REPORT

EPL 21266 – BI-ANNUAL MONITORING REPORT
DECEMBER 2021 – MAY 2022

S2-FGJV-ENV-REP-0064

Rev A

JULY 2022

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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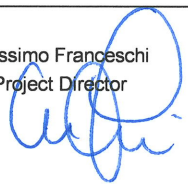
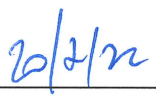
E ndorsed:	Name: Massimo Franceschi Job Title: Project Director Signed:  Date: 

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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. During this reporting period there has been three variations to EPL 21266. An EPL variation was issued on 14 January 2022 which included an increase discharge from 1.66 ML/day to 4.32 ML/day with a flow rate of 50L/s. An EPL variation was issued 4 February 2022 which covered:

- written approval for commencement of scheduled development works;
- Quarterly Spoil Monitoring Reporting; and
- a Pollution Reduction Program.

An EPL variation was issued on 13 May 2022 which consisted of discharging treated sewerage and processed water at Tantangara with additional new water discharge and monitoring points within the Tantangara Reservoir. This includes:

- updated locations of monitoring pointers 1 – 51;
- discharge point EPL 46 added for the discharge of treated effluent into Tantangara Reservoir;
- volume monitoring points EPL 47, EPL 48 and EPL 49 have been added; and
- effluent and volume monitoring point EPL 50 has been added including monitoring for nitrogen, phosphorus, faecal coliforms, pH, BOD, nitrogen (ammonia), TSS, oil and grease, and electrical conductivity, flow limit

An EPL variation was issued on 31 May 2022 which removed the requirement for the Pollution Reduction Program (issued in February 2022) due to its completion.

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 Jess Adams, Environmental Coordinator for Future Generation. Jess holds a Bachelor of Environmental, and a Master of Environmental Law and Policy with 9 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 11 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
EPL 01	148.413	-35.792	Lobs Hole	Groundwater	Wallace Creek Bridge
EPL 02	148.413	-35.792	Lobs Hole	Groundwater	Wallace Creek Bridge
EPL 04	148.415	-35.788	Lobs Hole	Groundwater	Lobs Hole Portal Access
EPL 05	148.416	-35.785	Lobs Hole	Surface Water	Yarrangobilly River, upstream of the exploratory tunnel and construction pad
EPL 06	148.412	-35.793	Lobs Hole	Surface Water	Wallaces Creek, upstream of the confluence of Yarrangobilly River and Wallaces Creek
EPL 08	148.401	-35.789	Lobs Hole	Surface Water	Yarrangobilly River, downstream of Lick Hole Gully
EPL 09	148.387	-35.782	Lobs Hole	Surface Water	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir
EPL 10	148.380	-35.773	Lobs Hole	Reservoir Water	Talbingo Reservoir, upstream of Lobs Hole STP/PWTP diffuser outlet and water intake point
EPL 11	148.375	-35.771	Lobs Hole	Reservoir Water	Talbingo Reservoir, downstream of Lobs Hole STP/PWTP diffuser outlet
EPL 12	148.414	-35.789	Lobs Hole	Surface Water	Yarrangobilly River, immediately downstream of portal pad
EPL 14	148.405	-35.794	Lobs Hole	Surface Water	Yarrangobilly River, downstream of road construction areas
EPL 15	148.404	-35.792	Lobs Hole	Surface Water	Yarrangobilly River, downstream of road construction areas
EPL 16	148.393	-35.785	Lobs Hole	Surface Water	Yarrangobilly River, downstream of road construction areas
EPL 24	148.389	-35.780	Lobs Hole	Surface Water	Yarrangobilly River tributary (Watercourse 2), directly downstream of road
EPL 25	148.415	-35.788	Lobs Hole	Groundwater	Portal Access
EPL 26	148.488	-35.794	Marica	Surface Water	Eucumbene River, downstream of Marica Road
EPL 27	148.488	-35.794	Marica	Surface Water	Eucumbene River, upstream of Marica Road
EPL 28	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.
EPL 29	148.661	-35.793	Tantangara	Reservoir Water	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River
EPL 30	148.652	-35.801	Tantangara	Surface Water	Kellys Plain Creek, downstream of accommodation camp and laydown areas
EPL 31	148.648	-35.806	Tantangara	Surface Water	Kellys Plain Creek, upstream of accommodation camp and laydown areas
EPL 32	148.659	-35.790	Tantangara	Reservoir Water	Tantangara Reservoir, Tantangara Intake. Downstream of construction works
EPL 33	148.664	-35.795	Tantangara	Surface Water	Murrumbidgee River, downstream of Tantangara reservoir outlet
EPL 34	148.633	-35.865	Tantangara	Surface Water	Nungar Creek, upstream of Tantangara Road
EPL 35	148.633	-35.865	Tantangara	Surface Water	Nungar Creek, downstream of Tantangara Road
EPL 36	148.668	-35.952	Rock Forest	Surface Water	Camerons Creek, upstream of works in Rock Forest
EPL 37	148.675	-35.948	Rock Forest	Surface Water	Camerons Creek, downstream of works in Rock Forest

EPL 38	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
EPL 39	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
EPL 40	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
EPL 41	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
EPL 42*	148.375	-35.772	Talbingo	Discharge Point	Diffuser outlet discharging into Talbingo Reservoir from Lobs Hole STP/PWTP
EPL 43*	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
EPL 44*	148.417	-35.787	Lobs Hole	Volume Inflow – PWTP	Lobs Hole (MAT Portal) PWTP Inflow Volume Monitoring Point
EPL 45*	148.393	-35.783	Talbingo	Volume Inflow – Ex-Camp STP	Lobs Hole Ex-Camp STP Inflow Volume Monitoring Point
EPL 46	148.657	-35.795	Tantangara	Discharge Point	Diffuser outlet discharging into Tantangara Reservoir from Tantangara STP / PWTP
EPL 47	148.392	-35.783	Talbingo	Volume Inflow – Main Camp STP	Talbingo Main Camp STP Inflow Monitoring Point
EPL 48	148.656	-35.802	Tantangara	Volume Inflow STP	Tantangara STP Inflow Volume Monitoring Point
EPL 49	148.650	-35.791	Tantangara	Volume Inflow PWTP	Tantangara PWTP Inflow Volume Monitoring Point
EPL 50	148.651	-35.791	Tantangara	Volume Outflow	Tantangara STP/PWTP final effluent quality and volume monitoring point
EPL 51	148.660	-35.794	Tantangara	Surface Water	Tantangara Reservoir, downstream of Tantangara STP/PWTP diffuser outlet.

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

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

Table 1-3 summarises the amendments included in each variation of EPL 21266 between December 2021 and May 2022.

Table 1-3: EPL Variation within this reporting period

Date of Variation	Changes outlined
14 January 2022	The variation requested amendment to the volume limit at discharge point 43 from 1.66 ML/day to 4.32 ML/day of treated water to Talbingo Reservoir and the amendment of the rate of discharge from 19 L/s to 50 L/s to assist with the predicted increase in water load requiring management at Lobs Hole.
4 February 2022	An EPL variation was issued 4 February which covered the following: • Written approval for commencement of scheduled development works • Quarterly Spoil Monitoring Reporting • Pollution Reduction Program
13 May 2022	An EPL variation was issued on 13 May which consisted of discharging treated sewerage and processed water at Tantangara with additional new water discharge and monitoring points within the Tantangara Reservoir. This includes: • Updated locations of monitoring pointers 1 – 51 • Discharge point EPL 46 added for the discharge of treated effluent into Tantangara Reservoir • Volume monitoring points EPL 47, EPL 48 and EPL 49 have been added • Effluent and volume monitoring point EPL 50 has been added including monitoring for nitrogen, phosphorus, faecal coliforms, pH, BOD, nitrogen (ammonia), TSS, oil and grease, and electrical conductivity, flow limit
31 May 2022	Licence updated to remove the Pollution Reduction Program requirements relating to water and contamination management at the MAT spoil stockpile area

1.4. Project Updates

This bi-annual monitoring update includes December 2021 – May 2022 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)

- Commenced drill and blast activities
- TBM cradle under construction
- TBM / facilities underground services near completion
- Talbingo Adit cradle installation works commenced
- WTP construction ongoing

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

- Tunneling works continuing
- Level spreader and rock-lined batter chute rectification works ongoing
- Marica West HDD Pad construction commenced
- Concrete lined slurry ponds at Lick Hole Gully constructed for the receiving and treatment of slurry from Gooandra
- Track installed for access to the ECVT level spreader

- Concstruction of wedge pit and concrete at ECVT
- Asphalting of Ravine Road commenced.
- Clearing for road widening works between R7-R15.
- Improvement and implementation of additional ERSED controls at R5 laydown area, including rehabilitation plots

1.4.3. Marica

- Marica Camp earthworks and underground utilities completed. All structural footings/ foundations are completed and buildings on site. Currently in the process of constructing the ring road, access roads and the car park. All other common buildings are substantially completed.
- Marica Trail Road from Snowy Mountain Highway to CH2100 is being widened to the IFC design.
- The remaining of Marica Trail from CH2100 to CH5300 is under construction and are currently working between CH2900 – CH3200 installing rock bolts and draped mesh
- Marica West from CH0 – CH1200 including the upper HDD Pad cleared. Bulk earthworks completed up to upper HDD Pad earthworks package.
- Marica West trail bulk earthworks commenced and will require fill from the HDD pad to be constructed to the IFC design.
- Upstream Surge Shaft bulk earthworks are completed with the remaining fill being hauled from Marica Trail. Facility FRP works is well underway for all the facility to support the shaft excavation.
- Shaft spoil stockpile area C&G to commence once no-objection has been received.
- Installation of Dip Creek Crossing commenced

1.4.4. Tantangara

- Excavation of the ADIT is complete, cradle construction complete
- TBM#3 assembly completed, excavation started, commissioning in progress.
- Batch Plant commissioning completed and in operation.
- Cofferdam earthworks is completed. Installation of the liner completed. Rock fill ongoing
- Camp earthworks complete. Services and concrete ongoing as well as the installation of the rooms.
- Tantangara road and Quarry trail pioneering road maintenance ongoing with regular repairs throughout
- Works ongoing on Tantangara Spoil Road. The earthworks are completed up to the spoil area. Pavement to be installed after the intake blasting
- Water treatment plant commissioned and operational.
- Sediment basin construction at gate shaft.
- Surplus concrete from batch plant being crushed for re-use.
- Tantangara Intake commenced blasting.

- Quarry Trail Road widening ongoing.
- Construction of concrete pad and wedge pit under the BM spoil conveyor.

1.4.5. Trunk Services

- Trenching along the alignment ongoing.
- Clearing carried out for drill pads and towards Tantangara.
- Site rehabilitation progressing.
- ERSED improvement actions and items largely complete.
- Water Quality Monitoring ongoing.
- Underboring commenced.

1.4.6. Rock Forest

- Site now operational as laydown area

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. Note this weather station requires maintenance and so weather data for Tantangara site is limited to manual rainfall gauges, supplemented by data from BoM

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 previous Biannual Monitoring Report (S2-FGJV-ENV-REP-0051*)* noted above-average rainfall. The conditions for this reporting period followed a similar pattern with La Nina conditions.

The cumulative rainfall between December 2021 and May 2022 is presented in **Figure 2-1.**

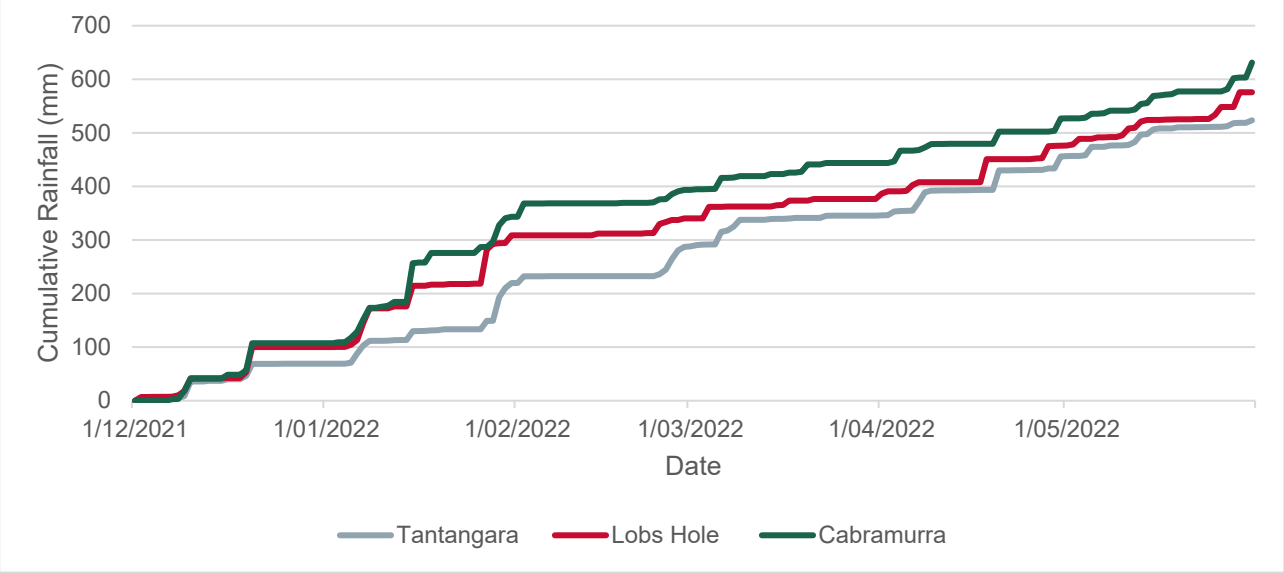


Figure 2-1: Cumulative Rainfall across Tantangara, Cabramurra and Lobs Hole

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:

- 63.8 mm at Lobs Hole – 27/01/2022
- 72.4 mm at Cabramurra (Marica) – 15/01/2022
- 43.8 mm at Tantangara – 29/01/2022

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

- Lobs Hole: 90.2 mm between the 29 and 2 February 2022;
- Cabramurra (Marica): 91.4 mm between 14 and 18 January 2022; and
- Tantangara: 86.6 mm between 27 January and 1 February 2022

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
December	69.00	59.4	107.40	97.3	100.20	69.0
January	150.80	58.8	236.00	73.9	194.00	63.7
February	67.40	52.4	50.20	79.5	43.20	54.4
March	58.20	56.0	50.20	82.6	39.00	63.7
April	110.60	46.4	83.00	79.5	98.80	41.6
May	67.40	47.1	104.40	93.2	100.60	48.6

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**), caused by the continuation and strengthening of La Nina in the Tropical Pacific.

2.3. Temperature Data

Figure 2-1 to

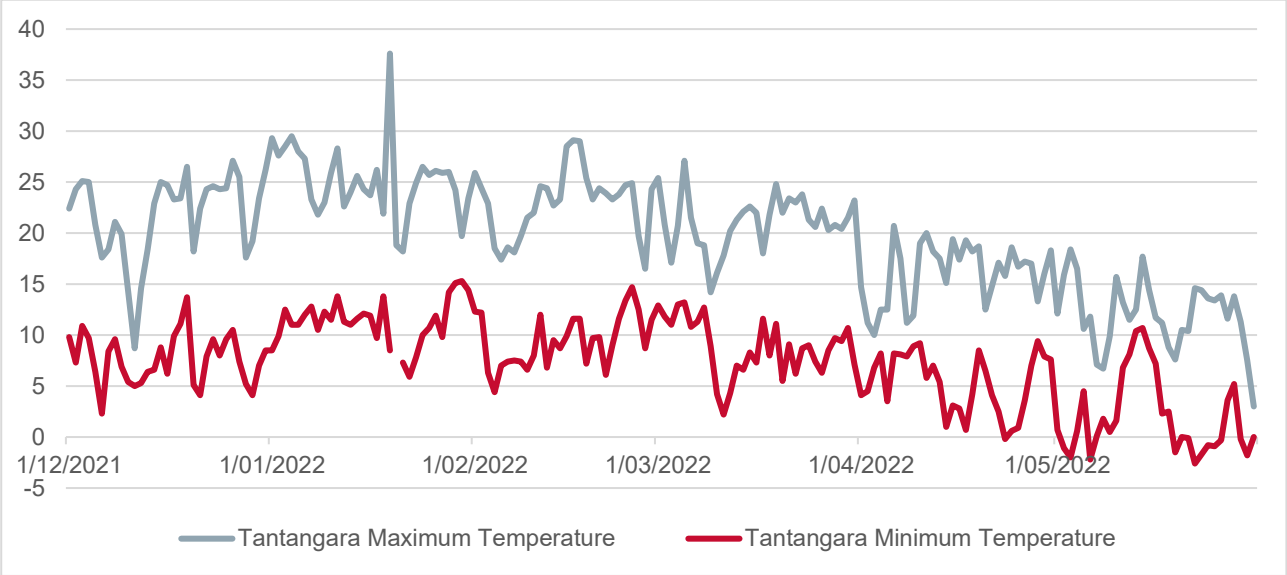


Figure 2-4 show temperature maximum and minimums across the project at Lobs Hole and Cabramurra weather stations.

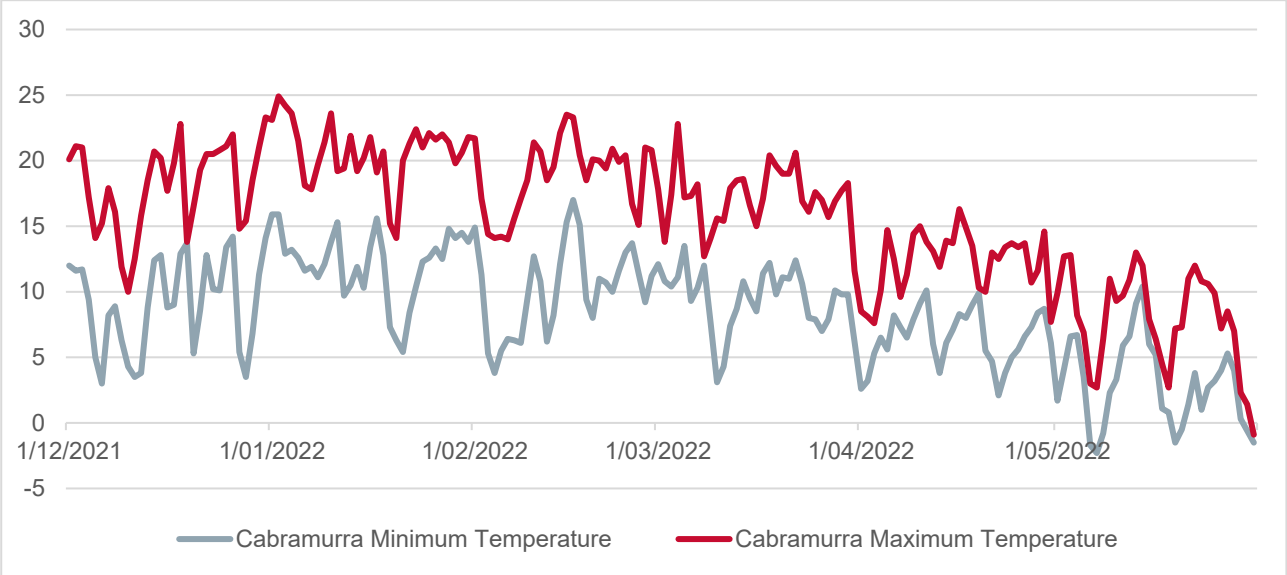


Figure 2-2: Cabramurra (Marica) - Minimum and Maximum Temperatures

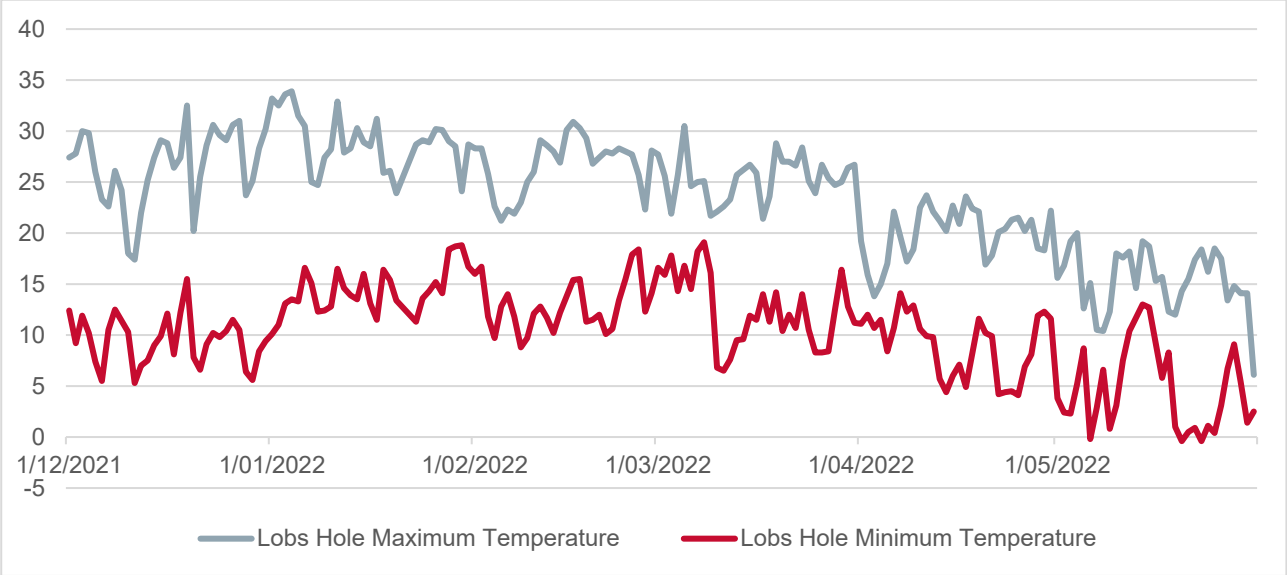


Figure 2-3: Lobs Hole - Minimum and Maximum Temperatures

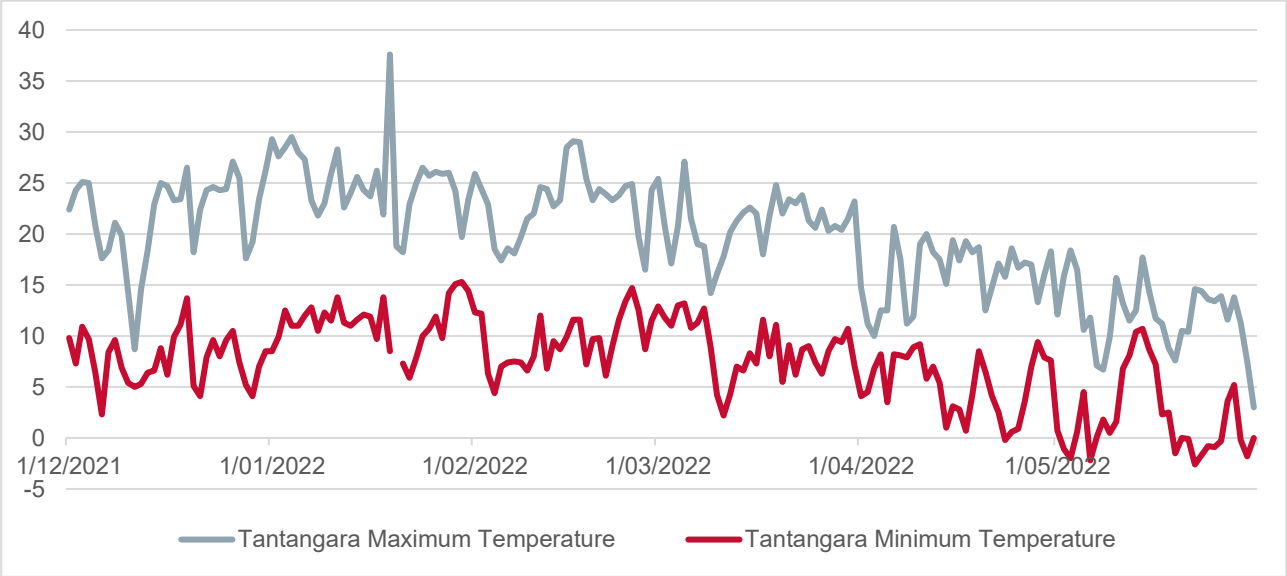


Figure 2-4: Tantangara - Minimum and Maximum Temperatures

3. MONITORING RESULTS

3.1. January 2020 Bushfire

As noted in previous monitoring updates for EPL 21266, the January 2020 bushfires severely impacted the area surrounding Snowy 2.0 construction works. Generally, bushfires have a significant impact on catchment hydrology and water quality. Impacts are highly variable and are primarily

influenced by fire severity, the extent of catchment impacted and rainfall patterns that occur in the months following the fire (Smith 2011).

Briefly, post fire rainfall can result in significant wash off events resulting in water quality issues including (eWater CRC and Smith 2011):

- High runoff rates and increased soil erodibility can result in significant erosion of gullies and the general landform.
- High sediment loads can result in increased turbidity and sedimentation in downstream waterways. Severe sedimentation impacts are most likely to occur in waterways that are immediately downstream of fire affected areas.
- High loads of dissolved organic material and leaf litter can occur in wash off. Dissolved organic matter is readily degraded microbially, which can lead to anoxic conditions in poorly flushed water bodies. Anoxic conditions can lead to so called 'black water' conditions that are characterised by low dissolved oxygen, sulphur like odours and water discolouration. These conditions can have a significant impact on aquatic life.
- High loads of nutrients (mostly phosphorus) can result in eutrophic conditions and potentially algae blooms in poorly flushed water bodies.
- High loads of metals such as iron, copper, zinc, chromium, arsenic and lead and inorganics such as cyanide can enter waterways; and
- Loss of riparian vegetation can reduce natural sediment capture buffers, habitat and increase water temperatures.

