-	6.5-8	7.56	7.75	7.76	7.62	7.62	7.76	7.56	7.74	7.61	7.96	7.46	7.57	7.46	7.53	7.35	6.94	6.96	7.03	8.99	-	-	7.45
Electrical Conductivity	µS/cm	-	30-350	62.0	52.0	70.0	59.0	54.0	56.0	53.0	57.0	69.0	223.0	31.0	26.0	35.0	207.0	37.0	16.0	39.0	40.0	103.0	-	-	463.0
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	249.0	210.0	215.0	253.0	207.0	226.0	242.0	224.0	239.0	96.0	121.0	155.0	167.0	155.0	207.0	208.0	215.0	191.0	119.0	-	-	182.0
Temperature	°C	-	No Water Quality Objective Value	8.25	8.63	9.05	9.28	9.02	12.22	11.11	9.54	14.63	8.58	7.35	7.29	6.92	6.79	7.95	6.60	7.70	7.98	2.04	-	-	13.03
Dissolved Oxygen	% saturation	-	90-110	93.70	115.80	85.30	100.60	82.70	81.90	80.40	92.80	115.40	126.02	88.60	89.30	78.40	68.60	107.40	136.90	77.40	76.30	115.00	-	-	77.90
Turbidity	NTU	-	2-25	28.50	58.80	44.30	64.60	26.60	47.60	43.60	63.10	35.20	8.20	6.50	18.70	15.30	16.00	12.50	10.10	30.10	46.20	38.10	-	-	10.40
Laboratory analytes																									
TSS	mg/L	5	No Water Quality Objective Value	5.00	26.00	12.00	16.00	6.00	18.00	14.00	38.00	<5	<5	<5	<5	8.00	<5	6.00	<5	9.00	20.00	<5	-	-	<5
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	19.00	21.00	22.00	23.00	19.00	28.00	19.00	19.00	24.00	5.00	5.00	<1	<1	2.00	<1	<1	11.00	11.00	167.00	-	-	54.00
Nutrients																									
Ammonia as N	µg/L	5	13	110.0	30.0	70.0	130.0	80.0	90.0	200.0	60.0	40.0	<10	<10	<10	<10	<10	20.0	10.0	<10	10.0	30.0	-	-	100.0
Nitrite + Nitrate as N (NOx)	µg/L	10	15	10.0	10.0	30.0	90.0	10.0	20.0	10.0	10.0	20.0	10.0	10.0	20.0	10.0	10.0	10.0	10.0	10.0	80.0	2660			7030
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	300.0	200.0	200.0	300.0	200.0	200.0	300.0	200.0	200.0	100.0	<100	<100	100.0	200.0	<100	700.0	700.0	400.0	800.0	-	-	700.0
Nitrogen (Total)	µg/L	10	250	300.0	200.0	200.0	400.0	300.0	200.0	300.0	200.0	400.0	100.0	<100	<100	100.0	200.0	<100	700.0	800.0	500.0	7300	-	-	7600
Reactive Phosphorus	µg/L	1	15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10			<10
Phosphorus (Total)	µg/L	5	20	60.0	80.0	40.0	60.0	40.0	70.0	50.0	40.0	60.0	40.0	80.0	50.0	60.0	60.0	30.0	70.0	60.0	60.0	20.0	-	-	<10
Inorganics																									
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	-	-	<4
Hydrocarbons																									
Oil and Grease	mg/L	5	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1
Metals																									
Aluminium (dissolved)	µg/L	5	27	16.00	7.00	15.00	19.00	16.00	15.00	16.00	16.00	8.00	6.00	6.00	16.00	30.00	24.00	14.00	12.00	90.00	84.00	10.00	-	-	<5
Aluminium (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic (dissolved)	µg/L	1	0.8	<0.2	<0.2	0.20	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.40	0.40	0.50	-	-	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (III+VI) (dissolved)	µg/L	1	0.01	1.20	<0.2	0.20	10.00	0.30	0.20	0.40	0.40	<0.2	<0.2	0.20	<0.2	<0.2	0.20	<0.2	<0.2	0.20	0.20	6.30	-	-	0.80
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper (dissolved)	µg/L	1	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
Copper (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron (dissolved)	µg/L	50	300	33.00	9.00	20.00	330.00	22.00	21.00	24.00	26.00	16.00	9.00	10.00	19.00	15.00	90.00	22.00	19.00	270.00	248.00	<2	-	-	<2
Iron (total)	µg/L	50	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese (dissolved)	µg/L	5	1,200	1.50	1.50	1.40	2.20	1.10	1.70	1.20	1.50	8.50	1.40	2.00	0.90	1.10	1.50	2.50	2.20	4.80	6.20	1.90	-	-	<0.5
Manganese (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (dissolved)	µg/L	1	8	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	-	0.50
Nickel (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (dissolved)	µg/L	5	0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	-	-	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (dissolved)	µg/L	5	2.4	<1	<1	<1	<1	<1	<1	<1	<1	3.00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	-	-	<0.01
Zinc (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

* Water Quality Objective values for surface water refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

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Future Generation
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Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 30 July 2023 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49	EPL 50
Flow Rate				25/07/2023							13/07/2023
Inflow#	**ML/day**	-	-	-	0.0199	0.0000	0.2307	0.0444	0.1439	0.0001	-
Outflow#	**ML/day**	-	4.32 (EPL 43 / 50)	-	-	-	-	-	-	-	-
Field											
pH	**pH Unit**	-	6.5-8.5	7.63	-	-	-	-	-	-	7.41
Electrical Conductivity	**µS/cm**	-	700 (EPL 41) / 200 (EPL 50)	54	-	-	-	-	-	-	25
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	211	-	-	-	-	-	-	239
Temperature	**°C**	-	15	8.95	-	-	-	-	-	-	6.12
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	107.7	-	-	-	-	-	-	63
Turbidity	**NTU**	-	<25	21.9	-	-	-	-	-	-	14.6
Laboratory analytes											
Total suspended solids	**mg/L**	5	5/10	<5	-	-	-	-	-	-	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	5	-	-	-	-	-	-	<1
Nutrients											
Ammonia as N	**µg/L**	5	200/2000^	90	-	-	-	-	-	-	80
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	100	-	-	-	-	-	-	300
Nitrogen (Total)	**µg/L**	10	350/-^	200	-	-	-	-	-	-	500
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<10	-	-	-	-	-	-	<10
Phosphorus (Total)	**µg/L**	5	100/300^	10	-	-	-	-	-	-	50
Inorganics											
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-	-	-	-	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	2/5^	<1	-	-	-	-	-	-	<1
Metals											
Aluminium (dissolved)	**µg/L**	5	55	47	-	-	-	-	-	-	<5
Arsenic (dissolved)	**µg/L**	0.2	13	<0.2	-	-	-	-	-	-	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	1.7	-	-	-	-	-	-	<0.2
Copper (dissolved)	**µg/L**	0.5	14	1.9	-	-	-	-	-	-	<0.5
Iron (dissolved)	**µg/L**	2	300	4	-	-	-	-	-	-	<2
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	-	-	-	-	-	-	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	0.8	-	-	-	-	-	-	<0.5
Nickel (dissolved)	**µg/L**	0.5	11	<0.5	-	-	-	-	-	-	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.1	-	-	-	-	-	-	<0.1
Zinc (dissolved)	**µg/L**	1	8	11	-	-	-	-	-	-	<1
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-	-	-	-	<1
Biological Oxygen Demand	**mg/L**	<5	5	<2	-	-	-	-	-	-	<2

Note: Treated water was not being discharged at Talbingo ot Tantangara Reservoirs at the time of EPL sampling.
There is no 100th percentile limit for Nitrogen (Total).

* Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

\- Samples not required

^ 90 Percentile concentration limit/100 Percentile limit

Inflows to STP and CWTP do not directly correspond to outflow at RO as much of the water is reused on site

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 31 July 2023 - Treated Water

Date	EPL 43 *	EPL 50 ^	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49
	Discharge volume (Megalitres)		Discharge volume (Megalitres)				
1/07/2023	-	-		0.04	0.11	0.07	0.47
2/07/2023	-	-		0.05	0.13	0.07	0.46
3/07/2023	-	-		0.05	0.14	0.06	0.36
4/07/2023	-	-		0.06	0.16	0.07	0.25
5/07/2023	-	-		0.06	0.17	0.08	0.36
6/07/2023	-	-		0.04	0.14	0.02	0.23
7/07/2023	-	-		0.06	0.17	0.10	0.21
8/07/2023	-	1.98		0.05	0.25	0.08	0.30
9/07/2023	-	-		0.06	0.05	0.08	0.31
10/07/2023	-	0.76		0.06	0.17	0.06	0.31
11/07/2023	-	0.32		0.04	0.14	0.09	0.29
12/07/2023	-	0.56		0.05	0.17	0.06	0.33
13/07/2023	-	-		0.05	0.15	0.07	0.24
14/07/2023	-	-		0.05	0.16	0.07	0.35
15/07/2023	-	-		0.04	0.14	0.06	0.34
16/07/2023	-	0.59		0.06	0.11	0.08	0.25
17/07/2023	-	0.25		0.05	0.13	0.07	0.32
18/07/2023	-	-		0.04	0.12	0.07	0.32
19/07/2023	-	0.35		0.05	0.15	0.07	0.41
20/07/2023	-	-		0.05	0.16	0.07	0.29
21/07/2023	-	-		0.06	0.18	0.07	0.29
22/07/2023	-	-		0.05	0.08	0.07	0.29
23/07/2023	-	0.57		0.04	0.25	0.04	0.41
24/07/2023	-	0.57		0.05	0.14	0.03	0.28
25/07/2023	-	0.13		0.05	0.12	0.08	0.25
26/07/2023	-	-		0.06	0.16	0.07	0.37
27/07/2023	-	0.46		0.05	0.19	0.06	0.29
28/07/2023	-	0.29		0.05	0.08	0.06	0.30
29/07/2023	-	-		0.06	0.21	0.07	0.37
30/07/2023	-	0.76		0.05	0.15	0.07	0.31
31/07/2023	-	0.16		0.06	0.15	0.07	0.32

Note: The EPL discharge volume limit for EPL 43 and 50 is 4.32 megalitres per day. Compliance with this criteria was met during the reporting month.
EPL 44 volume inflows were not recorded in July 2023 due to the technology upgrades.
Water was not suitable for discharge at Talbingo in July hence no discharge occurred at EPL 43.

* The maximum flow rate capacity for Lobs Hole STP/PWTP during the reporting month was 0 L/s.

^ The maximum flow rate capacity for Tantangara STP/PWTP during the reporting month was 23 L/s

\- Water not discharged on this day

Snowy Hydro 2.0 Main Works EPL Sampling: 01 - 31 August 2023

Environmental Protection Licence No:	21266
Licensee:	Snowy Hydro Limited
Licensee address:	PO Box 332, Cooma, NSW 2630
Premises:	Snowy 2.0 Pumped Hydro Power Station Talbingo and Tantangara, Kosciuszko National Park and Rock Forest, Kosciuzko NSW 2642
EPA Public Register:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21266&id=21266&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued

Monthly water sampling and analysis is performed as part of the Snowy 2.0 Approval Conditions, Environmental Protection Licence No 21266 - Variation 6 June 2023, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

A map showing the location of each of the EPL named sampling points is provided after the results tables.

Groundwater Results: Elevated concentrations of nutrients and metals were observed in groundwater however are within historical ranges.
Surface Water Results: There were concentrations of Dissolved Oxygen for many EPL's outside of the water quality criteria possibly due to changes in temperature and fluctuations of naturally occurring bacteria. Elevated turbidity was recorded at the downstream location at Rock Forest due to cattle grazing in the vicinity of the sample. A number of samples had elevated pH, phosphorus, and ammonia in August which is consistent with background for the reporting period. Nitrogen and nitrate concentrations at EPL24 and EPL6 are being investigated further. There were a number of minor elevations in metals in surface water across the sites which were within historical ranges and are similar to background concentrations in the respective locations.
Reservoir Results: Biochemical Oxygen Demand exceeded the 90th percentile concentration at EPL10 however with minimal discharge occurring at Talbingo Reservoir in August it is more like due to natural causes, such as run off and algal blooms. Most EPLs had exceeded the WQO for total phosphorus likely caused by an accumulation of nutrients in the reservoir also resulting from algal blooms. Marginally elevated concentrations of ammonia and nitrate were also recorded in both reservoirs and are representative of background conditions.
Discharge Results: A TARP was raised during the previous month due to exceeded levels of Nitrogen for EPL 41. Ongoing bi-weekly monitoring was conducted over the monthly period, with changes in the operation of the Reverse Osmosis plant to reduce levels of nitrogen. Water from the Reverse Osmosis plant was tested and predominantly used for irrigation. Where water was suitable for discharge, discharge occurred. Nitrogen concentration at Tantangara Reservoir slightly exceeded the 90th percentile concentration on the day of sampling.
GF01 Results: Comprehensive and in situ samples are collected on a weekly basis while an invesitgation is being undertaken to determine the source of elevated Nitrate.
Tantangara Emplacement Area Results: Elevated concentrations of nutirient and metal concentrations were observed in groundwater however these appear representative of background conditions.

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01-31 August 2023 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL1	EPL2	EPL4	EPL25	EPL56	EPL57	EPL58	EPL68	EPL69	EPL70
Physiochemical				15/08/2023	15/08/2023	4/08/2023	4/08/2023	8/08/2023	8/08/2023	8/08/2023	24/08/2023	24/08/2023	24/08/2023
pH	pH Unit	-	6.5-8	7.94	6.96	7.88	6.89	7.69	8.12	6.25	5.97	6.53	6.53
Electrical Conductivity	µS/cm	-	30-350	105	326	1390	550	214	257	400	23	29	121
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	9	150	136	-24	268	194	338	279	245	247
Temperature	°C	-	No Water Quality Objective Value	14	13.9	8.22	11.78	13.65	14.15	15.36	13.65	12.93	13.26
Dissolved Oxygen	% saturation	-	No Water Quality Objective Value	0	0	35.6	50.9	87.3	106.5	16	73.7	90.2	36.4
Turbidity	NTU	-	No Water Quality Objective Value	97.4	725	1000	447	24.2	356	1.4	29.4	14.2	1000
Laboratory analytes													
TSS	mg/L	5	No Water Quality Objective Value	72	129	19,100	332	90	2,390	20	54	26	202
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	150	233	209	219	122	131	122	<1	<1	22
Nutrients													
Ammonia as N	µg/L	5	13	160	10	560	160	200	30	30	<10	<10	110
Nitrite + Nitrate as N (Nox)	µg/L	10	15	<10	<10	10	20	20	<10	17,300	950	790	350
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	400	300	1,800	500	400	300	5,200	200	300	5,400
Nitrogen (Total)	µg/L	10	250	400	300	1,800	500	400	300	22,500	1,200	1,100	5,800
Reactive Phosphorus	µg/L	1	15	<10	<10	20	<10	<10	<10	<10	10	<10	<10
Phosphorus (Total)	µg/L	5	20	40	220	1440	150	10	70	<10	<10	<10	9800
Inorganics													
Cyanide Total	µg/L	4	4	#	#	#	#	<4	<4	<4	<4	<4	95
Hydrocarbons													
Oil and Grease	mg/L	5	5	#	#	#	#	<1	<1	<1	<1	<1	<1
Metals													
Aluminium (dissolved)	µg/L	5	27	<5	<5	<5	<5	<5	<5	<5	6	30	<5
Aluminium (total)	µg/L	5	No Water Quality Objective Value	-	-	5	8,180	294	73,000	263	714	798	18,400
Arsenic (dissolved)	µg/L	1	0.8	1.7	0.5	20.6	0.8	0.3	3.3	0.2	<0.2	<0.2	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value	-	-	21.2	9	#	#	#	<0.2	0.2	1.6
Chromium (III+VI) (dissolved)	µg/L	1	0.01	0.3	<0.2	0.2	<0.2	<0.2	<0.2	0.8	<0.2	<0.2	<0.2
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	-	-	<0.2	26.8	0.8	163	1.9	0.7	0.7	9.2
Copper (dissolved)	µg/L	1	1	2.8	3.9	<0.5	0.9	4.4	<0.5	68.3	<0.5	<0.5	<0.5
Copper (total)	µg/L	1	No Water Quality Objective Value	-	-	<0.5	163	15.8	394	139	1.2	0.9	11
Iron (dissolved)	µg/L	50	300	<2	3	94	41	<2	<2	<2	4	27	<2
Iron (total)	µg/L	50	No Water Quality Objective Value	-	-	415	15,000	267	108,000	468	476	456	12,800
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	-	-	<0.1	37.5	1.2	393	5.5	0.5	0.3	5.4
Manganese (dissolved)	µg/L	5	1,200	122	193	1,000	1,120	33.6	152	18.3	8.7	6.1	10.6
Manganese (total)	µg/L	5	No Water Quality Objective Value	-	-	1,240	1,440	44.7	3,640	27	36.5	13.1	170
Nickel (dissolved)	µg/L	1	8	17.7	1.9	1.2	3.1	0.7	2.2	2.8	<0.5	<0.5	<0.5
Nickel (total)	µg/L	1	No Water Quality Objective Value	-	-	1.3	45	1.6	404	3.6	1.1	<0.5	5.1
Silver (dissolved)	µg/L	5	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.02	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value	-	-	<0.1	0.2	<0.01	1.24	<0.01	0.18	0.07	<0.01
Zinc (dissolved)	µg/L	5	2.4	2	4	<1	12	4	<1	15	6	3	6
Zinc (total)	µg/L	5	No Water Quality Objective Value	-	-	2	177	9	421	14	8	5	37

* Water Quality Objective values for groundwater refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

\# Sample result not returned from Laboratory

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 31 August 2023 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40	EPL51
Field				6/8/23	6/8/23	2/8/23	2/8/23	2/8/23	2/8/23	2/8/23	2/8/23	2/8/23
pH	**pH Unit**	-	6.5-8	7.28	7.18	8.24	7.86	7.94	8.07	8.69	8.26	7.78
Electrical Conductivity	**µS/cm**	-	20-30	52	40	18	21	21	20	27	24	21
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	266	230	122	274	268	245	165	224	284
Temperature	**°C**	-	No Water Quality Objective Value	11.75	12.13	6.51	6.34	6.19	6.01	6.39	5.41	6.4
Dissolved Oxygen	**% saturation**	-	90-110	108.9	64.9	98.2	78.4	89.6	70.3	76.6	98.1	90.9
Turbidity	**NTU**	-	1-20	2	1.9	6	1.8	2.7	2.2	2.5	2	1.8
Laboratory analytes												
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	<5	<5	<5	<5	<5	<5	<5	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	22	17	2	2	2	2	2	2	2
Nutrients												
Ammonia as N	**µg/L**	5	10	20	30	<10	<10	10	<10	20	60	<10
Nitrite + Nitrate as N (NOx)	**µg/L**	10	10	30	20	10	<10	<10	20	10	<10	<10
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	<100	100	200	200	100	200	100	100	200
Nitrogen (Total)	**µg/L**	10	350	<100	100	200	200	100	200	100	100	200
Reactive Phosphorus	**µg/L**	1	5	<10	<10	<10	10	<10	<10	<10	<10	<10
Phosphorus (Total)	**µg/L**	5	10	20	30	40	40	40	10	10	10	20
Inorganics												
Cyanide Total	**µg/L**	4	7	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons												
Oil and Grease	**mg/L**	5	5	#	#	<1	<1	<1	<1	<1	<1	<1
Metals												
Aluminium (dissolved)	**µg/L**	5	55	8	9	25	29	28	23	14	11	29
Arsenic (dissolved)	**µg/L**	0.2	13	0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper (dissolved)	**µg/L**	0.5	14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron (dissolved)	**µg/L**	2	300	20	17	58	82	82	62	38	32	81
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	9.6	5.1	2.2	1.5	1.9	2	4.6	3.9	1.4
Nickel (dissolved)	**µg/L**	0.5	11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (dissolved)	**µg/L**	1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1
Biological												
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	<1	<1	-	-	-	-	-	<1
Biochemical Oxygen Demand	**mg/L**	2	1/5^	2	<2	<2	<2	<2	<2	<2	<2	<2

* Water Quality Objective values for Talbingo and Tantangara Reservoir refer to the default trigger values for physical and chemical stressors in south-east Australia (fresh lakes and reservoirs) for the protection of 95% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

^ 90th percentile concentration limits / 100 percentile concentration limits

\- Sample not required at this location.

