



Appendix D

Preliminary Bushfire Hazard Analysis

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Information statement

*Where the term “**Bushfire prevention and mitigation related activities**” (or words to that effect) are used, this is to be defined as the clearance of vegetation in accordance with the Tasmanian State Government guidelines and standard, including clearing and maintenance of existing fire breaks and/or fire access for fire fighters under electricity pylons and properties that have been constructed to Australian Standard AS3959 and/or the National Construction Code.*

Executive Summary

Fire Risk Consultants Pty Ltd has prepared this report to provide a comprehensive overview of potential bushfire risks and recommended high-level risk mitigation principles for the Tarraleah Redevelopment Project. This analysis is based on information supplied by Entura, the Tasmania Fire Service, and both desktop and on-ground site assessments undertaken by Fire Risk Consultants. This report is current as of the date of publication.

This report will support Entura prepare an Environmental Impact Statement for the Tarraleah Redevelopment Project and address bushfire requirements within the EPA *Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*.

Bushfire poses a significant threat to people, communities, industries, and the environment in Tasmania, a threat exacerbated by climate change. Effective risk reduction is essential through a prevention, preparedness, response and recovery approach.

This report underscores the importance of applying consistent approaches to vegetation fire management in alignment with State Government policy and guidelines, and industry best practices. This report considers strategic asset management and looks at bushfire risk from not just a planning compliance perspective, but more importantly from a fire suppression perspective with preservation of life being the overarching priority.

The report highlights that most vegetation around the project area is most likely unsuitable for fuel reduction burning, which increases bushfire risk. Historical data indicates that the surrounding landscape has been frequently affected by bushfires over the past sixty years, suggesting that the area will continue to be at risk from bushfire in the future.

To mitigate these risks, the report recommends high-level principles and site-specific measures identified within Tables 7 & 8. When implemented these should satisfy the bushfire requirements within the EPA *Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. The responsibility for implementing the high-level principles and site-specific measures lies with the Principal Contractor, Entura, and Hydro Tasmania.

Indicative ecological assessment zones have also been recommended within this report. These are areas where natural and cultural values assessments relevant to this report may be required. There are 10 zones totalling approx. 883^{ha}. The zones will support contextualising the project's potential footprint and will need to be further investigated during the Construction Bushfire Mitigation Plan development stage which is outside of this report's scope.

Key messages

Significant Risks Identified: The five most significant bushfire risks identified to the project's key sites include:

- Bushfire originating external to the project area and directly impacting some or all key sites;
- Accidental ignition of unplanned fire during construction or operational activities;
- Limited mobile phone reception potentially hindering early bushfire detection, delaying warnings and evacuations, and potentially causing entrapment of occupants.
- Potential for Butlers Gorge Road being impacted during a fire event, making egress not possible and entrapment occurring; and
- The level of training may be insufficient for Tarraleah Redevelopment Project staff and contractors to undertake firefighting duties.

Evaluation of bushfire risk and the safety of occupants at sites has determined that the primary action to follow under normal bushfire conditions should be to shelter-in-place at onsite refuge/s.

Vegetation and Bushfire Risk: Most of the vegetation adjacent to the project area can be classified as untreatable for fuel reduction burning, posing increased levels of bushfire risk. The surrounding landscape has experienced significant bushfires over the past sixty years, indicating that the area will continue to be impacted by bushfires in the future.

Increased Risk During Construction: Although the bushfire risk level for the Butlers Gorge and Tarraleah human settlement areas is currently identified as low and very low in State Government bushfire risk registers, these risk levels are expected to increase significantly during the project's construction period due to an increase in site occupancy and the likelihood of unplanned ignitions.

High-Level Principles and Measures: State Government guidelines and industry best practices in bushfire risk management have been incorporated into high-level principles and site-specific measures to address the relevant bushfire risks associated with the project. These include Bushfire Emergency Plans, Bushfire Response Plans, training, and management of vegetation and are summarised in Tables 7 & 8.

Compliance and Approval: Subject to the implementation of the recommended high-level principles and site-specific measures, this Preliminary Bushfire Hazard Analysis (PHA) should address the relevant bushfire risks associated with the project, satisfying the bushfire requirements within the EPA *Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks should not preclude approval.

Project Description

Hydro Tasmania is proposing to redevelop the Tarraleah Hydropower Scheme to replace end of life assets and provide a more flexible and efficient scheme to ensure a reliable and safe renewable energy source into the future. The key permanent components of the Tarraleah Redevelopment Project are outlined below:

- An approximately 4.2 km **headrace pipeline** and associated service roads connecting the Lake King William tunnel (under construction) to the headrace tunnel.
- An approximately 9.8 km low pressure **headrace tunnel**.
- An approximately 2.3 km long high pressure **power tunnel** that splits into two short penstocks before entering the power station.
- A partially underground **power station** with an installed capacity of approximately 180 MW and rated flow of 60 m³/s located adjacent to the existing Tarraleah Power Station.
- A **surge facility** consisting of a 70 m high (above ground level) surge tower and associated underground approximately 140 m high surge shaft to control water pressure in the headrace and power tunnels.
- An approximately 6 m³/s **pumping station** and approximately 0.8 km **rising main** to transfer water from the existing No. 2 Pond to the power and headrace tunnels via the surge tower.
- A **transformer yard** and **switchyard** located close to the power station connecting the power station to the proposed transmission line.
- A new 22 kV **power supply** from the existing 22 kV network to the western, mid access and Paddy's Quarry portals, pump station, surge tower and power station will provide power during construction and operation.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

- A new 220 kV **transmission line**. There are currently two transmission line options being considered:
 - A 14 km double circuit line from the existing Tungatinah Switchyard to the existing Dee Lagoon substation (northern option), or
 - A 15 km double circuit line from the proposed Tarraleah Switchyard to the existing Liapootah substation (southern option)
- **Access tunnels, tunnel portals and access roads** to provide access to the headrace and power tunnels. Excess spoil from tunnel, power station and portal excavations will be stored in one of three **permanent spoil emplacement areas** located at the western portal, mid tunnel access portal and Paddy's Quarry portals.

