



S2-FGJV-ENV-PLN-0090

## SNOWY 2.0 – MAIN WORKS NATURAL HAZARD 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	19.06.2020	Initial draft for Snowy Hydro review
B	2.07.2020	Rev B revised to address Snowy Hydro comments and for issue to NPWS
C	04.08.2020	Rev C revised to address NPWS comments.



Our ref: DOC20/627518

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Dear Laurenne

***Snowy 2.0 Main Works CSSI 9687 – Emergency Management Plan (referred to as the Natural Hazard Management Plan)***

Thank you for your colleague Vincent Gillies email dated 4 August 2020 providing the National Parks and Wildlife Service (NPWS) with the final version of the Natural Hazard Management Plan (NHMP), incorporating the Bushfire Management Plan, for the Snowy 2.0 Main Works.

NPWS has reviewed the final NHMP, particularly with regard to the requirements set out in Schedule 2 Condition 9 and Schedule 3 Conditions 60 (Bushfire Requirements) and 61 (Emergency Management Plan) of the project approval.

On behalf of NPWS, I approve the S2-FGJV-ENV-PLN-0090-C-Main Works-Natural Hazard Management Plan incorporating S2-FGJV-ENV-PLN-0050-D-Main Works-Bushfire Management Plan dated 4 August 2020 as relevant to this stage of the project. Please ensure that the approved plan is provided to DPIE Planning and Assessments and placed on the project website. NPWS look forward to commenting on future reviews and any amended plans required from approved modifications.

If you have any questions regarding this matter, please contact Glenn Stroud, Senior Project Officer NPWS Snowy 2.0, Southern Ranges Branch on 0428 427 553.

Yours sincerely

**NICOLE SHOTTER**  
**Manager, NPWS Snowy 2.0 Team**  
**Southern Ranges Branch**  
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Date: 21/8/2020

# TABLE OF CONTENTS

<b>Abbreviations and Definitions.....</b>	<b>4</b>
<b>1. Introduction.....</b>	<b>6</b>
1.1. Project Description .....	6
1.1.1. Overview .....	6
1.1.2. Construction Activities and Program.....	6
1.2. Project Approval .....	9
1.3. Disturbance area .....	9
1.4. Environmental Management System .....	11
1.4.1. Management Plan Hierarchy .....	11
1.5. Purpose and objectives of this plan.....	14
1.6. Consultation.....	14
1.7. Plan Preparation.....	14
<b>2. Environmental Requirements .....</b>	<b>16</b>
2.1. Legislation .....	16
2.2. Conditions of Approval .....	16
2.3. Revised Environmental Management Measures .....	17
2.4. Permits and Licences .....	18
2.5. Guidelines.....	18
<b>3. Site Characteristics .....</b>	<b>19</b>
3.1. Bushfire Risk .....	19
3.1.1. January 2020 Bushfire .....	19
3.2. Flood Risk.....	19
3.2.1. Ravine .....	21
3.2.2. Plateau .....	21
3.2.3. Rock Forest.....	22
3.3. Landslip Risk .....	22
<b>4. Hazard Prevention .....</b>	<b>23</b>
4.1. Overview.....	23
4.2. Bushfire .....	23
4.3. Flood Design .....	23
4.3.1. Access and road design.....	23
4.3.2. Accommodation camps and work sites .....	23
4.4. Landslip Design .....	24
4.5. Dangerous Tree Trimming .....	24
<b>5. Hazard Preparedness and Response .....</b>	<b>25</b>
5.1. Bushfire Preparedness and Response.....	25
5.2. Flood Preparedness and Response.....	25
5.2.1. Extreme Weather Monitoring .....	25
5.2.2. Site Preparation .....	25
5.2.3. Evacuation .....	26
5.3. Landslip Preparedness and Response .....	26
5.4. Emergency Contact Numbers .....	27
<b>6. Recovery .....</b>	<b>29</b>
6.1. Site Inspections .....	29
6.2. Post-incident Investigation .....	29

<b>7. Compliance Management .....</b>	<b>31</b>
7.1. Site Induction and Training Requirements .....	31
7.2. Monitoring and Inspection .....	31
7.3. Review .....	31
<b>Appendix A – Bushfire Management Plan .....</b>	<b>32</b>
<b>Appendix B – Flood Hazard Lobs Holes and Kellys Plain Creek .....</b>	<b>33</b>
<b>Appendix C – Flood Event Management Guide.....</b>	<b>38</b>
<b>Appendix D – Exploratory Works Conditions of Approval.....</b>	<b>40</b>

## FIGURES

Figure 1-1: Timing of Snowy 2.0 Exploratory Works and Main Works .....	7
Figure 1-2: Snowy 2.0 Main Works work areas.....	8
Figure 1-3: Disturbance area and construction envelope.....	10
Figure 1-4: Health and safety management plans .....	12
Figure 1-5: Management plans and post-approval documents with the TMP indicated. ....	13
Figure 3-1: Flood hazard curves.....	20
Figure 5-1: Access and refuge areas .....	28
Figure 6-1: Environmental incident process .....	30

## TABLES

Table 1-1: Disturbance area terminology .....	9
Table 1-2: Consultation with stakeholder summary .....	14
Table 2-1: Main Works (CSSI 9687) conditions of approval relevant to natural hazards .....	16
Table 2-2: Main Works (CSSI 9687) management measures relevant to natural hazards.....	17
Table 2-3: Exploratory Works (SSI-9208) management measures relevant to natural hazards.....	17
Table 3-1: Flood hazards classification .....	20
Table 3-2: Talbingo Reservoir flood levels .....	21
Table 3-3: Tantangara Reservoir flood levels.....	21
Table 4-1: Road design criteria .....	23
Table 5-1: Emergency service contact details.....	27
Table D-1: Exploratory Works (CSSI 9208) conditions of approval relevant to natural hazards .....	41

## ABBREVIATIONS AND DEFINITIONS

Acronym	Definition														
AEP	Annual Exceedance Probability. The probability of an event being equalled or exceeded within a year. <table border="1" data-bbox="432 483 1174 703"> <thead> <tr> <th>AEP (%)</th> <th>Average recurrence interval (years)</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>10</td> </tr> <tr> <td>5</td> <td>20</td> </tr> <tr> <td>2</td> <td>50</td> </tr> <tr> <td>1</td> <td>100</td> </tr> <tr> <td>0.2</td> <td>500</td> </tr> <tr> <td>0.05</td> <td>2,000</td> </tr> </tbody> </table>	AEP (%)	Average recurrence interval (years)	10	10	5	20	2	50	1	100	0.2	500	0.05	2,000
AEP (%)	Average recurrence interval (years)														
10	10														
5	20														
2	50														
1	100														
0.2	500														
0.05	2,000														
AHD	Australian Height Datum – national surface level datum corresponding to a mean sea level														
BOM	Bureau of Meteorology														
BCD	Biodiversity and Conservation Division (formerly OEH)														
CMG	Consequence Management Guide														
DPIE	NSW Department of Planning, Industry and Environment														
EIS	Environmental Impact Statement														
EMS	Environmental Management Strategy														
EOC	Emergency Operations Centre														
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>														
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>														
EPA	NSW Environment Protection Authority														
EPL	Environment Protection Licence														
ERMP	Emergency Response Management Plan – the parent plan to this plan														
FSL	(Reservoir) Full Supply Level														
LEOC	Local Emergency Operations Committee														
Main Works EIS	<i>Snowy 2.0 Main Works Environmental Impact Statement</i>														
Fire Season	Fire season also referred to as the statutory Bush Fire Danger Period normally starts on 1 October and continues through the following 31 March as per the RFS website.														
Future Generation	Future Generation Joint Venture														
Future Generation-PMS	Project Management System														
HSMP	Health and Safety Management Plan														
HSE	Health, Safety and Environment														
IC	Incident Controller														
KNP	Kosciuszko National Park														
MOL	(Reservoir) Minimum Operating Level														
NPWS	NSW National Parks and Wildlife Service (within the NSW Department of Planning, Industry and Environment (DPIE))														
NSW RFS	NSW Rural Fire Service														
PEP	Project Execution Plan														
PIC	Person in charge – the Project Director or their delegate														

Acronym	Definition
PMF	Probable Maximum Floo
PMT	Project Management Team
Project, the	Snowy 2.0 Main Works
QMP	Quality Management Plan
REMM	Revised environmental management measures
Remote Area	A remote area is one where personnel are not within a 20-minute response time of the project ambulance
SES	State Emergency Services
SHL or Snowy Hydro	Snowy Hydro Limited
Submissions Report or RTS	<i>Response to Submissions Snowy 2.0 Main Works</i>

## 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. This management plan has been prepared for the Snowy 2.0 Main Works project.

#### 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 Main Works construction program is summarised in Figure 1-1.

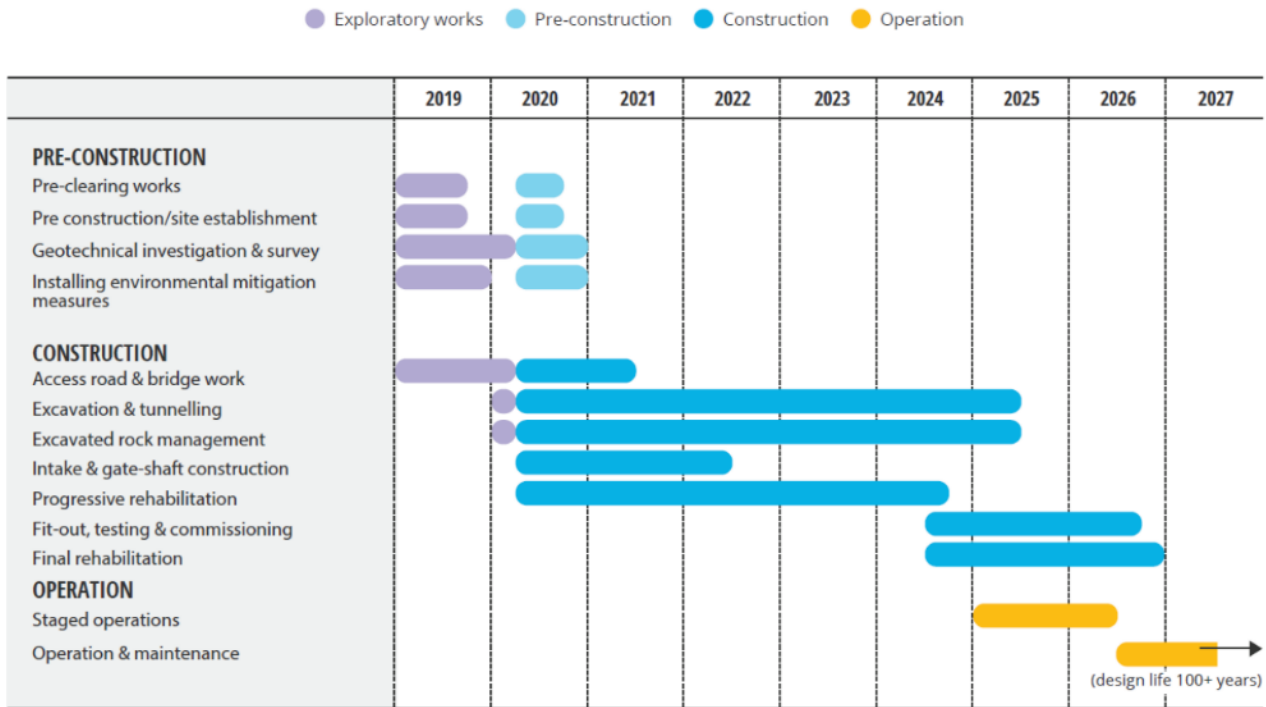


Figure 1-1: Timing of Snowy 2.0 Exploratory Works and Main Works

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

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



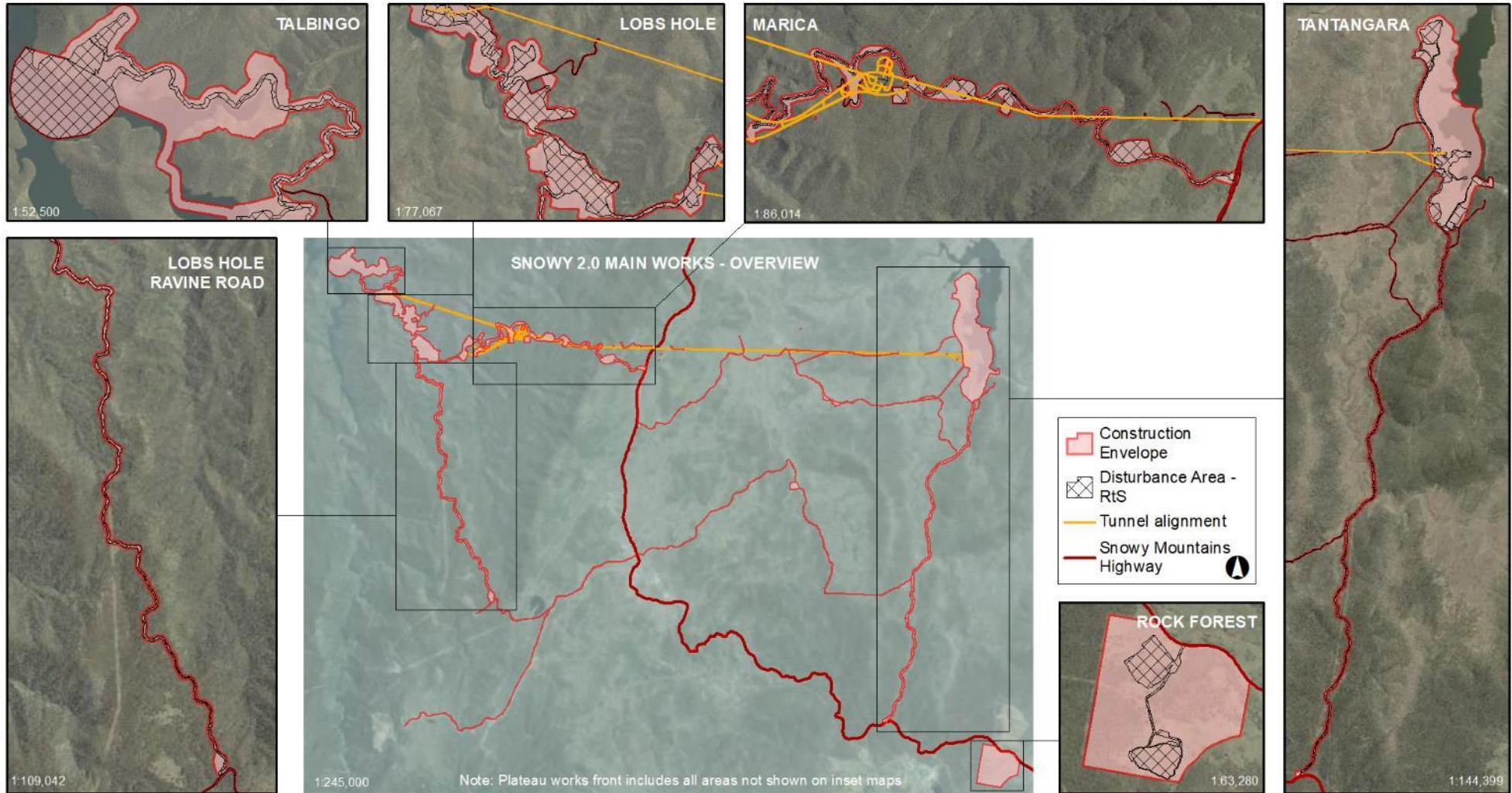


Figure 1-2: Snowy 2.0 Main Works work areas

## 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 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 CSSI 9687. Further to the Infrastructure Approval, the Main Works RTS and Exploratory Works RTS includes revised environmental management measures (REMMs) 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

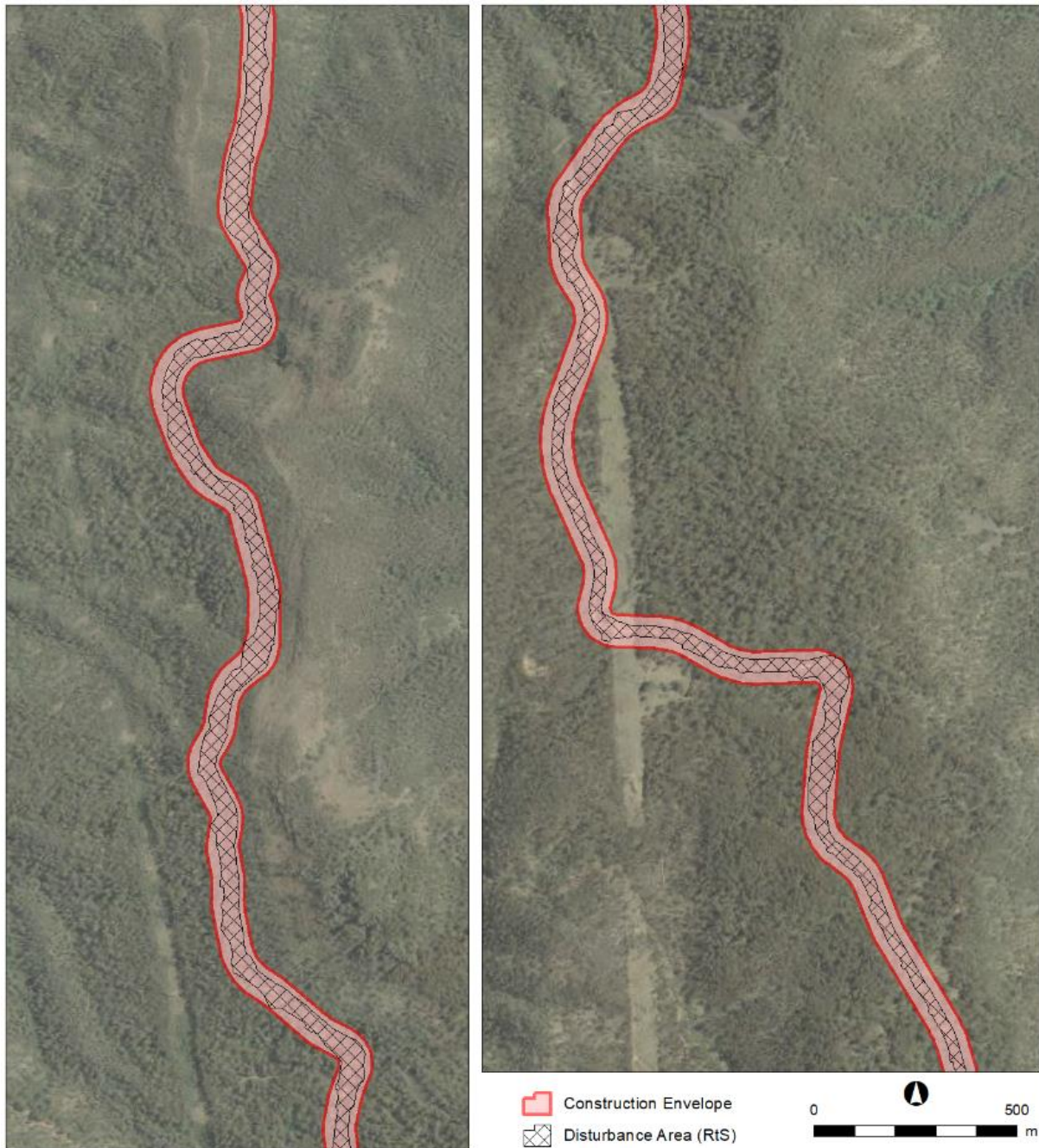
A key refinement following public exhibition of the Main Works EIS was a change to and clarification of disturbance area terminology.

The revised disturbance area terminology as defined within the Infrastructure Approval and Submissions Report is detailed within Table 1-1. An example of the terminology is shown 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.
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

Term	Definition	Reasoning
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.	move within the assessed construction envelope subject to recommended environmental management measures and provided it does not exceed the limits defined by Schedule 2, Condition 5 of the Infrastructure Approval (SSI 9687).



**Figure 1-3: Disturbance area and construction envelope**

## 1.4. 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.

This Natural Hazard Management Plan (NHMP or plan) and Bushfire Management Plan (BushfireMP) (Appendix A) form part of Future Generation's environmental management framework as described in the EMS and also sits under the Health and Safety Emergency Response Management Plan as shown in Figure 1-2.

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.

This document has been prepared for construction of the Snowy 2.0 Main Works project and supersedes the Exploratory Works Bushfire Management Plan (Emergency Plan). It does not address the operational phase of the project.

The Exploratory Works Bushfire Management Plan will continue to remain in place until it is superseded by this plan, which will occur following their approval by the relevant authority. Further detail is provided within Table 4-4.

### 1.4.1. Management Plan Hierarchy

Figure 1-4 demonstrates the management plan hierarchy in relation to this plan. This Natural Hazard Management Plan sits under the Emergency Response Management Plan, which sits within the overarching Health and Safety Management Plan. The Bushfire Management Plan is included as Appendix A of this plan.

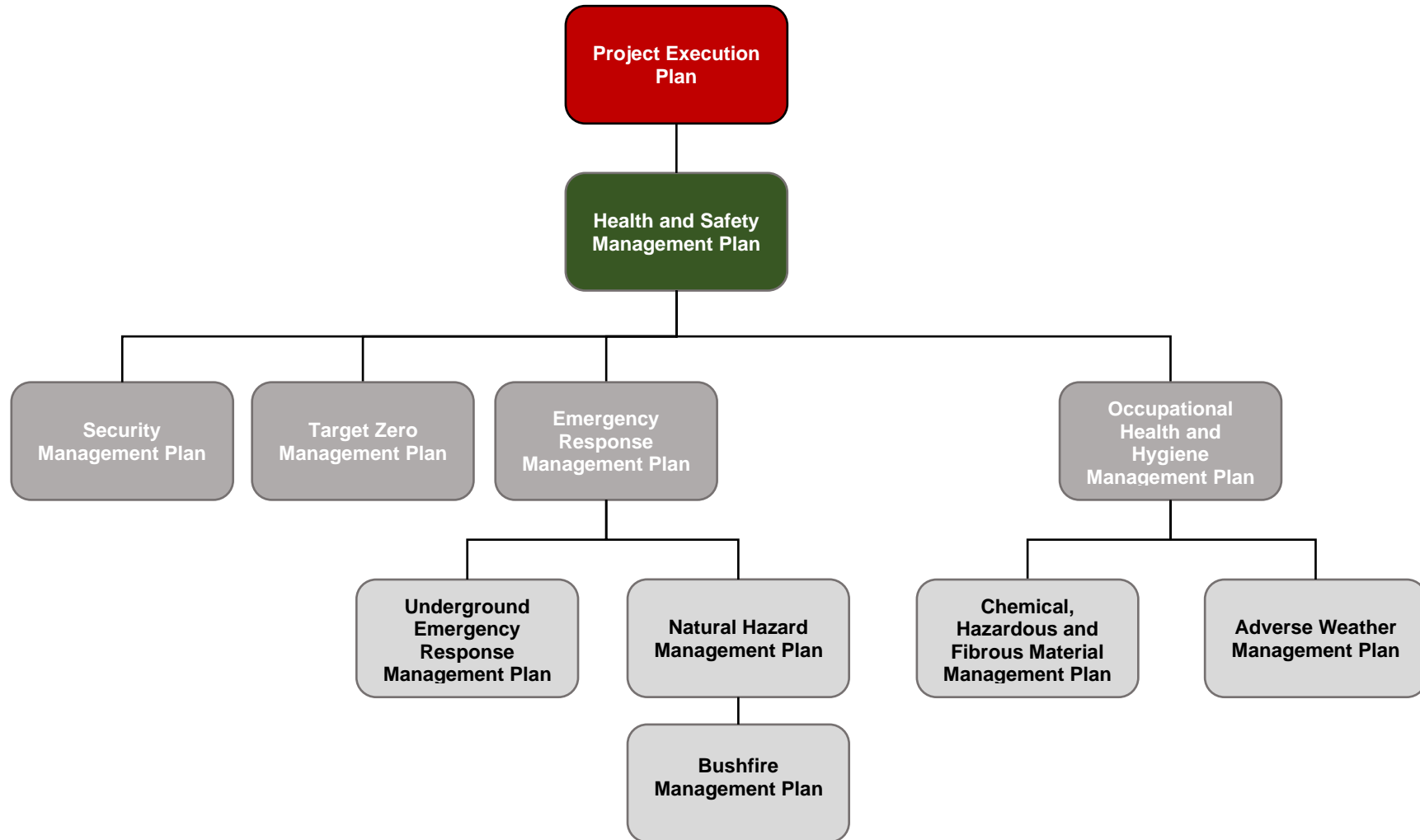


Figure 1-4: Health and safety management plans

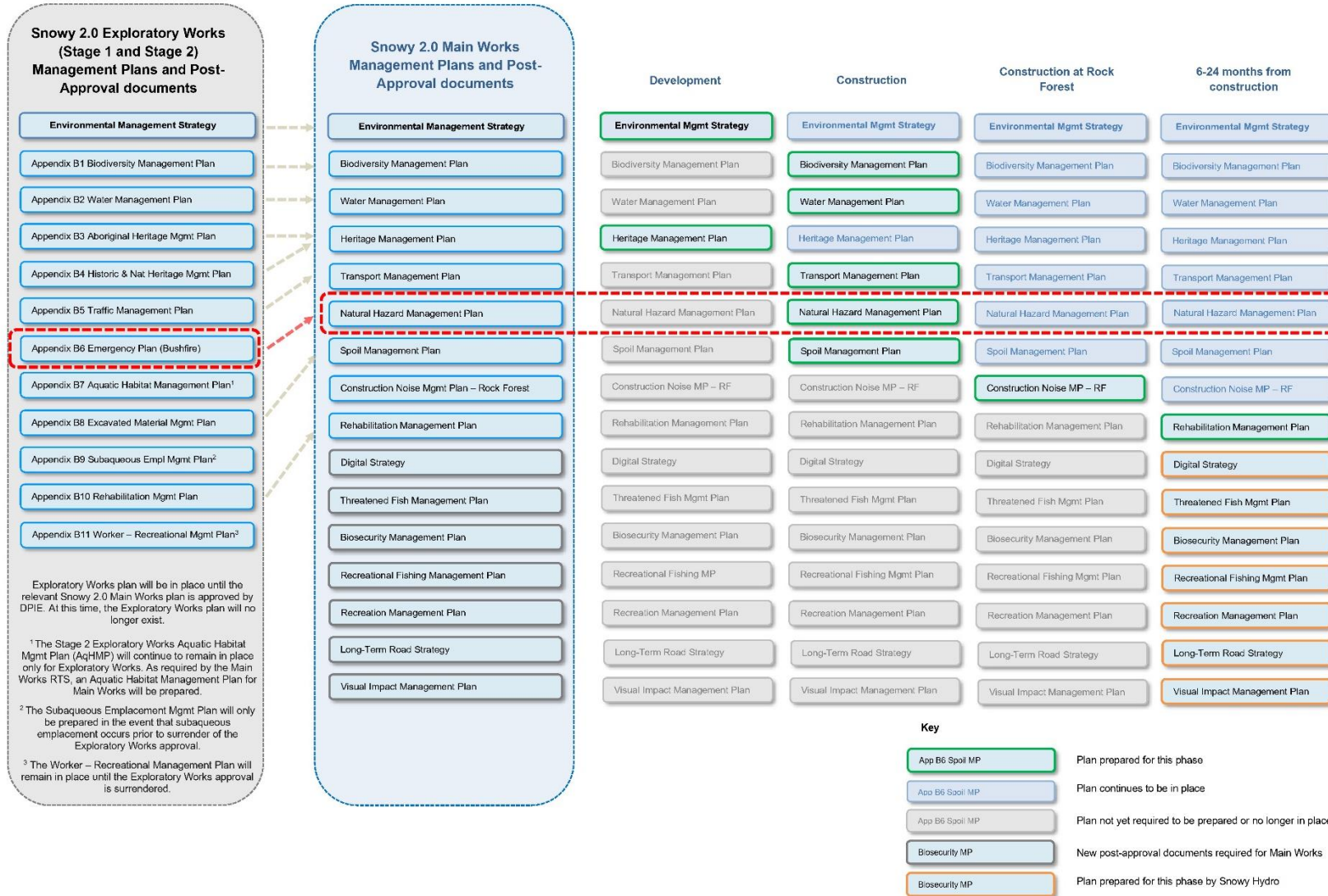


Figure 1-5: Management plans and post-approval documents with the TMP indicated.

### 1.5. Purpose and objectives of this plan

The purpose of this plan is to address the construction environmental management requirements relevant to natural hazards, detailed in:

- the Infrastructure Approval (SSI 9687) (Approval) issued for Snowy 2.0 Main Works on 20 May 2020;
- the Infrastructure Approval (SSI 9208) issued for Snowy 2.0 Exploratory Works on 07 February 2019;
- the Main Works Snowy 2.0 - Environmental Impact Statement;
- the revised environmental management measures (REMMs) within the Main Works RTS;
- 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; and
- the REMMs within the Exploratory Works RTS.

The key objective of this plan is to identify the hazards and risks associated with and the actions and responsibilities for managing, bushfire response procedures (Appendix A), flooding response procedures landslip response procedures; and management of external natural hazards.

