S2-FGJV-ENV-PLN-0010

SNOWY 2.0 MAIN WORKS – WATER MANAGEMENT PLAN

Approval Record			
Document preparation, review and approval		**Name in print**	**Signature**
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Document Revision Table		
Rev.	**Date**	**Description of modifications / revisions**
A	27.11.2019	Initial draft for SHL review
B	22.5.2020	Update to reflect conditions of approval and revised environmental management measures
C	15.6.2020	For consultation
D	25.06.2020	Update to address Commonwealth conditions of approval
E	06.08.2020	Revised to address stakeholder comments
F	19.09.2020	Revised to address DAWE and DPIE comments
G	15.10.2020	Revised to address NRAR clarification

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ABBREVIATIONS AND DEFINITIONS

Acronym	Definition
AFL	Agreement for Lease
AHD	Australian Height Datum
AIP	Aquifer Interference Policy
CoA	Infrastructure Conditions of Approval (SSI 9687)
Construction envelope	The maximum extent within which the disturbance area corridor can move to allow the final siting of infrastructure through the detailed design process
Disturbance footprint	The disturbance footprint as described in the PIR-RTS is the indicative corridor inside the larger construction envelope, where construction works required to build Snowy 2.0 can be carried out.
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
Exploratory Works	The development of an exploratory tunnel and associated infrastructure described in the Environmental Impact Statement for the *Snowy 2.0 Exploratory Works* (CSSI 9208) dated July 2018, and modified by the: • *Submissions Report* dated October 2018 and additional information provided to the Department on 17 October 2018, 19 November 2018 and 23 January 2019; • *Modification Report* dated 6 June 2019 and associated *Submissions Report* dated 2 September 2019 and amendment letter date 4 October 2019; and • *Modification Report* dated 17 October 2019 and associated *Submissions Report* dated 10 January 2020
EMS	Environmental Management Strategy
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPA	NSW Environment Protection Authority
EPL	Environmental Protection Licence
ESCP	Erosion and Sediment Control Plan
Future Generation	Future Generation Joint Venture
Future Generation-PMS	Project Management System
GMP	Groundwater Management Plan (S2-FGJV-ENV-PLN-0012) (Appendix B)
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance
KNP	Kosciusko National Park
Lobs Hole site	The development in the vicinity of Lobs Hole, including the GFO1 emplacement area; construction facilities (Main Yard), including workers' accommodation camp and temporary spoil emplacement areas; Main Access Tunnel and Emergency Cable and Ventilation Tunnel portals; and ancillary infrastructure including access roads, substation, cableyard and utilities.
Main Works	The development of an underground power station and associated infrastructure described in the Environmental Impact Statement for the *Snowy 2.0 Main Works* (CSSI 9687) dated September 2019, and modified by the: • *Preferred Infrastructure Report and Response to Submissions – Snowy 2.0 Main Works*, dated February 2020; and

Acronym	Definition
	• Additional information provided to the Department by EMM on 24 March 2020 and 7 April 2020
Marica site	The development in the vicinity of Marica, including the headrace surge shaft; ventilation shaft; construction facility workers' camp; and ancillary infrastructure including access roads and utilities.
Material harm	Is unauthorised harm that: • involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or • results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)
NPWS	National Park and Wildlife Services
NSW DPI	The NSW Department of Primary Industries within Regional NSW
Plateau site	The development in the vicinity of the Plateau, including the instream barrier in Tantangara Creek and ancillary infrastructure including access roads and utilities.
Plateau area	The plateau area; located to the east of the Snowy Mountains Highway and spanning the area between the highway and Tantangara Reservoir, is typical of elevated alpine environments, dominated by low energy streams, gentle rolling hills and mostly flat floodplains. The plateau area includes the Plateau and Tantangara work sites.
PMF	Probable Maximum Flood
POEO Act	*Protection of the Environment Operations Act 1997*
POEO Regulation	*Protection of the Environment (General) Regulation 2009*
Project	Snowy 2.0 Main Works
Project area	The project area is the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated. The project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments.
Ravine zone	The ravine area; located mostly to the west of the Snowy Mountains Highway, is characterised by deep gorges and steep sloping ridges, the product of incision from river flow, historic glaciation and structural movement. The ravine area includes the Talbingo, Lobs Hole and Marica work sites.
REMM	Revised Environmental Management Measures
Rock Forest site	The development on the Rock Forest property, including the Rock Forest emplacement area, logistics laydown area and ancillary infrastructure including access roads.
Submissions Report or RTS	Response to Submissions Main Works for Snowy 2.0
SHC Act	*Snowy Hydro Corporatisation Act 1997*
SHL	Snowy Hydro Limited
SSI	State Significant Infrastructure under EP&A Act (Infrastructure Approval 9687)
Talbingo Reservoir site	The development in and around the Talbingo Reservoir, including the Ravine Bay emplacement area; development at Middle Bay, including the water intake and associated structures, barge launch ramp, and construction facilities; and ancillary infrastructure, including access roads and utilities.
Tantangara Reservoir site	The development in and around the Tantangara Reservoir, including the Tantangara emplacement area; water intake and associated infrastructure; barge launch infrastructure; construction and laydown facilities, including workers' camp; fish screens; and ancillary infrastructure, including access roads and utilities.

Acronym	Definition
SWMP	Surface Water Management Plan (S2-FGJV-ENV-PLN-0011) (Appendix A)
WAL	Water Access Licence
Water Group	The Water Group within the Department of Planning Industry and Environment
WM Act	*Water Management Act 2000*
WM Regulation	*Water Management (General) Regulation 2018*
WMP	Water Management Plan (S2-FGJV-ENV-PLN-0010) (this Plan)
WSP	Water Sharing Plan
WTP	Water Treatment Plant

1. INTRODUCTION

1.1. Project Description

1.1.1. Overview

Snowy Hydro Limited (Snowy Hydro) is constructing a pumped hydro-electric expansion of the Snowy Mountains Hydro-electric Scheme (Snowy Scheme), called Snowy 2.0. Snowy 2.0 will be built by the delivery of two projects: Exploratory Works (which has commenced) and Snowy 2.0 Main Works.

Snowy 2.0 is a pumped hydro-electric project that will link the existing Tantangara and Talbingo reservoirs through a series of new underground tunnels and a hydro-electric power station. Most of the project's facilities will be built underground, with approximately 27 kilometres of concrete-lined tunnels constructed to link the two reservoirs and a further 20 kilometres of tunnels required to support the facility. Intake and outlet structures will be built at both Tantangara and Talbingo Reservoirs.

Snowy 2.0 will increase the generation capacity of the Snowy Scheme by an additional 2,000 MW, and at full capacity will provide approximately 350,000 MWh of large-scale energy storage to the National Electricity Market (NEM). This will be enough to ensure the stability and reliability of the NEM, even during prolonged periods of adverse weather conditions.

Salini Impregilo, Clough and Lane have formed the Future Generation Joint Venture (Future Generation) and have been engaged to deliver both Stage 2 of Exploratory Works and Snowy 2.0 Main Works.

1.1.2. Construction Activities and Program

The Snowy 2.0 Main Works Project includes, but is not limited to, construction of the following:

- pre-construction preparatory activities including dilapidation studies, survey, investigations, access etc;
- exploratory works including:
  - an exploratory tunnel to the site of the underground power station;
  - horizontal and test drilling;
  - a portal construction pad;
  - an accommodation camp;
  - barge access infrastructure;
- an underground pumped hydro-electric power station complex;
- water intake structures at Tantangara and Talbingo reservoirs;
- power waterway tunnels, chambers and shafts;
- access tunnels;
- new and upgraded roads to allow ongoing access and maintenance;
- power, water and communication infrastructure, including:
  - a cable yard to facilitate connection between the NEM electricity transmission network and Snowy 2.0;

- permanent auxiliary power connection;
- permanent communication cables;
- permanent water supply to the underground power station; and

- post-construction revegetation and rehabilitation.

The Snowy 2.0 construction program is summarised in Figure 1-1.

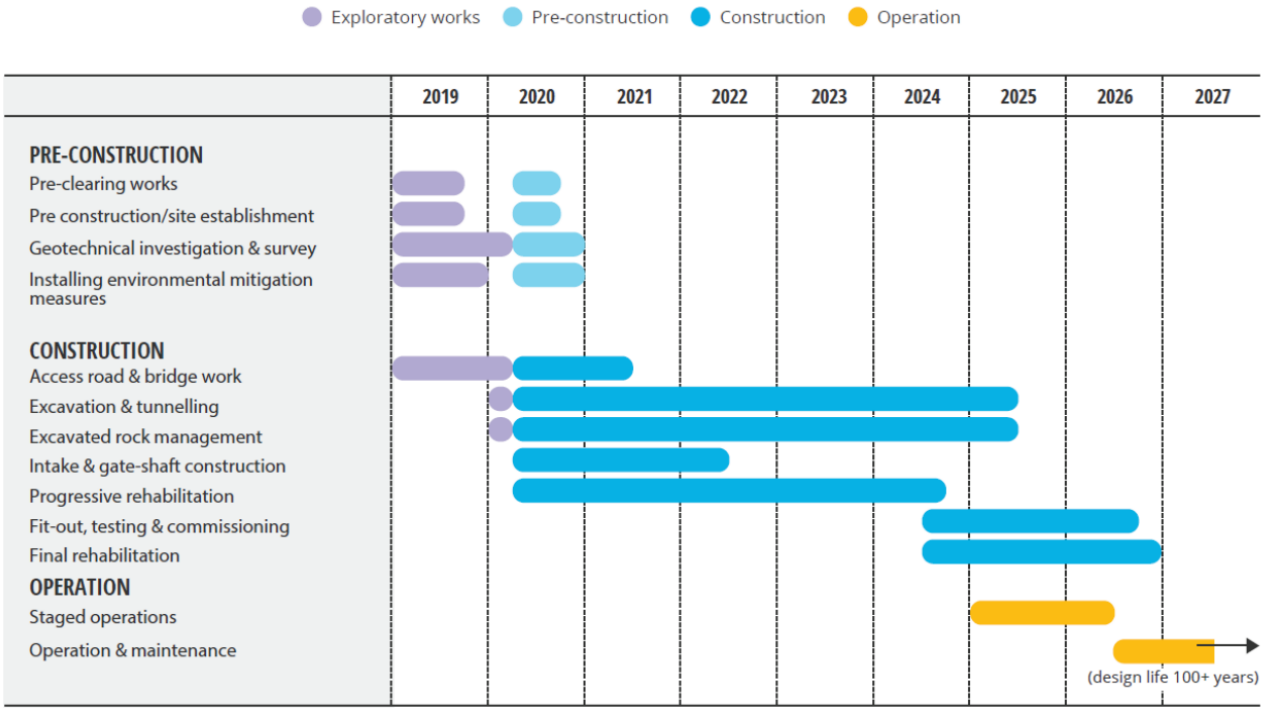

Figure 1-1: Timing of Snowy 2.0

The Snowy 2.0 Main Works Project includes numerous work sites as shown in Figure 1-2. These work sites include:

- Lobs Hole Ravine Road;
- Lobs Hole;
- Marica;
- Plateau;
- Rock Forest;
- Talbingo; and
- Tantangara.

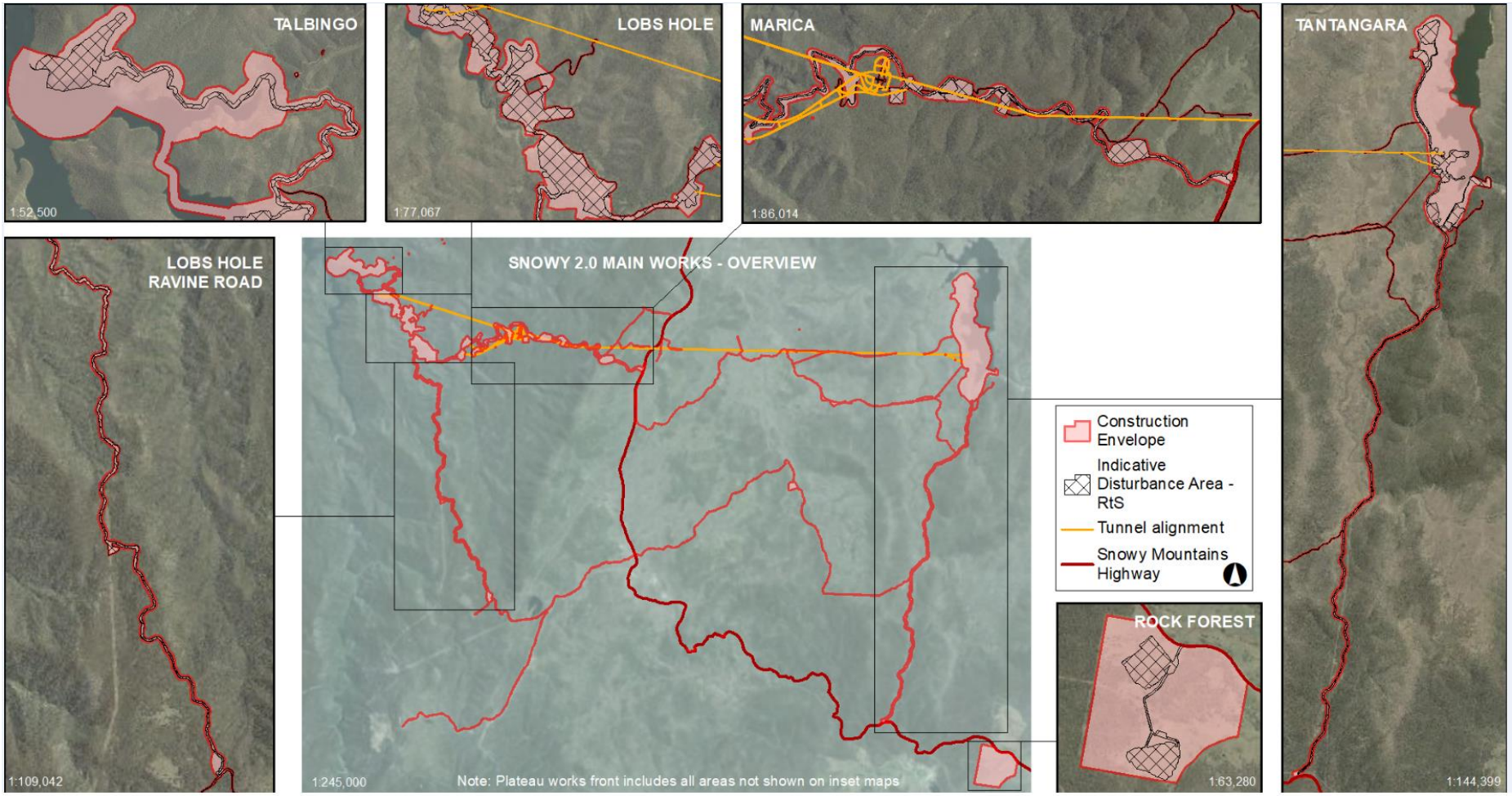

Figure 1-2: Snowy 2.0 Main Works work sites

1.2. Project Approval

On 7 March 2018 the NSW Minister for Planning declared Snowy 2.0 to be State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) under the *Environmental Planning and Assessment Act 1979* (EP&A Act) on the basis that it is critical to the State for environmental, economic or social reasons.

An environmental impact statement for the first stage of Snowy 2.0, the *Environmental Impact Statement Exploratory Works for Snowy 2.0* (Exploratory Work EIS) was submitted to the then Department of Planning and Environment in July 2018 and publicly exhibited between 23 July 2018 and 20 August 2018. Approval for the first stage of Snowy 2.0 was granted for Exploratory Works by the Minister for Planning on 7 February 2019. In accordance with section 5.25 of the EP&A Act, the infrastructure approval for the Exploratory Works was modified on 2 December 2019 and on 27 March 2020.

An environmental impact statement for the second stage of Snowy 2.0, the *Snowy 2.0 Main Works - Environmental Impact Statement* (Main Work EIS) was submitted to Department of Planning, Industry and Environment (DPIE) in September 2019 and was publicly exhibited between 26 September 2019 and 7 November 2019. A total of 222 submissions were received during the public exhibition period, including 10 from government agencies, 30 from special interest groups and 182 from the general public. In February 2020, the response to submissions (RTS or Submissions Report) was issued to DPIE to address the public and agency submissions (*Snowy 2.0 Main Works - Preferred Infrastructure Report and Response to Submissions, February 2020*).

Following consideration of the Main Works EIS and RTS, approval was granted by the Minister for Planning and Public Spaces on 20 May 2020, through issue of Infrastructure Approval SSI 9687.

Further to the Infrastructure Approval, the Main Works RTS includes revised environmental management measures (REMMs) within Appendix C which will also be implemented for the Project.

In addition to the State approval, a referral (EPBC 2018/8322) was prepared and lodged with the Commonwealth Department of Agriculture, Water and Environment (DAWE) (formally Commonwealth Department of Energy and Environment) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Commonwealth Minister's delegate determined on 5 December 2018 that Snowy 2.0 Main Works is a "controlled action" under the EPBC Act. The EPBC Act referral decision determined that the project will be assessed by accredited assessment under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979.*

1.3. Disturbance area

A key refinement following public exhibition of the Main Works EIS was a change to and clarification of disturbance area terminology. The revised disturbance area terminology as per the SSI-9687 Instrument, Main Works RTS and this Plan is outlined in Table 1-1, with an example shown at Lobs Hole Ravine Road in Figure 1-3

Table 1-1: Disturbance area terminology

Term	Definition	Reasoning
Project area	The project area is the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated.	The project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments.