3.2. December 2021 – May 2022 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.

3.3. 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	
2021					

Dec	13	15	5	1	Exceedances in samples are representative of background conditions in December 2021 with minimal recorded rainfall one week prior to sampling of 7.2 mm in Lobs Hole and 3.6 mm in Tantangara.
2022					
Jan	25	7	5	1	Low DO, pH, and EC are representative of background conditions for January 2022.
Feb	4	9	15	3	Low DO, pH, and EC are representative of background conditions for February 2022. Elevated DO is within range of previous results. Both DO and turbidity reflect the recent inflows resulting from the significant rainfall.
Mar	17	4	3	3	Low DO and EC are representative of background conditions for March 2022 and are consistent with previous results. Elevated turbidity is less than January and February 2022. pH is within the range of WQO for baseline data and is generally representative of background conditions.
Apr	6	0	8	1	A number of samples were collected however due to a software malfunction, these results were not saved. The pH is generally representative of background conditions. DO is lower than previously recorded and was monitored in accordance with TARP process.
May	21	13	9	3	DO and pH are within the range of WQO for baseline data and are representative of background conditions. DO was significantly elevated compared to previous months for a number of locations. Low DO and EC, and elevated turbidity are representative of background conditions for May 2022 and are consistent with previous results for a number of locations.

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

In general, the results were within the Water Quality Objectives (WQO), with greatest exceedances noted during the March rain event including 22.2 mm of rain between 06 - 09 March 2022 in Lobs Hole and 50.6 mm of rain between 01 - 09 March 2022. Erosion caused by rainfall increases the likelihood of altering the physical parameters of watercourses, especially considering impacts to vegetation and soils since the bushfires of January 2020.

Throughout the Quarter, several higher-than-average rainfall events were experienced at all sites (Figure 2-1), including:

- 7 – 11 December (34.8 mm Lobs Hole, 32.2 mm, Tantangara, 41.2 mm Marica)
- 16 – 20 December (58.2 mm Lobs Hole, 31.8 mm, Tantangara 66.2 mm Marica)
- 4 – 8 January (72.2 mm Lobs Hole, 42.6 mm Tantangara, 64.4 mm Marica)
- 12 – 16 January (42.2 mm Lobs Hole)
- 14 – 18 January (91.4 mm Marica)
- 27 – 1 February (86.6 mm Tantangara)
- 29 January – 2 February (90.2 mm Lobs Hole, 71.4 mm Marica)
- 24 – 28 February (54.6 mm Tantangara)
- 6 – 10 March (46 mm Tantangara)
- 7 – 11 April (38 mm Tantangara)
- 20 – 24 April (43 mm Lobs Hole, 37 mm Tantangara)
- 12 – 16 May (28.4 mm Marica, 32.2 mm Lobs Hole, 30.8 mm Tantangara)
- 27 – 31 May (54 mm Marica, 49.8 mm Lobs Hole)

Exceedances of the water quality objectives were present in the upstream, downstream and basin sampling locations. When downstream and basin results were compared to the predicted discharge quality characterises, exceedances were consistent with the likely ranges.

Water samples were collected for comprehensive water testing and the EPA were notified of the releases in accordance with R4.1 of EPL 21266.

Dissolved oxygen (DO%) and Electrical Conductivity (EC µS/cm) numbers show variance from the WQO with consistency across the 6 months. Where values occurred outside the WQO range - they were noted to be both upstream, downstream of the Snowy 2.0 construction envelope. It has been determined that these exceedances are not impacts resulting from Snowy 2.0 work activities and are indicative of existing background conditions rather than impacts from the project.

3.4. Groundwater Monitoring

Groundwater sampling was undertaken in February and May 2022. Due to safe access restrictions, groundwater piezometer data is currently unavailable for Q2 period. This report will be updated once the groundwater data is obtained.

Analyte concentrations that exceed or are outside the range of relevant water quality trigger values are presented in **Appendix C**. Generally, Laboratory analytes in February and May 2022 were less than, or within, relevant water quality trigger values except for:

- Nitrogen (total);
- Aluminimum (filtered);
- Copper (filtered);
- Iron (filtered);
- Nickel (filtered); and
- Zinc (filtered).

Nitrogen and Aluminium exceeded the relevant water quality objectives in two groundwater boreholes, whereas Iron, Nickel, Zinc and Copper generally exceeded the relevant water quality trigger values in groundwater in the majority of boreholes. Although exceedances are noted:

- Groundwater quality was generally within the previously noted results and background range.
- Localised differences in monitoring bores situated in fractured rock aquifers should be expected as differences in fracture size, frequency and connectivity all affect the aquifer flow and transmission of geochemistry into groundwater.
- Tailrace tunnelling commenced at Lobs Hole in June 2021. Groundwater modelling suggests that construction activities are not likely to impact the surrounding environment until approximately 3 to 4 years into the Snowy 2.0 project.
- Significant wet weather events were experienced throughout summer and autumn with the continuation of the La Nina during this reporting period. This would have caused groundwater recharge through fire impacted areas, which could have led to the increased concentrations of some metals as similar increases in metals have been observed in surface water on site.

Based on the information above, groundwater exceedances between December 2021 to May 2022 data are not impacts resulting from Snowy 2.0 work activities and are indicative of background data. These exceedances did not trigger the need for further sampling, remedial actions or TARPs.

3.5. Surface Water

Surface water monitoring has been split up into:

- Talbingo and Tantangara Reservoirs;

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

3.5.1. 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 December 2021 to May 2022 were less than, or within, relevant water quality trigger values except for:

- Nitrite + Nitrate as N;
- Nitrogen;
- Aluminium (filtered);
- Copper (filtered);
- Chromium;
- Cyanide;
- Lead;
- Iron; and
- Zinc (filtered).

The monitoring results demonstrate that the water quality in the Tantangara and Talbingo Reservoir has consistency across multiple EPL monitoring events with the exceedances not shown to have increased since the onset of the proximal construction of Snowy 2.0. Elevated nitrogen, nitrates, and faecal coliform presence are likely due to the algae blooms in the reservoir which can affect the results.

The exceedances to the water quality objectives within the Talbingo and Tantangara Reservoirs 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.

3.5.2. 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 December 2021 and May 2022 were less than, or within, relevant water quality trigger values except for:

- Nitrite + Nitrate as N;
- Cyanide;
- Nitrogen;
- Aluminium (filtered);
- Chromium (filtered);
- Copper (filtered);
- Nickel (filtered); and

- Zinc (filtered).

The monitoring results demonstrate that the water quality in Lobs Hole has consistency across multiple EPL monitoring events with the exceedances not shown to have increased since the onset of the proximal construction of Snowy 2.0. Increased metals are likely to be a by-product of the 2020 bushfires as outlined in section 3.1 and in detail within EPL 21266 Quarterly December 2019 (Pre-Bushfire) - February 2020 (Post-Bushfire).

The exceedances to the water quality objectives within the Lobs Hole 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.

3.5.3. 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, Laboratory analytes in December 2021 and May 2022 were less than, or within, relevant water quality trigger values except for:

- Nitrite + Nitrate as N;
- Cyanide;
- Nitrogen; and
- Zinc (filtered).

The monitoring results demonstrate that the water quality in the Marica has consistency across multiple EPL monitoring events with the exceedances not shown to have increased since the onset of the proximal construction of Snowy 2.0.

The exceedances to the water quality objectives within the Marica surface waters are natural in origin 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.

3.5.4. 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, Laboratory analytes in December 2021 and May 2022 were less than, or within, relevant water quality trigger values except for:

- Nitrite + Nitrate as N;
- Cyanide;
- Nitrogen (total);
- Aluminium (filtered);
- Copper (filtered);
- Chromium (filtered);
- Iron (filtered); and

- Zinc (filtered).

The monitoring results demonstrate that the water quality in the Tantangara has consistency across multiple EPL monitoring events with the exceedances not shown to have increased since the onset of the proximal construction of Snowy 2.0. Increased metals are likely to be a by-product of the 2020 bushfires as outlined in section 3.1 and in detail within EPL 21266 Quarterly December 2019 (Pre-Bushfire) - February 2020 (Post-Bushfire). There are fewer exceedances within Tantangara samples compared to that of Lobs Hole which can be attributed to the lower impacts of fire damage in the area.

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.

3.5.5. 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, Laboratory analytes in December 2021 and May 2022 were less than, or within, relevant water quality trigger values with the exception of:

- Nitrite + Nitrate as N;
- Cyanide (total);
- Nitrogen (total);
- Aluminium (filtered);
- Asenic (filtered);
- Chromium (filtered);
- Copper (filtered);
- Iron (filtered); and
- Zinc (filtered).

Minimal construction works were completed between December 2021 and May 2022 at Rock Forest Area. 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 as a by-product of the 2020 bushfires as outlined in section 3. and in detail within EPL 21266 Quarterly December 2019 (Pre-Bushfire) - February 2020 (Post-Bushfire) as well as linked to historic pesticides and agricultural practices.

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.

4. DISCUSSION

4.1. EPA Notifiable Events

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

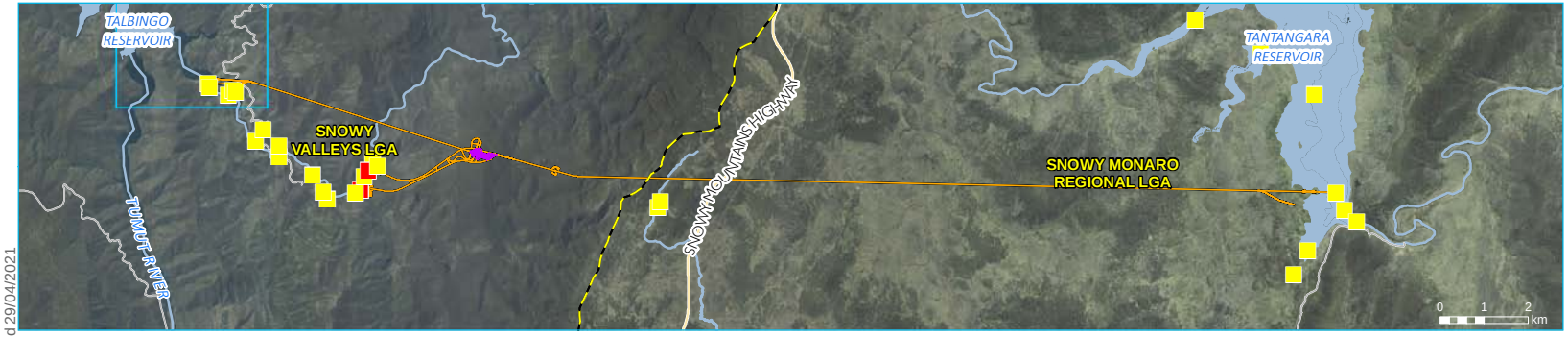
Table 4-1: Events Triggering TARP Implementation and EPA Notification

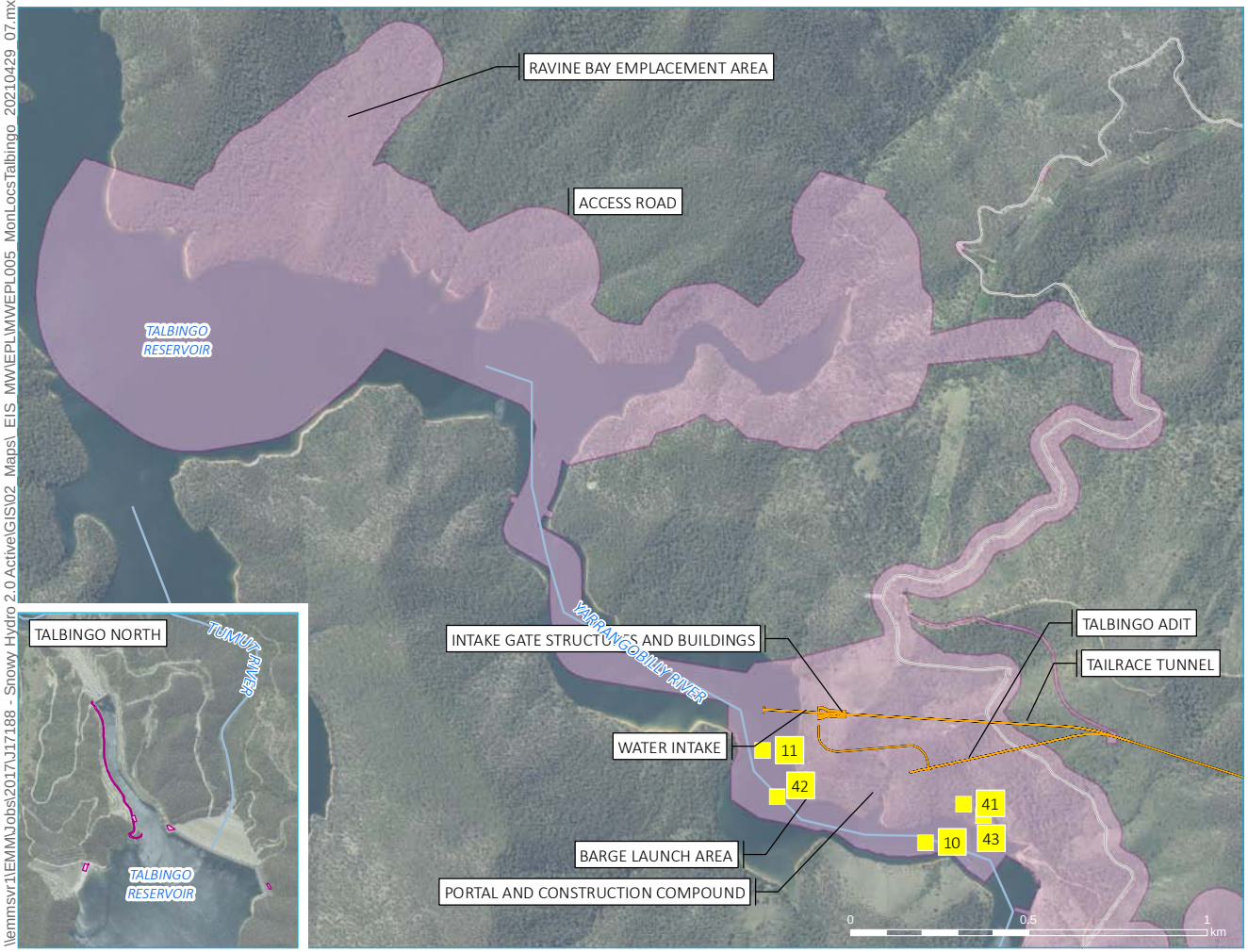
Date	Location	Event ID	Event	Outcome
19/12/2021	Lobs Hole	S2-FGJV-ENV-INC-1140	Failure of clean water drain level spreader	Water sampling undertaken upstream and downstream of the discharge point. Immediate remedial actions were taken to direct water flow down rock lined chute. Rectification works completed to fix scouring of the batter chute.
29/01/2022	Lobs Hole	S2-FGJV-ENV-INC-1218	Failure of clean water drain level spreader	Water sampling undertaken upstream and downstream of the discharge point. Sediment controls installed at bottom of slope to mitigate further sedimentation. Follow up meeting with wider team to discuss immediate actions and planning for further permanent rectification.
31/01/2022	Marica	S2-FGJV-INC-1222	Sediment laden water entering creek	Pump and sprinkler switched off. Water sampling undertaken upstream, downstream and within the source. Review of dewatering plan and operations for Marica Trail including new sprinkler systems ordered and existing systems decommissioned until new equipment arrives on site.
02/03/2022	Marica	S2-FGJV-INC-1309	Sediment laden water entering creek	Pump and sprinkler switched off. Water sampling undertaken upstream, downstream and within the source. Review of dewatering plan and operations for Marica Trail including new sprinkler systems ordered and existing systems decommissioned until new equipment arrives on site.
30/04/2022	Marica	S2-FGJV-ENV-INC-1439	Basin over topping	Water sampling undertaken. Desilting of sediment basin carried out.

4.2. Recommendations

During February 2022, the EPA recommended a Water Monitoring Program be developed for MAT spoil stockpile area. Short- and long-term measures were implemented in accordance with the PRP. In May 2022 the EPA considered it appropriate to remove the PRP.

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

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

GDA 1994 MGA Zone 55

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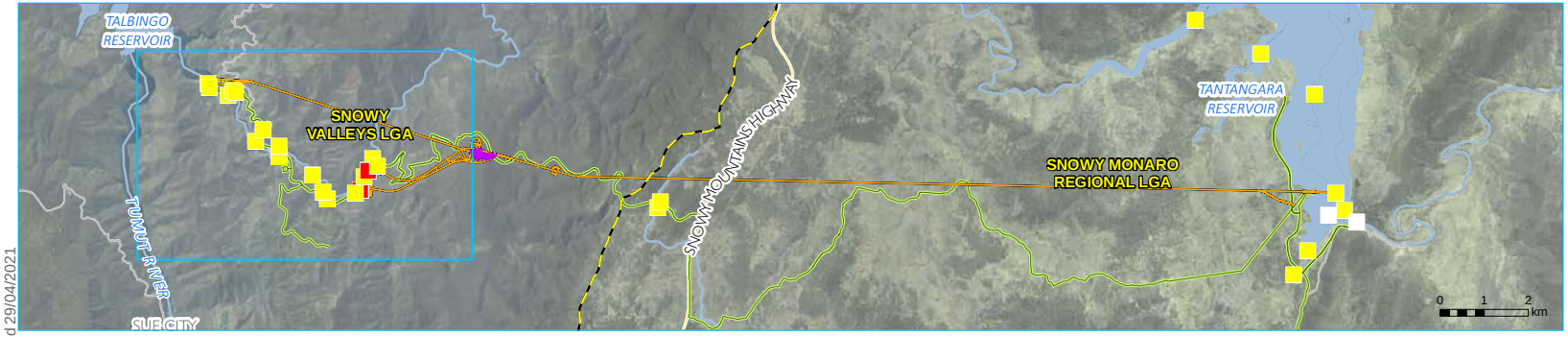

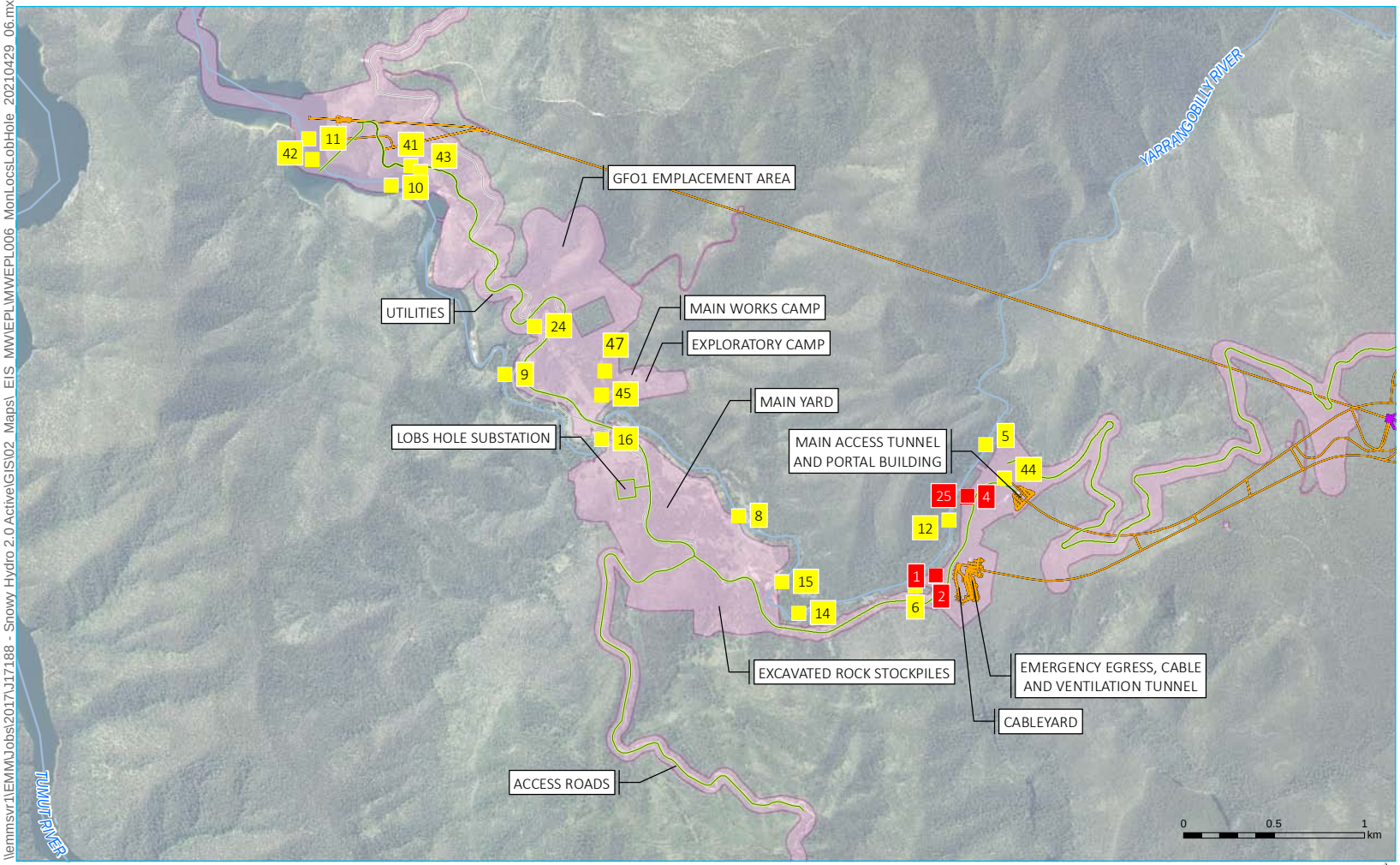

KEY

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

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

GDA 1994 MGA Zone 55

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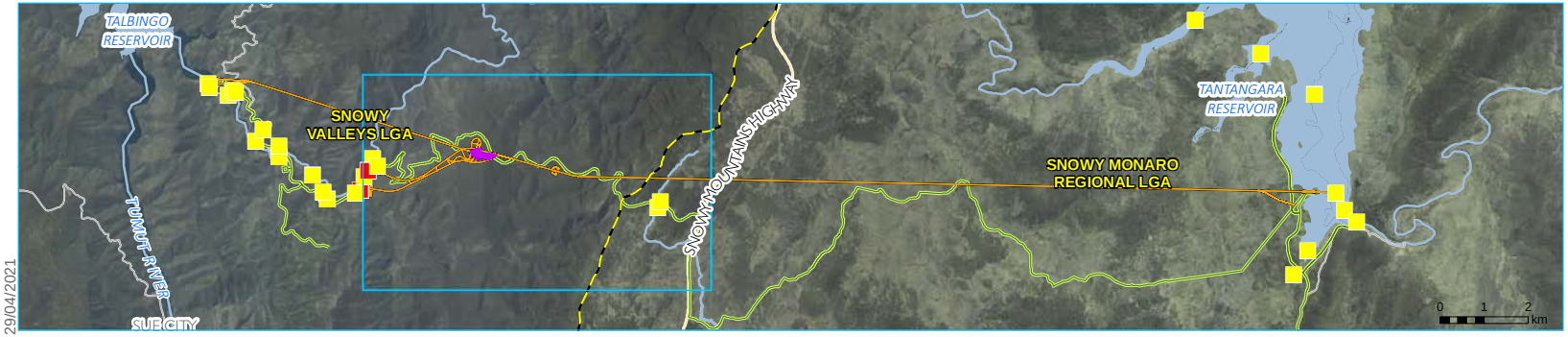

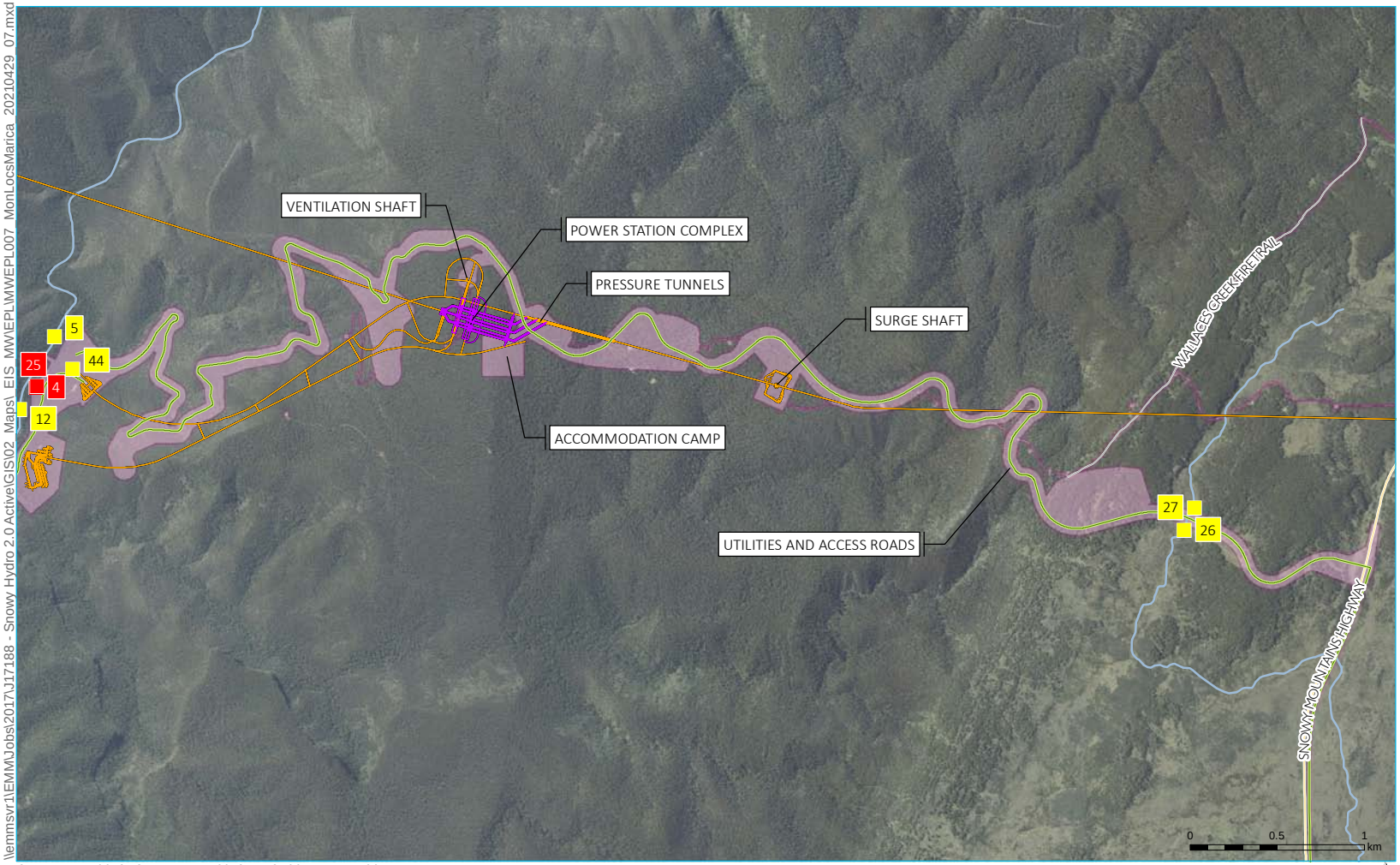

KEY

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 - Marica

Snowy 2.0
Main Works
Figure 3

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

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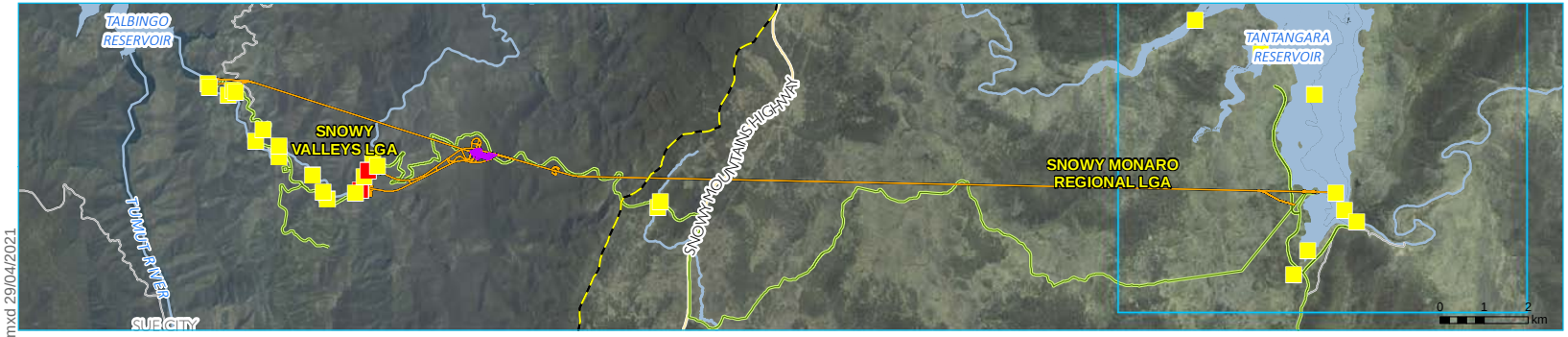