To achieve this, Snowy Hydro and Future Generation will:

- ensure appropriate measures are implemented to address the relevant conditions of Approval and the REMMs listed within the Submissions Report, as detailed within Section 2.2 and 2.3 of this plan; and
- ensure practicable measures are implemented during construction to avoid or minimise impacts of natural hazards on worker and public safety, the project and the surrounding areas prior to and during the bush fire season.

### 1.6. Consultation

Consultation undertaken and endorsement of the BushfireMP is included in Section 1.6 of the BushfireMP, provided in Appendix A of this plan.

In accordance with schedule 3, condition 61 of the Approval, this plan is to be prepared to the satisfaction of the National Parks and Wildlife Service (NPWS).

Table 1-2 below provides a summary of consultation on this plan.

**Table 1-2: Consultation with stakeholder summary**

Date	Consultation	Outcome
05 July 2020	NPWS	Various comments on both the NHMP and BushfireMP. Amendments made and response provided on 4 August 2020.

### 1.7. Plan Preparation

In accordance with condition 61 of the Infrastructure Approval, this plan is to be prepared by a suitably qualified an experienced person/s whose appointment has been endorsed by NPWS.

Nathan Kearnes of Eco Logical Australia is proposed as the suitably qualified and experienced person in relation to bushfire management. While the plan’s focus is primarily on bushfire



management, condition 61 also requires that the plan include measures relevant to flood and landslide risk, response and evacuation. Future Generation has incorporated the project's existing health and safety procedures into the plan in relation to flood risk and landslide management.



## 2. ENVIRONMENTAL REQUIREMENTS

Environmental requirements relevant to bushfire management are included in the BushfireMP provided as Appendix A of this plan.

### 2.1. Legislation

Legislation relevant to natural hazards includes:

- NSW *Biodiversity Conservation Act 2016* (BC Act);
- Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act);
- NSW *National Parks and Wildlife Act 1974* (NPW Act);
- NSW *State Emergency Service Act 1989*;
- NSW *State Emergency and Rescue Management Act 1989*;
- NSW *Water Management Act 2000*; and
- NSW *Rural Fires Act 1997*.

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 conditions of Approval (SSI 9687) relevant to the management of natural hazards and bushfire risk for Main Works.

**Table 2-1: Main Works (CSSI 9687) conditions of approval relevant to natural hazards**

Condition	Requirement	Where addressed
Schedule 3, Condition 17	The proponent must	
	.... (c) minimise the trimming of trees required for safety purposes along the approved road network within the Kosciuszko National Park and adjoining the disturbance area; ....	Section 4.5 Main Works Biodiversity Management Plan (Table 5-1, BM16)
Schedule 3, Condition 60	The proponent must	Refer to Section 5.1 of Appendix A
	(a) include suitable asset protection measures into the final design of the development in accordance with the Planning for Bushfire Protection (RFS 2018) guidelines, or its latest version;	Refer to Section 5.1 of Appendix A
	(b) ensure all buildings developed on site comply with the relevant requirements of the BAL-29 construction standards of Australian Standard AS 3959-2018: Construction of buildings in bushfire prone areas or the NASH Standard (1.7.14 updated) in National Standard Steel Framed Construction in Bushfire Areas – 2014; and	Refer to Section 5.1 of Appendix A
	(c) ensure any fire trails or asset protection zones associated with the development are wholly contained within the approved disturbance area.	Refer to Section 5.1 of Appendix A
Schedule 3, Condition 61	Prior to the commencement of construction, the Proponent must prepare an Emergency Management Plan for the development to the satisfaction of the NPWS. This plan must	This plan, Section 1.4

Condition	Requirement	Where addressed
	(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the NPWS;	This plan, Section 1.7
	(b) be consistent with the Kosciuszko National Park Fire Management Strategy 2008-2013 (NPWS 2008), or its latest version;	Appendix A – Bushfire Management Plan
	(c) include evacuation protocols for the site;	Section 5.2.2, Section 5.2.3, Appendix A – Bushfire Management Plan
	(d) describe the measures that would be implemented to: <ul style="list-style-type: none"> <li>minimise the risk of bushfires on site;</li> </ul>	Appendix A – Bushfire Management Plan
	<ul style="list-style-type: none"> <li>protect the assets on site from bushfires;</li> </ul>	Appendix A – Bushfire Management Plan
	<ul style="list-style-type: none"> <li>respond to any bushfires on or in the vicinity of the site;</li> </ul>	Appendix A – Bushfire Management Plan
	<ul style="list-style-type: none"> <li>minimise flood risks on site, including flooding response procedures;</li> </ul>	This plan, Section 4.3, Section 5.2 and Section 6
	<ul style="list-style-type: none"> <li>minimise the risk of landslips on site, including landslip response procedures; and</li> </ul>	This plan, Section 4.4 and Section 5.3
	<ul style="list-style-type: none"> <li>evacuate the site in an emergency; and</li> </ul>	This plan, Section 5.2.2, Section 5.2.3 and Appendix A – Bushfire Management Plan
	(e) monitor and review the effectiveness of these measures.	This plan, Section 7

### 2.3. Revised Environmental Management Measures

Environmental safeguards and management measures are included in the Main Works EIS in Appendix G. During preparation of the Submissions Report, revised environmental management measures (REMMs) were developed and are included in Appendix C of the Submissions Report.

The Main Works REMMs relevant to this plan are listed in Table 2-2 below. If additional measures are cross-referenced from another section of the Main Works EIS or Submissions Report, these measures are also included. To evaluate the continuity or redundancy of Exploratory Works REMMs, these are provided in Table 2-3.

**Table 2-2: Main Works (CSSI 9687) management measures relevant to natural hazards**

Ref #	Revised environmental management measures	Where addressed
WM14	Flood emergency response plans will be developed for both construction and operational phases	This plan. Section 5.2 (operational phase by Snowy Hydro)

**Table 2-3: Exploratory Works (SSI-9208) management measures relevant to natural hazards**

Ref #	Revised environmental management measures	Where addressed
FM_1.3	A flood emergency response plan will be prepared as part of the project's emergency response plans.	This plan. Section 5.2

Ref #	Revised environmental management measures	Where addressed
PUS01	An Emergency Response Management Plan (ERMP) will be prepared and implemented during construction. The ERMP will contain all procedures relating to flood and other emergencies.	This plan Bushfire Management Plan (Appendix A)

Main Works and Exploratory Works REMMs relevant to bushfire management are provided in Tables 2.2 and 2.3 respectively of Appendix A – Bushfire Management Plan.

## 2.4. Permits and Licences

Environment Protection Licence (EPL) 21266 has been issued for the project for the scheduled activity of extractive activities for the Exploratory Works phase. The premises boundary for the Exploratory Works EPL will be expanded to encompasses both Exploratory Works and Main Works activities and the governing scheduled activity for Main Works will be electricity generation.

A Construction Lease and Works Access Licence will be established between Snowy Hydro and NPWS in order to carry out the relevant Snowy 2.0 Main Works.

## 2.5. Guidelines

The guidelines considered in the development and implementation of this management plan include:

- Ball, J et al (2016), Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia;
- DPIE (2019) NPWS Tree Risk Management Procedures;
- DPIE (2020) NPWS Landslides and Rockfalls Procedures;
- NSW Department of Infrastructure, Planning and Natural Resources (2005), *Floodplain Development Manual*, NSW Government;
- Tree Risk Management Procedures, 2019, NSW National Parks and Wildlife Services (2019); and
- *Australian Disaster Resilience Handbook 7 Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia, Supporting Guideline 7-3 - Flood Hazard*, Australian Institute of Disaster Resilience 2017(AIDR 2017).

## 3. SITE CHARACTERISTICS

### 3.1. Bushfire Risk

The bushfire risk of the project area is detailed in Section 3 of the BushfireMP, provided in Appendix A of this plan.

#### 3.1.1. January 2020 Bushfire

On 4 January 2020, the Snowy 2.0 project site and greater northern section of KNP was impacted by a significant bushfire. 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.

Following the bushfire, fuel loads in the locality has been substantially reduced and the threat of bushfire has been somewhat reduced for the near term. However, the threat of bushfire in and surrounding the project remains. Also, removed ground cover due to the 2020 bushfire has increased the potential for topsoil erosion and ground destabilisation in steep areas during rainfall events.

### 3.2. Flood Risk

Parts of the project will be undertaken on, or in close proximity to, flood prone land. This includes construction of temporary and permanent infrastructure. The Flood Risk Assessment, undertaken for the Main Works EIS (Appendix J, Annexure C), concluded any impacts on flooding would be localised and would not impact areas of significance and that the risk of flood impacts is considered minor.

This plan addresses the residual flood risk to the workforce during construction.

Flood hazard is defined as a source of potential harm or a situation with the potential to result in loss. The hazard is based on the relationship between velocity and depth of flood waters. Figure 3-1 and Table 3-1 describe the flood hazard relationship.

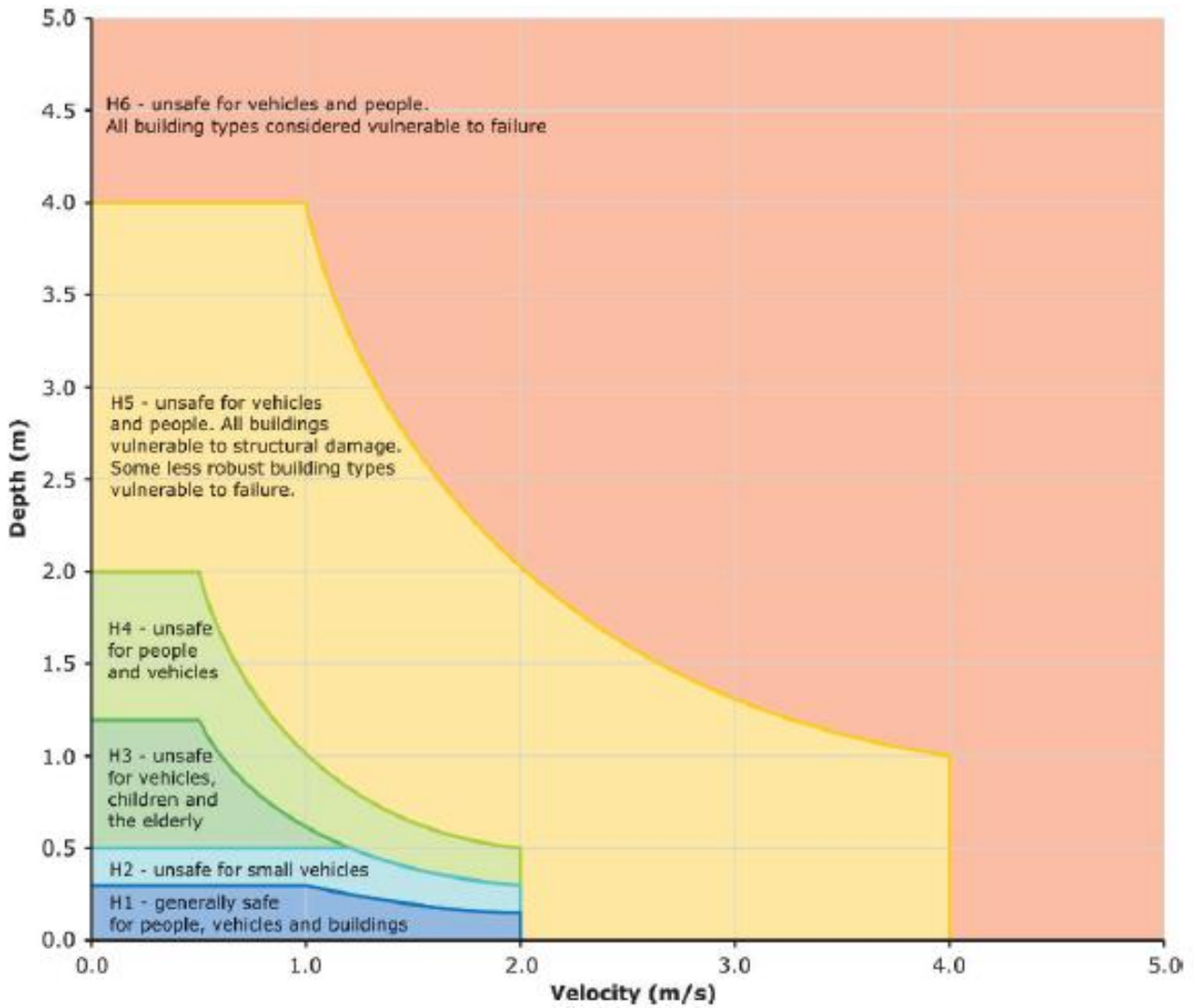


Figure 3-1: Flood hazard curves

Table 3-1: Flood hazards classification

Classification	Description
H1	Generally safe for people, vehicles and buildings
H2	Unsafe for small vehicles
H3	Unsafe for vehicles, children and the elderly
H4	Unsafe for vehicles and people
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.
H6	Unsafe for vehicles and people. All building types vulnerable to failure.

Baseline flooding characteristics is described below for key project areas, where residual flood risk may pose a risk to workers.

### 3.2.1. Ravine

The Ravine area includes Talbingo Reservoir and Yarrangobilly River at Lobs Hole.

Within the Ravine area, the Yarrangobilly River is the major regional watercourse that flows into Talbingo Reservoir, downstream of Lobs Hole. The Yarrangobilly River has a number of tributaries within the ravine, including Wallaces Creek, Stable Creek, Sheep Station Creek and Highground Creek. At Lobs Hole the Yarrangobilly River emerges from a deeply incised gorge and follows a relatively narrow floodplain through to Talbingo Reservoir.

In flood, flows along the Yarrangobilly River through Lobs Hole are predominantly confined to the main river channel and immediate overbank areas for floods up to about the 5% annual exceedance probability (AEP) event. Full inundation of the floodplain occurs in the 1% AEP and greater magnitude events (rare events).

Flood characteristics of Talbingo Reservoir are summarised in Table 3-2. The spillway would be overtopped in a 2% AEP flood event.

**Table 3-2: Talbingo Reservoir flood levels**

Characteristic	Reservoir Level (mAHD)
Minimum Operating Level (MOL)	534.3
Full Supply Level (FSL)	543.2
Spillway Crest	544.7
Water level 2% AEP	545.8
Water level 1% AEP	546.1
Probable Maximum Flood (PMF)	552.1

Flood hazard is generally classified H6 in Yarrangobilly River for all flood events between a 20% AEP and the PMF. At Wallace Creek a flood hazard is classified H5 for the 20% AEP flood event, increasing to H6 for all other flood events up to the PMF. Flood hazard mapping for the 1% AEP and the PMF event at Lobs Hole are included in Appendix B.

### 3.2.2. 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, which either flow north into the Murrumbidgee River or directly into Tantangara Reservoir, including Gooandra Creek, Tantangara Creek, Nungar Creek and Kellys Plain Creek.

Floodwaters generally follow the alignment of Kellys Plain Creek for all events up to the PMF, with no major breakouts or flow diversions.

Flood characteristics of Tantangara Reservoir are summarised in Table 3-3.

**Table 3-3: Tantangara Reservoir flood levels**

Characteristic	Dam Level (mAHD)
MOL	1205.8
FSL	1228.7

Characteristic	Dam Level (mAHD)
Spillway Crest	1228.7
Water level 2% AEP	1230.1
Water level 1% AEP	1230.3
PMF	1236.3

The spillway would be overtopped in a 2% AEP flood event.

Flood hazard is classified generally as H5 along Kellys Plain Creek for the 1% AEP event, rising to H6 for the PMF. Shallow overland flows the approach Kellys Plain Creek from the east are classified generally as H1 flood hazard. Peak flood levels in the lower reaches of Kelly Plain Creek are influenced by reservoir water levels. Flood hazard mapping for the 1% AEP and the PMF event at Kellys Plain Creek are included in Appendix B.

### 3.2.3. Rock Forest

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

Floodwaters generally follow the alignment of watercourses for all events up to the PMF, with no major breakouts or flow diversions.

Flood hazard is classified generally as H1 in the vicinity of Rock Forest for all events up to the PMF, with some isolated areas of greater hazard (up to H5).

### 3.3. Landslip Risk

The term ‘landslide’ may be taken to mean any kind of movement of material down a slope.

Different combinations of movement and material create different landslide types, including:

- falls – rocks tumbling off a cliff (referred to as ‘rockfalls’ in these procedures);
- topples – similar to falls, but involve an entire slab collapsing;
- slides – material sliding down an incline;
- spreads – sideways movement of saturated material;
- flows – similar to slides, but involve more liquid and travel further; and
- complex combinations of different movement types.

Within Kosciuszko National Park, landslides are a known risk. The *Kosciuszko National Park Plan of Management Implementation Report 2011-2012* notes that heavy rains in summer 2010-11 and 2011-12 led to some landslips and further degradation of previously rehabilitated sites. This included a large slip that reached down to lake water level at Club Lake and Lake Cootapatamba.

Landslides and rock falls are also known to periodically obstruct roads within Kosciuszko National Park.

Weather events such as heavy rainfall and flooding, can affect the stability of geological or geomorphological features and increase the risk of landslip.

## 4. HAZARD PREVENTION

### 4.1. Overview

The prevention stage of emergency management includes the identification of hazards, the assessment of threats to life and property and the taking of measures to reduce potential loss to life or property. Prevention is the reduction, elimination or mitigation of emergency risks using an all-hazards approach, before an emergency event occurs. For Snowy 2.0, Future Generation proposes to take the following preventative measures.

### 4.2. Bushfire

Actions for bushfire prevention are provided in Section 5 of the BushfireMP which is provided in Appendix A of this plan.

### 4.3. Flood Design

#### 4.3.1. Access and road design

All project roads and bridges will be designed above the 1% AEP in order to ensure flood free access is maintained for flood events up to the 1% AEP. Main access roads are shown in Figure 5-1 and road design criteria provided in Table 4-1.

Table 4-1: Road design criteria

	Classification		
	Primary	Maintenance	Construction
Road	Mine Trail Ravine Road	Lobs Hole Road Marica Trail Pipeline Road Quarry Trail Talbingo Intake Road Tantangara Road Wharf Road	Camp Road Marica West Trail Talbingo Adit Road Talbingo Spoil Disposal Road Tantangara Camp Road Tantangara Spoil Disposal Road
Bridge		Wallaces Creek Bridge on Mine Trail Nungar Creek Bridge on Tantangara Road Yarrangobilly River Bridge	Camp Bridge
Minimum elevation	1.0m above the greater of: <ul style="list-style-type: none"> <li>the 1% AEP flood extent; or</li> <li>FSL of the relevant reservoir</li> </ul>	1.0m above the greater of: <ul style="list-style-type: none"> <li>the 1% AEP flood extent; or</li> <li>FSL of the relevant reservoir</li> </ul>	0.5m above the greater of: <ul style="list-style-type: none"> <li>the 1% AEP flood extent; or</li> <li>FSL of the relevant reservoir</li> </ul>

In rare flood events with a magnitude greater than the 1% AEP access may be cut at points along roads and trails. Given the modelled flood behaviour, overtopping is likely to occur first at existing creek crossings.

#### 4.3.2. Accommodation camps and work sites

The design for the Lobs Hole and Tantangara accommodation camps has considered flood levels and risks. Both accommodation camps are entirely free from flood in the 1% AEP and only the very



margin of the Lobs Hole camp is affected by less frequent flood events including the PMF event. Marica accommodation camp and works area has not been identified as a flood risk area.

During construction work there is the potential for Tintangara Reservoir to be held at lower levels within the current operating range to facilitate construction activities. This may potentially lower peak water levels for any given frequency of flooding.

As all accommodation camps are above the PMF levels, they are considered as suitable onsite flood refuges as shown in Figure 5-1.

In addition, all active work areas for tunnelling, logistics, laydown and on land rock emplacement have been designed to avoid flood prone land as far as practicable as shown in Appendix B. This includes the temporary infrastructure associated with the logistics yard and emplacement areas at Rock Forest which largely avoids flood prone land.

#### 4.4. Landslip Design

Landslip and stability issues are dealt with through the design process through a combination of designs, all of which are in accordance with Transport for NSW quality assurance specifications. This includes but is not limited to:

- soil stability:
  - batters to be reinforced with soil and or rock nails where required;
  - revegetation of slopes to be undertaken with temporary and permanent grasses to prevent undermining and erosion gullies;
  - dependant on slope grade, batters will have scour protection;
  - as required cuttings will be shotcrete or terramesh supported;
- water diversion to reduce soil saturation:
  - clean water drains on the upslope of all cuts; and
  - surface waters from road will drain into an engineered swale drain / culvert.

#### 4.5. Dangerous Tree Trimming

Where dangerous trees, which are located adjacent to the disturbance area (but within the construction envelope), present a safety hazard that requires intervention, they should be managed/removed such that the impact to native vegetation is minimised. Where safe to do so, corrective pruning is preferable to tree removal and should be performed in accordance with Australian standard AS 4373-2007 Pruning of Amenity Trees.

All clearing impacts associated with dangerous tree removal/management shall be accounted for in the project-wide clearing tracking. Further information is provided in the Main Works Biodiversity Management Plan.

## 5. HAZARD PREPAREDNESS AND RESPONSE

The following key actions are implemented across the site to ensure natural hazard risks are minimised.

### 5.1. Bushfire Preparedness and Response

Actions for bushfire emergency preparedness and response are provided in Section 7 and 8 of the BushfireMP which is provided in Appendix A of this plan.

### 5.2. Flood Preparedness and Response

Flood preparedness and response measures will include:

- design of access roads ensures flood free access to all work sites up to the 1% AEP; and
- all accommodation and refuge areas will be located above the PMF risk area. Safe flood refuge is therefore available on site.

#### 5.2.1. Extreme Weather Monitoring

Future Generation will monitor and interpret local conditions onsite, via the BOM Warning Centre website (<http://www.bom.gov.au/australia/flood/>) and via more accurate, local forecasting provided by Snowy Hydro Monitoring information will be used to allow appropriate planning for work tasks to be undertaken for the day.

Due to the potential for lag in accurate and local weather forecasting, direction from the PIC to stop work and find safe refuge will be based on conservative analysis of site and weather monitoring to enable proactive response (e.g. in the event of a flash flood).

Consultation with Snowy Hydro will occur in relation to reservoir levels during flood periods.

Risk notifications and warnings can also be found through the NSW SES website ([www.ses.nsw.gov.au](http://www.ses.nsw.gov.au)). The NSW SES is the combat agency for flooding and information can be sourced at.

#### 5.2.2. Site Preparation

If a flood event is forecast work activities will be reviewed and the event management guide within Appendix C will be implemented.

##### 5.2.2.1. Plant and machinery

Where it is considered safe to do so, any plant, equipment and potentially contaminating materials located within potential flood zones would be moved to flood free locations on site as instructed by the Site Supervisor.

For inland waterways specific weather reports will be provided giving three day lookahead and 24-hour lookahead, broken down into three-hourly intervals. These forecasts will give details of anticipated wind speeds (both average and expected gusts), wind direction and anticipated wave heights at each work front location. The weather forecast will be discussed at each morning briefing and/or JHA and be taken into consideration for the work planned.

When required, work will cease and all vessels are to be safely fixed to their dedicated storm mooring.

##### 5.2.2.2. Personnel

If a flood event is forecast site personnel requirements will be reviewed.

Personnel on site would follow instructions to meet at the designated muster points. Key muster points are identified within Figure 5-1. Muster checkers will complete a muster check (roll-call).

All personnel will be directed to seek shelter at project accommodation at the appropriate times staged as below.

1. Non-essential personnel including support personnel shall return to flood refuge (accommodation) on notice from the Project Management Team (PMT).
2. Semi-essential personnel may be required to remain on site to assist with flood preparedness. This may include the work teams, engineers, and anyone deemed useful by the PMT to carry out preparedness duties.
3. Skeleton crew will involve essential personnel to carry out final preparedness, including supervisors, riggers and welders and anyone deemed appropriate.

No attempt should be made to enter or cross any flood waters that is above a minor flood level, or where the flood inundation level is not known. Should a life-threatening situation arise in a flood event, emergency services will be contacted (000) immediately.

Based on an assessment of the likely length of disruption to site activities, site personnel may be directed to vacate the site if it is safe to do so.

### 5.2.3. Evacuation

Evacuation of project personnel from an area of danger or potential danger is a possible strategy to mitigate the impact of any hazard. Assessment of the imminent danger to the project and the need to evacuate must be assessed prior to the decision to evacuate. The Person in Charge (PIC) that manages or controls evacuation arrangements is to ensure that such arrangements do not conflict with other emergency response agencies. Consultation with relevant stakeholders identified in the Emergency Response Management Plan will be undertaken prior to evacuating.

Where evacuation from an area of flood potential occurs, the PIC will direct workers to access roads (above the 1% AEP) and accommodation areas (above the PMF).

Should a life-threatening situation arise in a flood event, emergency services will be contacted (000) immediately. Where emergency services are required to attend a flood event, Future Generation will provide clear access and control of the emergency area for emergency services to undertake relevant works.

Remobilisation will be in accordance with forecasts from BOM, NSW Emergency Services, and instruction from the Project Director and the HR / IR Manager.

### 5.3. Landslip Preparedness and Response

Landslip preparedness and response measures will include:

- landslip hazard is minimised through design, as ground stability is considered in the design of all temporary and permanent structures including access roads;
- the safe removal of all personnel from the area of the landslide will occur (if working in the vicinity of the area);
- the area will be secured to restrict access to the area;
- site personnel will be advised of the restrictions which apply on the project site (eg restricted road access); and
- in the event that the landslide prohibits access on site roads, alternate access provisions will be communicated to project staff;

- where evacuation of the site is required, it will be undertaken in accordance with section 5.2.3 of this plan; and
- where necessary adherence to Local Emergency Operations Controller as the combat agency for landslip.

Landslips are often occur during periods of extreme weather or extended rain.

Site inspections will occur following adverse conditions (e.g. including bushfire, heavy rain, flood) to check for natural hazards.

Where emergency services are required to attend the scene of a landslip, Future Generation will provide clear access. The relevant emergency service will control the area until it is cleared for release back to Future Generation.

If required advice from appropriate specialist (engineering/geotechnical, arborist/ecologist) will be obtained, to assess the stability of the incident area and to identify risks. This will inform required short term actions and any longer-term or broader investigations that may be required.

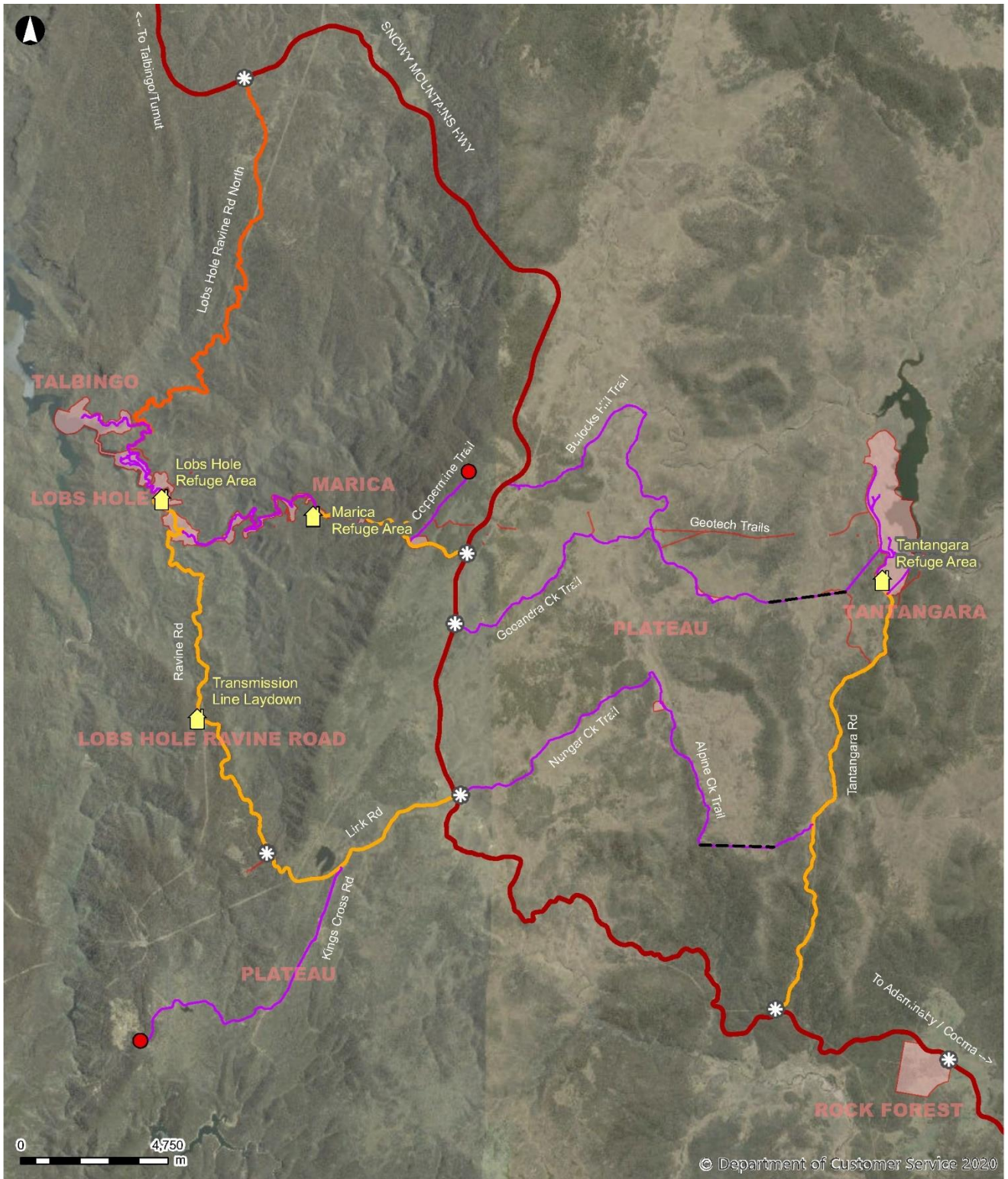
### 5.4. Emergency Contact Numbers

Appendix D of the Emergency Response Management Plan contains contact details for key Future Generation emergency response personnel. Note that Future Generation and emergency service contacts are subject to change.