Term	Definition	Reasoning
Construction envelope	The envelope within which the disturbance area of the development may be located	As detailed design continues, final siting of the infrastructure (i.e. the disturbance area) can move within the assessed construction envelope subject to recommended environmental management measures and provided it does not exceed the limits defined by the construction envelope.
Disturbance area	The area within the construction envelope where development may be carried out; the precise location of the disturbance area will be fixed within the construction envelope following final design	

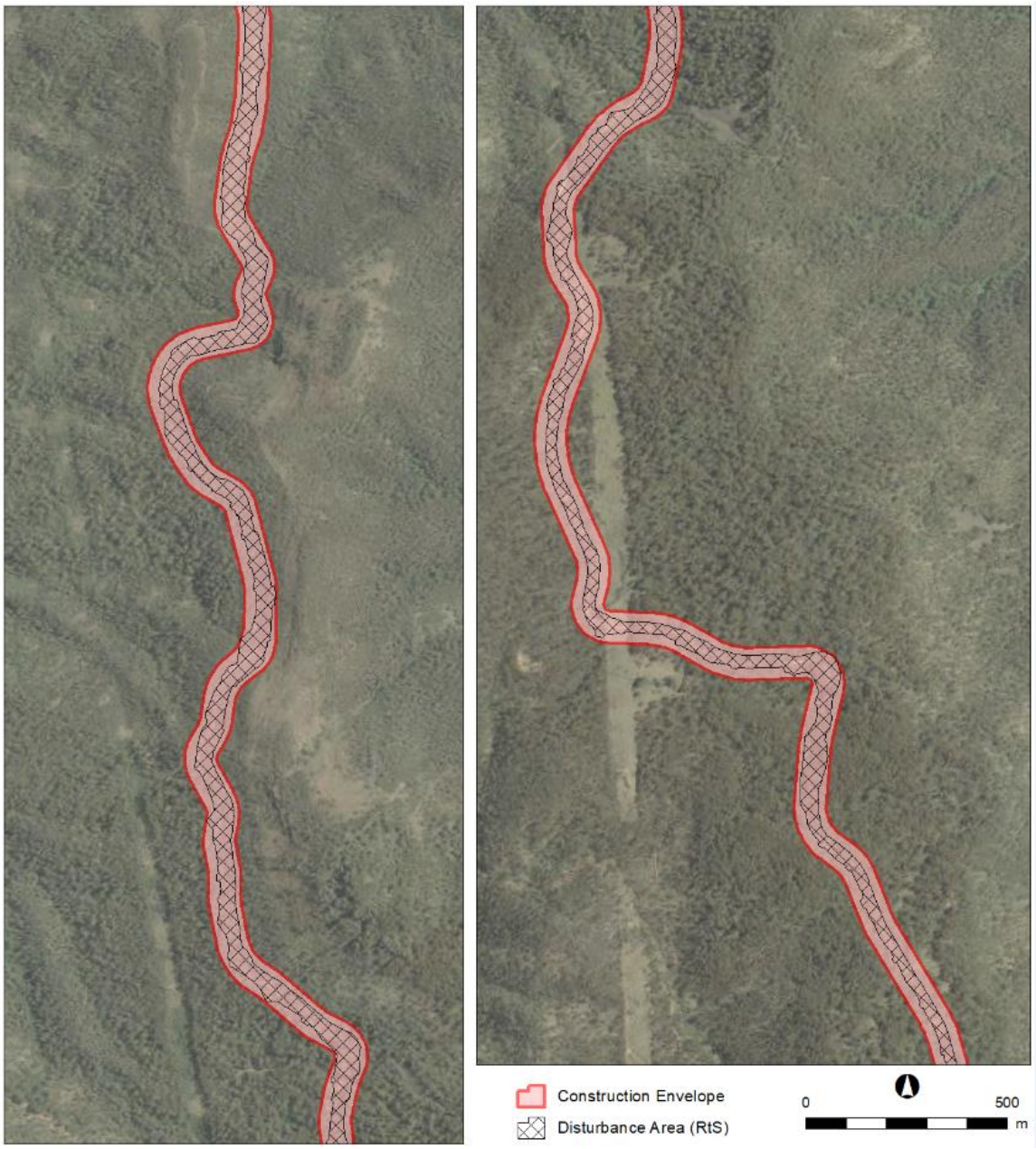

Figure 1-3: Disturbance area and construction envelope

1.4. Works within the Construction Envelope

Where project works are required to occur in locations outside of the disturbance boundary, Future Generation will review the proposed area of clearing against the limits included within condition 5 of schedule 2. The review will be undertaken to ensure that the maximum disturbance area and maximum native vegetation clearing remains within the total areas nominated within the condition. These area limits are included within Table 1-2.

All vegetation clearing which occurs on the project will be monitored regularly to record the extent of clearing which has occurred, and to ensure that the clearing limits are not exceeded.

Table 1-2: Maximum disturbance area and native vegetation clearing

Matter	Exploratory Works	Main Works	Total
Maximum Disturbance Area	126 ha	504 ha	630 ha
Maximum Native Vegetation Clearing	107 ha	425 ha	532 ha

1.5. Environmental Management System

The overall environmental management system for the Project is described in the Environmental Management Strategy (EMS). The EMS forms part of the Project Management System (Future Generation-PMS) and will include any requirements specified in the contract documents, where appropriate. All Future Generation-PMS procedures will support, interface or directly relate to the development and execution of the Plan.

The management plans and post-approval documents for the project include those listed within Figure 1-4.

This Water Management Plan (WMP or Plan) (S2-FGJV-ENV-PLN-0010) has been prepared for the Snowy 2.0 Main Works project, and supersedes the existing Stage 1 and Stage 2 Exploratory Works Water Management Plan. It does not address the operational phase of the project. This Plan forms part of Future Generation's environmental management framework and includes the:

- Surface Water Management Plan (SWMP) (Appendix A) (S2-FGJV-ENV-PLN-0011); and
- Groundwater Management Plan (GMP) (Appendix B) (S2-FGJV-ENV-PLN-0012).

An overview of the Plan structure relative to the elements of water management is shown in Figure 1-5.

This Plan aims to transfer the relevant requirements of the Approval documents into a management plan which can be practically applied on the Project site.

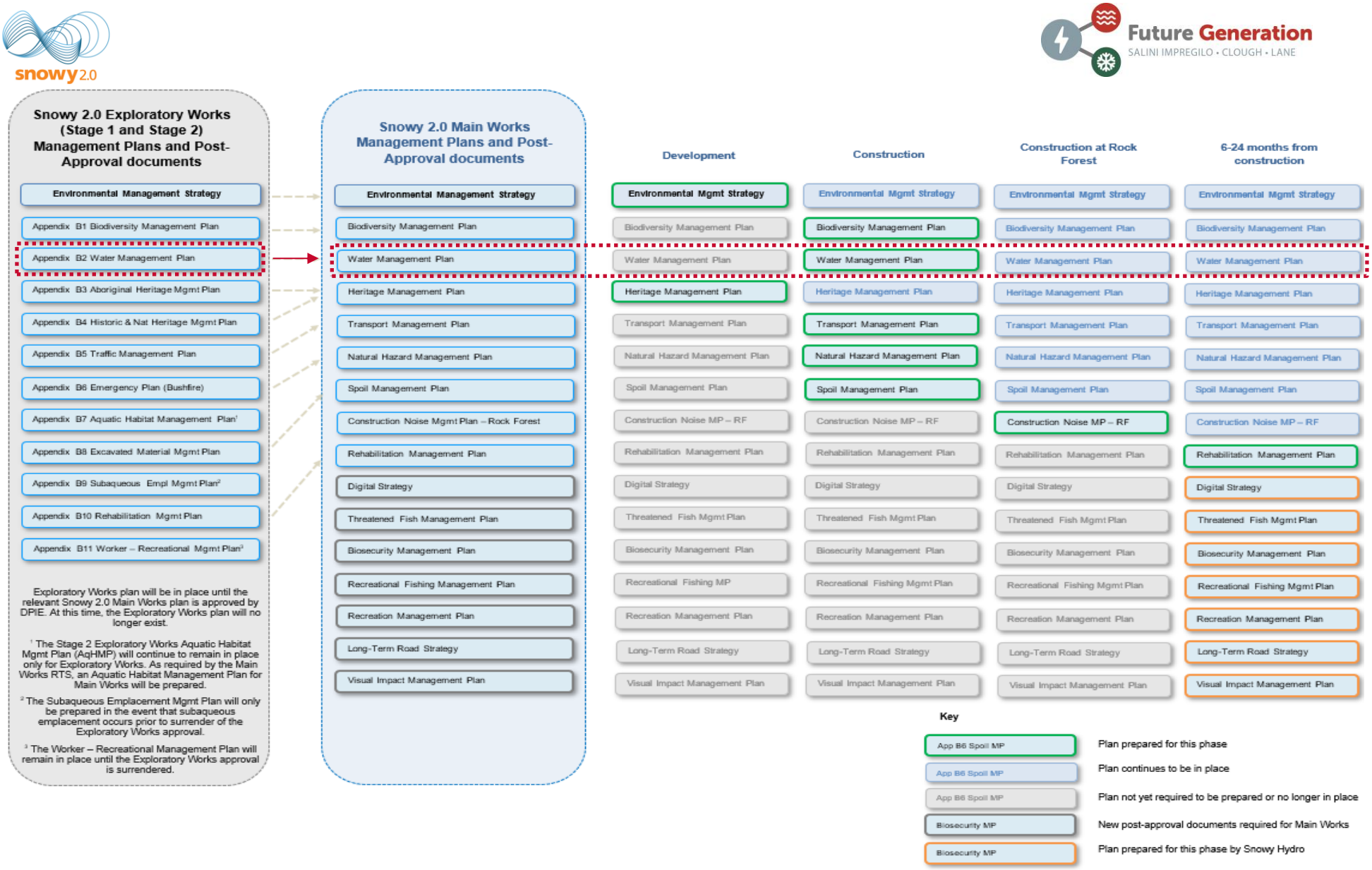

Figure 1-4: Management plans and post-approval documents with the WMP indicated

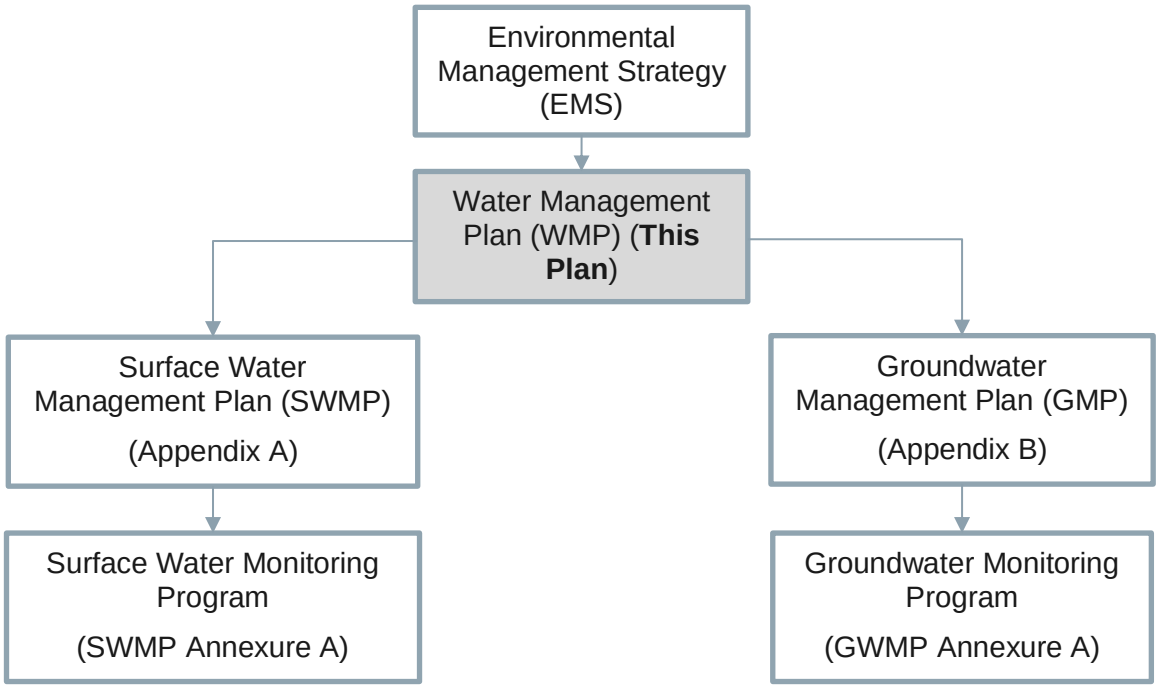

Figure 1-5: Water Management Plan Structure

1.6. Purpose and objective of this plan

The purpose of this Plan is to address the construction environmental management requirements detailed in:

- the Infrastructure Approval (SSI 9687) (Approval) issued for Snowy 2.0 Main Works on 21 May 2020;
- the *Main Works Snowy 2.0 - Environmental Impact Statement*;
- the revised environmental management measures (REMMs) within the Main Works RTS;
- the Infrastructure Approval (SSI 9208) issued for Snowy 2.0 Exploratory Works on 7 February 2019 and modified on 2 December 2019 and 27 March 2020;
- the *Exploratory Works for Snowy 2.0 - Environmental Impact Statement*;
- the *Exploratory Works for Snowy 2.0 – Modification 1 Assessment Report*;
- the *Exploratory Works for Snowy 2.0 – Modification 2 Assessment Report*;
- the REMMs within the Exploratory Works RTS, Exploratory Works Modification 1 RTS, and Exploratory Works Modification 2 RTS; and
- the environmental protection licence (EPL) 21266.

The key objective of this Plan is to detail management measures and inform site procedures for implementation so that water impacts are minimised and within the scope permitted by the Infrastructure Approval. To achieve this, Snowy Hydro and Future Generation will implement:

- appropriate measures to address relevant conditions of approval and REMMs listed within the Submissions Reports, as detailed within Section 2 of this Plan;

- appropriate measures during construction to manage and minimise impacts to water;
- monitoring programs during construction to verify that water impacts are being minimised; and
- corrective actions and contingency measures during construction when triggered.

Specific on-site management measures identified in this plan will be incorporated into site documents where relevant. These site-specific documents will be prepared for construction activities and will detail the management measures which are to be implemented on the ground. Construction personnel will be required to undertake works in accordance with the mitigation measures identified in the site-specific documents.

1.7. Staging

Some distinct work activities require greater detail prior to commencement. Consequently, this Plan will be updated, in consultation with relevant government agencies, and submitted to DPIE prior to the commencement of specific activities as detailed in Table 1-3.

Table 1-3: Activities that require update to this WMP

Activities	Timing
Dredging, channel extraction or underwater blasting	This WMP will be updated for approval prior to dredging, channel extraction or underwater blasting.
Permanent in-reservoir emplacement areas	This WMP will be updated prior to in-reservoir emplacement.
Construction works in the third year for the purposes of determining need/location streamflow monitoring sites	This WMP will be updated in the third year of construction to determine the need for surface water flow monitoring sites and if necessary, suitable locations to monitor potential streamflow impacts (based on additional groundwater monitoring data / revised drawdown predictions).
Operation of Snowy 2.0 Project, including dewatering of the tailrace tunnel during operations.	Operation will be addressed through a separate Snowy Hydro framework or document.

1.8. Plan Preparation

In accordance with schedule 3, condition 31 of the Approval, the WMP has been prepared by suitably qualified and experienced personnel.

This plan was prepared by Dr Rick Van Dam, Water Quality Advice and Dr Richard Cresswell, Eco Logical Australia.

1.9. Consultation

In accordance with schedule 3, condition 31 of the Infrastructure Approval, the WMP is to be prepared in consultation with;

- NSW Environment Protection Agency (EPA);
- National Parks and Wildlife Services (NPWS);
- Department of Planning Industry and Environment– Water (Water Group);
- Natural Resources Access Regulator (NRAR); and
- NSW Department of Primary Industries (NSW DPI)

In accordance with condition 18 of the Commonwealth approval, the WMP is also to be prepared in consultation with the DAWE.

On 15 June 2020, the Plan was issued to stakeholder agencies for review and comment. Comments from consultation have been incorporated into this Plan where appropriate. Response to the comments have been provided back to the stakeholder agencies. Consultation is summarised in Table 1-4.

An agency briefing for the WMP was held on 30 April 2020 and 7 May 2020 with EPA, NPWS, Water Group, NSW DPI and the Biodiversity and Conservation Division (BCD).

Table 1-4: Consultation undertaken for the WMP

Date	Consultation	Outcomes
30/04/2020	EPA, NPWS, Water Group, DPI Fisheries, BCD	Agency briefing (online PowerPoint) providing overview of document structure and surface water management approach.
07/05/2020	EPA, NPWS, Water Group, BCD	Agency briefing (online PowerPoint) providing overview of the development of the surface water monitoring program and groundwater monitoring program.
15/06/2020	NPWS, EPA, Water Group, NRAR, NSW DPI	WMP (revision C) issued to stakeholders for review and comment
26/06/2020	DAWE	WMP (revision D) issued to DAWE for review and comment
08/07/2020	DAWE	Agency briefing (online PowerPoint) providing overview of document structure and water management approach.
03/08/2020	NRAR, Water Group	Amendment to groundwater monitoring network.
24/08/2020	DAWE	Further rationale for adjustment to surface water monitoring locations, details of bushfire impacts on water quality and general clarifications.
09/09/2020	EPA	Amendment to surface water monitoring program, specifically in relation to discharge outlet verification monitoring.

A separate document is proposed to be provided to DPIE and DAWE which details the consultation process, along with Future Generation responses to stakeholder comments and how feedback has been implemented during the action.

1.9.1. Ongoing Consultation

Future Generation will consult with stakeholders identified in schedule 3, condition 31 of the Infrastructure Approval for updates to this WMP.

Where additional monitoring infrastructure is proposed outside the construction envelope (see 6.3.1. Future Generation will review environmental constraints and consult with relevant stakeholders (i.e. NPWS for monitoring infrastructure within the KNP).

2. ENVIRONMENTAL REQUIREMENTS

2.1. Legislation

Legislation relevant to water management includes:

- Environmental Planning and Assessment Act 1979 (EP&A Act);
- *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation);
- *Protection of the Environment Operations Act 1997* (POEO Act);
- *Protection of the Environment (General) Regulation 2009* (POEO General Regulation);
- *Water Management Act 2000* (WM Act);
- *Water Management Amendment Act 2014* (WMA Act);
- *Water Management (General) Regulation 2018* (WM General Regulation);
- Water Sharing Plan for the Murrumbidgee unregulated and alluvial water sources (2012); and
- *Snowy Hydro Corporatisation Act 1997* (SHC Act).