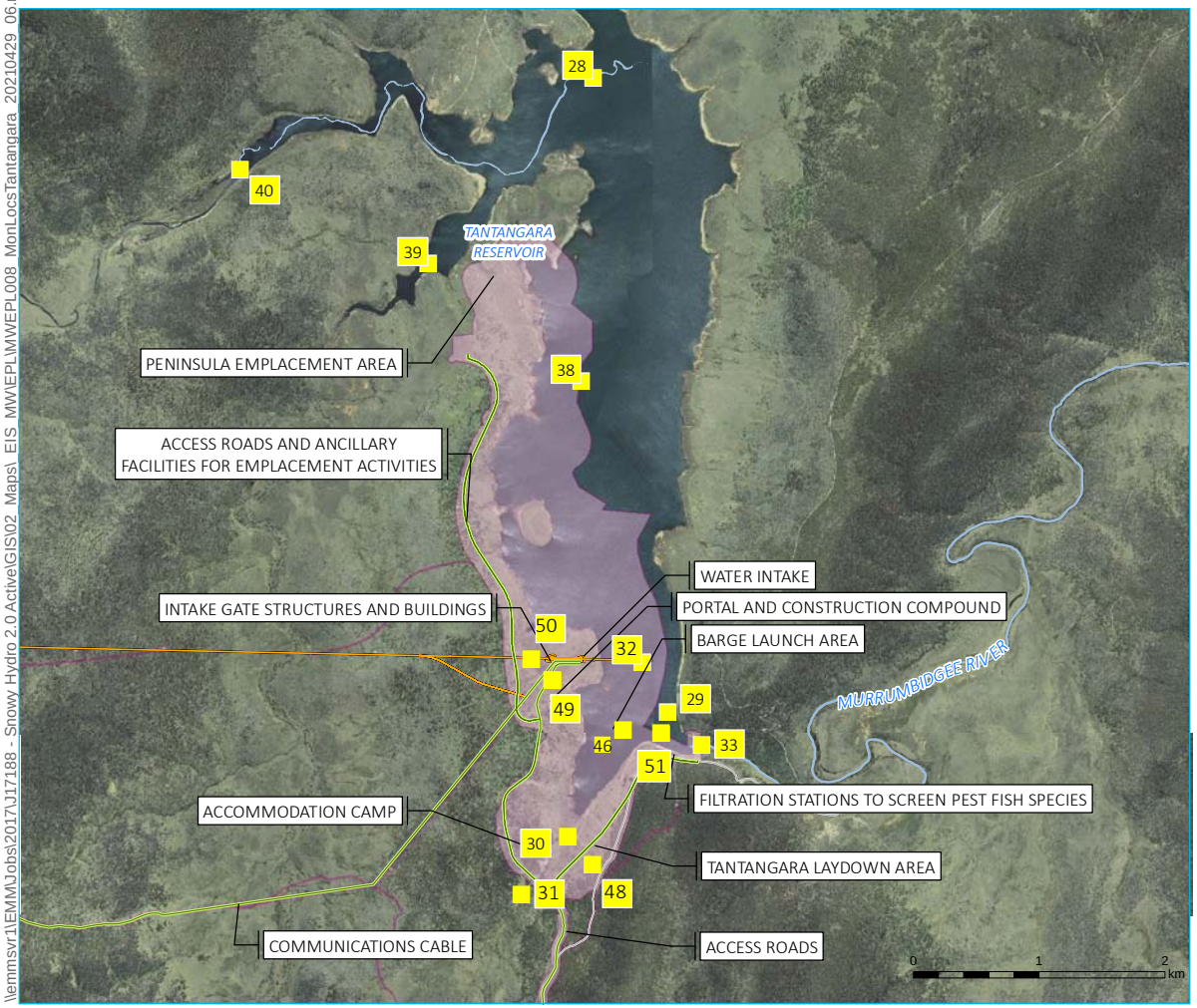

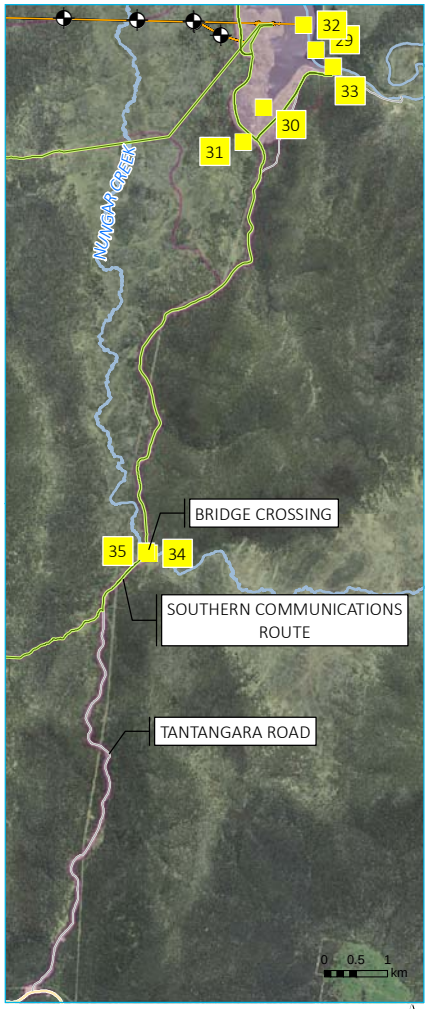

KEY

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 - 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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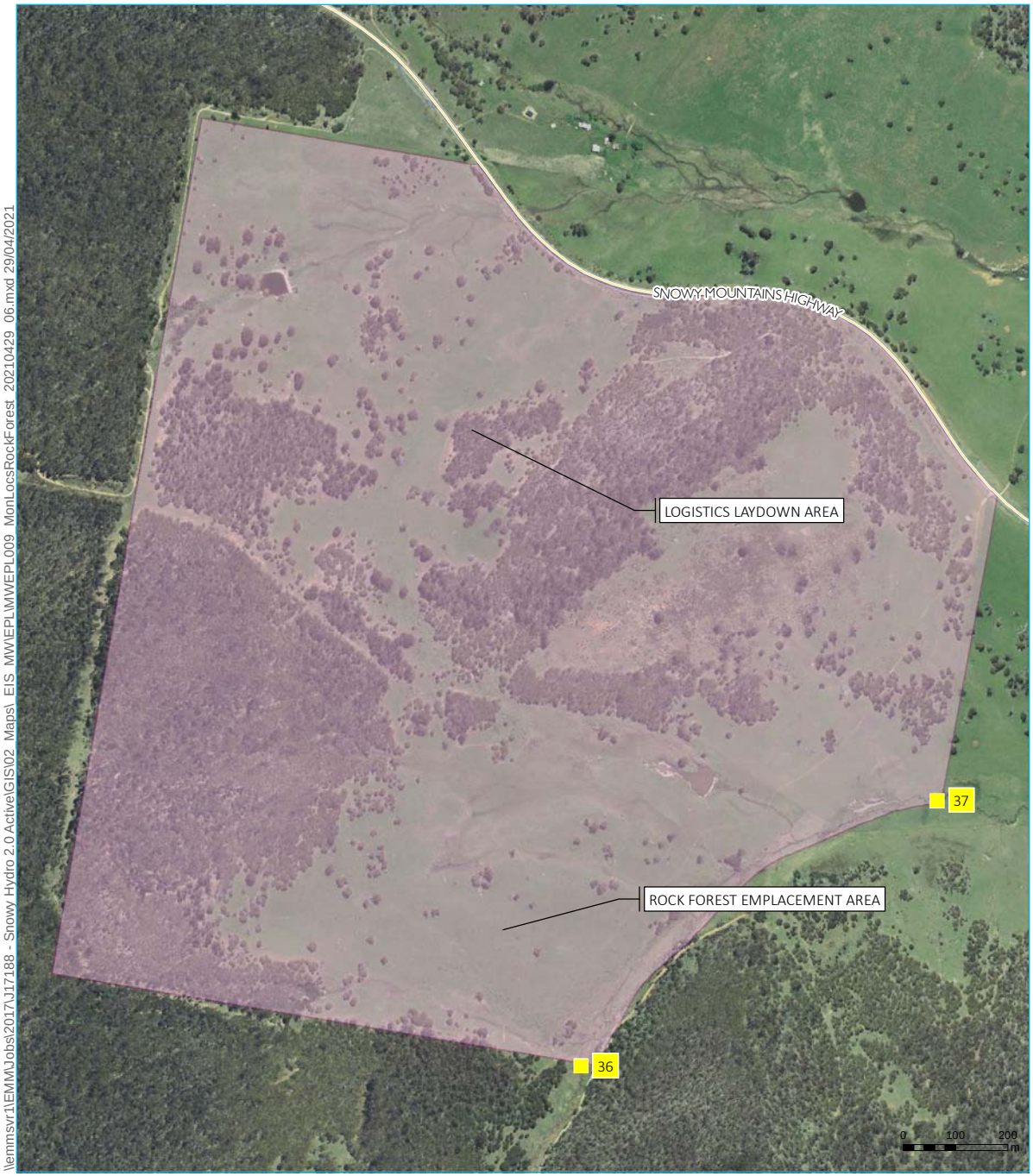

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KEY

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

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

December 2021 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring 5-7 December 2021

Future Generation
Webuild • Clough • Lane

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
5/12/2021, 8:15 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	13.75	99	10.26	73	47	7.59	201	4.91	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 8:30 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	13.9	93.1	9.62	76	49	7.79	153	4.82	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 9:00 am	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	12.11	93.8	10.08	86	56	7.96	215	3.62	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 9:30 am	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	14.08	96.4	9.92	88	57	7.96	225	4.9	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 10:00 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	14.26	96	9.83	79	52	7.99	218	4.66	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 10:30 am	EPL14	Yarrangobilly River, downstream of road construction areas	14.47	91.6	9.34	88	57	7.99	227	4.49	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 1:00 pm	EPL15	Yarrangobilly River, downstream of road construction areas	16.21	94.4	9.27	80	52	7.99	201	5.1	Medium flow, not turbid, no recent rainfall	-
5/12/2021, 1:30 pm	EPL16	Yarrangobilly River, downstream of road construction areas	17.1	105.4	10.16	79	51	7.95	183	4.37	Medium flow, not turbid, no recent rainfall.	-
5/12/2021, 2:20 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	19.28	70.8	6.53	71	46	7.34	72	26.5	Low flow, slightly cloudy, no recent rainfall	DO is within baseline range and is representative of low flow conditions. The source of the slightly elevated turbidity is due to the nature of the swirling water effect among the rocks where the sample was collected.
5/12/2021, 8:07 am	EPL26	Eucumbene River downstream of Marica Road	9.7	88.7	10.08	22	20.15	7.18	130.5	6.38	QA-MAR was taken here. Medium flow. Clear	This location is upstream of works and is therefore representative of background conditions and with data outside the range of WQO noted are within relative ranges of baseline data.
5/12/2021, 8:11 am	EPL27	Eucumbene River upstream of Marica Road	9.7	89.2	10.14	21.5	19.5	6.04	209.8	4.66	Medium flow. clear.	Data outside the range of WQO are similar to background conditions and are within relative ranges of baseline data.
5/12/2021, 12:26 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	12.1	84.1	9.04	13.9	11.7	6.35	202.2	5.7	Fast flowing. clear.	DO, EC, and pH are representative of background conditions in December 2021 and are withing baseline ranges.
5/12/2021, 12:35 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	12.2	85.2	9.15	13.5	11.7	6.7	187.4	4.71	High flow clear. QA TAN was taken here.	This location is upstream of works and is therefore representative of background conditions.
5/12/2021, 1:58 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	14.8	93.5	9.47	16.7	13.65	6.34	471.8	5.58	Clear flow from Dam spillway	EC and pH are representative of background conditions in December 2021 and are withing baseline ranges.
5/12/2021, 2:34 pm	EPL34	Nungar Creek, upstream of Tantangara Road	12.3	89.8	9.61	15.4	13	6.77	294.3	7.1	-	This location is upstream of works and is therefore representative of background conditions.
5/12/2021, 2:38 pm	EPL35	Nungar Creek, downstream of Tantangara Road	12.5	90.7	9.67	16.7	14.3	6.6	281.6	6.2	-	EC is representative of background conditions at this location and within baseline range.
5/12/2021, 3:58 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	18.2	61.8	5.8	34.5	26.0	6.6	242.8	3.94	Medium flow. very clear. organics in water.	This location is upstream of works and is therefore representative of background conditions.
5/12/2021, 4:36 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	18.8	88.9	8.3	48.7	35.8	6.7	209.5	6.14	Medium flow and clear. cattle and car traffic	DO is within baseline range.

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
7/12/2021, 12:30 pm	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	20.6	102	9.16	42.2	30	7.5	217.3	2.55	Not turbid, still water	EC is within range of previous results for this location.
7/12/2021, 12:05 pm	EPL11	Talbingo Reservoir, downstream of outlet	20.3	101.5	9.17	40.5	29	7.54	230.2	2.72	Not turbid, still water	EC is within range of previous results for this location.
6/12/2021, 12:51 pm	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	16.5	83.1	8.12	17.9	13.6	6.74	240	6.19	Overcast. Wind is moderate. No recent rain previous 4 days clear water reservoir level medium to high. sample taken approximately 1km downstream due to water level.	This location is upstream of works and is therefore representative of background conditions.
6/12/2021, 1:44 pm	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	16.9	89.1	8.63	17.4	13.6	6.89	228.5	2.58	Overcast. QA-TAN-1 TAKEN HERE. No recent rain previous 4 days clear water reservoir level medium to high.	DO and EC are representative of background conditions in Tantangara Reservoir for December 2021.
6/12/2021, 1:40 pm	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	16.8	87.7	8.51	17.4	13.6	6.79	234.6	3.23	Overcast. No recent rain previous 4 days clear water reservoir level medium to high.	DO and EC are representative of background conditions in Tantangara Reservoir for December 2021.
6/12/2021, 1:15 pm	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	16.7	86	8.36	17.3	13.6	6.84	220.9	3.65	Overcast. No recent rain previous 4 days clear water reservoir level medium to high.	DO and EC are representative of background conditions in Tantangara Reservoir for December 2021.
6/12/2021, 12:35 pm	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	13.7	87.2	9.04	15	12.3	6.49	255.2	3.41	Overcast. No recent rain previous 4 days clear water reservoir level medium to high. sample taken approximately 1km downstream due to water level.	This location is upstream of works and is therefore representative of background conditions.
6/12/2021, 11:56 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	13	91.4	9.63	17.5	14.95	6.45	290.4	2.98	Overcast. No recent rain previous 4 days clear water reservoir level medium to high. sample taken approximately 1km downstream due to water level.	This location is upstream of works and is therefore 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	-	-

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
7/12/2021, 12:14 pm	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	21.05	101.4	9.03	34	22	8.9	179	0.4	RO plant out of service and has not processed water for a week	Water is not being discharged at this time.

Notes:

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.

January 2022 EPL 21266 In Situ Water Quality Measurements
EPL Monthly Monitoring 9 - 11 January 2022

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	Context
8/1/2022, 10:00 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	15.77	69.3	6.9	49.0	0.032	7.0	220.0	17.8	Rain in the last 24 hours, medium-strong flow, dark hue	This location is upstream of works and is therefore representative of background conditions.
8/1/2022, 1:30 pm	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	21.01	60.4	5.4	86.0	0.056	8.2	176.0	5.7	-	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored. pH is within previous WQO range and is generally representative of baseline conditions for January 2022.
9/1/2022, 12:45 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	19.65	60.4	5.5	77.0	0.05	8.1	184.0	7.6	Rain in the last 48 hours, dark brown hue, medium flow	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored. pH is within previous WQO range and is generally representative of baseline conditions for January 2022.
10/1/2022, 9:10 am	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	17.82	62	5.9	80.0	0.052	8.0	178.0	6.1	Rain in the last 72 hours, medium flow, brown hue	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
8/1/2022, 11:00 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	16.61	67.3	6.6	51.0	0.033	7.8	208.0	17.9	Dark brown hue, rain in the last 24 hours, medium-strong flow	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
10/1/2022, 7:10 am	EPL14	Yarrangobilly River, downstream of road construction areas	17.24	61.8	5.9	79.0	0.051	7.9	186.0	6.6	Rain in the last 72 hours, brown hue, medium flow	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
8/1/2022, 2:30 pm	EPL15	Yarrangobilly River, downstream of road construction areas	19.4	66.0	6.1	55.0	0.036	7.9	183.0	15.2	Rain in the last 24 hrs, dark brown hue, medium-strong flow, QA-LOB-01	DO is lower than previously recorded and will be monitored in accordance with TARP process.
10/1/2022, 8:20 am	EPL16	Yarrangobilly River, downstream of road construction areas	17.42	57.5	5.5	80.0	0.052	7.9	182.0	5.4	Rain in the last 72 hours, brown hue, medium flow	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
10/1/2022, 9:45 am	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	19.45	55.0	5.1	80.0	0.052	7.5	95.0	247.0	Rain in the last 72 hours, milky colour, turbid, low flow	DO is within baseline range and is representative of low flow conditions. Elevated turbidity will be monitored in accordance's with TARP process.
10/1/2022, 4:02 pm	EPL26	Eucumbene River downstream of Marica Road	18.9	79.3	7.4	26.7	19.5	6.8	174.3	6.4	-	Low DO and EC are representative of background conditions at this location for January 2022.
10/1/2022, 3:52 pm	EPL27	Eucumbene River upstream of Marica Road	18.9	81.3	7.6	26.7	19.5	6.6	169.4	5.9	QA-MAR01 taken here	This location is upstream of works and is therefore representative of background conditions.
10/1/2022, 2:05 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	18.1	86.9	8.2	21.6	16.25	6.7	255.0	9.6	-	Low DO and EC are representative of background conditions at this location for January 2022.
10/1/2022, 1:39 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	17.4	89.6	8.6	18.7	14.3	6.7	166.9	7.4	QA-TAN02 taken here	This location is upstream of works and is therefore representative of background conditions.
10/1/2022, 2:33 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	21.1	85.1	7.6	20.7	14.3	6.6	317.4	4.1	-	Low DO and EC are representative of background conditions at this location for January 2022.
9/1/2022, 3:20 pm	EPL34	Nungar Creek, upstream of Tantangara Road	19.6	82.1	7.5	15.9	11.79	5.8	259.3	5.9	-	This location is upstream of works and is therefore representative of background conditions.
9/1/2022, 3:07 pm	EPL35	Nungar Creek, downstream of Tantangara Road	19.5	80.9	7.4	16.4	11.7	6.2	18.4	5.9	-	Low DO, pH, and EC are representative of background conditions for January 2022.
9/1/2022, 4:14 pm	EPL36	Camerons Creek, upstream of works in Rock Forest	23	44.5	3.8	45.4	30.55	6.4	277.3	4.4	-	This location is upstream of works and is therefore representative of background conditions.
9/1/2022, 3:55 pm	EPL37	Camerons Creek, downstream of works in Rock Forest	24.5	76.9	6.4	46.1	30.55	6.1	233.3	8.3	-	Low DO and pH are representative of background conditions for January 2022.

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
11/1/2022, 4:30 pm	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	26.07	102.9	8.34	66.0	8.34	9.4	143	7.9	-	-
11/1/2022, 4:00 pm	EPL11	Talbingo Reservoir, downstream of outlet	25.95	120.6	9.79	64.0	0.042	9.5	157	8.4	-	Elevated DO is within range of previous results for this location.
11/1/2022, 10:08 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	21.9	81.9	7.2	21.2	14.95	7.0	126.7	2.2	Clear water. Raining	This location is upstream of works and is therefore representative of background conditions.
11/1/2022, 10:36 am	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	20.4	81.7	7.4	20.2	14.3	6.6	188.1	2.7	Raining. Clear water	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
11/1/2022, 10:28 am	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	20.4	77.7	7.0	20.2	14.3	6.9	167.7	2.5	Clear water. Raining	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
11/1/2022, 10:18 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	21.7	80.6	7.1	20.8	14.3	6.9	155.9	2.1	Clear water. Raining	Low DO is representative of the background conditions in January 2022 though a decreasing trend is becoming apparent and will be monitored.
11/1/2022, 9:30 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	20.7	75.6	6.8	18.4	13	7.1	184.8	2.9	Clear water	This location is upstream of works and is therefore representative of background conditions.
11/1/2022, 9:45 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	18.2	76	7.2	21.9	16.25	6.3	226.9	3.2	QA-TAN03 collected on this sample. Clear water	This location is upstream of works and is therefore 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	-	-

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
7/12/2021, 12:14 pm	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	25.02	95.5	7.89	67	0.04	6.6	256	0.4	RO plant out of service and has not processed water for a week	Water was not being discharged at this time.

Notes:

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.

February 2022 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring 01-02 February 2022

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	Context
1/2/2022, 10:10 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	17.23	94.3	9.1	47.0	0.031	7.5	128.0	37.2	Heavy rain in the last 72 hours, medium flow, brown hue	This location is upstream of works and is therefore representative of background conditions.
1/2/2022, 2:00 pm	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	20.57	90.7	8.2	56.0	0.036	8.2	104.0	4.2	Heavy rain in the last 72 hours, clear, medium-low flow	pH is within the range of WQO for baseline data and is generally representative of background conditions.
1/2/2022, 3:30 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	19.94	91	8.3	52.0	0.034	8.1	119.0	17.6	Heavy rain in the last 72 hours, brown hue, medium flow	pH is within the range of WQO for baseline data and is generally representative of background conditions.
1/2/2022, 4:30 pm	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	20.2	96.8	8.8	50.0	0.033	8.1	124.0	19.7	Heavy rain in the last 72 hours, brown hue, medium flow	pH is within the range of WQO for baseline data and is generally representative of background conditions.
1/2/2022, 9:40 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	17.07	99.7	9.6	48.0	0.031	7.8	162.0	21.5	Heavy rain in the last 72 hours, medium flow, brown hue	-
1/2/2022, 2:30 pm	EPL14	Yarrangobilly River, downstream of road construction areas	19.56	93.7	8.6	50.0	0.033	8.1	-92.0	17.2	Heavy rain in the last 72 hours, slightly turbid, brown hue	pH is within the range of WQO for baseline data and is generally represtative of background conditions.
1/2/2022, 3:00 pm	EPL15	Yarrangobilly River, downstream of road construction areas	19.62	95.0	8.7	49.0	0.032	8.1	117.0	16.9	Heavy rain in the last 72 hours, medium flow, brown hue, QA-LOB	DO is lower than previously recorded and will be monitored in accordance with TARP process.
1/2/2022, 6:00 pm	EPL16	Yarrangobilly River, downstream of road construction areas	20.03	90.4	8.2	50.0	0.032	7.9	96.0	23.9	Heavy rain in the last 72 hours, brown hue, medium flow	-
1/2/2022, 5:30 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	23.75	75.7	6.4	55.0	0.036	7.2	12.0	168.0	Heavy rain in the last 72 hours, milky pale colour, turbid, low flow	DO is within baseline range and is representative of low flow conditions. Elevated turbidity will be monitored in accordance's with TARP process.
1/2/2022, 11:48 am	EPL26	Eucumbene River downstream of Marica Road	14.2	85.4	8.8	27.4	22.1	5.9	221.2	6.0	-	Low DO, EC, and pH are representative of background conditions at this location for January 2022.
1/2/2022, 12:00 pm	EPL27	Eucumbene River upstream of Marica Road	13.8	54.4	5.6	11.0	9.1	5.9	200.3	7.1	-	This location is upstream of works and is therefore representative of background conditions.
1/2/2022, 8:45 am	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	13.8	83.6	8.7	22.4	18.85	6.3	200.7	9.2	-	Low DO, EC, and pH are representative of background conditions at this location for January 2022.
1/2/2022, 8:15 am	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	13.4	82.9	8.7	19.8	16.25	6.1	232.9	9.3	-	This location is upstream of works and is therefore representative of background conditions.
1/2/2022, 9:13 am	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	19.4	71.7	6.6	39.1	28.6	6.6	178.5	9.2	-	Low DO is representative of background conditions at this location for February 2022 but will be monitored.
1/2/2022, 9:47 am	EPL34	Nungar Creek, upstream of Tantangara Road	16.4	81.8	8.0	17.2	13.65	6.4	200.0	6.6	-	This location is upstream of works and is therefore representative of background conditions.
1/2/2022, 9:57 am	EPL35	Nungar Creek, downstream of Tantangara Road	16.4	83.3	8.1	17.1	13	6.4	192.1	8.3	-	Low DO, pH, and EC are representative of background conditions for February 2022.
1/2/2022, 7:10 am	EPL36	Camerons Creek, upstream of works in Rock Forest	16.7	50.3	4.9	23.7	18.2	6.6	187.8	6.4	-	This location is upstream of works and is therefore representative of background conditions.
1/2/2022, 6:50 am	EPL37	Camerons Creek, downstream of works in Rock Forest	16.5	57.4	5.6	37.0	28.6	6.6	193.6	7.4	-	Low DO is representative of background conditions for January 2022.