\# Sample result not returned from Laboratory

snowy 2.0

Future Generation
Webuild • Clough • Lane

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 31 August 2023 - Surface Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL5	EPL6	EPL8	EPL9	EPL12	EPL14	EPL15	EPL16	EPL24	EPL26	EPL27	EPL30	EPL31	EPL33	EPL34	EPL35	EPL36	EPL37	EPL52	EPL53	EPL54	EPL55
Field				3/08/23	15/8/23	3/08/23	3/08/23	3/08/23	3/08/23	3/08/23	3/08/23	3/08/23	1/08/23	1/08/23	2/08/23	2/08/23	2/08/23	2/08/23	15/8/23	15/8/23	15/8/23	8/08/23			8/08/23
pH	-	-	6.5-8	8.18	8.75	8.28	8.43	8.08	8.25	8.27	8.4	7.59	7.72	7.78	8.1	8.08	8.14	8.16	6.96	7.47	7.44	8.92	-	-	8.05
Electrical Conductivity	µS/cm	-	30-350	75	102	83	76	77	76	76	75	117	29	31	22	22	20	13	14	38	38	735	-	-	490
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	260	146	270	280	249	283	277	276	242	249	186	260	265	265	270	257	263	163	248	-	-	267
Temperature	°C	-	No Water Quality Objective Value	7.24	9.56	12.25	12.26	6.84	10.42	10.74	11.88	13.19	7.02	7.18	10.83	11.23	9.6	9.12	7.53	8.73	9.62	14.22	-	-	12.88
Dissolved Oxygen	% saturation	-	90-110	85.7	115.7	111.1	87.5	75.8	92.8	75.4	105.1	82.3	126.2	81.5	81.6	101	80.6	80.2	65.2	18.6	47	124.2	-	-	55.9
Turbidity	NTU	-	2-25	2	5.1	0.6	1.5	9.4	1.6	1.6	2.1	10	4.1	3.5	3.2	3.8	1.2	2.4	0.3	7.3	881	4.7	-	-	3.1
Laboratory analytes				-																					
TSS	mg/L	5	No Water Quality Objective Value	<5	6	<5	<5	<5	<5	<5	<5	14	<5	5	8	7	<5	<5	<5	14	31	17			12
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	36	154	38	36	36	36	36	36	39	9	9	7	4	2	<1	<1	11	11	231			131
Nutrients				-																					
Ammonia as N	µg/L	5	13	170	2,190	280	80	70	20	120	190	<10	<10	<10	<10	<10	<10	40	<10	<10	<10	40	-	-	40
Nitrite + Nitrate as N (NOx)	µg/L	10	15	20	2,780	20	<10	<10	20	<10	<10	2,500	40	30	50	10	<10	30	<10	130	160	29,300	-	-	16,800
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	200	3,400	300	100	200	<100	200	200	<100	<100	<100	<100	<100	200	100	100	400	400	5,800	-	-	6,600
Nitrogen (Total)	µg/L	10	250	200	6,200	300	100	200	<100	200	200	2,500	<100	<100	<100	<100	200	100	100	500	600	35,100	-	-	7600
Reactive Phosphorus	µg/L	1	15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	-	<10
Phosphorus (Total)	µg/L	5	20	30	40	30	10	20	20	20	20	60	50	40	<10	<10	<10	10	<10	40	30	<10	-	-	20
Inorganics				-																					
Cyanide Total	µg/L	4	4	<4	#	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	#	#	#	<4	-	-	<4
Hydrocarbons				-																					
Oil and Grease	mg/L	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1
Metals				-																					
Aluminium (dissolved)	µg/L	5	27	8	<5	7	7	8	6	7	9	<5	5	<5	10	10	29	15	17	113	119	23	-	-	<5
Aluminium (total)	µg/L	5	No Water Quality Objective Value	110	-	102	123	121	100	110	101	650	47	131	111	137	144	126	-	-	-	139	-	-	625
Arsenic (dissolved)	µg/L	1	0.8	0.3	<0.2	0.2	0.2	0.3	0.2	0.3	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	0.4	<0.2	-	-	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value	0.3		0.3	0.3	0.3	0.3	0.3	0.3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	<0.2	-	-	
Chromium (III+VI) (dissolved)	µg/L	1	0.01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	0.3	<0.2	-	-	1.7
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	0.4		0.2	0.4	0.3	0.2	0.3	0.4	1.2	0.2	0.4	<0.2	<0.2	<0.2	0.3	-	-	-	0.2	-	-	2.8
Copper (dissolved)	µg/L	1	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	0.5
Copper (total)	µg/L	1	No Water Quality Objective Value	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	7	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	-	-	1.3
Iron (dissolved)	µg/L	50	300	14	6	12	13	25	11	11	13	13	12	11	19	15	90	38	44	358	375	62	-	-	13
Iron (total)	µg/L	50	No Water Quality Objective Value	80		71	96	90	68	74	74	702	56	184	91	112	180	136	-	-	-	150	-	-	595
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-	-	1.4
Manganese (dissolved)	µg/L	5	1,200	1	2.7	1.4	4	1	1.8	1.4	2.1	80.6	1.4	1.7	1.6	1.3	1.2	2.3	2.8	8.8	18.3	2	-	-	8.6
Manganese (total)	µg/L	5	No Water Quality Objective Value	2.2		2.4	7.6	2.8	2.7	2.2	3	90	2.2	7.2	2.6	3.6	8.2	3.5	-	-	-	7.6	-	-	18.5
Nickel (dissolved)	µg/L	1	8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	-	<0.5
Nickel (total)	µg/L	1	No Water Quality Objective Value	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	-	-	1.4
Silver (dissolved)	µg/L	5	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.01	-	-	<0.01
Zinc (dissolved)	µg/L	5	2.4	<1	<1	<1	<1	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1
Zinc (total)	µg/L	5	No Water Quality Objective Value	<1		1	<1	2	<1	<1	<1	9	<1	1	1	<1	<1	2	-	-	-	<1	-	-	4

* Water Quality Objective values for surface water refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

\# Sample result not returned from Laboratory

snowy 2.0

Future Generation
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Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 31 August 2023 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49	EPL 50
Flow Rate				3/08/2023							2/08/2023
Inflow#	**ML/day**	-	-	-	0.0001	0.4121	0.0430	0.1392	0.0572	0.1192	-
Outflow#	**ML/day**	-	4.32 (EPL 43 / 50)	-	-	-	-	-	-	-	-
Field											
pH	**pH Unit**	-	6.5-8.5	7.86	-	-	-	-	-	-	8.01
Electrical Conductivity	**µS/cm**	-	700 (EPL 41) / 200 (EPL 50)	40	-	-	-	-	-	-	26
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	267	-	-	-	-	-	-	326
Temperature	**°C**	-	15	15.17	-	-	-	-	-	-	12.07
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	96.2	-	-	-	-	-	-	109.7
Turbidity	**NTU**	-	<25	1.2	-	-	-	-	-	-	1.2
Laboratory analytes											
Total suspended solids	**mg/L**	5	5/10	<5	-	-	-	-	-	-	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	5	-	-	-	-	-	-	<1
Nutrients											
Ammonia as N	**µg/L**	5	200/2000^	110	-	-	-	-	-	-	130
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	100	-	-	-	-	-	-	300
Nitrogen (Total)	**µg/L**	10	350/-^	300	-	-	-	-	-	-	400
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<10	-	-	-	-	-	-	<10
Phosphorus (Total)	**µg/L**	5	100/300^	20	-	-	-	-	-	-	10
Inorganics											
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-	-	-	-	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	2/5^	<1	-	-	-	-	-	-	<1
Metals											
Aluminium (dissolved)	**µg/L**	5	55	16	-	-	-	-	-	-	<5
Arsenic (dissolved)	**µg/L**	0.2	13	<0.2	-	-	-	-	-	-	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	1.1	-	-	-	-	-	-	<0.2
Copper (dissolved)	**µg/L**	0.5	14	8.2	-	-	-	-	-	-	<0.5
Iron (dissolved)	**µg/L**	2	300	4	-	-	-	-	-	-	<2
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	-	-	-	-	-	-	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	0.7	-	-	-	-	-	-	<0.5
Nickel (dissolved)	**µg/L**	0.5	11	<0.5	-	-	-	-	-	-	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	-	-	-	-	-	-	0.03
Zinc (dissolved)	**µg/L**	1	8	60	-	-	-	-	-	-	<1
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-	-	-	-	<1
Biological Oxygen Demand	**mg/L**	<5	5	<2	-	-	-	-	-	-	<2

Note: Due to the discharge to Talbingo Reservoirs being limited through August, samples could not be coordinated to be collected while dischare was occuring.
There is no 100th percentile limit for Nitrogen (Total).

* Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

\- Samples not required

^ 90 Percentile concentration limit/100 Percentile limit

Inflows to STP and CWTP do not directly correspond to outflow at RO as much of the water is reused on site

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 31 August 2023 - Treated Water

Date	EPL 43 *	EPL 50 ^	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49
	Discharge volume (Megalitres)		Discharge volume (Megalitres)				
1/08/2023	-	-		0.06	0.17	0.07	0.32
2/08/2023	-	0.41		0.05	0.17	0.07	0.34
3/08/2023	-	0.40		0.07	0.13	0.07	0.32
4/08/2023	-	0.17		0.06	0.18	0.07	0.34
5/08/2023	0.01	-		0.06	0.16	0.06	0.32
6/08/2023	-	-		0.06	0.18	0.06	0.34
7/08/2023	-	-		0.06	0.17	0.07	0.36
8/08/2023	-	0.80		0.06	0.15	0.06	0.34
9/08/2023	-	-		0.05	0.17	0.07	0.33
10/08/2023	-	-		0.05	0.12	0.06	0.32
11/08/2023	-	0.16		0.07	0.18	0.07	0.33
12/08/2023	-	0.19		0.05	0.16	0.07	0.33
13/08/2023	-	-		0.05	0.20	0.07	0.39
14/08/2023	-	0.94		0.05	0.18	0.07	0.34
15/08/2023	-	-		0.05	0.16	0.08	0.36
16/08/2023	-	-		0.06	0.15	0.08	0.29
17/08/2023	-	-		0.06	0.14	0.07	0.21
18/08/2023	-	0.03		0.07	0.15	0.04	0.37
19/08/2023	0.02	-		0.06	0.17	0.06	0.15
20/08/2023	-	0.55		0.07	0.19	0.06	0.42
21/08/2023	0.07	-		0.05	0.15	0.07	0.41
22/08/2023	-	0.23		0.05	0.17	0.11	0.61
23/08/2023	-	-		0.06	0.15	0.07	0.40
24/08/2023	-	0.52		0.05	0.15	0.06	0.30
25/08/2023	-	-		0.06	0.16	0.08	0.23
26/08/2023	-	0.34		0.06	0.17	0.07	0.27
27/08/2023	-	-		0.06	0.17	0.07	0.33
28/08/2023	-	-		0.05	0.14	0.07	0.33
29/08/2023	-	0.70		0.05	0.17	0.07	0.43
30/08/2023	-	-		0.05	0.15	0.06	0.06
31/08/2023	-	-		0.06	0.17	0.06	0.58

Note: The EPL discharge volume limit for EPL 43 and 50 is 4.32 megalitres per day. Compliance with this criteria was met during the reporting month.

EPL 44 volume inflows were not recorded in August 2023 due to the technology upgrades.

* The maximum flow rate capacity for Lobs Hole STP/PWTP during the reporting month was 0.8 L/s.

^ The maximum flow rate capacity for Tantangara STP/PWTP during the reporting month was 11 L/s

\- Water not discharged on this day

Snowy Hydro 2.0 Main Works EPL Sampling: 01 - 30 September 2023

Environmental Protection Licence No:	21266
Licensee:	Snowy Hydro Limited
Licensee address:	PO Box 332, Cooma, NSW 2630
Premises:	Snowy 2.0 Pumped Hydro Power Station Talbingo and Tantangara, Kosciuszko National Park and Rock Forest, Kosciuzko NSW 2642
EPA Public Register:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21266&id=21266&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued

Monthly water sampling and analysis is performed as part of the Snowy 2.0 Approval Conditions, Environmental Protection Licence No 21266 - Variation 6 June 2023, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

A map showing the location of each of the EPL named sampling points is provided after the results tables.

Surface Water Results: Electrical conductivity is less than, and turbidity is slightly greater than the water quality criteria at Tantangara, however this is within historical range and consistent with background conditions for September 2023. Chromium as not reported by the laboratory to adequate sensitivity in September 2023, however all samples were reported at concentrations less than the limit of detection. This issue has been raised with the laboratory. There were a number of minor elevations in metals in surface water across the sites which were within historical ranges and are similar to background concentrations in the respective locations. There were concentrations of Dissolved Oxygen for many EPL's outside of the water quality criteria possibly due to changes in temperature and fluctuations of naturally occurring bacteria. A number of samples had slightly elevated pH, phosphorus, nitrates, nitrogen, and ammonia in September which is consistent with background for the reporting period. ve Nitrogen and nitrate concentrations at EPL24 are being investigated further.
Reservoir Results: Reactive phosphorus was not reported by the laboratory to adequet sentisitivity in September 2023, however all samples were reported at concentrations less than the limit of detection. This issue has been raised with the laboratory. Concentrations of pH, electrical conductivity, dissolved oxygen, and turbidity outside the range of water quality criteria are generally consistent with background conditions in Talbingo and Tantangara Reservoirs, with turbidity caused by low water levels. pH in Talbingo reservoir is slightly elevated however this is not due to discharge as there were minimal releases to Talbingo Reservoir in September 2023.
Discharge Results: Ongoing bi-weekly monitoring was conducted over the monthly period, with changes in the operation of the Reverse Osmosis plant to reduce levels of nitrogen. Water from the Reverse Osmosis plant was tested and predominantly used for irrigation. Where water was suitable for discharge, discharge occurred.
GF01 Results: Comprehensive and in situ samples are collected on a weekly basis while an invesitgation is being undertaken to determine the source of elevated Nitrate.
Tantangara Emplacement Area Results: Elevated concentrations of nutirient and metal concentrations were observed in groundwater. EPL 70 required re-development and was not sampled in September 2023.

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Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01-30 September 2023 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL56	EPL57	EPL58	EPL68	EPL69
Physiochemical				14/09/2023	14/09/2023	14/09/2023	16/09/2023	16/09/2023
pH	pH Unit	-	6.5-8	7.98	8.26	6.4	6.22	6.59
Electrical Conductivity	µS/cm	-	30-350	277	298	347	26	36
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	149	66	231	310	298
Temperature	°C	-	No Water Quality Objective Value	18.87	19.65	17.55	15.09	16.21
Dissolved Oxygen	% saturation	-	No Water Quality Objective Value	12.5	5	66.7	66.1	70
Turbidity	NTU	-	No Water Quality Objective Value	688	264	29.9	118	40.7
Laboratory analytes								
TSS	mg/L	5	No Water Quality Objective Value	489	685	386	126	88
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	124	140	79	<1	<1
Nutrients								
Ammonia as N	µg/L	5	13	80	30	<10	<10	<10
Nitrite + Nitrate as N (Nox)	µg/L	10	15	60	380	13,600	1,450	150
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	2,100	300	1,600	500	200
Nitrogen (Total)	µg/L	10	250	2,200	700	15,200	2,000	400
Reactive Phosphorus	µg/L	1	15	<10	<10	<10	10	<10
Phosphorus (Total)	µg/L	5	20	270	210	30	140	20
Inorganics								
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4
Hydrocarbons								
Oil and Grease	mg/L	5	5	<1	<1	<1	<5	<5
Metals								
Aluminium (dissolved)	µg/L	5	27	<5	<5	<5	<5	86
Aluminium (total)	µg/L	5	No Water Quality Objective Value	8,320	15,100	5,000	2,900	2,690
Arsenic (dissolved)	µg/L	1	0.8	0.3	3.3	0.3	<0.2	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value	3.4	10.1	10.7	0.7	1
Chromium (III+VI) (dissolved)	µg/L	1	0.01	0.3	<0.2	0.3	<0.2	<0.2
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	26.8	31.5	13.8	2.8	3.6
Copper (dissolved)	µg/L	1	1	9.4	<0.5	191	<0.5	0.8
Copper (total)	µg/L	1	No Water Quality Objective Value	105	162	426	3.7	5.7
Iron (dissolved)	µg/L	50	300	<2	<2	<2	<2	49
Iron (total)	µg/L	50	No Water Quality Objective Value	12,600	19,200	9,030	2,400	2,460
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	1.1	<0.1	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	70.7	45.4	57.8	2.2	2.8
Manganese (dissolved)	µg/L	5	1,200	23	115	29.4	7.6	7.1
Manganese (total)	µg/L	5	No Water Quality Objective Value	471	740	204	190	110
Nickel (dissolved)	µg/L	1	8	1.1	0.6	1.9	<0.5	<0.5
Nickel (total)	µg/L	1	No Water Quality Objective Value	33.8	64.4	18.5	3.3	3.4
Silver (dissolved)	µg/L	5	0.02	<0.01	<0.01	<0.01	<0.01	0.08
Silver (total)	µg/L	5	No Water Quality Objective Value	0.19	0.13	0.07	0.09	0.41
Zinc (dissolved)	µg/L	5	2.4	3	<1	10	4	13
Zinc (total)	µg/L	5	No Water Quality Objective Value	140	76	40	15	35

* Water Quality Objective values for groundwater refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

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Monthly EPL Sampling: 01 - 30 September 2023 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40	EPL51
Field				17/9/23	17/9/23	20/9/23	21/9/23	20/9/23	20/9/23	20/9/23	20/9/23	20/9/23
pH	**pH Unit**	-	6.5-8	8.26	8.34	6.29	7.21	6.66	6.96	7	6.59	6.94
Electrical Conductivity	**µS/cm**	-	20-30	88	94	26	299	42	22	27	30	23
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	311	312	163	231	255	178	279	289	190
Temperature	**°C**	-	No Water Quality Objective Value	15.3	13.51	13.26	12.45	14.14	13.52	13.65	13.21	13.11
Dissolved Oxygen	**% saturation**	-	90-110	193.2	165.6	171.1	194.6	175.3	162.3	195.4	228.5	178.7
Turbidity	**NTU**	-	1-20	0	0	53.5	44.2	2.7	121	3.5	13.1	95.7
Laboratory analytes												
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	<5	476	24	22	473	41	22	140
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	36	28	2	2	2	<1	<1	2	2
Nutrients												
Ammonia as N	**µg/L**	5	10	<10	<10	70	<10	<10	50	<10	<10	20
Nitrite + Nitrate as N (NOx)	**µg/L**	10	10	40	30	10	20	20	40	10	10	20
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	100	100	800	300	400	1,000	300	300	400
Nitrogen (Total)	**µg/L**	10	350	100	100	800	300	400	1,000	300	300	400
Reactive Phosphorus	**µg/L**	1	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus (Total)	**µg/L**	5	10	10	10	210	20	30	150	20	20	120
Inorganics												
Cyanide Total	**µg/L**	4	7	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons												
Oil and Grease	**mg/L**	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Metals												
Aluminium (dissolved)	**µg/L**	5	55	10	9	16	28	27	31	17	16	47
Arsenic (dissolved)	**µg/L**	0.2	13	0.3	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper (dissolved)	**µg/L**	0.5	14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron (dissolved)	**µg/L**	2	300	26	18	138	115	110	141	72	90	130
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	13	9.2	42.7	75	43.3	12.2	6.8	9.6	64.1
Nickel (dissolved)	**µg/L**	0.5	11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (dissolved)	**µg/L**	1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1
Biological												
Faecal Coliforms	**CFU/100mL**	1	10/100^	5	1	3	-	-	-	-	-	2
Biochemical Oxygen Demand	**mg/L**	2	1/5^	<2	<2	<2	<2	<2	<2	<2	<2	<2

* Water Quality Objective values for Talbingo and Tantangara Reservoir refer to the default trigger values for physical and chemical stressors in south-east Australia (fresh lakes and reservoirs) for the protection of 95% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

** Algal blooms can present as feacal coliforms - green tinge noted in Talbingo Resevroir water at time of sampling.

^ 90th percentile concentration limits / 100 percentile concentration limits

\- Sample not required at this location.