The Surface Water Management Plan (Appendix A) and Groundwater Management Plan (Appendix B) contain legislation applicable to their respective aspects.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the EMS.

2.2. Conditions of Approval

Table 2-1 details the CoA that are relevant to water management and demonstrates where these conditions are addressed.

Table 2-1: Conditions of approval relevant to water

CoA	Requirement	Where addressed
Schedule 3		
15	**Potential Additional Offsets – Alpine Sphagnum Bogs and Associated Fens** The Proponent must ensure that the development does not cause any exceedances of the following performance measures in the Alpine Sphagnum Bogs and Associated Fens above the Gooandra Volcanics and Kellys Plains Volcanics: (a) negligible change to the shallow groundwater regime supporting the bogs and associated fens when compared to a suitable control site; and (b) negligible change in the ecosystem functionality of the bogs and associated fens.	GMP – Section 7.2.3 and Annexure A Section 2.5.1
16	If the Planning Secretary determines that the development has caused exceedances of the performance measures in condition 15 above, the Proponent must pay additional funds to the NPWS within 3 months of the determination to offset the groundwater-related impacts of the development on the Alpine Sphagnum Bogs and Associated Fens. The Planning Secretary will determine the amount of funds the proponent must pay following consultation with the NPWS, DAWE and the Proponent; and having regard to: (a) The significance of the impacts on the bogs and associated fens; (b) The relevant values from the Biodiversity Offset Payment calculator; and	Biodiversity Management Plan (S2-FGJ-ENV-PLN-0008)

CoA	Requirement	Where addressed
	(c) The likely cost of carrying out the conservation actions required to offset these impacts on the bogs and associate fens. *Note: These funds will be added to the funds paid under condition 12 (Biodiversity Offset Payments) and managed in accordance with the notes under that condition.*	
28	**Water Supply** The Proponent must ensure it has sufficient water for each stage of the development; and if necessary, adjust the scale of development on site to match its available water supply. *Note: Under the Water Management Act 2000, the Proponent must obtain the necessary water licences for the development.*	WMP – Section 2.5.3 SWMP – Section 2.5.3 GMP – Section 2.5.3
29	**Water Pollution** Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act. *Note: Section 120 of the POEO Act makes it an offence to pollute any waters*	SWMP – Table 5-3: SW02, SW22, SW30 GMP – Table 5-1: GW03
30	**Water Mitigation Requirements** The Proponent must:	
	(a) maximise the recycling and reuse of water on site;	WMP – Section 4.2 SWMP – Section 5.1, Section 5.3.1, Table 5-3: SW14
	(b) maximise the diversion of clean water runoff around the disturbance areas;	SWMP – Section 5.1, Table 5-3: SW04, SW06
	(c) minimise the flow rates and velocities of any clean water runoff diversions to adjoining watercourses;	SWMP - Section 5.1, Table 5-3: SW08
	(d) minimise the flooding impacts of the development;	SWMP – Section 5.2, Table 5-3: SW18, SW19 Natural Hazard Management Plan (S2-FGJV-ENV-PLN-0090) Spoil Management Plan (S2-FGJV-ENV-PLN-0019)
	(e) minimise groundwater take from the Goonandra Volcanics and Kellys Plain Volcanics using pre and post grouting of the tunnel, to minimise the loss of stream flows in the waterways above these geological formations, including Goonandra Creek and the headwaters of the Eucumbene River;	GMP – Section 5.1 and Table 5-1: GW04, GW05
	(f) minimise erosion and the generation and dispersion of sediment using suitable controls in accordance with the relevant requirements in the *Managing Urban Stormwater: Soils and Construction* guidance series;	SWMP – Section 5.1, Table 5-3: SW03
	(g) design all instream works, particularly the inlet and outlet works, to minimise scour and erosion;	SWMP - Section 5.7, Table 5-3: SW58, SW59
	(h) unless permitted by this approval, avoid carrying out of any development within 40 metres of any watercourse;	SWMP – Section 5.7, Table 5-3: SW51
	(i) carry out all instream works or development within 40 metres of any watercourse generally in accordance with the requirements in the *Guidelines for Controlled Activities on Waterfront Land*;	SWMP – Section 5.7, Table 5-3: SW51, SW52
	(j) treat all wastewater and surplus process water prior to discharging it at the approved discharge points at the Talbingo Reservoir or Tantangara Reservoir;	SWMP – Section 5.3, Table 5-3: SW22, SW30 and Annexure F

CoA	Requirement	Where addressed
	(k) reduce the number of diffuser points for low velocity discharges to the Talbingo Reservoir or Tantangara Reservoir;	SWMP – Section 5.3.4, Table 5-3: SW27, SW35 and Annexure F
	(l) not discharge any surplus process water to the stormwater basins on site;	SWMP – Section 5.3, Table 5-3: SW28
	(m) minimise the surface water quality impacts associated with the development, including: • the development carried out in the vicinity of waterways, particularly in the Talbingo Reservoir, Tantangara Reservoir and Yarrangobilly River; • all instream works, including dredging, channel excavations, underwater blasting, barge infrastructure, fish barriers and screens, culverts and bridges, and service crossings; • the temporary and permanent spoil emplacement areas; • development at the Marica, Plateau and Rock Forest sites; • road works; • the operation of the power station and associated infrastructure, including the operation of the inlets and outlet to minimise sediment distruabnce risks and the dewatering of the trailrace tunnel	SWMP – Section 5, Table 5-3 (All measures) Note the WMP will be updated prior to major sub-surface water works in Talbingo Reservoir and Tantangara Reservoir (including dredging / channel extraction / underwater blasting) for construction of intake structures, and prior to in-reservoir emplacement. A separate document or framework will be prepared prior to operations.
	(n) minimise the risk of spills or leaks on site, and clean up any spills or leaks as quickly as possible;	SWMP – Section 5.4, Table 5-3: SW36, SW37, SW39, SW41, Annexure C (Spill Response Procedure)
	(o) minimise the groundwater quality impacts of the development, particularly through the design of the temporary and permanent spoil emplacement areas and all water storages on site;	GMP – Section 5.4 and Table 5-1: GW09 Spoil Management Plan (S2-FGJV-PLN-0019)
	(p) store chemicals and hydrocarbon products in bunded areas in accordance with the relevant Australian Standards.	SWMP - Section 5.4, Table 5-3: SW41, Annexure C (Spill Response Procedure)
31	**Water Management Plan** Prior to the commencement of construction, the Proponent must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This Plan
	(a) be prepared by a suitably qualified and experienced person in consultation with the EPA, NPWS, the Water Group, NRAR and NSW DPI;	WMP - Section 1.9
	(b) include a Site Water Balance for the development and a program to review and update this water balance each calendar year;	WMP - Section 5
	(c) include a Surface Water Management Plan, containing detailed plans for the Talbingo Reservoir, Lobs Hole, Marica, Plateau, Tantangara Reservoir, and Rock Forest sites with: • detailed baseline data on surface water flows and quality in the watercourses that could be affected by the development, and a program to augment this baseline data over time; • detailed criteria for determining the surface water impacts of the development (flows, quality and flooding), including criteria for triggering remedial action (if necessary); • description of the measures that would be implemented to minimise the surface water impacts of the development and comply with the relevant water management requirements in conditions 4,6 and 30 above, including specific plans covering: – the temporary or permanent emplacement of spoil; – dredging, channel extraction and underwater blasting in the Talbingo Reservoir and Tantangara Reservoir	SWMP SWMP – Annexure A Attachment B SWMP – Annexure A Section 1.2 and Annexure A Section 2 SWMP – Section 5,Table 5-3 (All measures). This SWMP will be updated prior to major sub-surface water works in Talbingo Reservoir and Tantangara Reservoir and in-reservoir emplacement. A

CoA	Requirement	Where addressed
	– operation of the discharge points – the design of the inlets and outlets; and – dewatering of the tailrace tunnel during operations; • identify the key risks to the successful implementation of these measures, and describe the contingency measures that would be implemented to address these risks; • a program to monitor and publicly report on the surface water impacts of the development.	separate document or framework will be prepared prior to operations. SWMP – Section 5.14 SWMP – Section 6.7, Annexure A Section 3 and Annexure A Section 7
	(d) include a Groundwater Management Plan with: • detailed baseline data of groundwater levels, yield and quality on the aquifers that could be affected by the development, and a program to augment this baseline data over time; • a program to validate and calibrate the groundwater model for the development as new information is collected; • detailed criteria for determining the groundwater impacts of the development, including criteria for triggering remedial action (if necessary) • a description of the measures that would be implemented to comply with the management requirements in condition 30 above; • a program to monitor and report on: – groundwater inflows to the tunnel; – water take from the groundwater bores and connected water sources; – the impacts of the development on: ○ regional and local (including alluvial) aquifers; ○ base flow to surface water sources; *Note: The Proponent may stage the preparation of the Water Management Plan, including the preparation of each of the detailed plans required under the Surface Water Management Plan. However, the detailed plans must be approved prior to any construction occurring on the relevant site.*	GMP GMP – Annexure A Attachment A GMP – Section 8.2 and Table 5-1: GW12 GMP – Section 6.4 GMP – Section 5 and Table 5-1 GMP – Section 6.8 and Annexure A Section 2
38	The Proponent must implement the approved Water Management Plan for the development.	This Water Management Plan will be implemented for the development.
Schedule 4		
5	**Monitoring** The Proponent may undertake monitoring outside the construction envelope of the development provided this monitoring is required under the conditions of this approval and authorised under an approved management plan	WMP - Section 6.3.1

2.3. Revised Environmental Management Measures

During preparation of the Exploratory Works and Main Works Submissions Reports, Revised Environmental Management Measures (REMMs) were developed and are included in Appendix C of the Main Works RTS and Section 8 of the Exploratory Works RTS.

The Main Works and Exploratory Works REMMs relevant to water are listed in Table 2-2 and Table 2-3. Specific section references are identified within the SWMP and GMP. In accordance with CSSI 9687, schedule 2, CoA 3, if there is any inconsistency between the Exploratory Works and Main Works documents, the most recent document will prevail to the extent of the inconsistency (i.e. Main Works). These requirements that conflict, as well as requirements that have been completed have been identified with an asterix and comment.

Table 2-2: Main works (SSI 9687) revised environmental management measures relevant to water

Impact	Reference	Environmental Management Measures	Where addressed
General	WM01	A Water Management Plan will be developed for Snowy 2.0 Main Works that includes:	This Plan
		• proposed mitigation and management measures for all construction water management categories;	WMP – Section 4.1 SWMP - Table 5-3 (All measures) GMP - Table 5-1 (All measures)
		• spill management and response;	SWMP - Annexure C (Spill Response Procedure)
		• a surface and groundwater monitoring program;	SWMP - Annexure A GMP – Annexure A
		• water quality trigger action response plan;	SWMP – Section 6.4, Annexure B GMP – Section 7, Annexure B, Annexure C, Annexure D
		• reporting requirements;	WMP - Section 6.6 SWMP - Section 6.7 GMP – Section 6.8
		• corrective actions;	SWMP – Section 6 GMP – Section 7
		• contingencies; and	SWMP - Section 5.3.1, Section 5.14 and Section 6.4 GMP – Table 5-1: GW13
		• responsibilities for all management measures.	SWMP – Table 5-3 GMP – Table 5-1
		The WMP will be prepared in consultation with DPIE, EPA, WaterNSW and key local stakeholders, and would consider concerns raised during the exhibition and approvals process for the project.	WMP Section 1.9
General	WM02	A water monitoring program will be developed as part of the water management plan to monitor quality and quantity impacts to surface water, groundwater and reservoirs. The water monitoring program will incorporate and update the existing monitoring network and detail monitoring frequencies and water quality constituents.	SWMP - Annexure A GMP – Annexure A
Water quality impacts from stormwater runoff	WM03	Where practical, clean water will be diverted around or through construction areas. Runoff from clean water areas that cannot be diverted will be accounted for in the design of water management systems.	SMWP – Section 5.1, Table 5-3: SW07
Water quality impacts from stormwater runoff	WM04	An Erosion and Sediment Control Plan (ESCP) will be prepared for each construction area that will include relevant information presented in the water management report.	SMWP – Section 5.1, Table 5-3: SW04

Impact	Reference	Environmental Management Measures	Where addressed
Water quality impacts from stormwater runoff	WM05	A suitably qualified erosion and sediment control professional(s) will be engaged to: • oversee the development of ESCPs; • inspect and audit controls; • train relevant staff; and • provide advice regarding erosion and sediment control	SMWP – Section 5.1, Table 5-3: SW05
Groundwater modelling	WM06	The groundwater model developed for Snowy 2.0 Main Works will be validated and, if necessary, recalibrated to new groundwater monitoring data as the monitoring record increases throughout construction. It is recommended that assessment of the monitoring record and groundwater affecting activities, along with model updates, be undertaken at least annually throughout construction and into operation until it is evident that the update frequency can be reduced.	GMP – Section 8.2
Groundwater inflow / drawdown	WM07	Where discrete high flow features are intercepted, pregrouting and secondary grouting from the TBM may be undertaken to enable tunnel construction.	GMP – Section 5.1.4, Section 5.1.5 and Table 5 1: GW05
Water supply	WM08	A water supply system will be established to supply water for potable water use and construction activities. The system will most likely source water from regional groundwater resources, but may also source water from either Tantangara or Talbingo Reservoirs provided licences are available. Extraction from watercourses will be avoided where practicable. The most suitable extraction locations and water sources will be established during detailed design	WMP – Section 2.5.3, Section 5
Reservoir water quality (wastewater management)	WM09	A wastewater management system will be established to manage effluent from construction compounds and accommodation camps. All wastewater will be treated to meet the water quality specifications provided in the water management report and will be discharged to reservoirs. Wastewater discharges to watercourses will be avoided.	SWMP - Section 5.3.2, Table 5-3: SW30
Reservoir water quality (process water management)	WM10	A process water management system will be established to manage water during construction; and to supply water to construction activities. All surplus process water will be treated to meet the water quality specifications provided in the water management report and will be discharged to reservoirs. Process water discharges to watercourses will be avoided.	SWMP - Section 5.3.1, Table 5-3: SW22
Changes to reservoir water quality due to plug removal within the reservoirs	WM11	The specifications and locations of the proposed environmental measures will be determined as part of detailed design, including the installation of silt curtains. They will be designed such that water quality criteria is agreed with the regulators, with the application of a mixing zone if required.	SWMP - Section 5.9, Table 5-3: SW66

Impact	Reference	Environmental Management Measures	Where addressed
Reservoir bed sediments are disturbed by commissioning water flows	WM12	Investigations to minimise the disturbance of bed sediments due to water flows during commissioning will be undertaken as part of detailed design. Potential measures to minimise the disturbance of bed sediments include: • investigate mitigated design measures; • dredging sediments from the potential disturbance zones and placing them in another part of the reservoir; and/or • armouring the sediments in the potential disturbance zones. These options are currently being assessed.	SWMP - Section 5.9, Table 5-3: SW67
Flooding	WM13	Further consideration of flooding conditions and impacts, including flood modelling where necessary, will be undertaken to support future detailed design of both temporary and permanent works.	SWMP - Section 5.2, Table 5-3: SW18
Flooding	WM14	Flood emergency response plans will be developed for both construction and operational phases	Natural Hazard Management Plan (S2-FGJV-ENV-PLN-0090)
Impacts to aquatic habitats	AE02	Bridges or culverts would be designed and constructed in accordance with NSW DPI fish passage requirements for waterway crossings (Fairfull & Witheridge 2003) where practicable.	Aquatic Habitat Management Plan (S2-FGJV-PLN-009)
Impacts to aquatic habitats	AE03	Construction works within the channel of a permanent waterway with type 1 or 2 key fish habitat would allow some flow to maintain fish passage at all times and be staged to minimise the total disturbance at any given time.	Aquatic Habitat Management Plan (S2-FGJV-PLN-009)
Soil erosion and sedimentation	SOIL03	Site-based Erosion and Sediment Control Plans (ESCPs) will be prepared or reviewed by a Certified Professional in Erosion and Sediment Control (CPESC) for the construction works.	SWMP – Section 5.1, Table 5-3: SW04
Water Supply	HAZ06	Water supply requirements for firefighting, including the provision of hydrants and hose reels, is designed, constructed in accordance with the relevant Standards and PBP 2018.	Water supply is discussed in WMP Section 2.5.3, SWMP Section 2.5.3 and GMP Section 2.5.3. Construction firefighting requirements are identified in Natural Hazard Management Plan (S2-FGJV-ENV-PLN-0090)

Table 2-3: Exploratory works (SSI 9208) revised environmental management measures relevant to water