Table 5-1 below includes relevant emergency service contact details. Note that all contact to emergency services in an emergency should be made through 000.

**Table 5-1: Emergency service contact details**

Agency	Location	Phone
Police	Adaminaby	02 6454 2244
	Cooma	02 6452 0099
	Tumut	02 6947 7199
Snowy Valleys Council – all hours duty officer	Tumut	TBC
Snowy Monaro Regional Council – all hours duty officer	Cooma	TBC
Fire and Rescue NSW	Tumut	02 6947 1202
NSW RFS	Cooma	02 6455 0400
	Tumut	02 6941 2229
SES	NSW	13 25 00
LEOCON	Cooma	TBC
	Tumut	TBC
NPWS	24-hour incident response	1800 629 104
	Jindabyne	02 6450 5600
	Tumut	02 6947 7025
EPA Pollution Incident Hotline	NSW	131 555
Safe Work NSW	NSW	13 10 50
		02 6933 6506



- Primary access/egress route
- Secondary access/egress route
- Internal road/track
- Snowy Mountains Highway
- ▭ Construction Envelope
- 🏠 Camp/Refuge area
- ✳️ Site access point
- Dead End - No Emergency Access / Egress

Figure 5-1: Access and refuge areas

## 6. RECOVERY

### 6.1. Site Inspections

Any site areas which required closure would be opened only once it is deemed safe following inspection by the HSE Manager and Site Supervisor. Other specialists, such as structural engineers or geotechnical specialists, may be requested to assess the site prior to reopening.

Where areas have been closed by a relevant combat agency for response, the site will be handed back to Future Generation when deemed safe to do so by the relevant combat agency.

When safe to do so, a post-rainfall inspection will be completed immediately following significant rainfall (> 80 mm in 24 hours or otherwise depending on the intensity, duration, soil moisture or location). This will be undertaken by the Future Generation Environment Team and/ or Site Supervisor. Actions and timeframe for completion will be agreed with the Construction Team. Safety considerations will also be a factor in determining if it is safe to complete the action following significant rainfall.

### 6.2. Post-incident Investigation

The environmental incident process in Section 7 and Appendix A5 of the EMS (Figure 6-1) will be considered following flood or landslide events. Should the event constitute an incident, notification and reporting will occur in accordance with the requirements of Section 7 of the EMS, the Pollution Incident Response Management Plan (PIRMP) and EPL. The investigation will include a review of events leading up to the incident and implement improved practices as required.

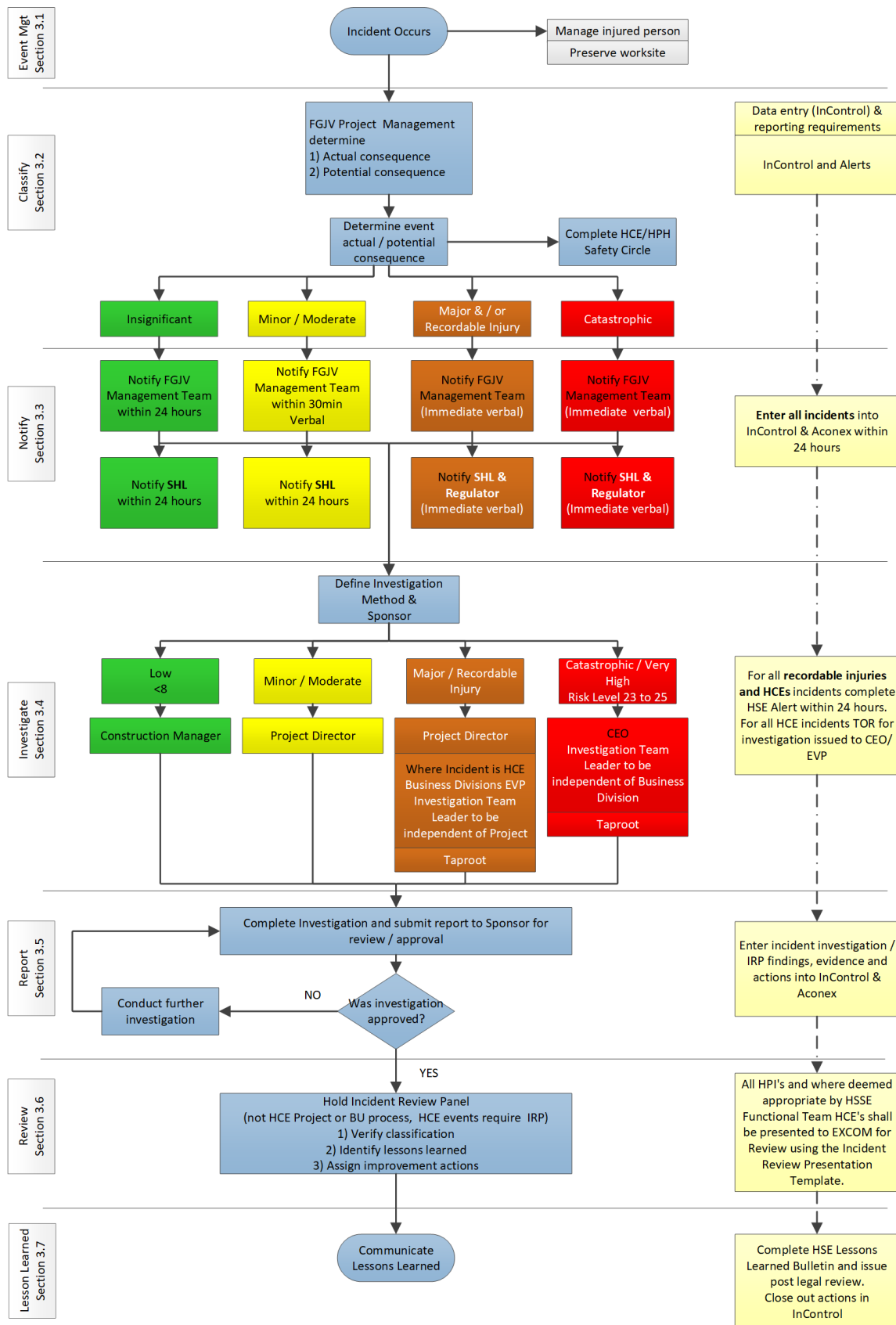


Figure 6-1: Environmental incident process

## 7. COMPLIANCE MANAGEMENT

### 7.1. Site Induction and Training Requirements

The PIC or delegate is responsible for the induction of new staff members, contractors, visitors and site users. The induction is to include information relating to natural hazards. Further details regarding the staff induction and training are outlined in Section 5 of the EMS.

All personnel with responsibilities within the emergency control organisational structure or for the operation of emergency equipment must have the appropriate level of competency-based training in accordance with the Future Generation ERMP.

### 7.2. Monitoring and Inspection

The PIC should undertake the following monitoring activities on a monthly basis:

- confirm that the preparedness processes (as per Section 5) are being followed, including site inspections following adverse conditions (e.g. including bushfire, heavy rain, flood) to check for natural hazards;
- ensure the relevant personnel have received appropriate training (as per section 6.1); and
- implement corrective actions where necessary to maintain compliance with this plan.

Weekly environmental inspections of the project will occur in accordance with Section 8 of the EMS.

Bushfire monitoring and inspection requirements are provided in Section 9.1 of the BushfireMP provided in Appendix A of this plan.

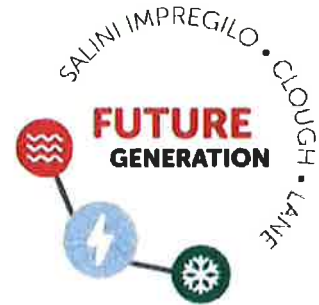
### 7.3. Review

This NHMP will be provided for comment annually to Local Emergency Management Committees, NSWRFSS, NSWSES and NPWS. Following natural hazard emergencies, where necessary lessons learnt will be incorporated into this plan.





## APPENDIX A – BUSHFIRE MANAGEMENT PLAN



S2-FGJV-ENV-PLN-0050

## BUSHFIRE MANAGEMENT PLAN SNOWY 2.0 – MAIN WORKS

Approval Record			
Document preparation, review and approval		Name in print	Signature
Prepared by	Environmental Consultant	A. Costenoble	
Reviewed by	Bushfire Specialist	N. Kearnes	
	HSE Manager	J. Weir	
	Construction Manager	W. Binsted	
	Environment Manager	L Coetzee	
Approved by	Project Director	A. Betti	p.p.

Document Revision Table		
Rev	Date	Description of modifications/revisions
A	27.11.2019	Initial draft for Snowy Hydro review
B.1	14.05.2020	Updated to incorporate project updates and include Main Works Draft Conditions of Approval
B.2	10.06.2020	Updated to include final conditions of approval
C	02.07.2020	Revised following Snowy Hydro comment. For consultation.
D	04.08.2020	Rev D revised to address NPWS comments.



Our ref: DOC20/627518

Laurenne Coetzee  
Environmental Manager  
Future Generation Joint Venture

Email: l.coetzee@futuregenerationjv.com.au

Dear Laurenne

***Snowy 2.0 Main Works CSSI 9687 – Emergency Management Plan (referred to as the Natural Hazard Management Plan)***

Thank you for your colleague Vincent Gillies email dated 4 August 2020 providing the National Parks and Wildlife Service (NPWS) with the final version of the Natural Hazard Management Plan (NHMP), incorporating the Bushfire Management Plan, for the Snowy 2.0 Main Works.

NPWS has reviewed the final NHMP, particularly with regard to the requirements set out in Schedule 2 Condition 9 and Schedule 3 Conditions 60 (Bushfire Requirements) and 61 (Emergency Management Plan) of the project approval.

On behalf of NPWS, I approve the S2-FGJV-ENV-PLN-0090-C-Main Works-Natural Hazard Management Plan incorporating S2-FGJV-ENV-PLN-0050-D-Main Works-Bushfire Management Plan dated 4 August 2020 as relevant to this stage of the project. Please ensure that the approved plan is provided to DPIE Planning and Assessments and placed on the project website. NPWS look forward to commenting on future reviews and any amended plans required from approved modifications.

If you have any questions regarding this matter, please contact Glenn Stroud, Senior Project Officer NPWS Snowy 2.0, Southern Ranges Branch on 0428 427 553.

Yours sincerely

**NICOLE SHOTTER**  
**Manager, NPWS Snowy 2.0 Team**  
**Southern Ranges Branch**  
**National Parks and Wildlife Service**

Date: 21/8/2020

# CONTENTS

<b>Abbreviations and Definitions.....</b>	<b>5</b>
<b>1. Introduction.....</b>	<b>8</b>
1.1. Project Description .....	8
1.1.1. Overview .....	8
1.1.2. Construction Activities and Program.....	8
1.2. Project Approval .....	11
1.3. Disturbance area .....	11
1.4. Environmental Management System .....	13
1.4.1. Management Plan Hierarchy .....	13
1.5. Objective.....	15
1.6. Consultation.....	15
1.7. Author Endorsement.....	16
<b>2. Environmental Requirements .....</b>	<b>17</b>
2.1. Legislation .....	17
2.2. Conditions of Approval .....	17
2.3. Revised Environmental Management Measures .....	19
2.4. Permits and Licences .....	23
2.4.1. Total Fire Ban Hot Works Exemption.....	23
2.5. Guidelines.....	24
<b>3. Existing Environment .....</b>	<b>25</b>
3.1. Landscape Bush Fire Environment .....	25
3.1.1. January 2020 Bushfire .....	25
3.2. Fire Danger Period (Bushfire Season) .....	26
3.3. Local Government Area and Fire Danger Ratings Areas.....	26
3.4. Aboriginal and Historic Heritage Sites.....	26
3.5. Threatened Species .....	26
<b>4. Onsite and Offsite Emergency Provisions .....</b>	<b>27</b>
4.1. Project Location and Access .....	27
4.2. Evacuation Arrangements .....	30
4.2.1. Offsite Evacuation and/or Neighbourhood Safer Place .....	30
4.3. Assembly Areas.....	31
4.3.1. Staying and Defending at Assembly Areas .....	32
4.4. Muster Points.....	32
4.5. Helipads.....	33
4.6. Firefighting Water Supplies and Equipment.....	33
4.7. External Firefighting Resources .....	34
4.8. NPWS Fire Detection Towers .....	34
<b>5. Bushfire Prevention and Mitigation.....</b>	<b>35</b>
5.1. Maintenance of Asset Protection Zones and Vegetation Management .....	35
5.2. Building Maintenance and Preparedness .....	35
5.3. New Building Establishment (Occupied and Fuels and/or Explosive Stores).....	36
5.4. Fire Breaks and Trails .....	36
5.5. Permit to Work System.....	37
<b>6. Bushfire and Hazard Awareness Training .....</b>	<b>38</b>
6.1. Site Induction and Training Requirements .....	38

6.1.1.	Bushfire Awareness Training .....	38
6.2.	Fire Danger Awareness .....	38
6.2.1.	Fire Danger Boards .....	38
6.2.2.	Staff Briefing and Toolbox Talks .....	38
6.3.	Liaison and Pre-Season Drills with the NPWS and Local NSW RFS .....	39
6.4.	Other Related Hazards .....	39
6.4.1.	Powerlines and Aircraft Operations .....	39
6.4.2.	Risk from Fires Burning Near Transmission Powerlines and Electricity Arcing .....	39
<b>7.</b>	<b>Bushfire Preparedness Actions .....</b>	<b>40</b>
7.1.	Assess Fire Danger and Notify Personnel .....	40
7.1.1.	Accessing Fire Danger Information .....	40
7.1.2.	Determining Fire Preparedness Works Code .....	42
7.1.3.	Leaving Early .....	42
7.1.4.	Night Shift Considerations .....	43
7.2.	Bushfire Preparedness (Code Yellow, Orange, Red and Grey) .....	43
7.3.	Total Fire Ban Bushfire Preparedness (Code Black) .....	47
7.3.1.	TOBAN Rules and standard exemptions relevant to the Project .....	47
<b>8.</b>	<b>Bushfire Emergency Response .....</b>	<b>50</b>
8.1.	Fire and Incident Emergency Controller .....	50
8.2.	Fire Fighting Precautions .....	50
8.2.1.	Rapid Response First Attack .....	50
8.2.2.	Firefighting Near Powerlines .....	50
8.3.	Emergency Alert Issued .....	52
8.4.	Smoke or Fire Present .....	53
8.5.	Emergency Contact Details .....	54
8.6.	Where to Go – Managed Evacuation .....	55
8.6.1.	Site Map and Evacuation Routes .....	55
<b>9.</b>	<b>Compliance Management .....</b>	<b>57</b>
9.1.	Monitoring and Inspection .....	57


## FIGURES


Figure 1-1: Timing of Snowy 2.0 Exploratory Works and Main Works .....	9
Figure 1-2: Snowy 2.0 Main Works zones .....	10
Figure 1-3: Disturbance area and construction envelope .....	12
Figure 1-4: Health and safety sub-plans .....	14
Figure 1-5: Indicative timings in relation to plan sections .....	15
Figure 4-1: Access to project work fronts .....	29
Figure 7-1: Sample of Fire Bulletin data provided by BOM Realtime Data Services .....	41
Figure 7-2: FFDI map from BOM website (circle indicates approximate location of the project site) .....	41
Figure 8-1: Emergency alert response actions .....	52
Figure 8-2: Fire reporting procedures and actions .....	53
Figure 8-3: Evacuation routes - overview .....	56

## TABLES

Table 1-1: Disturbance area terminology .....	11
Table 1-2: Consultation with stakeholder summary .....	16
Table 2-1: Main Works (SSI 9687) conditions of approval relevant to bush fire management .....	17
Table 2-2: Exploratory Works (SSI 9208) conditions of approval relevant to bush fire management .....	18
Table 2-3: Main Works (CSSI 9687) management measures relevant to bush fire .....	19
Table 2-4: Exploratory Works (SSI-9208) management measures relevant to bush fire .....	20
Table 4-1: NSW RFS Neighbourhood safer places and distances from project work fronts .....	30
Table 4-2: Assembly Area – location and description .....	31
Table 4-3: Helipad – location and description .....	33
Table 7-1: Fire preparedness in relation to FFDI .....	44
Table 7-2: Total Fire Ban preparedness requirements .....	47
Table 8-1: Emergency and Stakeholder Contact Details .....	54
Table 8-2: Work area maps and evacuation instructions .....	55
Table D-1: Exploratory Works (CSSI 9208) conditions of approval relevant to natural hazards .....	64

## ABBREVIATIONS AND DEFINITIONS

Acronym	Definition
AA	Assembly Area – map symbol = encircled 
AFAC	Australasian Fire and Emergency Services Authorities Council
APZ	Asset protection zone
Back-burning	Back-burning is a last-resort measure to stop wildfire from burning out specific areas. It works by setting fires from containment lines, such as established fire breaks or ones made with a bulldozer or cut by hand.
BFDP	Bush Fire Danger Period – refer to Fire season below
BFMC	Bush Fire Management Committee
BOM	Bureau of Meteorology
BushfireMP	Bushfire Management Plan, a sub-plan of the Natural Hazard Management Plan
BCD	Biodiversity and Conservation Division (formerly OEH)
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CMG	Consequence Management Guide
CoA	Conditions of Approval
Designated Smoking Area	A signposted non-combustible area set aside within the Project site for the purpose of smoking. KNP is a no smoking area, however, smoking is permitted in designated areas as per NPWS permit (Annexure B).
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
Enclosed Area	An area that is sheltered from the weather which fully contains the enclosed activities such that there is zero potential for bushfire ignition in surrounding areas. It may include, but not be limited to, inside buildings, workshops, shipping containers and inside tunnelling.
EOC	Emergency Operations Centre
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
ERMP	Emergency Response Management Plan – the parent plan to this Plan
Main Works EIS	The Environmental Impact Statement titled <i>Snowy 2.0 Main Works Environmental Impact Statement</i> dated 13 September 2019.
EWAR	Exploratory Works Access Roads
FCNSW	Forestry Corporation NSW
FFDI	Forest Fire Danger Index. A relative number denoting the potential rates of spread or suppression difficulty for specific combinations of temperature, relative humidity, drought effects and wind speed.
FDR	Fire Danger Rating. A relative class denoting the potential rates of spread or suppression difficulty for specific combinations of temperature, relative humidity, drought effects and wind speed, indicating the relative evaluation of fire danger. Forecast in classes as LOW, MODERATE, HIGH, VERY HIGH, SEVERE, EXTREME and CATASTROPHIC.

Acronym	Definition
Fire Risk Work	Includes heat or potential spark producing activities other than hot works that have the potential of creating a fire risk when undertaken in a hazardous area. Fire Risk work on the Project includes: <ul style="list-style-type: none"> <li>• Slashing;</li> <li>• Mulching;</li> <li>• Chainsaw operation;</li> <li>• Chipping;</li> <li>• Mowing;</li> <li>• Brush cutting;</li> <li>• Track grading</li> <li>• Rock-breaking;</li> <li>• Drilling;</li> <li>• Blasting; and</li> <li>• Geophysical investigations.</li> </ul>
Fire Season	Fire season also referred to as the statutory Bush Fire Danger Period normally starts on 1 October and continues through the following 31 March as per the RFS website.
Future Generation	Future Generation Joint Venture
Future Generation-PMS	Project Management System
HSMP	Health and Safety Management Plan
H	Helipad – map symbol = encircled 'H' 
Hazard Reduction Burn	A hazard reduction burn is one way to reduce the fuel load (vegetation) and therefore minimise the potential impacts of a bush fire on life, property and the environment. Hazard reduction burns are a preventative mitigation measure and differs from back-burning, which is a fire fighting strategy.
Hazardous Area	For the purposes of this plan a Hazardous Area is defined as any work area where flames, sparks, molten materials and hot surfaces may come into contact with flammable/combustible materials. Hazardous areas may include (but not be limited to): <ul style="list-style-type: none"> <li>• Dry/combustible vegetation or areas within 30m of such vegetation;</li> <li>• Confined spaces (not including the exploratory tunnel);</li> <li>• Buildings where there are materials that are made of or contain combustible matter;</li> <li>• Rubbish, and</li> <li>• Oil and fuel storage areas.</li> </ul>
Hot works	Any action that involves high temperatures and has a high risk of creating a fire. Examples of hot work include but are not limited to: <ul style="list-style-type: none"> <li>• Welding, Oxy-Acetylene or Plasma cutting;</li> <li>• Grinding/cutting of metal including the use of flexible sanding disks;</li> <li>• Production of heat, flammable fumes and gases during work activities; and</li> <li>• Dry concrete metal grinding/cutting.</li> </ul>
HSE	Health, Safety and Environment
IC	Incident Controller
KNP	Kosciuszko National Park
Neighbourhood Safer Place	A Neighbourhood Safer Place is a building or an open space that may provide for improved protection of human life during the onset and passage of a bush fire. It is a location where people facing an immediate threat to their personal safety can gather and seek shelter from the impact of a bush fire. Their function is to provide a place of last resort for a person to seek shelter at during the passage of the bush fire front.
NHMP	Natural Hazard Management Plan



Acronym	Definition
Non-combustible areas	Includes enclosed workshops, hardstand laydown areas, area within camp boundaries, underground tunnels and maintained access roads that are not otherwise considered a hazardous area. Non-combustible areas may be indoors or outdoors but is indicative of a modified environment where bushfire ignition potential is negligible.
NPWS	NSW National Parks and Wildlife Service (within the NSW Office of Environment and Heritage (OEH))
NSW RFS	NSW Rural Fire Service
Outdoor Area	An area that is not an enclosed area
PEP	Project Execution Plan
PIC	Person in charge – the Project Director or their delegate
Project, the	The Main Works Project (SSI 9687) including the proposed works detailed in Section 1.1
PTW	Permit to Work
QMP	Quality Management Plan
REMM	Revised environmental management measures
Remote Area	A remote area is one where personnel are not within a 20-minute response time of the project ambulance
SNOWY HYDRO	Snowy Hydro Limited
Submissions Report or RTS	<i>Response to Submissions Snowy 2.0 Main Works</i>
TOBAN	Total Fire Ban as declared by the NSW RFS Commissioner

## 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 in two stages: 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. This management plan has been prepared for the Snowy 2.0 Main Works project.

#### 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 Main Works construction program is summarised in Figure 1-1.

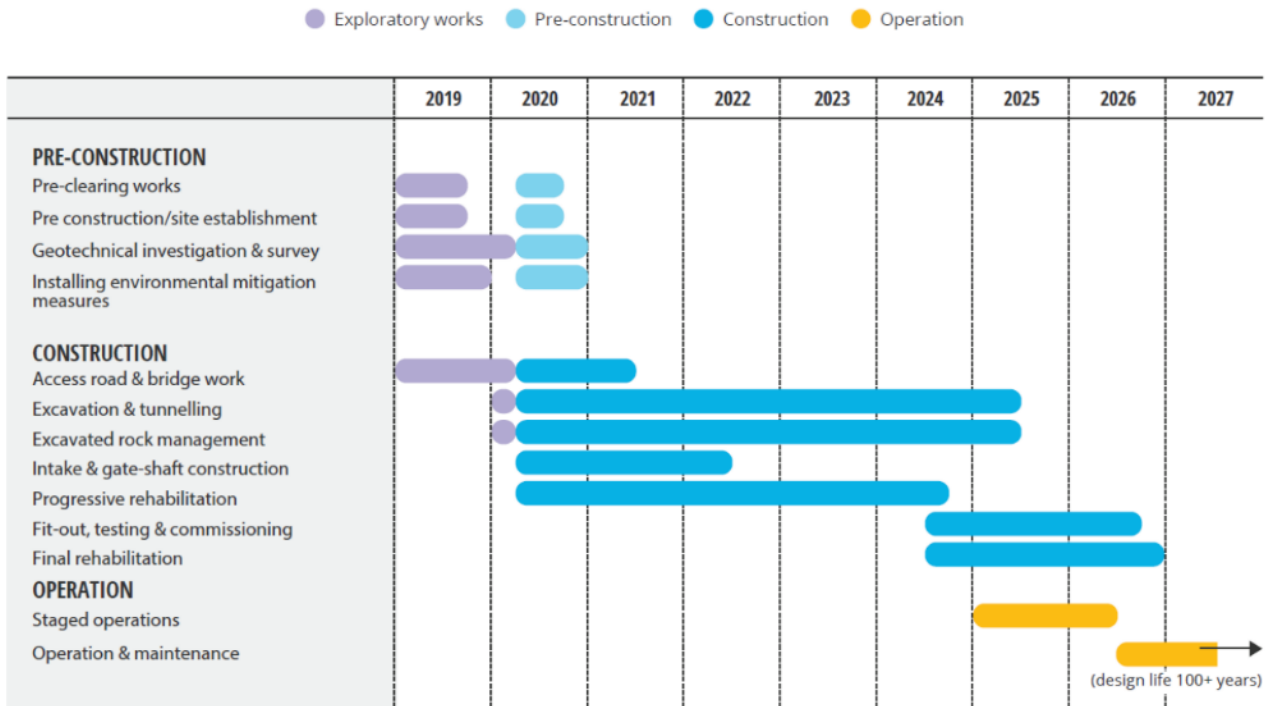


Figure 1-1: Timing of Snowy 2.0 Exploratory Works and Main Works

The Main Works project includes numerous work fronts as shown in Figure 1-2. These work fronts include:

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

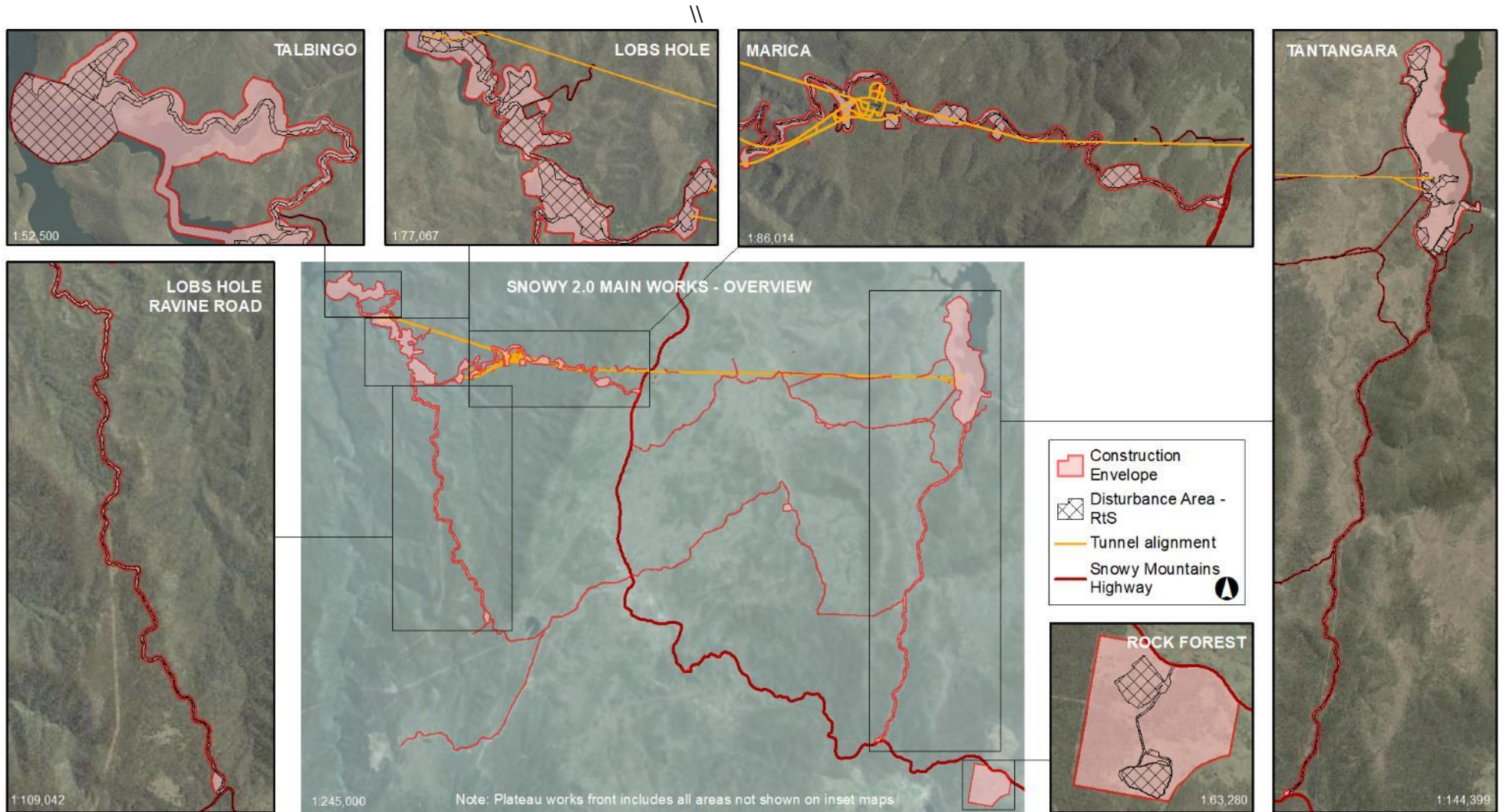


Figure 1-2: Snowy 2.0 Main Works zones

## 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 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. The purpose of Exploratory Works is primarily to gain a greater understanding of the underground geological conditions at the new power station. 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 Main Works for Snowy 2.0 (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 201 submissions were received during the public exhibition period, including 10 from government agencies and 191 from the public and special interest groups. In February 2020, the response to submissions report (RTS) 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.