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Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 30 September 2023 - Surface Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL5	EPL6	EPL8	EPL9	EPL12	EPL14	EPL15	EPL16	EPL24	EPL26	EPL27	EPL30	EPL31	EPL33	EPL34	EPL35	EPL36	EPL37	EPL52	EPL53	EPL54	EPL55
Field				13/09/23	13/09/23	13/09/23	13/09/23	13/09/23	13/09/23	13/09/23	13/09/23	13/09/23	23/09/23	23/09/23	16/09/23	16/09/23	16/09/23	16/09/23	16/09/23	16/09/23	16/09/23	14/09/23	-	-	14/09/23
pH	-	-	6.5-8	5.88	7.32	7.83	7.8	6.76	7.64	7.85	7.83	7.02	7.35	8.19	7.43	7.06	7.64	7.5	7.88	7.09	7.27	8.68	-	-	8.07
Electrical Conductivity	µS/cm	-	30-350	174	77	78	80	81	74	73	79	111	42	356	27	23	23	18	15	47	52	634	-	-	289
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	261	219	197	197	228	201	196	186	198	213	172	232	250	216	212	180	214	196	176	-	-	188
Temperature	°C	-	No Water Quality Objective Value	13.15	11.16	13.23	15.34	12.19	12.52	13.04	15.51	16.47	8.42	8.38	15.35	14.91	13.95	14.46	13.78	15.15	16.41	17.05	-	-	16.87
Dissolved Oxygen	% saturation	-	90-110	128.3	84.6	65.5	87.3	82.1	77.1	79	64.4	52.7	118.2	225.5	81.2	97.2	75.1	75.3	80.2	94.8	88.9	77.9	-	-	85.8
Turbidity	NTU	-	2-25	0	0	0	0	0	0	0	0	0	0	0	34.3	28.7	20.9	27.2	25.9	27.8	38.6	4.9	-	-	0
Laboratory analytes																									
TSS	mg/L	5	No Water Quality Objective Value	<5	<5	<5	<5	6	<5	<5	6	6	<5	<5	17	-	9	12	10	7	16	19	-	-	47
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	33	36	36	36	33	36	36	36	35	12	12	7	2	2	<1	<1	13	13	182	-	-	83
Nutrients																									
Ammonia as N	µg/L	5	13	<10	<10	<10	<10	20	<10	<10	<10	<10	100	<10	<10	<10	<10	<10	<10	<10	10	10	-	-	<10
Nitrite + Nitrate as N (NOx)	µg/L	10	15	20	<10	<10	<10	200	10	<10	<10	1,420	30	250	20	10	20	<10	<10	60	70	21,500	-	-	15,000
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	100	<100	<100	100	<100	<100	<100	<100	200	200	200	300	400	200	300	300	700	600	2,500	-	-	1,300
Nitrogen (Total)	µg/L	10	250	100	<100	<100	100	200	<100	<100	<100	1,600	200	400	300	400	200	300	300	800	700	24,000	-	-	16,300
Reactive Phosphorus	µg/L	1	15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10	-	-	<10
Phosphorus (Total)	µg/L	5	20	<10	<10	<10	<10	<10	10	20	<10	<10	70	<10	20	40	<10	<10	10	40	50	30	-	-	20
Inorganics																									
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	-	-	<4
Hydrocarbons																									
Oil and Grease	mg/L	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1
Metals																									
Aluminium (dissolved)	µg/L	5	27	10	<5	10	10	11	10	10	11	5	<5	<5	12	15	28	19	20	91	85	9	-	-	<5
Aluminium (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	716	-	-	1260
Arsenic (dissolved)	µg/L	1	0.8	0.2	<0.2	0.2	0.2	0.2	0.2	0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	0.4	0.5	-	-	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	0.6
Chromium (III+VI) (dissolved)	µg/L	1	0.01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	0.4	4.4	-	-	0.4
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	-	-	2.9
Copper (dissolved)	µg/L	1	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
Copper (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1.6
Iron (dissolved)	µg/L	50	300	13	5	13	13	15	14	14	14	13	14	14	28	26	102	64	64	307	342	<2	-	-	3
Iron (total)	µg/L	50	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1060	-	-	1380
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1	-	-	4.4
Manganese (dissolved)	µg/L	5	1,200	1.3	2	1.3	2.8	1	1.2	1.4	1.9	52.4	2.7	2	1.4	2.2	25.1	2.6	2.6	5.4	11.6	<0.5	-	-	0.5
Manganese (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29.7	-	-	42.2
Nickel (dissolved)	µg/L	1	8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.6	<0.5	-	-	<0.5
Nickel (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	2.7
Silver (dissolved)	µg/L	5	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	<0.01
Zinc (dissolved)	µg/L	5	2.4	<1	<1	<1	<1	<1	<1	<1	<1	4	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1
Zinc (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	8

* Water Quality Objective values for surface water refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

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Monthly EPL Sampling: 01 - 30 September 2023 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49	EPL 50
Flow Rate				17/09/2023							17/09/2023
Inflow#	**ML/day**	-	-	-	0.0027	0.4473	0.0498	0.1531	0.0652	0.1218	-
Outflow#	**ML/day**	-	4.32 (EPL 43 / 50)	-	-	-	-	-	-	-	-
Field											
pH	**pH Unit**	-	6.5-8.5	8.06	-	-	-	-	-	-	7.06
Electrical Conductivity	**µS/cm**	-	700 (EPL 41) / 200 (EPL 50)	189	-	-	-	-	-	-	19
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	587	-	-	-	-	-	-	174
Temperature	**°C**	-	15	10.54	-	-	-	-	-	-	12.34
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	154.9	-	-	-	-	-	-	55.7
Turbidity	**NTU**	-	<25	0	-	-	-	-	-	-	8.8
Laboratory analytes											
Total suspended solids	**mg/L**	5	5/10	<5	-	-	-	-	-	-	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	24	-	-	-	-	-	-	<1
Nutrients											
Ammonia as N	**µg/L**	5	200/2000^	<10	-	-	-	-	-	-	<10
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	100	-	-	-	-	-	-	200
Nitrogen (Total)	**µg/L**	10	350/-^	200	-	-	-	-	-	-	300
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<10	-	-	-	-	-	-	<10
Phosphorus (Total)	**µg/L**	5	100/300^	20	-	-	-	-	-	-	10
Inorganics											
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-	-	-	-	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	2/5^	<1	-	-	-	-	-	-	<1
Metals											
Aluminium (dissolved)	**µg/L**	5	55	64	-	-	-	-	-	-	<5
Arsenic (dissolved)	**µg/L**	0.2	13	0.2	-	-	-	-	-	-	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	-	-	-	-	-	-	<0.2
Copper (dissolved)	**µg/L**	0.5	14	6.6	-	-	-	-	-	-	<0.5
Iron (dissolved)	**µg/L**	2	300	8	-	-	-	-	-	-	<2
Lead (dissolved)	**µg/L**	0.1	3.4	0.2	-	-	-	-	-	-	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	0.6	-	-	-	-	-	-	<0.5
Nickel (dissolved)	**µg/L**	0.5	11	2.6	-	-	-	-	-	-	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	-	-	-	-	-	-	<0.01
Zinc (dissolved)	**µg/L**	1	8	141	-	-	-	-	-	-	<1
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-	-	-	-	<1
Biological Oxygen Demand	**mg/L**	<5	5	<2	-	-	-	-	-	-	<2

Note: Treated water was not being discharged at Talbingo Reservoir at the time of EPL sampling. Due to the discharge to Talbingo Reservoir being limited through September, samples could not be coordinated to be collected while discharge was occuring.

There is no 100th percentile limit for Nitrogen (Total).

* Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

\- Samples not required

^ 90 Percentile concentration limit/100 Percentile limit

Inflows to STP and CWTP do not directly correspond to outflow at RO as much of the water is reused on site

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 30 September 2023 - Treated Water

Date	EPL 43 *	EPL 50 ^	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49
	Discharge volume (Megalitres)		Discharge volume (Megalitres)				
1/09/2023	-	0.78		0.078	0.168	0.0654	0.36891
2/09/2023	-	-		0.0540	0.1620	0.0670	0.3851
3/09/2023	-	0.27		0.0480	0.1480	0.0608	0.1540
4/09/2023	0.34	-		0.048	0.109	0.0477	0.115
5/09/2023	-	-		0.05	0.15	0.06	0.36
6/09/2023	-	0.75		0.05	0.17	0.07	0.45
7/09/2023	-	-		0.06	0.17	0.06	0.14
8/09/2023	-	0.14		0.07	0.22	0.08	0.13
9/09/2023	-	0.57		0.04	0.32	0.07	0.12
10/09/2023	-	0.12		0.04	0.01	0.08	0.11
11/09/2023	-	0.49		0.05	0.11	0.08	0.19
12/09/2023	-	-		0.04	0.19	0.06	--
13/09/2023	-	-		0.05	0.13	0.06	0.04
14/09/2023	-	-		0.05	0.15	0.06	0.01
15/09/2023	-	-		0.07	0.15	0.07	0.01
16/09/2023	-	-		0.04	0.15	0.07	0.12
17/09/2023	-	0.11		0.02	0.15	0.07	0.06
18/09/2023	-	-		0.02	0.16	0.07	0.16
19/09/2023	-	-		0.08	0.12	0.06	0.20
20/09/2023	-	-		0.04	0.15	0.06	0.02
21/09/2023	-	-		0.04	0.08	0.07	0.32
22/09/2023	-	-		0.05	0.20	0.06	0.08
23/09/2023	-	-		0.03	0.14	0.07	0.15
24/09/2023	-	-		0.04	0.16	0.06	0.20
25/09/2023	-	-		0.03	0.12	0.06	0.07
26/09/2023	-	-		--	0.20	0.06	0.31
27/09/2023	-	0.09		0.09	0.18	0.06	0.24
28/09/2023	-	-		--	0.21	0.07	0.09
29/09/2023	-	-		--	0.23	0.07	0.27
30/09/2023	-	-		--	0.18	0.07	0.28

Note: The EPL discharge volume limit for EPL 43 and 50 is 4.32 megalitres per day. Compliance with this criteria was met during the reporting month.
EPL 44 volume inflows were not recorded in September 2023 due to the technology upgrades.

* The maximum flow rate capacity for Lobs Hole STP/PWTP during the reporting month was 4 L/s.

^ The maximum flow rate capacity for Tantangara STP/PWTP during the reporting month was 9 L/s

\- Water not discharged on this day

-- Flow meter non-operational. Water volumes are considered to be similar daily flows to those recorded for each respective plant as works progressed at the same rate.

Snowy Hydro 2.0 Main Works EPL Sampling: 01 - 31 October 2023

Environmental Protection Licence No:	21266
Licensee:	Snowy Hydro Limited
Licensee address:	PO Box 332, Cooma, NSW 2630
Premises:	Snowy 2.0 Pumped Hydro Power Station Talbingo and Tantangara, Kosciuszko National Park and Rock Forest, Kosciuzko NSW 2642
EPA Public Register:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21266&id=21266&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued

Monthly water sampling and analysis is performed as part of the Snowy 2.0 Approval Conditions, Environmental Protection Licence No 21266 - Variation 6 June 2023, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

A map showing the location of each of the EPL named sampling points is provided after the results tables.

Surface Water Results: There was exceedances of Turbidity and Dissolved Oxygen for many EPL's however this was observed during sampling and is likely a result of high flows. The DO displaying outside WQO parameters was possibly due to changes in temperature and fluctuations of naturally occuring bacteria. Minor exceedances of EC and pH were generally within background ranges for October. There were a number of minor elevations in metals in surface water across the sites which were within historical ranges and are similar to background concentrations in the respective locations. A number of samples had slightly elevated nitrates, nitrogen, and ammonia in October which are generally consistent with background for the reporting period. Nitrogen and nitrate concentrations at EPL24 and EPL 12 are being investigated further.
Reservoir Results: Exceedances for ammonia and nitrate+nitrite at Tantangara Reservoir are observed upstream of works as well as downstream and are therefore considered to be representative of background conditions. The source of elevated aluminium at EPL51 is unknown and will be monitored further. EPL28 is upstream of works at Tantangara with no observed causes of elevated coliforms.
Discharge Results: Ongoing bi-weekly monitoring was conducted over the monthly period for EPL41, with changes in the operation of the Reverse Osmosis plant to reduce levels of nitrogen. Water from the Reverse Osmosis plant was tested and used for irrigation to avoid water overflow. Discharge results for October at Tantangara were compliant, though little water was required to be discharged through October. As a result, sampling did not align with discharge.
GF01 Results: Comprehensive and in situ samples are collected on a weekly basis while an invesitgation is being undertaken to determine the source of elevated Nitrate. The majority of metals exceed the WQO hoever they are similar to concentrations in upgradient groundwater and are therefore considered representative of background conditions.
Tantangara Emplacement Area Results: Elevated concentrations of nutirient and metal concentrations were observed in groundwater. Addtional groundwater wells are being installed to further establish if the nitrate levels are attributed to natural variaction and background conditions. The majority of metals exceed the WQO however they are similar to concentrations in upgradient groundwater and are therefore considered representative of background conditions.

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01-31 October 2023 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL56	EPL57	EPL58	EPL68	EPL69	EPL70
Physiochemical				9/10/2023	9/10/2023	9/10/2023	10/10/2023	10/10/2023	12/10/2023
pH	pH Unit	-	6.5-8	8.1	8.06	6.62	6.53	7.05	7.06
Electrical Conductivity	µS/cm	-	30-350	231	267	238	25	35	95
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	138	138	195	235	213	224
Temperature	°C	-	No Water Quality Objective Value	13.07	13.42	15.1	14.9	13.81	14.62
Dissolved Oxygen	% saturation	-	No Water Quality Objective Value	4.5	14.7	36.2	65.2	78.3	76.7
Turbidity	NTU	-	No Water Quality Objective Value	221	242	142	170	94	0
Laboratory analytes									
TSS	mg/L	5	No Water Quality Objective Value	362	180	18	148	56	210
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	126	134	75	<1	2	25
Nutrients									
Ammonia as N	µg/L	5	13	<10	10	20	20	20	20
Nitrite + Nitrate as N (Nox)	µg/L	10	15	20	<10	13,100	1,020	160	520
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	<100	200	1,800	200	100	300
Nitrogen (Total)	µg/L	10	250	<100	200	14,900	1,200	300	800
Reactive Phosphorus	µg/L	1	15	<10	<10	10	<10	<10	40
Phosphorus (Total)	µg/L	5	20	5	42	1	3	<1	29
Inorganics									
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4
Hydrocarbons									
Oil and Grease	mg/L	5	5	<5	<5	<5	<5	<5	<1
Metals									
Aluminium (dissolved)	µg/L	5	27	27	16	<5	15	157	<5
Aluminium (total)	µg/L	5	No Water Quality Objective Value	9,540	6,920	489	2,560	1,070	17,600
Arsenic (dissolved)	µg/L	1	0.8	0.3	3.4	0.2	<0.2	<0.2	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value	3.6	6.0	0.8	0.5	0.3	1.8
Chromium (III+VI) (dissolved)	µg/L	1	0.01	<0.2	<0.2	0.4	0.3	0.2	<0.2
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	28.6	15.0	1.8	2.2	1.2	9.0
Copper (dissolved)	µg/L	1	1	9.7	2.3	9.0	2.8	2.1	<0.5
Copper (total)	µg/L	1	No Water Quality Objective Value	92.6	18.1	47.0	3.3	1.2	9.1
Iron (dissolved)	µg/L	50	300	25	31	5	11	63	<2
Iron (total)	µg/L	50	No Water Quality Objective Value	13,900	8,460	806	2,120	824	13,600
Lead (dissolved)	µg/L	1	1	0.5	<0.1	2.2	<0.1	0.1	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	71.6	21.7	6.8	2.1	1.0	5.9
Manganese (dissolved)	µg/L	5	1,200	30.0	119	15.3	4.8	2.6	6.5
Manganese (total)	µg/L	5	No Water Quality Objective Value	484	400	25.8	177	35.2	185
Nickel (dissolved)	µg/L	1	8	<0.5	0.7	1.9	1.8	<0.5	<0.5
Nickel (total)	µg/L	1	No Water Quality Objective Value	34.9	27.3	3.4	2.5	1.0	5.9
Silver (dissolved)	µg/L	5	0.02	<0.01	0.04	0.02	<0.01	<0.01	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value	0.13	0.04	<0.01	0.12	<0.01	0.08
Zinc (dissolved)	µg/L	5	2.4	13	4	12	8	6	3
Zinc (total)	µg/L	5	No Water Quality Objective Value	136	38	10	13	4	38

* Water Quality Objective values for groundwater refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 31 October 2023 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40	EPL51
Field				8/10/23	8/10/23	13/10/23	13/10/23	13/10/23	13/10/23	13/10/23	13/10/23	13/10/23
pH	**pH Unit**	-	6.5-8	7.95	7.93	6.6	6.52	6.57	6.67	7.6	7.13	6.43
Electrical Conductivity	**µS/cm**	-	20-30	57	56	21	21	21	21	22	21	21
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	376	412	304	315	312	302	257	281	318
Temperature	**°C**	-	No Water Quality Objective Value	15.08	14.08	11.06	12.73	12.63	11.83	10.67	9.76	12.05
Dissolved Oxygen	**% saturation**	-	90-110	93.2	95.4	56	73.6	72.3	88.8	85.7	64.3	91.7
Turbidity	**NTU**	-	1-20	118	128	121	128	135	125	102	98.8	106
Laboratory analytes												
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	<5	<5	<5	<5	<5	<5	<5	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	28	28	2	2	2	2	2	2	2
Nutrients												
Ammonia as N	**µg/L**	5	10	<10	<10	20	<10	20	20	<10	20	<10
Nitrite + Nitrate as N (NOx)	**µg/L**	10	10	<10	<10	40	20	10	20	30	40	20
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	100	100	100	100	200	100	100	<100	200
Nitrogen (Total)	**µg/L**	10	350	100	100	100	100	200	100	100	<100	200
Reactive Phosphorus	**µg/L**	1	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus (Total)	**µg/L**	5	10	<1	<1	<1	<1	1	<1	<1	<1	3
Inorganics												
Cyanide Total	**µg/L**	4	7	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons												
Oil and Grease	**mg/L**	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Metals												
Aluminium (dissolved)	**µg/L**	5	55	7	6	28	44	41	45	17	17	102
Arsenic (dissolved)	**µg/L**	0.2	13	0.3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper (dissolved)	**µg/L**	0.5	14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.4
Iron (dissolved)	**µg/L**	2	300	17	15	58	124	118	127	46	44	140
Lead (dissolved)	**µg/L**	0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	1.2	0.8	23.1	31.7	34.2	32.2	8.4	6.4	40.6
Nickel (dissolved)	**µg/L**	0.5	11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (dissolved)	**µg/L**	1	8	<1	<1	<1	<1	<1	<1	<1	<1	2
Biological												
Faecal Coliforms	**CFU/100mL**	1	10/100^	2	3	15	-	-	-	-	-	2
Biochemical Oxygen Demand	**mg/L**	2	1/5^	<2	<2	<2	<2	<2	2	<2	2	<2

* Water Quality Objective values for Talbingo and Tantangara Reservoir refer to the default trigger values for physical and chemical stressors in south-east Australia (fresh lakes and reservoirs) for the protection of 95% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

** Algal blooms can present as feacal coliforms - green tinge noted in Talbingo Resevroir water at time of sampling.

^ 90th percentile concentration limits / 100 percentile concentration limits

\- Sample not required at this location.