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
2/2/2022, 8:15 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	24.5	141.1	11.77	65.0	42	9.7	115	33.7	Water green with evidence of algal blooms the previous week or two following high temperatures Heavy rain previous night and ~80mm the last 5 days	Elevated DO is within range of previous results for this location. Both DO and turbidity reflect the recent inflows resulting from the significant rainfall.
2/2/2022, 9:00 am	EPL11	Talbingo Reservoir, downstream of outlet	24.63	135.2	11.25	64.0	41	9.8	93	29.9	Water green with evidence of algal blooms the previous week or two following high temperatures. Heavy rain previous night and ~80mm the last 5 days	Elevated DO is within range of previous results for this location. Both DO and turbidity reflect the recent inflows resulting from the significant rainfall.
2/2/2022, 2:30 pm	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	21.34	88.3	7.8	24.0	16	7.4	148.0	4.9	Water appears clear. Over 80mm rain recorded the previous 5 days. Light winds NE winds.	This location is upstream of works and is therefore representative of background conditions.
2/2/2022, 3:20 pm	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	22.27	97.1	8.5	22.0	15	7.9	160.0	2.6	QA Tan 3 taken here. Water appears clear. Over 80mm rain recorded the previous 5 days. Light to fresh NE winds.	-
2/2/2022, 3:10 pm	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	22.5	98.5	8.5	23.0	15	8.1	160.0	3.3	Water appears clear. Over 80mm rain recorded the previous 5 days. Light to fresh NE winds.	-
2/2/2022, 2:50 pm	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	21.45	96.3	8.5	23.0	15	7.7	185.0	4.1	Water appears clear. Over 80mm rain recorded the previous 5 days. Light to fresh NE winds.	-
2/2/2022, 1:30 pm	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	21.86	94.3	8.3	22.0	15	7.4	167.0	6.5	QA Tan 1 taken here. Samples 350m downstream of epl point due to low water levels. Water appears clear. Over 80mm rain recorded the previous 5 days. Light winds NE winds.	-
2/2/2022, 2:00 pm	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	18.32	95.3	9.0	23.0	15	7.5	152.0	7.0	QA Tan 2 taken here. Samples 350m downstream of epl point due to low water levels. Water appears clear. Over 80mm rain recorded the previous 5 days. Light winds NE winds.	-

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	-	-

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
2/2/2022, 8:30 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	24.20	87.5	7.32	27	18.00	6.2	223	1.3	-	Water was not being discharged at this time.

Table 3 - Groundwater Quality Data
Groundwater

Water Quality Objectives (see note 4)							
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	Field Comments / Context	Context
1/2/2022, 11:30 am	EPL1	Wallace Creek Bridge	24.7	60.5	5.0	568	0.364	7.8	-133	55.1	Dip taken from bottom of the gatic. Slight grey hue.	Elevated EC is consistent and within range of previous data.
1/2/2022, 12:00 pm	EPL2	Wallace Creek Bridge	25.3	24.3	2.0	160	0.104	8.4	-55	572	Dip taken from the bottom of the gatic (top conjute). Slight sulphurous odour. Pale brown colour.	Elevated pH will be monitored in accordance with TARP procedure.
1/2/2022, 10:40 am	EPL4	Portal Access	20.1	31.5	5.2	357	-	7.4	-89	850	Dip taken from top of gatic cover. Milky grey sediment, turbidity reading taken from horiba, sulphurous odour, TDS measurement could not be obtained due to probe error.	Elevated EC is consistent and within range of previous data.
1/2/2022, 11:00 am	EPL25	Portal Access	22.9	21.9	1.9	229	0.148	7.0	-73	1000	Dip taken from top of gatic cover. Milky grey sediment with sulphurous odour. Turbidity over measurable range.	-

Notes:

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.

March 2022 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring 4-9 March 2022

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	Context
7/3/2022, 9:00 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	15.8	96.6	9.6	50.0	0.032	8.0	124.0	7.5	Rain in the last 48 hours, brown, medium flow	-
7/3/2022, 12:30 pm	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	19.45	87.3	8.0	76.0	0.05	8.3	118.0	2.3	Within 48hrs of rain, low to medium flow, clear hue	DO and pH are within the range of WQO for baseline data and pH generally representative of background conditions. DO will be monitored.
7/3/2022, 1:20 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	19.91	93.3	8.5	59.0	0.038	8.2	127.0	6.0	Within 48hrs of rain, medium flow, brown hue	pH is within the range of WQO for baseline data and is generally representative of background conditions.
8/3/2022, 10:30 am	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	17.94	95	9.0	64.0	0.041	8.0	127.0	4.6	Medium flow, dark brown, light rain whilst taking sample	-
7/3/2022, 10:50 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	16.71	95.3	9.3	51.0	0.033	8.1	137.0	7.1	Within 48hrs of rain, low to medium flow, brown	pH is within the range of WQO for baseline data and is generally representative of background conditions.
6/3/2022, 1:30 pm	EPL14	Yarrangobilly River, downstream of road construction areas	18.58	94.8	8.9	37.0	0.024	7.9	123.0	26.1	Rain in last 24hr, medium flow, dark brown hue, F5a-US	Collected as the upstream reference point of Basin F5a after an overtopping during a rain event.
6/3/2022, 1:00 pm	EPL15	Yarrangobilly River, downstream of road construction areas	18.25	95.1	9.0	37.0	0.024	8.0	112.0	40.6	Rain in last 24hrs, medium flow, dark brown hue, F5a/ds	Collected as the downstream reference point of Basin F5a after an overtopping during a rain event.
7/3/2022, 8:00 am	EPL16	Yarrangobilly River, downstream of road construction areas	15.94	101	10.0	51.0	0.033	8.0	108.0	8.4	Rain in the last 48 hours, medium flow, brown	-
8/3/2022, 1:00 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	19.5	56.1	5.2	107.0	0.069	7.1	62.0	32.6	Light rain whilst taking sample, low flow, slightly turbid	DO is within baseline range and is representative of low flow conditions. Elevated turbidity is less than January and February 2022 but will continue to be monitored.
5/3/2022, 10:03 am	EPL26	Eucumbene River downstream of Marica Road	13.6	83.6	8.6	30.9	25.2	7.6	14.0	5.2	-	Low DO is representative of background conditions for March 2022 and are consistent with previous results.
5/3/2022, 9:55 am	EPL27	Eucumbene River upstream of Marica Road	13.5	88	9.2	30.2	25.1	7.8	20.4	5.6	-	This location is upstream of works and is therefore representative of background conditions.
7/3/2022, 11:32 am	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	15.8	86.2	8.5	24.3	18.85	6.8	181.6	19.4	-	Low DO and EC are representative of background conditions for March 2022 and are consistent with previous results.
7/3/2022, 1:35 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	15.7	86.9	8.6	20.6	16.25	6.7	181.2	12.6	-	This location is upstream of works and is therefore representative of background conditions.
7/3/2022, 2:00 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	18	94.2	8.9	36.0	27.3	6.8	208.4	9.3	QA Taken here	-
5/3/2022, 8:34 am	EPL34	Nungar Creek, upstream of Tantangara Road	16	84	8.3	16.7	13.1	7.0	49.3	7.3	-	This location is upstream of works and is therefore representative of background conditions.
5/3/2022, 8:27 am	EPL35	Nungar Creek, downstream of Tantangara Road	16	86.2	8.5	16.6	13	7.0	47.5	7.4	-	Low DO and EC are representative of background conditions for March 2022 and are consistent with previous results.
5/3/2022, 7:14 am	EPL36	Camerons Creek, upstream of works in Rock Forest	16.9	60.7	5.9	41.2	31.7	6.9	76.4	10.6	-	This location is upstream of works and is therefore representative of background conditions.
5/3/2022, 7:42 am	EPL37	Camerons Creek, downstream of works in Rock Forest	16.8	62.2	6.2	42.7	32.9	7.0	95.9	10.7	-	Low DO is representative of background conditions for March 2022 and are consistent with previous results.

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
9/3/2022, 9:00 am	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	17.57	97.3	9.29	67.0	0.044	7.1	171	7.0	Dark brown green hue, light winds from SE, light rain in in the past 24 hours	-
9/3/2022, 8:30 am	EPL11	Talbingo Reservoir, downstream of outlet	18.23	81.8	7.7	61.0	0.039	6.8	171	6.7	Dark brown green hue, moderate winds from SE, light rain in last 24hrs.	No discharge was occurring at the time of sampling. Low DO is within the range of WQO for baseline data but will be monitored.
4/3/2022, 9:48 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	18	78.5	7.4	21.7	16.25	6.8	136.2	6.3	-	This location is upstream of works and is therefore representative of background conditions.
4/3/2022, 10:31 am	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	17.5	67.2	6.7	21.7	16.25	6.6	159.6	5.3	-	Low DO is representative of the background conditions in March 2022 though a decreasing trend is becoming apparent and will be monitored.
4/3/2022, 10:15 am	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	17.7	75.1	7.1	21.6	16.25	6.8	143.8	4.2	-	Low DO is representative of the background conditions in March 2022 though a decreasing trend is becoming apparent and will be monitored.
4/3/2022, 9:57 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	18.2	81.9	7.7	21.8	16.25	6.9	143.4	4.3	-	Low DO is representative of the background conditions in March 2022 though a decreasing trend is becoming apparent and will be monitored.
4/3/2022, 9:09 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	15.9	80.1	7.9	18.3	14.3	7.2	158.6	6.8	-	Low DO is representative of the background conditions in March 2022 though a decreasing trend is becoming apparent and will be monitored.
4/3/2022, 9:26 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	16.2	78	7.7	25.0	19.5	6.6	149.0	6.3	-	Low DO is representative of the background conditions in March 2022 though a decreasing trend is becoming apparent and will be monitored.

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	-	-

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
9/3/2022, 9:30 am	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	21.66	90.5	7.95	0	0.00	7.4	172	0.7	Clear	No discharge was ocurring at time of sampling.

Notes:

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.

April 2022 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring 4 - 7 April 2022

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	Context
4/4/2022, 11:10 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	13.27	97.7	10.2	84.0	54	7.8	158.0	4.7	Raining last 24 hrs, medium - low flow, clear water	-
4/4/2022, 12:12 pm	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	13.64	90.3	9.4	103.0	0.067	8.3	166.0	1.9	Rain within the last 24hours, low flow, clear	Turbidity is better than expected water quality and reasonable for this location. The pH is generally representative of background conditions though will be monitored.
4/4/2022, 3:20 pm	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	14.14	90.8	9.3	89.0	58	8.2	174.0	4.2	Rain within 24 hrs, clear water, medium-low flow. QA-LOB collected here	The pH is generally representative of background conditions though will be monitored.
5/4/2022, 8:50 am	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	12.36	98.4	10.5	111.0	72	6.8	215.0	3.2	Clear water, rainfall within last 25 hrs, low flow	-
4/4/2022, 11:41 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	13.32	96.8	10.1	84.0	0.055	8.0	169.0	4.3	24hrs rain event, clear water, medium to low flow	-
4/4/2022, 12:49 pm	EPL14	Yarrangobilly River, downstream of road construction areas	14.03	97	10.0	86.0	56	8.3	167.0	3.8		The pH is generally representative of background conditions though
4/4/2022, 2:43 pm	EPL15	Yarrangobilly River, downstream of road construction areas	14.22	85.5	8.8	86.0	56	8.2	171.0	3.7	Rain within the last 24 hrs, clear water, low flow	The pH is generally representative of background conditions though will be monitored. DO is lower than previously recorded and will be monitored in accordance with TARP process.
4/4/2022, 4:00 pm	EPL16	Yarrangobilly River, downstream of road construction areas	14.2	89	9.1	87.0	57	8.2	177.0	3.5	Rain within 24 hrs, clear water, medium to low flow	The pH is generally representative of background conditions though will be monitored. DO is lower than previously recorded and will be monitored in accordance with TARP process.
5/4/2022, 9:16 am	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	-	-	-	-	-	-	-	-	No sample taken, dry/stagnant creek	-
-	EPL26	Eucumbene River downstream of Marica Road	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL27	Eucumbene River upstream of Marica Road	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL34	Nungar Creek, upstream of Tantangara Road	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL35	Nungar Creek, downstream of Tantangara Road	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL36	Camerons Creek, upstream of works in Rock Forest	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL37	Camerons Creek, downstream of works in Rock Forest	-	-	-	-	-	-	-	-		These samples were collected, due to a software malfuntion, these results were not saved.

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
-	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	-	-	-	-	-	-	-	-	-	These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL11	Talbingo Reservoir, downstream of outlet	-	-	-	-	-	-	-	-	-	These samples were collected, due to a software malfuntion, these results were not saved.
6/4/2022, 10:29 am	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	13.3	89.7	9.4	19.8	17	8.6	218.1	4.4	-	This location is upstream of works and is therefore representative of background conditions.
-	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	-	-	-	-	-	-	-	-	-	These samples were collected, due to a software malfuntion, these results were not saved.
-	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	-	-	-	-	-	-	-	-	-	These samples were collected, due to a software malfuntion, these results were not saved.
6/4/2022, 11:02 am	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	13.9	87.9	9.1	20.0	16	8.5	259.0	7.0	QA taken here	DO is within range of previous results for this location. Both DO and pH are representative of background conditions for April 2022.
6/4/2022, 10:11 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	12.6	88.3	9.4	15.5	13	7.2	92.4	9.7	Dam was so low sample was taken at the mouth	DO is within range of previous results for this location and is representative of background conditions for April 2022.
6/4/2022, 10:24 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	12.5	87	9.3	21.0	18	9.8	142.5	6.1	-	These samples were collected, due to a software malfuntion, these results were not saved.

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	-	-

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
-	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	-	-	-	-	-	-	-	-	-	These samples were collected, due to a software malfuntion, these results were not saved.

Notes:

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 sampling results for EPL10, 11, 21, 24, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37 are unavailable due to laboratory processing issues.

May 2022 EPL 21266 In Situ Water Quality Measurements

EPL Monthly Monitoring 4-25 May 2022

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	Context
4/5/2022, 8:16 am	EPL5	Yarrangobilly River, upstream of the exploratory tunnel and construction pad	9.15	120.3	13.9	62.0	0.041	8.0	110.0	4.3	Low flow, light turbidity, currently raining	This location is upstream of works and is therefore representative of background conditions.
4/5/2022, 9:00 am	EPL6	Wallaces Creek, upstream of Yarrangobilly River and Wallaces Creek confluence	9.39	110.2	12.6	70.0	0.046	7.9	170.0	22.4	Low flow, grey turbidity, currently raining.	DO is representative of background conditions and significantly elevated compared to previous months.
4/5/2022, 10:15 am	EPL8	Yarrangobilly River, downstream of Lick Hole Gully	9.46	112.5	12.9	68.0	0.044	8.1	156.0	4.2	Low flow, light brown hue, rainfall within 24hrs	DO and pH are within the range of WQO for baseline data and are representative of background conditions. DO is significantly elevated compared to previous months.
4/5/2022, 11:00 am	EPL9	Yarrangobilly River, downstream of the accommodation camp and upstream of Talbingo Reservoir	9.55	113.1	12.9	65.0	0.042	8.0	183.0	6.1	Low flow, light brown hue, currently raining.	DO is representative of background conditions and significantly elevated compared to previous months.
4/5/2022, 8:30 am	EPL12	Yarrangobilly River, immediately downstream of portal pad	9.16	114.1	13.1	65.0	0.042	8.1	145.0	3.8	Low flow, light brown hue, currently raining.	DO and pH are within the range of WQO for baseline data and are representative of background conditions. DO is significantly elevated compared to previous months.
4/5/2022, 9:30 am	EPL14	Yarrangobilly River, downstream of road construction areas	9.3	114.8	13.2	65.0	0.042	8.0	172.0	6.5	Low flow, grey and brown hue, currently raining	DO is representative of background conditions and significantly elevated compared to previous months.
4/5/2022, 10:30 am	EPL15	Yarrangobilly River, downstream of road construction areas	9.51	111.4	12.7	65.0	0.042	8.1	167.0	4.6	Low flow, light brown hue, currently raining.	DO and pH are within the range of WQO for baseline data and are representative of background conditions. DO is significantly elevated compared to previous months.
4/5/2022, 10:00 am	EPL16	Yarrangobilly River, downstream of road construction areas	9.36	111.2	12.8	65.0	0.043	8.0	169.0	3.7	Low flow, light brown hue, rain in last 24hrs	DO is representative of background conditions and significantly elevated compared to previous months.
4/5/2022, 12:30 pm	EPL24	Yarrangobilly River tributary (Watercourse 2), directly downstream of road	12.08	119.0	12.8	135.0	0.088	7.4	153.0	275.0	Low flow, milky grey hue, currently raining, spring above EPL 24 milky grey hue, clean water drain above the spring is dry.	DO is representative of background conditions and significantly elevated compared to previous months. The turbidity is consistently high in this location though the spring upstream was also turbid.
5/5/2022, 1:10 pm	EPL26	Eucumbene River downstream of Marica Road	10.1	81.4	9.2	22.1	20.15	6.4	220.9	24.5	Rainfall event occured within 24 hours of sampling. Water is clear	Low DO, EC, and pH are representative of background conditions for March 2022 and are consistent with previous results.
5/5/2022, 12:40 pm	EPL27	Eucumbene River upstream of Marica Road	9.8	88.6	10.0	22.0	20.15	6.4	235.4	10.2	Rainfall event occured within 24 hours of sampling. Clear day and water is clear QA-MAR	This location is upstream of works and is therefore representative of background conditions.
4/5/2022, 1:57 pm	EPL30	Kellys Plain Creek, downstream of accommodation camp and laydown areas	9	88.6	10.2	20.7	19.5	6.8	236.4	63.5	Rainfall event	Low DO and EC, an elevated turbidity are representative of background conditions for May 2022 and are consistent with previous results.
4/5/2022, 1:46 pm	EPL31	Kellys Plain Creek, upstream of accommodation camp and laydown areas	9	91.3	10.6	18.4	17.55	6.8	239.8	33.4	Rainfall event	This location is upstream of works and is therefore representative of background conditions.
4/5/2022, 3:04 pm	EPL33	Murrumbidgee River, downstream of Tantangara reservoir outlet	12.7	89.1	9.5	19.5	16.25	6.7	227.6	4.8	Rainfall, clear, TAN-QA1	Low DO and EC are generally representative of background conditions for May 2022 and are consistent with previous results.
4/5/2022, 2:23 pm	EPL34	Nungar Creek, upstream of Tantangara Road	8.9	89.9	10.4	10.9	10.4	6.5	245.9	9.5	Rainfall event, cloudy, wet	This location is upstream of works and is therefore representative of background conditions.
4/5/2022, 2:32 pm	EPL35	Nungar Creek, downstream of Tantangara Road	9	91.2	10.6	10.9	10.4	5.6	236.4	7.9	Rainfall, wet, cold, clear	Low EC is representative of background conditions in May 2022. There was no visual cause of the low pH during sampling but it will be monitored.
5/5/2022, 10:59 am	EPL36	Camerons Creek, upstream of works in Rock Forest	9	86.4	10.0	26.9	25.35	6.4	232.0	5.6	Rainfall event occured within 24 hours, clear water	This location is upstream of works and is therefore representative of background conditions.
5/5/2022, 10:09 am	EPL37	Camerons Creek, downstream of works in Rock Forest	9.3	94.3	10.8	27.8	26	7.5	208.0	8.6	Rainfall event occrued within 24 hrs, Clear weather and water clear, QA-ROK	Low EC is representative of background conditions in May 2022.

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
5/5/2022, 4:00 pm	EPL10	Talbingo Reservoir, downstream of road works and upstream of water intake point	15.3	86.7	8.68	43.9	35	8.0	198.8	1.6	-	No discharge was occurring at the time of sampling. Low DO is within the range of WQO for baseline data but will be monitored.
5/5/2022, 3:45 pm	EPL11	Talbingo Reservoir, downstream of outlet	15.3	90.1	8.97	42.3	34	8.5	143.9	1.6	-	-
4/5/2022, 12:09 pm	EPL28	Tantangara Reservoir, upstream in the mouth of the Murrumbidgee River	11	87.9	9.7	18.3	16.25	6.5	225.9	4.4	Rainfall event, cloudy	This location is upstream of works and is therefore representative of background conditions.
4/5/2022, 12:47 pm	EPL29	Tantangara Reservoir, downstream of works area and upstream of lower Murrumbidgee River	12.7	84.7	9.0	19.4	16.25	6.5	238.6	4.8	-	Low DO is representative of the background conditions in May 2022 though a decreasing trend is becoming apparent and will be monitored.
4/5/2022, 12:37 pm	EPL32	Tantangara Reservoir, Tantangara Intake. Downstream of construction works	12.7	83.1	8.8	19.5	16.9	6.6	231.6	3.3	-	Low DO is representative of the background conditions in May 2022 though a decreasing trend is becoming apparent and will be monitored.
4/5/2022, 12:13 pm	EPL38	Tantangara Reservoir, variable location dependant on tide and reservoir levels. Between the emplacement area and the ancillary facilities for emplacement activities	12.3	86.1	9.2	19.2	16.25	6.6	232.5	4.0	-	Low DO is representative of the background conditions in May 2022 though a decreasing trend is becoming apparent and will be monitored.
4/5/2022, 11:02 am	EPL39	Confluence of Nungar Creek and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of Tantangara construction works	7.9	93.2	11.1	13.2	13	8.0	137.1	9.9	During rainfall event, cloudy.	-
4/5/2022, 11:48 am	EPL40	Confluence of the upper Murrumbidgee River and Tantangara Reservoir, variable location dependent on tide and reservoir levels. Upstream of works	7.9	95.9	11.4	16.5	15.6	7.1	207.7	3.6	Rainfall event, cloudy	-

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	-	-

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
5/5/2022, 3:30 pm	EPL41	Lobs Hole STP/PWTP Final Effluent Quality Monitoring Point. Downstream of final treatment, prior to discharge to Talbingo Reservoir.	16.16	78.1	7.66	82	52.60	11.9	44	1.0	-	No discharge was occuring at the time of sampling.

Table 4 - Groundwater Quality Data
Groundwater

Water Quality Objectives (see note 4)							
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	Field Comments / Context	Context
25/5/2022, 12:00 pm	EPL1	Wallace Creek Bridge	16.4	87.2	8.5	1200	0.766	7.1	-72	27.3	depth measured from above the well, not turbid, no smell of water	Elevated EC is consistent and within range of previous data.
25/5/2022, 12:30 pm	EPL2	Wallace Creek Bridge	16.4	82.3	8.0	449	0.292	6.6	17	53.5	medium turbid, brown hue, slight odour, depth measured from above bore	Elevated EC is consistent and within range of previous data.
25/5/2022, 1:30 pm	EPL4	Portal Access	16.1	81.7	8.0	1490	0.956	7.4	-103	0	depth measured from level of the bore, medium to high turbidity, slight odour. horiba not reading NTU.	Elevated EC is consistent and within range of previous data.
25/5/2022, 1:00 pm	EPL25	Portal Access	16.8	81.4	7.9	445	0.289	6.1	34	860	depth measured at level of bore, medium turbid water, slight odour	Elevated EC is consistent and within range of previous data. pH will be monitored but is within comparible range of EPL2 which is of the same aquifer.

Notes:

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: 05-07 December 2021

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 30 August 2021, 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.

Exceedances in samples are representative of background conditions in December 2021 with minimal recorded rainfall one week prior to sampling of 7.2 mm in Lobs Hole and 3.6 mm in Tantangara.

The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.
Therefore, based on water quality results from upstream of the site, site activity, and supporting evidence the monitoring are a result of the recent bushfire activity in the area and not site works.

The publication of this pollution monitoring data is carried out in accordance with section 66 (6) of the Protection of the Environment Operations Act 1997 (NSW).