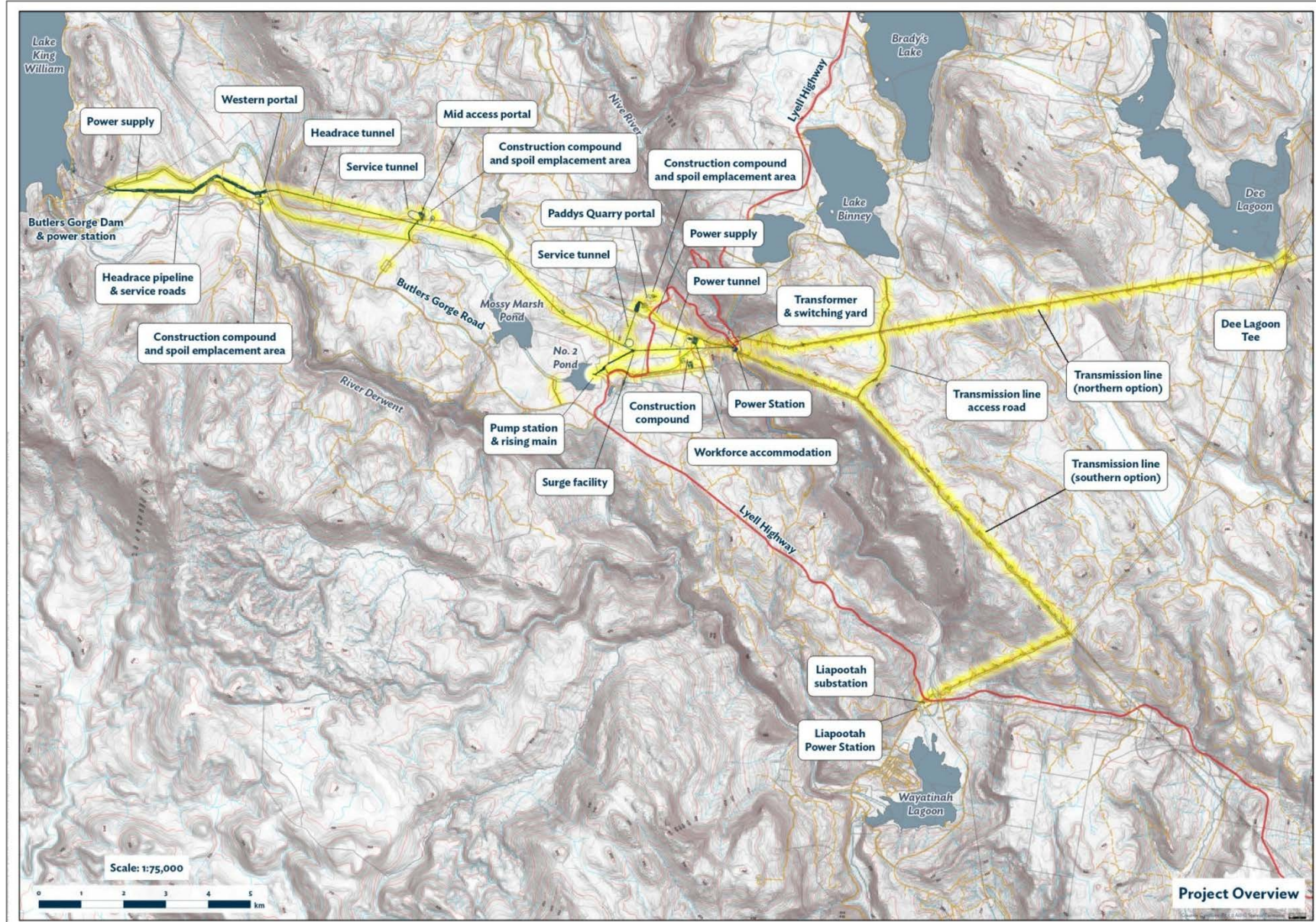
Construction of the Tarraleah Redevelopment Project underground works will be completed using drill and blast techniques and may be supported by a tunnel boring machine. Above ground works will be completed by conventional earth moving and mechanical excavation. To support construction the following key temporary infrastructure is proposed:

- A **construction compound** at Tarraleah Village supported by smaller construction compounds located at each of the tunnel portals and the power station. Construction compounds will include site administration facilities and workshops, handle and store materials and equipment imported to site and concrete batching and crushing and screening plant.
- Explosives for excavation work are required to be stored in a dedicated facility. Two **explosive magazines** will be located off Butlers Gorge Road.
- To facilitate construction of the power station a **temporary bridge** will be built over the Nive River.
- A workforce accommodation village will be constructed at Tarraleah but is not included in the scope of this assessment.

Upon the completion of works, all temporary construction sites will be rehabilitated.

Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project

Proposed Tarraleah Redevelopment Project



Contents

Executive Summary.....	i
Key messages	i
Project Description	ii
Glossary.....	1
1 Introduction	2
1.1 Purpose.....	2
1.2 Objectives	3
1.3 Alignment to Tasmanian State Government bushfire risk management framework	3
1.4 Preliminary bushfire hazard analysis key sites	3
2 Establishing the context.....	6
2.1 Description of the Tarraleah Redevelopment Project area.....	6
2.2 Adjoining land, vegetation and landscape.....	6
2.3 Bushfire-prone areas relative to Tarraleah Redevelopment Project.....	7
2.4 Climate and bushfire season	7
2.4.1 Potential climate change impacts on project.....	7
2.5 Documented fire history relative to Tarraleah Redevelopment Project.....	7
3 Identifying bushfire risks.....	14
3.1 General methodology.....	14
3.2 Drivers of bushfire risk	15
3.2.1 Bushfire attack mechanisms	15
3.3 Treatable and untreatable bushfire fuels relative to Tarraleah Redevelopment Project	16
3.3.1 Vegetation flammability ratings	16
3.4 Bushfire likelihood.....	19
3.5 Bushfire consequences.....	19
3.6 Bushfire hazard identification	20
3.7 Phoenix RapidFire computer modelling	22
3.7.1 Phoenix RapidFire methodology	22
3.7.2 Phoenix RapidFire Fireshed maps	22
3.7.3 Phoenix RapidFire isochrone and intensity maps	23
4 Analysing and evaluating bushfire risk	24
4.1 Bushfire risks to Butlers Gorge and Tarraleah human settlement areas	24
4.2 External bushfires impacting Tarraleah Redevelopment Project.....	24
4.3 Bushfires originating within and exiting Tarraleah Redevelopment Project.....	25
4.4 Bushfire risk to Tarraleah Redevelopment Project key sites.....	28
4.5 Bushfire risk to natural assets	28
4.6 Conclusion based on Phoenix RapidFire results	29
5 Bushfire risk treatment.....	29
5.1 Bushfire suppression within Tarraleah Redevelopment project area.....	29
5.2 Aerial fire suppression.....	29
5.3 Bushfire emergency planning.....	30
5.4 Recommended principles to reduce bushfire risk at key sites.....	31
5.5 Indicative ecological assessment zones.....	39
6 Engagement	40
6.1 Key stakeholders	40

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

7	Conclusion of Preliminary Bushfire Hazard Analysis.....	41
8	References	43

Appendices

Appendix A: Key site construction elements	45
Appendix B: Tasmanian Vegetation Fire Management Policy 2017	51
Appendix C: Australian Fire Danger Rating System	53
Appendix D: Transmission Line Easement – TasNetworks.....	54
Appendix E: Indicative Ecological Assessment Zones	62