The Infrastructure Approval contains the conditions of approval (COA). The Main Works Project will be carried out in accordance with these COA. Further to the COA, 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 the Environment (DAWE) 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, RTS and this EMS is outlined in Table 1-1. An example of the terminology is shown in Figure 1-3 at Ravine road.

**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. 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.

This Bushfire Management Plan (BushfireMP or plan) forms part of Future Generation's environmental management framework as described in the EMS and also sits under the Health and Safety Emergency Response Management Plan as shown in Figure 1-2.

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.

### 1.4.1. Management Plan Hierarchy

Figure 1-4 demonstrates the management plan hierarchy in relation to this plan. The BushfireMP is an appendix to the Natural Hazard Management Plan (NHMP). The NHMP sits under the Emergency Response Management Plan, which sits within the overarching Health and Safety Management Plan.

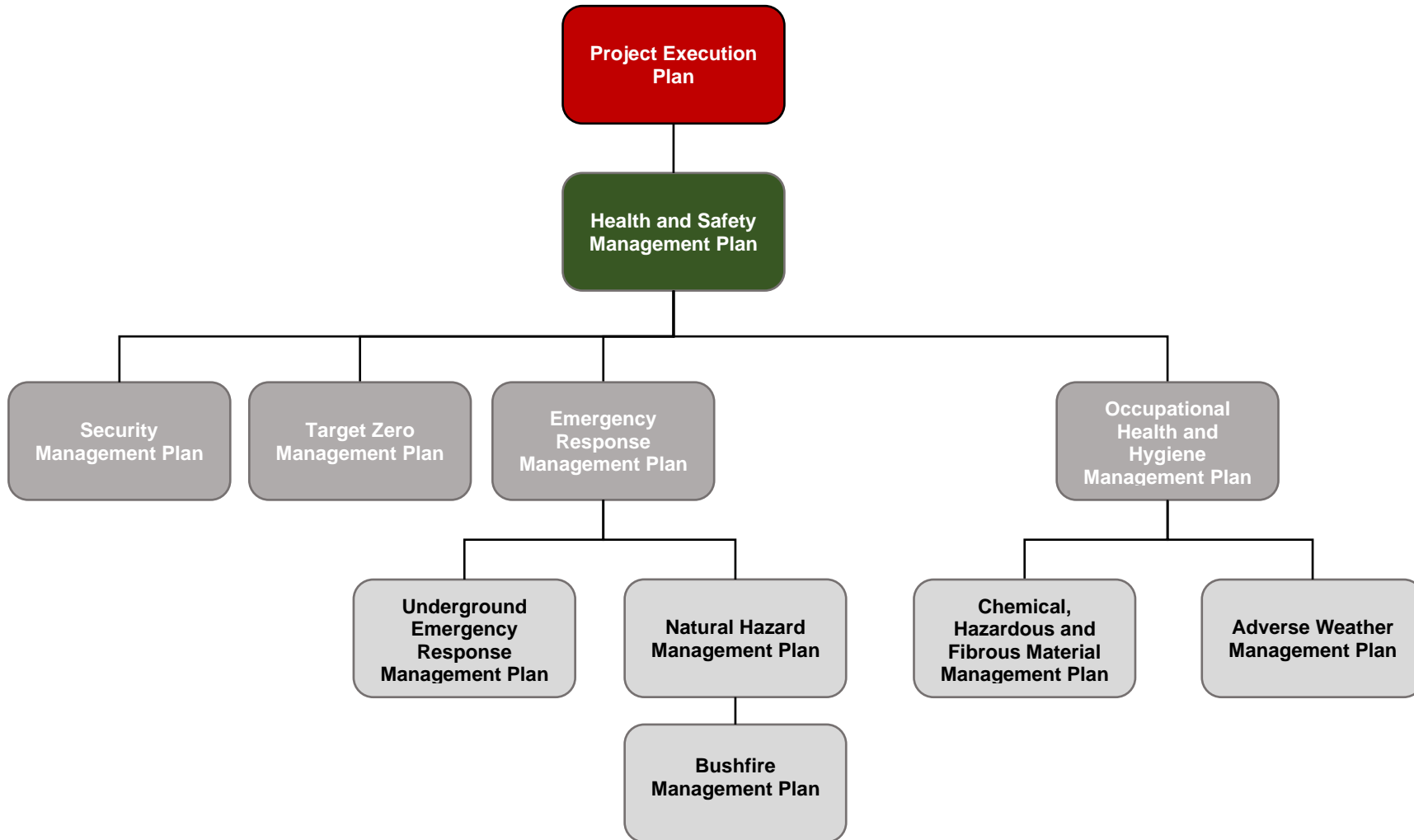


Figure 1-4: Health and safety sub-plans



## 1.5. Objective

The key objective of this BushfireMP is to identify the associated bushfire hazards and risks and the actions and responsibilities for managing these during construction of Snowy 2.0. To achieve this, Snowy Hydro and Future Generation will:

- ensure appropriate measures are implemented to address the relevant conditions of approval and the REMMs listed within the Submissions Report, as detailed within Section 2.2 and 2.3 of this Plan;
- ensure practicable measures are implemented during construction to avoid or minimise impacts of bush fire on public safety, the project and the surrounding areas prior to and during the bush fire season.

The focus of this plan is hazard mitigation and preparedness. Specific details relating to the decision to evacuate from assembly areas and the logistical procedures for evacuation are addressed in parent plans as detailed in Section 1.4.1.

Bushfire management measures are grouped into five sections within this plan based on the relative seasonal timing and situational context as shown in Figure 1-5.

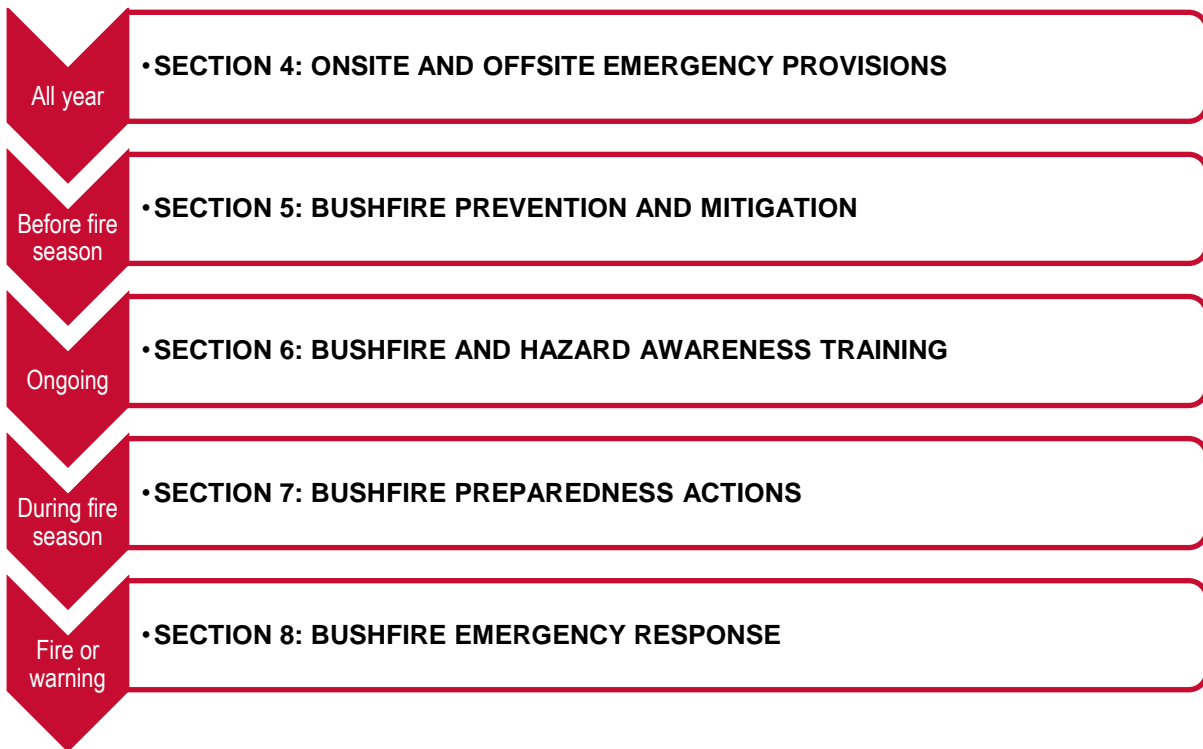


Figure 1-5: Indicative timings in relation to plan sections

## 1.6. Consultation

In accordance with schedule 3, condition 61 of the Infrastructure Approval, this plan, is to be prepared to the satisfaction of the National Parks and Wildlife Service (NPWS).

This plan was initially prepared for the Exploratory Works project (SSI 9208) and has been updated for Main Works. Table 1-2 below provides a summary of the consultation on this plan that has occurred throughout the Exploratory Works project through to Main Works.

**Table 1-2: Consultation with stakeholder summary**

Project	Date	Consultation	Outcome
Exploratory Works	04/09/2018	Site visit with NSWRFSS, NPWS and Bushfire Specialist (EcoLogical)	Discuss expectations of NSWRFSS and NPWS to inform the plan preparation
	17/04/2019	Initial draft for review and consultation	Comments received and addressed
	28/06/2019	Update following agency consultation	Plan approved
	19/11/2019	Plan updated to incorporate Mod 1 changes and issued for approval	Received feedback and comments indicating the need for a workshop to clarify definitions and preparedness actions.
	5/12/2019	Workshop with Snowy Hydro, NPWS and Future Generation	Bushfire preparedness measures refined. Clearer identification of hot works and other activities to be prohibited at certain forest fire danger index (FFDI) levels
	11/02/2020	Plan was updated for Modification 1 and issued to NPWS for review and comment.	NPWS approved Rev E of the Exploratory Works plan.
	13/03/2020	Phone consultation was undertaken with NPWS following the 2019/20 bushfires in KNP.	The plan was updated based on the NPWS comments.
	03/04/2020	Rev G of EW Plan revised and issued to NPWS for comment.	NPWS provided comments which were addressed in Rev H
	07/05/2020	Rev H issued to NPWS for final signoff	NPWS approve the revised plan (Rev H) on 08/05/2020.
Main Works	02/07/2020	Main Works plan Rev C issued to NPWS for review. The plan was updated from EW Rev H to include additional matters and work areas relevant to Main Works.	NPWS provided comments which were addressed in Rev D and reissued to NPWS on 3 August 2020.

### 1.7. Author Endorsement

In accordance with the requirements of schedule 3 condition 54 of the Exploratory Works Infrastructure Approval, the original version of this plan was prepared by Dominic Adshead of Eco Logical Australia whose appointment, on behalf of Future Generation, has been endorsed by NPWS on 30 May 2019.

Updates to the plan made by Future Generation were then reviewed by Nathan Kearnes of Eco Logical Australia whose appointment, on behalf of Future Generation, has been endorsed by NPWS on 28 October 2019. Nathan Kearnes of Eco Logical Australia has been re-endorsed as the bushfire specialist for this revised Main Works plan as required under schedule 3 condition 64(a) of the Main Works Infrastructure Approval.

## 2. ENVIRONMENTAL REQUIREMENTS

### 2.1. Legislation

Legislation relevant to bushfire includes:

- NSW *Biodiversity Conservation Act 2016* (BC Act);
- NSW *Biosecurity Act 2015* (Biosecurity Act);
- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act);
- Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- NSW *Fire Brigades Act 1989* (FB Act);
- NSW *National Parks and Wildlife Act 1974* (NPW Act);
- NSW *Rural Fires Act 1997* (RF Act); and
- *State Emergency and Rescue Management Act 1989*.

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 conditions of Approval (SSI 9687) relevant to the management of bushfire risk for Main Works. The conditions of Approval that are applicable to the Exploratory Works approval (SSI 9208) are included in

Table 2-2.

Table 2-1: Main Works (SSI 9687) conditions of approval relevant to bush fire management

Condition	Requirement	Where addressed
<b>Bushfire Requirements</b>		
Schedule 3, Condition 60	The Proponent must:	
	(a) include suitable asset protection measures into the final design of the development in accordance with the Planning for Bushfire Protection (RFS 2018) guidelines, or its latest version;	This plan, Section 5
	(b) ensure all buildings developed on site comply with the relevant requirements of the BAL-29 construction standards of Australian Standard AS 3959-2018: Construction of buildings in bushfire prone areas or the NASH Standard (1.7.14 updated) in National Standard Steel Framed Construction in Bushfire Areas – 2014; and	This plan, Section 5
	(c) ensure any fire trails or asset protection zones associated with the development are wholly contained within the approved disturbance area.	This plan, Section 5.4
<b>Emergency Management Plan</b>		
Schedule 3, Condition 61	Prior to the commencement of construction, the Proponent must prepare an Emergency Management Plan for the development to the satisfaction of the NPWS. This plan must:	This plan addresses the bushfire related requirements Section 1.6
	(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the NPWS;	Section 0

Condition	Requirement	Where addressed
<b>Bushfire Requirements</b>		
	(b) be consistent with the <i>Kosciuszko National Park Fire Management Strategy 2008-2013</i> (NPWS 2008), or its latest version;	The <i>Kosciuszko National Park Fire Management Strategy</i> was reviewed in preparation of this plan. This plan has been prepared to the satisfaction of NPWS – Section 2.5
	(c) include evacuation protocols for the site;	Section 8.6
	(d) describe the measures that would be implemented to:	Section 5.5, 6 and 7
	<ul style="list-style-type: none"> <li>minimise the risk of bushfires on site;</li> </ul>	Section 5
	<ul style="list-style-type: none"> <li>protect the assets on site from bushfires;</li> </ul>	Section 5
	<ul style="list-style-type: none"> <li>respond to any bushfires on or in the vicinity of the site;</li> </ul>	Section 4 and 8
	<ul style="list-style-type: none"> <li>minimise flood risks on site, including flooding response procedures;</li> </ul>	Addressed in Natural Hazard Management Plan
	<ul style="list-style-type: none"> <li>minimise the risk of landslips on site, including landslip response procedures; and</li> </ul>	
	<ul style="list-style-type: none"> <li>evacuate the site in an emergency; and</li> </ul>	Section 8.6
	(e) monitor and review the effectiveness of these measures.	Section 9.1 for bushfire

**Table 2-2: Exploratory Works (SSI 9208) conditions of approval relevant to bush fire management**

Condition	Requirement	Where addressed
Schedule 3, Condition 54	Prior to carrying out the development on site, the Proponent must prepare an Emergency Plan for the development to the satisfaction of the NPWS. This plan must:	This Plan Section 1.6
	(a) monitor and review the effectiveness of these measures	Section 9.1
	(b) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the NPWS;	Section 0
	(c) be consistent with the <i>Kosciuszko National Park Fire Management Strategy 2008-2013</i> (NPWS 2008), or its latest version;	The <i>Kosciuszko National Park Fire Management Strategy</i> was reviewed in preparation of this plan. This plan has been prepared to the satisfaction of NPWS – Section 2.5
	(d) describe the measures that would be implemented to:	Section 5.5, 6 and 7
	<ul style="list-style-type: none"> <li>minimise the risk of bushfires on site;</li> </ul>	Section 5.1
	<ul style="list-style-type: none"> <li>protect the assets on site from bushfires;</li> </ul>	Section 5.1
	<ul style="list-style-type: none"> <li>respond to any bushfires on or in the vicinity of the site;</li> </ul>	Section 4 and 8
<ul style="list-style-type: none"> <li>evacuate the site in an emergency</li> </ul>	Section 8.6	

### 2.3. Revised Environmental Management Measures

Environmental safeguards and management measures are included in the Main Works EIS in Appendix G. During preparation of the Submissions Report, Revised Environmental Management Measures (REMMs) were developed and are included in Appendix C of the Submissions Report.

The Main Works REMMs relevant to this plan are listed in Table 2-3 below. If additional measures are cross-referenced from another section of the Main Works EIS or Submissions Report, these measures are also included. To evaluate the continuity or redundancy of Exploratory Works REMMs, these are provided in

Table 2-4.

Table 2-3: Main Works (CSSI 9687) management measures relevant to bush fire

Ref #	Revised Environmental Management Measures	Where addressed
HAZ02	Vegetation is managed within operational APZs in perpetuity.	APZ maintenance throughout construction is detailed in Section 5
HAZ04	All On-site Refuge buildings will be within each Snowy 2.0 Main Works Accommodation site, constructed to BAL-29 construction standard, be of appropriate capacity, signposted and mapped.	Section 5 includes details on construction standards, maintenance requirements to protect refuge areas prior to and during the bushfire season.
HAZ05	Primary and secondary access is maintained, upgraded and/or constructed to comply where possible with performance criteria and/or acceptable solution requirements of PBP 2019 and NSW RFS Fire Trail Standards (NSWRFS 2019). Consultation with the NSW RFS will be undertaken where compliance is constrained.	Construction site access is detailed in Section 4.1.
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 2019.	Construction fire water resources are detailed in Section 4.6.
HAZ08	A Bushfire Emergency Management Plan is prepared for the project area and includes responsibilities associated with and details of:	This plan
	<ul style="list-style-type: none"> <li>site specific hazards and risk at each Snowy 2.0 Main Works site;</li> </ul>	Section 3 details the existing bushfire hazards. Section 8.2 includes additional details of hazards in the vicinity of power lines.
	<ul style="list-style-type: none"> <li>procedures to maintain bushfire awareness;</li> </ul>	Section 6.1 details personnel training. Section 6.2 details fire danger awareness measures.
	<ul style="list-style-type: none"> <li>bushfire mitigation measures;</li> </ul>	Site mitigation measures addressed in Section 5.
	<ul style="list-style-type: none"> <li>fire preparedness actions;</li> </ul>	Fire prevention and preparedness activities and limitations are detailed in Section 7.
	<ul style="list-style-type: none"> <li>fire response actions including responses to Emergency Alerts issued by emergency services; and</li> <li>bushfire recovery requirements.</li> </ul>	Emergency response addressed in section 8.

Ref #	Revised Environmental Management Measures	Where addressed
HAZ09	Each main works accommodation camp shall have a full time, onsite Emergency Response Team (ERT), with an appropriate level of training and equipment to respond to potential bushfire and initial structural fire events.	All personnel working in bushfire-prone areas onsite will have Bushfire Awareness Training as detailed in Section 6.1. This includes training in the use of firefighting equipment provided at each work area as detailed in the Preparedness requirements (see Table 7-1). These trained personnel constitute the bushfire emergency response team. For other emergencies, site security and health and safety team will coordinate emergency response as detailed in the Health & Safety Management Plan.

**Table 2-4: Exploratory Works (SSI-9208) management measures relevant to bush fire**

Ref #	Revised environmental management measures	Where addressed
PUS01	An Emergency Response Management Plan (ERMP) will be prepared and implemented during construction. The ERMP will contain all procedures relating to flood and other emergencies.	This plan and the Natural Hazard Management Plan interact with the project ERMP.
	A Bushfire Management Plan (BMP) including the bushfire emergency response and evacuation plan will be prepared and implemented during construction. The BMP will contain all procedures relating to bushfire. Including:	This plan.
	<ul style="list-style-type: none"> <li>management actions proposed to ensure suitable bushfire preparedness is undertaken as part of the Exploratory Works and ahead of the bush fire season, as well as specific procedures to limit the risk of ignition of surrounding bush land resulting from the Exploratory Works;</li> </ul>	Pre-season preparation addressed in Section 5 Procedures to prevent bushfire ignition included in Section 7.
	<ul style="list-style-type: none"> <li>the minimum requirements for a Village Protection Plan (as applicable to the Exploratory Works) as outlined within Section 3.4.9 of Kosciuszko National Park Fire Management Strategy 2008-2013 (NPWS, 2008). The plan will be provided to NPWS for comment.</li> </ul>	This plan meets the NPWS requirements for a Village Protection Plan as specified in Section 3.4.9 of the Kosciusko National Park Fire Management Strategy 2008-19 (DECC 2008).
	<ul style="list-style-type: none"> <li>bush fire awareness training;</li> </ul>	This plan, Section 6
	<ul style="list-style-type: none"> <li>a community bush fire refuge place in the case that offsite evacuation cannot occur;</li> </ul>	This plan, Section 4.3
	<ul style="list-style-type: none"> <li>bushfire maintenance measures and procedures;</li> </ul>	This plan, Section 5
	<ul style="list-style-type: none"> <li>work procedures, so as to limit the potential of ignition of surrounding bushland;</li> </ul>	This plan, Section 7
	<ul style="list-style-type: none"> <li>monitoring and review procedures;</li> </ul>	This plan, Section 9
	Bushfire Emergency Response and Evacuation Plan which will include:	
	<ul style="list-style-type: none"> <li>developed to be consistent with, A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan (NSW RFS 2014), Australian Standard 3745-2010 Planning for emergencies in facilities and the relevant provisions of the KNP Fire Management Strategy (NPWS 2008);</li> </ul>	This Bushfire Management Plan is consistent with these requirements.

Ref #	Revised environmental management measures	Where addressed
	<ul style="list-style-type: none"> <li>the requirements for pre-bush fire season and continual bush fire awareness;</li> </ul>	This plan, Section 5 and 6
	<ul style="list-style-type: none"> <li>the requirements for immediate notification to the local NPWS of accidental ignition of surrounding vegetation;</li> </ul>	This plan, Section 8.4 and 8.5
	<ul style="list-style-type: none"> <li>mechanisms for notification of neighbouring communities (Yarrangobilly Caves village and the village of Talbingo) of accidental ignition of surrounding vegetation leading to bush fire that may impact upon them;</li> </ul>	This plan, Section 8.4 and 8.5
	<ul style="list-style-type: none"> <li>the circumstances under which different evacuation types are to be implemented, in response to a bush fire emergency;</li> </ul>	This plan, Section 4.2 and 8.6
	<ul style="list-style-type: none"> <li>mechanism for the early relocation of staff, noting that on days of catastrophic fire weather, the NSW RFS recommends leaving early as the only safe option;</li> </ul>	The PIC determines the required actions as per Section 7.1
	<ul style="list-style-type: none"> <li>detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements;</li> </ul>	This plan, Section 4 and 8.6.1
	<ul style="list-style-type: none"> <li>the specific structure and role of emergency control for the site (e.g. fire wardens);</li> </ul>	This plan, Section 8.1
	<ul style="list-style-type: none"> <li>details of staff training consistent with their responsibilities within the emergency control organisational structure with the equipment provided;</li> </ul>	Detailed in ERMP
	<ul style="list-style-type: none"> <li>the requirements for training in preparation for response to an emergency, including trial emergency evacuations via Lobs Hole Ravine Road and via the barge access route;</li> </ul>	Section 6.3. At present no arrangements are made for a barge egress route. This may be updated once the barge infrastructure has been constructed
	<ul style="list-style-type: none"> <li>the requirements for clarifying a safe egress route (via Lobs Hole Ravine Road or the barge access route) and an understanding of the extent/spread of local fires before allowing the evacuating persons to leave the site;</li> </ul>	Section 4.2. The decision to evacuate from site will be determined in accordance with the ERMP as detailed in Section 1.4.1.
	<ul style="list-style-type: none"> <li>the requirements for egress and communication in the scenario that persons are leaving the Exploratory Works as emergency services are attending the Exploratory Works (noting that sections of Upper and Lower Lobs Hole Ravine Road are single lane only); and</li> </ul>	Passing bays are provided along the access road as detailed in Section 5.4. Specifics evacuation procedures are detailed in the ERMP.
	<ul style="list-style-type: none"> <li>mechanisms for communication with NPWS and neighbouring communities (Yarrangobilly Caves village and the village of Talbingo) on suitable egress routes and an understanding of the impacts that the egress of high numbers of project staff may have on the neighbouring communities ability to safely egress along the Snowy Mountains Highway.</li> </ul>	Managed by the Fire Authority Incident Controller in response to fire behaviour and forecast conditions and detailed in an incident Action Plan as per Section 8.1.
	<p>The Bushfire Management Plan shall include the provision of a suitable communication network. Snowy Hydro should liaise with the NSW RFS District offices of Riverina Highlands and Monaro to determine the appropriate network requirements for connecting to both internal and external response agencies.</p>	Contact details including preferred UHF channels provided in Section 8.5
	<p>To maximise the safety of the camp's occupants, the facility's occupants and employees are to be comprehensively and regularly trained to undertake safe first attack firefighting operations. Training is recommended to specifically include the extent of first attack fire operations that can be undertaken without endangering the safety of</p>	This plan, Section 6.1 Equipment and building maintenance addressed in Section 5

Ref #	Revised environmental management measures	Where addressed
	persons engaged in fire-fighting activities. The maintenance of equipment related to this will be specifically addressed in the Exploratory Works Bush Fire Management Plan.	
	<p>The Bush Fire Management Plan shall incorporate the provision of a full time, onsite emergency response team (ERT).</p> <p>The ERT should be fully trained and equipped to deal with all potential bush fire events. Snowy Hydro should liaise with the RFS District offices of Riverina Highlands and Monaro to determine the appropriate level of training and equipment required to fulfil this task.</p>	<p>Relevant personnel will be trained in first action response and the use of fire safety equipment. See section 6.1 and 7.2.</p> <p>RFS liaison detailed in Section 6.3.</p>
	A copy of the Bush Fire Management Plan and Bushfire Evacuation and Response Procedures will be submitted to the NSWRFs District offices of Riverina Highlands and Monaro for comment. Any comments provided by the District offices shall be incorporated into any amended plans.	This BushfireMP will be circulated and updated as prescribed
	Snowy Hydro shall liaise with the relevant Bush Fire Management Committees (BFMC) and Local Emergency Management Committees to ensure the committees are aware of the proposal and all assets associated with the proposal are incorporated into future risk management plans.	This plan, Section 5.4
	To minimise the consequences of fire incidents involving vehicles engaged in tunnel construction and excavation, all vehicles that are required to enter the tunnel will be fitted with onboard automatic engine fire suppression systems that comply with AS 5062 - 2016. In addition, all vehicles will be provided with portable fire extinguishers that comply with AS 2444 – 2001.	<p>Tunnel entry requirements will be applicable once tunnelling commences and identified in an updated BushfireMP.</p> <p>Section 7.2 addresses fire preparatory provisions.</p>
	APZs will be designed implemented and maintained as prescribed in the BFHRA.	This plan, Section 5
	At the detailed design stage, consideration will be given to the administration building, for the allowance of an APZ.	<p>Design has considered APZ for all buildings.</p> <p>Section 5.3 details APZ requirements for new buildings.</p>
	At the detailed design stage, consideration will be given to the accessibility of fire trucks within the defendable space of the portal construction pad structures, as well as the accessibility to the fire water tanks at this location.	Design considers accessibility of fire trucks and access to the fire water tanks at the MAT Portal.
	Consideration should be given to the implementation of passing bays or reversing bays at regular intervals in the upgrade of Upper and Lower Lobs Hole Ravine Road.	This plan, Section 4.1
	At the detailed design stage, consideration should be given to a fire trail, around the perimeter of the accommodation camp and within the APZ of the camp.	Design of the accommodation camp includes access around the perimeter of the camp and a minimum 20 m APZ
	A community bush fire refuge will be required at Lobs Hole providing a refuge for anyone caught out by fire preventing evacuation. This will include those staying at the accommodation camp.	This plan, Section 4.3
	Appropriate access standards for staff, fire fighters, emergency service workers and those involved in evacuation will be provided.	This plan, Section 5
	Adequate water supply and pressure is to be designed, implemented and maintained during construction for firefighting purposes.	Design of the accommodation camp meets these requirements.