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 05-07 December 2021 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40
Field											
pH	pH Unit	-	6.5-8	7.5	7.54	6.74	6.89	6.79	6.84	6.49	6.45
Electrical Conductivity	µS/cm	-	20-30	42.2	40.5	17.9	17.4	17.4	17.3	15	17.5
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	217.3	230.2	240	228.5	234.6	220.9	255.2	290.4
Temperature	°C	-	No Water Quality Objective Value	20.6	20.3	16.5	16.9	16.8	16.7	13.7	13
Dissolved Oxygen	% saturation	-	90-110	102	101.5	83.1	89.1	87.7	86	87.2	91.4
Turbidity	NTU	-	1-20	2.55	2.72	6.19	2.58	3.23	3.65	3.41	2.98
Laboratory analytes											
Total suspended solids	mg/L	5	No Water Quality Objective Value	<5	<5	9.8	<5	6.0	<5	5.0	<5
Hardness as $CaCO_3$ (filtered)	mg/L	1	No Water Quality Objective Value	27	26	7.9	7.6	7.5	7.8	7.4	8.8
Nutrients											
Ammonia as N	µg/L	5	10								
Nitrite + Nitrate as N (NOx)	µg/L	2	10	<10	<10	<10	<10	<10	<10	<10	<10
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	60	70	90	90	110	130	120	40
Nitrogen (Total)	µg/L	10	350	60	70	90	90	110	130	120	40
Reactive Phosphorus	µg/L	1	5	4	5	43	4	4	4	3	4
Phosphorus (Total)	µg/L	5	10								
Inorganics											
Cyanide Total	µg/L	4	7	<4	<5	<4	18	5	5	5	5
Hydrocarbons											
Oil and Grease	mg/L	5	No Water Quality Objective Value	8.2	<5	11	9.7	<5	7.5	<5	8.1
Metals											
Aluminium (dissolved)	µg/L	5	55	34	27	39	39	54	54	18	47
Arsenic (dissolved)	µg/L	0.2	13	<1	<1	<1	<1	<1	<1	<1	1
Chromium (III+VI) (dissolved)	µg/L	0.2	1	<1	<1	<1	<1	<1	<1	<1	1
Copper (dissolved)	µg/L	0.5	14	<1	<1	<1	<1	<1	<1	<1	<1
Iron (dissolved)	µg/L	2	300	<50	<50	120	130	140	130	170	110
Lead (dissolved)	µg/L	0.1	3.4	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	0.5	1,900	<5	<5	<5	<5	<5	<5	11	<5
Nickel (dissolved)	µg/L	0.5	11	<1	<1	<1	<1	<1	<1	<1	<1
Silver (dissolved)	µg/L	0.01	0.05	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	1	8	<5	<5	<5	<5	<5	<5	<5	<5
Biological											
Biochemical Oxygen Demand	mg/L	2	1/5^	<5	<5	-	-	-	-	-	-
Faecal Coliforms	CFU/100mL	1	10/100^	#	#	-	-	-	-	-	-

* 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.

\# Due to laboratory error, no results were provided

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 05-07 December 2021- 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
Field																					
pH	-	-	6.5-8	7.59	7.96	7.99	7.99	7.79	7.96	7.99	7.95	7.34	7.18	6.04	6.6	6.77	6.34	6.35	6.7	6.61	6.7
Electrical Conductivity	µS/cm	-	30-350	73	86	88	80	76	88	79	79	71	22	21.5	16.7	15.4	16.7	13.9	13.5	34.5	48.7
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	201	215	227	201	153	225	218	183	72	130.5	209.8	281.6	294.3	471.8	202.2	187.4	242.8	209.5
Temperature	°C	-	No Water Quality Objective Value	13.75	12.11	14.47	16.21	13.9	14.08	14.26	17.1	19.28	9.7	9.7	12.5	12.3	14.8	12.1	12.2	18.2	18.8
Dissolved Oxygen	% saturation	-	90-110	99	93.8	91.6	94.4	93.1	96.4	96	105.4	70.8	88.7	89.2	90.7	89.8	93.5	84.1	85.2	61.8	88.9
Turbidity	NTU	-	2-25	4.91	3.62	4.49	5.1	4.82	4.9	4.66	4.37	26.5	6.38	4.66	6.2	7.1	5.58	5.7	4.71	3.94	6.14
Laboratory analytes																					
TSS	mg/L	5	No Water Quality Objective Value	5.6	5.0	10	6.8	6.6	5.8	<5	7.4	14	12	10	11	13	<5	<5	<5	5.2	5.4
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	36	42	41	36	34	41	39	37	31	12	12	13	7.5	8.2	7.4	6.8	7.7	24
Nutrients																					
Ammonia as N	µg/L	5	13	27	24	23	20	27	24	23	<5	23	18	29	13	13	42	27	25	25	32
Nitrite + Nitrate as N (NOx)	µg/L	2	15	<10	<10	<10	<10	10	20	<10	<10	30	50	20	<10	<10	<10	<10	50	<10	<10
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	110	60	200	90	70	120	50	70	90	30	70	120	80	140	290	170	180	500
Nitrogen (Total)	µg/L	10	250	110	60	200	90	90	140	50	70	110	60	80	120	80	140	290	220	180	500
Reactive Phosphorus	µg/L	1	15	30	5	4	5	5	<5	5	5	4	4	4	4	4	5	<5	4	4	5
Phosphorus (Total)	µg/L	5	20																		
Inorganics																					
Cyanide Total	µg/L	4	4	<4	18	<4	<5	5	5	5	10	21	4	10	<4	5	4	<4	4	22	5
Hydrocarbons																					
Oil and Grease	mg/L	5	No Water Quality Objective Value	5.9	8.2	5.5	<5	<5	<5	<5	5.9	<5	<5	24	6.9	<5	<5	<5	5.4	<5	8.2
Metals																					
Aluminium (dissolved)	µg/L	5	27	30	18	47	34	39	40	32	27	67	6	7	25	25	290	31	30	79	35
Arsenic (dissolved)	µg/L	0.2	0.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	µg/L	0.2	0.01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	µg/L	0.5	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1
Iron (dissolved)	µg/L	2	300	<50	<50	<50	<50	<50	<50	<50	<50	140	<50	<50	60	50	460	210	250	230	1,100
Lead (dissolved)	µg/L	0.1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	0.5	1,200	<5	6	<5	5	<5	<5	<5	<5	140	5	<5	6	6	20	10	9	9	29
Nickel (dissolved)	µg/L	0.5	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	2	2
Silver (dissolved)	µg/L	0.01	0.02	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	1	2.4	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	9	<5	16	6	<5

* 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 EPL Sampling: 09-11 January 2022

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, Kosciuszko 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 14 January 2022, 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.

No discharge was occurring at the time the samples at EPL 41 were collected.
Elevated nitrogen, nitrates, and faecal coliform presence are likely due to the algae blooms in the reservoir which can effect the results.
The EPL variation issued on 14 January includes an increase discharge from 1.66 ML/day to 4.32 ML/day with a flow rate of 50 L/s.

Any exceeding values are likely representative of background conditions after a wet weather event of approximately 25.6 mm of rain between 01-06 January 2021.

The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.

Based on water quality results from upstream of the site, site activity, and supporting evidence the monitoring are a result of the recent bushfire activity in the area and not site works.

The publication of this pollution monitoring data is carried out in accordance with section 66 (6) of the Protection of the Environment Operations Act 1997 (NSW).

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 08-11 January 2022 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40
Field											
pH	pH Unit	-	6.5-8	9.43	9.46	6.98	6.62	6.89	6.94	7.06	6.32
Electrical Conductivity	µS/cm	-	20-30	66	64	21.2	20.2	20.2	20.8	18.4	21.9
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	143	157	126.7	188.1	167.7	155.9	184.8	226.9
Temperature	°C	-	No Water Quality Objective Value	26.07	25.95	21.9	20.4	20.4	21.7	20.7	18.2
Dissolved Oxygen	% saturation	-	90-110	102.9	120.6	81.9	81.7	77.7	80.6	75.6	76
Turbidity	NTU	-	1-20	7.89	8.44	2.16	2.67	2.5	2.08	2.86	3.19
Laboratory analytes											
Total suspended solids	mg/L	5	No Water Quality Objective Value	< 5	< 5	< 5	< 5	30	< 5	<5	<5
Hardness as $CaCO_3$ (filtered)	mg/L	1	No Water Quality Objective Value	27.00	26.00	7.50	7.40	7.30	7.60	7.2	8.8
Nutrients											
Ammonia as N	µg/L	5	10	<10	<10	-35.00	<10	<10	<10	26.0	<5
Nitrite + Nitrate as N (NOx)	µg/L	2	10	30.0	<10	110.0	<10	<10	28000	30.0	10.0
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	800.0	400.0	470.0	290.0	940.0	1300	110.0	220.0
Nitrogen (Total)	µg/L	10	350	830.0	400.0	470.0	290.0	940.0	29000	140.0	250.0
Reactive Phosphorus	µg/L	1	5	5.0	5.0	7.0	7.0	4.0	7.0	2.0	4.0
Phosphorus (Total)	µg/L	5	10	<10	12.0	<5	<5	<5	<5	6.0	<5
Inorganics											
Cyanide Total	µg/L	4	7	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons											
Oil and Grease	mg/L	5	No Water Quality Objective Value	16	18	22	24	< 5	19	<5	<5
Metals											
Aluminium (dissolved)	µg/L	5	55	10.0	19.0	22.0	48.0	42.0	40.0	25.0	27.0
Arsenic (dissolved)	µg/L	0.2	13	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	µg/L	0.2	1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	µg/L	0.5	14	<1	2.0	<1	3.0	<1	1.0	<1	<1
Iron (dissolved)	µg/L	2	300	<50	<50	210.0	190.0	200.0	220.0	190.0	170.0
Lead (dissolved)	µg/L	0.1	3.4	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	0.5	1,900	<5	<5	<5	<5	<5	<5	<5	8.0
Nickel (dissolved)	µg/L	0.5	11	<1	<1	<1	<1	<1	<1	<1	<1
Silver (dissolved)	µg/L	0.01	0.05	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	1	8	<5	<5	<5	<5	<5	<5	<5	<5
Biological											
Faecal Coliforms	CFU/100mL	1	10/100^	140	220	-	-	-	-	-	-
Biochemical Oxygen Demand	mg/L	2	1/5^	<5	<5	-	-	-	-	-	-

* 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.

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 08-11 January - 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
Field																					
pH	-	-	6.5-8	7.01	8.22	8.13	8	7.76	7.91	7.92	7.86	7.5	6.8	6.6	6.7	6.7	6.6	5.8	6.2	6.4	6.1
Electrical Conductivity	µS/cm	-	30-350	49	86	77	80	51	79	55	80	80.0	26.7	26.7	21.6	18.7	20.7	15.9	16.4	45.4	46.1
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	220	176	184	178	208	186	183	182	95.0	174.3	169.4	255.0	166.9	317.4	259.3	18.4	277.3	233.3
Temperature	°C	-	No Water Quality Objective Value	15.77	21.01	19.65	17.82	16.61	17.24	19.4	17.42	19.5	18.9	18.9	18.1	17.4	21.1	19.6	19.5	23.0	24.5
Dissolved Oxygen	% saturation	-	90-110	69.3	60.4	60.4	62	67.3	61.8	66	57.5	55.0	79.3	81.3	86.9	89.6	85.1	82.1	80.9	44.5	76.9
Turbidity	NTU	-	2-25	17.8	5.69	7.55	6.11	17.9	6.61	152	5.37	247.0	6.4	5.9	9.6	7.4	4.1	5.9	5.9	4.4	8.3
Laboratory analytes																					
TSS	mg/L	5	No Water Quality Objective Value	30	9.2	5.4	< 5	27	< 5	18	5.4	74.0	< 5	< 5	< 5	18.0	9.0	5.2	24.0	8.8	12.0
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	20	36	32	33	21	33	23	33	48.0	11.0	11.0	8.3	7.5	7.4	6.2	6.2	16.0	17.0
Nutrients																					
Ammonia as N	µg/L	5	13	<10	<5	<10	21	<10	<10	<10	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Nitrite + Nitrate as N (NOx)	µg/L	10	15	30	70	20	<10	50	30	<10	<10	300.0	<10	7000	<10	<10	20.0	<10	<10	30.0	20.0
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	590	780	530	60	630	770	130	60	280.0	50.0	5200	90.0	70.0	120.0	120.0	110.0	290.0	330.0
Nitrogen (Total)	µg/L	10	250	630	850	550	60	680	800	130	60	580.0	50.0	12000	90.0	70.0	140.0	120.0	110.0	320.0	350.0
Reactive Phosphorus	µg/L	1	15	7	15	60	6	6	6	6	7	11.0	6.0	4	7	9	7	7	7	7	6
Phosphorus (Total)	µg/L	5	20	29	10	7	5	16	<5	11	<5	75.0	<5	<5	<5	<5	31.0	<5	<5	<5	11.0
Inorganics																					
Cyanide Total	µg/L	4	4	<4	<4	4	7	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons																					
Oil and Grease	mg/L	5	No Water Quality Objective Value	7.8	< 5	18	16	< 5	14	5.6	< 5	14.0	17.0	14.0	17.0	< 5	< 5	5.3	20.0	17.0	18.0
Metals																					
Aluminium (dissolved)	µg/L	5.0	27	97	16	66	27	76	48	110	25	200.0	<5	8.0	16.0	7.0	47.0	30.0	36.0	23.0	23.0
Arsenic (dissolved)	µg/L	1.0	0.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	µg/L	1.0	0.01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	3	3.0	<1	<1	<1	<1	<1	<1	<1	<1	<1
Iron (dissolved)	µg/L	50.0	300	130	<50	70	<50	120	<50	120	<50	220.0	<50	<5	70.0	<5	200.0	270.0	270.0	1000.0	910.0
Lead (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	5.0	1,200	<5	7	<5	6	8	<5	<5	<5	170.0	<5	<5	<5	<5	9.0	6.0	6.0	25.0	24.0
Nickel (dissolved)	µg/L	1.0	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver (dissolved)	µg/L	5.0	0.02	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	5.0	2.4	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

* 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: 08-11 January 2022 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45
Flow Rate							
Inflow^	**ML/day**			-	-	0.227	0.052
Outflow^	**ML/day**		4.32	-	0.010	-	-
Field							
pH	**pH Unit**	-	6.5-8.5	6.6	-	-	-
Electrical Conductivity	**µS/cm**	-	700	67	-	-	-
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	256	-	-	-
Temperature	**°C**	-	15	25.02	-	-	-
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	95.5	-	-	-
Turbidity	**NTU**	-	<25	0.4	-	-	-
Laboratory analytes							
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	-	-	-
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	3	-	-	-
Nutrients							
Ammonia as N	**µg/L**	5	No Water Quality Objective Value	34	-	-	-
Nitrite + Nitrate as N (NOx)	**µg/L**	2	No Water Quality Objective Value	260	-	-	-
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	10	-	-	-
Nitrogen (Total)	**µg/L**	10	270	270	-	-	-
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<1	-	-	-
Phosphorus (Total)	**µg/L**	5	30	8	-	-	-
Inorganics							
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-
Hydrocarbons							
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	6	-	-	-
Metals							
Aluminium (dissolved)	**µg/L**	5	55	<5	-	-	-
Arsenic (dissolved)	**µg/L**	0.2	13	<1	-	-	-
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<1	-	-	-
Copper (dissolved)	**µg/L**	0.5	14	3	-	-	-
Iron (dissolved)	**µg/L**	2	300	<50	-	-	-
Lead (dissolved)	**µg/L**	0.1	3.4	<1	-	-	-
Manganese (dissolved)	**µg/L**	0.5	1,900	<5	-	-	-
Nickel (dissolved)	**µg/L**	0.5	11	<1	-	-	-
Silver (dissolved)	**µg/L**	0.01	0.05	<5	-	-	-
Zinc (dissolved)	**µg/L**	1	8	28	-	-	-
Biological							
Faecal Coliforms	**CFU/100mL**	1	10/100^	700	-	-	-
Biological Oxygen Demand	**mg/L**		5	<5	-	-	-

* 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

^ 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 EPL Sampling: 01-02 February 2022

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 09 February 2022, 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.

The EPL variation issued on 09 February 2022 does not include variations to the routine monthly sampling.

Any exceeding values are likely representative of background conditions after a wet weather event of approximately 83 mm of rain between 29 January and 02 February 2022.

The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.

Based on water quality results from upstream of the site, site activity, and supporting evidence the monitoring are a result of the recent bushfire activity in the area and not site works.

The publication of this pollution monitoring data is carried out in accordance with section 66 (6) of the Protection of the Environment Operations Act 1997 (NSW).

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 08-11 January 2022 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40
Field											
pH	**pH Unit**	-	6.5-8	9.7	9.8	7.4	7.9	8.1	7.7	7.4	7.5
Electrical Conductivity	**µS/cm**	-	20-30	65.0	64.0	24.0	22.0	23.0	23.0	22.0	23.0
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	115	93.0	148	160	160	185	167	152
Temperature	**°C**	-	No Water Quality Objective Value	24.5	24.6	21.3	22.3	22.5	21.5	21.9	18.3
Dissolved Oxygen	**% saturation**	-	90-110	141	135	88.3	97.1	98.5	96.3	94.3	95.3
Turbidity	**NTU**	-	1-20	33.7	29.9	4.9	2.6	3.3	4.1	6.5	7.0
Laboratory analytes											
TSS	**mg/L**	5	No Water Quality Objective Value	16	10	5.4	<5	7.4	<5	14	9.4
Hardness as CaCO3	**mg/L**	1	No Water Quality Objective Value	25.0	25.0	7.5	7.3	7.6	7.7	7.7	8.4
Nutrients											
Ammonia as N	**µg/L**	5	10	53.0	<10	<10	<10	<10	<5	<5	140
Nitrite + Nitrate as N (NOx)	**µg/L**	2	10	<50	<50	<50	<50	<50	<50	<50	<50
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	72.0	63.0	180	170	160	130	190	170
Nitrogen (Total)	**µg/L**	10	350	72.0	63.0	180	170	160	130	190	170
Reactive Phosphorus	**µg/L**	1	5	6.0	6.0	5.0	5.0	6.0	6.0	7.0	5.0
Phosphorus (Total)	**µg/L**	5	10	6.0	10.0	12.0	<5	<5	<5	<5	7.0
Inorganics											
Cyanide Total	**µg/L**	4	7	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	6.0	11.0	6.8	<5	140	<5	<5	<5
Metals											
Aluminium (dissolved)	**µg/L**	5	55	15.0	<5	<5	<5	<5	<5	<5	<5
Arsenic (dissolved)	**µg/L**	0.2	13	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	**µg/L**	0.5	14	<1	<1	<1	<1	<1	<1	<1	<1
Iron (dissolved)	**µg/L**	2	300	<50	<50	220	210	220	230	280	170
Lead (dissolved)	**µg/L**	0.1	3.4	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	**µg/L**	0.5	1,900	<5	<5	<5	<5	<5	<5	14.0	<5
Nickel (dissolved)	**µg/L**	0.5	11	<1	<1	<1	<1	<1	<1	<1	<1
Silver (dissolved)	**µg/L**	0.01	0.05	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	**µg/L**	1	8	<5	<5	<5	<5	<5	<5	<5	<5
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	17.0	12.0	-	-	-	-	-	-
Biochemical Oxygen Demand	**mg/L**	2	1/5^	<5	<5	-	-	-	-	-	-

***** 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.

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 01-02 February 2022 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL1 (RMSB6)	EPL2 (RSMB7)	EPL4 (RSMB8)	EPL25 (RSMB9)
Physiochemical							
pH	pH Unit	-	6.5-8	7.76	8.37	7.35	6.95
Electrical Conductivity	µS/cm	-	30-350	568	160	357	229
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	-133	-55.0	-89	-73
Temperature	°C	-	No Water Quality Objective Value	24.7	25.3	20.1	22.9
Dissolved Oxygen	% saturation	-	No Water Quality Objective Value	60.5	24.3	31.5	21.9
Turbidity	NTU	-	No Water Quality Objective Value	55.1	572	850	>1000
Nutrients							
Nitrogen (Total)	µg/L	10	250	300	<200	<200	600
Reactive Phosphorus	µg/L	1	15	<50	<50	<50	<50
Metals							
Aluminium (dissolved)	µg/L	5	27	<5	<5	1300	560
Copper (dissolved)	µg/L	0.5	1	<1	3.0	42.0	6.0
Iron (dissolved)	µg/L	2	300	350	1800	1200	5100
Lead (dissolved)	µg/L	0.1	1	<1	<1	2.0	5.0
Manganese (dissolved)	µg/L	0.5	1,200	150	150	150	1000
Nickel (dissolved)	µg/L	0.5	8	3.0	3.0	6.0	9.0
Silver (dissolved)	µg/L	0.01	0.02	<5	<5	<5	<5
Zinc (dissolved)	µg/L	1	2.4	<5	<5	6.0	16.0

* 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: 01-02 February 2022 - 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
Field																					
pH	-	-	6.5-8	7.5	8.2	8.1	8.1	7.8	8.1	8.1	7.9	7.2	5.9	5.9	6.3	6.1	6.6	6.4	6.4	6.6	6.6
Electrical Conductivity	µS/cm	-	30-350	47.0	56.0	52.0	50.0	48.0	50.0	49.0	50.0	55.0	27.4	11.0	22.4	19.8	39.1	17.2	17.1	23.7	37.0
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	128	104	119	124	162	-92.000	117	96.0	12.0	221	200	201	233	179	200	192	188	194
Temperature	°C	-	No Water Quality Objective Value	17.2	20.6	19.9	20.2	17.1	19.6	19.6	20.0	23.8	14.2	13.8	13.8	13.4	19.4	16.4	16.4	16.7	16.5
Dissolved Oxygen	% saturation	-	90-110	94.3	90.7	91	96.8	99.7	93.7	95	90.4	75.7	85.4	54.4	83.6	82.9	71.7	81.8	83.3	50.3	57.4
Turbidity	NTU	-	2-25	37.2	4.23	17.6	19.7	21.5	17.2	16.9	23.9	168.0	6.0	7.1	9.2	9.3	9.2	6.6	8.3	6.4	7.4
Laboratory analytes																					
TSS	mg/L	5	No Water Quality Objective Value	32.0	11.0	29.0	30.0	43.0	28.0	31.0	34.0	53.0	9.8	16.0	14.0	18.0	6.4	11.0	9.0	13.0	9.4
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	43	48.0	46.0	45.0	43.0	45.0	44.0	44.0	48.0	13.0	13.0	9.3	11.0	17.0	7.0	7.3	15.0	16.0
Nutrients																					
Ammonia as N	µg/L	5	13	<5	<5	110.0	<10	<10	<10	300	78.0	110	18.0	<10	<10	<10	<10	42.0	14.0	<10	12.0
Nitrite + Nitrate as N (NOx)	µg/L	10	15	<50	<50	<50	<50	<50	<50	<50	<50	70.0	<50	<50	<50	<50	<50	<50	<50	<50	<50
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	12.0	80.0	100	100	100	90.0	90.0	90.0	90.0	90.0	80.0	90.0	90.0	180	150	170	380	130
Nitrogen (Total)	µg/L	10	250	120	80.0	100	100	100	90.0	90.0	90.0	160	90.0	80.0	90.0	90.0	180	150	170	380	130
Reactive Phosphorus	µg/L	1	15	6.0	6.0	6.0	7.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	4.0	4.0	6.0	5.0	6.0	6.0	6.0
Phosphorus (Total)	µg/L	5	20	12.0	<5	12.0	15.0	16.0	11.0	25.0	21.0	78.0	250.0	5.0	7.0	5.0	<5	6.0	13.0	33.0	27.0
Inorganics																					
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	6.0	<4	<4	<4
Hydrocarbons																					
Oil and Grease	mg/L	5	No Water Quality Objective Value	<5	<5	13.0	<5	<5	<5	<5	<5	8.7	<5	<5	<5	<5	11.0	<5	<5	8.5	<5
Metals																					
Aluminium (dissolved)	µg/L	5.0	27	<5	130	95.0	64.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic (dissolved)	µg/L	1.0	0.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.0	<1
Chromium (III+VI) (dissolved)	µg/L	1.0	0.01	<1	<1	<1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	µg/L	1.0	1	<1	<1	<1	4.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.0	<1	<1	<1	<1
Iron (dissolved)	µg/L	50.0	300	60.0	<50	70.0	90.0	60.0	70.0	80.0	50.0	80.0	50.0	60.0	70.0	90.0	380	400	450	1300	1400
Lead (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	5.0	1,200	<5	11.0	5.0	8.0	<5	<5	5.0	5.0	280.0	7.0	<5	5.0	8.0	16.0	90.0	9.0	26.0	28.0
Nickel (dissolved)	µg/L	1.0	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.0	<1	<1	<1	1.0
Silver (dissolved)	µg/L	5.0	0.02	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	5.0	2.4	<5	<5	<5	<5	<5	<5	<5	<5	<5	21.0	<5	<5	<5	12.0	<5	<5	<5	<5

* 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: 01-02 February 2022 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45
Flow Rate							
Inflow^	**ML/day**			-	-	0.044	0.822
Outflow^	**ML/day**		4.32	-	0.017	-	-
Field							
pH	**pH Unit**	-	6.5-8.5	6.2	-	-	-
Electrical Conductivity	**µS/cm**	-	700	27.0	-	-	-
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	223	-	-	-
Temperature	**°C**	-	15	24.2	-	-	-
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	87.5	-	-	-
Turbidity	**NTU**	-	<25	1.3	-	-	-
Laboratory analytes							
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	27.0	-	-	-
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	43.0	-	-	-
Nutrients							
Ammonia as N	**µg/L**	5	No Water Quality Objective Value	44.0	-	-	-
Nitrite + Nitrate as N (NOx)	**µg/L**	2	No Water Quality Objective Value	180	-	-	-
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	<10	-	-	-
Nitrogen (Total)	**µg/L**	10	270	110	-	-	-
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	5.0	-	-	-
Phosphorus (Total)	**µg/L**	5	30	<5	-	-	-
Inorganics							
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-
Hydrocarbons							
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	<5	-	-	-
Metals							
Aluminium (dissolved)	**µg/L**	5	55	<5	-	-	-
Arsenic (dissolved)	**µg/L**	0.2	13	<1	-	-	-
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<1	-	-	-
Copper (dissolved)	**µg/L**	0.5	14	3.0	-	-	-
Iron (dissolved)	**µg/L**	2	300	<50	-	-	-
Lead (dissolved)	**µg/L**	0.1	3.4	<1	-	-	-
Manganese (dissolved)	**µg/L**	0.5	1,900	<5	-	-	-
Nickel (dissolved)	**µg/L**	0.5	11	<1	-	-	-
Silver (dissolved)	**µg/L**	0.01	0.05	<5	-	-	-
Zinc (dissolved)	**µg/L**	1	8	10.0	-	-	-
Biological							
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-
Biological Oxygen Demand	**mg/L**		5	<5	-	-	-

* 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

^ 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 EPL Sampling: 04 - 09 March 2022

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 09 February 2022, 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.