List of Figures

Figure 1: Preliminary bushfire hazard analysis area key site locations.....	5
Figure 2: Peak fire seasons in Australia (Source: Australian Government Bureau of Meteorology)	8
Figure 3: Tarraleah redevelopment project area and surrounds authority land map.....	11
Figure 4: Tarraleah redevelopment project area and surrounds bushfire-prone areas map.....	12
Figure 5: Tarraleah redevelopment project area and surrounds documented fire last impacted map.....	13
Figure 6: The emergency related risk management process (NERAG, Attorney General’s Department, 2015)	14
Figure 7: Untreatable bushfire fuels relative to Tarraleah redevelopment project	17
Figure 8: Vegetation flammability ratings relative to Tarraleah redevelopment project.....	18
Figure 9: Fireshed map identifying potential level of bushfire exposure to key sites	26
Figure 10: Site 1 - Isochrone and intensity map showing no treatment to reduce bushfire risk	27
Figure 11: Site 1 - Isochrone and intensity maps showing Site 1 maintained as hazard management area.....	27
Figure 12: Medium firebombing helicopter (Commercial Helicopters 2013).....	30
Figure 13: State Government guidelines for roadside vegetation management (Source: Tasmania Fire Service)	39
Figure 14: Butlers Gorge Road, compliant roadside vegetation management (October 2024)	39
Figure 15: Australian Fire Danger Rating System.....	53

List of Tables

Table 1: Preliminary bushfire hazard analysis key sites.....	4
Table 2: Documented fire history relative to Tarraleah Redevelopment Project.....	9
Table 3: Bushfire likelihood table	19
Table 4: Bushfire consequence table.....	20
Table 5: Bushfire risk matrix	20
Table 6: Key bushfire risks to project.....	21
Table 7: Summary of recommended high-level principles to reduce bushfire risk to tolerable level	32
Table 8: Recommended site-specific high-level principles to reduce bushfire risk to tolerable levels	34
Table 9: Summary of indicative ecological assessment zones.....	40

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Glossary

To promote the use of common terminology, the Australasian Fire and Emergency Services Authority Council (AFAC) Bushfire Glossary, and Director’s Determination - Bushfire Hazard Areas version 1.2 will be used as reference in this plan.

AS 3959	Means Australian Standard AS 3959:2018 Construction of buildings in bushfire-prone areas.
Asset	A term used to describe anything valued by the community that may be adversely impacted by bushfire. This may include houses, infrastructure, agriculture, production forests, industry, and environmental and heritage sites.
Bushfire	An unplanned fire burning vegetation.
Bushfire Attack level (BAL)	Means the bushfire attack level for a building site determined by TFS or a bushfire hazard practitioner in accordance with AS 3959.
Bushfire hazard	The potential or expected behaviour of a bushfire burning under a particular set of conditions, i.e., the type, arrangement and quantity of fuel, the fuel moisture content, wind speed, topography, relative humidity, temperature, and atmospheric stability.
Bushfire-prone area	Land is a bushfire-prone area if: a) the land is within the boundary of a bushfire-prone area on a planning scheme overlay map; or b) where the relevant planning scheme overlay map for the land does not show any land within the relevant municipal area as being within the boundary of a bushfire-prone area, the land is within 100 metres of an area of bushfire-prone vegetation that is equal to or greater than one hectare.
Bushfire risk management	A systematic process to coordinate, direct and control activities relating to bushfire risk with the aim of limiting the adverse effects of bushfire on the community.
Consequence	Impact(s) of an event on the five key areas: environment, economy, people, social setting, and public administration.
Fuel	Any material such as grass, leaf litter and live vegetation which can be ignited and sustains a fire. Fuel is usually measured using the Overall Fuel Hazard Assessment Guide 4th ed. 2010 DSE.
Fuel break	A natural or manmade change in fuel characteristics which affects fire behaviour so that fires burning into them can be more readily controlled.
Fuel management	Modification of fuels by prescribed burning or other means.
Fuel reduction burning	The planned application of fire to reduce hazardous fuel quantities; undertaken in prescribed environmental conditions within prescribed boundaries.
Hazard Management Area	The area between a habitable building or building area and bushfire-prone vegetation, which provides access to a fire front for firefighting, which is maintained in a minimal fuel condition and in which there are no other hazards present which will significantly contribute to the spread of a bushfire.
Human Settlement Area	Term given for the dataset used to define where people live and work. The dataset was developed for the purpose of risk modelling and was created using a combination of building locations, cadastral information, and Australian Bureau of Statistics data. Includes seasonally populated areas and industrial areas.
Likelihood	Chance of something happening. It is used as a general description of probability and may be expressed qualitatively or quantitatively.
Risk treatment	Process of selection and implementation of controls to modify risk. The term ‘risk treatment’ is sometimes used for the controls themselves.

1 Introduction

This PHA has been prepared by Fire Risk Consultants (FRC) for Entura. FRC are industry leaders within the specialist area of bushfire risk analysis and bushfire impact and mitigation planning.

This PHA has been developed as an investigation and assessment of the bushfire risk to establish the level of hazard exposure, vulnerability, and the required mitigation to achieve an acceptable level of residual risk towards the Tarraleah Redevelopment Project (the project).

The key bushfire risks to the project are identified within Table 6 and include:

- Bushfire originating external the project area and directly impacting some or all key sites;
- The accidental ignition of a fire during construction or operational activities including hot works, plant & machinery, smoking, poor maintenance of infrastructure resulting in fire entering the external environment;
- Limited mobile phone reception potentially hindering early bushfire detection, delaying warnings and evacuations, and potentially causing entrapment of occupants;
- Butlers Gorge Road is an approx. 17km long dead-end road providing access to multiple sites in a highly forested area. Potential for Butlers Gorge Road to be impacted during a fire event, making egress not possible and entrapment occurring; and
- The level of training may be insufficient for Tarraleah Redevelopment Project staff and contractors to undertake firefighting duties.

The project is part of Hydro Tasmania's Major Projects Program (MPP). The project includes new pressurised tunnels and a pipeline to convey water from Lake King William. A new power station with a capacity of ~180 MW would be located adjacent to the existing Tarraleah Power Station in the Nive Valley. Construction of the project is anticipated to take four years, with a peak construction workforce of approximately 250 people.

The project area can be defined as bushfire-prone because it is subject to a Bushfire-prone Areas Overlay on the Tasmanian Planning Scheme - Central Highlands Local Provisions Schedule. Land that is bushfire-prone means that is more susceptible to being impacted by bushfire.

This PHA provides an assessment of bushfire risk and outlines high-level protective features and controls (principles) to ensure that the bushfire risk can be mitigated to a tolerable level that does not preclude approval.

1.1 Purpose

This PHA is intended to provide information in relation to the project and support an Environmental Impact Statement (EIS) being prepared by Entura for the project. It is understood that Entura will lodge the EIS to the Board of the Environment Protection Authority (EPA). The Board uses an EIS as a 'case for assessment', to assess the environmental impact of an activity, as required under the *Environmental Management and Pollution Control Act 1994* (EMPCA).

This PHA will demonstrate that bushfire risk levels do not preclude approval and address Section 5.10 of the EPA *Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. This PHA will give guidance by way of recommended high-level principles to mitigate bushfire risk to a tolerable level summarised into Tables 7 & 8 of this PHA.

1.2 Objectives

The objective of this PHA is to clearly and concisely communicate bushfire risk and principles to reduce risk associated with the project as required within Section 5.10 of the EPA *Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*, including:

- Consideration of fire within the project's sites, fire escaping from the sites and the impact of bushfire originating outside the development and the environmental impacts that could result from such an event;
- The objectives and management principles to be adopted to prevent and respond to potential fire events; and
- Where a fire response plan is appropriate, it should be fully integrated with other relevant documents, such as a Tasmania Fire Service Local Area Fire Management Plan, a Sustainable Timber Tasmania Fire Management Plan and a Parks and Wildlife Service Fire Action Plan for relevant districts.