Ref #	Revised environmental management measures	Where addressed
	<p>If spray systems are to be incorporated into the design of the buildings, dedicated fire water supplies will be increased to accommodate the systems.</p> <p>To facilitate safe first attack fire-fighting operations by staff, all buildings of the accommodation camp will be served by a fire hose reel system. Regardless of any floor area thresholds or other exclusions permitted in Clause E1.4 of the National Construction Code, the fire hose reel system will serve all buildings (irrespective of occupancy classification) and comply with all other requirements of Clause E 1.4 of the National Construction Code and AS 2441.</p>	
	Location and maintenance of services will be carried out so as not to contribute to the risk of bush fire or impede the firefighting effort.	All buildings and storage facilities will have appropriate APZs as detail in Section 5
	<p>Buildings are to be constructed in accordance with relevant National Construction Code, Building Code of Australia and Australian Standards.</p> <p>To maximise the safety of the camp's occupants, the accommodation camp's buildings or parts of buildings that are classified as Class 1 a, 1 b, 2, 3, 4 or 9b under the provisions of Volume One of the National Construction Code will be provided with a smoke alarm system or detection system (as applicable).</p> <p>All buildings are to be provided with portable fire extinguishers that are suitable for the fire hazard protected and in accordance with the requirements of AS 2444 - 2001.</p>	This plan, Section 5.3
	<p>Diesel generators and associated fuel storage at the portal construction pad, construction compound at Lobs Hole and the barge access (north and south) infrastructure will need to be designed, housed and maintained so that they will not serve as a risk to surrounding bushland and will be located away from the hazard, wherever possible.</p> <p>A suitable storage facility will be designed for storage of the ammunition for blasting activities and fuel storage, to prevent ignition of surrounding vegetation and to reduce the storage area susceptibility to bush fire impacts.</p>	This plan, Section 5.1 All buildings and storage facilities will have appropriate APZs as detail in Section 5
	The Exploratory Works Bushfire Management Plan will be reviewed and, if required, updated to include the revised secondary access arrangements for Lobs Hole via Lobs Hole Ravine Road (North).	This plan, Section 4.1

## 2.4. Permits and Licences

Environment Protection Licence (EPL) 21266 has been issued for the project for the scheduled activity of extractive activities for the Exploratory Works phase. The premises boundary for the Exploratory Works EPL has been expanded to encompasses both Exploratory Works and Main Works activities and the governing schedule activity for Main Works will be Electricity Generation.

A Construction Lease and Works Access Licence will be established with NPWS in order to carry out the relevant Snowy 2.0 Main Works.

An exemption permit has been obtained from NPWS for smoking in KNP within the project site (Annexure B).

### 2.4.1. Total Fire Ban Hot Works Exemption

Currently a Total Fire Ban exemption has been applied from NSW RFS. When exemption has been obtained, this plan will be reviewed and updated accordingly. The current version of the plan

assumes no exemption has been granted. This plan will be updated as required to reflect the status of any relevant permits and exemptions.

## 2.5. Guidelines

The guidelines considered in the development and implementation of this management plan include:

- AS 3959:2018 Construction of buildings in bushfire-prone areas. Standards Australia, Sydney;
- AS 2441-2005 Installation of fire hose reels – incorporating amendment No. 1 Reconfirmed 2018. Standards Australia, Sydney;
- Common Hose Couplings for Australian AFAC Member Agencies. Version 6 May 2008 Australasian Fire and Emergency Services Authorities Council (AFAC) (2008);
- Guidelines for the establishment and operation of onshore Helicopter Landing Sites. Civil Aviation Advisory Publication CAAP 92-2(2) February 2014, Civil Aviation Safety Authority (CASA) (2014);
- Kosciuszko National Park Fire Management Strategy 2008–2013. Prepared by the Parks and Wildlife Group, July 2008, Sydney Department of Environment and Climate Change (2008);
- National Construction Code Volume One - Building Code of Australia, Australian Building Codes Board (2019);
- National Guidelines on Electrical Safety for Emergency Service Personnel ENA Doc 008—2006, Standards Australia, Sydney;
- NSW RFS: Fire Trail Standards. March 2019, (Doc17/4137) [https://www.rfs.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0009/69552/Fire-Trail-Standards.pdf](https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0009/69552/Fire-Trail-Standards.pdf);
- Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers. 2019, NSW RFS, Sydney;
- Overall fuel hazard assessment guide 4th edition July 2010. Fire and adaptive management, report no. 82, Hines, F., Tolhurst, KG., Wilson, AAG, and McCarthy, GJ. (2010); and
- Tree Risk Management Procedures, 2019, NSW National Parks and Wildlife Services (2019).

## 3. EXISTING ENVIRONMENT

### 3.1. Landscape Bush Fire Environment

The project is located within the KNP (see Annexure C), with a range of infrastructure types to be developed in bushfire-prone environments. Construction works will be ongoing for several years and will continue throughout bushfire seasons. As such, a range of ongoing mitigation, awareness, preparedness and response actions are required to be implemented continuously during the bushfire danger period.

Within the KNP, when vegetation is dry enough for a fire to start and spread, bushfires have historically burnt over large areas of these alpine regions and at high intensity, producing embers and spotting ahead of the fire front. Under certain conditions (i.e. dry vegetation and strong winds) fire can be a risk at any time of the year. The project area is located in part of the KNP with one of the highest occurrences of bushfire (DECC 2008).

The majority of Main Works sites occur west of the Snowy Mountains Highway within the Southern Slopes Fire Weather Area and the Snowy Valleys Bush Fire Management Committee (BFMC) Area. The Snowy Valleys BFMC Bush Fire Risk Management Plan (Snowy Valleys BFMC 2017) identifies that within this region the:

- climate is cool temperate with winter rainfall maximum;
- bush fire season usually occurs from November to March;
- adverse fire weather is associated with north-westerly winds, high daytime temperature and low humidity; and
- dry lightning storms are common in the fire season.

The eastern sites of Tantangara, Plateau and Rock Forest are within the western extent of the Monaro Alpine Fire Weather Area and the Snowy Monaro BFMC Area. The Snowy Monaro BFMC Bush Fire Risk Management Plan (Snowy Monaro BFMC 2009) identifies that within this region the:

- climate is cool temperate with winter and summer rainfall maximums;
- bush fire season usually occurs from October to March;
- adverse fire weather is associated with north-westerly to south-westerly winds, high daytime temperature and low humidity;
- dry lightning storms occur in the fire season; and
- fire danger periods have occurred in winter months.

#### 3.1.1. January 2020 Bushfire

On 4 January 2020, the Snowy 2.0 project site and overall northern section of Kosciuszko National Park was impacted by a significant bushfire. 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 post-bushfire recovery of the surrounding areas is of key concern to KNP stakeholders and as such it is imperative that the project manage its indirect environmental impacts accordingly.

Following the bushfire, the fuel load in the locality is substantially reduced and the threat of bushfire has been somewhat reduced for the near term. Nevertheless, the management

requirements of this plan remain integral to preventing ignition and mitigating the safety risk to personnel.

### 3.2. Fire Danger Period (Bushfire Season)

The fire danger period runs from 01 October to 31 March, unless adjusted by the NSW Rural Fire Service (NSW RFS) Commissioner.

### 3.3. Local Government Area and Fire Danger Ratings Areas

The Main Works are located within:

#### Lobs Hole, Talbingo and Marica works

- Snowy Valleys Council area;
- Southern Slopes Fire Area (for fire danger rating forecasting);

#### Tantangara, Plateau and Rock Forest works

- Snowy Monaro Regional Council;
- Monaro Alpine Fire Area (for fire danger rating forecasting).

It is noteworthy that the plateau topography divides the Fire Area and council jurisdictions roughly east to west.

### 3.4. Aboriginal and Historic Heritage Sites

The area includes a range of Aboriginal and historic heritage sites which are subject to management measures identified in the Aboriginal heritage management plan and Historical and natural heritage management plan.

### 3.5. Threatened Species

The site includes a range of threatened fauna species. The following restrictions are required to reduce potential impacts:

- Firefighting chemicals (bushfire fighting foam or retardant) should not be applied within 50m of the banks of the Yarrangobilly River, Tantangara Creek, Talbingo Reservoir or Tantangara Reservoir.
- No track widening, new control line construction or vegetation disturbance is permitted on upper Lobs Hole Ravine Road between the junction of O'Hares Trail and the junction with Link Road. The same restriction applies on Marica Track where similar threatened species habitat occurs. Where emergency track widening occurs as part of a coordinated fire suppression strategy with combat agencies, this may result in vegetation and / or heritage site disturbance.

## 4. ONSITE AND OFFSITE EMERGENCY PROVISIONS

### 4.1. Project Location and Access

#### Lobs Hole and Talbingo works

Access to Lobs Hole will be via Ravine Road from the southern access point at the Link Road junction (see Figure 4-1). Secondary access via Lobs Hole Ravine Road North and Marica Track when road upgrades are complete.

Link Road – Lobs Hole Ravine Road junction is designated as the Link Road Junction Muster Point and is located:

- 11.2km north-east of Cabramurra;
- 47km west of Adaminaby;
- 63km south Talbingo;
- 97km south Tumut;
- 100km west of Cooma.

Secondary four-wheel drive access is possible from the north on Lobs Hole Ravine Road from the Snowy Mountains Highway (23km to the Yarrangobilly River crossing).

The majority of water-based works on Talbingo will be launched from the Talbingo Barge ramp (constructed during Exploratory Works) at Lobs Hole. An alternative access point to the Talbingo reservoir is via the Talbingo Boat Ramp, approximately 2.4km south from Tumut Hydroelectric Power Station – Tumut 3 and 8.1km south from Talbingo township.

#### Marica works

Access to the Marica area will be via Coppermine Trail. Coppermine Trail will be accessed from the Snowy Mountains Highway (see Figure 4-1). Once constructed, the road between Marica and Lobs Hole will provide an alternative access route between the two sites.

#### Tantangara works

Access to the Tantangara Works area is via Tantangara Road north off Snowy Mountains Highway (see Figure 4-1). The junction of Tantangara Road and Snowy Mountains Highway provides evacuation routes southeast to Adaminaby (19km) and Cooma (72km) or northwest to Talbingo (74km) and Tumut (108km).

Secondary egress, utilising Pockets Saddle Road and Port Phillip Trail may be used to return to Snowy Mountains Highway in the case of an emergency. Access here may be hindered if the Tantangara Reservoir levels flood the Port Phillip causeway. There are also locked NPWS gates along this route during the winter closure, between the June and October long weekends.

#### Plateau works

Works in the Plateau area will occur on Gooandra Trail, Nungar Creek Trail, Bullocks Hill Trail, Alpine Creek Trail, Tantangara Creek Trail and various other temporary one-way access tracks, which will primarily be accessed off Snowy Mountains Highway. Plateau works closer to Tantangara may be accessed from Tantangara Road. Under no circumstance should these be used for emergency access or egress, this will be reflected in advance warning signage.



## Rock Forest works

The Rock Forest works site is situated directly on Snowy Mountains Highway (see Figure 4-1) which provides evacuation routes southeast to Adaminaby (13km) and Cooma (66km) or northwest to Talbingo (80km) and Tumut (114km).

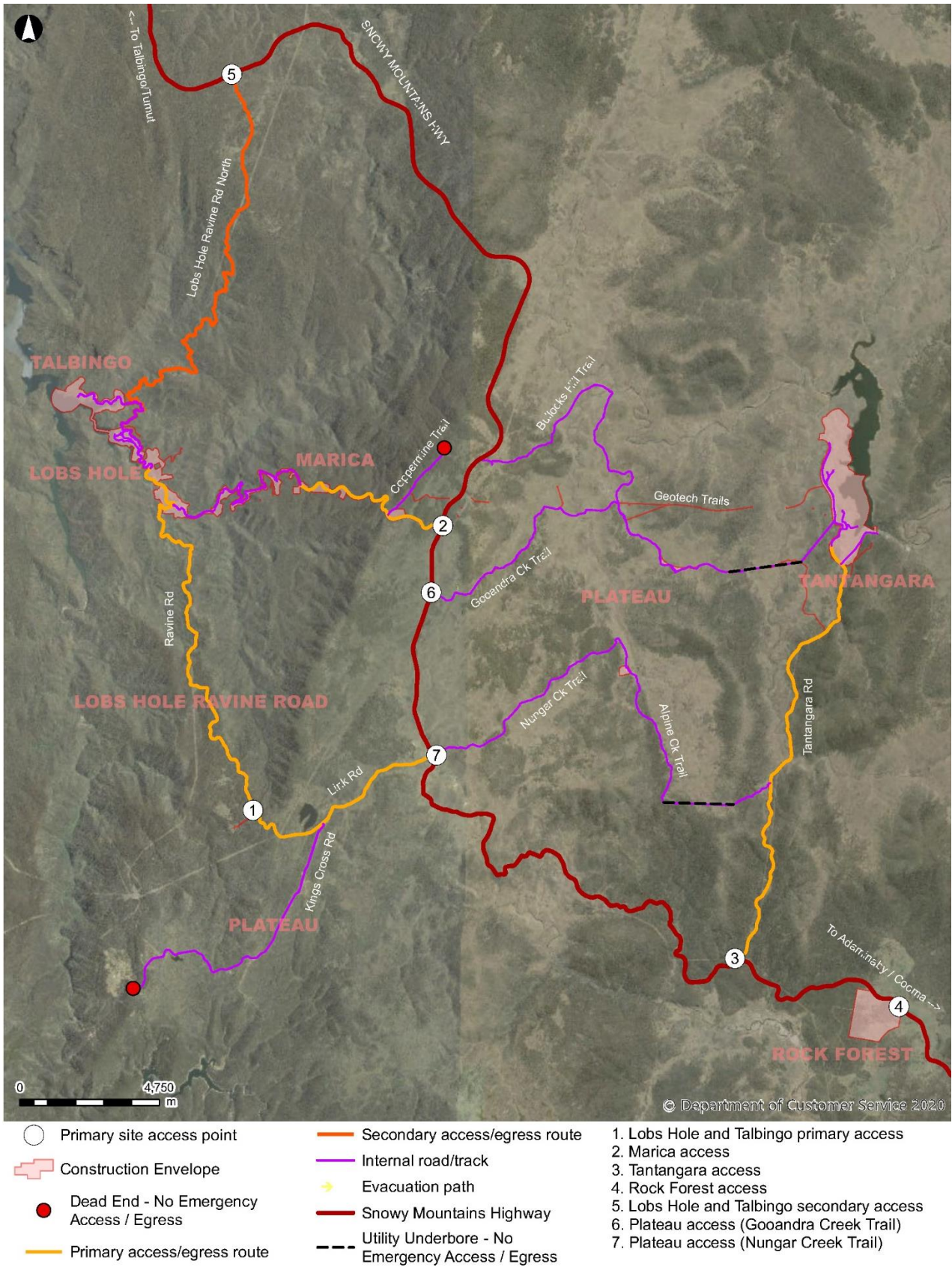


Figure 4-1: Access to project work fronts

## 4.2. Evacuation Arrangements

All vehicle access routes traverse bushfire prone vegetation which can support higher intensity bushfires. Attempting to evacuate at the last moment through these areas during a bushfire may be extremely dangerous, with fatal consequences.

All evacuations must be managed in accordance with the instructions of the Person in Charge (PIC), Incident Controller (IC), fire warden or their delegate. Personnel may be directed to a works area Muster Point to await instructions or seek refuge and shelter at the nearest Refuge Assembly Area (Assembly areas detailed in Section 4.3) until a bushfire passes.

A Consequence Management Guide (CMG) relating to evacuation will be in place prior to works mobilisation. This will include notification triggers to the local Emergency Operations Centre (EOC). CMGs will be discussed with the local EOC to ensure compatibility with EOC operations.

Each Assembly Area will have an evacuation CMG due to the various topographical and access constraints at each location. The CMGs will form part of the Evacuation Management Plan and will be referenced in this document once it has been prepared. Evacuations from site will be conducted in accordance with the Evacuation Management Plan which is the relevant human resources and logistics plan as detailed in Section 1.4.1.

### 4.2.1. Offsite Evacuation and/or Neighbourhood Safer Place

Offsite evacuations must only be undertaken as a coordinated action at the direction of the PIC (or delegate) or IC and must not be undertaken at the last minute, when it may be too late and/or dangerous to evacuate. Table 4-1 details the nearest identified Neighbourhood safer places in the vicinity of each of the project work fronts.

**Table 4-1: NSW RFS Neighbourhood safer places and distances from project work fronts**

Neighbourhood Safer Place	Distance from Project	Work fronts to use this safer place
<b>The Big Trout Park</b> Off Snowy Mountains Highway, <u>Adaminaby</u>  35°59'50.2"S 148°46'27.9"E	<ul style="list-style-type: none"> <li>Approximately 38km south-east from junction of Link Road and Snowy Mountains Highway</li> <li>Approximately 19km south-east from junction of Tantangara Road and Snowy Mountains Highway</li> </ul>	Primary safer place when evacuating south from: <ul style="list-style-type: none"> <li>Lobs Hole;</li> <li>Talbingo;</li> <li>Marica;</li> <li>Plateau;</li> <li>Tantangara; or</li> <li>Rock Forest;</li> </ul>
<b>Miles Franklin Park</b> Cnr Murray Jackson Drive & Bridle Street, <u>Talbingo</u>  35°34'46.3"S 148°18'11.0"E	<ul style="list-style-type: none"> <li>Approximately 55 km north from junction of Link Road and Snowy Mountains Highway</li> <li>Approximately 74 km north-west from junction of Tantangara Road and Snowy Mountains Highway</li> </ul>	Primary safer place when evacuating north from: <ul style="list-style-type: none"> <li>Lobs Hole Ravine Road;</li> <li>Lobs Hole;</li> <li>Talbingo</li> <li>Marica;</li> <li>Plateau;</li> <li>Tantangara; or</li> <li>Rock Forest.</li> </ul>



Neighbourhood Safer Place	Distance from Project	Work fronts to use this safer place
<b>Tumut Plains Cricket Ground</b> Tumut Plains Road, <u>Tumut Plains</u>  35°21'03.8"S 148°16'16.3"E	<ul style="list-style-type: none"> <li>Approximately 83 km north from junction of Link Road and Snowy Mountains Highway</li> <li>Approximately 103 km north-west from junction of Tantangara Road and Snowy Mountains Highway</li> </ul>	Secondary safer place when evacuating north from: <ul style="list-style-type: none"> <li>Lobs Hole Ravine Road;</li> <li>Lobs Hole;</li> <li>Talbingo</li> <li>Marica;</li> <li>Plateau;</li> <li>Tantangara; or</li> <li>Rock Forest.</li> </ul>
<b>Multifunction Centre</b> Cromwell Street, <u>Cooma</u>  36°14'23.2"S 149°07'26.2"E	<ul style="list-style-type: none"> <li>Approximately 90 km south east from junction of Link Road and Snowy Mountains Highway</li> <li>Approximately 71 km south-east from junction of Tantangara Road and Snowy Mountains Highway</li> </ul>	Secondary safer place when evacuating south from: <ul style="list-style-type: none"> <li>Lobs Hole Ravine Road;</li> <li>Lobs Hole;</li> <li>Talbingo</li> <li>Marica;</li> <li>Plateau;</li> <li>Tantangara; or</li> <li>Rock Forest</li> </ul>
<b>1488 Bistro and Canteen</b> Murrain Road (Centre of Town Complex), Cabramurra  35° 56' 9" S, 148° 22' 50.55" E	<ul style="list-style-type: none"> <li>Approximately 20 km south west from junction of Link Road and Snowy Mountains Highway</li> <li>Approximately 35.6 km west from junction of Tantangara Road and Snowy Mountains Highway</li> </ul>	Secondary safer place when evacuating south from: <ul style="list-style-type: none"> <li>Lobs Hole Ravine Road;</li> <li>Lobs Hole; or</li> <li>Talbingo.</li> </ul>

### 4.3. Assembly Areas

The nominated assembly areas across the project are detailed in Table 4-2. These areas provide a safe space for workers to assemble prior to evacuation (if required). Evacuation from the site will be in accordance with the Evacuation Management Plan and Human Resources Evacuation Process as indicated in Section 1.4.1. General evacuation instructions are included in Section 8.6.

Table 4-2: Assembly Area – location and description

Assembly Area	Lat	Long
Ravine Refuge Assembly Area	35°47'8.00"S	148°23'39.50"E
	This assembly area is located 150m east of Yarrangobilly River Crossing, 80m east of the Washington Hotel ruin and 16.2km north along Lobs Hole Ravine Road from the Link Road junction.	
Lobs Hole Camp Refuge Assembly Area ( <b>once camp is established</b> )	35°46'57.00"S	148°23'41.00"E
	This assembly area is to be located within Lobs Hole Camp, on the northern side of Yarrangobilly River, 400m north of Yarrangobilly River Crossing and 16.4km north along Lobs Hole Ravine Road from the Link Road junction.	
Marica Camp Assembly Area ( <b>once camp established</b> )	35°47'10.4"S	148°26'39.1"E
	This assembly area will be located within the Marica Camp along the Marica trail approximately 5.5km west of the Snowy Mountain Highway.	
	35°48'05.5"S	148°38'52.0"E

Assembly Area	Lat	Long
Tantangara Camp Assembly Area ( <b>once camp established</b> )	This assembly area will be located within the Tantangara Camp at the southern extent of the Tantangara Reservoir on Quarry Trail off Tantangara Road, approximately 15km north of the Snowy Mountain Highway.	

The Assembly Areas will include:

- A minimum 20,000L dedicated fire water supply (rainwater roof collected, topped up by water cart) fitted with 65mm Storz bushfire couplings;
- A minimum of three 12m x 3m portable offices (or equivalent floor space) placed in a U-shape. The sizing of these assembly areas will be catered to suit the expected number of personnel at each location;
- Gravel central hardstand and gravel building perimeter track;
- Colorbond perimeter fence (minimum 1.8m high) – the Colorbond perimeter fence is flush with the ground and maintained with no gaps between the fence bottom and the ground surface;
- A 20m buffer around the refuge buildings and a 10m buffer around the perimeter will be maintained as an APZ with any grass <10cm height.

#### 4.3.1. Staying and Defending at Assembly Areas

Ideally, the bulk or all of the workforce would be evacuated well in advance of any known bushfire threat. The assembly areas will also function as a site of safer refuge for workers if it is determined too late to safely evacuate from site.

The decision to stay and defend at a site must not be taken without careful planning. A specific incident action plan and a back-up plan that carefully considers all the local risk factors associated with a bushfire in the vicinity of each Refuge Assembly Area must be prepared. The incident action plan should also consider the impact an evacuation, which may increase congestion on the Snowy Mountain Highway, would have on the egress capabilities for the surrounding community.

Regardless of a decision to leave early or stay and defend, the Refuge Assembly Areas should be prepared for direct flames, radiant heat and ember attack from bushfire.

A site is better prepared (even if you choose to leave) and potentially defensible if by the start of the fire season and during the fire season, the mitigation actions identified in Section 5 are in place.

#### 4.4. Muster Points

Muster points provide gathering points for personnel in the locality of their works area. They serve as the initial coordination point for personnel prior to mobilisation from the works area to the assembly areas (see Section 4.2).

Muster points will be determined dynamically by the PIC and/or HSE representative as the construction activities progress throughout the project site. The location of muster points will be communicated to personnel through signage on site, HSE notice boards and in toolbox talks.

Workers in the Talbingo and Lobs Hole work areas will muster and mobilise to Assembly Areas as instructed by the PIC. The Assembly Areas are nominated in Table 5.1. Muster points are dynamic and change as the work site is developed. They are identified in the Emergency Evacuation Plan for each respective work site. It should be noted that Muster Points will be for any emergency at that specific work site.

## 4.5. Helipads

Table 4-3 provides a breakdown of helipad locations and descriptions.

**Table 4-3: Helipad – location and description**

Helipad	Lat	Long
(H) Ravine Helipad Exploratory Works Camp area	35°46'57.31" S	148°23'50.87" E
	Located at the Exploratory Work Lobs Hole camp area.	
(H) Marica works area <b>(once camp established)</b>	35°47'07.6"S	148°26'37.7"E
	Future helipad details will be provided here once they are built	
(H) Tantangara Boat Ramp <b>(once camp established)</b>	35°48'04.7"S	148°38'49.9"E
	Future helipad details will be provided here once they are built	
(H) Rock Forest	NA	NA
	Future helipad details will be provided here as they are built	
<i>All helipads should be established and maintained with consideration of the CASA Helicopter Landing Site Guidelines (CASA 2014).</i>		
<i>An additional helipad is proposed for Lobs Hole Camp once the camp is constructed. This will replace either of the two locations noted above and become the main helipad.</i>		

## 4.6. Firefighting Water Supplies and Equipment

The following resources will be available on the project site:

- Dedicated 20kL firefighting static water supply tanks (steel-shielded or concrete water tanks) will be located at the following locations:
  - near the shed building at the Ravine Refuge Assembly Area ;
  - Transmission Laydown Staging Area (approximately 6 km north of the intersection of Link and Ravine Road) see Figure 8-3;
  - *Additional locations of fire fighting water supplies will be detailed here in future revisions of the plan as this infrastructure is installed during Main Works.*

The water supply tanks will have 65mm Storz coupling to suit bushfire tankers;

- Light-pumper Category 9 fire units (utility vehicle or dedicated fire trailer with slip-on tank of 300-400L capacity, hose reel and 65mm Storz couplings) are required at each discrete worksite to put out spot fires, as per the preparedness requirements Section 7.2.

In addition, water can be directly sourced from the Talbingo Reservoir or Tantangara Reservoir.

Adequate water supply and pressure is to be designed, implemented and maintained during construction of the accommodation camps for firefighting purposes. All camp buildings (irrespective of occupancy classification) must comply with the requirements of clause E1.4 of the National Construction Code and AS 2441.

#### 4.7. External Firefighting Resources

The nearest fire resources are NPWS Blowering Works Depot, and the volunteer NSW RFS brigades at Adaminaby, Talbingo and Tumbarumba, all more than one-hour response time away, when available. NPWS also maintains firefighting units, which are based at Tumut and Jindabyne.

The NSW RFS or Tumbarumba Fire and Rescue are likely to be the first responders dispatched to an incident. This will be dependent on the emergency response automated system which will deploy available or closest units. There are also fire stations in Cooma and Tumut, however both are more than two hours response time away.

#### 4.8. NPWS Fire Detection Towers

When manned, the Black Jack Fire Tower (35°58'29.00"S | 148°18'48.50"E) (approximately 20km SSE) and Big Talbingo Fire Tower (35°36'58.00"S | 148°19'53.00"E) (approximately 20km NNE) can pick up smoke sightings from the vicinity of Lobs Hole but not see directly into the valley.

It should be noted that the Big Talbingo Fire Tower was destroyed in January 2020 and is required to be rebuilt, this may result in some reduced capability during the 2020/21 fire season.

NPWS advises the Snowy Mountains Control Centre of smoke sightings and where relevant will also advise the PIC or their delegate. The Control Centre would directly notify the PIC or their delegate in the event of smoke sightings in the vicinity of or having potential to affect the Project.

## 5. BUSHFIRE PREVENTION AND MITIGATION

### 5.1. Maintenance of Asset Protection Zones and Vegetation Management

From the commencement of the works and for every bushfire season throughout the project duration, the PIC or delegate must maintain the following asset protection zones (APZ):

- A 20m radius APZ from the external wall and/or part of the Refuge Assembly Area buildings (once constructed) and occupied accommodation buildings;
- A 10m APZ around:
  - The external side of each Refuge Assembly Area perimeter Colorbond fence;
  - All diesel generators;
  - Non-accommodation buildings;
  - All other site infrastructure.
- A 25m radius APZ around any buildings in the vicinity of high voltage transmission lines. Buildings at these areas are to be located > 25m from the nearest transmission line due to potential electrical hazards (see section 6).

The siting of liquid fuel and explosive storage areas will maximise the distance from bushfire prone vegetation and will not be located within a 20m radius of retained vegetation or within the nominated asset protection zones for other infrastructure as detailed above.

Fuel levels within all APZs are to be maintained in accordance with NSW RFS Standards (NSWRFS 2018, Appendix 4), within an overall fuel hazard of low to moderate range (based on Hines et al 2010). This is achieved by:

- Slashing grass to <10cm but avoiding damage to the thatch, which would result in grass death or mineral soil exposure;
- Reducing tree cover to <15% within the first 10m of any structure by:
  - Removing all lower branches up to 2m through pruning;
  - Removing all flammable shrubs and tall grasses near walls, windows and doors;
  - Reducing shrubs to <30% across the extent of the APZ.
- Removing all flammable landscaping material (such as woodchip and mulch) or fuels from within 10m of buildings.

**NOTE: APZ maintenance activities are to occur within the project area only. Vegetation management/removal is prohibited in the adjacent KNP.**

### 5.2. Building Maintenance and Preparedness

Once constructed, site buildings are to be well-maintained for bushfire mitigation. The following preparatory maintenance activities should be conducted prior to the official start of the bushfire season (October 1, unless declared earlier) and monthly throughout the bushfire period:

- Clear all leaf litter and debris <6mm diameter from:
  - Gutters;
  - Garden beds;
  - Roofs;

- External decks;
- Ensuring external walls, eaves and roofs are sealed and painted and any window fly wires or screens are repaired – this will reduce the potential for ember attack;
- Service fire extinguishers;
- Conduct testing of fire hose reels and alarm systems, where installed.