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
Impacts to aquatic habitat and biota during dredging and subaqueous placement	ECO15	1	The subaqueous placement monitoring program for Talbingo Reservoir will be developed and implemented.	Spoil Management Plan (S2-FGJV-PLN-0019) Aquatic Habitat Management Plan (S2-FGJV-ENV-PLN-0032)	
		2	Measures relevant to aquatic ecology will be implemented as described below including: • monitoring of water quality indicators including turbidity, pH and dissolved oxygen within and downstream of the construction area and, if a decline in water quality is detected as a result of the works, investigate potential causes and develop and implement an appropriate response;	SWMP – Annexure A, Table 5-3: SW68	
		3	Measures relevant to aquatic ecology will be implemented as described below including: • the extent of the placement area will be minimised as far as practicable;	Spoil Management Plan (S2-FGJV-PLN-0019)	
		4	Measures relevant to aquatic ecology will be implemented as described below including: • the extent of the dredge footprint will be minimised as far as practicable;	A dredge management plan will be prepared for dredging associated with exploratory works prior to undertaking dredging	
		5*	Measures relevant to aquatic ecology will be implemented as described below including: • subaqueous placement would not occur shallower than 3 m below minimum operating level (i.e. where aquatic habitat, such as aquatic plants are less likely to occur);	Spoil Management Plan (S2-FGJV-PLN-0019)	Main works excavated materials management stipulates placement of drill and blast material in the reservoirs within active storage between minimum operating level and full supply level (RTS Appendix O page 55)
		6	Measures relevant to aquatic ecology will be implemented as described below including: • placement of large rocks within the placement area will occur and is expected to enhance the value of this habitat for fish and mobile invertebrates by providing hard surface and refuges;	Spoil Management Plan (S2-FGJV-PLN-0019)	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
		7	Measures relevant to aquatic ecology will be implemented as described below including: • un-necessary noise and vibration disturbances should be kept to a minimum where practicable to avoid impacts to fish and other aquatic species;	Aquatic Habitat Management Plan (S2-FGJV-ENV-PLN-0032)	
		8*	Measures relevant to aquatic ecology will be implemented as described below including: • removing wood debris from within the dredge footprint and subaqueous placement location and spreading it back into the reservoir in relatively shallow water (0-10 m) where fish are more likely to occur;	Threatened Fish Management Plan	Main Works Sch 3, CoA 24 (f) prevails.
		9*	Measures relevant to aquatic ecology will be implemented as described below including: • where feasible, mapping/identification of aquatic habitats within and adjacent to the subaqueous placement areas and other reference areas to characterise the habitat and place this in context of that present throughout the entire reservoir; and	Aquatic Habitat Management Plan (S2-FGJV-ENV-PLN-0032)	Aquatic habitats identified in RTS Appendix H, item 12 and submission response 27
		10	Measures relevant to aquatic ecology will be implemented as described below including: • mapping of aquatic habitats would include searches for crayfish burrows along the shoreline, as these could indicate the presence of Murray crayfish and would inform the final placement area extent. Deployment of crayfish traps along the shorelines adjacent to the placement area and within the placement area could be used to re-locate any large mobile invertebrates (including any Murray crayfish) from these areas to nearby sections of the reservoir that would not be affected by placement;	Aquatic Habitat Management Plan (S2-FGJV-ENV-PLN-0032)	
		11	Measures relevant to aquatic ecology will be implemented as described below including: • prior to commencement of seismic surveys, smaller releases of compressed air will be undertaken just below the surface;	Aquatic Habitat Management Plan (S2-FGJV-ENV-PLN-0032)	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
		12	Measures relevant to aquatic ecology will be implemented as described below including: • during seismic surveys, operators will be vigilant to potential harm to fish and invertebrates. If any harmed or dead biota are observed during works then this would result in the scaling back of works or review and adjustment of methodology (e.g. magnitude, frequency and/or duration of releases);	Aquatic Habitat Management Plan (S2-FGJV-ENV-PLN-0032)	
Erosion and sediment transport	SOIL02	1	Erosion and sedimentation controls will be implemented as part of the Water Management Plan to minimise erosion potential in accordance with the guideline Managing Urban Stormwater, Volumes 1 and 2, or equivalent.	SWMP – Section 5.1, Table 5-3: SW03, SW04	
Flood risks	FM1.1	1*	Camp and Wallaces bridges will be designed in accordance with AustRoads bridge design standards which require the bridge deck soffit to be located above the 1% AEP flood level;	This scope of works has been completed.	Not required as part of Main Works, completed in Exploratory Works.
Leaching/ running into groundwater/ creeks	WAT01	1	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • minimising direct access to the river by construction vehicles and mechanical plant;	SWMP - Section 5.4, Table 5-3: SW36, SW37, SW38, SW39, SW40 and SW41, Annexure C (Spill Response Procedure) GMP - Section 5, Table 5-1: GW02, GW06, GW07, GW08	
		2	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • regular inspection of construction vehicles and mechanical plant for leakage of fuel and /or oils;		
		3	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • establishing a bunded area for storage of fuel and oils;		
		4	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • refuelling and maintenance of vehicles and mechanical plant at least 50 m from watercourses;		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
		5	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • avoiding as far as possible re-fuelling, washing and maintenance of land-based vehicles and plant within 50 m of watercourses;		
		6	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • reporting spillages to the appropriate officer and immediately deploying spill containment and / or absorption kits as required to restrict its spread;		
		7	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • vehicles, vessels and plant would be properly maintained and regularly inspected for fluid leaks;		
		8	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • emergency spill kits will be kept onsite, at refuelling areas and on all vessels at all times during the Exploratory Works. The spill kit will be appropriately sized for the volume of substances on the vessel. All staff would be made aware of the location of the spill kit and trained in its use;		
		9	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • if any hydrocarbon spills were to occur during soil stripping, the impact will be isolated and clean-up procedures implemented;		
		10	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • areas to be used for long-term storage and handling of hydrocarbons and chemicals will be enclosed with concrete bunds;		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
		11	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • chemicals will be handled and stored as per manufacturer's instructions; and		
		12	Management measures will be implemented to minimise potential environmental impacts to water and soil from hydrocarbon and chemical spills and leaks including • below ground, refuelling will be undertaken in dry, enclosed, bunded areas;		
Surface and groundwater	WAT02	1	A Surface and Groundwater Monitoring Program will be developed and implemented to monitor the effectiveness of water quality controls.	WMP GMP	
		2	The program will include: • establish monitoring locations to provide suitable baseline and detection monitoring of surface and groundwater parameters;	SWMP – Annexure A GMP – Annexure A	
		3	The program will include: • monitor groundwater inflows indirectly through the process water system and groundwater levels as well as groundwater quality during construction; and	GMP – Annexure A	
		4	The program will include: • set out annual monitoring requirements for Yarrangobilly Caves and plant community types potentially reliant on groundwater.	GMP – Annexure A Biodiversity Management Plan (S2-FGJ-ENV-PLN-0008)	
	WAT03	1	Areas of groundwater inflow will be shotcrete or sealed by other methods to minimise further ingress.	GMP – Section 5.1.4, Section 5.1.5 and Table 5-1: GW05	
	WAT03	2	If groundwater is intercepted and reductions to groundwater inflows to watercourses predicted, then groundwater should be discharged to waterways. This would occur following appropriate treatment of discharge water.	GMP – Section 5.3 and Table 5-1: GW13	
Impacts from barge access construction	WAT04	1*	A dredge environmental management plan (DEMP) and associated mitigation measures will be implemented for dredging and construction of barge access infrastructure including:	A dredge management plan will be prepared for dredging associated with exploratory	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
		2	including: • a water quality monitoring program at the dredge area prior to, during and following completion of dredging and barge access infrastructure construction works;	works prior to undertaking dredging.	
		3	including: • installation of silt curtains around dredging and active construction work areas within waterways;		
		4	including: • selecting uncontaminated granular fill with less than 2% fines and selecting granular bedding material;		
		5	including: • ensuring skip bins for land disposal of excavated material are watertight;		
		6	including: • all activities would be carried out in a manner that minimises the potential for leaks and spills and in compliance with waste handling and disposal procedures outlined in the DEMP;		
		7	including: • establishing a bunded area and sediment and erosion control measures around the land disposal area;		
		8	including: • subaqueous placement of dredge spoil will include the mitigation measures described in WAT17;		
		9*	including: • subaqueous placement of any dredged material would be in a confined placement location rather than spreading the material across a wider section of the reservoir bed;		
		10	including: • a silt curtain would be placed around the backhoe dredger or other suitable equipment at the dredge area; and		
		11	including: • the dredged material once placed on barges would not be drained at the dredging site. Barges for subaqueous placement and skip bins for land placement would be watertight.		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
Spills of hydrocarbons	WAT11	1	Procedures to address spills and leaks will be developed and implemented as part of the CEMP.	SWMP – Section 5.4, Table 5 3: SW36, Annexure C (Spill Response Procedure)	
Controls for construction disturbance areas	WM1.1	1	The following controls will be applied to the design of the clean water management system: • where practical, all clean water will be diverted around or through water management areas. Runoff from clean water areas that cannot be diverted must be accounted for in the design of water management systems;	SWMP – Section 5.1, Table 5-3: SW07	
	WM1.2	1*	The following controls will be applied to the design of the clean water management system: • All permanent clean water drainage will be designed and constructed to convey the 1% AEP peak flow and will have adequate scour protection. Temporary clean water drainage will be designed to convey the 50% AEP peak flow;	Not applicable	Main Works Sch 3, CoA 30(b)(c) prevail.
	WM1.3	1*	The following controls will be applied to the design of the clean water management system: • where practical, diversions will seek to avoid materially increasing flow rates in adjoining watercourses; and.	Not applicable	Main Works Sch 3, CoA 30(b)(c) prevail.
	WM1.4	1	The following controls will be applied to the design of the clean water management system: • Where practical, the permanent diversion of drainage lines or watercourses using contour drains will be avoided.	SWMP – Section 5.1, Table 5-3: SW61	
	WM2.1	1*	An Erosion and Sediment Control Plan (ESCP) will be prepared for each construction area.	SWMP – Section 5.1, Table 5-3: SW03, SW04, SW05	Main Works REMM SOIL03, WM03, WM04 and WM05 prevail
		2	Each ESCP will: • consider local soil characteristics, clean water management and the proposed construction methods;		
		3	Each ESCP will: • apply all practical source control and rehabilitation methods; and		
		4	Each ESCP will: • be progressively amended as required during construction.		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
		5	Each ESCP will: • A suitably qualified erosion and sediment control expert will be commissioned to develop and execute each ESCP. The expert will be responsible for overseeing the development of the ESCP and inspecting and auditing controls during implementation. Regular expert input will ensure that erosion and sediment control practices will be established and operated to a high standard and progressively improved.		
	WM2.7	1*	Where appropriate, sedimentation basins will be constructed in accordance with the methods recommended in Managing Urban Stormwater: Soils and Construction: Volume 1 (Landcom 2004) and Volume 2D (DECC 2008). Water treatment chemicals will be applied to sedimentation basins with catchment areas greater than 2,500 m^2 to enhance sedimentation and phosphorus and dissolved metal removal rates. Only water treatment chemicals that have a low risk of increasing the toxicity of treated stormwater will be used. Water treatment chemicals will be applied using an automated chemical dosing and mixing system. The design treatment rate will be the 1-year ARI peak flow.	SWMP – Section 5.1, Table 5-3: SW03, SW04	Revised Main Works SWMP does not include automated chemical dosing systems using alum based PAC due to agency concerns with this methodology for sedimentation basins.
	WM2.2	1	The clean water management controls WM_1.1 to 1.4 apply to all ESCPs.	SWMP – Section 5.1, Table 5-3: SW07, SW08	Main Works Sch 3, CoA 30(b)(c) prevail.
	WM2.3	1	Stockpiles will be located where they are not exposed to concentrated or flood flow. Flood flow is defined as the 20% AEP flood extent. Monitoring for dispersion and erosion of soil stockpiles will be undertaken, particularly on moderately dispersive soils. Addition of ameliorants, such as gypsum and organic matter for dispersive soils will be undertaken as needed.	SWMP – Section 5.2, Table 5 3: SW07 Spoil Management Plan (S2-FGJV-ENV-PLN-0019)	
	WM2.4	1	Soils will be lightly scarified on the contour to encourage rainfall infiltration and minimise run-off. As soon as practicable after respreading, a cover crop will be established to limit erosion and soil loss. This will also provide good mulch for native plant establishment.	SWMP –Table 5-3	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
	WM2.5	1	Sediment traps or filters will be maintained at all discharge locations. The filters will only use non-toxic or materials which will not cause material harm to the environment, including biodegradable or natural materials where practicable. Sediment traps, filters and other appropriate sediment control devices will be installed to target the removal of coarse sediments.	A combination of sediment basins, treatment basins, water treatment drains will be utilised to limit course sediment discharging into adjacent water courses.	
Additional controls for construction areas that are constrained by terrain or the proposed disturbance boundary	WM2.6	1*	Runoff from construction areas that are constrained by terrain or the proposed disturbance boundary and are larger than 2,500 m^2 will be captured in a sump and pumped to a water treatment plant. The water treatment plant will use water treatment chemicals to enhance sedimentation and phosphorus and dissolved metal removal rates using an automated chemical dosing system. Only water treatment chemicals that have a low risk of increasing the toxicity of treated stormwater will be used. The design dewatering and treatment rate will be the 1 in 3-month average return interval (ARI) peak flow	SWMP – Section 5.1, Table 5-3: SW03, SW04	Disturbed areas are directed to sediment basins in accordance with the blue book, and will be managed to avoid discharge to the environment (passively or via water treatment plant systems)
Additional controls for construction areas that are not constrained by terrain	WM2.8	1	When practical, water captured in sedimentation basins will be used for dust suppression.	SWMP – Section 5.1, Table 5-3: SW14	
Water management controls for access roads Controls for all access roads	WM3.1	1*	Sections of Lobs Hole Road that will no longer be required following the construction of the new access roads will be removed and rehabilitated. This will reduce associated sediment loads;	SWMP – Section 5.5, Table 5 3: SW42, SW43, SW44, SW45, SW01, SW46	Main Works converts Lobs Hole Road to a two way road and all areas will be managed as part as final design. There are no sediment basins on Lobs Hole Ravine road due to steep terrain and to minimise clearing impacts on threatened species habitat (WM3.6).
	WM3.2	1	• all cut and fill batters will be stabilised as soon as practicable;		
	WM3.3	1	• the clean water management controls WM_1.1 to 1.4 will apply to the design of all access roads.		
	WM3.4	1	• access road surfaces will be maintained with appropriate aggregate material to reduce the risk of erosion;		
	WM3.5	1	• where practicable and safe to do so access roads will be single cross fall and will grade to a table drain located against the toe of the cut batters. The drains will be stabilised by rock armouring as required;		
	WM3.6	1	• where appropriate, the sedimentation basins established to manage runoff during construction of the access roads will be maintained during the Exploratory Works to provide ongoing treatment of runoff from access roads;		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
Additional controls for access roads that are not constrained by terrain or the proposed disturbance footprint.	WM3.7	1*	The sedimentation basins established to manage runoff during construction of the access roads will be modified to be constructed wetland style basins. Constructed wetland style basins will maintain permanent water. An extended detention zone will be established above the permanent water. The extended detention zone will drain slowly through a low flow outlet control. Where practical, runoff from road embankments that have been stabilised by vegetation will be diverted into the clean water drainage system to minimise the contributing catchment area to the constructed wetlands. This will increase the effective size of the basin (in terms of depth of rainfall captured) and will result in a treatment volume that is greater than the 5 day 85th percentile volume that is proposed for sedimentation basins for construction areas.	Main Works converts Lobs Hole Road to a two way road and all areas will be managed as part as final design. There are no sediment basins on Lobs Hole Ravine road due to steep terrain.	Main Works converts Lobs Hole Road to a two way road and all areas will be managed as part as final design. There are no sediment basins on Lobs Hole Ravine road due to steep terrain.
Water management controls for the accommodation camp	WM4.1	1*	A stormwater management plan will be prepared as part of the detailed design of the project. The plan will consider geotechnical constraints including shallow soils.	SWMP – Section 5.6, Table 5-3: SW47, SW48, SW49	Implemented for the Exploratory Works Lob Hole Accommodation Camp.
	WM4.2	1	Clean water from upslope areas will be diverted around the accommodation camp.		
	WM4.3	1	A piped drainage system will be established to capture stormwater and convey it to the proposed water quality improvement ponds. The drainage system will have a 20% AEP capacity. Overland flow paths will be provided as required.		
	WM4.4	1	All pervious areas including batters will be vegetated with endemic native vegetation where practicable.		
	WM4.5	1	Runoff from roof areas will be collected in rainwater tanks where practicable. Captured water will be used for non-potable uses, reducing runoff volumes.		
	WM4.6	1	Source controls including permeable pavers and rain gardens will be used where practicable.		
	WM4.7	1	All runoff from the accommodation camp will be treated in water quality improvement basin(s). The basin(s) will be designed as constructed wetlands where practicable and will provide a water quality improvement function and attenuate peak runoff rates from the accommodation camp.		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
	WM4.8	1	Collectively, the stormwater controls will be sized and configured to achieve the water quality specifications provided in SWA Table 6.12.		
	WM4.9	1	The water quality improvement pond batters will be established using retaining structures or other suitable measures to avoid disturbance of the Watercourse 3 channel.		
Water management controls for the portal construction pad	WM5.1	1*	A stormwater management plan will be prepared as part of the detailed design of the project. The plan will be integrated with the process water system.	SWMP - Table 5-3: SW39, SW07, SW04, SW13	Implemented for the Exploratory Works portal construction pad.
	WM5.2	1	Where practical, all activities that will occur on the portal construction pad with potential to contaminate stormwater runoff will be isolated from the stormwater system through the use of covering (i.e. by a building or roof) and bunding. Water produced within the covered and bunded areas will be either: • managed by the process water system; or • disposed as liquid waste to an appropriate facility.		
	WM5.3	1	Clean water from upslope areas will be diverted through or around the portal construction pad in a designated clean water drainage system.		
	WM5.4	1	A piped drainage system will be established to capture stormwater and convey it to the water management basin. The drainage system will have a 1% AEP capacity. Overland flow paths will be provided as required.		
	WM5.5	1	All aggregate storage and stockpile areas will be bunded to prevent stormwater ingress. Runoff from these areas will be treated in sediment wedge pits or other sediment controls to remove all coarse material. Sediment wedge pits will overflow into the piped drainage system.		