1.3 Alignment to Tasmanian State Government bushfire risk management framework

This PHA has not been written in isolation and shares the principles of the Tasmanian State Government's Tasmanian Vegetation Fire Management Policy which enables the safe and effective conduct of vegetation fire management activities on public and private land across Tasmania. The overarching principle of this PHA is to protect human life.

This PHA also shares linkages and risk assessment outcomes to the Tasmanian State Government's Midlands Fire Management Area Bushfire Risk Management Plan available at www.sfmc.tas.gov.au.

1.4 Preliminary bushfire hazard analysis key sites

This PHA identifies 10 key sites (Table 1 & Figure 1). Sites 8 & 10 are both possible transmission alignment options (northern and southern). Only one of the two transmission options will ultimately be chosen and constructed.

Both sites 8 & 10 are outside of Entura's EIS scope as they are not being formally assessed by EPA Tasmania as they are outside the scope of the EPA Board's assessment.

However, sites 8 & 10 have been included within this PHA to support Entura's planning processes to reduce bushfire risk levels towards the project to a tolerable level.

Appendix A of this PHA includes the key construction elements for each site.

Workforce accommodation is proposed to be located within Tarraleah Village. Workforce accommodation is outside of Entura's EIS scope, and in turn outside of this PHA scope. Bushfire risk assessments regarding the workforce accommodation will be managed by the EPC Contractor through a separate bushfire planning process to this PHA.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

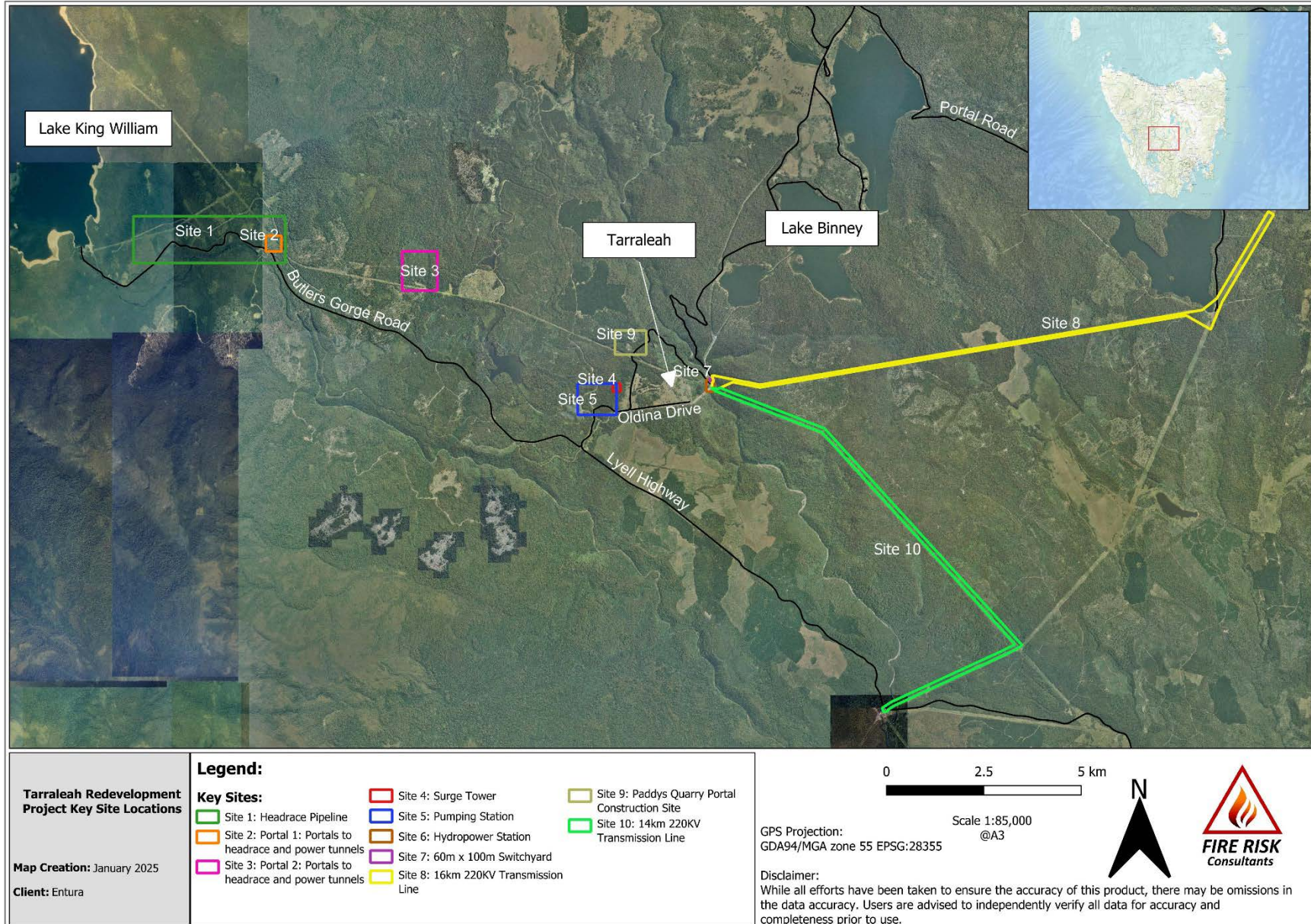
Table 1: Preliminary bushfire hazard analysis key sites

Site ID:	Site Details:
Site 1	An approximately 4.2km headrace pipeline.
Site 2	Portal 1: Portals to the headrace and power tunnels (note: temporary infrastructure [e.g. site offices, water treatment plants etc.] will be located at tunnel portal during construction)
Site 3	Portal 2: Portals to the headrace and power tunnels (note: temporary infrastructure [e.g. site offices, water treatment plants etc.] will be located at tunnel portal during construction).
Site 4	A surge tower, approximately 70m high (above ground level) and 16m diameter.
Site 5	A pumping station and approximately 1.1km long pipeline to transfer water from the existing No.2 Pond to the surge tower.
Site 6	A new hydropower station with an installed capacity of approximately 190MW located adjacent to the existing Tarraleah Power Station.
Site 7	An up to approximately 60m by 100m switchyard located either adjacent to the existing Tungatinah Power Station or within the easement of the existing Liapootah to Palmerston transmission line.
Site 8*	A new, approximately 16km long 220 kilovolt (kV) transmission line connecting the new Power Station to the existing Liapootah to Palmerston transmission line located to the east.
Site 9	Portal 3: Portals to the headrace and power tunnels (note: temporary infrastructure [e.g. site offices, water treatment plants etc.] will be located at tunnel portal during construction).
Site 10*	A new, approximately 14km long 220 kilovolt (kV) transmission line connecting the new Power Station to the existing Tarraleah to Liapootah transmission line, terminating at the existing Liapootah Power Station located to the southeast.

*Not being assessed within EIS.