### 5.3. New Building Establishment (Occupied and Fuels and/or Explosive Stores)

Construction buildings will be in accordance with the Building Code of Australia and AS3959:2018 (as updated) for all occupied buildings and all structures containing flammable materials or for storing explosives.

Any above-ground building containing flammable liquids and explosive materials must be constructed to a minimum of BAL29 construction standard, AS3959:2018, to provide for enhanced ember protection.

### 5.4. Fire Breaks and Trails

Fire trails, trail signage, passing bays, turn-around points and fire breaks must be serviceable before the start of each fire season and during the season. The Future Generation PIC or delegate will identify any maintenance required within the project site to meet the NPWS fire trail requirements and the NSW RFS fire trail standard (NSW RFS 2019). Where maintenance by Future Generation is required within the project site, requirements and plans will be communicated to Snowy Hydro and NPWS.

All major trails on and adjoining the Main Works areas will be clearly marked with key information (e.g. dead end, no access, steep and narrow) and will be wholly contained within the approved disturbance area. These locations include:

- Lobs Hole Ravine Road – at multiple points;
- Middle Bay Road (aka Pipeline Road);
- Toll Bar Track (no access);
- Mine Trail Road (no through trail) – at multiple points;
- Wallace Creek;
- Yarrangobilly River;
- Tantangara Road;
- Gooandra Trail
- Nungar Creek Trail;
- Quarry Trail;
- Coppermine Trail;
- Bullocks Hill Trail;
- Alpine Creek Trail;
- Tantangara Creek Trail;
- all Muster Points and Assembly Areas; and

- directional signage to the active Helipads.

Where trail and access tracks do not provide an escape route in an emergency, signage will be installed to notify project staff accordingly.

## 5.5. Permit to Work System

All personnel and contractors must abide by the Permit to Work (PTW) system as detailed in the Future Generation Health and Safety Management Plan (HSMP), including:

- Hot works controls;
- Other ignition prevention actions (including smoking in designated areas only – see permit at Annexure B).

In addition, the following measures apply for site works throughout the bushfire season:

- Bushfire preparedness measures and permissions in accordance with Section 7;
- Fire Risk Assessment and Control Measures Form (Annexure A) will be required where the FFDI is 30 or greater (FFDI detailed in Section 7.1.1).

## 6. BUSHFIRE AND HAZARD AWARENESS TRAINING

### 6.1. Site Induction and Training Requirements

The PIC or delegate is responsible for the induction of new staff members, contractors, visitors and site users. The induction is to include:

- Information about the site context as detailed in Section 3;
- Fire weather awareness and preparedness requirements – in response to forecast FFDI and FDR, see Section 7.2; Section 7.3;
- Permissible activities based on works preparedness code, see Table 7-1;
- Familiarisation and training in the safe and effective use of the provided fire safety equipment, see Table 7-1;
- Response to an emergency warning being issued by fire authorities, see Section 8.3;
- Fire reporting and response actions to a smoke sighting or fire starting, see Section 8.4;
- Onsite and offsite emergency arrangements, including but not limited to evacuation procedures and assembly area locations, see Section 4 and Section 8.

#### 6.1.1. Bushfire Awareness Training

All Future Generation supervisory personnel working in bushfire-prone areas during the bushfire season must complete Future Generation Bushfire Awareness Training prior to starting activities. All other ground personnel must be briefed on how to avoid a bushfire ignition and what to do in a bushfire through toolbox talks and the above site induction requirements. All personnel working outside compounds are to be escorted by a person who has completed the Bushfire Awareness Training.

All personnel with responsibilities within the emergency control organisational structure or for the operation of emergency equipment must have the appropriate level of competency-based training in accordance with the Future Generation ERMP.

### 6.2. Fire Danger Awareness

#### 6.2.1. Fire Danger Boards

Fire danger boards will be set up and updated daily and will communicate the RFS Fire Danger Rating (FDR) for the day. The fire danger boards will be positioned at the discretion of the Construction Manager and/or PIC throughout the site to give best clarity to workers and will be relocated as the concentration of personnel relocates for works activities. A fire danger board will also be situated at the main access gate.

#### 6.2.2. Staff Briefing and Toolbox Talks

The PIC shall ensure that personnel are informed of site-specific fire and emergency procedures and hot works permit requirements as part of toolbox talks given to all staff and contractors at:

- The commencement of each fire season;
- New starter induction;
- Daily during the fire season, to confirm the FFDI and fire danger works preparedness code level for the current and next four days.



### 6.3. Liaison and Pre-Season Drills with the NPWS and Local NSW RFS

The PIC or delegate will annually and prior to the bushfire season (which typically starts 1 October, unless brought forward by the NSW RFS Commissioner) invite the local NSW RFS Brigade and NPWS representatives onsite for site familiarisation, fire response and evacuation drill and liaison with personnel. This will include running through the procedures and operations detailed in this plan.

A copy of this plan will be provided to Snowy Hydro to provide to the relevant Bush Fire Management Committee (BFMC) and Local Emergency Management Committees.

During times where FDR is Very high or above, Future Generation's PIC or delegate and NPWS project officers will remain in frequent and direct communication to share information on project activities being undertaken and how these relate to ongoing or predicted bushfire hazards in the locality. Snowy Hydro will be kept informed of these discussions and the resulting Project consequences.

### 6.4. Other Related Hazards

#### 6.4.1. Powerlines and Aircraft Operations

Powerlines may not be visible to aircraft, including helicopters. Aircraft, drone and unmanned aerial vehicle pilots carrying out project activities should be advised of the presence of powerlines in the vicinity.

During a bushfire incident no project aircraft, drones or unmanned aerial vehicles will be used from the first sighting or notification of a fire in the area until clearance is given by the RFS and NPWS.

#### 6.4.2. Risk from Fires Burning Near Transmission Powerlines and Electricity Arcing

As per the National Guidelines on Electrical Safety for Emergency Service Personnel (*ENA Doc 008—2006*):

'Large fires burning adjacent to or under high voltage transmission lines have the potential to create electrical arcs (known as "flashovers") that can endanger people, animals and objects. The combination of dense smoke and hot gases generated by a large fire directly under or near a high voltage transmission line can create a conductive path that increases the potential for a flashover. A flashover is when electricity, especially at higher voltages, jumps across an air gap to create a conductive path. A flashover may occur between wires or from wires to the ground – this may be seen as a flash or heard as an explosion or loud cracking sound.

Under everyday conditions, the height of wires and their separations are designed to be entirely safe. However, a fire burning under or very close to the powerline can increase the distance that an electricity arc can jump. Flashovers are potentially life threatening to a person standing in the near vicinity of the flashover and can also cause damage to nearby equipment.

When there is a fire close to a powerline keep all personnel, vehicles and attachments at least 25 metres clear from the powerline.'

See Section 8.2 for protocols for firefighting in the vicinity of powerlines.

## 7. BUSHFIRE PREPAREDNESS ACTIONS

### 7.1. Assess Fire Danger and Notify Personnel

The PIC or delegate must undertake the following daily throughout the bushfire season:

- check for notice of Total Fire Ban in the relevant fire areas (Section 7.1.1.2);
- check the fire danger level for the site at 6am each day as per Section 7.1.1;
- review the fire danger prior to the commencement of night shift;
- daily monitor fire danger weather warnings and change in weather conditions on the Bureau of Meteorology (BoM) website over the next four days. Take note of forecasts for:
  - Fire Danger Rating;
  - increases in wind or temperature;
  - reductions in humidity;
  - significant changes to wind direction or speed;
  - potential for lightning; and
  - fires in the area.
- determine the fire preparedness works colour code by 6am each day (see Section 7.1.2 and Table 7-1);
- consider the merits of leaving early (Section 7.1.3) on days where the FFDI is or is predicted to be greater than 30 (for night shift following these days see Section 7.1.4);
- notify personnel of relevant weather forecasts and direct the implementation of the applicable fire preparedness works colour code actions (as per Table 7-1);
- consistently monitor the fire danger levels and weather forecast on adverse bush fire weather days throughout the day as prescribed in Table 7-1;
- consistently monitor the following media for fire warnings and bushfire emergency alerts:
  - ABC local radio (ABC South East NSW 1602 kHz AM Monaro, ABC Riverina 97.9FM or 89.9FM in the Ravine) – note there is poor reception in Lobs Hole;
  - NSW RFS website and/or Fires Near Me App.
- notify personnel of any official emergency alert issued for the site (as required); and
- direct initiation of response actions when an emergency warning is issued (Section 8.3).

#### 7.1.1. Accessing Fire Danger Information

**The primary fire danger indicator to be employed on the project site is the Forest Fire Danger Index (FFDI).** A secondary indicator will be the Fire Danger Rating (FDR). Section 7.1.1.1 details how to access FFDI data. Section 7.1.1.2 details accessing FDR information.

The forecast FDR for the next four days should be reviewed for planning purposes, and is available from: <http://www.bom.gov.au/nsw/forecasts/fire-danger-ratings.shtml>.

##### 7.1.1.1. Forest Fire Danger Index

The FFDI can be obtained via the following methods in order of preference:

### 1. Site Specific FFDI

The FFDI can be calculated on the project site by the FGJV PIC or delegate e.g. site supervisor, using the NSW RFS Pocketbook App, relevant data from the FGJV Weather Station and from the NSW RFS ICON website in the case of Fuel Load and Drought Factor. The PIC or delegate shall only determine site-specific FFDI calculations if they have been recognised by Future Generation health and safety management as having the competency to use the FFDI calculation software and other relevant equipment.

### 2. BOM Fire Weather Bulletin for NSW (Product code: IDN60036)

This is a subscription-based service which provides text-based data of the current FFDI and maximum FFDI observed for the subject day, updated half-hourly for all weather stations in NSW. The nearest weather station to the project sites is Cabramurra and an example is shown on Figure 7-1. Compared to the above option, this is the preferred data source for unambiguity, however it is noted that the Lobs Hole area may experience slightly higher FFDI than Cabramurra, due to the difference in elevation. The PIC can obtain the necessary subscription from BOM Real-time Data Services at <http://reg.bom.gov.au/reguser/reguser.shtml>.

Station	DF	Grass Curing %	Grass Load t/ha	Current Observations								Max FFDI since 0000 EST								Max GFDI since 0000 EST								Miss	
				Time EST	T	Td	RH	Wd	Ws km/h	Wg km/h	FFDR/FFDI	GFDI	Time EST	T	Td	RH	Wd	Ws km/h	Wg km/h	FFDR/FFDI	GFDI	Time EST	T	Td	RH	Wd	Ws km/h		Wg km/h
Cabramurra	4	49	2.5	1430	1	-2	80	WNW	15	20	L-M 0	L-M 0	1430	1	-2	80	WNW	15	20	L-M 0	1430	1	-2	80	WNW	15	20	L-M 0	

Figure 7-1: Sample of Fire Bulletin data provided by BOM Realtime Data Services

### 3. BOM Maximum Fire Danger Index Forecast Maps

This free service is available at the BOM website (<http://www.bom.gov.au/nsw/forecasts/fire-map.shtml>). A map is provided for reference, however as shown in Figure 7-2, the map scale and colour gradient makes it difficult to accurately determine the precise FFDI for the project site. This map can however provide a quick general indication for reference of the forecast FFDI.

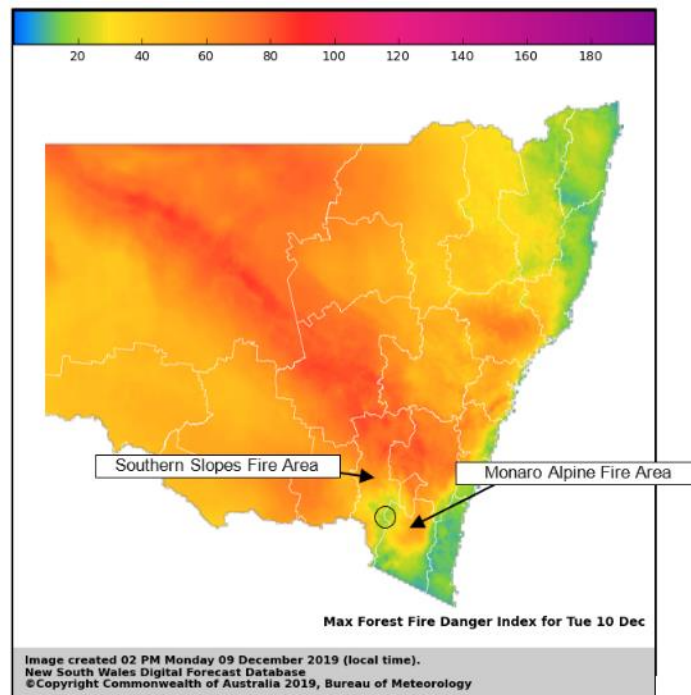


Figure 7-2: FFDI map from BOM website (circle indicates approximate location of the project site)

### 7.1.1.2. Fire Danger Rating

#### Total Fire Ban

The NSW RFS FDR and Total Fire Ban declarations can be found at the following link:

- <https://www.rfs.nsw.gov.au/fire-information/fdr-and-tobans>

#### Fire Danger Rating

The forecast FDR for the following four days can be found at the following link:

- <http://www.bom.gov.au/nsw/forecasts/fire-danger-ratings.shtml>

Works in the vicinity of Lobs Hole, Talbingo and Marica are located within the Southern Slopes Fire Area (Area 16). Works in the vicinity of Tantangara Reservoir, Plateau and Rock Forest are located within the Monaro Alpine Fire Area (Area 7).

The FDR is considered a secondary fire danger indicator for the project site because the conditions on site can vary significantly from the surrounding Fire Areas due to altitude variations and other localised climatic effects on the project site. This can be seen on Figure 7-2, where on that particular day, the project site location had a lower forecast FFDI than the rest of the Southern Slopes Fire Area and the Monaro Alpine Fire Area. At other times, the localised FFDI could be higher than the surrounding Fire Areas. The FDR is a coarser classification which is generalised across too large an area to be adopted as the primary indicator on the project site.

### 7.1.2. Determining Fire Preparedness Works Code

The fire preparedness code is determined by cross referencing the FFDI and Total Fire Ban declaration (if in force) in Table 7-1 and Table 7-2.

The forecast FDR over the next four days should be considered as detailed in Section 7.1.1.2. Additional forecast weather conditions over the following three days should also be considered. Where significant increases in wind and/or temperature or decreases in humidity are forecast, the fire danger is likely to increase. Significant increases in fire danger for coming days should be considered for any works with ignition potential or where personnel will be working in remote and hazardous areas.

### 7.1.3. Leaving Early

Leaving early is always the safest option on Very High (above FFDI 30 – Works Code Red), Severe or higher fire danger days. Leaving early may mean staff stay offsite or schedule works earlier and that only critical personnel<sup>1</sup> attend the works area (no contractors or visitors).

The PIC or their delegate may direct onsite personnel to leave early and/or reschedule works under the following conditions:

- Very High (above FFDI 30 – Works Code Red), Severe, Extreme or a Catastrophic FDR is forecast by the BoM for the Southern Slopes Fire Area and/or Monaro Alpine Fire Area;
- staff are not physically or mentally prepared and not able to stay and shelter in place, if required;
- dry lightning storms coupled with hot weather is forecast;
- remote work areas are not defensible from bush or grassfire under the conditions forecast;

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<sup>1</sup> The Construction Manager is responsible for determining which personnel would be deemed “critical personnel” based on the activities being carried out in relation to the potential bush fire risk

- National Parks and Wildlife Service or an emergency services authority recommends vacating the area.

#### 7.1.4. Night Shift Considerations

If the decision to leave early or cease work has been taken for the day shift due to bushfire concern, then night shift can only commence if:

- the FFDI has dropped below 30;
- there is no TOBAN in place;
- the Fire Risk Assessment and Control Measures Form has been completed by the Superintendent or the Construction Manager; and
- relevant management measures will be implemented for the proposed shift activities.

#### 7.2. Bushfire Preparedness (Code Yellow, Orange, Red and Grey)

Table 7-1 details the bushfire preparedness requirements for all project works within the bushfire danger period. Where Total Fire Ban (TOBAN) has been declared, refer to section 7.3.

Note that Table 7-1 details a list of preparatory requirements that apply for working on days where there is an FFDI of 1 to 30 (preparedness code Yellow and Orange). On days where the FFDI is over 30 (preparedness code Red, Grey or Black) strict prohibitions on certain activities including hot works and fire risk works must be enforced in the indicated areas. In the event of an inconsistency between works colour code requirements detailed in Table 7-1, the higher colour code requirement prevails.

Project personnel will be trained in the safe and effective use of the fire safety equipment listed in Table 7-1 as detailed in Section 6.1.1.

**Table 7-1: Fire preparedness in relation to FFDI**

Fire Danger Level (as per Section 7.1.1)	Works Fire Preparedness Code	Fire Preparedness Requirements
<p><b>FFDI 1-5 (Low Fire Danger)</b> and <b>FFDI 6-11 (Moderate Fire Danger)</b></p> <ul style="list-style-type: none"> <li>Fires can be easily controlled</li> <li>Minimal impact of fire</li> </ul>	<p><b>CODE YELLOW (FFDI 14 or less)</b></p>	<p>The PIC must ensure:</p> <ul style="list-style-type: none"> <li>Site works must be in accordance with standard procedures, including compliance with Hot Works Permit conditions</li> <li>Induction and briefings include ignition prevention and fire response actions</li> <li>Fire Danger is assessed for the day in accordance with Section 7.1. This assessment shall include, but not be limited to, considering the forecast FDR for the coming four days in programming work and in setting any work limitations.</li> <li>Personnel are notified in accordance with Section 7.1</li> <li>Code Yellow work limitations are enforced, or higher code limitations are applied if deemed appropriate by the PIC or delegate, considering forecast FDR for the coming four days</li> <li>Category 1 preparedness requirements are implemented</li> </ul>
<p><b>FFDI 12-14 (High Fire Danger (part))</b></p>		<p><b>Category 1 preparedness requirements:</b></p> <ul style="list-style-type: none"> <li>Each vehicle, workplace centre or mechanical plant must have available for immediate use:             <ul style="list-style-type: none"> <li>One 15L knapsack or equivalent<sup>2</sup> filled with water</li> <li>At least one rake hoe in serviceable condition</li> <li>A 2kg fire extinguisher</li> </ul> </li> <li>All vehicles and mechanical plant must:             <ul style="list-style-type: none"> <li>Be fitted with firmly mounted fuel lines and tanks</li> <li>Be clean of surplus oil and vegetation around surfaces heated by the exhaust or motor</li> <li>Have electrical and exhaust systems in good order</li> <li>Have fire blankets for each occupant where a risk assessment determines them necessary (e.g. a person working &gt;30 minutes from a bushfire refuge or an area that does not provide secondary access/egress).</li> </ul> </li> </ul> <p>Code Yellow work limitations:</p> <ul style="list-style-type: none"> <li>None</li> </ul>

\* refer to Abbreviation and Definitions at start of this document

<sup>2</sup> The term 'equivalent' equates to either a stored pressure water-style fire extinguisher of 9L minimum capacity, certified and approved to AS/NZS 1841.2 (and providing high pressure air for refilling is readily available from a mechanical unit working at the site), or a dry chemical powder extinguisher of at least 1.25kg capacity, certified and approved to AS/NZS 1841.5

Fire Danger Level (as per Section 7.1.1)	Works Fire Preparedness Code	Fire Preparedness Requirements
<ul style="list-style-type: none"> <li>• FFDI 15-24</li> <li>• (High Fire Danger (part))</li> <li>• Fires can be controlled</li> <li>• Embers may be blown ahead of the fire</li> <li>• Spot fires can occur close to the main fire</li> <li>• Potential for vigorous bushfire spread through surface and near-surface fuel layers in native vegetation areas if not promptly extinguished</li> </ul>	<b>CODE ORANGE</b>  <b>(FFDI 15-29)</b>	<p><b>The PIC must ensure:</b></p> <ul style="list-style-type: none"> <li>• Code Yellow preparedness requirements are implemented</li> <li>• The PIC or delegate is to maintain a 'listening watch' for fire warnings (e.g. RFS 'Fires Near Me') or changes to forecast weather as detailed in Section 7.1</li> <li>• PIC to reassess the FFDI at 12:00pm (or before if weather conditions worsen noticeably) <ul style="list-style-type: none"> <li>– If the FFDI at 12:00pm remains below 30, fire risk work* and hot works* in hazardous areas* may continue. Hourly monitoring of the FFDI will be undertaken during the works. If the FFDI goes above 30 then implement Code Red requirements</li> </ul> </li> <li>• Code Orange work limitations are enforced.</li> </ul> <hr/> <p><b>Category 2 preparedness requirements:</b></p> <ul style="list-style-type: none"> <li>• A two-way radio (or mobile phone where reception is adequate) is present at the worksite and in contact with a base with phone reception</li> <li>• A mobile water unit (min. 400L capacity) is present at each work location with: <ul style="list-style-type: none"> <li>– Tanks kept full</li> <li>– Pump fully fuelled</li> <li>– Minimum pump unit 2.2kW/3HP</li> <li>– Minimum 60m of hose</li> <li>– Fill and outlet hoses with 65mm Storz fittings</li> <li>– Nozzle capable of fog and jet stream</li> <li>– Must be maintained in a fully serviceable condition</li> </ul> </li> <li>• There should be two operators trained in the use of the mobile water unit equipment at each location (minimum Bushfire Awareness Training) and the procedure to put out fires</li> <li>• A fire watch person will monitor fire risk work* and hot works* activities in hazardous areas*. The number of fire watchers will be appropriate to ensure adequate oversight of all fire risk works being undertaken in hazardous areas. The fire watcher's primary task will be observing the fire risk works in their area of responsibility.</li> <li>• In the case of a towed mobile water unit, the towing vehicle must remain attached</li> </ul> <p>Code Orange work limitations:</p> <ul style="list-style-type: none"> <li>• None</li> </ul>
<p><b>FFDI 25-29</b> <b>(Very High Fire Danger (part))</b></p> <ul style="list-style-type: none"> <li>• Fires can be difficult to control – flames may burn into the tree tops</li> <li>• Embers may be blown ahead of the fire</li> <li>• Spot fires may occur up to 2km ahead of the fire</li> <li>• Very High Fire Danger typically occurs on dry, windy days</li> <li>• Fire behaviour can rapidly escalate</li> <li>• Fires burning in Very High Fire Danger have been responsible for large scale property loss and threats to human life</li> </ul>		

\* refer to Abbreviation and Definitions at start of this document

Fire Danger Level (as per Section 7.1.1)	Works Fire Preparedness Code	Fire Preparedness Requirements
<p><b>FFDI 30-49</b> <b>(Very High Fire Danger (part))</b></p> <ul style="list-style-type: none"> <li>• Fires can be difficult to control – flames may burn into the tree tops</li> <li>• Embers may be blown ahead of the fire</li> <li>• Spot fires may occur up to 2km ahead of the fire</li> <li>• Very High Fire Danger typically occurs on dry, windy days</li> <li>• Fire behaviour can rapidly escalate</li> <li>• Fires burning in Very High Fire Danger have been responsible for large scale property loss and threats to human life</li> </ul>	<p><b>CODE RED</b>  <b>(FFDI 30-49)</b></p>	<p><b>The PIC must ensure:</b></p> <ul style="list-style-type: none"> <li>• Code Orange preparedness requirements are implemented</li> <li>• Hourly monitoring of the FFDI to be undertaken by the PIC or delegate <ul style="list-style-type: none"> <li>– If monitoring shows escalation of the FFDI into the middle to upper part of the range, then the PIC or delegate shall consider the existing and forecast conditions in relation to the criteria for suspending works and leaving early in hazardous* and remote areas* (as per Section 7.1.3). If works are suspended in a particular area, then recommencement of Night Shift works shall only be approved in accordance with the requirements of Section 7.1.4.</li> </ul> </li> <li>• Fire risk works* in hazardous areas* are conducted in accordance with the Fire Risk Assessment and Control Measures Form (Annexure A)</li> <li>• Haulage and other vehicle usage occur on formed tracks and access roads only</li> <li>• Code Red work limitations are enforced.</li> </ul> <p><b>Code Red work limitations:</b></p> <ul style="list-style-type: none"> <li>• Fire risk works* and hot works* in hazardous areas* are suspended by 12:00</li> <li>• All works (including fire risk work and hot works) may continue in non-combustible areas*, however, safe egress should be communicated to staff.</li> <li>• If a TOBAN is in place (see Section 7.1) then Table 7-2 applies.</li> </ul>
<p><b>FFDI 50-74</b> <b>(Severe Fire Danger)</b> <b>FFDI 75-99</b> <b>(Extreme Fire Danger)</b> <b>FFDI 100+</b> <b>(Catastrophic Fire Danger)</b></p> <ul style="list-style-type: none"> <li>• Fires occurring at these fire danger ratings have been responsible for most bushfire deaths and property losses</li> <li>• Fires will be uncontrollable and move quickly</li> <li>• Flames will be higher than roof tops</li> <li>• Thousands of embers will be blown around</li> <li>• Spot fires will move quickly and come from many directions, up to 20 km ahead of the fire.</li> </ul>	<p><b>CODE GREY</b> <b>(FFDI 50+)</b></p>	<p><b>The PIC must ensure:</b></p> <ul style="list-style-type: none"> <li>• Code Red preparedness requirements are implemented</li> <li>• Consideration is given to leaving early (Section 7.1.3)</li> <li>• Fire risk works* in non-combustible areas* are conducted in accordance with the Fire Risk Assessment and Control Measures Form (Annexure A)</li> <li>• Code Grey work limitations are enforced</li> </ul> <p><b>Code Grey work limitations:</b></p> <ul style="list-style-type: none"> <li>• All works in hazardous areas* are suspended</li> <li>• All outdoors* hot works* are prohibited (except in accordance with the Total Fire Ban exemption permit – if obtained)</li> </ul>



Fire Danger Level (as per Section 7.1.1)	Works Fire Preparedness Code	Fire Preparedness Requirements
* refer to Abbreviation and Definitions at start of this document		

### 7.3. Total Fire Ban Bushfire Preparedness (Code Black)

When NSW RFS has declared a Total Fire Ban (TOBAN) in the Project's Fire Areas<sup>3</sup>, the fire preparedness requirements detailed in Table 7-2 below override those in Table 7-1 above.

Table 7-2: Total Fire Ban preparedness requirements

Total Fire Ban	Works Fire Preparedness Code	Fire Preparedness Requirements
TOTAL FIRE BAN (TOBAN)*	CODE BLACK	<p><b>In the event that a TOBAN is declared by NSW RFS the following preparedness requirements override the provisions detailed in Table 7-1.</b></p> <p><b>The PIC must ensure:</b></p> <ul style="list-style-type: none"> <li>The Code preparedness requirements from Table 7-1 will apply based on the forecast/current FFDI for the site.</li> <li>Haulage and other vehicle usage can occur on formed tracks and access roads only</li> <li>Code Black work limitations override those prescribed in Table 7-1</li> </ul> <p>Code Black work limitations:</p> <ul style="list-style-type: none"> <li>All Fire Risk Works* and hot works* are prohibited outdoors* (except in accordance with the Total Fire Ban exemption permit – if obtained)</li> <li>TOBAN rules will be added to prestart sheets and obtained off the NSW RFS Website:  <a href="https://www.rfs.nsw.gov.au/fire-information/fdr-and-tobans/total-fire-ban-rules">https://www.rfs.nsw.gov.au/fire-information/fdr-and-tobans/total-fire-ban-rules</a></li> </ul>
* refer to Abbreviation and Definitions at start of this document		

#### 7.3.1. TOBAN Rules and standard exemptions relevant to the Project

A TOBAN means no fires out in the open. A Total Fire Ban helps limit the potential of fires developing. During a Total Fire Ban you cannot light, maintain or use a fire in the open, or to carry out any activity in the open that causes, or is likely to cause, a fire. For the purposes of this project the “outdoors” are defined in the definition section of this plan. General purpose hot works (such as welding, grinding or gas cutting or any activity that produces a spark or flame) are restricted in the

<sup>3</sup> Works in the vicinity of Lobs Hole and Marica are located within the Southern Slopes Fire Area (Area 16). Works in the vicinity of Tantangara Reservoir are located within the Monaro Alpine Fire Area (Area 7).

outdoors during TOBAN (see Table 7-1). Additionally, all activities defined as Fire Risk Works on this project (as per definition at front of this plan) are restricted during TOBAN (see Table 7-1).

A range of activities may be exempt from Total Fire Bans, such as emergency infrastructure work, use of fireworks or ceremonial fires. The NSW RFS Commissioner is responsible for exemptions to Total Fire Bans. These exemptions are advertised in the NSW Government Gazette (<https://legislation.nsw.gov.au/#/gazettes>) each time a Total Fire Ban is declared. Each declaration can be unique and so the gazette **must be reviewed for the relevant exemptions**, however, a list of standard exemptions of relevance to the project may include:

- Bitumen roadworks

Fire lit, maintained or used for the purpose of heating bitumen in tankers, sprayers, storage units, mobile asphalt plants, mobile asphalt pavers and pavement recycling machines for road repair and construction works provided that:

- a) the fire is lit, maintained or used in a manner which will prevent the escape of the fire, and
- b) adequate fire fighting equipment is provided at the site of the fire to prevent the escape or spread of the fire.