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
	WM5.6	1*	All runoff from the portal construction pad and adjoining access road will be conveyed to a water management basin with adequate capacity for at least a 5 day 95th percentile rainfall event and include additional volume to accommodate required water quality treatments (i.e. a total volume of at least 3,750 m^3). The basin will provide a water quality improvement function. Water captured in the basin will be extracted to supply the process water system. Water treatment chemicals will be applied to the water management basin to enhance sedimentation and phosphorous and dissolved metal removal rates. Only water treatment chemicals that have a low risk of increasing the toxicity of treated stormwater will be used. Water treatment chemicals will be applied using an automated chemical dosing and mixing system. The system will be designed to meet the water quality specifications provided in SWA Table 6.16. The design treatment rate will be the 1-year ARI peak flow.		Disturbed areas are directed to sedimentation basins in accordance with the blue book, and will be managed to avoid discharge to the environment (passively or via water treatment plant systems)
	WM5.7	1	The water management basin will be designed to provide a freeboard between its overflow pipe and spillway. The freeboard volume will be calculated to contain probable leaks, spills and firewater runoff volumes. The overflow pipe will have a manual shutoff valve that will enable site management to shut off the overflow pipe to enable the basin to contain any leak, spill or fire water runoff.		
Water management controls for the process water system	WM6.1	1	A process water management system will be established to manage any potentially contaminated water that may be produced by the construction activities.	SWMP – Section 5.3.1, Table 5-3: SW22	
	WM6.2	1	The process water management system will be separated from the stormwater system to avoid uncontrolled overflows associated with stormwater ingress.	SWMP – Section 5.3.1, Table 5-3: SW24	
	WM6.3	1*	The process water system will incorporate a water treatment plant that will treat water to a suitable quality for its proposed use in construction activities. If required to meet water quality criteria, additional treatment will be provided for any water that is discharged to Talbingo Reservoir via the controlled discharge pipeline. This treatment system will meet the water quality specifications provided in Table 4.5 of the RTS.	SWMP – Section 5.3.1, Table 5-3: SW22	This treatment systems will meet the specifications in the Main Works RTS, WMP - Appendix A (SWMP) and EPL.

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
	WM6.4	1*	The process water management system will have the ability to extract water from the portal construction pad's water management basin. This will be done to top-up supply.	SWMP – Section 5.3.1, Table 5-3: SW22	Main Works, process water will be recycled. Water from sediment basins will be used for irrigation and dust suppression.
	WM6.5	1	A reticulation system will be established to enable the process water system to: • extract water from Talbingo Reservoir (as required); and • discharge treated process water into Talbingo Reservoir (as required).	SWMP – Section 5.3.1, Table 5-3: SW22	
Water management controls for the waste water management system	WM7.1	1	Waste water from the accommodation camp will be reticulated to a waste water treatment plant via a sewer system. The sewer system will be designed to restrict stormwater ingress into the waste water system.	SWMP – Section 5.3.2, Section 5.6, Table 5-3: SW32	
	WM7.2	1	Water efficient fittings will be used to minimise waste water loads.	SWMP – Table 5-3: SW34	
	WM7.3	1	Low phosphorus products are to be used for washing activities controlled by site management (i.e. laundry services and mess hall) and encouraged (via education) for general use.	SWMP – Table 5-3: SW50	
	WM7.4	1	The waste water storage system will include emergency storage of untreated waste water. The storage volume will be calculated at detailed design based on analysis of response times from regional waste management contractors to provide emergency trucking and offsite disposal options.	SWMP – Table 5-3: SW30	
	WM7.5	1*	A waste water treatment plant will meet the water quality specifications provided in Table 4.4 of the RTS.	SWMP – Section 5.3.2, Section 5.6, Table 5-3: SW30	This treatment system will meet the specifications in the Main Works RTS, WMP - Appendix A (SWMP) and EPL.
	WM7.6	1	Treated waste water will be disposed to Talbingo Reservoir via the controlled discharge pipeline.	SWMP – Section 5.3.2, Table 5-3: SW30	
Water quality impacts from	WM_8.2	1	During establishment, the water management controls for construction areas (Wm_2.1 to 2.8) will be applied.	SWMP – Table 5-3 Refer to WM_2.1 to 2.8 above	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
rock emplacement areas	WM_8.6	1	Runoff from Lock Hole Gully will be diverted around or through the eastern emplacement area. The diversion works will comprise a dam upstream of the diversion inlet and either a gravity or pump assisted diversion system. The diversion works will have a 1% AEP capacity. The dam upstream of the diversion inlet will be designed as a detention basin and will not permanently hold water. A high-flow diversion drain will be established to convey runoff from Lick Hole Gully around the emplacement area in a controlled manner, avoiding uncontrolled overflows through the emplacement area. This diversion drain will only be engaged if a flood greater than a 1% AEP even occurs.	SWMP – Table 5-3: SW07, SW08	
	WM_8.7	1	Seepage from the eastern emplacement area will be collected in a water management dam. Collected water will either be irrigated to the emplacement (to promote evaporation) or treated in the process water treatment plant. Discharge of seepage water to the Yarrangobilly river will be avoided.	SWMP – Table 5-3: SW15	
Flood risks	FM_1.1	2*	Camp and Wallaces bridges will be designed in accordance with AustRoads bridge design standards which require the: • bridge structure to be designed to withstand a 0.05% AEP event; and	This scope of works has been completed.	This has been completed.
	FM_1.1	3*	Camp and Wallaces bridges will be designed in accordance with AustRoads bridge design standards which require the: • abutments to be protected by appropriately designed scour protection.	This scope of works has been completed.	
	FM_1.2	1	The western emplacement will be designed to prevent the risk of emplacement material being entrained in flood waters during a 1 in 5000 year flood event.	Spoil Management Plan (S2-FGJV-PLN-0019)	
	FM_1.3	1	Flood emergency procedures will be prepared in implemented as part of the Emergency Response Plan.	Natural Hazard Management Plan (S2-FGJV-ENV-PLN-0090)	
Borehole drilling	M1.6	1	During borehole drilling slurries used will be of appropriate grade and composition such that it poses no threat to groundwater quality should it infiltrate intersected aquifers.	GMP – Table 5-1: GW08	
Clean water	M1.8	1	Where practicable, all clean water will be diverted around or through sites using cross-path drains or other similar measures to limit impact to existing flow regimes.	SWMP – Section 5.1, Table 5-3: SW07, SW08	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
Regrading	M1.9	1	Drill sites that have been modified to allow for vehicle access will be regraded to natural lay of the land as part of the site rehabilitation.	Rehabilitation Management Plan (S2-FGJV-ENV-PLN-0023)	
Refuelling	M1.10	1	A refuelling protocol will be developed for in-reservoir borehole drilling and will be included in the Construction Environment Management Plan (CEMP).	SWMP - Annexure D	
Erosion and sedimentation	M1.11	1	Erosion and Sediment Control Plans will be prepared for all proposed construction sites and drilling pads. These plans will consider local soil characteristics, clean water management and site-specific measures to suit the proposed construction methods.	SWMP – Section 5.1, Table 5-3: SW03, SW04	
Spills	M1.12	1	Geotechnical investigation drilling will be undertaken in accordance with the surface water management plan. The following mitigation measures are included in the existing surface water management plan: • All fuel and hazardous substances used in drilling will be stored in designated areas of the drill pad. Hazardous chemicals will be stored in accordance with relevant standards, including AS 1940:2004. • Designated fuel storage areas will be bunded to mitigate risk of contamination to surface water and soils should spills occur. Refuelling will also be carried out in the designated, bunded area. • Equipment should be appropriately maintained to ensure there are no leaks. • Spill kits will be available on site to contain contamination should any spills outside these bunded areas occur. If used, waste from the spill kits will be disposed of appropriately. • The safety data sheets of all hazardous chemicals required for drilling activities will be made available on site. • All waste produced during drilling will be stored on site in above ground containers, and when required will be taken off-site by vehicles. All waste will be disposed of off-site to an EPA licensed facility.	SWMP - Section 5.4, Table 5 3: SW36, SW37, SW38, SW39, SW40 and SW41, Annexure C (Spill Response Procedure)	
Flooding	M1.13	1	Protocols will be developed for the proposed modification elements for use and storage of plant, equipment and materials in flood prone areas commensurate with the frequency of inundation.	Natural Hazard Management Plan (S2-FGJV-ENV-PLN-0090)	

Impact	Reference		Revised Environmental Management Measures	Where Addressed	Comment
Barge ramp establishment	MOD2 - 001		The following measures will be implemented for barge ramp establishment works at Middle Bay: • all barge ramp construction and dredging works would be closely monitored and carried out according to the Dredge Management Plan, Surface Water Management Plan and Aquatic Habitat Management Plan; • appropriate methods and pre-dredge testing would be implemented to that material is appropriately handled to minimise impacts to aquatic species and habitat; and • removal and subsequent disposal of aquatic macrophytes would be undertaken according to the Dredge Management Plan and / or Waste Management Plan.	A dredge management plan will be prepared for dredging associated with exploratory works prior to undertaking dredging.	

**In accordance with CSSI 9687, schedule 2, CoA 3, if there is any inconsistency between the above documents (Exploratory Works and Main Works), the most recent document will prevail to the extent of the inconsistency (Main Works). However, the conditions of this approval (CSSI 9687) must prevail to the extent of any inconsistency*

2.4. EPBC Approval

The EPBC Act approval for Snowy 2.0 Main Works was granted by DAWE in 2020. This approval was provided for the impact of the Snowy 2.0 Main Works Project on national heritage values of a national heritage place (Sections 15B and 15C of the EPBC Act), listed threatened species and communities (Section 18, Section 18A of the EPBC Act) and listed migratory species (Section 20, Section 20A of the EPBC Act).

Table 2-4 details the EPBC Act Approval conditions which are relevant to water and demonstrates where these conditions are addressed.

Table 2-4: Commonwealth conditions of approval relevant to water

Condition	Requirement	Where addressed
17	To minimise impacts on water resources, the approval holder must comply with conditions 30 – 32 of the NSW approval relating to water management	Refer to Table 2-1
18	The approval holder must prepare the Water Management Plan required by condition 31 of the NSW approval in consultation with the Department, before it is approved by the NSW Planning Secretary	Section 1.7
19	The Water Management Plan must include provisions to make monitoring data (excluding sensitive ecological data) available as part of the monitoring, evaluation and reporting programs required by condition 31c and 31d of the NSW approval	WMP - Appendix A (SWMP) WMP - Appendix B (GMP)
20	Once the Water Management Plan is approved by the NSW Planning Secretary, the approval holder must implement the plan for the duration of the approval, unless otherwise agreed by the Minister in writing.	This WMP will be implemented for the development.

2.5. Licences and Permits

2.5.1. Environment Protection Licence

Environment Protection Licence (EPL) (No 21266) has been issued as part of the Exploratory Works phase for extractive activities. The premise boundary for the Exploratory Works EPL will be expanded to encompasses both Exploratory Works and Main Works activities and the governing schedule activity will be Electricity Generation.

The water quality requirements in the Project EPL will be adhered to and includes surface and groundwater monitoring. At times, the water monitoring requirements of the EPL may differ to that detailed within this Plan, particularly in the event of variations to the EPL. Differences may include changes to the monitoring locations; changes to the frequency of monitoring; or changes to the parameters which are required to be monitored.

Should differences arise, the monitoring requirements of the EPL will take precedence. This will occur until such time that the revised WMP is updated and approved.

2.5.2. Agreement for Lease

Snowy Hydro Limited have established an Agreement for Lease (AFL) with NPWS. A Construction Lease and Works Access Licence will be established with NPWS in order to carry the works in accordance with Main Works, Exploratory Works, CSSI 9687 and the approved management plans.

2.5.3. Water Access Licence

Section 60A of the *Water Management Act 2000* requires that a water access licence be obtained to extract water from a water source.

Section 21 and schedule 4 of the *Water Management (General) Regulation 2018* does however provide exemptions for the requirement to obtain water access licences. This includes clause 7, the exemption for water taken in course of certain aquifer interference activities (i.e. pump testing a bore; or monitoring)

Water access licences would therefore not be required if Snowy Hydro, as the licence holder, are using the water for certain aquifer interference activities (i.e. pump testing a bore; or monitoring) with less than 3ML of groundwater take in a water year.

Any other water required for construction purposes would however require a water access licence. This includes extraction for:

- interception activities (i.e. intercepted groundwater during tunnelling);
- potable uses for human consumption associated with the accommodation camp; and
- process water via the services pipeline from Talbingo and Tantangara Reservoirs for tunnelling and construction activities

Snowy Hydro have secured two groundwater access licences (WAL42408, WAL42960) and a surface water specific purpose access licences (WAL42407) for the Exploratory Works Project. These three licences allow for direct and indirect take of water from the Lachlan Fold Belt (LFB) Murray Darling Basin (MDB) Groundwater Source and direct take from the Upper Tumut water source (i.e. from Talbingo Reservoir).

Snowy Hydro are in the process of securing groundwater licences via Controlled Allocation Order for additional share entitlement from the LFB MDB groundwater source (RO13-19-093), the LFB South Coast groundwater source (RO13-19-192) and a surface water specific purpose access licence (to take water from Tantangara Reservoir) for the Main Works Project. The additional allocation covers the peak predicted annual take modelled for both Main Works and Exploratory Works.

These Water Access Licenses are being processed by the Natural Resources Access Regulator (NRAR) and registration with NSW Land Registry Services (LRS) has commenced. Actual take will be reported to NRAR on an annual basis in accordance with licence conditions.

Table 2-5 summarises the licencing arrangements.

Table 2-5: Water licences

Water Access Licence	Project	Water source	Share (ML)
WAL42407– Specific Purpose Access Licence	Exploratory Works	Upper Tumut water source	227
WAL42408 – Groundwater Licence	Exploratory Works	Lachlan Fold Belt MDB	0
WAL42960 – Groundwater Licence	Exploratory Works	Lachlan Fold Belt MDB	354
RO13-19-093 – via Controlled Allocation	Main Works	Lachlan Fold Belt MDB	3,375
RO1-19-092 – via Controlled Allocation	Main Works	Lachlan Fold Belt South Coast	1,722
Specific Purpose Access Licence (under application)	Main Works	Tantangara Water Source	In progress

2.6. Guidelines

The main guidelines, specifications and policy documents relevant to this Plan include:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000);
- Managing Urban Stormwater: Soils and Construction (Landcom, 4th Edition March 2004 (reprinted 2006) (the “Blue Book”)) Volume 1 and Volume 2;
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW – March 2004.

The management plans appended to this Plan contain additional guidelines applicable to their respective aspects. Other reference documents include:

- *Snowy 2.0 Environmental Impact Statement Volume 3, Appendix J, Water Assessment Annexure A, September 2019;*
- *Snowy 2.0 Main Works - Preferred Infrastructure Report and Response to Submissions,* Appendix I, *Revised Water Modelling Report, February 2020;* and
- *Snowy 2.0 Main Works - Preferred Infrastructure Report and Response to Submissions,* Appendix J, *Revised Water Management Report*, February 2020

3. EXISTING ENVIRONMENT

3.1. Topography and Landscape

The Snowy 2.0 Project is mostly located within the KNP and spans the NSW Western Slopes, South Eastern Highlands and Australian Alps Interim Biogeographic Regionalisation for Australia (IBRA) regions. The geomorphic history of the project area is complex and has resulted in a landscape of disrupted drainage patterns, swampy basins and erosion surfaces (Snowy Hydro 2017). This complexity is seen in the diverse landforms present in the area, ranging from valleys to mountain ranges. For the most part, the project area can be broken into two distinctive terrains the incised ravine area and the plateau area.

The ravine area; located mostly to the west of the Snowy Mountains Highway, is characterised by deep gorges and steep sloping ridges, the product of incision from river flow, historic glaciation and structural movement. The ravine area includes the Talbingo, Lobs Hole and Marica work zones.

The plateau area; located to the east of the Snowy Mountains Highway and spanning the area between the highway and Tantangara Reservoir, is typical of elevated alpine environments, dominated by low energy streams, gentle rolling hills and mostly flat floodplains. The plateau area includes the Plateau and Tantangara work zones.

The landscape varies from 545m AHD in the Ravine area (Lobs Hole) leading up the valleys (Marica/ Plateau zones) to the plateau topped Tantangara zone at 1524m AHD.

The Rock Forest work zone is located on farm land south east of the KNP.

3.2. Geology

The project area is located within the south-eastern portion of the Lachlan Fold Belt (LFB) of NSW. The LFB comprises a suite of Ordovician to Devonian sedimentary, igneous and metamorphic rocks that have developed during multiple orogenic periods.

The geology between Talbingo and Tantangara reservoirs (Table 3-1:) is structurally deformed with numerous folds and several major faults associated with the north-south trending Long Plain Fault (LPF) zone.

The project intercepts two major structural blocks. These two structural blocks form distinct geological terrains; the dominantly Silurian Tumut Block in the west (the ravine area), and the dominantly Ordovician Tantangara Block in the east (the plateau area). The terrains are separated by an escarpment caused by movement on the LPF.

The key geological formations for each block are shown in Table 3-1: and Figure 3-1:.

Table 3-1: Key geological formations

Plateau	Ravine
Tertiary Basalt, Kellys Plain Volcanics, Boggy Plain Suite, Peppercorn Formation, Tantangara Formation, Temperance Formation, Shaw Hill Gabro and the Gooandra Volcanics	Boraig Group, Byron Range Group, Ravine Beds and Yarrangobilly Limestone. Within the Tantangara Block

There are eight karst areas in KNP, all of which are developed in Silurian or Devonian limestones. These include Yarrangobilly Caves, a known groundwater dependent ecosystem (GDE) and karst area, and Coolemans Plain karst area; both are recognised in the KNP Plan of Management (DEC 2014) for their cultural and natural significance.

This complex geology, in association with topography, has resulted in a diverse soil landscape. Soils vary significantly in relation to altitude, temperature and rainfall.