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 1: Preliminary bushfire hazard analysis area key site locations



2 Establishing the context

2.1 Description of the Tarraleah Redevelopment Project area

The project area is approximately 886^{ha} and situated within the Central Highlands Local Government Area including the localities of Bronte Park, Butlers Gorge, and Tarraleah (Figure 1). The project area sits within a highly forested landscape varying in altitude between approx. 240m and 800m above sea level.

Main vehicle access to the project area is via the Lyell Highway and Butlers Gorge Road.

Authority land managers within the project area include Hydro Tasmania, Sustainable Timber Tasmania, and Parks and Wildlife Service. Small fragments of private freehold land are also included within the project area (Figure 3).

2.2 Adjoining land, vegetation and landscape

The predominant land to the north and east of the project area is Crown Land managed by Sustainable Timber Tasmania, much managed for production forestry. There are also aggregates of land vested to Hydro Tasmania, Crown Land managed by Parks and Wildlife Service, Freehold Title land managed by TasNetworks, and private property.

To the south and west of the project area is predominantly Crown Land managed by Parks and Wildlife Service with few small aggregates of Crown Land managed by Sustainable Timber Tasmania. This area also includes area identified as World Heritage.

Lake King William, a large freshwater body managed by Hydro Tasmania is to the west and northwest of the project area.

Much of the landscape is highly modified including road networks, transmission line easements and assorted power production infrastructure. The production forestry supports creating a mosaic of forest fuels at different stages since disturbance, subsequently disrupting potential bushfire intensity.

At a landscape scale much of the adjacent vegetation within and external to the sites can be identified within the following vegetation community groups:

- Agricultural, urban and exotic vegetation;
- Dry eucalypt forest and woodland;
- Moorland, sedgeland, rushland and peatland;
- Plantations for silviculture – hardwood;
- Rainforest and related scrub; and
- Wet eucalypt forest and woodland.

The predominant vegetation communities relevant to the project area are dry eucalypt forest and woodland, and wet eucalypt forest and woodland. Dry eucalypt forests are generally highly fire-adapted, a single fire should generally not affect biodiversity although high intensity fires or repeated short intervals i.e. < 10 years may cause long-term changes (Pyrke & Marsden-Smedley, 2005). Wet eucalypt forest and woodland vegetation communities are generally a fire-adapted community requiring at least 30 years between fires to maintain the defining species. Fire intervals greater than 80 years are required to reach mature stand structure.

Most of the vegetation adjacent to the project area can be classified as untreatable for fuel reduction burning. This has the potential to pose increased levels of bushfire risk to the project area (Section 3.3).

2.3 Bushfire-prone areas relative to Tarraleah Redevelopment Project

The project area sits in a highly bushfire-prone landscape (Figure 4) and can be defined as bushfire-prone because it is subject to a Bushfire-prone Areas Overlay on the Tasmanian Planning Scheme - Central Highlands Local Provisions Schedule. Land that is bushfire-prone means that is more susceptible to being impacted by bushfire.

Proposed use and development (including subdivision) within a bushfire-prone area may be required to have a Bushfire Hazard Management Plan and comply with minimum standards for construction, hazard management areas, firefighting water supplies, access and emergency planning. These requirements can influence available siting options, building design and construction and maintenance requirements (Tasmania Fire Service, no date).

2.4 Climate and bushfire season

Climate change refers to long-term shift in temperatures and weather patterns. The most direct link between bushfire and climate change comes from the long-term trend towards a hotter climate. Climate change makes hot days hotter, heatwaves longer and more frequent, resulting in increased bushfire weather. Combining this with less rain over southern Australia during cooler months, days suitable to undertake fuel reduction burning to reduce bushfire risk decreases significantly.

2.4.1 Potential climate change impacts on project

Tasmania is separated into 10 Fire Management Areas (FMA). The project area sits within Midlands FMA. The Midlands FMA experiences extreme temperatures, with cold winters and hot summers. Locations within the Midlands FMA consistently record the states maximum and minimum temperatures. High risk fire weather can be expected in the Midlands FMA when dry winters and springs are followed by summers, resulting in very dry fuels. The strong north-westerly winds that often precede cold fronts in summer contain dry air from the interior of the Australian mainland, which results in very low humidity as this air stream descends from the Central Highlands. This combination of strong winds and low humidity creates the ideal weather conditions for major bushfires within the Midland FMA (State Fire Management Council, 2023).

Under a changing climate, Tasmania is expected to experience increased storm events and changes in rainfall patterns, which are likely to result in increased temperatures and longer fire seasons, with more frequent and intense bushfire events (Tasmania's Draft Climate Change Action Plan 2023-25 2023). Noting this, the likelihood of bushfire impacting the project area (and surrounds) throughout the asset's life is likely and could be either directly impacted through direct flame contact, or indirectly through ember impact.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant climate change considerations, satisfying Section 5.8 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Climate change bushfire risks towards the project should not preclude approval.

2.5 Documented fire history relative to Tarraleah Redevelopment Project

Bushfire has been a natural feature of the Tasmanian landscape with a history of significant bushfires events pre and post European settlement. Significant bushfire events include the Derwent and Huon Valleys bushfires (1933-34), Black Tuesday bushfires (1967), Heemskirk Bushfires (2008) and the most recent Dunalley Bushfires (2013) and the Gell River Bushfires (2019).

Tasmania's high bushfire risk is the result of factors that increase the likelihood and consequences of fire. These factors include large areas of the state comprising highly flammable dry eucalypt forest, protracted droughts and an increasing population density in bushfire-prone areas.

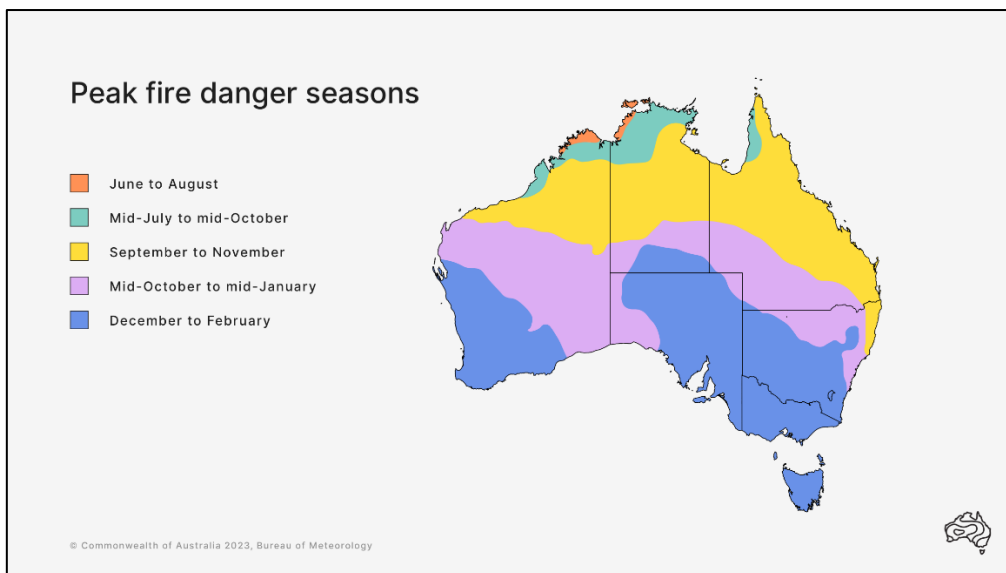
While bushfire is a significant risk facing Tasmania, it is also a natural part of the environment and many plant species rely on fire to regenerate.