- Building construction or demolition

Fire lit, maintained or used by an authorised person in association with any cutting, welding or grinding work for the purpose of the urgent and essential construction or demolition of a building provided that:

- a) the authority to undertake the fire is lit, maintained or used in a manner which will prevent the escape of the fire, and Government Notices 603 NSW Government Gazette No 16 of 9 February 2018
- b) adequate fire fighting equipment is provided at the site of the fire to prevent the escape or spread of the fire, and
- c) if the work is to be carried out above the normal ground or floor level—the area below the work free of all combustible material and the fire is prevented from falling to that area, and
- d) the person in charge of the building or demolition work:
  - i. if the land where the fire is to be lit is within a rural fire district—has notified the NSW Rural Fire Service Fire Control Centre for that district of the proposed fire, or
  - ii. if the land where the display is to be held is within a fire district—has notified the officer in charge of the nearest Fire and Rescue NSW fire station of the proposed fire, and
- e) the person in charge of the building or demolition work complies with any direction or additional condition which may be imposed by the NSW Rural Fire Service or Fire and Rescue NSW, which may include a direction that the proposed fire not be lit.

- Electric or gas barbecues

1) An electric appliance (barbeque) maintained or used for the purpose of food preparation provided that:

- a) the appliance is under the direct control of a responsible adult person who is present at all times while it is operating, and
- b) no combustible material of any kind is allowed within 2 metres of the appliance while it is operating.

- 2) Fire lit, maintained or used for the purpose of food preparation on a gas appliance provided that:
- a) the appliance is under the direct control of a responsible adult person who is present at all times while it is operating, and
  - b) no combustible material of any kind is allowed within 2 metres of the appliance while it is operating, and
  - c) a system of applying an adequate stream of water to the appliance and its surrounds is available for immediate and continuous use, and
  - d) if the appliance is on land on which a permanent private dwelling is located—the gas appliance is within 20 metres of that dwelling, and
  - e) if the appliance is not on land on which a permanent private dwelling is located, both the appliance and the site of the appliance have been approved by:
    - i. the National Parks and Wildlife Service in the case of land acquired or reserved under the National Parks and Wildlife Act 1974, or
    - ii. the Forestry Corporation of NSW in the case of land in a state forest, or
    - iii. the council for the area in which the land is located in any other case.

- Fire approved by Commissioner of the Rural Fire Service

Fire lit, maintained or used in accordance with a written approval (including any conditions to which the approval may be subject) of the Commissioner of the NSW Rural Fire Service.

The full list of standard exemptions can be viewed at the following web link:

- [https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette\\_2018\\_2018-16.pdf](https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette_2018_2018-16.pdf)

## 8. BUSHFIRE EMERGENCY RESPONSE

### 8.1. Fire and Incident Emergency Controller

In the event of an emergency, the PIC or their delegate will function initially as the Incident Controller (IC) until replaced by responding external fire authority IC. The replacement will occur on the arrival of the external fire authority IC and following a handover briefing.

The IC shall ensure the necessary parties are notified of an existing bushfire in accordance with Section 8.5. The information in Sections 8.6, 4.2, 4.3 and the nature of the existing bushfire threat should inform the Incident Action Plan and any decision to evacuate.

In the event of ignition on site the IC shall consider the deployment of trained personnel to provide a rapid response first attack (Section 8.2.1) if safe to do so.

### 8.2. Fire Fighting Precautions

#### 8.2.1. Rapid Response First Attack

Site personnel are not employed as firefighters and are not expected to combat bushfires on the site. However, in accordance with Section 6.1.1 relevant personnel will be provided with Bushfire Awareness Training and will be instructed on the safe and effective operation of the fire safety equipment that is detailed in Table 7-1. In the event of a fire ignition on site, these trained personnel will be capable of providing a rapid response to extinguish minor fires and to prevent escalation to bushfire. Personnel should only carry out this work if safe to do so and report any incidents in accordance with Section 8.4 and 8.5. The precautions of Section 8.2.2 should be observed where relevant.

#### 8.2.2. Firefighting Near Powerlines

As detailed in Section 6.4.2, firefighting in the vicinity of powerlines introduces additional hazards for electrocution and spark. Follow the following steps when firefighting under powerlines:

- Do not directly attack fires in cleared areas beneath powerlines;
- Do not spray water from the ground or air on or near powerlines or insulators;
- Wait for fire to burn clear of the cleared areas beneath the powerlines before commencing a mop-up operation;
- At all times treat the powerline as live until clearance has been given by powerline company personnel onsite;
- At all times keep personnel and vehicles at a minimum of 25m clear of a fire burning under or within 25m of the powerlines;
- When working near or under live powerlines, approach no closer than 25m to the fire edge to conduct mop-up of grass fires;
- Mop-up may include the knockdown of low (less than 2m high) isolated flames, spots and/or smouldering logs which are not producing a convection column or heavy smoke plume. In such cases:
  - Never direct the hose stream into the powerline;
  - Never direct the hose stream into a smoke plume that is near (less than 25m from) or reaching powerlines. Keep stream no higher than a person's head height;

- Never direct the hose stream at a burning bush or tree (more than head height) in a powerline easement.
- Bushes or trees burning in powerline easement present a real threat of creating a flashover to earth from powerlines – KEEP AT LEAST 25m CLEAR.
- When crossing powerline easement, ensure there is adequate clearance (which will vary between 3m to 8m depending on the voltage of the line) between the highest point of the vehicle (including aerials) and powerlines, avoiding areas with tall vegetation under lines.

### 8.3. Emergency Alert Issued

The PIC should oversee the steps detailed in Figure 8-1 in the event of:

- A formal bushfire emergency alert being issued by the NSW Rural Fire Service;




Emergency Alert		
 <b>Advice</b>	 <b>Watch and Act</b>	 <b>Emergency Warning</b>
Description		
<ul style="list-style-type: none"> <li>• A fire has started</li> <li>• There is no immediate danger</li> <li>• Stay up to date in case the situation changes</li> </ul>	<ul style="list-style-type: none"> <li>• There is a heightened level of threat</li> <li>• Conditions are changing and you need to start taking action now to protect yourself and others</li> </ul>	<ul style="list-style-type: none"> <li>• An Emergency Warning is the highest level of bushfire alert</li> <li>• You may be in danger and need to take action immediately</li> <li>• Any delay now puts your life at risk</li> </ul>
Site Action		
<ul style="list-style-type: none"> <li>• Business as usual</li> <li>• PIC or delegate is to monitor the local bushfire situation on the NSW RFS website and/or app and ABC local radio (note poor reception in Lobs Hole)</li> <li>• All work units and contractors are to follow the directions of the PIC or delegate</li> </ul>	<ul style="list-style-type: none"> <li>• In addition to the above steps, seek further instructions from the PIC or delegate</li> <li>• If safe, move to the nearest Muster Point or area or the Ravine Refuge Assembly Area or Lobs Hole Camp Assembly Area (once constructed)</li> <li>• At the Refuge Assembly Area close windows and ensure immediate surroundings of all buildings are clear of combustible materials</li> <li>• Determine any individuals deemed to be non-essential and initiate 'go early' actions if safe and approved by the PIC or IC</li> </ul>	<ul style="list-style-type: none"> <li>• All personnel listen on ABC local radio to Emergency Warning evacuation location advised by emergency services</li> <li>• Proceed early to evacuation location if safe and route is clear</li> <li>• If offsite evacuation is not possible, shelter-in-place within the shed or within vehicles at the Ravine Refuge Assembly Area or Lobs Hole Camp Assembly Area (once constructed) if it is safe to do so or within vehicles in a cleared area of vegetation</li> <li>• Personnel must not self evacuate if an Emergency Warning is given</li> <li>• Flee-in-panic responses and last minute evacuation into uncertain fire situations can be deadly. Any offsite evacuation must be controlled and authorised by the Emergency IC</li> </ul>

Figure 8-1: Emergency alert response actions

### 8.4. Smoke or Fire Present

Figure 8-2 breaks down the different stages of action in the event of fire or smoke. Relevant contact details are shown in Section 8.5 below.

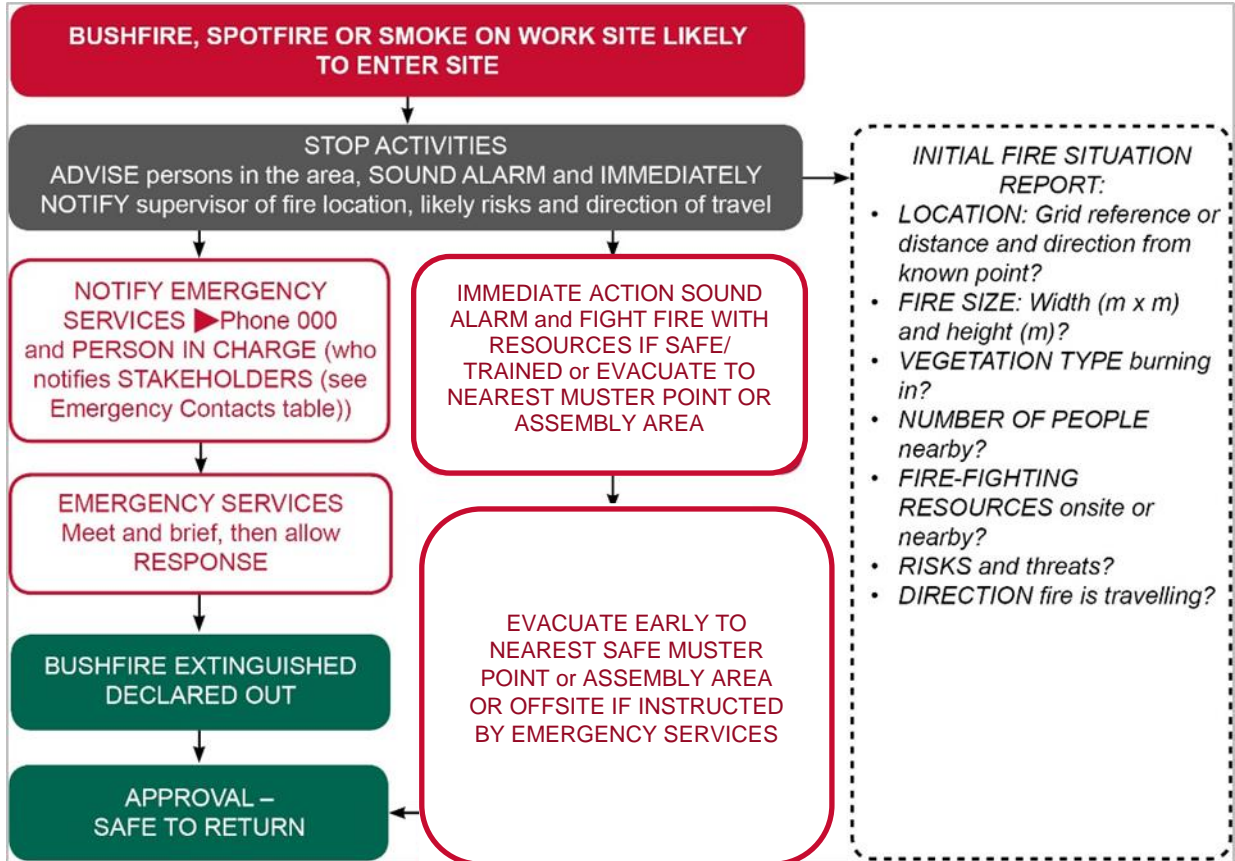


Figure 8-2: Fire reporting procedures and actions

## 8.5. Emergency Contact Details

Table 8-1 presents the emergency contacts and stakeholders within the project vicinity.

**Table 8-1: Emergency and Stakeholder Contact Details**

<b>Emergency Contacts</b>	
<b>IN AN EMERGENCY and FOR ALL FIRES: DIAL 000 (TRIPLE ZERO)</b> Secondary Emergency Call from Mobiles: <b>Dial 112</b>	
<b>DO NOT CALL 000 FOR INFORMATION OR ADVICE. CALLING 000 UNNECESSARILY MAY PUT OTHERS WHO ARE IN A GENUINE EMERGENCY SITUATION AT RISK.</b>	
<b>All emergencies including bushfires</b>	<b>Dial 000</b>
NSW RFS – current fire information	<a href="https://www.rfs.nsw.gov.au/fire-information/fires-near-me">https://www.rfs.nsw.gov.au/fire-information/fires-near-me</a>
NSW RFS Bush Fire Information Line	1800 NSW RFS (1800 679 737)
ABC Local Radio <sup>1</sup> ( <sup>1</sup> Poor reception in Lobs Hole)	<ul style="list-style-type: none"> <li>• ABC South East NSW 1602 kHz AM Monaro</li> <li>• ABC Riverina 97.9FM</li> </ul>
<b>STAKEHOLDERS (TO BE NOTIFIED IN THE EVENT OF A FIRE)</b>	
Snowy Hydro Snowy Mountains Control Centre	02 6453 2777
NPWS Duty Officer After Hours Emergency	02 6450 5550
NPWS After Hours Emergency Call Centre	1800 629 104
NSW RFS Riverina Highlands Duty Officer (24 hours)	02 6981 4229
NSW RFS Riverina Highlands Operations Centre	02 6981 4222
TransGrid (emergencies)	1800 027 253
<b>OTHER INFORMATION (NON-EMERGENCY)</b>	
NSW Police Talbingo Station (not 24 hours)	02 6949 5244
NSW Police Tumut Station (not 24 hours)	02 6947 7199
NSW Police Adaminaby (not 24 hours)	02 6454 2244
NSW Ambulance	131 233
State Emergency Service	132 500
UHF Radio Communication – UHF CB Bands	UHF Ch 12 and UHF Ch 20 – preferred RFS fireground UHF Ch 05 – Big Talbingo Mountain Emergency Repeater UHF Ch 02 – Mt Youngal UHF Transmitter





## 8.6. Where to Go – Managed Evacuation

The PIC (or their delegate) shall coordinate a managed evacuation in consultation with the relevant Emergency Services Agency. Personnel should not self-evacuate. Options for offsite evacuation include but are not limited to:

- the primary Neighbourhood Safer Place for the work front being evacuated (see Section 4.2.1);
- the secondary Neighbourhood Safer Place for the work front being evacuated (see Section 4.2.1);
- another low fire risk area; or
- an evacuation centre (if activated).

The detailed procedures for managed evacuations will be addressed in a CMG and Evacuation Management Plan. The general routes and site maps are included in Section 8.6.1 below.

### 8.6.1. Site Map and Evacuation Routes

Table 8-2 details assembly and evacuation instructions and site maps for the project work areas. Evacuation offsite will only be conducted under instruction from the PIC or Emergency Services. Site maps are shown on the following pages.

**Table 8-2: Work area maps and evacuation instructions**

Works Location	Assembly and evacuation instructions
Lobs Hole and MAT Portal	Personnel in this area will muster and fall back to the Lobs Hole and Ravine Assembly Areas. If required, evacuation from this area will follow the route shown on Figure 8-3 as directed by the PIC.
Lobs Hole and Talbingo South	Personnel in this area will muster and fall back to the Lobs Hole and Ravine Assembly Areas. If required, evacuation from this area will follow the route shown on Figure 8-3 as directed by the PIC.
Lobs Hole Ravine Road evacuation route	The general evacuation route will head south from the Assembly Areas along Lobs Hole Ravine Road to Link Road. If required, evacuation from this area will follow the route shown on Figure 8-3 as directed by the PIC.
Marica evacuation route	Personnel in this area will muster in the works area and fall back to the Marica Assembly area. If required, evacuation from this area will follow the route shown on Figure 8-3 as directed by the PIC.
Tantangara evacuation route	Personnel in this area will muster in the works area and fall back to the Tantangara Assembly area. If required, evacuation from this area will follow the route shown on Figure 8-3 as directed by the PIC.
Plateau evacuation route	Personnel in this area will muster in the works area and then proceed collectively to the nearest evacuation destination (Adaminaby unless directed elsewhere by PIC).
Rock Forest evacuation route	Personnel in this area will muster in the works area and then proceed collectively to the nearest evacuation destination (Adaminaby) unless directed elsewhere by PIC.

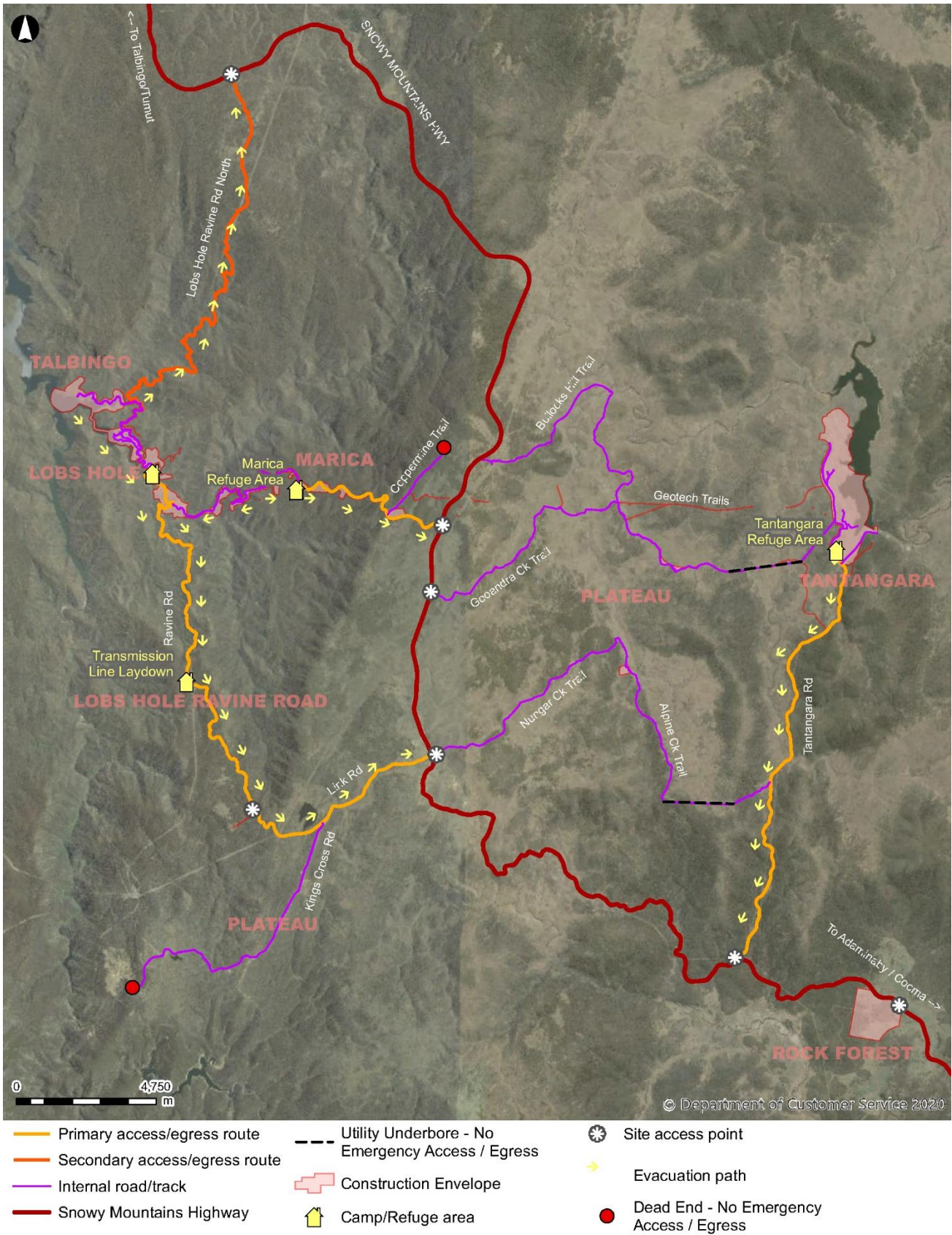


Figure 8-3: Evacuation routes - overview

## 9. COMPLIANCE MANAGEMENT

### 9.1. Monitoring and Inspection

The PIC should undertake the following monitoring activities on a monthly basis throughout the bushfire season:

- assess the APZs to ensure compliance with the requirements detailed in Section 5.1;
- confirm with the relevant personnel that the FFDI monitoring procedures are being undertaken and are effective;
- confirm that the bushfire preparedness processes (as per Table 7-1) are being followed;
- ensure the relevant personnel have received Bushfire Awareness Training (as per section 6.1.1); and
- implement corrective actions where necessary to maintain compliance with this plan.

Weekly environmental inspections of the project will occur in accordance with Section 8 of the EMS.



## ANNEXURE A – FIRE RISK ASSESSMENT AND CONTROL MEASURES FORM

# FIRE RISK ASSESSMENT & CONTROL MEASURES FORM



## A. DETAILS OF ACTIVITY (undertaken for fire risk work or hot work in a hazardous area)

Location:	Date:	Time:
Description of Work:		

## B. RISK ASSESSMENT (check appropriate answer)

**Declared Bushfire Danger Rating** **Low- Mod / High / Very High / Severe - Catastrophic**  
<https://www.rfs.nsw.gov.au/fire-information/fdr-and-tobans> or call the NSW RFS phone.: **1800 679 737**

Has a Total Fire Ban been declared? <b>If Yes, TOBAN rules and exemption rules apply (for exemptions see TOBAN notice and permit – if obtained)</b>	<input type="checkbox"/> Yes (next)	<input type="checkbox"/> No (Go to Section C)
Fire Risk Work activity proposed in a hazardous area? Includes Mulching / Slashing / Chainsaw Operations / Chipping / Mowing / Brush Cutting / Track Grading / Rock-Breaking / Drilling / Blasting / Geophysical Investigations (circle activity) <b>Note: This requires approval from the Project Director (or Designate) and Project HSSE Manager (or Designate)</b>	<input type="checkbox"/> Yes (next)	<input type="checkbox"/> No (Go to Section C)
Confirmed approval by Project Director (or Designate) and Project HSSE Manager (or Designate)	<input type="checkbox"/> Yes	<input type="checkbox"/> No (attach approval)

## C. CONTROL MEASURES (confirm the control measures are implemented)

**FIRE RISK WORK CONTROLS AND PRECAUTIONS (Check  to indicate the control has been implemented)**

Nominated Controls	Y	NA	Fire Fighting Requirements	Y	NA
Machinery free from combustible debris	<input type="checkbox"/>	<input type="checkbox"/>	9kg dry chemical extinguisher <b>OR</b>	<input type="checkbox"/>	<input type="checkbox"/>
Plant & equipment serviced and checked	<input type="checkbox"/>	<input type="checkbox"/>	9kg water extinguisher <b>OR</b>	<input type="checkbox"/>	<input type="checkbox"/>
Combustible materials removed from work area	<input type="checkbox"/>	<input type="checkbox"/>	15L Knapsack	<input type="checkbox"/>	<input type="checkbox"/>
Clear refueling area set up	<input type="checkbox"/>	<input type="checkbox"/>	Hand tools i.e. Rake-hoe & shovel	<input type="checkbox"/>	<input type="checkbox"/>
Equipment fitted with spark arrestor	<input type="checkbox"/>	<input type="checkbox"/>	Fire Trailer	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Avoid driving vehicles off formed tracks</li> <li>Available exit routes have been identified &amp; all staff are aware of their location and muster location</li> <li>Do not place or park hot equipment on combustible surfaces / materials</li> <li>Monitor equipment that may cause sparks</li> <li>Monitor weather conditions (Section E)</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>Firefighting equipment laid out ready for use (including hoses &amp; pumps etc. With enough water)</li> <li>Staff trained &amp; competent to use fire equipment</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Trained and Competent Fire Watch Observer Nominated</b> <ul style="list-style-type: none"> <li>Must be alert for any fire outbreak &amp; immediately stop work &amp; notify Supervisor if hazardous conditions are observed</li> <li>Ready to combat outbreak of fire if safe to do so</li> <li>Don't leave site unless the Supervisor approves a suitable replacement</li> <li>Keep work inside designated area</li> </ul>				<input type="checkbox"/>	<input type="checkbox"/>
<b>Fire Watch</b> – Inspect site before, during, at end of work & for 60 minutes after shutdown				<input type="checkbox"/>	<input type="checkbox"/>
<b>Other Controls:</b>					

## D. HSE ADVISOR VERIFY RISK ASSESSMENT & CONTROL MEASURES (before work commences)

Proposed work has been assessed for Fire Risk. I confirm the work can proceed with control measures implemented

Time:	Print Full Name:	Signature:
-------	------------------	------------

## E. SUPERVISOR VALIDATION OF CONTROL MEASURES DURING THE WORK

Control Measures must be revalidated **AT LEAST ONCE** per day & must be re-assessed if conditions change significantly during the day or new work activity undertaken

The above control measures have been validated & any changes to requirements implemented.

Time:	Print Full Name:	Signature:
Time:	Print Full Name:	Signature:

## F. FINAL FIRE CHECK AT COMPLETION OF WORK

A final fire check must be performed & signed off at the completion of any Fire Risk Works following designated monitoring period

**FIRE WATCH OBSERVER STATEMENT** - Final fire check has been completed & there is no risk of ignition

Time:	Print Full Name:	Signature:
-------	------------------	------------



## ANNEXURE B – EXEMPTION FOR SMOKING AREAS (NPWS)



Our Ref: DOC19/455177-1

Mr Charlie Litchfield  
Manager Environment and Lands  
Snowy Hydro Limited  
GPO Box 4351  
SYDNEY NSW 2001

Dear Charlie

**Re: Exemption for Snowy 2.0 Project from Smoking Prohibition in NSW National Parks under Clause 15A of NPW Regulation**

I refer to your letter dated 1 May 2019 requesting an exemption from Clause 15A of the *National Parks and Wildlife Regulation 2009* (NPW Regulation) for the construction phase of the Snowy 2.0 Project. I am pleased that Snowy Hydro Limited's (SHL) transition period for the 'business as usual' areas of the Scheme was successful and that the NPWS No Smoking in Parks Policy is now in place in those areas.

I appreciate the nature of the Snowy 2.0 Project and understand the requirement for an exemption.

This letter constitutes a temporary exemption under clause 15A(3)(b) of the NPW Regulation for the Snowy 2.0 approved Exploratory Works construction period, at the following designated smoking areas within Kosciuszko National Park:

- Lobs Hole (accommodation camps and works site areas at Lobs Hole)
- Tantangara (accommodation camps and works site areas at Lobs Hole)
- Marica Trail (accommodation camps and works site areas at Lobs Hole)

This exemption is conditional on the facilities noted in your letter being in place – designated smoking areas clearly identified with signage, waste facilities for butts, hard standing areas, fire extinguishers and sand buckets.

Please note that this exemption or any other exemption identified in the NPW Regulation does not over-ride the *Smoke-Free Environment Act 2000*. My understanding is that any commercial dining areas or enclosed public areas, including within four metres of an entrance to a public building are smoke free zones under this legislation. NPWS however, is not the authority responsible for this legislation and I recommend you confirm your responsibilities under this Act with the relevant authority.

As previously, I thank you for SHL's overall interest and support for the No Smoking in Parks Policy. I look forward to hearing about any initiatives developed during the Snowy 2.0 Project to assist workers to stop smoking.

If you have any questions regarding this exemption, please contact Nicole Shotter, Manager Snowy 2.0, National Parks and Wildlife Service, on (02) 6450 5535.