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Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 31 October 2023 - Surface Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL5	EPL6	EPL8	EPL9	EPL12	EPL14	EPL15	EPL16	EPL24	EPL26	EPL27	EPL30	EPL31	EPL33	EPL34	EPL35	EPL36	EPL37	EPL52	EPL53	EPL54	EPL55
Field				6/10/23	6/10/23	6/10/23	6/10/23	6/10/23	6/10/23	6/10/23	6/10/23	6/10/23	3/10/23	3/10/23	10/10/23	10/10/23	10/10/23	10/10/23	10/10/23	10/10/23	10/10/23	9/10/23			9/10/23
pH	-	-	6.5-8	8.17	7.58	8.18	8.18	7.81	7.5	7.72	8.01	7.72	7.05	6.84	7.6	7.38	7.78	7.78	7.73	7.47	7.84	7.74	-	-	7.98
Electrical Conductivity	µS/cm	-	30-350	51	69	54	53	50	53	52	54	80	34	32	27	34	23	30	15	51	50	316	-	-	291
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	208	223	188	187	213	224	214	185	195	251	263	216	224	214	215	209	220	205	175	-	-	166
Temperature	°C	-	No Water Quality Objective Value	10.76	11.47	12.73	12.95	11.05	12.1	12.66	13.29	13.74	11.03	9.66	14.75	14.95	17.28	15.32	13.93	16.21	17.76	16.86	-	-	16.2
Dissolved Oxygen	% saturation	-	90-110	99.2	75.5	83.3	82.5	69.9	78.2	79	72.8	75.5	42.9	10.7	75.1	109	92.8	96.8	68.5	94.2	71.7	87.9	-	-	101.8
Turbidity	NTU	-	2-25	139	130	136	132	140	135	135	127	183	61.4	62.9	91	90.8	89.2	86.6	78.6	117	132	106	-	-	94.2
Laboratory analytes																									
TSS	mg/L	5	No Water Quality Objective Value	16	10	15	16	15	14	15	14	18	6	10	10	11	<5	<5	<5	<5	8	<5	-	-	<5
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	22	33	24	28	22	24	24	24	30	12	12	7	7	2	<1	<1	17	17	93	-	-	96
Nutrients																									
Ammonia as N	µg/L	5	13	<10	<10	<10	<10	<10	<10	<10	<10	10	<10	<10	40	10	110	<10	10	40	50	<10	-	-	<10
Nitrite + Nitrate as N (NOx)	µg/L	10	15	10	<10	10	10	10	<10	20	10	490	20	10	20	<10	10	<10	<10	140	90	7,010	-	-	19,300
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	100	100	<100	100	1,000	700	300	300	200	100	200	200	100	200	200	200	600	500	800	-	-	2,400
Nitrogen (Total)	µg/L	10	250	100	100	<100	100	1,000	700	300	300	700	100	200	200	100	200	200	200	700	600	7,800	-	-	21,700
Reactive Phosphorus	µg/L	1	15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	-	<10
Phosphorus (Total)	µg/L	5	20	2	3	<1	12	3	6	6	3	6	2	4	2	2	1	1	1	4	4	<1	-	-	<1
Inorganics																									
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	-	-	<4
Hydrocarbons																									
Oil and Grease	mg/L	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1
Metals																									
Aluminium (dissolved)	µg/L	5	27	40	9	40	46	53	42	39	39	27	10	9	55	57	86	49	52	279	290	67	-	-	<5
Aluminium (total)	µg/L	5	No Water Quality Objective Value																			97	-	-	172
Arsenic (dissolved)	µg/L	1	0.8	0.2	0.2	0.2	0.2	0.2	0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.5	0.6	0.9	-	-	<0.2
Arsenic (total)	µg/L	1	No Water Quality Objective Value																			0.8	-	-	<0.2
Chromium (III+VI) (dissolved)	µg/L	1	0.01	<0.2	<0.2	0.2	<0.2	0.2	0.2	<0.2	<0.2	0.3	0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	0.5	0.5	5.9	-	-	0.4
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value																			6.7	-	-	0.7
Copper (dissolved)	µg/L	1	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.7	4.3	-	-	0.6
Copper (total)	µg/L	1	No Water Quality Objective Value																			0.7	-	-	1.1
Iron (dissolved)	µg/L	50	300	57	18	56	61	66	57	56	57	60	27	30	54	42	122	92	95	471	605	2	-	-	9
Iron (total)	µg/L	50	No Water Quality Objective Value																			38	-	-	133
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	<0.1	-	-	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value																			<0.1	-	-	0.3
Manganese (dissolved)	µg/L	5	1,200	2.4	1.9	2.4	3.0	2.0	2.0	2.2	2.4	9.6	4.2	2.5	3.2	2.2	35.8	4.6	4.8	20.8	21.0	2	-	-	0.9
Manganese (total)	µg/L	5	No Water Quality Objective Value																			4.5	-	-	2.4
Nickel (dissolved)	µg/L	1	8	1.1	1.0	0.9	1.2	1.2	1.2	1.1	1.2	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	0.8	<0.5	-	-	0.6
Nickel (total)	µg/L	1	No Water Quality Objective Value																			0.5	-	-	<0.5
Silver (dissolved)	µg/L	5	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value																			<0.01	-	-	<0.01
Zinc (dissolved)	µg/L	5	2.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	2	<1	<1	1	1	1	21	2	3	-	-	6
Zinc (total)	µg/L	5	No Water Quality Objective Value																			<1	-	-	3

* Water Quality Objective values for surface water refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 31 October 2023 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49	EPL 50
Flow Rate				17/09/2023							17/09/2023
Inflow#	**ML/day**	-	-	-	0.0111	0.4351	0.0330	0.1522	0.0565	0.1014	-
Outflow#	**ML/day**	-	4.32 (EPL 43 / 50)	-	-	-	-	-	-	-	-
Field											
pH	**pH Unit**	-	6.5-8.5	8.06	-	-	-	-	-	-	7.06
Electrical Conductivity	**µS/cm**	-	700 (EPL 41) / 200 (EPL 50)	189	-	-	-	-	-	-	19
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	587	-	-	-	-	-	-	174
Temperature	**°C**	-	15	10.54	-	-	-	-	-	-	12.34
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	154.9	-	-	-	-	-	-	55.7
Turbidity	**NTU**	-	<25	0	-	-	-	-	-	-	8.8
Laboratory analytes											
Total suspended solids	**mg/L**	5	5/10	<5	-	-	-	-	-	-	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	24	-	-	-	-	-	-	<1
Nutrients											
Ammonia as N	**µg/L**	5	200/2000^	<10	-	-	-	-	-	-	<10
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	100	-	-	-	-	-	-	200
Nitrogen (Total)	**µg/L**	10	350/-^	200	-	-	-	-	-	-	300
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<10	-	-	-	-	-	-	<10
Phosphorus (Total)	**µg/L**	5	100/300^	20	-	-	-	-	-	-	10
Inorganics											
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-	-	-	-	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	2/5^	<1	-	-	-	-	-	-	<1
Metals											
Aluminium (dissolved)	**µg/L**	5	55	64	-	-	-	-	-	-	<5
Arsenic (dissolved)	**µg/L**	0.2	13	0.2	-	-	-	-	-	-	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	-	-	-	-	-	-	<0.2
Copper (dissolved)	**µg/L**	0.5	14	6.6	-	-	-	-	-	-	<0.5
Iron (dissolved)	**µg/L**	2	300	8	-	-	-	-	-	-	<2
Lead (dissolved)	**µg/L**	0.1	3.4	0.2	-	-	-	-	-	-	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	0.6	-	-	-	-	-	-	<0.5
Nickel (dissolved)	**µg/L**	0.5	11	2.6	-	-	-	-	-	-	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	-	-	-	-	-	-	<0.01
Zinc (dissolved)	**µg/L**	1	8	141	-	-	-	-	-	-	<1
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-	-	-	-	<1
Biological Oxygen Demand	**mg/L**	<5	5	<2	-	-	-	-	-	-	<2

Note: Treated water was not being discharged at Talbingo ot Tantangara Reservoirs at the time of EPL sampling.
There is no 100th percentile limit for Nitrogen (Total).

* Water Quality Objective values Treated Water reference the predicted values for physical and chemical stressors from the treatment plant as presented in the Main Works EIS.

\- Samples not required

^ 90 Percentile concentration limit/100 Percentile limit

Inflows to STP and CWTP do not directly correspond to outflow at RO as much of the water is reused on site

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 31 October 2023 - Treated Water

Date	EPL 43 *	EPL 50 ^	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49
	Discharge volume (Megalitres)		Discharge volume (Megalitres)				
1/10/2023	-	-		--	0.20	0.06	0.19
2/10/2023	-	-		--	0.20	0.06	--
3/10/2023	-	-		--	0.21	0.06	0.00
4/10/2023	-	0.14		--	0.16	0.07	0.00
5/10/2023	-	0.64		--	0.18	0.07	0.19
6/10/2023	-	0.75		0.40	0.22	0.08	0.21
7/10/2023	-	0.86		0.04	0.15	0.09	0.19
8/10/2023	-	0.71		0.05	0.12	0.08	0.11
9/10/2023	-	0.66		0.05	0.20	0.08	0.45
10/10/2023	-	-		0.05	0.18	0.06	0.33
11/10/2023	-	-		0.05	0.13	0.07	0.40
12/10/2023	-	-		0.04	0.15	0.07	0.38
13/10/2023	-	-		0.07	0.14	0.04	0.19
14/10/2023	-	-		0.04	0.12	0.10	0.05
15/10/2023	-	-		0.05	0.21	0.07	0.02
16/10/2023	-	-		0.04	0.15	0.07	0.18
17/10/2023	-	-		0.04	0.18	0.07	0.37
18/10/2023	-	-		0.04	0.16	0.07	0.42
19/10/2023	-	-		0.05	0.14	0.06	0.08
20/10/2023	-	-		0.06	0.15	0.07	--
21/10/2023	-	-		0.05	0.17	0.07	--
22/10/2023	-	-		0.05	0.16	0.05	--
23/10/2023	-	-		0.04	0.15	0.06	--
24/10/2023	-	-		0.05	0.18	0.06	--
25/10/2023	-	-		0.04	0.19	0.06	--
26/10/2023	-	-		0.04	0.15	0.04	--
27/10/2023	-	-		0.06	0.10	0.07	--
28/10/2023	-	0.58		0.04	0.18	0.06	--
29/10/2023	-	-		0.05	0.17	0.05	--
30/10/2023	-	-		0.05	0.17	0.06	--
31/10/2023	-	-		0.05	0.15	0.07	--

- Water not discharged on this day

Note: The EPL discharge volume limit for EPL 43 and 50 is 4.32 megalitres per day. Compliance with this criteria was met during the reporting month.

EPL 44 volume inflows were not recorded in October 2023 due to the technology upgrades.

* The maximum flow rate capacity for Lobs Hole STP/PWTP during the reporting month was 0 L/s.

^ The maximum flow rate capacity for Tantangara STP/PWTP during the reporting month was 10 L/s.

- Water not discharged on this day

-- Flow meter non-operational. Water volumes are considered to be similar daily flows to those recorded for each respective plant as works progressed at the same rate.

Snowy Hydro 2.0 Main Works EPL Sampling: 01 - 30 November 2023

Environmental Protection Licence No:	21266
Licensee:	Snowy Hydro Limited
Licensee address:	PO Box 332, Cooma, NSW 2630
Premises:	Snowy 2.0 Pumped Hydro Power Station Talbingo and Tantangara, Kosciuszko National Park and Rock Forest, Kosciuzko NSW 2642
EPA Public Register:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21266&id=21266&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued

Monthly water sampling and analysis is performed as part of the Snowy 2.0 Approval Conditions, Environmental Protection Licence No 21266 - Variation 6 June 2023, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

A map showing the location of each of the EPL named sampling points is provided after the results tables.

Surface Water Results: The majority of analytes are within the water quality objectives however, there were exceedances of Turbidity and Dissolved Oxygen for many EPL's again in November 2023. There were also some exceedances of dissolved metals, but these are generally representative of upstream conditions.These were likely due to runoff from heavy rainfall periods causing high flow and fluctuations of naturally occuring bacteria as this was observed upstream as well as downstream. There were exceedances in nutrients including Ammonia, Total Nitrogen, and Nitrite+Nitrate which are being futher investigated. Water at EPL55 and EPL52 is being collected and treated on site at a process water treatement plant. EPL37 is representative of the upstream EPL36. Total metal concentrations at EPL71 were elavated and likely a result of the sediment in the sample however, this will be monitored further.
Reservoir Results: Most EPLs had exceeded levels of reactive and total phosphorus likely caused by an accumulation of nutrients in the resevoir from a number of recent rainfall events. Some algal blooms caused by eutrophication were present in the reseviors resulting in false postives results of feacal coliforms. The majority of the EPL's were within WQO parameters for most analytes and were representative of upstream conditions were exceedances were observed.
Discharge Results: A TARP was raised during the previous month due to exceeded levels of Nitrogen for EPL 41. Ongoing bi-weekly monitoring was conducted over the monthly period, with changes in the operation of the Reverse Osmosis plant to reduce levels of nitrogen. Water from the Reverse Osmosis plant was tested and used for irrigation to avoid water overflow at Talbingo. Sampling at Tantangara could did not align with a period of discharge due to the limited discharges that occurred. Discharges only occur as necessary at Tantangara Reservoir and when water quality objectives are met.
Groundwater Results: Excedances of Nitrogen were oberved at many of the groundwater bores. Much of this was due to elevated TKN which is asscoaited with organic nitrogen and is generally within hisotrical data ranges for the areas. Nutrients exceeded at on of the downgradient bores at Tantangara but were generally representative of the upstream bore. This is being closely monitored with additional boreholes installed to further assess the potential for impacts due to the project. The water quality upgradient and downgradient of the site at Marica are similarly though, nutrients and metals in the downgradient bore at Marica are marginally elevated relative to the upgradient bore. This has initiated TARP1 and will be followed up with further sampling. Works are ongoing at GF01 to manage the exceedances at EPL58. Comprehensive sampling is conducted weekly to monitor the changes in water quality.

snowy 2.0

Future Generation
Webuild • Clough • Lane

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01-30 November 2023 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL1	EPL2	EPL4	EPL25	EPL56	EPL57	EPL58	EPL68	EPL69	EPL70	EPL72	EPL73	EPL80	EPL81	EPL82	EPL83
Physiochemical				3/11/2023	3/11/2023	3/11/2023	3/11/2023	21/11/2023	21/11/2023	21/11/2023	19/11/2023	19/11/2023	19/11/2023	13/11/2023	13/11/2023	21/11/2023	21/11/2023	18/11/2023	21/11/2023
pH	**pH Unit**	-	6.5-8	8	6.59	8.07	7.46	7.63	7.96	5.98	5.69	5.96	6.25	8.3	7.82	6.6	6.72	5.78	6.07
Electrical Conductivity	**µS/cm**	-	30-350	1220	520	1250	471	256	314	270	24.5	42.6	77.3	43	62	935	531	724	535
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	-93	9	-195	100	99	39	188	-35.2	-17	-19.8	180	228	28	-32	171	124
Temperature	**°C**	-	No Water Quality Objective Value	19.96	19.27	19.94	18.63	16.92	17.13	18.74	14.3	14.2	14.2	20.54	15.54	21.33	20.4	19.73	20.69
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	158.3	156.8	179.9	59.3	42.1	43.7	3.6	87.5	72.7	72.6	79.6	104.8	60.9	88.2	87.1	63.4
Turbidity	**NTU**	-	No Water Quality Objective Value	217	435	0	405	485	292	301	17.5	14.3	54.4	57.7	51.6	146	773	0	114
Laboratory analytes																			
TSS	**mg/L**	5	No Water Quality Objective Value	56	130	1,310	126	323	209	149	152	63	138	24	17	6	568	2,230	21
Hardness as CaCO3	**mg/L**	1	No Water Quality Objective Value	132	223	184	160	113	116	68	<1	2	25	51	46	345	256	246	107
Nutrients																			
Ammonia as N	**µg/L**	5	13	160	30	440	30	30	30	<10	20	100	60	10	30	40	90	50	40
Nitrite + Nitrate as N (Nox)	**µg/L**	10	15	40	20	<10	<10	20	20	12100	930	140	480	40	60	20	60	50	3010
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	400	<100	1700	600	300	400	4400	200	200	400	<100	200	300	800	1100	1000
Nitrogen (Total)	**µg/L**	10	250	400	<100	1700	600	300	400	16500	1100	300	900	<100	300	300	900	1200	4000
Reactive Phosphorus	**µg/L**	1	15	10	<10	<10	<10	<10	<10	<10	1100	400	900	-	-	<10	40	<10	<10
Phosphorus (Total)	**µg/L**	5	20	70	240	680	80	140	130	80	70	30	330	40	50	60	220	1440	80
Inorganics																			
Cyanide Total	**µg/L**	4	4	-	-	-	-	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons																			
Oil and Grease	**mg/L**	5	5	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1
Metals																			
Aluminium (dissolved)	**µg/L**	5	27	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	17
Aluminium (total)	**µg/L**	5	No Water Quality Objective Value	-	-	-	-	6510	1850	1830	2570	1460	5200	572	601	23	5110	16400	492
Arsenic (dissolved)	**µg/L**	1	0.8	1.4	0.7	11	0.3	0.2	3.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	9.1	9.5	<0.2	11
Arsenic (total)	**µg/L**	1	No Water Quality Objective Value	-	-	-	-	2.5	4.1	2.6	0.4	0.4	0.6	<0.2	0.3	27.4	84.7	53.2	15.9
Chromium (III+VI) (dissolved)	**µg/L**	1	0.01	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2
Chromium (III+VI) (total)	**µg/L**	1	No Water Quality Objective Value	-	-	-	-	18.3	4.5	5	1.3	1.5	4	4	0.9	0.5	8.9	37.7	1.6
Copper (dissolved)	**µg/L**	1	1	1.8	0.8	<0.5	23.2	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	1	10.8
Copper (total)	**µg/L**	1	No Water Quality Objective Value	-	-	-	-	90.2	5.7	3.7	2.2	1.8	4.6	6.8	3.4	<0.5	13.1	71.2	36.7
Iron (dissolved)	**µg/L**	50	300	<0.2	3	80	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2	<0.2	<0.2	4
Iron (total)	**µg/L**	50	No Water Quality Objective Value	-	-	-	-	9390	2290	2760	1720	998	3760	398	546	514	11300	22700	722
Lead (dissolved)	**µg/L**	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1
Lead (total)	**µg/L**	1	No Water Quality Objective Value	-	-	-	-	38.7	6.6	18.9	1.5	1	2.6	0.6	5.4	<0.1	12.7	8.2	0.5
Manganese (dissolved)	**µg/L**	5	1,200	92.2	209	394	770	32.2	126	66.4	8.8	1.6	12.2	201	115	155	179	376	46.8
Manganese (total)	**µg/L**	5	No Water Quality Objective Value	-	-	-	-	336	213	112	124	40.3	104	192	122	160	218	700	60.9
Nickel (dissolved)	**µg/L**	1	8	6.3	1.1	1.8	24.4	<0.5	0.6	3.3	<0.5	<0.5	1.6	3.1	1.3	22.7	6	14.2	17
Nickel (total)	**µg/L**	1	No Water Quality Objective Value	-	-	-	-	24.6	7.2	8.2	1.8	1	4	5.6	1.9	29.1	30.4	59.7	21.9
Silver (dissolved)	**µg/L**	5	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver (total)	**µg/L**	5	No Water Quality Objective Value	-	-	-	-	0.08	<0.01	0.02	0.09	0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.04	<0.01
Zinc (dissolved)	**µg/L**	5	2.4	1	2	<1	74	5	<1	10	4	2	4	11	22	1	3	3	16
Zinc (total)	**µg/L**	5	No Water Quality Objective Value	-	-	-	-	104	13	22	11	5	13	13	26	4	49	76	30

* Water Quality Objective values for groundwater refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

snowy 2.0

Future Generation
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Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 30 November 2023 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40	EPL46	EPL51
Field				26/11/23	26/11/23	21/11/23	21/11/23	21/11/23	21/11/23	-	-	22/11/23	21/11/23
pH	pH Unit	-	6.5-8	7.45	7.05	7.11	7.8	7.07	7.32	Dry	Dry	7.36	7.52
Electrical Conductivity	µS/cm	-	20-30	75	62	31	44.9	55.4	34.3	Dry	Dry	35.1	26.5
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	194	211	-22.7	-99.8	-21.5	-24.5	Dry	Dry	-39	-36.6
Temperature	°C	-	No Water Quality Objective Value	19.03	19.4	22.3	19.1	22.8	20.8	Dry	Dry	16.2	19.6
Dissolved Oxygen	% saturation	-	90-110	99	82.8	80	78.9	75.2	77.7	Dry	Dry	66.7	78
Turbidity	NTU	-	1-20	123	96.9	62.1	7.12	3.84	6.63	Dry	Dry	3.43	2.54
Laboratory analytes													
Total suspended solids	mg/L	5	No Water Quality Objective Value	<5	<5	192	<5	8	6	Dry	Dry	<5	<5
Hardness as $CaCO_3$ (filtered)	mg/L	1	No Water Quality Objective Value	38	33	<1	2	2	<1	Dry	Dry	<1	2
Nutrients													
Ammonia as N	µg/L	5	10	<10	<10	30	<10	30	20	Dry	Dry	10	<10
Nitrite + Nitrate as N (NOx)	µg/L	10	10	10	<10	<10	<10	<10	20	Dry	Dry	<10	<10
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	200	200	2600	200	200	200	Dry	Dry	200	200
Nitrogen (Total)	µg/L	10	350	200	200	2600	200	200	200	Dry	Dry	200	200
Reactive Phosphorus	µg/L	1	5	<10	<10	0	0	0	0	Dry	Dry	0	0
Phosphorus (Total)	µg/L	5	10	30	10	360	<10	<10	10	Dry	Dry	10	<10
Inorganics													
Cyanide Total	µg/L	4	7	<4	<4	<4	<4	<4	<4	Dry	Dry	<4	<4
Hydrocarbons													
Oil and Grease	mg/L	5	5	<1	<1	<1	<1	<1	<1	Dry	Dry	<1	<1
Metals													
Aluminium (dissolved)	µg/L	5	55	7	7	18	35	27	34	Dry	Dry	31	33
Arsenic (dissolved)	µg/L	0.2	13	0.3	0.3	0.2	<0.2	<0.2	<0.2	Dry	Dry	<0.2	<0.2
Chromium (III+VI) (dissolved)	µg/L	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	Dry	Dry	<0.2	<0.2
Copper (dissolved)	µg/L	0.5	14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Dry	Dry	<0.5	<0.5
Iron (dissolved)	µg/L	2	300	36	52	224	133	213	183	Dry	Dry	128	129
Lead (dissolved)	µg/L	0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Dry	Dry	<0.1	<0.1
Manganese (dissolved)	µg/L	0.5	1,900	8.7	13	228	24.4	131	59	Dry	Dry	31.7	22.9
Nickel (dissolved)	µg/L	0.5	11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Dry	Dry	<0.5	<0.5
Silver (dissolved)	µg/L	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	Dry	<0.01	<0.01
Zinc (dissolved)	µg/L	1	8	<1	<1	<1	<1	<1	<1	Dry	Dry	<1	<1
Biological													
Faecal Coliforms	CFU/100mL	1	10/100^	8200**	6500**	180**	-	-	-	Dry	Dry	-	33**
Biochemical Oxygen Demand	mg/L	2	1/5^	4	<2	<2	<2	<2	<2	Dry	Dry	<2	<2

* Water Quality Objective values for Talbingo and Tantangara Reservoir refer to the default trigger values for physical and chemical stressors in south-east Australia (fresh lakes and reservoirs) for the protection of 95% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

** Algal blooms can present as feacal coliforms - green tinge noted in Talbingo Resevroir water at time of sampling.

^ 90th percentile concentration limits / 100 percentile concentration limits

\- Sample not required at this location.