A variety of causes can ignite a bushfire; some bushfires result from events that are natural, such as lightning, while others result from human activity. Following ignition, the direction and speed of the fire's travel, and the height and intensity of the flames are determined by climatic and weather conditions, topography and fuel in the area.

The climate in Tasmania is generally characterised by mild, moist winters followed by hot dry summers. The Tasmanian bushfire season typically occurs between the end of October and the start of May with the peak bushfire season generally being December to February.

Days of elevated bushfire risk are often typified by the passage of a cold front, which causes fires to spread rapidly and then change direction. Coastal sea breezes can have a similar effect. Most of Tasmania's significant fires have been subject to this type of effect, with many fatalities resulting from people being trapped by these fires after they changed direction.

Figure 2: Peak fire seasons in Australia (Source: Australian Government Bureau of Meteorology)



The greater landscape surrounding the project area has experienced significant bushfires over the past sixty years. There are documented fire history records available to the north, east, south, and west of the project area.

The 2009–10 fire season was significant to the project area. It demonstrated how fires can burn at significant intensity uninterrupted through vegetation much like that within the project area. This fire season was characterised by a wet winter breaking a prolonged drought which generated significant growth of vegetation across the State (including the project area). This growth provided a potential link for fires between separate forested areas. A wet winter provided a slow fire start to spring; however, several hot and windy days created an environment for several bushfires to burn.

In January 2010, a deliberately lit 6,500ha fire started near Wayatinah in the Upper Derwent Valley. This fire was <10km southeast from Tarraleah and was being driven by a north-westerly wind. The fire burned for several days with high fire danger ratings of 48 being reached on 31 January. The fire had the potential to travel into New Norfolk, however under a wind change scenario the fire had potential to impact Tarraleah. A large area of regenerated forest and pine plantation was lost and fences, hay sheds and other farming infrastructure destroyed (2013 Tasmanian Bushfire Inquiry, Volume One).

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Similarly, during January 2018 a lightning strike ignited a bushfire directly adjacent to the Tarraleah Village. The fire started on the southeastern side of the Village and burnt approximately 340ha being driven by north-westerly winds. If the ignition point for this fire was 2km to the northwest, it is highly probable the Tarraleah Village would be directly impacted bushfire.

Based on the frequency of bushfires within the project area's landscape in recent years, it is clear this is an area that will continue to be impacted by bushfires in years to come and that the area can be considered at risk from bushfires. A fire burning similar to that of the January 2010 or January 2018 fires has the potential to cause loss of life and create considerable disruptions to the project and its assets.

Documented fire history relative to the project area (last impacted) was accessed via LISTmap during September 2024. LISTmap is a publicly assessable State Government managed geographic information system (GIS) database that helps users find and use information about land and property in Tasmania.

Documented fire history (including fuel reduction burns) relative to the project area is summarised in Table 2 and shown on Figure 5. Most of these bushfire records are to the northwest and south of the project area being driven by north-westerly winds.

Table 2: Documented fire history relative to Tarraleah Redevelopment Project

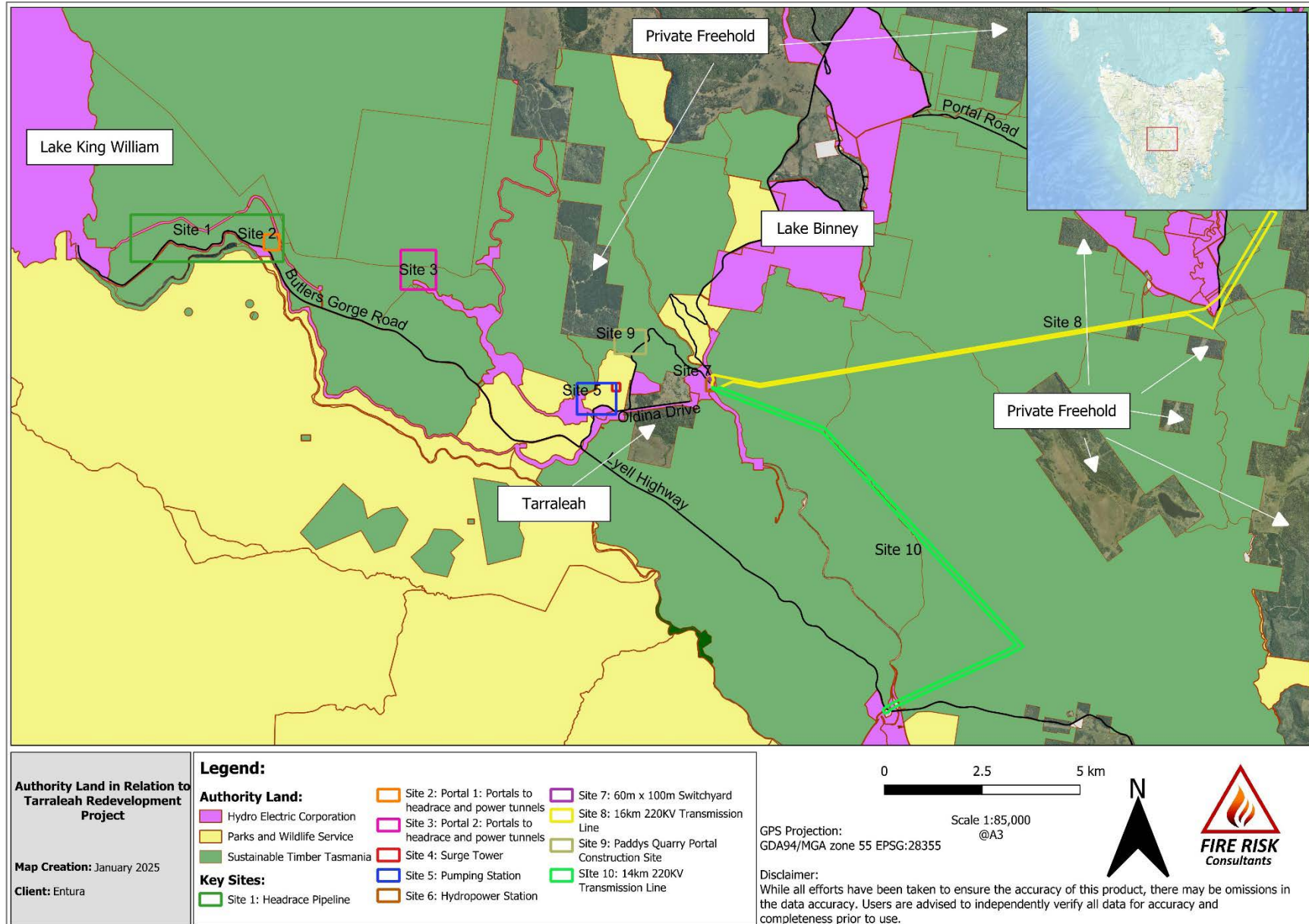
Ignition Season:	Fire Name:	Fire Type:	Area Burnt (ha):
1924/1925	Counsel River	Unknown	685
1944/1945	Blowhole Valley	Unknown	1,443
1966/1967	1967 Fire	Bushfire	198,781
1968/1969	Gell River	Unknown	3,645
1969/1970	Upper Gordon River	Unknown	959
1978/1979	Guelph Basin	Unknown	1,064
1978/1979	King William Plains	Unknown	2,776
1980/1981	lakekingwilliam2	Bushfire	470
1981/1982	Clarence Weir 1 (FT)	Bushfire	134
1981/1982	Pine River 1 (FT)	Bushfire	13,648
1981/1982	Tungatinah 1 (FT)	Bushfire	7,610
1982/1983	Upper Gordon River	Planned Burn	5,044
1982/1983	Long Bay	Bushfire	1,071
1983/1984	Newtons 1 (FT)	Bushfire	1,558
1983/1984	Blackbobs 1 (FT)	Bushfire	802
1984/1985	Navarre1	Bushfire	2,086
1987/1988	Victoria Valley Rd 1 (FT)	Bushfire	731
1988/1989	Coates Creek	Bushfire	153
1990/1991	Abel Park	Bushfire	334
1993/1994	Binney Dam 1 (FT)	Bushfire	144
1993/1994	Lake King William	Bushfire	180
1998/1999	Bradys 29 (FT)	Bushfire	320
1999/2000	Wentworth 52 (FT)	Bushfire	166