No discharge was occuring at the time the samples at EPL 41 were collected.
Due to an issue with sample delivery, the majority of analyses were unable to be performed.

Any exceeding values are likely representative of background conditions after a wet weather event of approximately 22.2 mm of rain between 06 - 09 March 2022 in Lobs Hole and 50.6mm of rain between 01 - 09 March 2022.
Elevated nitrogen, nitrates, and faecal coliform presence are likely due to the algae blooms in the reservoir which can effect the results.

The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality

The publication of this pollution monitoring data is carried out in accordance with section 66 (6) of the Protection of the Environment Operations Act 1997 (NSW).

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 04 - 09 March 2022 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40
Field											
pH	**pH Unit**	-	6.5-8	7.06	6.8	6.78	6.55	6.79	6.93	7.19	6.64
Electrical Conductivity	**µS/cm**	-	20-30	67	61	21.7	21.7	21.6	21.8	18.3	25
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	171	171	136.2	159.6	143.8	143.4	158.6	149
Temperature	**°C**	-	No Water Quality Objective Value	17.57	18.23	18	17.5	17.7	18.2	15.9	16.2
Dissolved Oxygen	**% saturation**	-	90-110	97.3	81.8	78.5	67.2	75.1	81.9	80.1	78
Turbidity	**NTU**	-	1-20	7.01	6.66	6.25	5.26	4.21	4.32	6.8	6.25
Laboratory analytes											
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	18	22	<5	-	<5	<5	10	5.0
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	41	40	8.7	-	9.2	9.3	8.1	11
Nutrients											
Ammonia as N	**µg/L**	5	10	<5	<5	<5	<10	<5	<5	<5	<5
Nitrite + Nitrate as N (NOx)	**µg/L**	2	10	<10	20	20	<50	250	40	210	30
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	120	110	230	-	460	230	340	390
Nitrogen (Total)	**µg/L**	10	350	130	130	240	-	710	260	450	430
Reactive Phosphorus	**µg/L**	1	5	4	3	3	-	2	2	3	3
Phosphorus (Total)	**µg/L**	5	10	22	21	31	-	20	14	12	12
Inorganics											
Cyanide Total	**µg/L**	4	7	9	8	9	-	7	5	4	4
Hydrocarbons											
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	<5	<5	<5	-	<5	8	<5	<5
Metals											
Aluminium (dissolved)	**µg/L**	5	55	59	48	28	-	21	51	35	21
Arsenic (dissolved)	**µg/L**	0.2	13	<1	<1	<1	-	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<1	<1	<1	-	<1	<1	<1	<1
Copper (dissolved)	**µg/L**	0.5	14	<1	<1	2	-	<1	7	2	1
Iron (dissolved)	**µg/L**	2	300	0	80	240	-	220	420	320	200
Lead (dissolved)	**µg/L**	0.1	3.4	<1	<1	<1	-	<1	<1	<1	<1
Manganese (dissolved)	**µg/L**	0.5	1,900	33	6	6	-	13	5	11	10
Nickel (dissolved)	**µg/L**	0.5	11	<1	<1	<1	-	<1	<1	<1	<1
Silver (dissolved)	**µg/L**	0.01	0.05	<5	<5	<5	-	<5	<5	<5	<5
Zinc (dissolved)	**µg/L**	1	8	<5	<5	16	-	<5	20	6	<5
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	280	136	-	-	-	-	-	-
Biochemical Oxygen Demand	**mg/L**	2	1/5^	<5	<5	-	-	-	-	-	-

***** 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.

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 04 - 09 March - 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
Field																					
pH	-	-	6.5-8	7.99	8.34	8.15	8	8.06	7.94	7.95	7.99	7.1	7.6	7.8	6.8	6.7	6.8	7.0	7.0	6.9	7.0
Electrical Conductivity	µS/cm	-	30-350	50	76	59	64	51	37	37	51	107	30.9	30.2	24.3	20.6	36.0	16.7	16.6	41.2	42.7
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	124	118	127	127	137	123	112	108	62.0	14.0	20.4	181.6	181.2	208.4	49.3	47.5	76.4	95.9
Temperature	°C	-	No Water Quality Objective Value	15.8	19.45	19.91	17.94	16.71	18.58	18.25	15.94	19.5	13.6	13.5	15.8	15.7	18.0	16.0	16.0	16.9	16.8
Dissolved Oxygen	% saturation	-	90-110	96.6	87.3	93.3	95	95.3	94.8	95.1	101	56.1	83.6	88.0	86.2	86.9	94.2	84.0	86.2	60.7	62.2
Turbidity	NTU	-	2-25	7.48	2.34	6.01	4.62	7.11	26.1	40.6	8.36	32.6	5.2	5.6	19.4	12.6	9.3	7.3	7.4	10.6	10.7
Laboratory analytes																					
TSS	mg/L	5	No Water Quality Objective Value	9.2	<5	<5	<5	15	52	62	16	58	8.0	5.2	20	17	15	5.8	5.8	7.8	18.0
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	40	52	43	43	39	32	34	41	54	17.0	15.0	10	8.6	22	8.0	7.1	19.0	18.0
Nutrients																					
Ammonia as N	µg/L	5	13	<5	<5	<5	<5	<5	<5	<5	<5	5	<5	<5	<5	<5	19	<5	<5	<5	<5
Nitrite + Nitrate as N (NOx)	µg/L	10	15	20	10	80	20	10	10	70	20	90	50	60	<10	<10	<10	20	130	4	5
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	80	50	140	180	70	90	830	160	100	40	190	80	80	140	260	110	300	180
Nitrogen (Total)	µg/L	10	250	100	60	220	200	80	10	890	180	180	50	250	80	80	140	280	240	460	310
Reactive Phosphorus	µg/L	1	15	4	10	5	4	5	4	3	5	3	4	4	3	5	5	3	2	6	7
Phosphorus (Total)	µg/L	5	20	33	120	26	<5	25	98	70	28	59	17	32	29	29	22	13	32	15	16
Inorganics																					
Cyanide Total	µg/L	4	4	8	9	8	<4	9	8	<4	7	9	8	8	9	7	5	5	4	4	5
Hydrocarbons																					
Oil and Grease	mg/L	5	No Water Quality Objective Value	<5	<5	<5	11	<5	5.5	<5	<5	<5	<5	<5	<5	<5	<5	14	<5	23	<5
Metals																					
Aluminium (dissolved)	µg/L	5.0	27	120	30	110	58	120	130	89	120	100	<5	7	28	26	6	28	39	32	78
Arsenic (dissolved)	µg/L	1.0	0.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	µg/L	1.0	0.01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1
Copper (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	1	2	2	2
Iron (dissolved)	µg/L	50.0	300	120	<50	110	70	120	170	140	140	230	70.0	<50	100	60	350	450	320	94	1200
Lead (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	5.0	1,200	<5	15	6	<5	<5	6	7	<5	1.1	11.0	<5	6	<5	120	7	7	41	48
Nickel (dissolved)	µg/L	1.0	8	<1	<1	<1	<1	<1	<1	<1	<1	3.0	<1	<1	<1	<1	<1	<1	<1	1	2
Silver (dissolved)	µg/L	5.0	0.02	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	5.0	2.4	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	8	<5	<5	6	5

* 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: 04 - 09 March 2022 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45
Flow Rate							
Inflow^	**ML/day**			-	-	0.822	0.044
Outflow^	**ML/day**		4.32	-	0.014	-	-
Field							
pH	**pH Unit**	-	6.5-8.5	7.35	-	-	-
Electrical Conductivity	**µS/cm**	-	700	0	-	-	-
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	172	-	-	-
Temperature	**°C**	-	15	21.66	-	-	-
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	90.5	-	-	-
Turbidity	**NTU**	-	<25	0.71	-	-	-
Laboratory analytes							
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	-	-	-
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	<1	-	-	-
Nutrients							
Ammonia as N	**µg/L**	5	No Water Quality Objective Value	<5	-	-	-
Nitrite + Nitrate as N (NOx)	**µg/L**	2	No Water Quality Objective Value	40	-	-	-
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	2	-	-	-
Nitrogen (Total)	**µg/L**	10	270	240	-	-	-
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	4	-	-	-
Phosphorus (Total)	**µg/L**	5	30	8	-	-	-
Inorganics							
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	4	-	-	-
Hydrocarbons							
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	<5	-	-	-
Metals							
Aluminium (dissolved)	**µg/L**	5	55	<5	-	-	-
Arsenic (dissolved)	**µg/L**	0.2	13	<1	-	-	-
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<1	-	-	-
Copper (dissolved)	**µg/L**	0.5	14	4	-	-	-
Iron (dissolved)	**µg/L**	2	300	<50	-	-	-
Lead (dissolved)	**µg/L**	0.1	3.4	<1	-	-	-
Manganese (dissolved)	**µg/L**	0.5	1,900	<5	-	-	-
Nickel (dissolved)	**µg/L**	0.5	11	<1	-	-	-
Silver (dissolved)	**µg/L**	0.01	0.05	<5	-	-	-
Zinc (dissolved)	**µg/L**	1	8	27	-	-	-
Biological							
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-
Biological Oxygen Demand	**mg/L**		5	<5	-	-	-

* 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

^ 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 EPL Sampling: 04 - 07 April 2022

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 09 February 2022, 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.

No discharge was occuring at the time the samples at EPL 41 were collected.
Any exceeding values are likely representative of background conditions after approximately 25.4 mm of rain between 01-07 April 2022 at Tantangara and 15.4mm of rain between 01 - 07 April 2022 at Lobs Hole.
Given the amount of rainfall, it is noted that it is unusal for EPL 24 to be dry, however there was no water flow at this location in April 2022.

The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.

Based on water quality results from upstream of the site, site activity, and supporting evidence the monitoring are a result of the recent bushfire activity in the area and not site works.

In situ water sampling results for EPL10, 11, 21, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37 are unavailable due to a malfunction in the monitoring software used.

The publication of this pollution monitoring data is carried out in accordance with section 66 (6) of the Protection of the Environment Operations Act 1997 (NSW).

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 04 - 07 April 2022 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40
Field											
pH	pH Unit	-	6.5-8	-	-	8.64	-	-	8.48	7.2	9.81
Electrical Conductivity	µS/cm	-	20-30	-	-	19.8	-	-	20	15.5	21
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	-	-	218.1	-	-	259	92.4	142.5
Temperature	°C	-	No Water Quality Objective Value	-	-	13.3	-	-	13.9	12.6	12.5
Dissolved Oxygen	% saturation	-	90-110	-	-	89.7	-	-	87.9	88.3	87
Turbidity	NTU	-	1-20	-	-	4.41	-	-	7.02	9.71	6.08
Laboratory analytes											
Total suspended solids	mg/L	5	No Water Quality Objective Value	25.0	23.0	8.2	8.4	8.1	8.5	7.6	6.7
Hardness as $CaCO_3$ (filtered)	mg/L	1	No Water Quality Objective Value	< 5	< 5	< 5	< 5	< 5	< 5	54	5.4
Nutrients											
Ammonia as N	µg/L	5	10	28.0	19.0	<10	<10	<10	<10	<10	<10
Nitrite + Nitrate as N (NOx)	µg/L	2	10	40.0	40.0	<10	10.0	20.0	10.0	<10	20.0
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	50.0	40.0	30.0	<10	<10	10.0	20.0	<10
Nitrogen (Total)	µg/L	10	350	90.0	80.0	30.0	10.0	20.0	20.0	20.0	20.0
Reactive Phosphorus	µg/L	1	5	1.0	1.0	1.0	1.0	1.0	1.0	4.0	1.0
Phosphorus (Total)	µg/L	5	10	14.0	<5	19.0	25.0	34.0	14.0	50.0	8.0
Inorganics											
Cyanide Total	µg/L	4	7	4	5	4	4	4	<4	<4	<4
Hydrocarbons											
Oil and Grease	mg/L	5	No Water Quality Objective Value	< 5	< 5	< 5	< 5	< 5	< 5	54	5
Metals											
Aluminium (dissolved)	µg/L	5	55	11.0	8.0	24.0	22.0	16.0	14.0	16.0	16.0
Arsenic (dissolved)	µg/L	0.2	13	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	µg/L	0.2	1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	µg/L	0.5	14	<1	<1	<1	<1	<1	<1	<1	<1
Iron (dissolved)	µg/L	2	300	<50	<50	230	260	250	270	170	140
Lead (dissolved)	µg/L	0.1	3.4	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	0.5	1,900	<5	<5	22.0	28.0	29.0	29.0	19.0	15.0
Nickel (dissolved)	µg/L	0.5	11	<1	<1	<1	<1	<1	<1	<1	<1
Silver (dissolved)	µg/L	0.01	0.05	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	1	8	<5	<5	<5	<5	<5	<5	<5	<5
Biological											
Faecal Coliforms	CFU/100mL	1	10/100^	2	1	-	-	-	-	-	-
Biochemical Oxygen Demand	mg/L	2	1/5^	<5	<5	-	-	-	-	-	-

***** 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.

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 04 - 07 April 2022 - 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
Field																					
pH	-	-	6.5-8	7.78	8.31	8.15	6.84	8.00	8.34	8.23	8.19	Dry	-	-	-	-	-	-	-	-	-
Electrical Conductivity	µS/cm	-	30-350	84.0	103.0	89.0	111	84.0	86.0	86.0	87.0	Dry	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	158	166	174	215	169	167	171	177	Dry	-	-	-	-	-	-	-	-	-
Temperature	°C	-	No Water Quality Objective Value	13.3	13.6	14.1	12.4	13.3	14.0	14.2	14.2	Dry	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	% saturation	-	90-110	97.7	90.3	90.8	98.4	96.8	97.0	85.5	89.0	Dry	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	2-25	4.73	1.94	4.22	3.17	4.31	-	3.68	3.49	Dry	-	-	-	-	-	-	-	-	-
Laboratory analytes																					
TSS	mg/L	5	No Water Quality Objective Value	5	< 5	< 5	< 5	5.4	< 5	< 5	< 5	Dry	29.0	29.0	36.0	< 5	9.40	9.80	9.20	9.20	12.0
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	47.0	58.0	49.0	37.0	45.0	48.0	49.0	46.0	Dry	17.0	18.0	9.90	8.50	8.80	5.40	5.70	11.0	12.0
Nutrients																					
Ammonia as N	µg/L	5	13	<10	<10	<10	<10	<10	<10	<10	<10	Dry	<10	<10	<5	<5	<5	<5	<5	<10	<10
Nitrite + Nitrate as N (NOx)	µg/L	10	15	<10	<10	0	<10	30	<10	10	<10	Dry	1500	1000	10.0	10.0	20.0	40.0	10.0	18000	200
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	<10	<10	20.0	10.0	60.0	30.0	30.0	20.0	Dry	80.0	200	190	290	180	160	490	3000	1900
Nitrogen (Total)	µg/L	10	250	<10	<10	60.0	10.0	90.0	30.0	40.0	20.0	Dry	2300	1000	100	320	190	240	500	21000	21000
Reactive Phosphorus	µg/L	1	15	2.00	6.00	2.00	2.00	1.00	2.00	1.00	2.00	Dry	1.00	2.00	68.0	5.00	6.00	17.0	5.00	3.00	4.00
Phosphorus (Total)	µg/L	5	20	10.0	24.0	13.0	13.0	<5	9.0	<5	7.00	Dry	100	100	3.00	3.00	3.00	3.00	3.00	26.0	29.0
Inorganics																					
Cyanide Total	µg/L	4	4	4	4	4	4	4	4	<4	4	Dry	<4	<4	<4	<4	<4	<4	9	4	<4
Hydrocarbons																					
Oil and Grease	mg/L	5	No Water Quality Objective Value	27	15	12	9	12	< 5	< 5	13	Dry	< 5	12	26	16	< 5	< 5	32	< 5	7.9
Metals																					
Aluminium (dissolved)	µg/L	5.0	27	12.0	<5	17.0	10.0	14.0	12.0	10.0	11.0	Dry	19.0	16.0	21.0	13.0	30.0	47.0	46.0	28.0	23.0
Arsenic (dissolved)	µg/L	1.0	0.8	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	µg/L	1.0	0.01	<1	<1	<1	<1	<1	<1	<1	2	Dry	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	2.0	<1	<1	1.0
Iron (dissolved)	µg/L	50.0	300	<50	<50	<50	<50	<50	<50	<50	70	Dry	100	100	<50	<50	230	160	170	700	600
Lead (dissolved)	µg/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	5.0	1,200	<5	14	<5	<5	<5	<5	<5	<5	Dry	12.0	12.0	<5	<5	20.0	6.0	<5	20.0	22.0
Nickel (dissolved)	µg/L	1.0	8	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver (dissolved)	µg/L	5.0	0.02	<5	<5	<5	<5	<5	<5	<5	<5	Dry	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	µg/L	5.0	2.4	<5	<5	<5	8.00	<5	<5	<5	<5	Dry	<5	<5	<5	<5	<5	<5	<5	<5	<5

* 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: 04 - 07 April 2022 - Treated Water

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45
Flow Rate							
Inflow^	**ML/day**			-	-	0.822	0.044
Outflow^	**ML/day**		4.32	-	0.008	-	-
Field							
pH	**pH Unit**	-	6.5-8.5	-	-	-	-
Electrical Conductivity	**µS/cm**	-	700	-	-	-	-
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	-	-	-	-
Temperature	**°C**	-	15	-	-	-	-
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	-	-	-	-
Turbidity	**NTU**	-	<25	-	-	-	-
Laboratory analytes							
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	< 5	-	-	-
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	< 1	-	-	-
Nutrients							
Ammonia as N	**µg/L**	5	No Water Quality Objective Value	<10	-	-	-
Nitrite + Nitrate as N (NOx)	**µg/L**	2	No Water Quality Objective Value	400	-	-	-
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	10	-	-	-
Nitrogen (Total)	**µg/L**	10	270	390	-	-	-
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	<1	-	-	-
Phosphorus (Total)	**µg/L**	5	30	14	-	-	-
Inorganics							
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	4	-	-	-
Hydrocarbons							
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	26	-	-	-
Metals							
Aluminium (dissolved)	**µg/L**	5	55	<5	-	-	-
Arsenic (dissolved)	**µg/L**	0.2	13	<1	-	-	-
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	<1	-	-	-
Copper (dissolved)	**µg/L**	0.5	14	3	-	-	-
Iron (dissolved)	**µg/L**	2	300	<50	-	-	-
Lead (dissolved)	**µg/L**	0.1	3.4	<1	-	-	-
Manganese (dissolved)	**µg/L**	0.5	1,900	<5	-	-	-
Nickel (dissolved)	**µg/L**	0.5	11	<1	-	-	-
Silver (dissolved)	**µg/L**	0.01	0.05	<5	-	-	-
Zinc (dissolved)	**µg/L**	1	8	9	-	-	-
Biological							
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-
Biological Oxygen Demand	**mg/L**		5	<5	-	-	-

* 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

^ 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 EPL Sampling: 04 - 05 May 2022

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 13 May 2022, and the approved Water Management Plan to ensure that works are not impacting on nearby receiving waters.

Amendments to the EPL included:
- updates to reflect the approval of scheduled works;
- additional monitoring points 46-51; and
- approval to discharge treated water to Tantangara Reservoir at a rate of 50 L/s;

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

EPL sampling was complete for Reservoir and Surface water samples prior to receiving the amended EPL. The additional monitoring locations will be sampled in June 2022.
No discharge was occuring at the time the samples at EPL 41 were collected.

Any exceeding values are likely representative of background conditions after a wet weather event of approximately 17.8mm of rain between 04 - 05 May 2022 at Tantangara.

The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.

Water sampling results for EPL26, 27, 36 and 37 are unavailable due to laboratory processing issues.

The publication of this pollution monitoring data is carried out in accordance with section 66 (6) of the Protection of the Environment Operations Act 1997 (NSW).

Snowy Hydro 2.0 Main Works

Monthly EPL Sampling: 04 - 05 May 2022 - Talbingo and Tantangara Reservoir

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL10	EPL11	EPL28	EPL29	EPL32	EPL38	EPL39	EPL40
Field											
pH	**pH Unit**	-	6.5-8	7.99	8.5	6.5	6.5	6.64	6.57	7.95	7.12
Electrical Conductivity	**µS/cm**	-	20-30	43.9	42.3	18.3	19.4	19.5	19.2	13.2	16.5
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	198.8	143.9	225.9	238.6	231.6	232.5	137.1	207.7
Temperature	**°C**	-	No Water Quality Objective Value	15.3	15.3	11	12.7	12.7	12.3	7.9	7.9
Dissolved Oxygen	**% saturation**	-	90-110	86.7	90.1	87.9	84.7	83.1	86.1	93.2	95.9
Turbidity	**NTU**	-	1-20	1.57	1.64	4.44	4.78	3.31	3.95	9.89	3.59
Laboratory analytes											
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	<5	<5	<5	<5	<5	<5	<5
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	23	20	8.1	8.1	10	7.8	6.1	7.7
Nutrients											
Ammonia as N	**µg/L**	5	10	12	<5	<5	<5	<5	<5	<5	<5
Nitrite + Nitrate as N (NOx)	**µg/L**	2	10	4200	1500	10	50	<10	<10	40	10
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	900	600	280	350	230	180	300	450
Nitrogen (Total)	**µg/L**	10	350	5100	2100	290	400	230	190	340	460
Reactive Phosphorus	**µg/L**	1	5	2	10	1	3	2	5	1	1
Phosphorus (Total)	**µg/L**	5	10	<5	<5	13	17	3100	<5	<5	<5
Inorganics											
Cyanide Total	**µg/L**	4	7	<4	<4	<4	<4	<4	<4	<4	<4
Hydrocarbons											
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	<5	18	<5	<5	<5	<5	63	5.5
Metals											
Aluminium (dissolved)	**µg/L**	5	55	63	59	41	29	13	18	21	10
Arsenic (dissolved)	**µg/L**	0.2	13	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	8	6	1	2	<1	<1	<1	<1
Copper (dissolved)	**µg/L**	0.5	14	1	4	2	2	2	3	1	<1
Iron (dissolved)	**µg/L**	2	300	60	50	130	160	140	150	100	70
Lead (dissolved)	**µg/L**	0.1	3.4	<1	<1	<1	<1	<1	<1	<1	<1
Manganese (dissolved)	**µg/L**	0.5	1,900	6	6	<5	<5	<5	<5	7	<5
Nickel (dissolved)	**µg/L**	0.5	11	5	4	<1	2	<1	<1	<1	<1
Silver (dissolved)	**µg/L**	0.01	0.05	<5	<5	<5	<5	<5	<5	<5	<5
Zinc (dissolved)	**µg/L**	1	8	8	10	<5	<5	11	12	13	<5
Biological											
Faecal Coliforms	**CFU/100mL**	1	10/100^	2	1	-	-	-	-	-	-
Biochemical Oxygen Demand	**mg/L**	2	1/5^	<5	<5	-	-	-	-	-	-

***** 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.

Snowy Hydro 2.0 Main Works
Monthly EPL Sampling: 25 May 2022 Groundwater

Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL1 (RMSB6)	EPL2 (RSMB7)	EPL4 (RSMB8)	EPL25 (RSMB9)
Physiochemical							
pH	pH Unit	-	6.5-8	7.11	6.59	7.37	6.12
Electrical Conductivity	µS/cm	-	30-350	1200	449	1490	445
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	-72	17.0	-103	34
Temperature	°C	-	No Water Quality Objective Value	16.4	16.4	16.1	16.8
Dissolved Oxygen	% saturation	-	No Water Quality Objective Value	87.2	82.3	81.7	81.4
Turbidity	NTU	-	No Water Quality Objective Value	27.3	54	0	860
Nutrients							
Nitrogen (Total)	µg/L	10	250	200	<200	300	300
Reactive Phosphorus	µg/L	1	15	<50	<50	<50	<50
Metals							
Aluminium (dissolved)	µg/L	5	27	12	<5	<5	38
Copper (dissolved)	µg/L	0.5	1	3	17	<1	<1
Iron (dissolved)	µg/L	2	300	420	1400	1000	3600
Lead (dissolved)	µg/L	0.1	1	<1	<1	<1	<1
Manganese (dissolved)	µg/L	0.5	1,200	190	180	460	1200
Nickel (dissolved)	µg/L	0.5	8	22.0	6.0	20.0	7.0
Silver (dissolved)	µg/L	0.01	0.02	<5	<5	<5	<5
Zinc (dissolved)	µg/L	1	2.4	6	25	<5	<5