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Future Generation
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Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01 - 30 November 2023 - Surface Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL5	EPL6	EPL8	EPL9	EPL12	EPL14	EPL15	EPL16	EPL17	EPL24	EPL26	EPL27	EPL30	EPL31	EPL33	EPL34	EPL35	EPL36	EPL37	EPL52	EPL53	EPL54	EPL55	EPL71
Field				16/11/23	16/11/23	16/11/23	16/11/23	16/11/23	16/11/23	16/11/23	16/11/23	16/11/23	16/11/23	17/11/23	17/11/23	15/11/23	15/11/23	15/11/23	15/11/23	15/11/23	15/11/23	15/11/23	25/11/23	-	-	25/11/23	17/11/23
pH	-	-	6.5-8	7.42	7.49	8.48	8.31	7.43	8.23	7.98	7.38	8.02	6.22	7.52	7.67	8.41	8.41	8.36	8.52	5.52	7.98	8.26	8.82	Dry	Dry	6.93	7.07
Electrical Conductivity	µS/cm	-	30-350	113	109	120	113	110	108	109	112	529	218	43	58	31	30	30	26	24	70	62	336	Dry	Dry	194	41
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	209	216	152	188	217	162	198	196	196	233	190	188	199	216	223	217	211	229	218	143	Dry	Dry	179	213
Temperature	°C	-	No Water Quality Objective Value	20.16	18.5	23.04	23.28	19.58	19.44	19.77	21.75	21	19.08	10.61	11.16	20.2	21.3	20.26	20.52	20.11	17.12	19.96	19.86	Dry	Dry	19.39	10.54
Dissolved Oxygen	% saturation	-	90-110	119.3	106.8	108.2	105.7	181.1	111.3	173.7	99.9	174.6	94.7	136.8	82.6	166	164.8	128	92.9	163.5	111.5	119.1	94.1	Dry	Dry	83.2	77.7
Turbidity	NTU	-	2-25	92.1	80.9	77.1	76.5	107	75.6	73.4	94.3	99.2	152	97.2	106	100	119	77.8	84.1	89.5	134	180	461	Dry	Dry	281	223
Laboratory analytes																											
TSS	mg/L	5	No Water Quality Objective Value	<5	<5	<5	<5	6	<5	<5	<5	34	<5	<5	<5	<5	10	<5	<5	<5	<5	11	70	Dry	Dry	12	12
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	48	48	46	48	48	48	48	43	259	56	16	16	9	<1	2	4	4	17	17	72	Dry	Dry	60	13
Nutrients																											
Ammonia as N	µg/L	5	13	40	<10	<10	<10	<10	<10	<10	<10	<10	20	<10	<10	<10	<10	<10	<10	<10	20	20	30	Dry	Dry	10	40
Nitrite + Nitrate as N (NOx)	µg/L	10	15	<10	<10	<10	<10	640	<10	<10	100	40	5640	10	<10	<10	<10	<10	<10	<10	170	110	8720	Dry	Dry	3690	<10
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	200	100	200	200	200	100	300	200	100	700	200	100	200	200	200	200	200	400	400	3200	Dry	Dry	1500	200
Nitrogen (Total)	µg/L	10	250	200	100	200	200	800	100	300	300	100	6300	200	100	200	200	200	200	200	600	500	11900	Dry	Dry	5200	200
Reactive Phosphorus	µg/L	1	15	30	<10	<10	<10	40	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	Dry	Dry	<10	<10
Phosphorus (Total)	µg/L	5	20	10	30	20	20	20	20	30	30	40	20	30	30	20	50	10	20	20	40	50	50	Dry	Dry	100	30
Inorganics																											
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	Dry	Dry	<4	<4
Hydrocarbons																											
Oil and Grease	mg/L	5	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	Dry	Dry	<1	<1
Metals																											
Aluminium (dissolved)	µg/L	5	27	9	<5	6	6	8	6	6	7	<5	<5	6	6	17	16	38	25	26	38	35	26	Dry	Dry	11	9
Aluminium (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2500	Dry	Dry	3050	5190
Arsenic (dissolved)	µg/L	1	0.8	0.5	0.3	0.5	0.4	0.4	0.4	0.4	0.5	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	0.3	0.3	0.4	1	Dry	Dry	<0.2	0.6
Arsenic (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	Dry	Dry	1.1	5.4
Chromium (III+VI) (dissolved)	µg/L	1	0.01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	3.3	Dry	Dry	0.6	<0.2
Chromium (III+VI) (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.5	Dry	Dry	6.3	6.3
Copper (dissolved)	µg/L	1	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Dry	Dry	0.8	<0.5
Copper (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	Dry	Dry	3.5	6.5
Iron (dissolved)	µg/L	50	300	10	6	11	11	10	9	10	11	<2	2	20	14	38	25	111	205	200	216	180	<2	Dry	Dry	42	21
Iron (total)	µg/L	50	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3070	Dry	Dry	3320	6280
Lead (dissolved)	µg/L	1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Dry	Dry	<0.1	<0.1
Lead (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	Dry	Dry	8.6	6
Manganese (dissolved)	µg/L	5	1,200	<0.5	2.1	1.2	1.6	0.6	0.7	1	1.3	<0.5	287	7.4	2.8	1.4	1.2	11.4	5	2.8	16.4	7.8	<0.5	Dry	Dry	1	26.9
Manganese (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.1	Dry	Dry	65.4	153
Nickel (dissolved)	µg/L	1	8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	Dry	Dry	<0.5	0.6
Nickel (total)	µg/L	1	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.3	Dry	Dry	4.9	8.1
Silver (dissolved)	µg/L	5	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	Dry	<0.01	<0.01
Silver (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00001	Dry	Dry	0.01	<0.01
Zinc (dissolved)	µg/L	5	2.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	7	<1	2	<1	<1	<1	25	<1	4	<1	<1	Dry	Dry	<1	<1
Zinc (total)	µg/L	5	No Water Quality Objective Value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	Dry	Dry	12	18

* Water Quality Objective values for surface water refer to the default trigger values for physical and chemical stressors in south-east Australia (upland rivers) for the protection of 99% of aquatic species ANZECC / ARMCANZ (2000), they are not pollutant limits imposed by EPL 21266.

\- Sample not required at this location.

^ Due to a laboratory error metals for 17/11/2023 were not analysed. Metal analysis results are from 22/11/2023

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 30 November 2023 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 50
Field				19/11/2023	17/11/2023
pH	**pH Unit**	-	6.5-8.5	7.71	6.51
Electrical Conductivity	**µS/cm**	-	700 (EPL 41) / 200 (EPL 50)	108	162
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	207	199
Temperature	**°C**	-	15	18.33	17.59
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	109.5	73.8
Turbidity	**NTU**	-	<25	92.2	122
Laboratory analytes					
Total suspended solids	**mg/L**	5	5/10	<5	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	33	<1
Nutrients					
Ammonia as N	**µg/L**	5	200/2000^	<10	40
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	<100	300
Nitrogen (Total)	**µg/L**	10	350/-^	<100	400
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	+	<10
Phosphorus (Total)	**µg/L**	5	100/300^	<10	<10
Inorganics					
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	<4
Hydrocarbons					
Oil and Grease	**mg/L**	5	2/5^	<1	<1
Metals					
Aluminium (dissolved)	**µg/L**	5	55	72	<5
Arsenic (dissolved)	**µg/L**	0.2	13	0.4	<0.2
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<0.2	<0.2
Copper (dissolved)	**µg/L**	0.5	14	6.3	<0.5
Iron (dissolved)	**µg/L**	2	300	49	<2
Lead (dissolved)	**µg/L**	0.1	3.4	0.3	<0.1
Manganese (dissolved)	**µg/L**	0.5	1,900	2.3	<0.5
Nickel (dissolved)	**µg/L**	0.5	11	0.7	<0.5
Silver (dissolved)	**µg/L**	0.01	0.05	<0.01	<0.01
Zinc (dissolved)	**µg/L**	1	8	15	<1
Biological					
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	<1
Biological Oxygen Demand	**mg/L**	<5	5	<2	<2

Note: Treated water was not being discharged at Talbingo ot Tantangara Reservoirs at the time of EPL sampling.
There is no 100th percentile limit for Nitrogen (Total).

* EIS.

\+ Due to a laboratory error, no result was returned for this analyte

^ 90 Percentile concentration limit/100 Percentile limit

Inflows to STP and CWTP do not directly correspond to outflow at RO as much of the water is reused on site

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 01 - 30 November 2023 - Treated Water

Date	EPL 43 *	EPL 50 ^	EPL 44	EPL 45	EPL 47	EPL 48	EPL 49
	Discharge volume (Megalitres)		Discharge volume (Megalitres)				
1/11/2023	-	-	0.40	0.04	0.17	0.06	0.61
2/11/2023	-	-	0.21	0.04	0.15	0.08	0.38
3/11/2023	-	-	0.36	0.04	0.18	0.07	0.30
4/11/2023	-	-	0.17	0.04	0.17	0.08	0.35
5/11/2023	-	-	0.21	0.04	0.15	0.06	0.24
6/11/2023	-	-	0.24	0.03	0.14	0.06	0.45
7/11/2023	-	-	0.31	0.05	0.21	0.06	0.44
8/11/2023	-	-	0.18	0.04	0.16	0.07	0.17
9/11/2023	-	0.21	0.18	0.04	0.16	0.07	0.43
10/11/2023	-	0.30	0.06	0.05	0.17	0.07	0.96
11/11/2023	-	-	0.27	0.04	0.16	0.08	0.90
12/11/2023	-	-	0.21	0.04	0.16	0.06	0.29
13/11/2023	-	0.12	0.40	0.04	0.16	0.08	0.27
14/11/2023	-	-	0.26	0.04	0.13	0.05	0.27
15/11/2023	-	-	0.27	0.06	0.07	0.06	0.39
16/11/2023	-	-	0.32	0.03	0.23	0.06	0.23
17/11/2023	-	-	0.16	0.03	0.27	0.08	0.39
18/11/2023	-	-	0.17	0.05	0.16	0.06	0.35
19/11/2023	-	-	0.31	0.03	0.05	0.09	0.16
20/11/2023	-	-	0.29	0.09	0.24	0.07	0.58
21/11/2023	-	-	0.27	0.04	0.15	0.06	0.34
22/11/2023	-	-	0.25	0.04	0.16	0.08	0.49
23/11/2023	-	-	0.07	0.01	0.13	0.07	0.32
24/11/2023	-	0.44	0.23	0.07	0.20	0.08	0.47
25/11/2023	-	0.04	0.31	0.05	0.19	0.07	0.63
26/11/2023	-	-	0.31	0.03	0.16	0.07	0.87
27/11/2023	-	-	0.03	0.04	0.19	0.08	0.51
28/11/2023	-	-	0.60	0.04	0.20	0.08	0.61
29/11/2023	-	-	0.34	0.04	0.15	0.05	0.55
30/11/2023	-	-	0.17	0.02	0.07	0.08	0.53

- Water not discharged on this day

Note: The EPL discharge volume limit for EPL 43 and 50 is 4.32 megalitres per day. Compliance with this criteria was met during the reporting month.

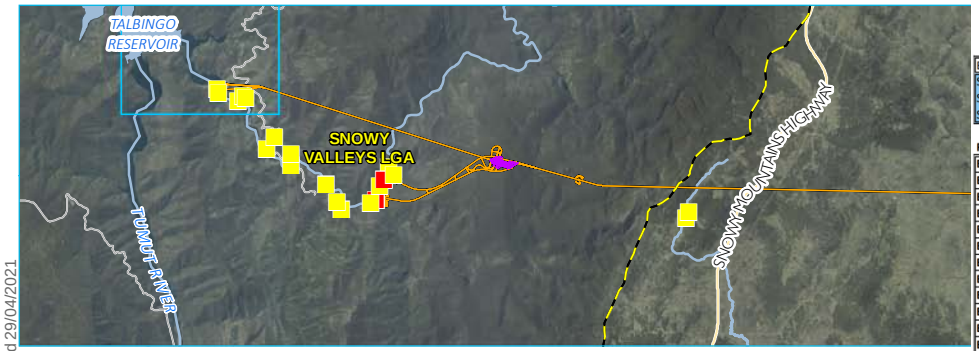
EPL 44 volume inflows were not recorded in October 2023 due to the technology upgrades.

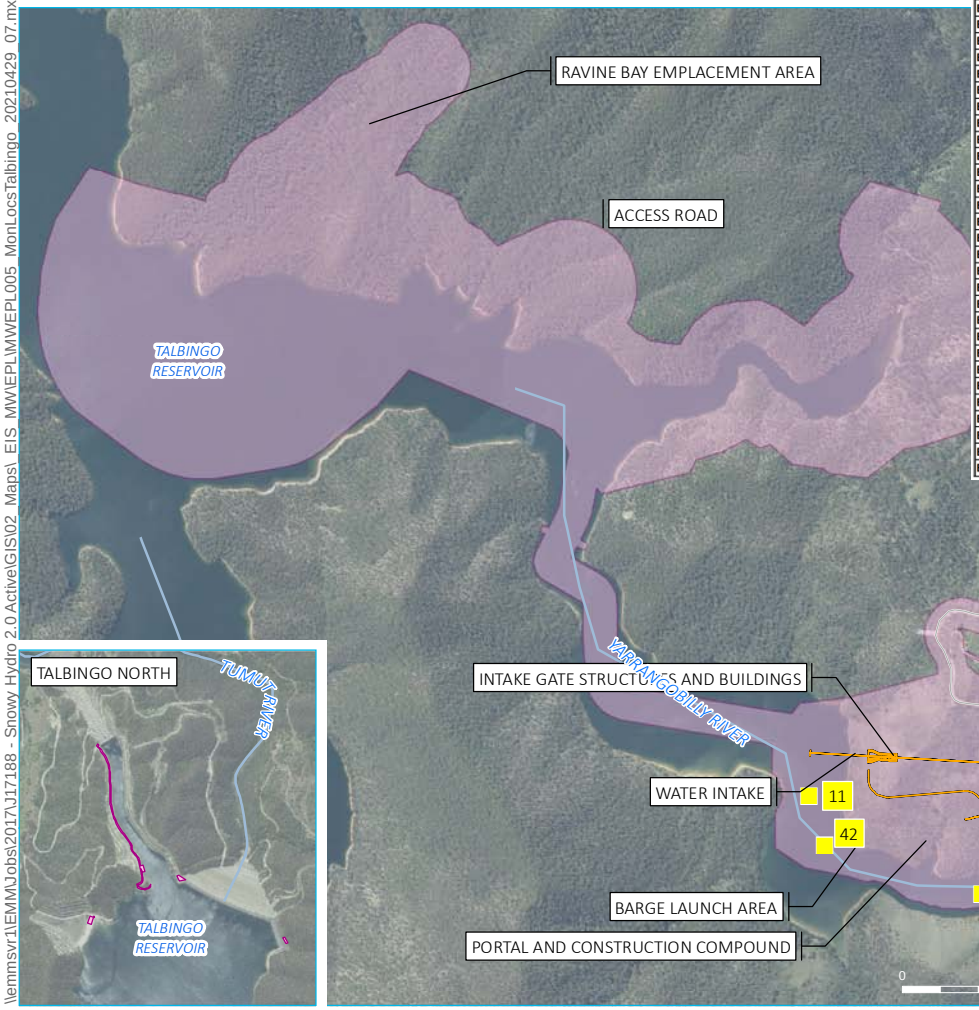
* The maximum flow rate capacity for Lobs Hole STP/PWTP during the reporting month was 0.0 ML/day.

^ The maximum flow rate capacity for Tantangara STP/PWTP during the reporting month was 0.9 ML/day

-- Flow meter non-operational. Water volumes are considered to be similar daily flows to those recorded for each respective plant as works progressed at the same rate.

APPENDIX D – EXCEEDANCE MAP





	Total Phosphorus as P (Organic Phosphate as P)	Nitrite + Nitrate as N	Cyanide Total	Nitrogen (Total)	Aluminium (filtered)	Arsenic (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Silver (filtered)	Zinc (filtered)
	mg/l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.002	0.004	0.01	0.005	0.0002	0.0002	0.0005	0.00001	0.001
Snowy 2.0 - Groundwater Guidelines	0.02	0.015	4	0.25	0.027	0.0008	0.00001	0.001	0.00002	0.0024
Snowy 2.0 - Reservoir Water Guidelines		0.01	0.007	0.35	0.055	0.013	0.001	0.014	0.00005	0.008
Snowy 2.0 - Surface Water Guidelines		0.015	0.004	0.25	0.027	0.0008	0.00001	0.001	0.00002	0.0024
Field ID	**Location Code**	**Date**								
EPL 10	EPL 10	21 Jun 2023	<0.01	0.02	<0.004	0.1	0.032	0.0002	0.0002	0.0023	<0.0001	0.005
EPL 11	EPL 11	21 Jun 2023	<0.01	0.03	<0.004	0.1	0.025	0.0002	0.0003	0.0038	<0.0001	0.002
EPL 41	EPL 41	21 Jun 2023	0.01	1.70	<0.004	2.5	0.437	0.0002	0.0176	0.0016	<0.0001	0.005
EPL 41	EPL 41	26 Jun 2023	13.1	6.38	0.006	108	0.04	<0.001	0.078	0.004	<0.001	0.031
EPL 41	EPL 41	11 Jul 2023	0.03	0.27	<0.004	0.8	0.075	<0.0002	0.0013	0.0025	<0.0001	0.019
EPL 10	EPL 10	16 Jul 2023	0.02	0.02	<0.004	0.3	0.032	<0.0002	<0.0002	<0.0005	<0.0001	<0.001
EPL 11	EPL 11	16 Jul 2023	0.05	0.02	<0.004	0.4	0.019	<0.0002	<0.0002	<0.0005	<0.0001	<0.001
EPL 41	EPL 41	25 Jul 2023	0.01	0.22	<0.004	0.5	0.047	<0.0002	0.0017	0.0019	<0.00001	0.011
EPL_41	EPL 41	26 Jul 2023	0.02	0.23	<0.004	0.4	0.060	<0.0002	0.0016	0.0025	<0.00001	0.016
EPL 41	EPL 41	27 Jul 2023	<0.01	0.07		0.2						
EPL 41	EPL 41	03 Aug 2023	0.02	0.23	<0.004	0.3	0.016	<0.0002	0.0011	0.0082	<0.00001	0.060
EPL 10	EPL 10	06 Aug 2023	0.02	0.03	<0.004	<0.1	0.008	0.0002	<0.0002	<0.0005	<0.00001	<0.001
EPL 11	EPL 11	06 Aug 2023	0.03	0.02	<0.004	0.1	0.009	0.0002	<0.0002	<0.0005	<0.00001	<0.001
EPL 41	EPL 41	06 Aug 2023	0.02	<0.01	<0.004	<0.1	<0.005	<0.0002	<0.0002	0.0059	<0.00001	0.041
EPL 41	EPL 41	09 Aug 2023	<0.01	0.01	<0.004	0.2	<0.005	<0.0002	<0.0002	0.0059	<0.00001	0.083
EPL 41	EPL 41	13 Aug 2023	<0.01	<0.01	<0.004	<0.1	<0.005	<0.0002	<0.0002	<0.0005	<0.00001	0.004
EPL 41	EPL 41	16 Aug 2023	<0.01	0.05	<0.004	0.2	<0.005	<0.0002	<0.0002	0.0084	<0.00001	0.085
EPL 41	EPL 41	23 Aug 2023	0.03	4.11	<0.004	6.0	0.126	0.0016	0.0384	0.0461	<0.00001	0.156
EPL 41	EPL 41	27 Aug 2023	0.02	1.27	<0.004	2.1	0.060	0.0004	0.0093	0.0012	<0.00001	0.013
EPL41	EPL 41	10 Sep 2023	<0.01	0.14	<0.004	0.5	0.038	<0.0002	0.0003	0.0006	<0.00001	0.006
EPL 10	EPL 10	17 Sep 2023	0.01	0.04	<0.004	0.1	0.010	0.0003	<0.0002	<0.0005	<0.00001	<0.001
EPL 11	EPL 11	17 Sep 2023	0.01	0.03	<0.004	0.1	0.009	0.0003	<0.0002	<0.0005	<0.00001	<0.001
EPL 41	EPL 41	17 Sep 2023	0.01	0.07	<0.004	0.2	0.064	0.0002	<0.0002	0.0066	<0.00001	0.141
EPL 41	EPL 41	20 Sep 2023	0.03	0.03	<0.004	<0.1	0.052	<0.0002	0.0005	0.0015	<0.00001	0.043
EPL 41	EPL 41	24 Sep 2023	<0.01	0.24	<0.004	0.2	0.036	0.0002	0.0002	0.0006	<0.00001	0.009
EPL41	EPL 41	26 Sep 2023	0.01	0.23		0.3						
EPL41	EPL 41	02 Oct 2023	<0.01	0.30		0.3						
EPL 41	EPL 41	04 Oct 2023	<0.01	0.20	<0.004	0.4	0.013	<0.0002	<0.0002	0.0009	<0.00001	0.005
EPL 10	EPL 10	08 Oct 2023	<0.01	<0.01	<0.004	0.1	0.007	0.0003	<0.0002	<0.0005	<0.00001	<0.001
EPL 11	EPL 11	08 Oct 2023	<0.01	<0.01	<0.004	0.1	0.006	0.0002	<0.0002	<0.0005	<0.00001	<0.001
EPL 41	EPL 41	08 Oct 2023	0.01	0.10	<0.004	0.2	0.042	0.0002	0.0002	0.0006	<0.00001	0.009
EPL 41	EPL 41	11 Oct 2023	<0.01	0.08	<0.004	0.3	0.026	0.0004	0.0002	0.0007	0.00015	0.005
EPL 41	EPL 41	15 Oct 2023	<0.01	0.01	<0.004	<0.1	0.028	0.0004	<0.0002	0.0017	<0.00001	0.006
EPL 41	EPL 41	18 Oct 2023	0.01	0.03	<0.004	<0.1	0.025	0.0004	<0.0002	0.0006	<0.00001	0.004
EPL 41	EPL 41	29 Oct 2023	<0.01	<0.01		0.1						
EPL 41	EPL 41	05 Nov 2023	<0.01	0.18		0.3						
EPL 41	EPL 41	12 Nov 2023	0.02	0.03		0.1						
EPL 41	EPL 41	19 Nov 2023	<0.01	0.06	<0.004	<0.1	0.072	0.0004	<0.0002	0.0063	<0.00001	0.015
EPL 10	EPL 10	26 Nov 2023	0.03	0.01	<0.004	0.2	0.007	0.0003	<0.0002	<0.0005	<0.00001	<0.001
EPL 11	EPL 11	26 Nov 2023	0.01	<0.01	<0.004	0.2	0.007	0.0003	<0.0002	<0.0005	<0.00001	<0.001
EPL 41	EPL 41	26 Nov 2023	0.01	0.06	<0.004	0.3	0.071	0.0004	<0.0002	0.0017	<0.00001	0.012