Yours sincerely



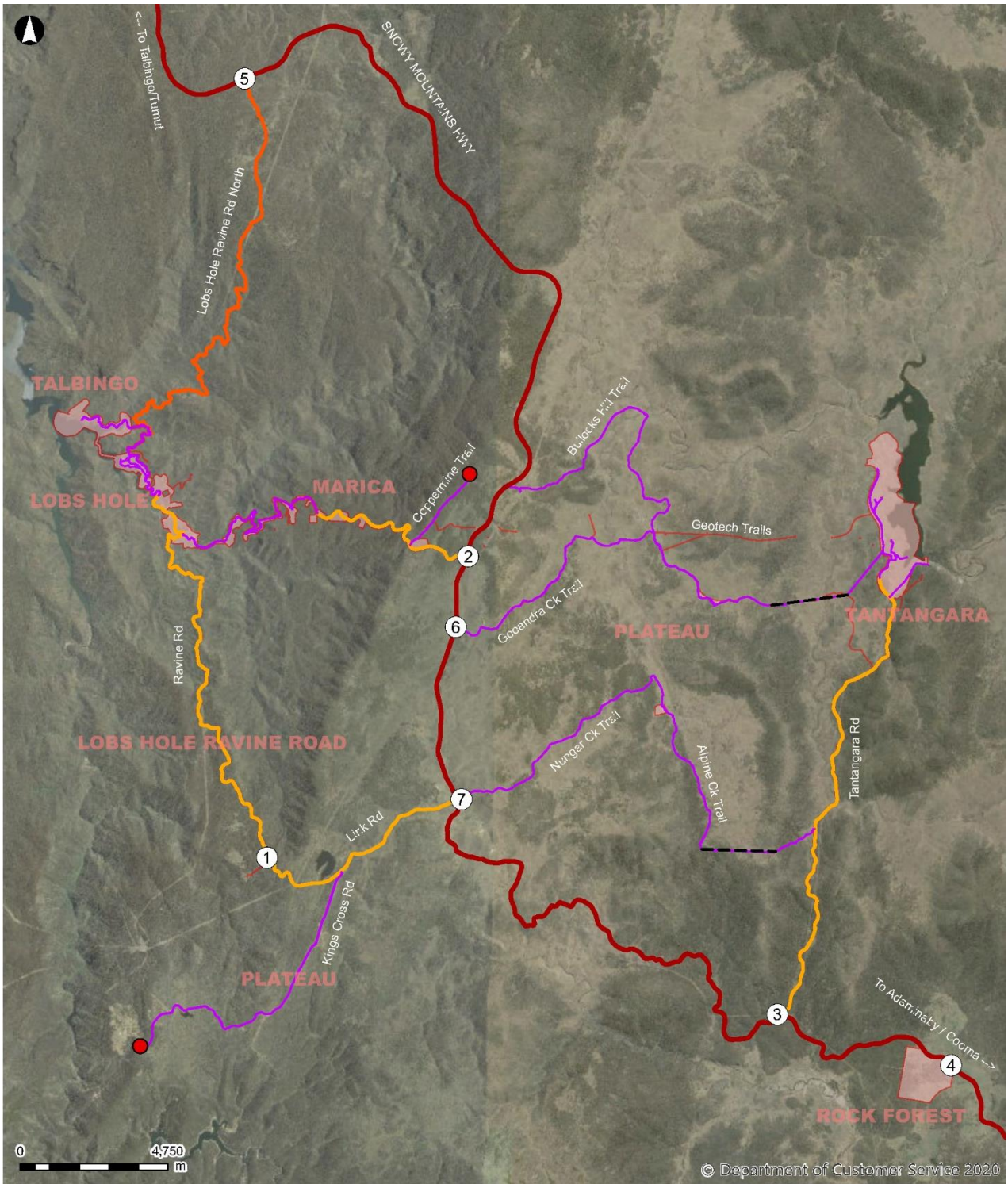
**MICK PETTITT**  
**Director Southern Ranges**  
**National Parks and Wildlife Service**










Date: 30-5-19

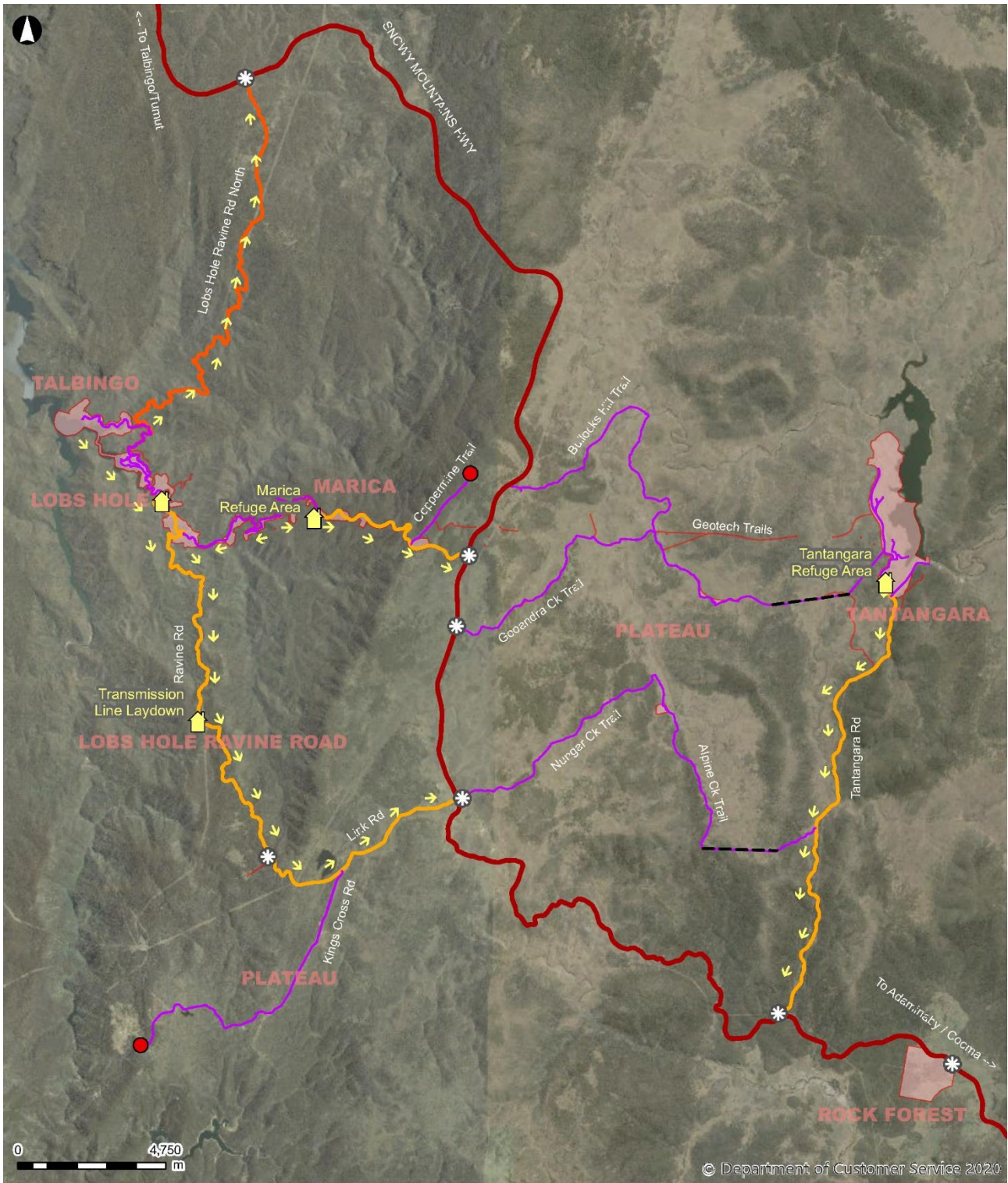




## ANNEXURE C – PROJECT OVERVIEW MAPS



- |   |  |  |
|---|--|--|
|  Primary site access point               |  Secondary access/egress route                    | 1. Lobs Hole and Talbingo primary access   |
|  Construction Envelope                   |  Internal road/track                              | 2. Marica access                           |
|  Dead End - No Emergency Access / Egress |  Evacuation path                                  | 3. Tantangara access                       |
|  Primary access/egress route             |  Snowy Mountains Highway                          | 4. Rock Forest access                      |
|   |  Utility Underbore - No Emergency Access / Egress | 5. Lobs Hole and Talbingo secondary access |
|   |  | 6. Plateau access (Gooandra Creek Trail)   |
|   |  | 7. Plateau access (Nungar Creek Trail)     |



- |                               |  |   |
|-------------------------------|--|---|
| Primary access/egress route   | Utility Underbore - No Emergency Access / Egress | Site access point                       |
| Secondary access/egress route | Construction Envelope                            | Evacuation path                         |
| Internal road/track           | Camp/Refuge area                                 | Dead End - No Emergency Access / Egress |
| Snowy Mountains Highway       |  |   |



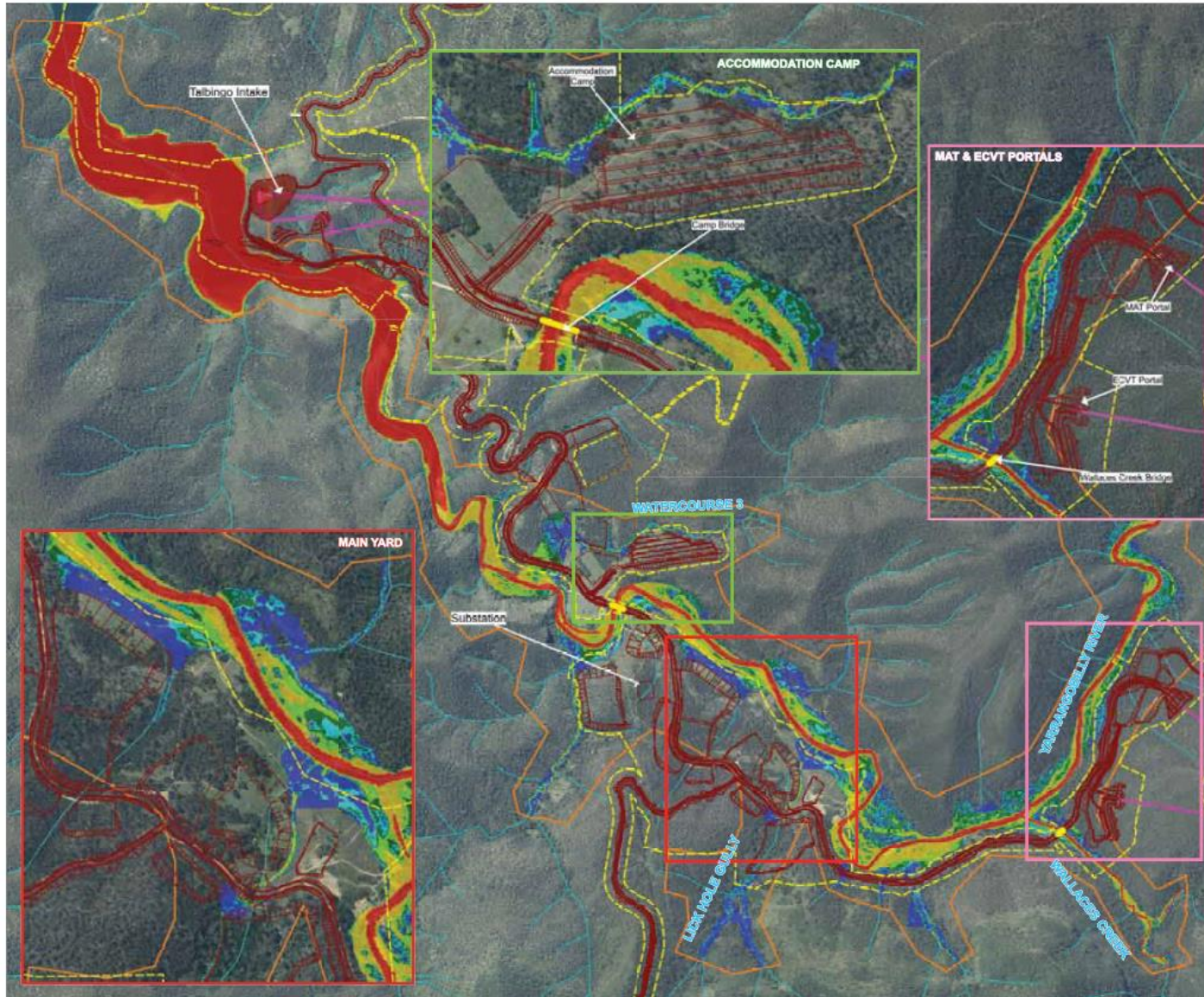
## ANNEXURE D – EXPLORATORY WORKS CONDITIONS OF APPROVAL

**Table D-1: Exploratory Works (CSSI 9208) conditions of approval relevant to natural hazards**







Condition	Requirement	Where addressed
Schedule 3, Condition 53	<p>The Proponent must:</p> <ul style="list-style-type: none"> <li>a) include suitable asset protection measures into the final design of the development in accordance with the Planning for Bushfire Protection (RFS 2006) guidelines, or its latest version; and</li> <li>b) ensure any fire trails or asset protection zones associated with the development are wholly contained within the approved disturbance area.</li> </ul>	<p>This plan, Section 5.1</p> <p>This plan, Section 5.4</p>
Schedule 3, Condition 54	<p>Prior to carrying out the development on site, the Proponent must prepare an Emergency Plan for the development to the satisfaction of the NPWS. This plan must:</p> <ul style="list-style-type: none"> <li>a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the NPWS;</li> <li>b) be consistent with the Kosciuszko National Park Fire Management Strategy 2008-2013 (NPWS 2008), or its latest version;</li> <li>c) describe the measures that would be implemented to: <ul style="list-style-type: none"> <li>• minimise the risk of bushfires on site;</li> <li>• protect the assets on site from bushfires;</li> <li>• respond to any bushfires on or in the vicinity of the site</li> <li>• evacuate the site in an emergency</li> </ul> </li> <li>d) monitor and review the effectiveness of these measures</li> </ul>	<p>This plan, Section 1.7</p> <p>This plan</p> <p>This plan</p> <p>This plan, Section 9.1</p>









## APPENDIX B – FLOOD HAZARD LOBS HOLES AND KELLYS PLAIN CREEK



**KEY**

-  Watercourse / Drainage Line
-  Disturbance Area
-  Model Extent
-  Permanent Bridge
-  Proposed Surface Works Construction and Operational Elements
-  Proposed Subsurface Works Operational Elements

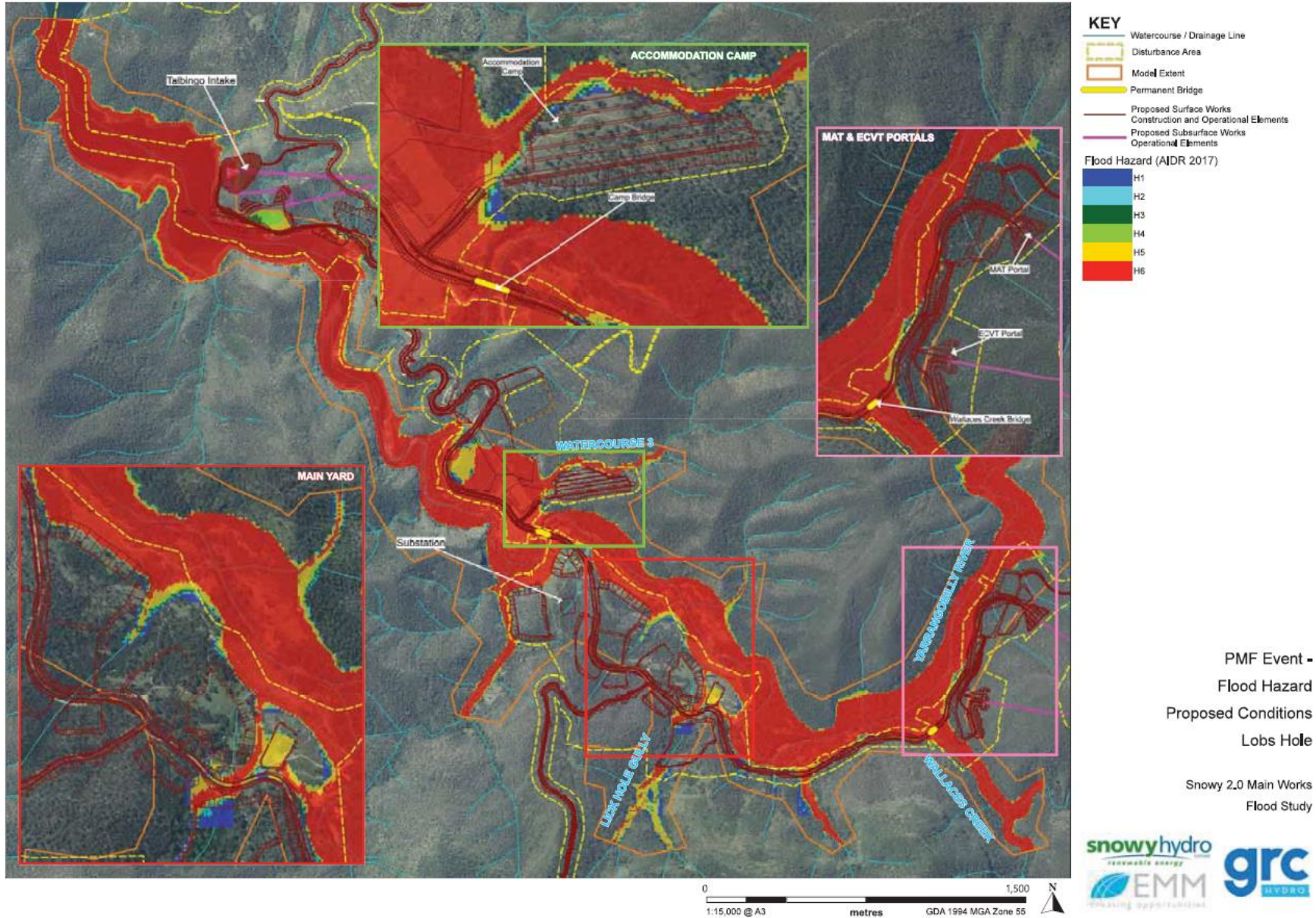
**Flood Hazard (AIDR 2017)**

-  H1
-  H2
-  H3
-  H4
-  H5
-  H6

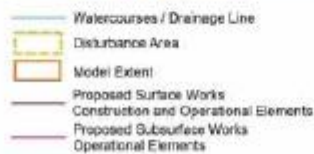
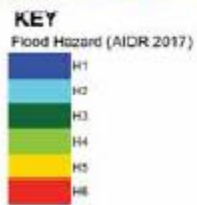
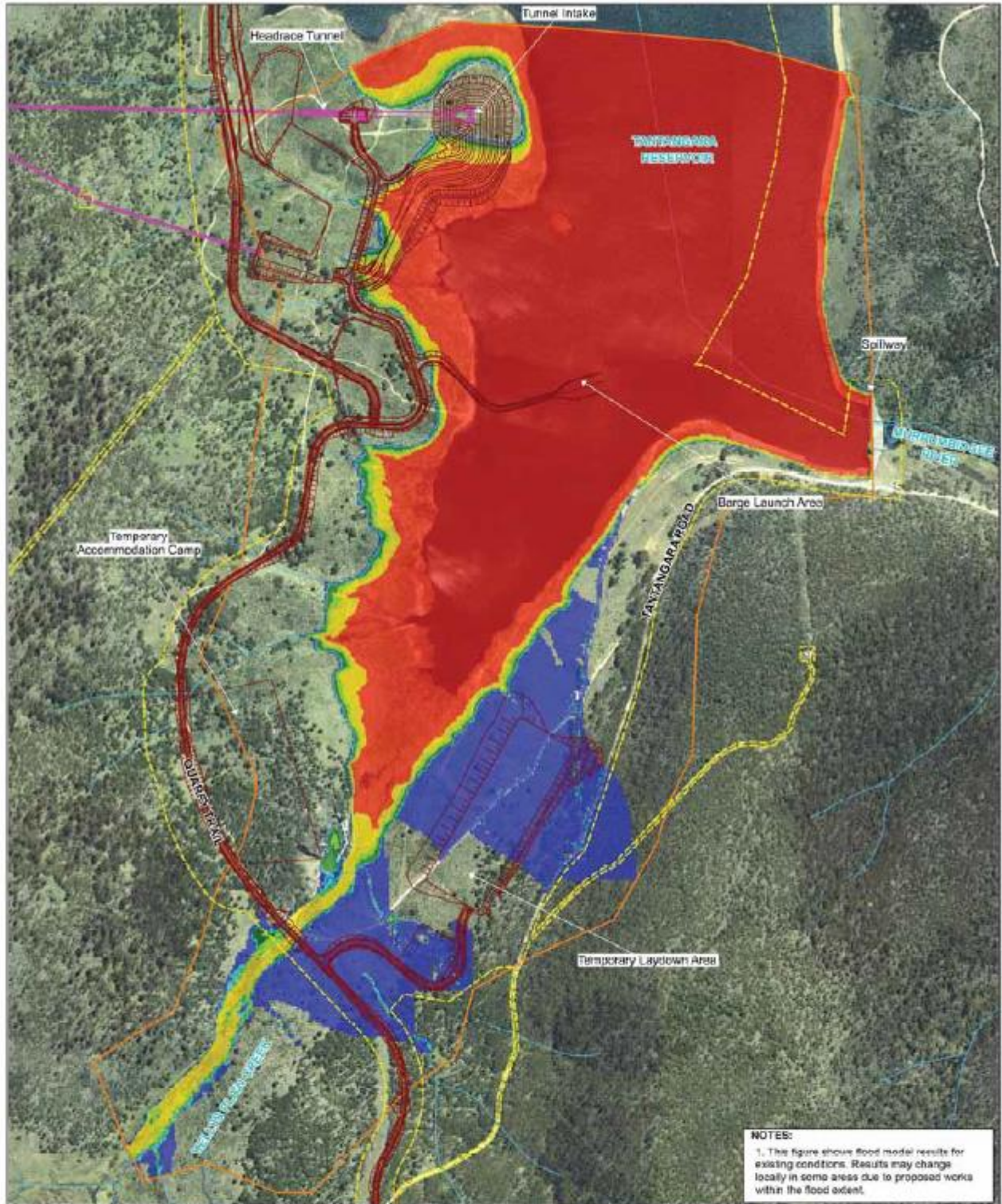
1% AEP Event -  
Flood Hazard  
Proposed Conditions  
Lobs Hole

Snowy 2,0 Main Works  
Flood Study





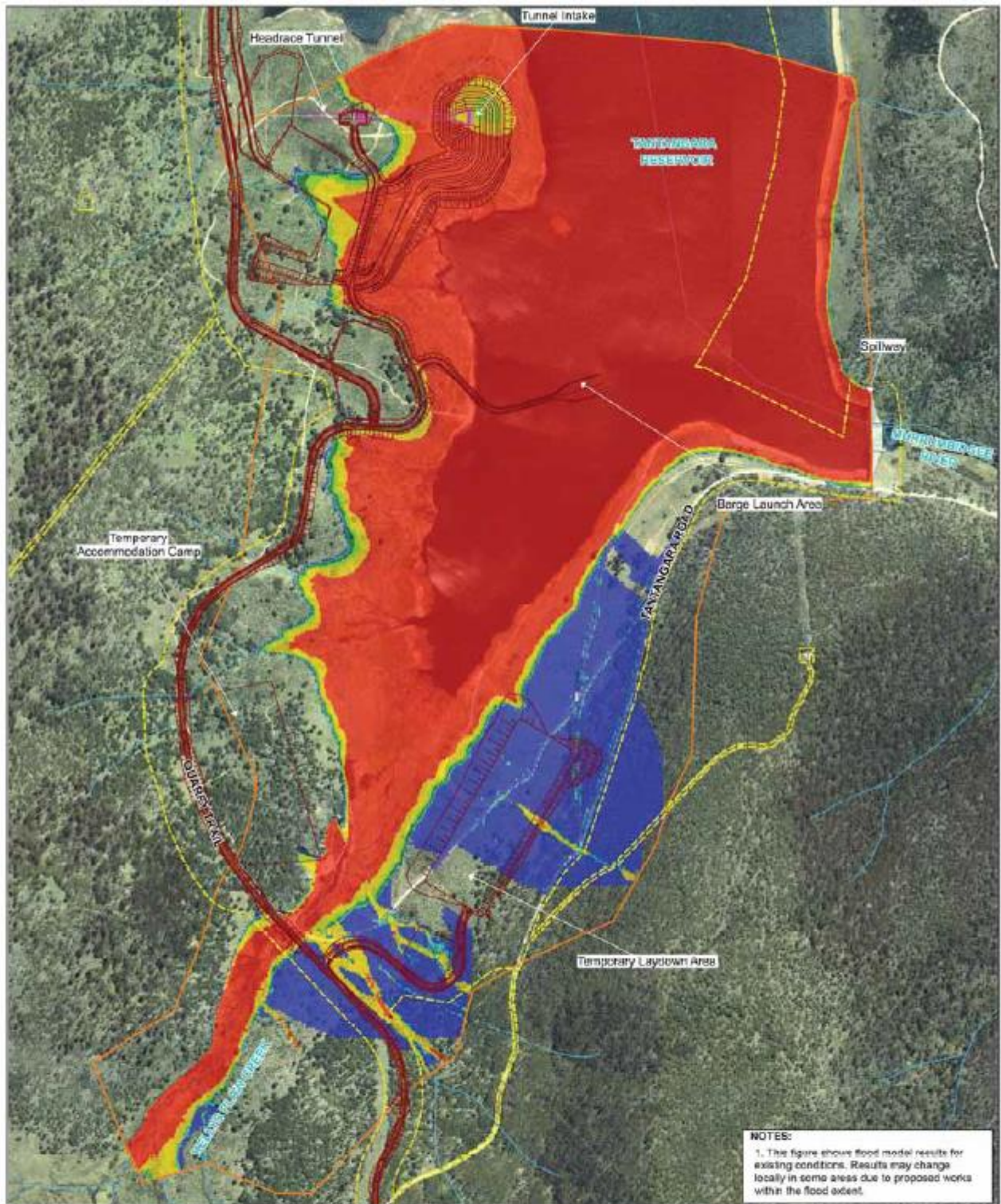




1% AEP Event -  
Flood Hazard  
Existing Conditions  
Kellys Plain Creek

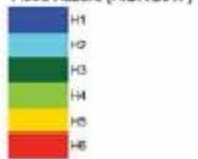


Snowy 2.0 Main Works  
Flood Study



**NOTES:**  
1. This figure shows flood model results for existing conditions. Results may change locally in some areas due to proposed works within the flood extent.

**KEY**  
Flood Hazard (AIDR 2017)



- Watercourses / Drainage Line
- Disturbance Area
- Model Extent
- Proposed Surface Works Construction and Operational Elements
- Proposed Subsurface Works Operational Elements

PMF Event -  
Flood Hazard  
Existing Conditions  
Kellys Plain Creek



Snowy 2.0 Main Works  
Flood Study



## APPENDIX C – FLOOD EVENT MANAGEMENT GUIDE

## Flooding – Inclement Weather

<b>Scenario description</b>	Local flooding from rain deluge	
<b>General outline of emergency response</b>	ERT Leader will secure the area. Casualties to be stabilised, first aid administered and evacuated as required. Involve appropriate external agencies if required.	
<b>Disciplines required (indicate) – Guide only</b>	Firefighting <input type="checkbox"/>	First Aid <input type="checkbox"/>
	Vehicle extraction <input type="checkbox"/>	Breathing apparatus <input type="checkbox"/>
	Hazmat <input type="checkbox"/>	Rescue <input type="checkbox"/>
	Specialist <input type="checkbox"/>	Other <input type="checkbox"/>
<b>Emergency response resources and their location</b>	<b>Site</b>	ERT, HSE Manager
	<b>Combat Agency</b>	NSW SES
	<b>Y/N</b>	
Can work be relocated to a drier area?		If Y, then work can proceed
Is there alternative work available at a drier location?		If Y, then work can proceed
Can tarps and/or enclosures be erected to keep out the rain?		If Y, then work can proceed
Can truck unloading be performed in a dry area?		If Y, then work can proceed
Can non-electrical work be performed?		If Y, then work can proceed if workers remain dry
Is the rain only light – i.e. drizzle, mist, light shower?		If Y, then work can proceed if workers remain dry
Will wet weather gear keep the user dry?		If Y, then work can proceed if work can be done safely
Will wearing of wet weather gear cause additional hazards, excessive sweating, heat stress?		If Y, then wet weather gear is not suitable and alternative work required
Can slings and/or chains be prevented from slipping? Can lift be performed safely?		If Y, then work can proceed if workers remain dry
Is work to be performed within an excavation?		If Y, then alternative work is required
Is lightning and thunder evident?		If Y, then personnel must work under cover
Are high winds present?		If Y, then crane lifts and work from elevating work platforms (EWP) may have to be postponed. Ensure equipment, materials and structure is secured.
Is the area likely to flood?		If Y, then consider damming area, temporary sump pump or alternative work.



## APPENDIX D – EXPLORATORY WORKS CONDITIONS OF APPROVAL

**Table D-1: Exploratory Works (CSSI 9208) conditions of approval relevant to natural hazards**

Condition	Requirement	Where addressed
Schedule 3, Condition 53	<p>The Proponent must:</p> <ul style="list-style-type: none"> <li>a) include suitable asset protection measures into the final design of the development in accordance with the Planning for Bushfire Protection (RFS 2006) guidelines, or its latest version; and</li> <li>b) ensure any fire trails or asset protection zones associated with the development are wholly contained within the approved disturbance area.</li> </ul>	<p>Appendix A – Section 5.1</p> <p>Appendix A – Section 5.1</p>
Schedule 3, Condition 54	<p>Prior to carrying out the development on site, the Proponent must prepare an Emergency Plan for the development to the satisfaction of the NPWS. This plan must:</p> <ul style="list-style-type: none"> <li>a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the NPWS;</li> <li>b) be consistent with the Kosciuszko National Park Fire Management Strategy 2008-2013 (NPWS 2008), or its latest version;</li> <li>c) describe the measures that would be implemented to:               <ul style="list-style-type: none"> <li>• minimise the risk of bushfires on site;</li> <li>• protect the assets on site from bushfires;</li> <li>• respond to any bushfires on or in the vicinity of the site</li> <li>• evacuate the site in an emergency</li> </ul> </li> <li>d) monitor and review the effectiveness of these measures</li> </ul>	<p>This plan, Section 1.7</p> <p>Appendix A – Bushfire Management Plan</p> <p>Appendix A – Bushfire Management Plan</p> <p>This plan Section 1.77</p> <p>Appendix A, Section 1.7</p>