* 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: 04 - 05 May 2022 - 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
Field																					
pH	-	-	6.5-8	8.02	7.89	8.06	7.99	8.08	7.98	8.10	7.97	7.44	7.20	6.23	6.80	6.78	6.66	6.51	5.55	6.38	7.46
Electrical Conductivity	µS/cm	-	30-350	62.0	70.0	68.0	65.0	65.0	65.0	65.0	65.0	135.0	22.5	21.1	20.7	18.4	19.5	10.9	10.9	26.9	27.8
Oxidation Reduction Potential	mV	-	No Water Quality Objective Value	110	170	156	183	145	172	167	169	153	252	268	236	240	228	246	236	232	208
Temperature	°C	-	No Water Quality Objective Value	9.15	9.39	9.46	9.55	9.16	9.30	9.51	9.36	12.08	6.40	6.50	9.00	9.00	12.70	8.90	9.00	9.00	9.30
Dissolved Oxygen	% saturation	-	90-110	120	110	113	113	114	115	111	111	119	77.6	87.8	88.6	91.3	89.1	89.9	91.2	86.4	94.3
Turbidity	NTU	-	2-25	4.33	22.4	4.17	6.10	3.76	6.51	4.55	3.65	275	5.35	2.92	63.5	33.4	4.76	9.48	7.87	5.59	8.62
Laboratory analytes																					
TSS	mg/L	5	No Water Quality Objective Value	<5	<5	<5	5.0	<5	<5	<5	<5	110	-	-	52	49	<5	<5	5	-	-
Hardness as CaCO3	mg/L	1	No Water Quality Objective Value	46	47	44	37	40	42	39	44	61	-	-	9.7	12	7.7	5.5	5.5	-	-
Nutrients																					
Ammonia as N	µg/L	5	13	<5	57.0	<5	<5	<5	<5	<5	<5	<5	-	-	<5	<5	9.00	<5	<5	-	-
Nitrite + Nitrate as N (NOx)	µg/L	10	15	1.0	1.00	<1	<1	1.0	<1	<1	<1	31.0	-	-	6.00	<1	<1	2.00	260	-	-
Kjeldahl Nitrogen Total	µg/L	10	No Water Quality Objective Value	4.00	4.00	6.00	5.00	4.00	4.00	5.00	5.00	180	-	-	520	190	20.0	280	190	-	-
Nitrogen (Total)	µg/L	10	250	50.0	50.0	70.0	60.0	50.0	50.0	60.0	50.0	490	-	-	580	190	210	300	450	-	-
Reactive Phosphorus	µg/L	1	15	3.00	9.00	3.00	3.00	3.00	3.00	3.00	3.00	7.00	-	-	5.00	10.0	1.00	1.00	2.00	-	-
Phosphorus (Total)	µg/L	5	20	<5	<5	<5	<5	<5	34.0	12.0	11.0	85.0	-	-	69.0	24.0	13.0	10.0	8.00	-	-
Inorganics																					
Cyanide Total	µg/L	4	4	<4	<4	<4	<4	<4	<4	<4	<4	<4	-	-	<4	<4	<4	<4	<4	-	-
Hydrocarbons																					
Oil and Grease	mg/L	5	No Water Quality Objective Value	<5	<5	<5	<5	11	8	6	<5	33	-	-	<5	<5	8	15	<5	-	-
Metals																					
Aluminium (dissolved)	µg/L	5.0	27	170	49.0	73.0	110	70.0	49.0	37.0	36.0	120	-	-	31.0	22.0	19.0	24.0	20.0	-	-
Arsenic (dissolved)	µg/L	1.0	0.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<1	<1	<1	<1	<1	-	-
Chromium (III+VI) (dissolved)	µg/L	1.0	0.01	35.0	18.0	14.0	14.0	6.00	4.00	2.00	2.00	3.00	-	-	<1	<1	<1	<1	<1	-	-
Copper (dissolved)	µg/L	1.0	1	<1	<1	<1	1.00	1.00	<1	1.00	<1	1.00	-	-	<1	2.00	4.00	<1	1.00	-	-
Iron (dissolved)	µg/L	50.0	300	170	110	90.0	100	60.0	50.0	<50	<50	130	-	-	70.0	80.0	160	100	110	-	-
Lead (dissolved)	µg/L	1.0	1	<1	<1	<1	1.0	<1	<1	<1	<1	<1	-	-	<1	<1	<1	<1	<1	-	-
Manganese (dissolved)	µg/L	5.0	1,200	5.00	14.0	5.00	6.00	<5	<5	<5	<5	550	-	-	6.00	7.00	<5	<5	5.00	-	-
Nickel (dissolved)	µg/L	1.0	8	23.0	13.0	10.0	9.00	4.00	3.00	2.00	1.00	3.00	-	-	<1	<1	<1	<1	<1	-	-
Silver (dissolved)	µg/L	5.0	0.02	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	-	<5	<5	<5	<5	<5	-	-
Zinc (dissolved)	µg/L	5.0	2.4	8.00	8.00	<5	<5	10.0	<5	<5	<5	<5	-	-	<5	5.00	14.0	<5	8.00	-	-

* 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: 05 May 2022 - Treated Water

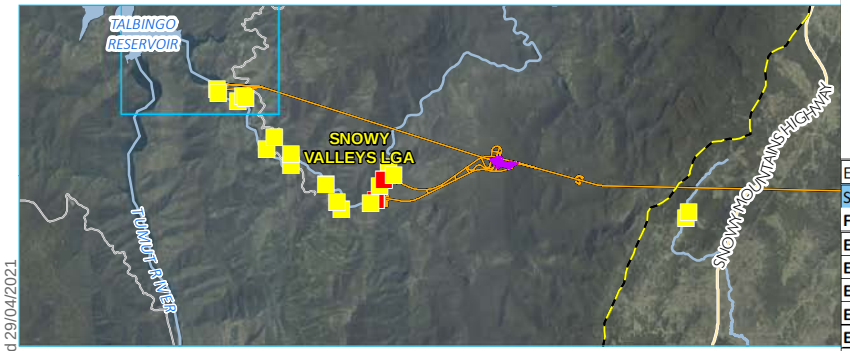
Analyte	Unit	Limit of Reporting	Water Quality Objective Value*	EPL 41	EPL 43	EPL 44	EPL 45
Flow Rate							
Inflow^	**ML/day**			-	-	0.669	0.044
Outflow^	**ML/day**		4.32	0.280	0.008	-	-
Field							
pH	**pH Unit**	-	6.5-8.5	11.9	-	-	-
Electrical Conductivity	**µS/cm**	-	700	82.2	-	-	-
Oxidation Reduction Potential	**mV**	-	No Water Quality Objective Value	44.0	-	-	-
Temperature	**°C**	-	15	16.2	-	-	-
Dissolved Oxygen	**% saturation**	-	No Water Quality Objective Value	78.1	-	-	-
Turbidity	**NTU**	-	<25	1.00	-	-	-
Laboratory analytes							
Total suspended solids	**mg/L**	5	No Water Quality Objective Value	<5	-	-	-
Hardness as $CaCO_3$ (filtered)	**mg/L**	1	No Water Quality Objective Value	2.30	-	-	-
Nutrients							
Ammonia as N	**µg/L**	5	No Water Quality Objective Value	420	-	-	-
Nitrite + Nitrate as N (NOx)	**µg/L**	2	No Water Quality Objective Value	150	-	-	-
Kjeldahl Nitrogen Total	**µg/L**	10	No Water Quality Objective Value	1600	-	-	-
Nitrogen (Total)	**µg/L**	10	270	1700	-	-	-
Reactive Phosphorus	**µg/L**	1	No Water Quality Objective Value	83.0	-	-	-
Phosphorus (Total)	**µg/L**	5	30	26.0	-	-	-
Inorganics							
Cyanide Total	**µg/L**	4	No Water Quality Objective Value	<4	-	-	-
Hydrocarbons							
Oil and Grease	**mg/L**	5	No Water Quality Objective Value	11	-	-	-
Metals							
Aluminium (dissolved)	**µg/L**	5	55	40.0	-	-	-
Arsenic (dissolved)	**µg/L**	0.2	13	<1	-	-	-
Chromium (III+VI) (dissolved)	**µg/L**	0.2	1	2.00	-	-	-
Copper (dissolved)	**µg/L**	0.5	14	<1	-	-	-
Iron (dissolved)	**µg/L**	2	300	<50	-	-	-
Lead (dissolved)	**µg/L**	0.1	3.4	2.00	-	-	-
Manganese (dissolved)	**µg/L**	0.5	1,900	<5	-	-	-
Nickel (dissolved)	**µg/L**	0.5	11	<1	-	-	-
Silver (dissolved)	**µg/L**	0.01	0.05	<5	-	-	-
Zinc (dissolved)	**µg/L**	1	8	24.0	-	-	-
Biological							
Faecal Coliforms	**CFU/100mL**	1	10/100^	<1	-	-	-
Biological Oxygen Demand	**mg/L**		5	<5	-	-	-

* 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.

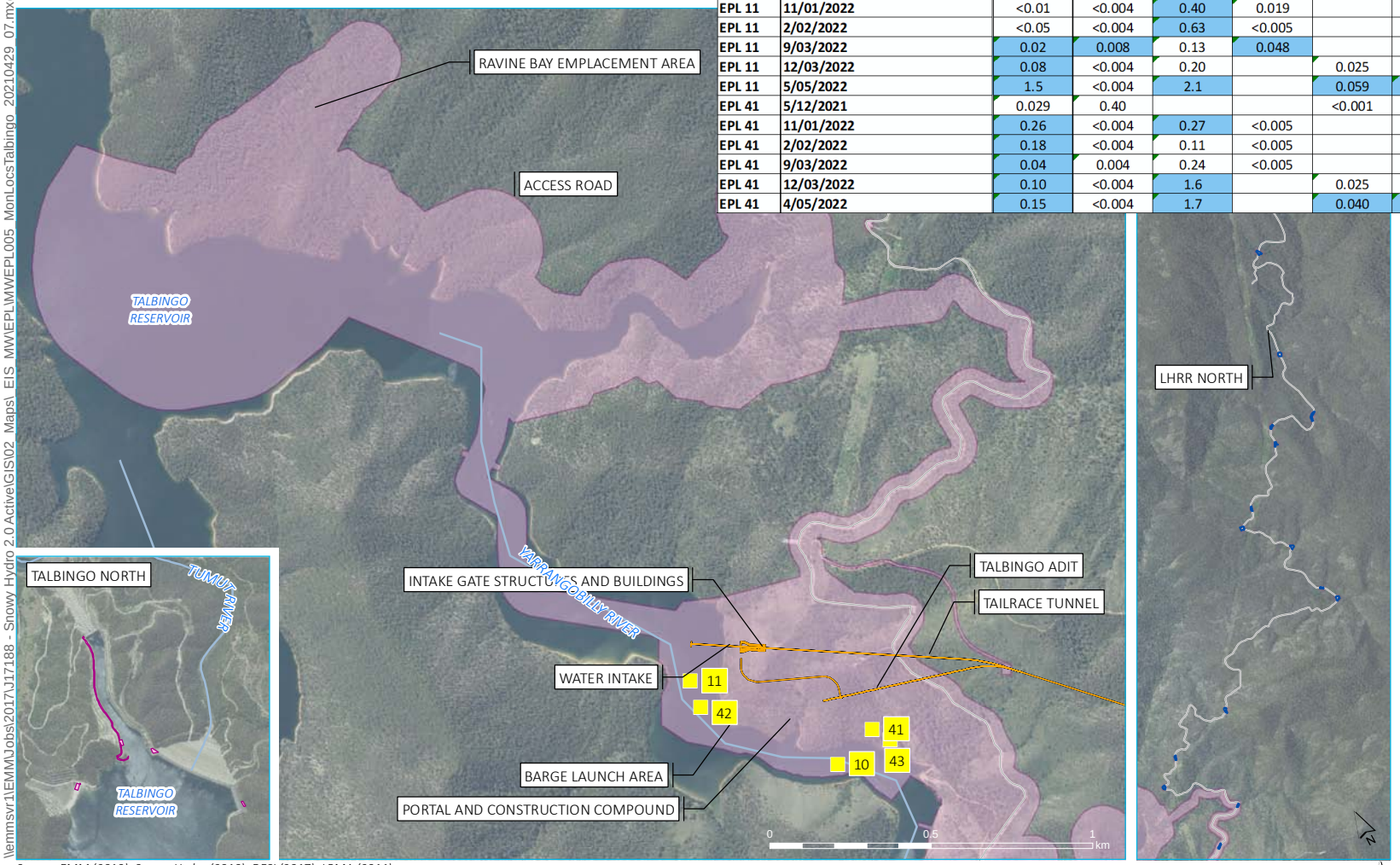
\- Samples not required

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

APPENDIX D – EXCEEDANCE MAP



		Inorganics			Metals						
		Nitrite + Nitrate as N	Cyanide Total	Nitrogen (Total)	Aluminium	Aluminium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Lead (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		0.01	0.004	0.01	0.005	0.005	0.001	0.001	0.001	0.005	0.005
Snowy 2.0 - Surface Water Guidelines		0.015	0.004	0.25	0.027	0.027	0.00001	0.001	0.001	0.00002	0.0024
Field ID	**Date**										
EPL 10	**11/01/2022**	0.03	<0.005	0.83	0.010		<0.001	<0.001	<0.001	<0.005	<0.005
EPL 10	**2/02/2022**	<0.05	<0.004	0.72	0.015		<0.001	<0.001	<0.001	<0.005	<0.005
EPL 10	**9/03/2022**	<0.01	0.009	0.13	0.059		<0.001	<0.001	<0.001	<0.005	<0.005
EPL 10	**12/03/2022**	0.06	<0.004	0.20		0.028	<0.001	0.004	<0.001	<0.005	<0.005
EPL 10	**5/05/2022**	4.2	<0.004	5.1		0.063	0.008	0.001	<0.001	<0.005	0.008
EPL 11	**11/01/2022**	<0.01	<0.004	0.40	0.019		<0.001	0.002	<0.001	<0.005	<0.005
EPL 11	**2/02/2022**	<0.05	<0.004	0.63	<0.005		<0.001	<0.001	<0.001	<0.005	<0.005
EPL 11	**9/03/2022**	0.02	0.008	0.13	0.048		<0.001	<0.001	<0.001	<0.005	<0.005
EPL 11	**12/03/2022**	0.08	<0.004	0.20		0.025	<0.001	0.009	<0.001	<0.005	<0.005
EPL 11	**5/05/2022**	1.5	<0.004	2.1		0.059	0.006	0.004	<0.001	<0.005	0.010
EPL 41	**5/12/2021**	0.029	0.40			<0.001		<0.05	<0.005	0.058	<5,000
EPL 41	**11/01/2022**	0.26	<0.004	0.27	<0.005		<0.001	0.003	<0.001	<0.005	0.028
EPL 41	**2/02/2022**	0.18	<0.004	0.11	<0.005		<0.001	0.003	<0.001	<0.005	0.010
EPL 41	**9/03/2022**	0.04	0.004	0.24	<0.005		<0.001	0.004	<0.001	<0.005	0.027
EPL 41	**12/03/2022**	0.10	<0.004	1.6		0.025	<0.001	0.002	<0.001	<0.005	0.044
EPL 41	**4/05/2022**	0.15	<0.004	1.7		0.040	0.002	<0.001	0.002	<0.005	0.024



GDA 1994 MGA Zone 55

N

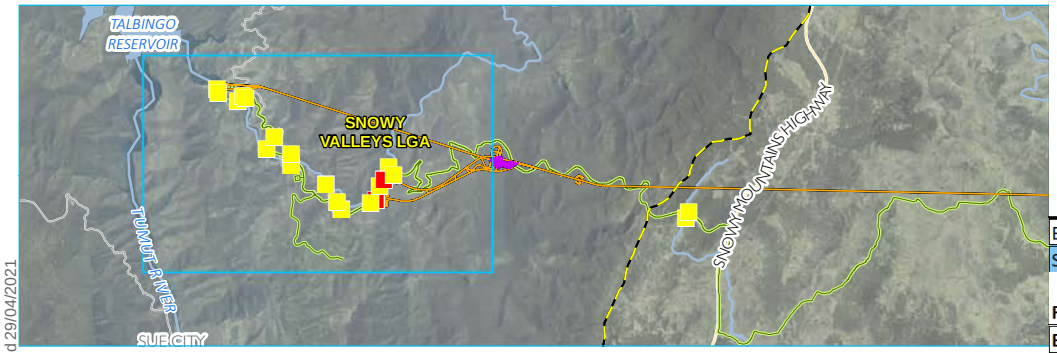
Figure 1 - EPL Exceedance Reservoir Water

snowy hydro

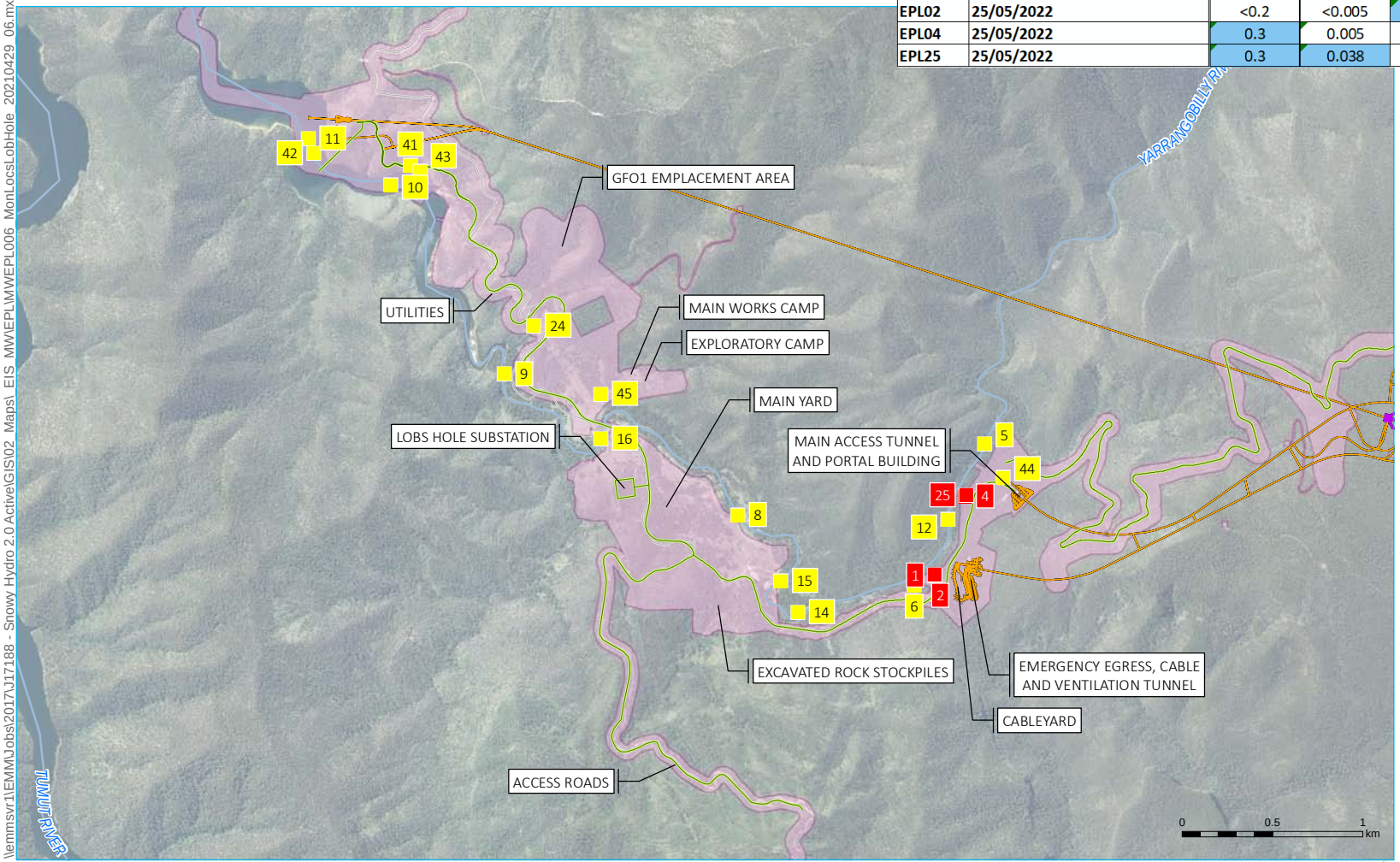
Future Generation
SALINI IMPREGILO · CLOUGH · LANE

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

\\emmsvr1\EMM\Jobs\2017\117188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MW\EPL\MWEPL005 MonLocsTalbingo 20210429 07.mxd 29/04/2021



	Nitrogen (Total)	Aluminium (filtered)	Copper (filtered)	Iron (filtered)	Nickel (filtered)	Zinc (filtered)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.01	0.005	0.001	0.05	0.001	0.005
Snowy 2.0 - Surface Water Guidelines	0.25	0.027	0.001	0.3	0.008	0.0024
Field ID	**Date**					
EPL01	**25/05/2022**	0.2	0.012	0.003	0.42	0.022	0.006
EPL02	**25/05/2022**	<0.2	<0.005	0.17	1.4	0.006	0.025
EPL04	**25/05/2022**	0.3	0.005	<0.001	1.0	0.020	<0.005
EPL25	**25/05/2022**	0.3	0.038	<0.001	3.6	0.007	<0.005



\\emmsvr1\EMM\Jobs\2017\317188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MW\EPL\MWEPL006 MonLocsLobHole 20210429 06.mxd 29/04/2021

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

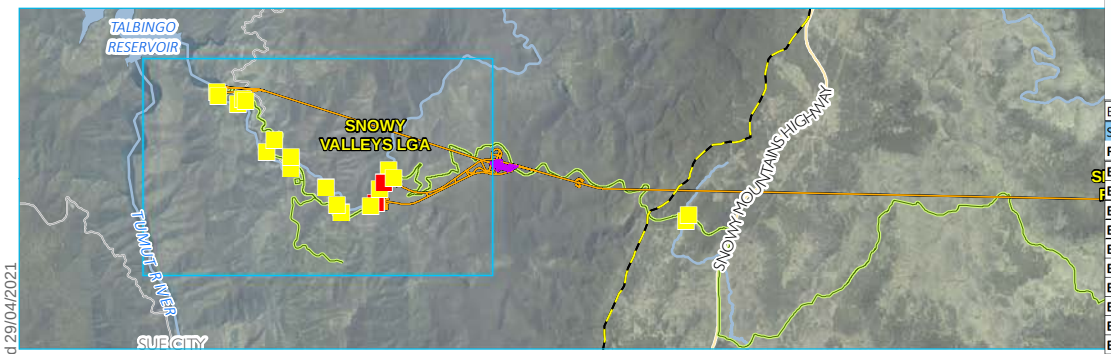
GDA 1994 MGA Zone 55

N

Figure 2 - EPL Exceedance - Groundwater

snowyhydro

Future Generation
SALINI IMPREGILO · CLOUGH · LANE

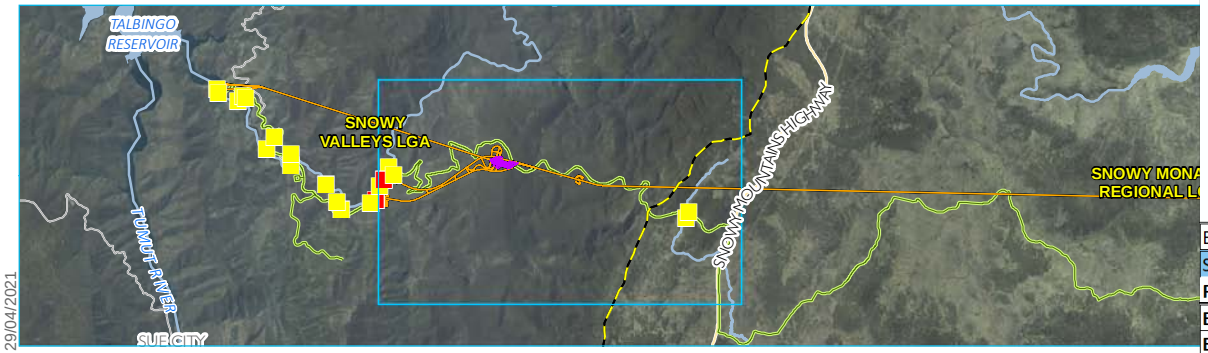


		Inorganics				Metals					
		Nitrite + Nitrate as N	Ammonia as N	Cyanide Total	Nitrogen (Total)	Aluminium	Aluminium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Nickel (filtered)	Zinc (filtered)
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL		0.01	0.005	0.004	0.01	0.005	0.005	0.001	0.001	0.001	0.005
Snowy 2.0 - Surface Water Guidelines		0.015		0.004	0.25	0.027	0.027	0.00001	0.001	0.008	0.0024
Field ID	**Date**										
EPL 05	**8/01/2022**	0.03	<0.01	<0.004	0.63	0.097		<0.001	<0.001	<0.001	<0.005
EPL 05	**7/03/2022**	0.02	<0.005	0.008	0.10	0.12		<0.001	<0.001	<0.001	<0.005
EPL 05	**4/05/2022**	0.01	<0.005	<0.004	0.05		0.17	0.035	<0.001	0.023	0.008
EPL 05	**5/12/2021**	<0.01	0.027	<0.004	0.11	0.030		<0.001	<0.001	<0.001	<0.005
EPL 06	**8/01/2022**	0.07	<0.005	<0.004	0.85	0.016		<0.001	<0.001	<0.001	<0.005
EPL 06	**1/02/2022**	<0.05	<0.005	<0.004	0.08	0.13		<0.001	<0.001	<0.001	<0.005
EPL 06	**7/03/2022**	0.01	<0.005	0.009	0.06	0.030		<0.001	<0.001	<0.001	<0.005
EPL 06	**4/05/2022**	0.01	0.057	<0.004	0.05		0.049	0.018	<0.001	0.013	0.008
EPL 06	**5/12/2021**	<0.01	0.024	0.018	0.06	0.018		<0.001	<0.001	<0.001	<0.005
EPL 08	**9/01/2022**	0.02	<0.01	0.004	0.55	0.066		<0.001	<0.001	<0.001	<0.005
EPL 08	**1/02/2022**	<0.05	0.11	<0.004	0.10	0.095		<0.001	<0.001	<0.001	<0.005
EPL 08	**7/03/2022**	0.08	<0.005	0.008	0.22	0.11		<0.001	<0.001	<0.001	<0.005
EPL 08	**4/05/2022**	<0.01	<0.005	<0.004	0.07		0.073	0.014	<0.001	0.010	<0.005
EPL 08	**5/12/2021**	<0.01	0.023	<0.004	0.20	0.047		<0.001	<0.001	<0.001	0.006
EPL 09	**10/01/2022**	<0.01	0.021	0.007	0.06	0.027		<0.001	<0.001	<0.001	<0.005
EPL 09	**1/02/2022**	<0.05	<0.01	<0.004	0.10	0.064		0.001	0.004	<0.001	<0.005
EPL 09	**8/03/2022**	0.02	<0.005	<0.004	0.20	0.058		<0.001	<0.001	<0.001	<0.005
EPL 09	**4/05/2022**	<0.01	<0.005	<0.004	0.06		0.11	0.014	0.001	0.009	<0.005
EPL 09	**5/12/2021**	<0.01	0.020	<0.005	0.09	0.034		<0.001	<0.001	<0.001	<0.005
EPL 12	**8/01/2022**	0.05	<0.01	<0.005	0.68	0.076		<0.001	<0.001	<0.001	<0.005
EPL 12	**7/03/2022**	0.01	<0.005	0.009	0.08	0.12		<0.001	<0.001	<0.001	<0.005
EPL 12	**4/05/2022**	0.01	<0.005	<0.004	0.05		0.070	0.006	0.001	0.004	0.010
EPL 12	**5/12/2021**	0.01	0.027	0.005	0.09	0.039		<0.001	<0.001	<0.001	<0.005
EPL 14	**5/12/2021**	0.02	0.024	0.005	0.14	0.040		<0.001	<0.001	<0.001	<0.005
EPL 14	**10/01/2022**	0.03	<0.01	<0.004	0.80	0.048		<0.001	<0.001	<0.001	<0.005
EPL 14	**6/03/2022**	0.01	<0.005	0.008	0.10	0.13		<0.001	<0.001	<0.001	<0.005
EPL 14	**4/05/2022**	<0.01	<0.005	<0.004	0.05		0.049	0.004	<0.001	0.003	<0.005
EPL 15	**5/12/2021**	<0.01	0.023	0.005	0.05	0.032		<0.001	<0.001	<0.001	<0.005
EPL 15	**8/01/2022**	<0.01	<0.005	<0.004	0.13	0.11		<0.001	<0.001	<0.001	<0.005
EPL 15	**6/03/2022**	0.07	<0.005	<0.004	0.89	0.089		<0.001	<0.001	<0.001	<0.005
EPL 15	**4/05/2022**	<0.01	<0.005	<0.004	0.06		0.037	0.002	0.001	0.002	<0.005
EPL 16	**5/12/2021**	<0.01	0.005	0.010	0.07	0.027		<0.001	<0.001	<0.001	<0.005
EPL 16	**10/01/2022**	<0.01	<0.01	<0.004	0.06	0.025		<0.001	0.003	<0.001	<0.005
EPL 16	**7/03/2022**	0.02	<0.005	0.007	0.18	0.12		<0.001	<0.001	<0.001	<0.005
EPL 16	**4/05/2022**	<0.01	<0.005	<0.004	0.05		0.036	0.002	<0.001	0.001	<0.005