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Ignition Season:	Fire Name:	Fire Type:	Area Burnt (ha):
2000/2001	King William Plains	Planned Burn	183
2003/2004	Harbacks Road	Planned Burn	115
2005/2006	King William Plains	Planned Burn	744
2005/2006	Little Navarre River	Planned Burn	431
2007/2008	Wilson's Creek (FT)	Bushfire	344
2007/2008	Glenmark (TFS)	Bushfire	1,111
2009/2010	Victoria Valley Road (FT)	Bushfire	440
2010/2011	Majors Lookout	Planned Burn	214
2011/2012	Navarre FRB	Planned Burn	196
2014/2015	Navarre River FWRNPSFR15	Planned Burn	157
2015/2016	Lake King Willam FWRNP192APZ	Planned Burn	1,073
2015/2016	Butlers Gorge Road - Butlers Gorge	Bushfire	217
2018/2019	Great Pine Tier	Bushfire	51,228
2018/2019	FWRNP190SFR Upper Gordon 1	Planned Burn	286
2023/2024	Mentmore Tier	Bushfire	1,847
2023/2024	Portal Road	Bushfire	1,651

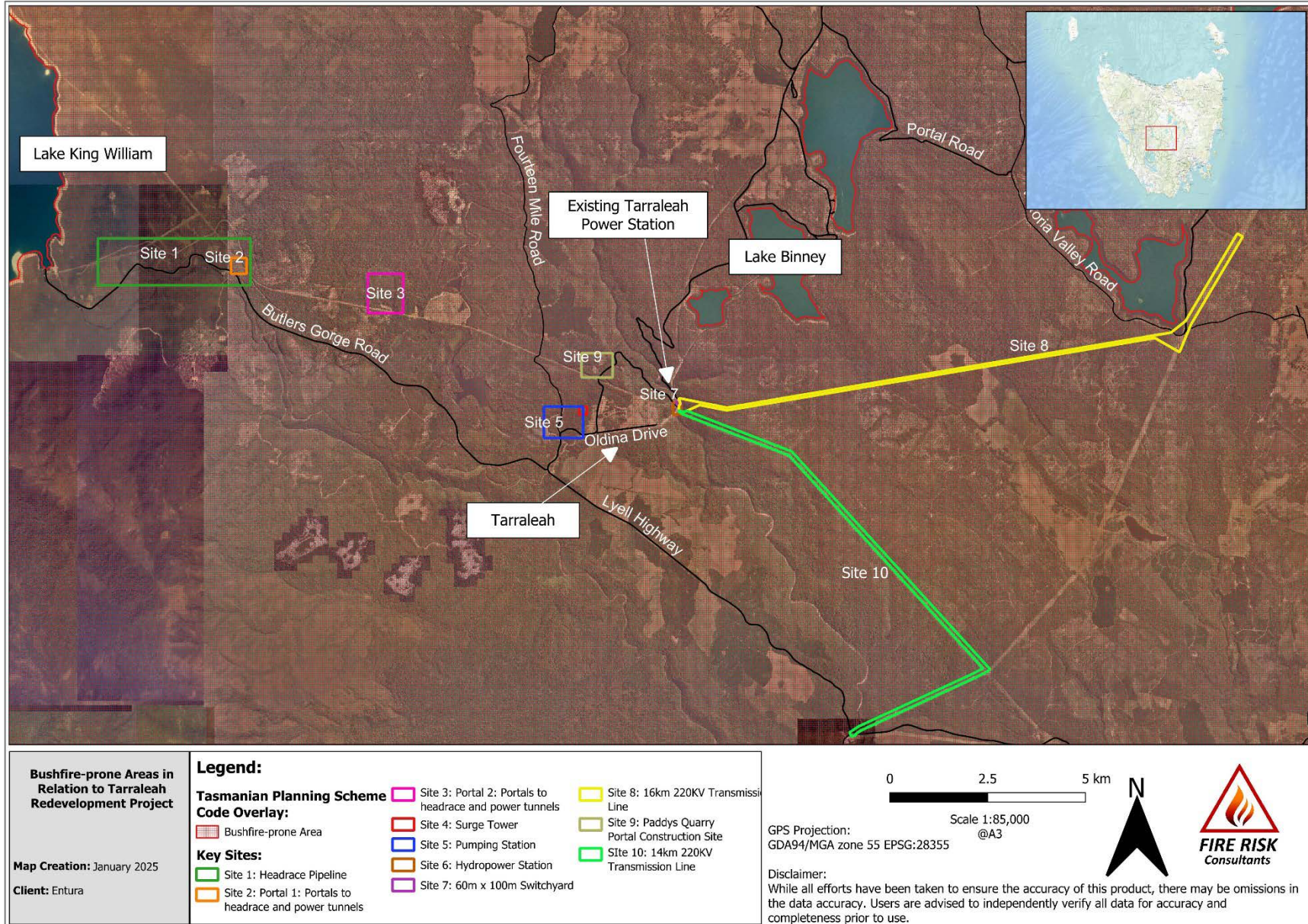
Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 3: Tarraleah redevelopment project area and surrounds authority land map