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

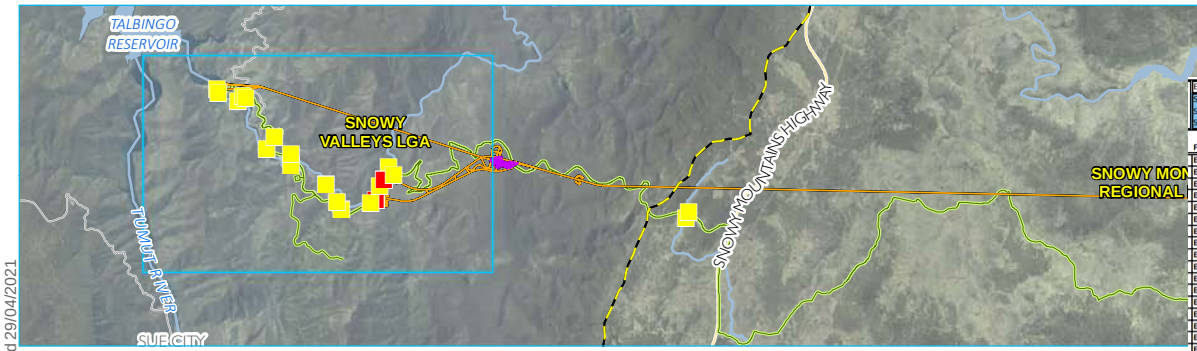
EPL Premise and monitoring point maps - Talbingo Reservoir

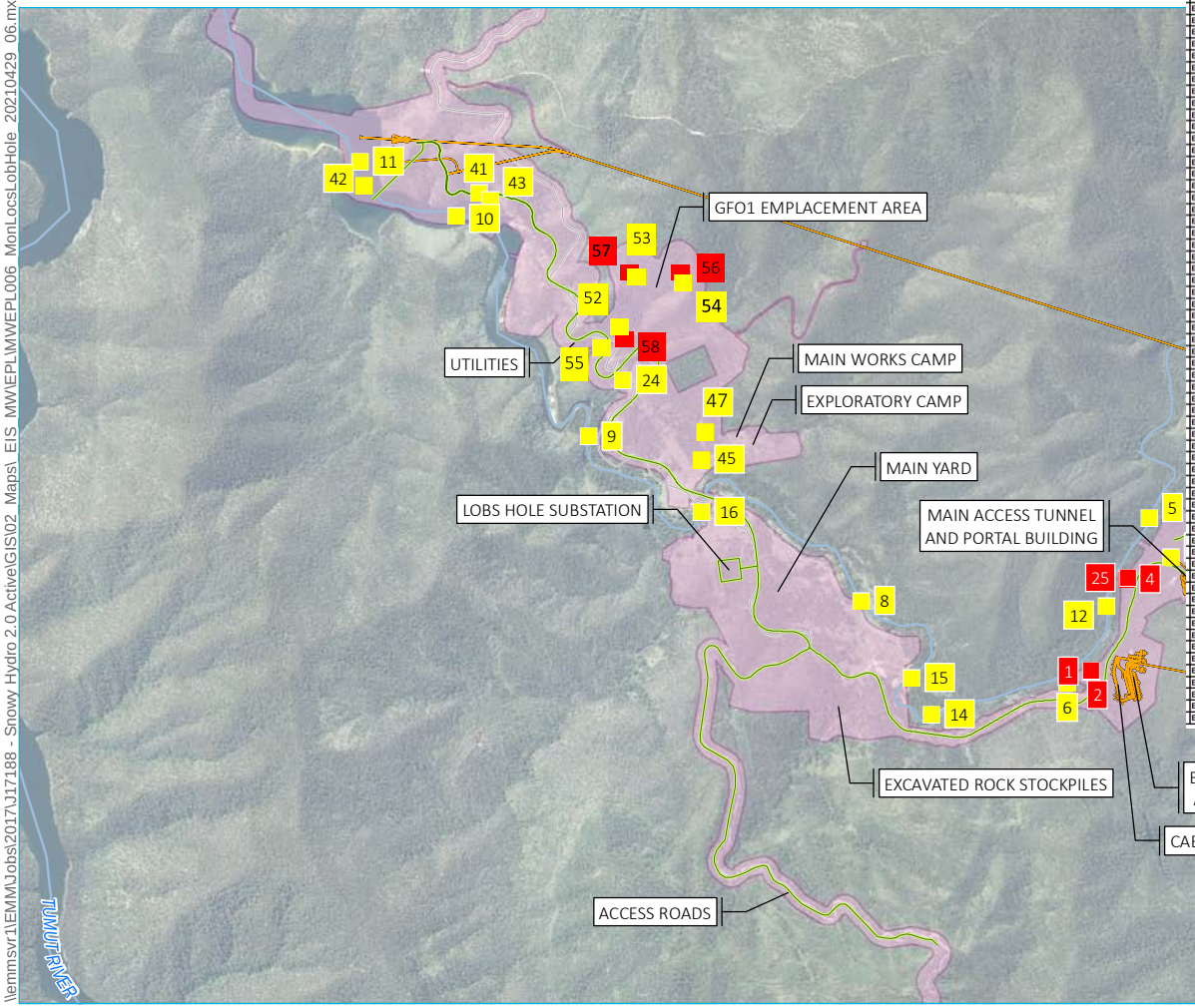
Snowy 2.0
Main Works
Figure 1

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

\\emmsvr1\EMM\Jobs\2017\117188 - Snowy Hydro 2.0 Active\GIS\02_Maps_EIS_MW\EPL\MWEPL005_MonLocsTalbingo_20210429_07.mxd 29/04/2021





Field ID	Location Code	Date	Total Phosphorus as P (Organic Phosphate as P)	Nitrite + Nitrate as N	Nitrogen (Total)	Aluminium (filtered)	Arsenic (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Lead (filtered)	Nickel (filtered)	Silver (filtered)	Zinc (filtered)
			mg/l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			0.005	0.002	0.01	0.005	0.0002	0.0002	0.0005	0.0001	0.0005	0.00001	0.001
			0.02	0.015	0.25	0.027	0.0008	0.00001	0.001	0.001	0.008	0.00002	0.0024
				0.01	0.35	0.055	0.013	0.001	0.014	0.0034	0.011	0.00005	0.008
				0.015	0.25	0.027	0.0008	0.00001	0.001	0.001	0.008	0.00002	0.0024
EQL			0.005	0.002	0.01	0.005	0.0002	0.0002	0.0005	0.0001	0.0005	0.00001	0.001
Snowy 2.0 - Groundwater Guidelines			0.02	0.015	0.25	0.027	0.0008	0.00001	0.001	0.001	0.008	0.00002	0.0024
Snowy 2.0 - Reservoir Water Guidelines				0.01	0.35	0.055	0.013	0.001	0.014	0.0034	0.011	0.00005	0.008
Snowy 2.0 - Surface Water Guidelines				0.015	0.25	0.027	0.0008	0.00001	0.001	0.001	0.008	0.00002	0.0024
EPL 56	EPL 56	04 Jun 2023	1.23	<0.01	0.9	0.01	<0.001	<0.001	0.012	<0.001	0.001	<0.001	<0.005
EPL 58	EPL 58	04 Jun 2023	0.02	15.9	16.8	<0.01	<0.001	0.003	0.110	0.003	0.004	<0.001	0.017
EPL56	EPL 56	14 Jun 2023	1.69	<0.01	1.4	<0.01	<0.001	<0.001	0.013	<0.001	0.001	<0.001	<0.005
EPL58	EPL 58	14 Jun 2023	0.16	12.3	13.0	<0.01	<0.001	0.002	0.035	0.002	0.002	<0.001	0.008
EPL57	EPL 57	14 Jun 2023	0.96	<0.01	0.5	<0.01	0.002	<0.001	0.008	<0.001	0.006	<0.001	<0.005
EPL 56	EPL 56	18 Jun 2023	0.10	<0.01	1.2	0.02	<0.001	<0.001	0.020	<0.001	<0.001	<0.001	0.005
EPL 58	EPL 58	18 Jun 2023	0.02	10.1	11.7	<0.01	<0.001	0.002	0.017	0.001	0.002	<0.001	0.009
EPL 57	EPL 57	18 Jun 2023	6.10	<0.01	4.9	0.10	0.003	<0.001	0.003	<0.001	0.013	<0.001	<0.005
EPL 56	EPL 56	25 Jun 2023	<0.01	4.48	5.1	0.038	0.0002	0.0016	0.0258	0.0023	0.0019	<0.0001	0.006
EPL 58	EPL 58	25 Jun 2023	0.12	<0.01	0.2	0.015	0.0002	<0.0002	0.0115	0.0004	0.0007	<0.0001	0.007
EPL 57	EPL 57	25 Jun 2023	1.03	<0.01	0.4	0.066	0.0037	0.0003	0.0065	0.0001	0.0053	<0.0001	0.002
EPL 58	EPL 58	01 Jul 2023	0.02	8.08	9.3	0.007	0.0002	0.0015	0.0119	0.0010	0.0020	<0.0001	0.014
EPL 57	EPL 57	01 Jul 2023	1.74	<0.01	1.6	0.02	0.0052	0.0003	<0.0005	<0.0001	0.0035	<0.0001	<0.001
EPL 58	EPL 58	06 Jul 2023	0.14	4.05	4.6	0.007	0.0002	0.0015	0.0133	0.0018	0.0022	<0.0001	0.019
EPL 57	EPL 57	06 Jul 2023	10.8	0.03	3.7	0.165	0.0042	0.0003	<0.0005	0.0006	0.0109	<0.0001	<0.001
EPL 58	EPL 58	16 Jul 2023	0.06	13.6	17.0	0.008	0.0002	0.0012	0.143	0.0036	0.0024	<0.0001	0.009
EPL 57	EPL 57	16 Jul 2023	2.13	<0.01	2.4	0.112	0.0037	0.0002	0.0012	0.0004	0.0084	<0.0001	0.005
EPL 58	EPL 58	21 Jul 2023	0.14	13.4	14.4	0.005	<0.0002	0.0006	0.113	0.0007	0.0026	<0.00001	0.011
EPL 57	EPL 57	21 Jul 2023	1.27	0.14	0.1	<0.005	0.0034	<0.0002	<0.0005	<0.0001	0.0063	<0.00001	<0.001
EPL 56	EPL 56	22 Jul 2023	0.16	0.12	0.1	<0.005	0.0002	<0.0002	0.0015	<0.0001	<0.0005	<0.00001	0.003
EPL 56	EPL 56	27 Jul 2023	0.14	0.06	0.3	<0.005	0.0003	<0.0002	0.0066	<0.0001	<0.0005	<0.00001	0.003
EPL 58	EPL 58	27 Jul 2023	0.09	18.2	19.1	<0.005	0.0002	0.0010	0.0411	0.0020	0.0026	<0.00001	0.007
EPL 57	EPL 57	27 Jul 2023	4.94	<0.01	1.2	<0.005	0.0030	<0.0002	<0.0005	<0.0001	0.0047	<0.00001	<0.001
EPL 56	EPL 56	01 Aug 2023	0.04	0.02	0.2	<0.005	<0.0002	<0.0002	0.0068	<0.0001	<0.0005	<0.00001	0.004
EPL 25	EPL 25	04 Aug 2023	0.15	0.02	0.5	<0.005	0.0008	<0.0002	0.0009	<0.0001	0.0031	<0.00001	0.012
EPL 56	EPL 56	08 Aug 2023	<0.01	0.02	0.4	<0.005	0.0003	<0.0002	0.0044	<0.0001	0.0007	<0.00001	0.004
EPL 58	EPL 58	08 Aug 2023	<0.01	17.3	22.5	<0.005	0.0002	0.0008	0.0683	0.0009	0.0028	<0.00001	0.015
EPL 57	EPL 57	08 Aug 2023	0.07	<0.01	0.3	<0.005	0.0033	<0.0002	<0.0005	<0.0001	0.0022	<0.00001	<0.001
EPL 1	EPL 1	15 Aug 2023	0.06	<0.01	0.4	<0.005	0.0017	0.0003	0.0028	<0.0001	0.0177	<0.00001	0.002
EPL 2	EPL 2	15 Aug 2023	0.22	<0.01	0.3	<0.005	0.0005	<0.0002	0.0039	<0.0001	0.0019	<0.00001	0.004
EPL 56	EPL 56	17 Aug 2023	0.02	0.48	0.6	<0.005	0.0002	<0.0002	0.0072	<0.0001	<0.0005	<0.00001	0.003
EPL 58	EPL 58	17 Aug 2023	0.02	17.9	18.6	0.005	<0.0002	0.0006	0.0558	0.0022	0.0018	<0.00001	0.006
EPL 57	EPL 57	17 Aug 2023	1.28	0.05	0.6	<0.005	0.0033	<0.0002	<0.0005	<0.0001	0.0007	<0.00001	<0.001
EPL 56	EPL 56	25 Aug 2023	0.09	0.03	0.1	<0.005	0.0004	<0.0002	0.0050	<0.0001	<0.0005	<0.00001	0.002
EPL 58	EPL 58	25 Aug 2023	0.02	16.4	19.0	0.006	0.0002	0.0006	0.0294	0.0013	0.0020	<0.00001	0.006
EPL 57	EPL 57	25 Aug 2023	1.92	0.16	1.1	<0.005	0.0032	<0.0002	<0.0005	<0.0001	0.0010	<0.00001	<0.001
EPL58	EPL 58	09 Sep 2023	0.03	13.4	14.7	<0.005	0.0002	0.0005	0.0092	0.0004	0.0016	<0.00001	0.018
EPL57	EPL 57	09 Sep 2023	0.65	0.03	0.3	<0.005	0.0034	<0.0002	<0.0005	<0.0001	0.0007	0.00002	<0.001
EPL 56	EPL 56	14 Sep 2023	0.27	0.06	2.2	<0.005	0.0003	0.0003	0.0094	<0.0001	0.0011	<0.00001	0.003
EPL 58	EPL 58	14 Sep 2023	0.03	13.6	15.2	<0.005	0.0003	0.0003	0.191	0.0011	0.0019	<0.00001	0.010
EPL 57	EPL 57	14 Sep 2023	0.21	0.38	0.7	<0.005	0.0033	<0.0002	<0.0005	<0.0001	0.0006	<0.00001	<0.001
EPL 56	EPL 56	22 Sep 2023	0.12	0.04	0.3	<0.005	0.0003	<0.0002	0.0014	<0.0001	<0.0005	<0.00001	0.002
EPL 57	EPL 57	22 Sep 2023	0.38	0.50	0.8	<0.005	0.0027	<0.0002	<0.0005	<0.0001	0.0005	<0.00001	<0.001
EPL 58	EPL 58	22 Sep 2023	0.04	12.2	15.9	<0.005	<0.0002	0.0004	0.0139	0.0005	0.0014	<0.00001	0.004
EPL 57	EPL 57	01 Oct 2023	0.76	0.12	1.8	0.014	0.0024	0.0007	<0.0005	<0.0001	0.0008	<0.00001	<0.001
EPL 58	EPL 58	01 Oct 2023	0.08	12.3	13.8	<0.005	<0.0002	0.0006	0.0036	0.0012	0.0009	<0.00001	0.003
EPL 57	EPL 57	07 Oct 2023	0.22	0.03	0.1	<0.005	0.0032	<0.0002	<0.0005	<0.0001	0.0008	<0.00001	<0.001
EPL 56	EPL 56	07 Oct 2023	0.03	0.02	<0.1	<0.005	0.0002	<0.0002	0.0059	<0.0001	<0.0005	<0.00001	0.003
EPL 58	EPL 58	07 Oct 2023	0.02	9.91	15.3	<0.005	0.0003	0.0003	0.0090	0.0006	0.0019	<0.00001	0.009
EPL 57	EPL 57	09 Oct 2023	0.42	<0.01	0.2	0.016	0.0034	<0.0002	0.0023	<0.0001	0.0007	0.00004	0.004
EPL 56	EPL 56	09 Oct 2023	0.05	0.02	<0.1	0.027	0.0003	<0.0002	0.0097	0.0005	<0.0005	<0.00001	0.013
EPL 58	EPL 58	09 Oct 2023	0.01	13.1	14.9	<0.005	0.0002	0.0004	0.0090	0.0022	0.0019	0.00002	0.012
EPL 57	EPL 57	20 Oct 2023	0.52	<0.01	0.4	<0.005	0.0032	<0.0002	<0.0005	<0.0001	0.0009	<0.00001	<0.001
EPL 56	EPL 56	20 Oct 2023	0.17	<0.01	0.3	<0.005	0.0007	<0.0002	0.0078	<0.0001	0.0022	<0.00001	0.004
EPL 58	EPL 58	20 Oct 2023	0.07	21.5	26.3	<0.005	0.0005	0.0004	0.0062	0.0002	0.0020	<0.00001	0.008
EPL 57	EPL 57	28 Oct 2023	0.22	<0.01	0.2	0.005	0.0035	<0.0002	<0.0005	<0.0001	0.0009	<0.00001	<0.001
EPL 56	EPL 56	28 Oct 2023	0.07	0.01	0.2	<0.005	0.0002	<0.0002	0.0037	<0.0001	<0.0005	<0.00001	0.004
EPL 58	EPL 58	28 Oct 2023	0.02	16.2	20.8	<0.005	0.0003	0.0003	0.0051	0.0002	0.0029	<0.00001	0.056
EPL 57	EPL 57	03 Nov 2023	0.08	0.04	0.3	<0.005	0.0031	<0.0002	<0.0005	<0.0001	0.0006	<0.00001	<0.001
EPL 1	EPL 1	03 Nov 2023	0.07	0.04	0.4	<0.005	0.0014	0.0002	0.0018	<0.0001	0.0063	<0.00001	0.001
EPL 2	EPL 2	03 Nov 2023	0.24	0.02	<1	<0.005	0.0007	<0.0002	0.0008	<0.0001	0.0011	<0.00001	0.002
EPL 25	EPL 25	03 Nov 2023	0.08	<0.01	0.6	<0.005	0.0003	<0.0002	0.0232	<0.0001	0.0244	<0.00001	0.074
EPL 56	EPL 56	03 Nov 2023	0.07	<0.01	<0.1	<0.005	<0.0002	<0.0002	<0.0005	<0.0001	<0.0005	0.00002	0.003
EPL 58	EPL 58	05 Nov 2023	<0.01	14	15.5	<0.005	0.0002	0.0002	0.0043	0.0004	0.0022	0.00001	0.015
EPL 57	EPL 57	14 Nov 2023	0.29	0.01	0.2	0.005	0.0029	<0.0002	<0.0005	<0.0001	0.0008	<0.00001	<0.001
EPL 56	EPL 56	14 Nov 2023	0.18	0.01	0.2	<0.005	<0.0002	<0.0002	0.0040	<0.0001	<0.0005	<0.00001	0.006
EPL 58	EPL 58	14 Nov 2023	0.03	10.8	11.7	0.006	0.0005	<0.0002	0.0012	0.0030	0.0065	<0.00001	0.008
EPL 57	EPL 57	18 Nov 2023	6.77	0.10	0.8	0.006	0.0041	<0.0002	<0.0005	<0.0001	0.0009	<0.00001	<0.001
EPL 56	EPL 56	18 Nov 2023	0.80	0.06	0.4	<0.005	0.0003	<0.0002	0.0039	<0.0001	<0.0005	<0.00001	0.006
EPL 58	EPL 58	18 Nov 2023	0.05	11.4	13.0	0.005	0.0004	<0.0002	0.0013	0.0029	0.0072	<0.00001	0.010
EPL 57	EPL 57	21 Nov 2023	0.13	0.02	0.4	<0.005	0.0032	<0.0002	<0.0005	<0.0001	0.0006	<0.00001	<0.001
EPL 56	EPL 56	21 Nov 2023	0.14	0.02	0.3	<0.005	0.0002	<0.0002	0.0032	<0.0001	<0.0005	<0.00001	0.005
EPL 58	EPL 58	21 Nov 2023	0.08	12.1	16.5	<0.005	0.0003	0.0003	<0.0005	0.0007	0.0033	<0.00001	0.010
EPL 57	EPL 57	25 Nov 2023	0.12	0.13	0.4	0.005	0.0024	<0.0002	<0.0005	<0.0001	0.0006	<0.00001	<0.001
EPL 56	EPL 56	25 Nov 2023	0.14	0.03	0.2	<0.005	<0.0002	<0.0002	0.0050	<0.0001	<0.0005	<0.00001	0.010
EPL 58	EPL 58	25 Nov 2023	0.02	11.5	15.8	<0.005	0.0004	<0.0002	0.0011	0.0012	0.0032	<0.00001	0.010
EPL 56	EPL 56	28 Nov 2023	0.37	<0.01	0.8	<0.005	<0.0002	<0.0002	0.0026	<0.0001	<0.0005	<0.00001	0.004
EPL 58	EPL 58	28 Nov 2023	0.69	11.8	13.2	<0.005	<0.0002	<0.0002	0.0005	0.0007	0.0039	<0.00001	0.009