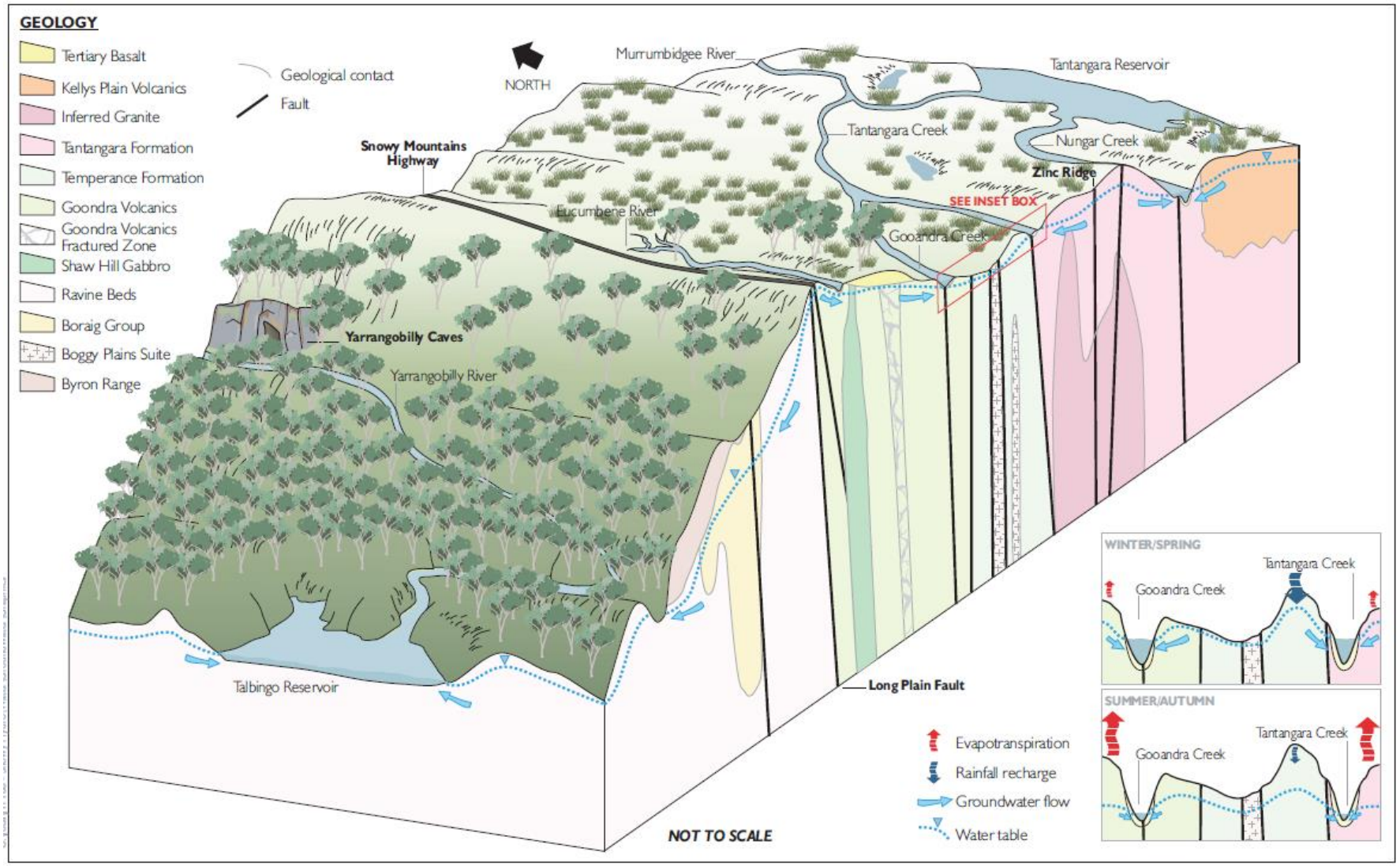

Figure 3-1: Conceptual geological block diagram (EMM, 2019)

3.3. Climate

The project area has an alpine climate that is characterised by cool summers and cold, damp, and snowy winters. The highest and most consistent precipitation occurs in winter to early spring, with precipitation amounts increasing with elevation. Summer and autumn are generally drier and experience greater variation in monthly rainfall. Summer rainfall is generally of higher intensity and of shorter duration than in winter. Climate data for the project area has been sourced from regional Bureau of Meteorology (BoM) and Snowy Hydro rainfall gauges, as well as climate maps produced by BoM. A summary of climate data for the ravine and plateau areas is provided in the Surface Water Management Plan (Appendix A).

3.4. Bushfire

In January 2020, during the Main Works EIS application, significant bushfires occurred within the Project area and northern section of Kosciuszko National Park. The project site at Lobs Hole was severely impacted with much of the groundcover and trees burned, leaving the catchment area with bare soil and no ground protection. Other parts of the Main Works project area including the Plateau, Marica and Tantangara were also impacted by the bushfire to varying degrees.

The bushfires have led to a reduction in ground cover and increase in burnt ash material within and adjacent to the construction envelope. It is likely that, for some time, the existing pre-fire baseline water data that has been gathered and discussed in the Surface Water Management Plan (Appendix A) and Groundwater Management Plan (Appendix B) will differ to the post-fire water quality.

3.5. Water Courses

All water courses are defined as receiving baseflow from groundwater (gaining streams). The key watercourses and the baseline water quality and flood characteristics are described below for the ravine area, plateau area and rock forest and are shown in Figure 3-2 and Figure 3-3. The ravine watercourses generally flow to the Talbingo Reservoir and the Plateau watercourses generally flow into the Tantangara Reservoir. Existing water quality characteristics are discussed in the Surface Water Management Plan (Appendix A).

3.5.1. Ravine

Within the ravine, the Yarrangobilly River is the major regional watercourse that flows into Talbingo Reservoir, downstream of Lobs Hole. Its catchment has an area of 271 km^2 that is wholly within the KNP. The Yarrangobilly River has a number of tributaries within the ravine, including Wallaces Creek, Stable Creek, Sheep Station Creek and Highground Creek. The majority of annual stream flow occurs in late winter and early spring, which is typical for rivers in the Australian Alps.

3.5.2. Plateau

The plateau is within the upper reaches of the Murrumbidgee and Eucumbene River catchments, wholly within KNP. The headwaters of the Eucumbene River are in the western plateau, and the river flows in a southerly direction to Lake Eucumbene. The Murrumbidgee River flows from north of the plateau in a south easterly direction into Tantangara Reservoir.

A number of perennial waterways are present across the plateau, that either flow north into the Murrumbidgee River or directly into Tantangara Reservoir, including Gooandra Creek, Tantangara Creek, Nungar Creek and Kellys Plain Creek.

3.5.3. Rock Forest

Rock Forest is in the headwaters of the Goorudee Rivulet catchment, outside of KNP and is nearby to two watercourses, being Camerons Creek and an unnamed 3rd order watercourse.

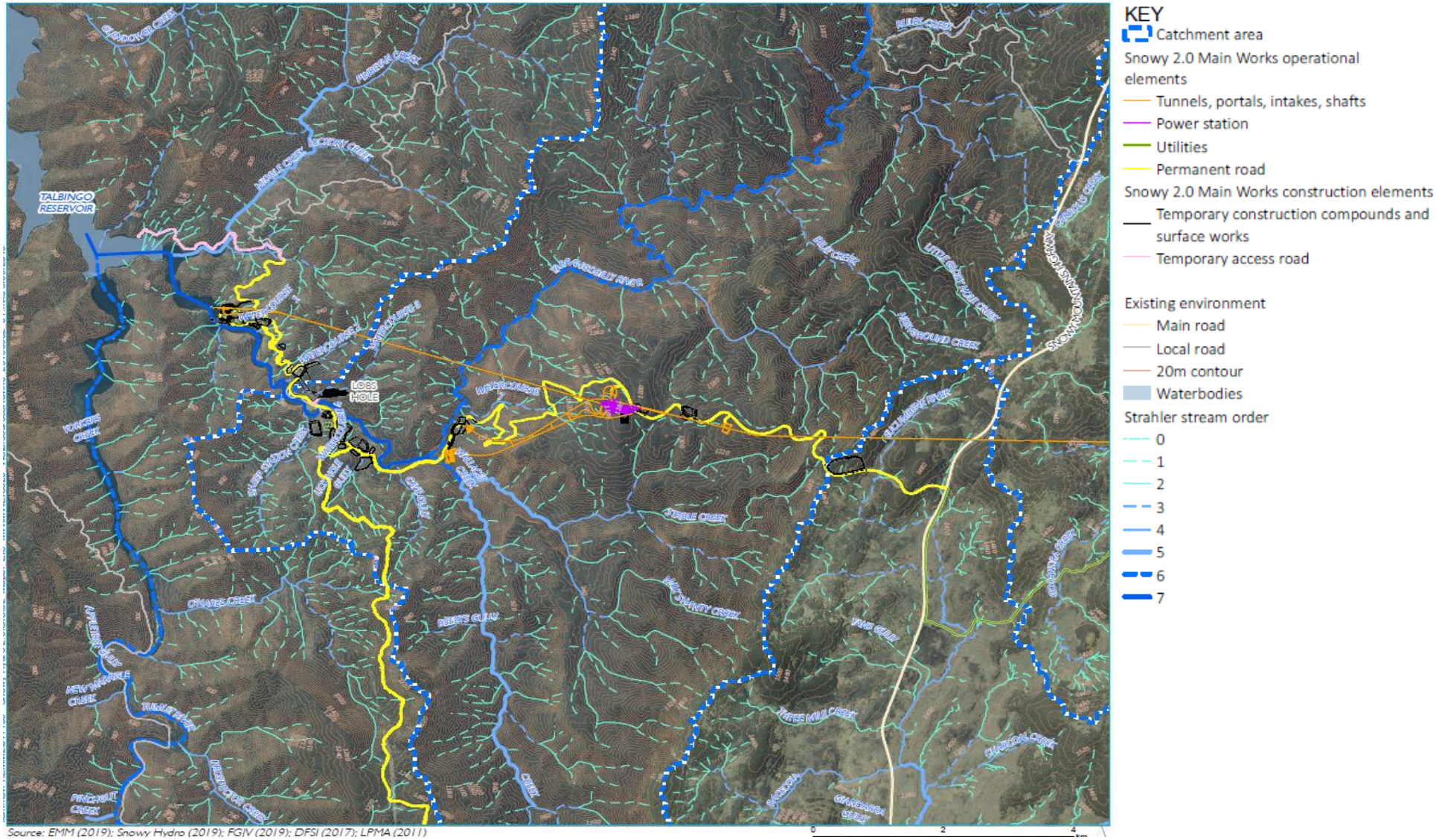

Figure 3-2: Water Courses – Ravine (EMM, 2019)

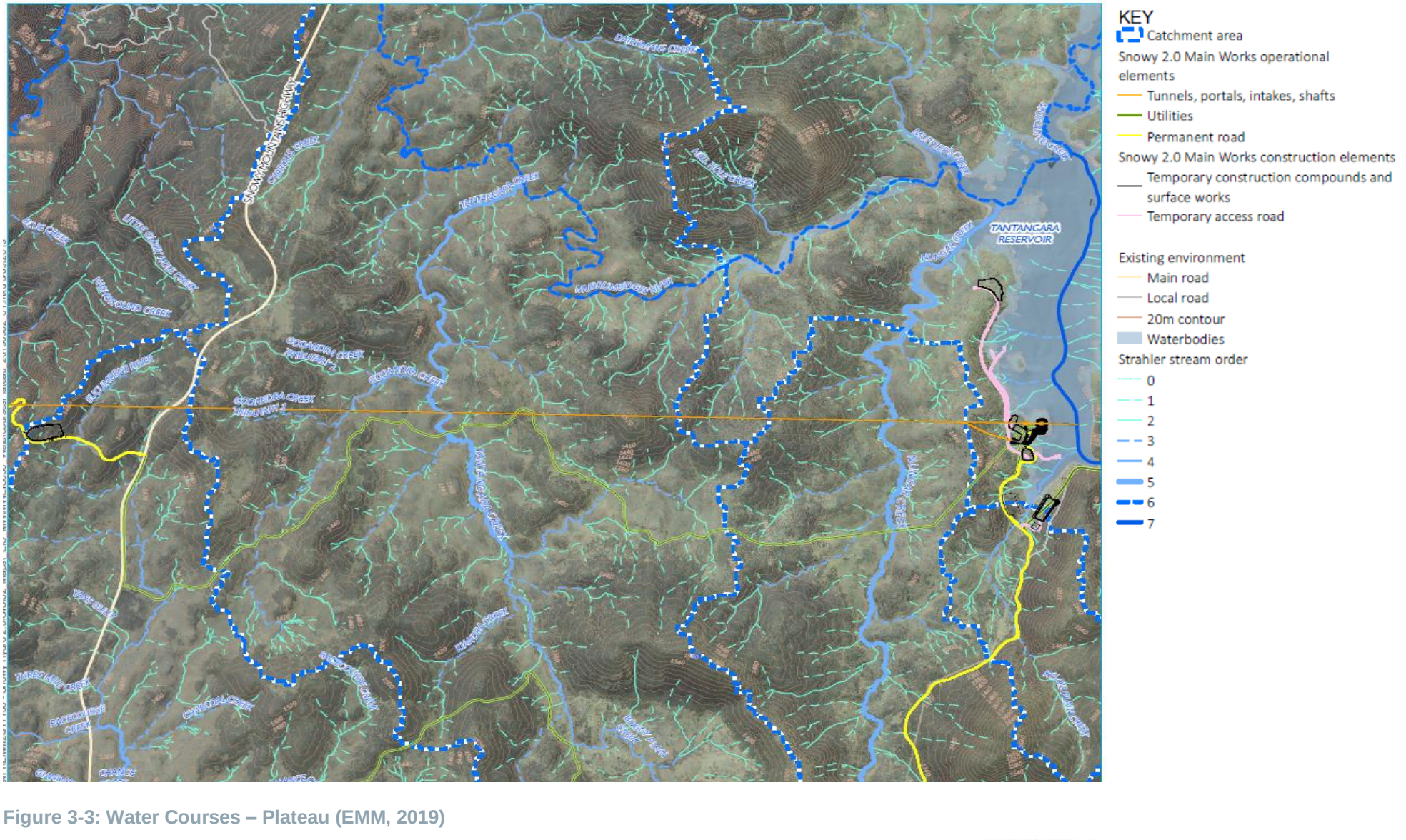

Figure 3-3: Water Courses – Plateau (EMM, 2019)

3.6. Groundwater

The hydrogeological units of the project are:

- alluvium, colluvium and weathered rock: these shallow units are generally recharged by moderate to high rainfall, flooding for alluvial areas and snow melt;
- shallow weathered fractured rock: these units have low to moderate permeability and are recharged by moderate to high rainfall and snow melt (occurring when soil moisture conditions are exceeded); and
- deep fractured rock: recharged by infiltration of rainfall migrating from shallow groundwater systems. Permeability is generally lowest in the central section of the plateau and higher in the east and western areas of the plateau. There is downward flow of groundwater in recharge areas and upward flow in discharge areas.

Measurements from the baseline groundwater monitoring network vary from approximately 1,470 m AHD in the topographically elevated terrain adjacent to the LPF, to approximately 570 m AHD in the topographically lower terrain near Lobs Hole. Groundwater levels may fall outside of this measured range in areas of higher relief and in some of the lower drainage lines, such as the interface between the Yarrangobilly River and Talbingo Reservoir where levels are likely at or close to surface levels of about 545 m AHD.

3.6.1. Ravine

Along the proposed headrace tunnel transect, groundwater levels within the Ravine Beds vary from approximately 1,325 m AHD in the topographically elevated terrain adjacent to the LPF in the east, to approximately 570 m AHD in the topographically lower terrain near Lobs Hole. Groundwater flow direction is generally from east to west, with the LPF area acting as a groundwater divide between the ravine and plateau areas.

Groundwater levels within the ravine do not typically show an obvious response to rainfall events or flow events within the Yarrangobilly River.

3.6.2. Plateau

Along the proposed headrace tunnel transect, groundwater levels vary from approximately 1,470 m AHD in the elevated areas adjacent to the LPF in the west, to approximately 1,170 m AHD in the lower elevated area near Tantangara Creek. Overall, groundwater levels observed along the proposed tunnel alignment indicate that groundwater flow direction is generally west to east from the LPF.

Groundwater levels within the plateau show a moderate to strong response to rainfall events, indicating a moderate to strong connection between surface and the regional groundwater system.

4. WATER MANAGEMENT APPROACH

4.1. Water Management Streams

The four key water management streams for the Project are described in Table 4-1.

Table 4-1: Water management streams

Water management stream	Description	Details of management measures
Stormwater	This refers to surface water runoff from areas disturbed by construction and surface runoff around construction areas (i.e. clean water diversions).	WMP - Appendix A (SWMP)
Process water	This refers to the water supply system for construction activities on the surface and in the tunnel and includes the: • extraction of water from groundwater wells (see Figure 5-1) • extraction of water from reservoirs; • reuse of intercepted groundwater; and • discharge of excess water to the reservoirs.	Water access licencing is discussed in Section 2.5.3. The Project site water balance is discussed in Section 5. Requirements relating to discharges are discussed in the WMP - Appendix A (SWMP). Requirements relating to the groundwater management and monitoring are discussed in WMP - Appendix B (GMP)
Wastewater	This refers to sewage and grey water generated from the accommodation camps and other amenities	WMP - Appendix A (SWMP)
Potable water	This refers to water that has been treated to a potable water standard (i.e. drinking water)	WMP - Appendix A (SWMP)

4.2. Water Reuse

The Project is committed to maximising the reuse and recycling of water. A key mechanism that has been designed is the reuse of process water as much as practicable in order to avoid release into the surrounding water environments.

During tunnelling, intercepted groundwater will be the primary water supply source (i.e. process water) for construction activities. Intercepted groundwater will be pumped to a process water treatment plant and treated. Future Generation will aim to reuse the water from the process water treatments plants in the fire water tanks and the industrial water tank which will be located within the portal / tunnel. This tank will be utilised for in-tunnel activities such as cooling the tunnel boring machine, dust suppression and washing equipment.

Any water that is not able to be reused within the portals / tunnels will be sent to surface tanks for reuse on site. Surface reuse opportunities under the investigation include:

- use in dust suppression on roads;
- wheel wash sites;
- use in compaction of soils;
- use in the emplacement areas;
- general washdown of equipment;
- concreting; and

- establishment of landscaping and rehabilitation.

In addition to process water reuse, stormwater will be harvested from sediment basins wherever practicable and used in water carts.