\\emmsvr1\EMM\Jobs\2017\317188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MW\EPL\MWEPL006 MonLocsLobHole 20210429 06.mxd 29/04/2021

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

Figure 3 - EPL Exceedance - Surface Water



		Inorganics				Metals
		Nitrite + Nitrate as N	Ammonia as N	Cyanide Total	Nitrogen (Total)	Zinc (filtered)
		mg/L	mg/L	mg/L	mg/L	mg/L
EQL		0.01	0.005	0.004	0.01	0.005
Snowy 2.0 - Surface Water Guidelines		0.015		0.004	0.25	0.0024
Field ID	**Date**					
EPL26	**5/12/2021**	0.05	0.018	0.004	0.06	<0.005
EPL27	**5/12/2021**	0.02	0.029	0.010	0.08	<0.005
EPL 26	**1/02/2022**	<0.05	0.018	<0.004	0.09	0.021
EPL 26	**5/03/2022**	0.05	<0.005	0.008	0.05	<0.005
EPL 27	**10/01/2022**	7.0	<0.01	<0.005	12	<0.005
EPL 27	**5/03/2022**	0.06	<0.005	0.008	0.25	<0.005

\\emmsvr1\EMMJobs\2017\317188 - 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)

Figure 4 - EPL Exceedance - Surface Water

snowyhydro

Future Generation
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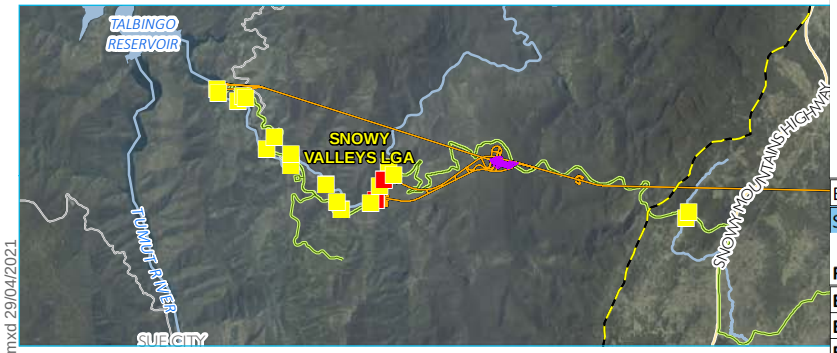
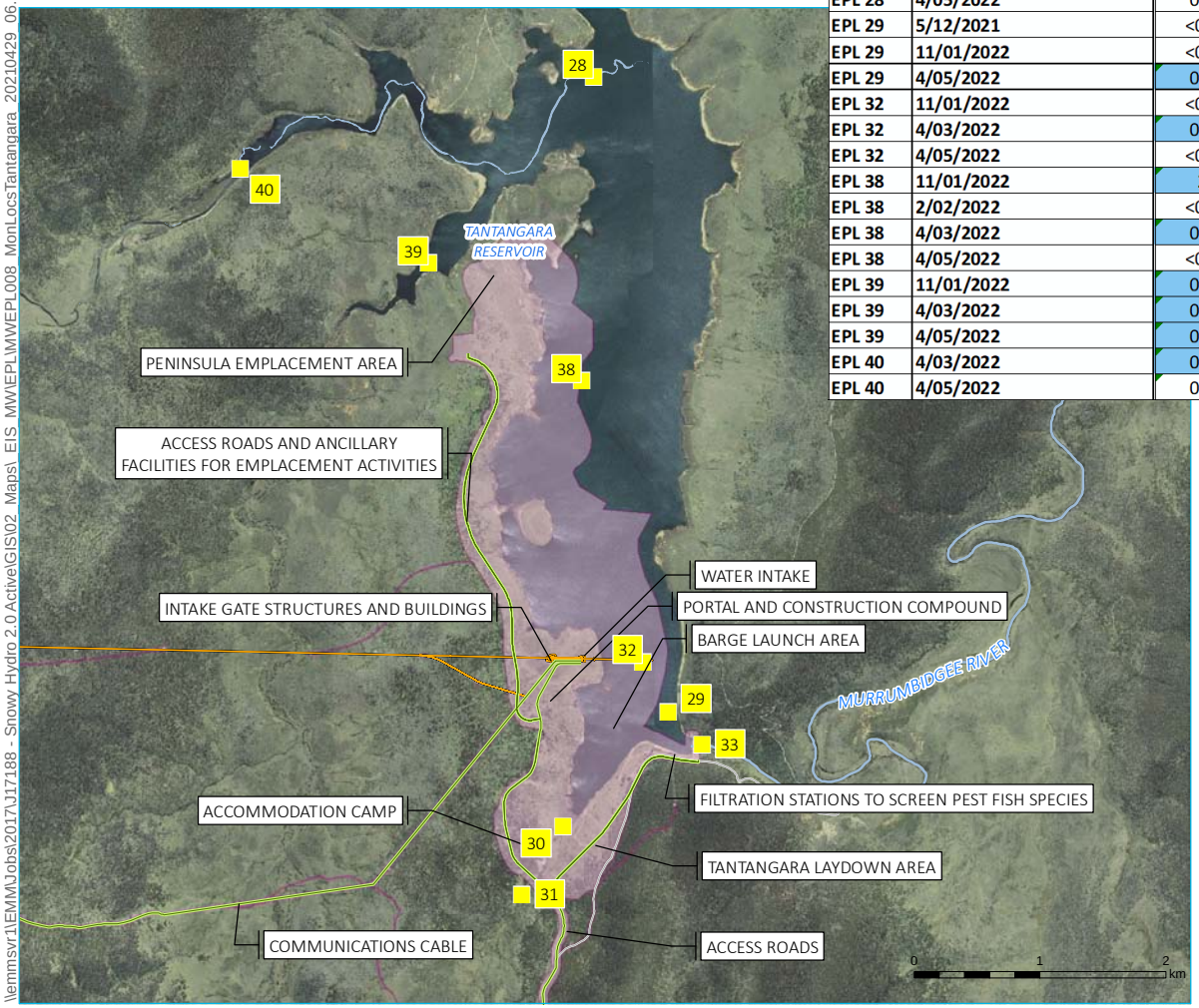
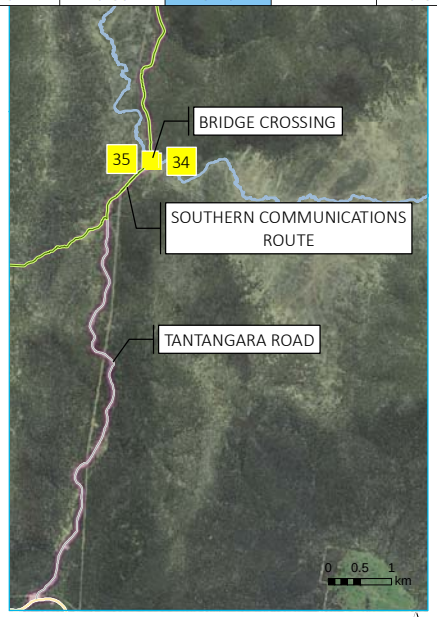


		Inorganics			Metals						
		Nitrite + Nitrate as N	Cyanide Total	Nitrogen (Total)	Aluminium	Aluminium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Zinc (filtered)
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL		0.01	0.004	0.01	0.005	0.005	0.001	0.001	0.05	0.005
Snowy 2.0 - Surface Water Guidelines		0.015	0.004	0.25	0.027	0.027	0.00001	0.001	0.3	0.0024
Field ID	**Date**									
EPL 28	**11/01/2022**	0.11	0.004	0.47	0.022		<0.001	<0.001	0.21	<0.005
EPL 28	**4/03/2022**	0.02	0.009	0.24	0.028		<0.001	0.002	0.24	0.016
EPL 28	**4/05/2022**	0.01	<0.004	0.29		0.041	0.001	0.002	0.13	<0.005
EPL 29	**5/12/2021**	<0.01	0.018	0.09	0.039		<0.001	<0.001	0.13	<0.005
EPL 29	**11/01/2022**	<0.01	<0.004	0.29	0.048		<0.001	0.003	0.19	<0.005
EPL 29	**4/05/2022**	0.05	<0.004	0.40		0.029	0.002	0.002	0.16	<0.005
EPL 32	**11/01/2022**	<0.01	<0.004	0.94	0.042		<0.001	<0.001	0.20	<0.005
EPL 32	**4/03/2022**	0.25	0.007	0.71	0.021		<0.001	<0.001	0.22	<0.005
EPL 32	**4/05/2022**	<0.01	<0.004	0.23		0.013	<0.001	0.002	0.14	0.011
EPL 38	**11/01/2022**	28	<0.005	29	0.040		<0.001	0.001	0.22	<0.005
EPL 38	**2/02/2022**	<0.05	<0.004	0.39	<0.005		<0.001	<0.001	0.23	<0.005
EPL 38	**4/03/2022**	0.04	0.005	0.26	0.051		<0.001	0.007	0.42	0.020
EPL 38	**4/05/2022**	<0.01	<0.004	0.19		0.018	<0.001	0.003	0.15	0.012
EPL 39	**11/01/2022**	0.03	<0.005	0.14	0.025		<0.001	<0.001	0.19	<0.005
EPL 39	**4/03/2022**	0.21	0.004	0.45	0.035		<0.001	0.002	0.32	0.006
EPL 39	**4/05/2022**	0.04	<0.004	0.34		0.021	<0.001	0.001	0.10	0.013
EPL 40	**4/03/2022**	0.03	0.004	0.43	0.021		<0.001	0.001	0.20	<0.005
EPL 40	**4/05/2022**	0.01	<0.004	0.46		0.010	<0.001	<0.001	0.07	<0.005





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

GDA 1994 MGA Zone 55

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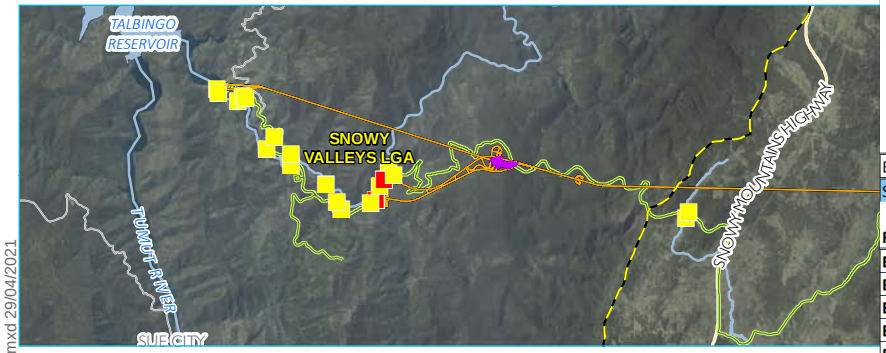
Figure 5 - EPL Exceedance - Reservoir Water

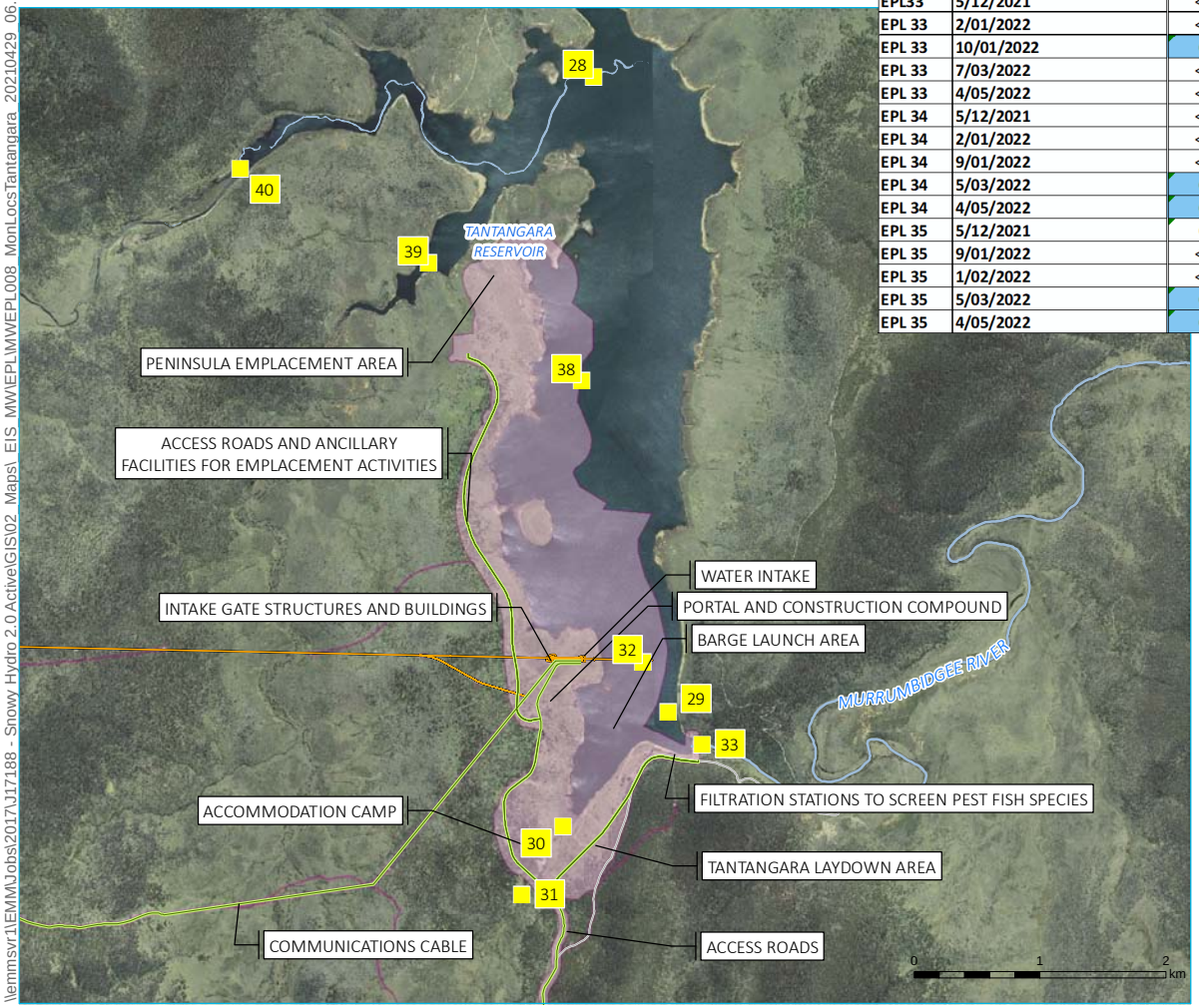
snowyhydro

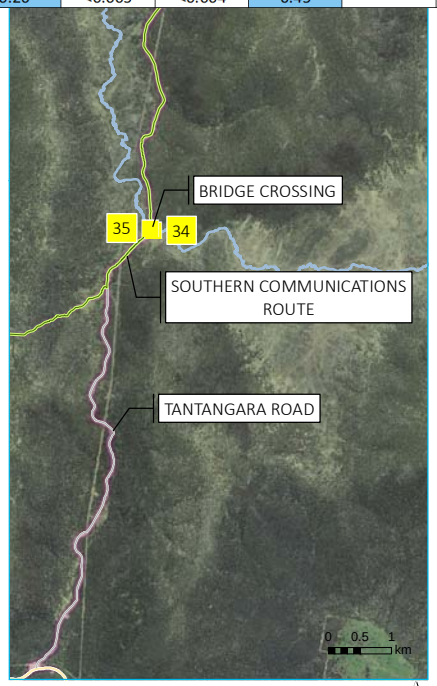
Future Generation

\\emmsvr1\EMMJobs\2017\317188 - Snowy Hydro 2.0 Active\GIS\02 Maps\ EIS MW\EPL\MWEPL008 MonLocsTantangara 20210429 06.mxd 29/04/2021



	Inorganics				Metals					
	Nitrite + Nitrate as N	Ammonia as N	Cyanide Total	Nitrogen (Total)	Aluminium	Aluminium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Zinc (filtered)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.01	0.005	0.004	0.01	0.005	0.005	0.001	0.001	0.05	0.005
Snowy 2.0 - Surface Water Guidelines	0.015		0.004	0.25	0.027	0.027	0.00001	0.001	0.3	0.0024
Field ID	**Date**									
EPL 30	7/03/2022	<0.01	<0.005	0.009	0.08	0.028		<0.001	<0.001	0.10	<0.005
EPL 30	4/05/2022	0.06	<0.005	<0.004	0.58		0.031	<0.001	<0.001	0.07	<0.005
EPL 31	7/03/2022	<0.01	<0.005	0.007	0.08	0.026		<0.001	<0.001	0.06	<0.005
EPL 31	4/05/2022	<0.01	<0.005	<0.004	0.19		0.022	0.001	0.002	0.08	0.005
EPL33	5/12/2021	<0.01	0.042	0.004	0.14	0.290		<0.001	<0.001	0.46	0.009
EPL 33	2/01/2022	<0.05	<0.005	<0.004	0.18	<0.005		<0.001	0.002	0.38	0.012
EPL 33	10/01/2022	0.02	<0.01	<0.004	0.14	0.047		<0.001	<0.001	0.20	<0.005
EPL 33	7/03/2022	<0.01	0.019	0.005	0.14	0.006		<0.001	0.002	0.35	0.008
EPL 33	4/05/2022	<0.01	0.009	<0.004	0.21		0.019	<0.001	0.004	0.16	0.014
EPL 34	5/12/2021	<0.01	0.027	<0.004	0.29	0.031		<0.001	<0.001	0.21	<0.005
EPL 34	2/01/2022	<0.05	0.042	0.006	0.15	<0.005		<0.001	<0.001	0.40	<0.005
EPL 34	9/01/2022	<0.01	<0.01	<0.005	0.12	0.030		<0.001	<0.001	0.27	<0.005
EPL 34	5/03/2022	0.02	<0.005	0.005	0.28	0.028		<0.001	0.001	0.42	<0.005
EPL 34	4/05/2022	0.02	<0.005	<0.004	0.30		0.024	<0.001	<0.001	0.10	<0.005
EPL 35	5/12/2021	0.05	0.025	0.004	0.22	0.030		<0.001	<0.001	0.25	0.016
EPL 35	9/01/2022	<0.01	<0.01	<0.004	0.11	0.036		<0.001	<0.001	0.27	<0.005
EPL 35	1/02/2022	<0.05	0.014	<0.004	0.17	<0.005		<0.001	<0.001	0.45	<0.005
EPL 35	5/03/2022	0.13	<0.005	0.004	0.24	0.039		<0.001	0.002	0.32	<0.005
EPL 35	4/05/2022	0.26	<0.005	<0.004	0.45		0.020	<0.001	0.001	0.11	0.008





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

GDA 1994 MGA Zone 55

N

Figure 6 - EPL Exceedance - Surface Water

snowyhydro

Future Generation

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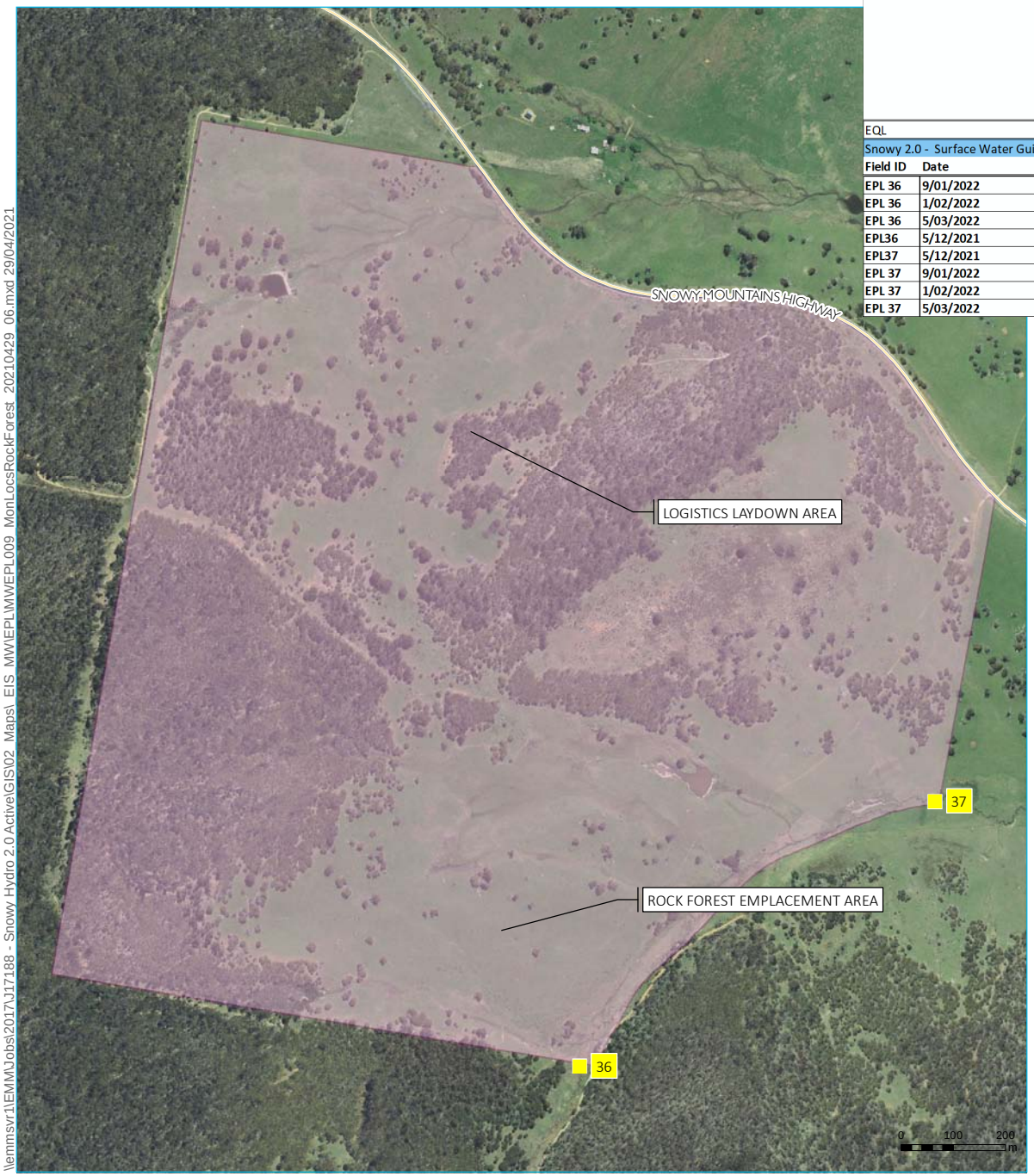
		Inorganics				Metals					
		Nitrite + Nitrate as N	Ammonia as N	Cyanide Total	Nitrogen (Total)	Aluminium	Arsenic (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Zinc (filtered)
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL		0.01	0.005	0.004	0.01	0.005	0.001	0.001	0.001	0.05	0.005
Snowy 2.0 - Surface Water Guidelines		0.015		0.004	0.25	0.027	0.0008	0.00001	0.001	0.3	0.0024
Field ID	**Date**										
EPL 36	**9/01/2022**	0.03	<0.01	<0.005	0.32	0.023	<0.001	<0.001	<0.001	1.00	<0.005
EPL 36	**1/02/2022**	<0.05	<0.01	<0.004	0.38	<0.005	0.001	<0.001	<0.001	1.3	<0.005
EPL 36	**5/03/2022**	0.16	<0.005	0.004	0.46	0.032	<0.001	0.001	0.002	0.94	0.006
EPL36	**5/12/2021**	<0.01	0.025	0.022	0.18	0.079	<0.001	<0.001	<0.001	0.23	0.006
EPL37	**5/12/2021**	<0.01	0.032	0.005	0.50	0.035	<0.001	<0.001	<0.001	1.10	<0.005
EPL 37	**9/01/2022**	0.02	<0.01	<0.005	0.35	0.023	<0.001	<0.001	<0.001	0.91	<0.005
EPL 37	**1/02/2022**	<0.05	0.012	<0.004	0.13	<0.005	<0.001	<0.001	<0.001	1.4	<0.005
EPL 37	**5/03/2022**	0.13	<0.005	0.005	0.31	0.078	<0.001	<0.001	0.002	1.2	0.005



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

GDA 1994 MGA Zone 55

N

Figure 7 - EPL Exceedance - Surface Water

snowy hydro

Future Generation

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