\\emmsvr1\EMM\Jobs\2017\317188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MWEPLMWEPL006 MonLocsLobHole 20210429 06.mxd 29/04/2021

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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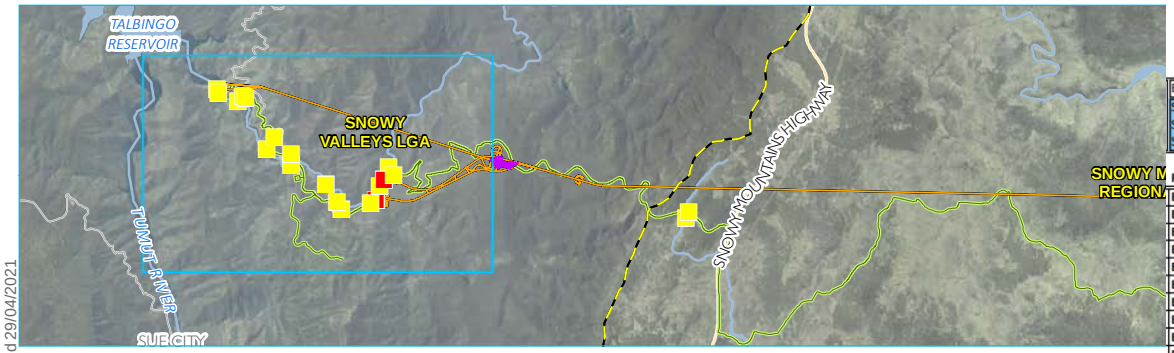
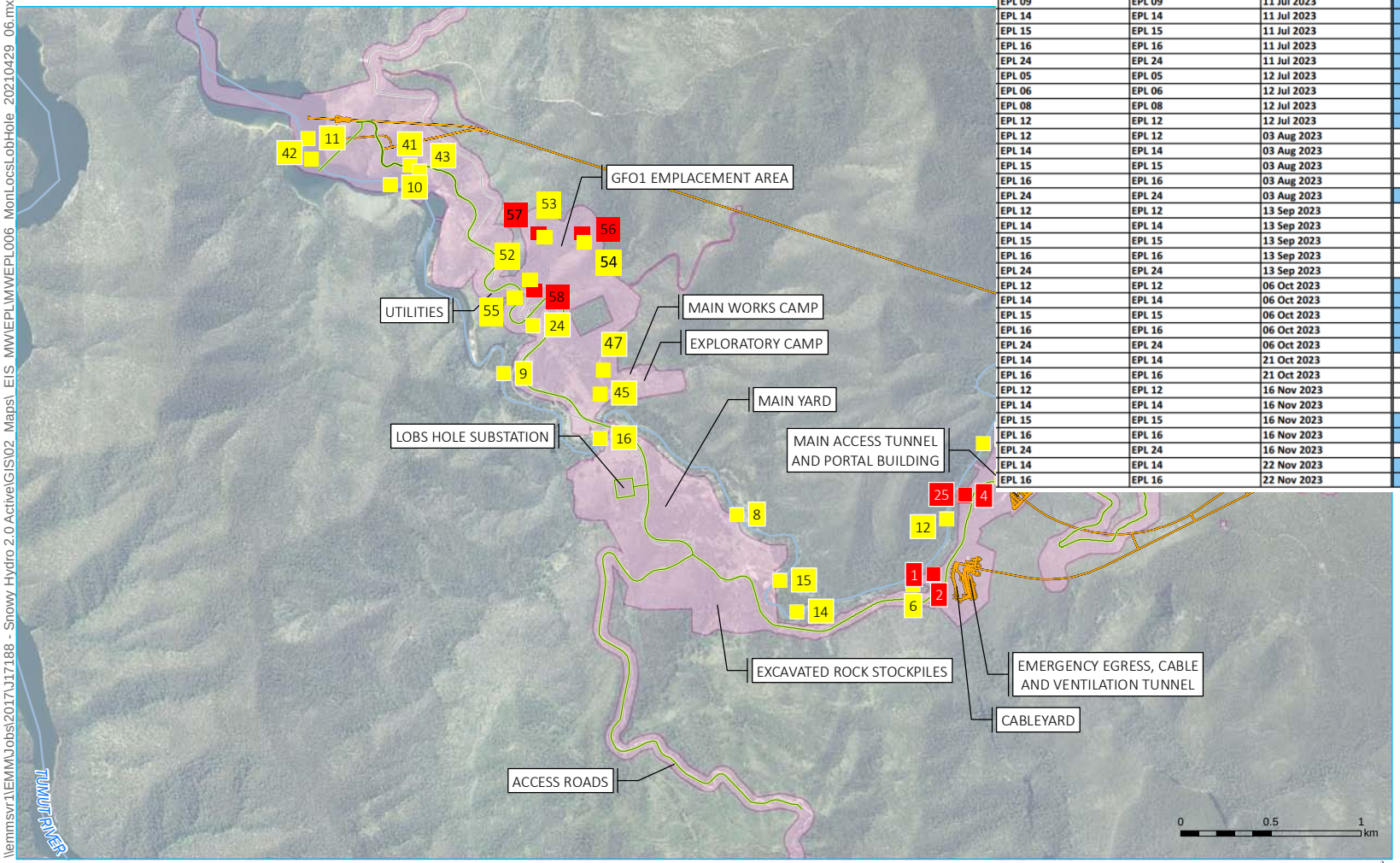
EPL Premise and monitoring point maps - Lobs Hole

Snowy 2.0
Main Works
Figure 2

snowy 2.0

EMM creating opportunities





	Total Phosphorus as P (Organic Phosphate as P)	Nitrite + Nitrate as N	Nitrogen (Total)	Aluminium (filtered)	Chromium (III+VI) (filtered)	Zinc (filtered)
	mg/l	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.002	0.01	0.005	0.0002	0.001
Snowy 2.0 - Groundwater Guidelines	0.02	0.015	0.25	0.027	0.00001	0.0024
Snowy 2.0 - Reservoir Water Guidelines		0.01	0.35	0.055	0.001	0.008
Snowy 2.0 - Surface Water Guidelines		0.015	0.25	0.027	0.00001	0.0024

Field ID	Location Code	Date					
EPL 05	EPL 05	17 Jun 2023	0.03	0.02	0.2	0.06	<0.001	<0.005
EPL 06	EPL 06	17 Jun 2023	0.02	<0.01	0.4	0.04	<0.001	<0.005
EPL 08	EPL 08	17 Jun 2023	0.01	<0.01	0.4	0.06	<0.001	<0.005
EPL 09	EPL 09	17 Jun 2023	0.02	<0.01	0.7	0.06	<0.001	<0.005
EPL 12	EPL 12	17 Jun 2023	0.02	<0.01	0.4	0.08	<0.001	<0.005
EPL 14	EPL 14	17 Jun 2023	0.02	<0.01	0.3	0.04	<0.001	<0.005
EPL 15	EPL 15	17 Jun 2023	0.02	<0.01	0.5	0.04	<0.001	<0.005
EPL 16	EPL 16	17 Jun 2023	0.03	<0.01	0.3	0.05	<0.001	<0.005
EPL 24	EPL 24	17 Jun 2023	0.03	0.52	1.1	0.06	<0.001	<0.005
EPL 09	EPL 09	11 Jul 2023	0.06	0.09	0.4	0.019	0.0010	<0.001
EPL 14	EPL 14	11 Jul 2023	0.07	0.02	0.2	0.015	0.0002	<0.001
EPL 15	EPL 15	11 Jul 2023	0.05	0.01	0.3	0.016	0.0004	<0.001
EPL 16	EPL 16	11 Jul 2023	0.04	0.01	0.2	0.016	0.0004	<0.001
EPL 24	EPL 24	11 Jul 2023	0.06	0.20	0.4	0.008	<0.0002	0.003
EPL 05	EPL 05	12 Jul 2023	0.06	0.01	0.3	0.016	0.0012	<0.001
EPL 06	EPL 06	12 Jul 2023	0.08	<0.01	0.2	0.007	<0.0002	<0.001
EPL 08	EPL 08	12 Jul 2023	0.04	0.03	0.2	0.015	0.0002	<0.001
EPL 12	EPL 12	12 Jul 2023	0.04	0.10	0.3	0.016	0.0003	<0.001
EPL 12	EPL 12	03 Aug 2023	0.02	<0.01	0.2	0.008	<0.0002	<0.001
EPL 14	EPL 14	03 Aug 2023	0.02	0.02	<0.1	0.006	<0.0002	<0.001
EPL 15	EPL 15	03 Aug 2023	0.02	<0.01	0.2	0.007	<0.0002	<0.001
EPL 16	EPL 16	03 Aug 2023	0.02	<0.01	0.2	0.009	<0.0002	<0.001
EPL 24	EPL 24	03 Aug 2023	0.06	2.50	2.5	<0.005	<0.0002	0.004
EPL 12	EPL 12	13 Sep 2023	<0.01	0.20	0.2	0.011	<0.0002	<0.001
EPL 14	EPL 14	13 Sep 2023	0.01	0.01	<0.1	0.010	<0.0002	<0.001
EPL 15	EPL 15	13 Sep 2023	0.02	<0.01	<0.1	0.010	<0.0002	<0.001
EPL 16	EPL 16	13 Sep 2023	<0.01	<0.01	<0.1	0.011	<0.0002	<0.001
EPL 24	EPL 24	13 Sep 2023	<0.01	1.42	1.6	0.005	0.0002	0.004
EPL 12	EPL 12	06 Oct 2023	0.03	0.01	1.0	0.053	0.0002	<0.001
EPL 14	EPL 14	06 Oct 2023	0.06	<0.01	0.7	0.042	0.0002	<0.001
EPL 15	EPL 15	06 Oct 2023	0.06	0.02	0.3	0.039	<0.0002	<0.001
EPL 16	EPL 16	06 Oct 2023	0.03	0.01	0.3	0.039	<0.0002	<0.001
EPL 24	EPL 24	06 Oct 2023	0.06	0.49	0.7	0.027	0.0003	<0.001
EPL 14	EPL 14	21 Oct 2023	0.02	<0.01	0.2	0.011	<0.0002	<0.001
EPL 16	EPL 16	21 Oct 2023	0.02	<0.01	0.2	0.011	<0.0002	<0.001
EPL 12	EPL 12	16 Nov 2023	0.02	0.64	0.8	0.008	<0.0002	<0.001
EPL 14	EPL 14	16 Nov 2023	0.02	<0.01	0.1	0.006	<0.0002	<0.001
EPL 15	EPL 15	16 Nov 2023	0.03	<0.01	0.3	0.006	<0.0002	<0.001
EPL 16	EPL 16	16 Nov 2023	0.03	0.10	0.3	0.007	<0.0002	<0.001
EPL 24	EPL 24	16 Nov 2023	0.02	5.64	6.3	<0.005	<0.0002	0.007
EPL 14	EPL 14	22 Nov 2023	0.08	<0.01	0.2	0.023	<0.0002	0.001
EPL 16	EPL 16	22 Nov 2023	0.06	<0.01	0.2	0.019	<0.0002	0.001

disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

EPL Premise and monitoring point maps - Lobs Hole

Snowy 2.0
Main Works
Figure 2

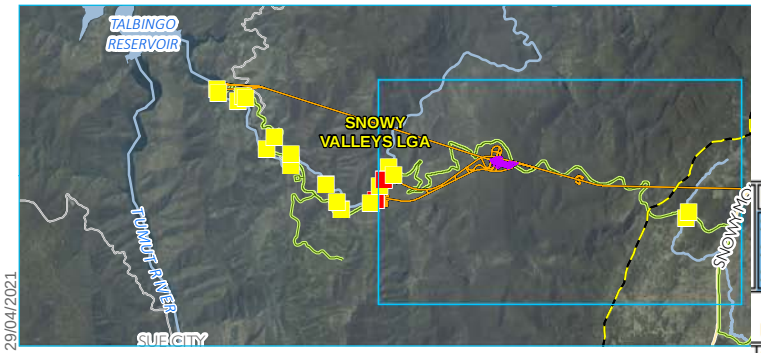
Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

N

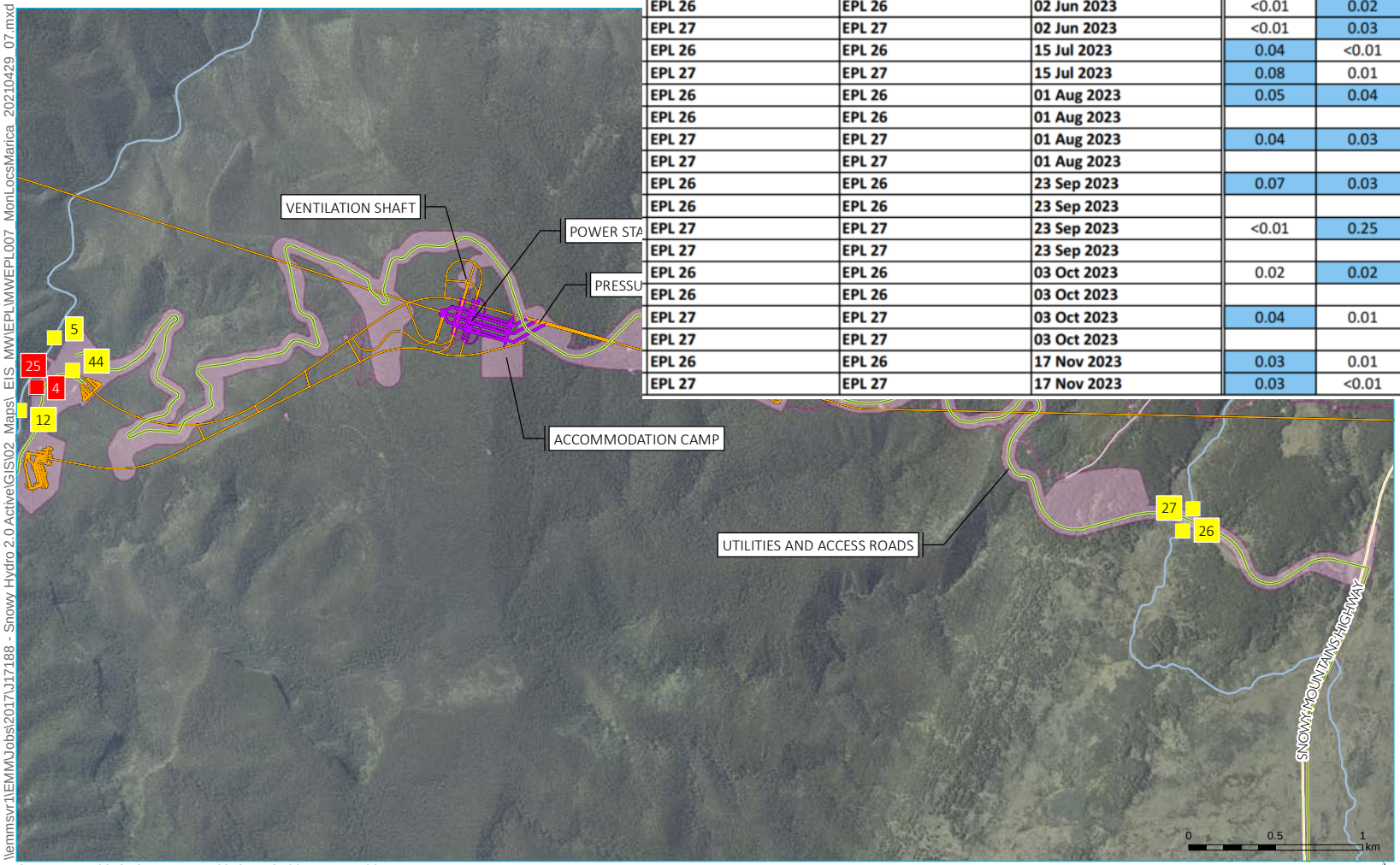
snowy 2.0

EMM creating opportunities



	Total Phosphorus as P (Organic Phosphate as P)	Nitrite + Nitrate as N	Nitrogen (Total)	Aluminium	Chromium (III+VI) (filtered)	Silver (filtered)
	mg/l	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.002	0.01	0.005	0.0002	0.00001
Snowy 2.0 - Groundwater Guidelines	0.02	0.015	0.25	0.027	0.00001	0.00002
Snowy 2.0 - Reservoir Water Guidelines		0.01	0.35	0.055	0.001	0.00005
Snowy 2.0 - Surface Water Guidelines		0.015	0.25	0.027	0.00001	0.00002

Field ID	Location Code	Date						
EPL 26	EPL 26	02 Jun 2023	<0.01	0.02	<0.1		<0.001	<0.001
EPL 27	EPL 27	02 Jun 2023	<0.01	0.03	0.1		<0.001	<0.001
EPL 26	EPL 26	15 Jul 2023	0.04	<0.01	0.1		<0.0002	<0.0001
EPL 27	EPL 27	15 Jul 2023	0.08	0.01	<0.1		0.0002	<0.0001
EPL 26	EPL 26	01 Aug 2023	0.05	0.04	<0.1	0.047	0.0002	<0.00001
EPL 26	EPL 26	01 Aug 2023						
EPL 27	EPL 27	01 Aug 2023	0.04	0.03	<0.1	0.131	0.0002	<0.00001
EPL 27	EPL 27	01 Aug 2023						
EPL 26	EPL 26	23 Sep 2023	0.07	0.03	0.2		0.0002	<0.00001
EPL 26	EPL 26	23 Sep 2023						
EPL 27	EPL 27	23 Sep 2023	<0.01	0.25	0.4		0.0002	<0.00001
EPL 27	EPL 27	23 Sep 2023						
EPL 26	EPL 26	03 Oct 2023	0.02	0.02	0.1		0.0002	0.00004
EPL 26	EPL 26	03 Oct 2023						
EPL 27	EPL 27	03 Oct 2023	0.04	0.01	0.2		<0.0002	0.00004
EPL 27	EPL 27	03 Oct 2023						
EPL 26	EPL 26	17 Nov 2023	0.03	0.01	0.2		0.0003	<0.00001
EPL 27	EPL 27	17 Nov 2023	0.03	<0.01	0.1		0.0002	<0.00001



\\emmsvr1\EMMJobs\2017\J17188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MW\EPL\MWEPL007 MonLocsMarica 20210429 07.mxd 29/04/2021