Further detail regarding the process water supply system is discussed in Section 5.

5. SITE WATER BALANCE

The Project is located in a remote location with no municipal potable water supply available in the area. A water supply system will be established to supply water for potable water use and construction activities. The system is planned to be sourced from licenced groundwater bores (see Figure 5-1) until an extraction pipeline is established to extract raw water for construction use from Talbingo and Tantangara Reservoirs. No surface watercourse extraction is proposed (i.e. the only surface water extraction proposed is from the reservoirs). During tunnelling, intercepted groundwater will become the primary water supply source (i.e. process water) for construction activities.

Treated process water from groundwater ingress into the tunnel will be recycled and re-used back into the tunnel or on site as non-potable water (refer to Section 4.2). Excess treated water that cannot be utilised on site, as well as treated wastewater (sewage) will be discharged via pipe into either the Talbingo or Tantangara Reservoir.

These systems are referred to as the Tantangara and Talbingo systems and will operate independently (i.e. they will not be connected, as delineated in Figure 5-2). Discharges from the treatment systems will be licenced under the Project EPL 21266. During construction, wastewater will be produced at all construction camps and facilities that have amenities.

All water extraction will be appropriately licenced (refer to Section 2.5.3) and required for the scope of works detailed in Section 1.1.2 of this Plan. Should watercourse extraction be required in the future, additional approvals under the Water Management Act would be reviewed and sought as required.

Water extraction (i.e. from groundwater bores, reservoirs and tunnel inflows) and water discharge (i.e. surplus treated process and wastewater) metering will comply with the Australian Standard AS 4747: 'Meters for non-urban supply'. The metering equipment will be installed at water source extraction points and prior to discharge points. Readings will be undertaken manually (the Project are investigating opportunities for electronic monitoring) on an ongoing basis throughout construction (i.e. weekly) and recorded in a project water useage register.

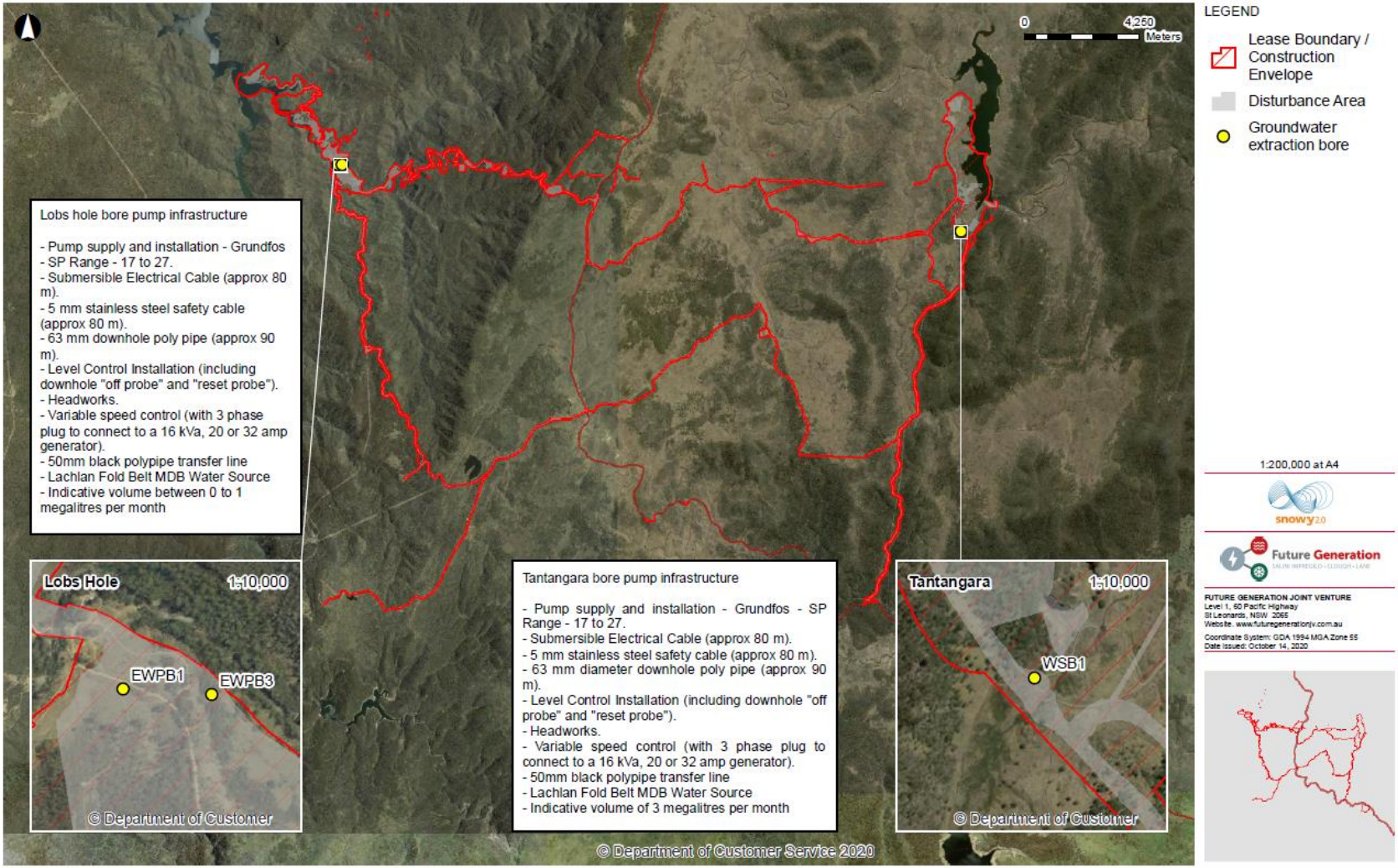

Figure 5-1: Groundwater extraction bores and associated infrastructure

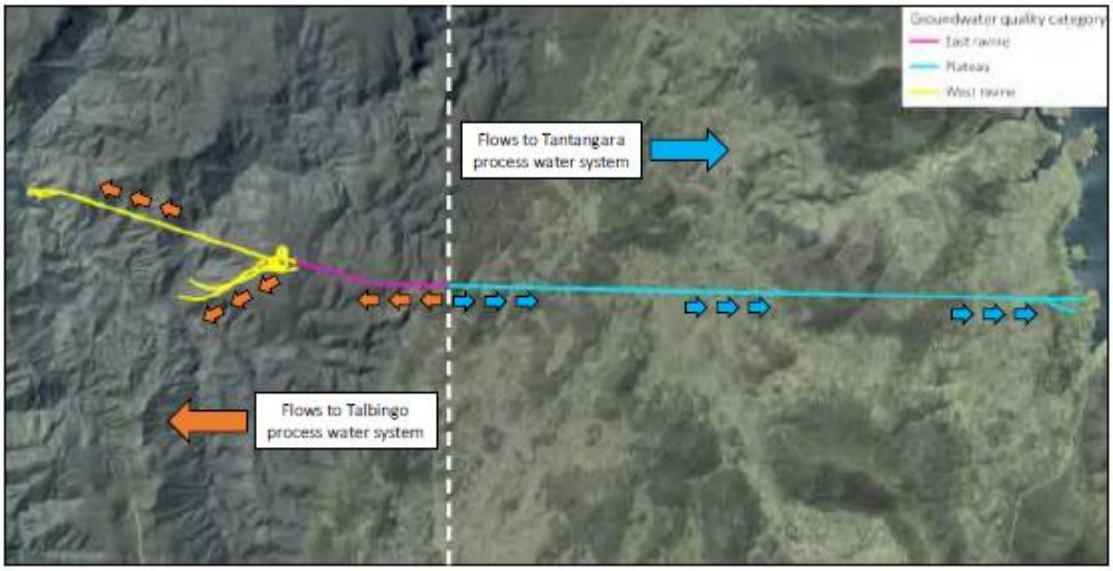

Figure 5-2: Process water system extent (EMM, 2019)

A conceptual overview of the water system with indicative metering locatons is shown in Figure 5-3. All monitoring will be used to track water take in accordance with water access licence requirements and inform the annual revised site water balance.

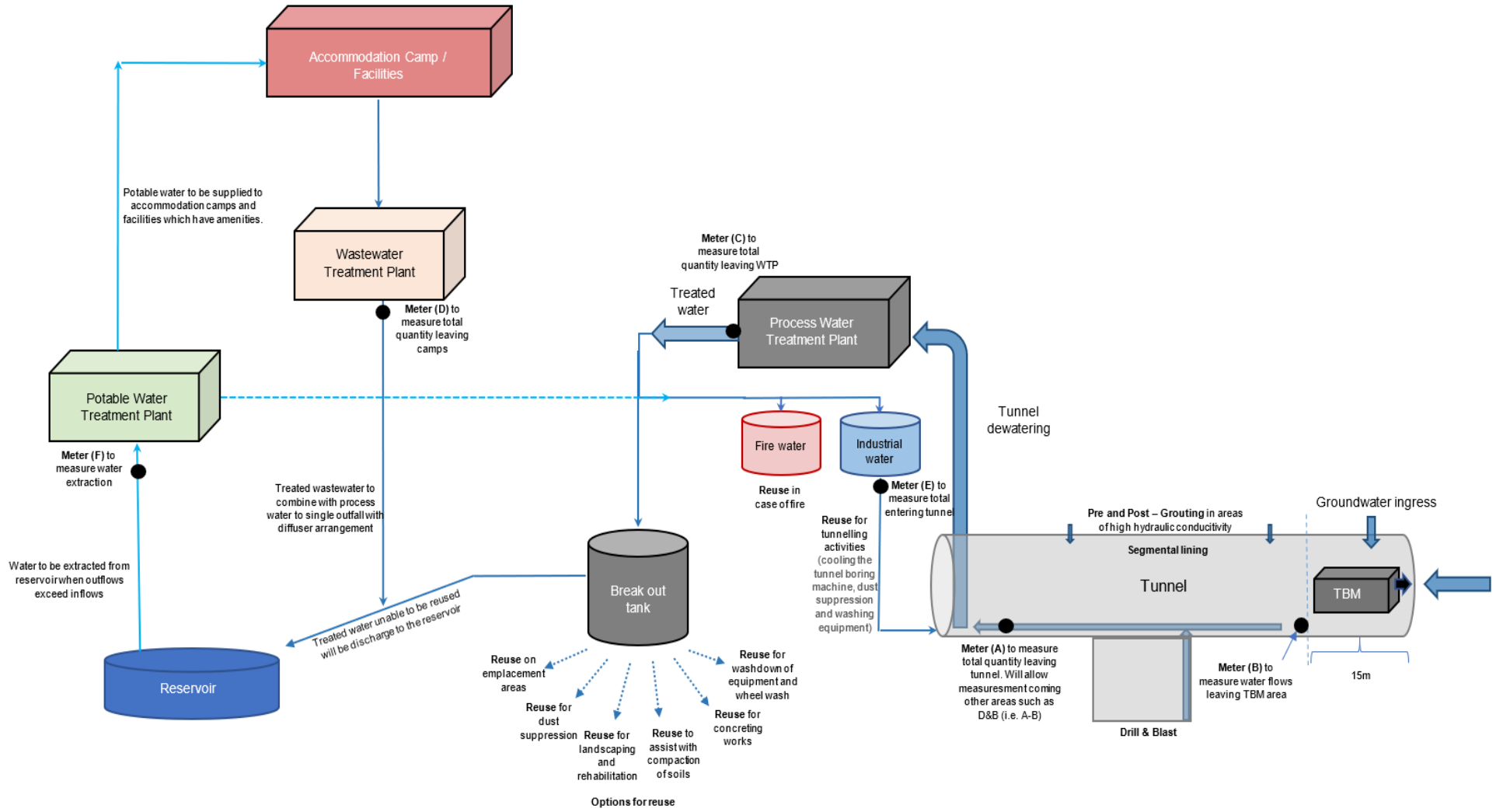

Figure 5-3: Conceptual water management overview (including process water, wastewater and potable water)

A preliminary Site Water Balance (Balance) was completed in the Revised Water Management Report (RTS Appendix J) to estimate the discharge and top-up profiles from the systems over the construction phase of the project. Table 2-1, Figure 5-4 and Figure 5-5 illustrate the following site water predictions;

- The peak discharge from the Tantangara system is expected to occur during the latter end of the construction timeline, with a discharge rate of approximately 3.7 ML/day. From approximately 1.5 years into construction until the start of commissioning the peak discharge from the Talbingo system is estimated to be in the order of 1.3 ML/day;
- The predicted maximum groundwater inflow into the tunnel is 3.9 ML/day in the Tantangara system and 1.2ML/day in the Talbingo system; and
- System top-ups will only be required when net usage exceeds net inflows and will be at peak of 6ML/month for Tantangara and 23 ML/month for Talbingo.

Table 5-1: Peak discharge and top-up rates

Process water system	Peak top-up rate	Peak discharge rate
Tantangara	6 ML/month or 0.2 ML/day	114 ML/month or 3.7 ML/day
Talbingo	23 ML/month or 0.7 ML/day	39 ML/month or 1.3 ML/day

The Balance for month 48 of construction is presented in Figure 5-6 as a snapshot during the construction period. The volume of water that requires management will progressively increase over the tunnel construction period.

The Balance is currently a conceptual model. Future Generation will continue to develop the Balance during construction and the completion of final tunnel design for the purpose of:

- demonstrating the functionality of the process water system;
- estimate the probable range in water transfer volumes; and
- record, update and report on the water transfer volumes each calendar year.

The Balance will be reviewed each calendar year. Where updates are identified, the revised Balance will be updated and included in future revision of this WMP.

This review will involve using monitored quantities to verify predicted quantities, adjust the Balance where required, and provide explanation of any differences between predicted and actual quantities. Any water infrastructure retrospectively added or changes in water access/extraction licences will be included in the revision.

Further details of the Tantangara and Talbingo systems are contained within in Surface Water Management Plan (Appendix A) and Groundwater Management Plan (Appendix B).

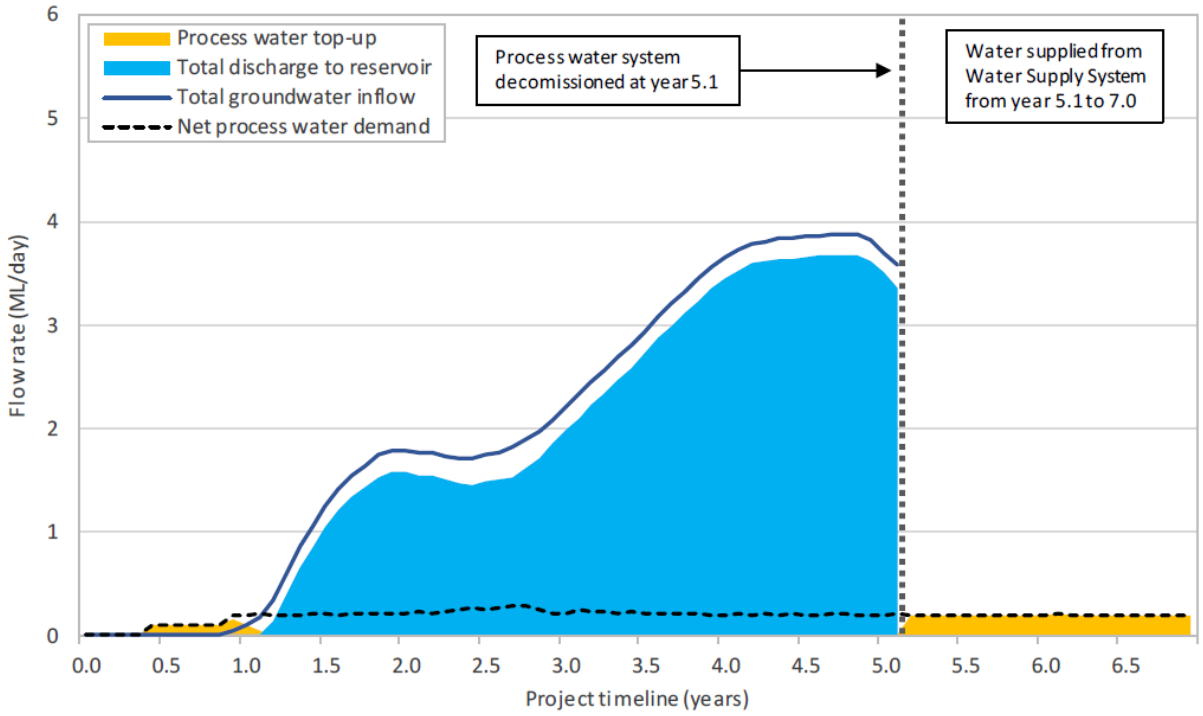

Figure 5-4: Tantangara process water system water balance (EMM, 2020)