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

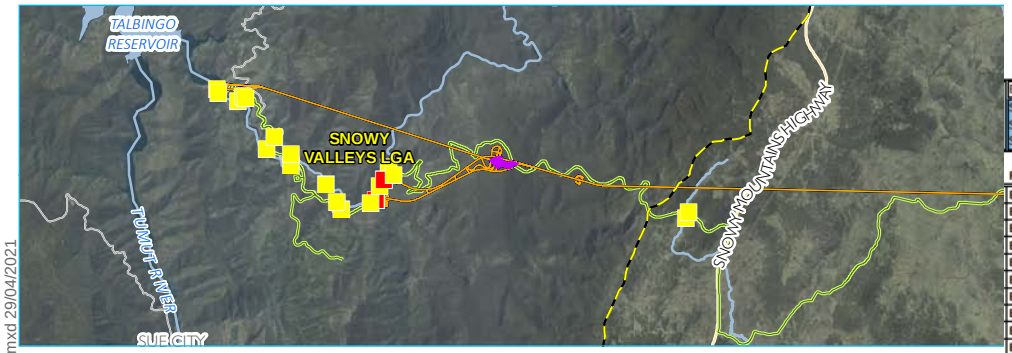
The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

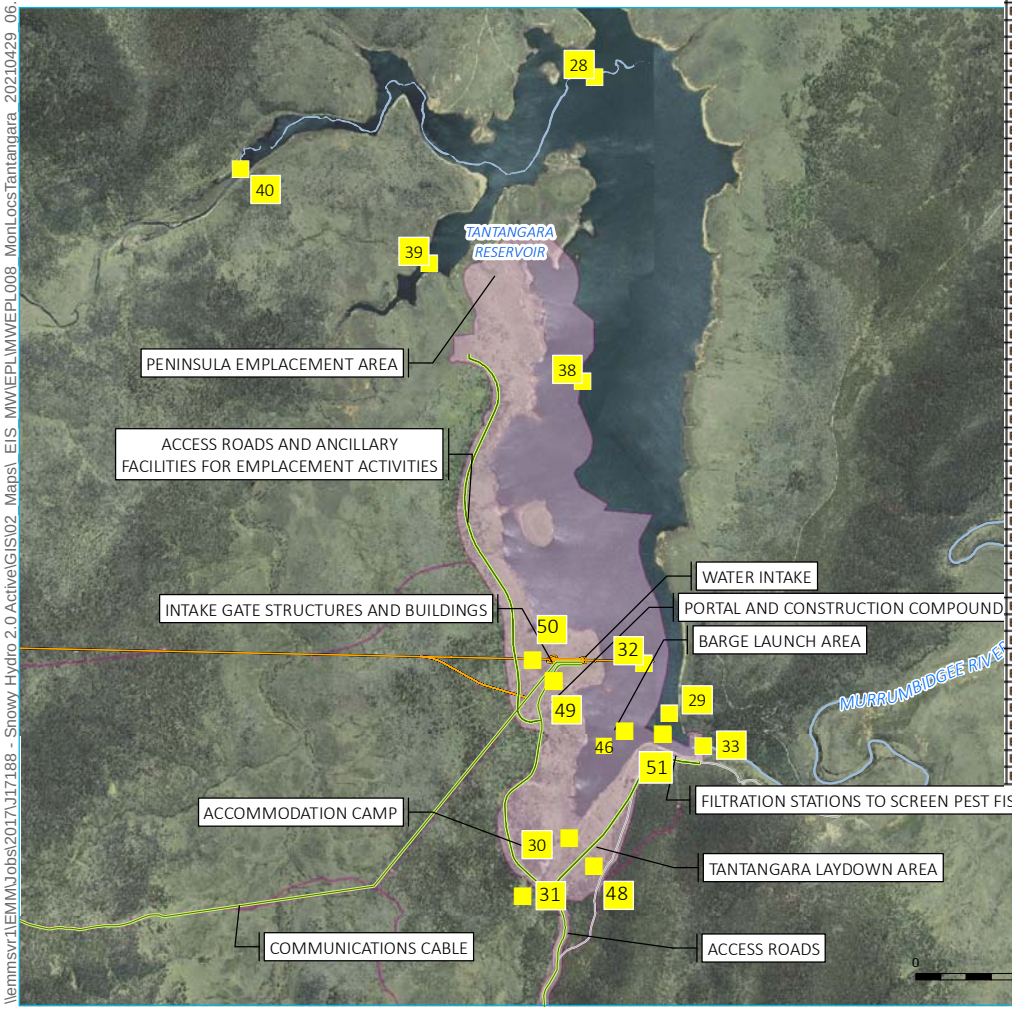
EPL Premise and monitoring point maps - Marica

Snowy 2.0
Main Works
Figure 3

snowy 2.0

EMM creating opportunities





	Total Phosphorus as P (Organic Phosphate as P)	Nitrite + Nitrate as N	Nitrogen (Total)	Aluminium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Silver (filtered)	Zinc (filtered)
	mg/l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.002	0.01	0.005	0.0002	0.0005	0.00001	0.001
Snowy 2.0 - Groundwater Guidelines	0.02	0.015	0.25	0.027	0.00001	0.001	0.00002	0.0024
Snowy 2.0 - Reservoir Water Guidelines		0.01	0.35	0.055	0.001	0.014	0.00005	0.008
Snowy 2.0 - Surface Water Guidelines		0.015	0.25	0.027	0.00001	0.001	0.00002	0.0024
Field ID	**Location Code**	**Date**						
EPL 33	EPL 33	07 Jun 2023	0.03	<0.01	0.2	0.02	<0.001	<0.001	<0.001	<0.005
EPL 35	EPL 35	07 Jun 2023	0.02	<0.01	0.1	0.01	<0.001	<0.001	<0.001	<0.005
EPL 50	EPL 50	07 Jun 2023	0.03	0.06	0.2	<0.01	<0.001	<0.001	<0.001	<0.005
EPL 28	EPL 28	20 Jun 2023	0.02	<0.01	0.2	0.036	<0.0002	<0.0005	<0.0001	0.001
EPL 39	EPL 39	20 Jun 2023	0.37	0.02	0.5	0.058	0.0003	<0.0005	<0.0001	0.002
EPL 40	EPL 40	20 Jun 2023	0.09	<0.01	0.2	0.066	<0.0002	<0.0005	<0.0001	0.006
EPL46	EPL 46	27 Jun 2023	0.09	<0.01	0.2	<0.005	<0.0002	<0.0005	<0.0001	<0.001
EPL38	EPL 38	27 Jun 2023	0.02	<0.01	0.3	0.043	<0.0002	<0.0005	<0.0001	<0.001
EPL51	EPL 51	27 Jun 2023	0.02	<0.01	0.2	0.032	<0.0002	<0.0005	<0.0001	<0.001
EPL 46	EPL 46	13 Jul 2023	0.08	0.04	0.2	0.034	<0.0002	<0.0005	<0.0001	<0.001
EPL 28	EPL 28	13 Jul 2023	0.06	<0.01	0.1	0.024	<0.0002	<0.0005	<0.0001	<0.001
EPL 29	EPL 29	13 Jul 2023	0.05	<0.01	0.2	0.032	<0.0002	<0.0005	<0.0001	<0.001
EPL 32	EPL 32	13 Jul 2023	0.05	<0.01	0.2	0.033	<0.0002	<0.0005	<0.0001	<0.001
EPL 38	EPL 38	13 Jul 2023	0.04	0.02	0.2	0.028	<0.0002	<0.0005	<0.0001	<0.001
EPL 39	EPL 39	13 Jul 2023	0.06	<0.01	0.2	0.02	<0.0002	<0.0005	<0.0001	<0.001
EPL 40	EPL 40	13 Jul 2023	0.04	<0.01	0.1	0.015	<0.0002	<0.0005	<0.0001	<0.001
EPL 50	EPL 50	13 Jul 2023	0.05	0.17	0.5	<0.005	<0.0002	<0.0005	<0.0001	<0.001
EPL 51	EPL 51	13 Jul 2023	0.06	<0.01	0.1	0.032	<0.0002	<0.0005	<0.0001	<0.001
EPL 33	EPL 33	14 Jul 2023	0.06	<0.01	0.2	0.024	0.0002	<0.0005	<0.0001	<0.001
EPL 35	EPL 35	14 Jul 2023	0.07	<0.01	0.7	0.012	<0.0002	<0.0005	<0.0001	0.001
EPL 46	EPL 46	02 Aug 2023	0.01	0.01	0.2	0.028	<0.0002	<0.0005	<0.00001	<0.001
EPL 28	EPL 28	02 Aug 2023	0.04	0.01	0.2	0.025	<0.0002	<0.0005	<0.00001	<0.001
EPL 29	EPL 29	02 Aug 2023	0.04	<0.01	0.2	0.029	<0.0002	<0.0005	<0.00001	<0.001
EPL 32	EPL 32	02 Aug 2023	0.04	<0.01	0.1	0.028	<0.0002	<0.0005	<0.00001	<0.001
EPL 33	EPL 33	02 Aug 2023	<0.01	<0.01	0.2	0.029	<0.0002	<0.0005	<0.00001	<0.001
EPL 38	EPL 38	02 Aug 2023	0.01	0.02	0.2	0.023	<0.0002	<0.0005	<0.00001	<0.001
EPL 39	EPL 39	02 Aug 2023	0.01	0.01	0.1	0.014	<0.0002	<0.0005	<0.00001	<0.001
EPL 40	EPL 40	02 Aug 2023	0.01	<0.01	0.1	0.011	<0.0002	<0.0005	<0.00001	<0.001
EPL 50	EPL 50	02 Aug 2023	0.01	0.08	0.4	<0.005	<0.0002	<0.0005	0.00003	<0.001
EPL 51	EPL 51	02 Aug 2023	0.02	<0.01	0.2	0.029	<0.0002	<0.0005	<0.00001	<0.001
EPL 35	EPL 35	15 Aug 2023	<0.01	<0.01	0.1	0.017	<0.0002	<0.0005	<0.00001	<0.001
EPL 33	EPL 33	16 Sep 2023	<0.01	0.02	0.2	0.028	<0.0002	<0.0005	<0.00001	<0.001
EPL 35	EPL 35	16 Sep 2023	0.01	<0.01	0.3	0.020	<0.0002	<0.0005	<0.00001	<0.001
EPL 50	EPL 50	17 Sep 2023	<0.01	0.12	0.3	<0.005	<0.0002	<0.0005	<0.00001	<0.001
EPL 46	EPL 46	20 Sep 2023	0.34	0.02	1.4	0.062	<0.0002	<0.0005	<0.00001	<0.001
EPL 28	EPL 28	20 Sep 2023	0.21	0.01	0.8	0.016	<0.0002	<0.0005	<0.00001	<0.001
EPL 32	EPL 32	20 Sep 2023	0.03	0.02	0.4	0.027	<0.0002	<0.0005	<0.00001	<0.001
EPL 38	EPL 38	20 Sep 2023	0.15	0.04	1.0	0.031	<0.0002	<0.0005	<0.00001	<0.001
EPL 39	EPL 39	20 Sep 2023	0.02	0.01	0.3	0.017	<0.0002	<0.0005	<0.00001	<0.001
EPL 40	EPL 40	20 Sep 2023	0.02	0.01	0.3	0.016	<0.0002	<0.0005	<0.00001	<0.001
EPL 51	EPL 51	20 Sep 2023	0.12	0.02	0.4	0.047	<0.0002	<0.0005	<0.00001	<0.001
EPL 29	EPL 29	21 Sep 2023	0.02	0.02	0.3	0.028	<0.0002	<0.0005	<0.00001	<0.001
EPL 33	EPL 33	10 Oct 2023	0.01	0.01	0.2	0.086	0.0002	<0.0005	<0.00001	0.001
EPL 35	EPL 35	10 Oct 2023	<0.01	<0.01	0.2	0.052	<0.0002	<0.0005	<0.00001	0.001
EPL 50	EPL 50	12 Oct 2023	<0.01	0.20	0.6	<0.005	<0.0002	<0.0005	<0.00001	<0.001
EPL 46	EPL 46	13 Oct 2023	<0.01	0.01	0.2	0.026	<0.0002	<0.0005	<0.00001	<0.001
EPL 28	EPL 28	13 Oct 2023	<0.01	0.04	0.1	0.028	<0.0002	<0.0005	<0.00001	<0.001
EPL 29	EPL 29	13 Oct 2023	<0.01	0.02	0.1	0.044	<0.0002	<0.0005	<0.00001	<0.001
EPL 32	EPL 32	13 Oct 2023	0.01	0.01	0.2	0.041	<0.0002	<0.0005	<0.00001	<0.001
EPL 38	EPL 38	13 Oct 2023	<0.01	0.02	0.1	0.045	<0.0002	<0.0005	<0.00001	<0.001
EPL 39	EPL 39	13 Oct 2023	<0.01	0.03	0.1	0.017	<0.0002	<0.0005	<0.00001	<0.001
EPL 40	EPL 40	13 Oct 2023	<0.01	0.04	<0.1	0.017	<0.0002	<0.0005	<0.00001	<0.001
EPL 51	EPL 51	13 Oct 2023	0.03	0.02	0.2	0.102	<0.0002	0.0024	<0.00001	0.002
EPL 33	EPL 33	15 Nov 2023	0.01	<0.01	0.2	0.038	<0.0002	<0.0005	<0.00001	<0.001
EPL 35	EPL 35	15 Nov 2023	0.02	<0.01	0.2	0.026	<0.0002	<0.0005	<0.00001	<0.001
EPL 50	EPL 50	17 Nov 2023	<0.01	0.09	0.4	<0.005	<0.0002	<0.0005	<0.00001	<0.001

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Maps - Tantangara Reservoir

Snowy 2.0
Main Works
Figure 4

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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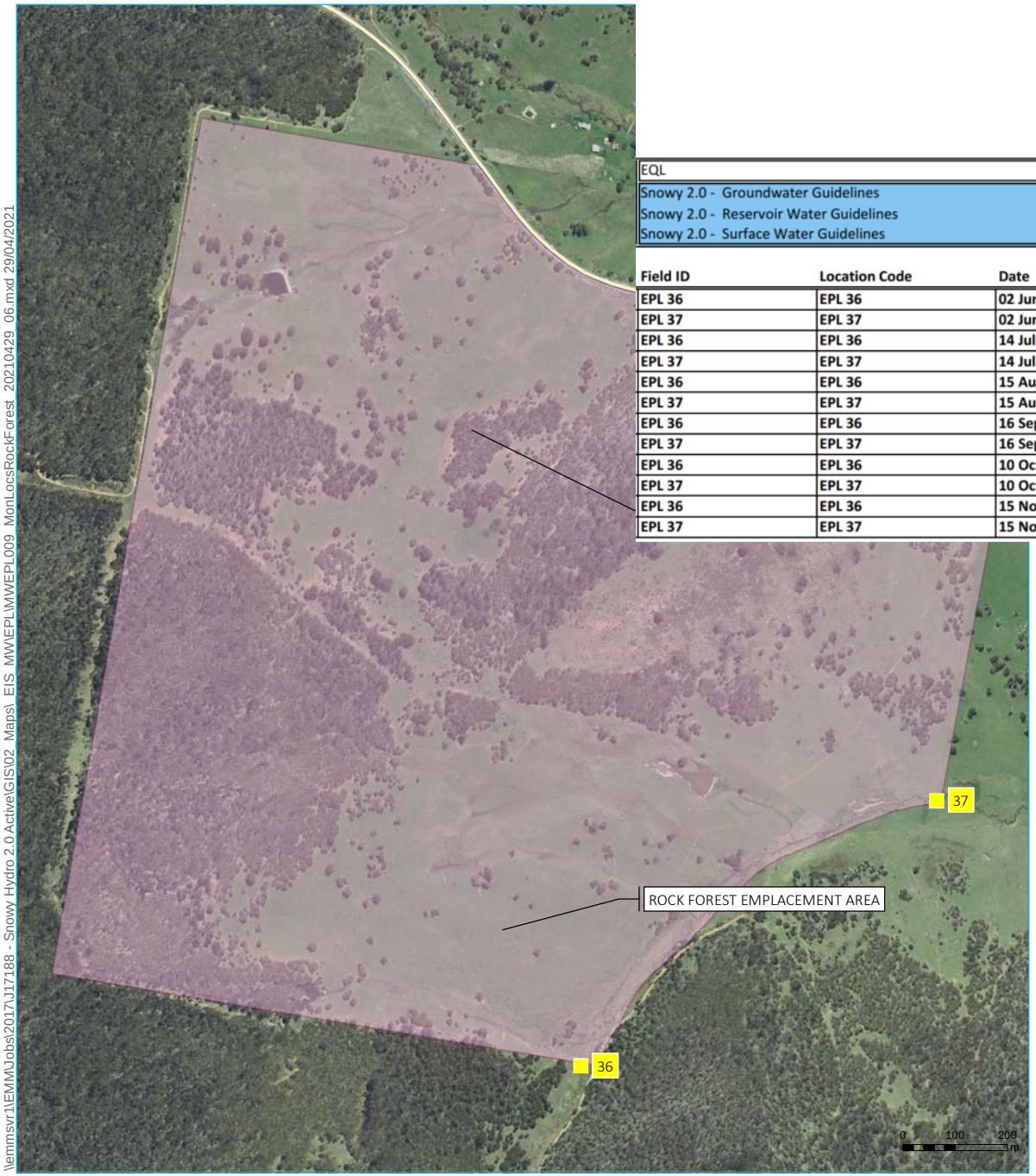
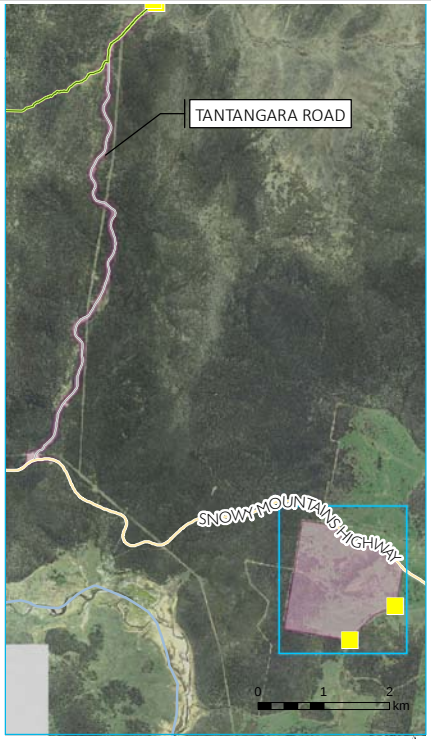
N

snowy 2.0

EMM creating opportunities

	Total Phosphorus as P (Organic Phosphate as P)	Nitrite + Nitrate as N	Nitrogen (Total)	Aluminium (filtered)	Chromium (III+VI) (filtered)	Iron (filtered)	Zinc (filtered)
	mg/l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.005	0.002	0.01	0.005	0.0002	0.002	0.001
Snowy 2.0 - Groundwater Guidelines	0.02	0.015	0.25	0.027	0.00001	0.3	0.0024
Snowy 2.0 - Reservoir Water Guidelines		0.01	0.35	0.055	0.001	0.3	0.008
Snowy 2.0 - Surface Water Guidelines		0.015	0.25	0.027	0.00001	0.3	0.0024
Field ID	**Location Code**	**Date**						
EPL 36	EPL 36	02 Jun 2023	<0.01	0.08	0.7	0.13	<0.001	0.31	<0.005
EPL 37	EPL 37	02 Jun 2023	0.05	0.16	0.7	0.21	<0.001	0.33	<0.005
EPL 36	EPL 36	14 Jul 2023	0.06	0.10	0.8	0.09	0.0002	0.27	<0.001
EPL 37	EPL 37	14 Jul 2023	0.06	0.08	0.5	0.084	0.0002	0.248	<0.001
EPL 36	EPL 36	15 Aug 2023	0.04	0.13	0.5	0.113	0.0003	0.358	<0.001
EPL 37	EPL 37	15 Aug 2023	0.03	0.16	0.6	0.119	0.0003	0.375	<0.001
EPL 36	EPL 36	16 Sep 2023	0.04	0.06	0.8	0.091	0.0003	0.307	<0.001
EPL 37	EPL 37	16 Sep 2023	0.05	0.07	0.7	0.085	0.0004	0.342	<0.001
EPL 36	EPL 36	10 Oct 2023	0.04	0.14	0.7	0.279	0.0005	0.471	0.021
EPL 37	EPL 37	10 Oct 2023	0.04	0.09	0.6	0.290	0.0005	0.605	0.002
EPL 36	EPL 36	15 Nov 2023	0.04	0.17	0.6	0.038	<0.0002	0.216	0.004
EPL 37	EPL 37	15 Nov 2023	0.05	0.11	0.5	0.035	<0.0002	0.180	<0.001





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The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

EPL Premise and monitoring point maps - Rock Forest

Snowy 2.0
Main Works
Figure 5

snowy 2.0

EMM
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APPENDIX E – TRENDS