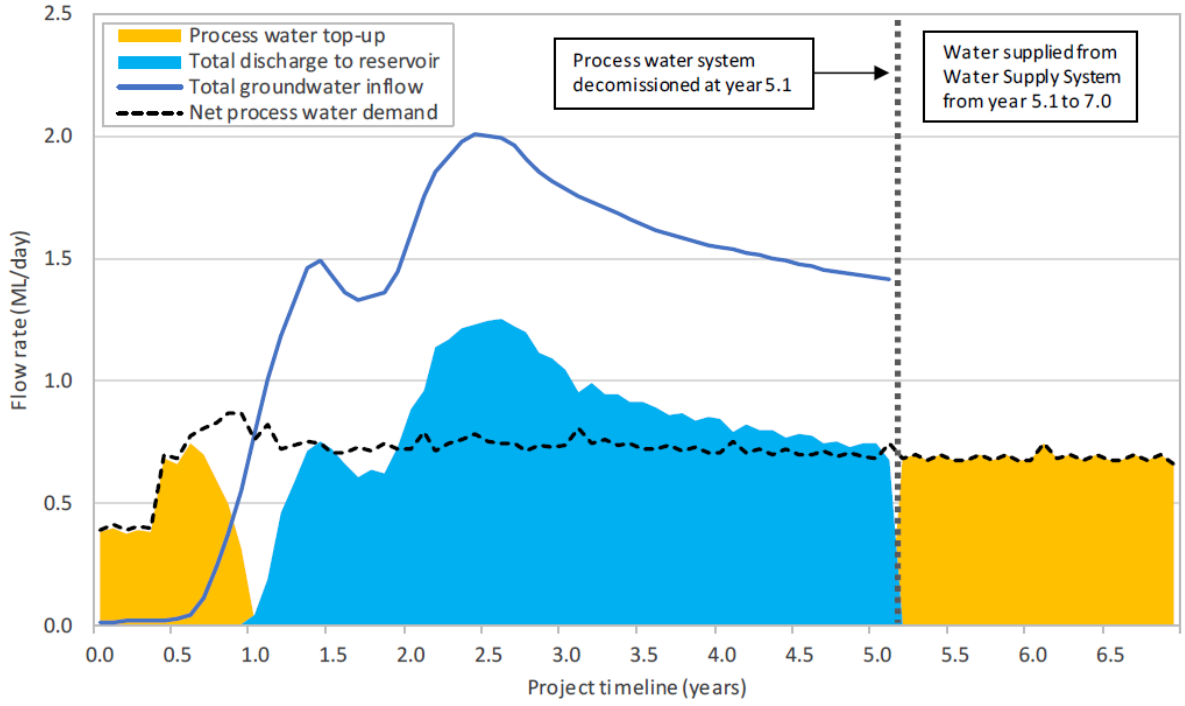

Figure 5-5: Talbingo process water system water balance (EMM, 2020)

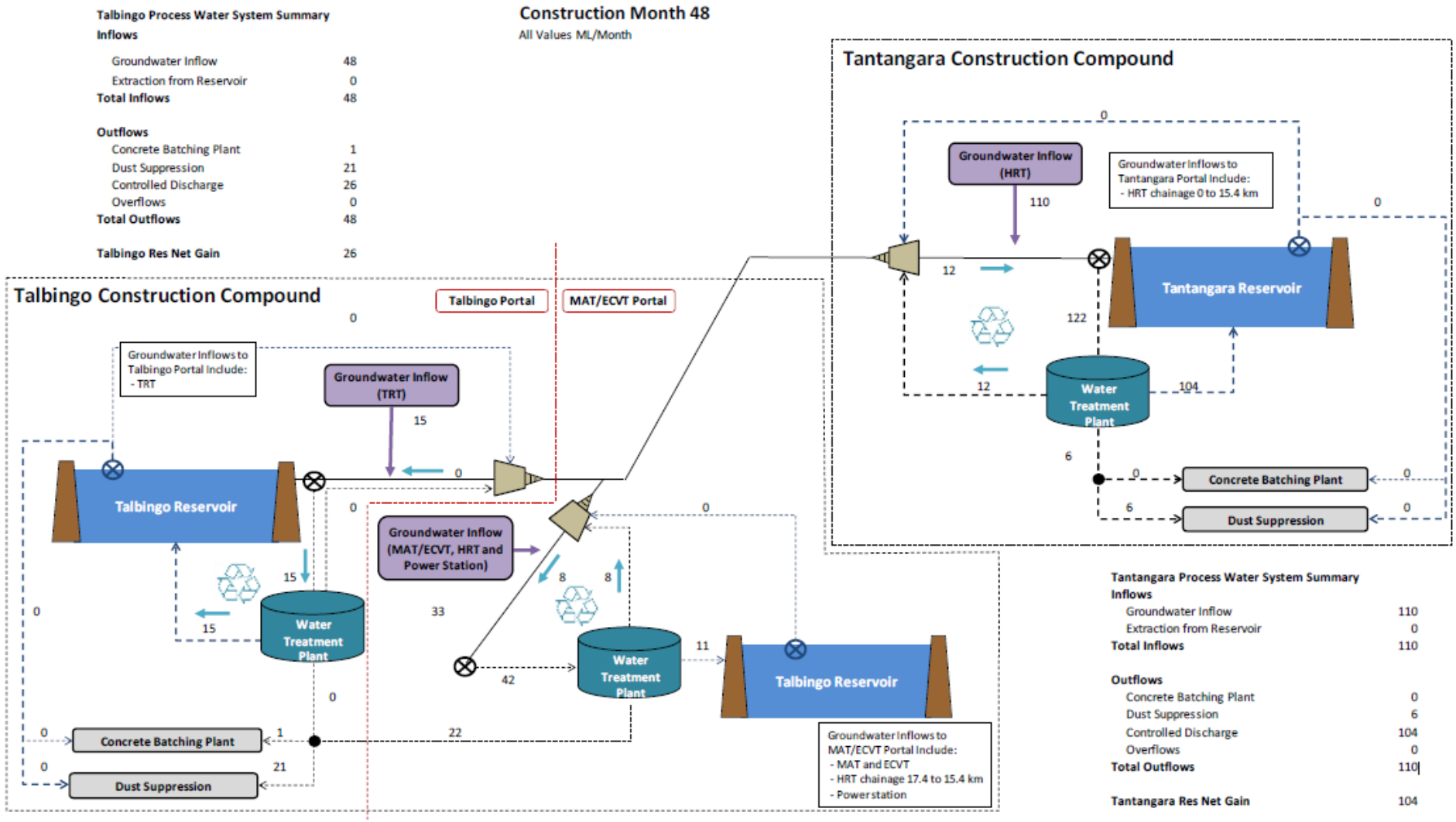

Figure 5-6: Main Works EIS Water Balance flow diagram - Month 48 of construction (EMM, 2020)

6. COMPLIANCE MANAGEMENT

6.1. Roles and Responsibilities

Future Generation's organisational structure and overall roles and responsibilities are outlined in Section 4 of the EMS. Specific responsibilities for the implementation of mitigation measures are detailed in Section 5 of the SWMP and GMP. Regardless of the allocation of responsibilities within this plan, the responsible party is to be assigned in accordance with the Contract

6.2. Inspections

Inspection of water management measures will be undertaken regularly during construction in the form of weekly environmental inspections and rainfall inspections. All inspections will be internally recorded.

Any opportunities for improvement identified through the inspection process will be recorded in an inspection report (minor issues) in accordance with Section 8 of the EMS or an incident report completed in accordance with Section 7 of the EMS. Findings from inspection and incident report(s) will be reported to relevant agencies where required.

6.3. Monitoring

Monitoring will be undertaken to confirm the satisfactory water outcomes are achieved during construction. A summary of the monitoring aspects within this WMP is provided in Table 6-1.

Further details, such as the parameters and frequency of monitoring are included in the Surface Water Management Plan (S2-FGJV-ENV-PLN-0011) and Groundwater Management Plan (S2-FGJV-ENV-PLN-0012).

The findings will be recorded and reported in accordance with Section 6.6.

Table 6-1: Water Management Plan Monitoring Overview

Aspect	Objective
Surface Water Management Plan	
Routine receiving surface water quality monitoring	• inform and assess the performance of management processes/measures that seek to minimise the Project's impact on surface water quality • help determine source and extent of any water quality changes • collect baseline data to characterise water quality and determine site specific values
Event based wet weather overtopping water quality monitoring	
Groundwater Management Plan	
Groundwater level monitoring	• inform and assess the performance of management processes/measures that seek to minimise the Project's impact on regional and local (including alluvial) aquifers and GDEs
Groundwater quality monitoring	
Water extraction monitoring	• inform and assess water consumption, site water balance and compliance with water access licences

6.3.1. Monitoring outside construction envelope

In accordance with schedule 4, condition 5 of the Infrastructure Approval, monitoring is permitted outside the construction envelope of the development provided the monitoring is required under the conditions of approval and authorised under an approved management plan.

This WMP includes surface water monitoring and groundwater monitoring inside and outside the construction envelope to monitor the surface water and groundwater impacts of the development (to satisfy schedule 3, condition 31(c) and 31(d) of the Infrastructure Approval).

Generally, monitoring will include the use of hand operated monitoring devices, sampling containers for the collection of water and the use of existing monitoring infrastructure (i.e. groundwater bores installed during project characterisation).

Where additional monitoring infrastructure is proposed outside the construction envelope, Future Generation will review environmental constraints and consult with relevant stakeholders (i.e. NPWS for monitoring infrastructure within the KNP) during the update to the Plan. Micro-siting principles will be implemented to minimise disturbance and compliance tracked against conditions of approval.

The ongoing use of monitoring infrastructure post construction will be determined in a SHL operational document or framework. Where monitoring infrastructure is no longer required, rehabilitation will be undertaken in accordance with the Rehabilitation Management Plan.

6.4. Incidents

Water incidents will be managed in accordance with Section 7 of the EMS and the Snowy Hydro Environmental Incident Process included within Appendix A4 of the EMS.

The Secretary and other relevant agencies will be notified of incidents in accordance with Section 7 of the EMS. Depending on the type and severity of the incident this may include notification to the Department and NPWS in writing for incidents defined under the conditions of approval, notification to the NPWS where required under the Deed of Agreement of Lease and notification to the EPA for pollution related incidents. Snowy Hydro would notify DPIE in writing immediately after they become aware of the incident on site.

6.5. Auditing

Audits will be undertaken to assess the effectiveness of water management measures and overall compliance with this WMP. Audit requirements are detailed in Section 8.3 of the EMS.

6.6. Reporting

Future Generation will report to Snowy Hydro and other agencies as detailed in Table 6-2 on water management aspects related to the Project. During construction, surface water and groundwater monitoring data will be collected, tabulated and assessed against thresholds.

Table 6-2: Reporting requirements relevant to water

Report	Requirement	Recipient
Reporting		
Weekly inspection	EMS Requirement Weekly inspection report undertaken by environmental advisor which includes aspects relevant to the management of water	FGJV Internal Record
Incident Report (related to water)	Infrastructure Approval Schedule 4, CoA 6 The Proponent must notify the Department and NPWS via the Major Projects Portal immediately after it becomes aware of an incident on site. This notice must set out the location and nature of the incident.	Depending on the type and severity of the incident this may include notification to the Department and NPWS in writing for incidents defined under the conditions of approval, notification to the NPWS where required under the Deed of

Report	Requirement	Recipient
	EPL 21266 Incident reports to be provided to EPA in accordance with EPL notification of environmental harm and written report requirements.	Agreement of Lease and notification to the EPA for pollution related incidents. Snowy Hydro will notify DPIE in writing immediately after they become aware of the incident on site.
EPL Monitoring Reports and Annual Returns/Report	EPL 21266 EPL monitoring reports will be prepared in accordance with the requirements of the EPL. An EPL Annual Return/Report will be prepared in respect of each EPL reporting period (typically 12 months)	EPA
Water Access Licence Report (annual)	Water Access Licence Actual water take will be reported to NRAR on an annual basis in accordance with water access licence conditions.	NRAR
Environmental Water Report (every 3 months)	Infrastructure Approval Schedule 3, CoA 31(c)(d) Commentary on the performance of the monitoring programs within the water management plan will be documented in the quarterly environmental water report. Any incidents and key environmental issues will be documented.	Publicly available on project website
Other Aspects		
Site Water Balance	Infrastructure Approval Schedule 3, CoA 31(b) Yearly calendar revision of the Site Water Balance will be undertaken and where updates are identified, the revised Balance will be updated and included in a future revision of this WMP.	Proposed future updates to this WMP will be provided to EPA, NPWS, Water Group, NRAR and NSW DPI.
Groundwater model validation	Infrastructure Approval Schedule 3, CoA 31(d) Yearly calendar groundwater model review, validation and recalibration (as dictated by monitoring results) (undertaken by SHL).	The revised model will be submitted to the relevant agencies on completion.
Updates to this WMP	Section 1.7 of this WMP This WMP will be updated prior to the commencement of the following activities: • dredging, channel extraction or underwater blasting • in-reservoir emplacement works • construction works in the third year for the purposes of determining need / location of streamflow monitoring sites • Snowy 2.0 operations (a separate SHL document or framework may be prepared)	Proposed future updates to this WMP will be provided to EPA, NPWS, Water Group, NRAR and NSW DPI.

APPENDIX A – SURFACE WATER MANAGEMENT PLAN

APPENDIX B – GROUNDWATER MANAGEMENT PLAN

APPENDIX C – EXPLORATORY WORKS CONSOLIDATED CONDITIONS OF APPROVAL (SSI-9208)

Table C 1 details the conditions from the Exploratory Works Infrastructure Approval which are relevant to water and demonstrates where these conditions are addressed or are no longer relevant.

Table C 1: Exploratory Works conditions of approval relevant to water (SSI 9208)

Condition	Requirement	Where addressed
Sch 3, Cond 31	The Proponent must ensure that it has sufficient water for all stages of the development; and if necessary, stage the development to match its available water supply. *Note: Under the Water Management Act 2000, the Proponent must obtain the necessary water licences for the development.*	WMP - Section 2.5.3
Sch 3, Cond 32	Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act. *Note: Section 120 of the POEO Act makes it an offence to pollute any waters.*	WMP - Appendix A (SWMP) WMP - Appendix B (GMP)
Sch 3, Cond 33	The Proponent must: (a) minimise the use of clean water on site; (b) maximise the diversion of clean water runoff around the approved disturbance areas on site; (c) minimise the flow rates from any clean water runoff diversions to adjoining watercourses; (d) minimise any soil erosion associated with the development; (e) ensure all chemical and hydrocarbon products are stored on site in bunded areas in accordance with the relevant Australian Standards.	WMP - Appendix A (SWMP) WMP - Appendix B (GMP)
Sch 3, Cond 34	Prior to carrying out any construction, unless the Planning Secretary agrees otherwise, the Proponent must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This Plan
	(a) be prepared in consultation with the EPA, NPWS, DoI Water and DPI - Fisheries by a suitably qualified and experienced person/s whose appointment has been approved by the Planning Secretary;	A Water Management Plan was prepared for both Stage 1 and Stage 2 of Exploratory Works in consultation with the EPA, NPWS, DoI Water and DPI – Fisheries. Consultation undertaken for this Main Works Water Management Plan is identified in Section 1.9
	(b) include a Site Water Balance for the development and a program to review and update the site water balance each calendar year;	WMP – Section 5
	(c) include a Surface Water Management Plan with: • detailed baseline data on surface water flows and quality in the watercourses that could potentially be affected by the development; • a program to augment the baseline data during the development; • a description of the measures that would be implemented to minimise the impacts of:	WMP - Appendix A (SWMP)

Condition	Requirement	Where addressed
	– any subaqueous emplacement; – the dredging within Talbingo Reservoir; – the barge infrastructure; – the water intake; – the water treatment pipes and outlets; – any in-stream works; – stockpiles; – eastern emplacement area; – western emplacement area; – construction portal; – accommodation camp; – Lobs Hole substation; – road upgrades, and in particular the road works in the vicinity of the Yarrangobilly River; – chemical and hydrocarbon storage. • surface water assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts of the development; • a description of the measures that would be implemented to minimise the surface water impacts of the development, and comply with the performance measures in Condition 33 above; • a program to monitor and report on the surface water impacts of the development including water monitoring locations, analytes and sampling frequency for each monitoring location; • a program to monitor and report on the surface water impacts of the development • a plan to respond to any exceedances of the surface water trigger levels and/or assessment criteria and mitigate and/or offset any adverse surface water impacts of the development;	
	(d) include a Dredging Management Plan with: • a description of the measures that would be implemented to minimise the generation and dispersion of sediments outside the identified works zone during dredging; • monitoring at representative locations to determine the extent of suspended sediment concentrations and any other potential pollutants dispersed by dredging; • a plan to respond to any exceedances of the surface water trigger levels and/or assessment criteria and mitigate and/or offset any adverse surface water impacts of the development;	A Dredging Management Plan will be prepared for exploratory works prior to the undertaking of any dredging for exploratory works.
	(e) include a Groundwater Management Plan with: • detailed baseline data on groundwater levels, yield and quality on the aquifers that could be affected by the development; • a program to augment the baseline data during the development;	WMP - Appendix B (GMP)

Condition	Requirement	Where addressed
	• groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; • a description of the measures that would be implemented to minimise the groundwater impacts of the development • a program to monitor and report on: • groundwater inflows to the tunnel, including inflows to relevant water sources; • groundwater takes from the groundwater bore • the impacts of the development on: • regional and local (including alluvial) aquifers; • groundwater dependent ecosystems, stygofauna and riparian vegetation; and • base flow to surface water sources; • a plan to respond to any exceedances of the trigger levels and/or assessment criteria and mitigate and/or offset any adverse groundwater impacts of the development.	
Sch 3, Cond 35	The Proponent must implement the approved Water Management Plan for the development.	This WMP will be implemented for the development.
Sch 3, Cond 39	The Proponent must: (a) ensure the temporary bridges over Wallace Creek and the Yarrangobilly River incorporate, to the greatest extent practicable, the requirements: • *Guidelines for Controlled activities on Waterfront Land (NRAR, 2018)*; and • *Policy and Guidelines for Fish Habitat Conservation* (DPI 2013) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries 2003); (b) remove temporary bridges as soon as practicable after the construction of the permanent bridges, and rehabilitate the land to the satisfaction of the NPWS; (c) consider scheduling to minimise in stream works between October to January, the migratory period of the Macquarie Perch (*Macquaria australasica*).	WMP - Appendix A (SWMP)
Sch 3, Cond 40	The Proponent must: (a) ensure that permanent bridges over Wallace creek and the Yarrangobilly River are designed and constructed to comply with the relevant requirements of the: • *Guidelines for Controlled activities on Waterfront Land* (NRAR, 2018); and • *Policy and Guidelines for Fish Habitat Conservation* (DPI 2013) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries 2003); (b) ensure that the permanent bridges over Wallace creek and the Yarrangobilly River are designed and constructed to comply with the relevant requirements of the relevant Austroads Standards (such as elevating them above the 1% AEP flood level);	WMP - Appendix A (SWMP)

Condition	Requirement	Where addressed
	(c) minimise in stream works between October to January, the migratory period of the Macquarie Perch (*Macquaria australasica*).	