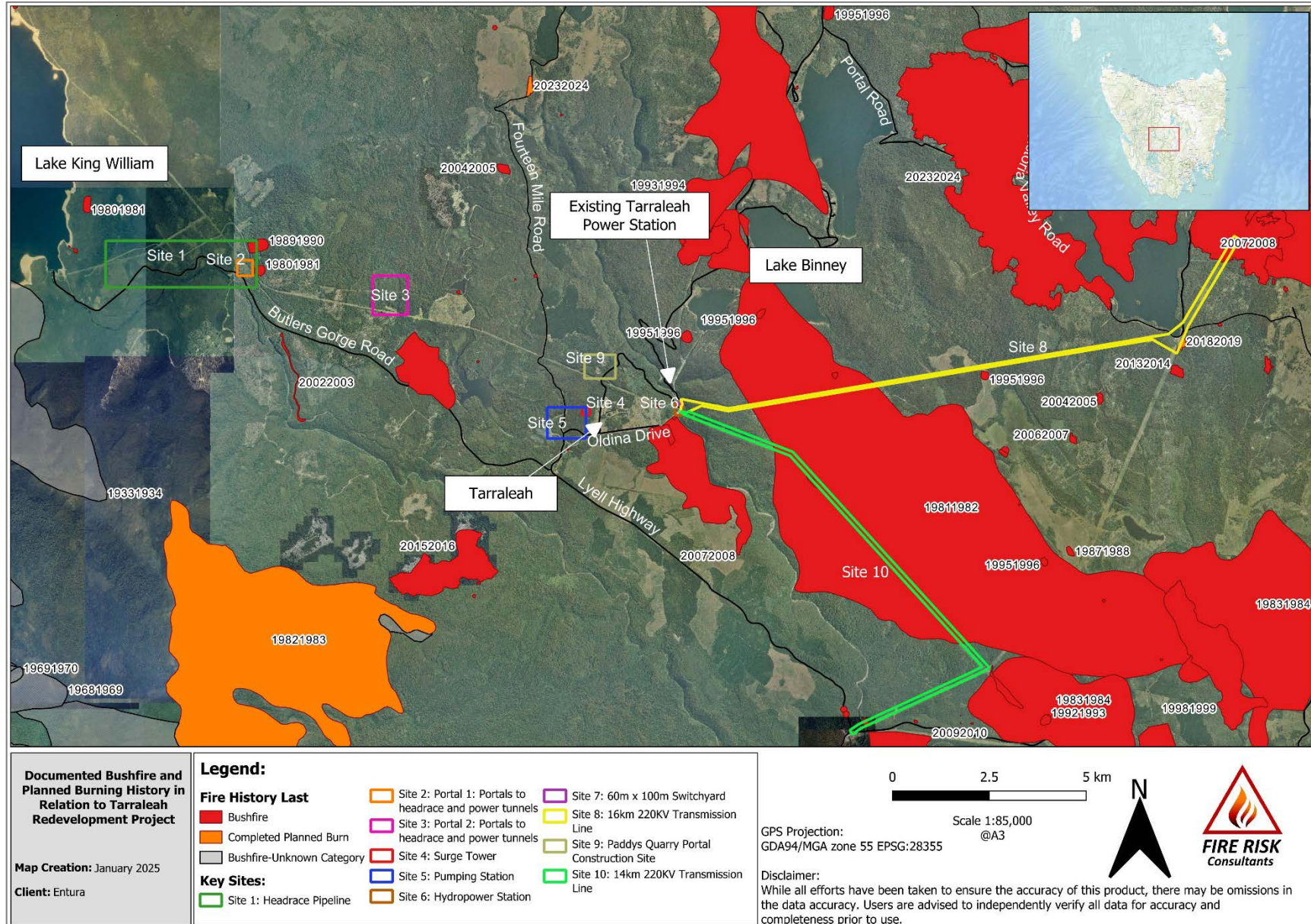
Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 4: Tarraleah redevelopment project area and surrounds bushfire-prone areas map



Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 5: Tarraleah redevelopment project area and surrounds documented fire last impacted map



3 Identifying bushfire risks

The PHA risk assessment process involved identifying, analysing, evaluating, and treating risks to a tolerable level (through high-level principles) where possible.

The key considerations that have been assessed in developing this PHA include:

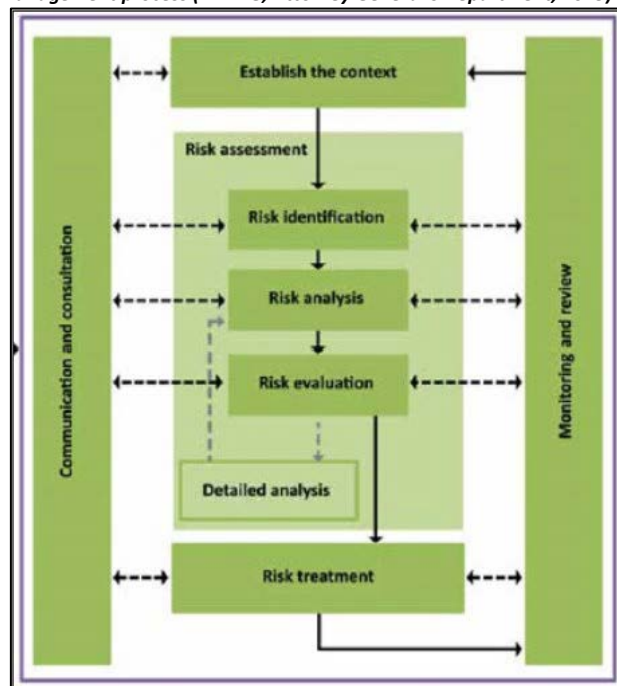
- Consideration to bushfire originating external to each site and the potential impacts to each site as a result; and
- Consideration to consequences of bushfire starting within each site and spreading to the external environment.

3.1 General methodology

A standard risk assessment process was used to determine bushfire risk levels and high-level treatment principles (Section 5.4) within this PHA. The risk assessment process followed decision support principals from the Tasmanian Emergency Risk Assessment Guidelines (TERAG) available at www.ses.tas.gov.au and the State Government's Bushfire Risk Management Planning Guidelines available at www.sfmc.tas.gov.au.

TERAG provides risk management methodology tailored to the Tasmanian context and is built around ISO 31000:2018 - Risk management — Guidelines. The risk management framework used within TERAG has strong linkages to those with the National Emergency Risk Assessment Guidelines (NERAG).

Figure 6: The emergency related risk management process (NERAG, Attorney General's Department, 2015)



PHASE 1: Preliminary desktop assessment of project area, initial assessment of bushfire risk indicators and mapping using available spatial and technical project data, specifically:

- Topography and vegetation composition of the project area and wider landscape;
- Fire and ignition history;
- Current road network and egress routes from the project area and the adequacy of these in relation to potential bushfire risk;
- Land tenure;

- Fire weather in the project area and broader Midlands Fire Management Area;
- Identification of bushfire response capability in the vicinity of the site and potential for adequate response to a bushfire event on the sites;
- Planning scheme overlays and relevant legislation; and
- Desktop landscape bushfire risk assessment.

PHASE 2: Detailed on-ground analysis of project area and surrounding landscape, including likely fire scenarios.

The on-ground site analysis was undertaken during September and October 2024 and January 2025 over multiple days with FRC and Entura. This involved driving and inspecting on foot the landscape within the project area to confirm information collated from the desktop assessment, including:

- Topography and vegetation composition of the project area and wider landscape;
- Visual assessment of adjoining roadsides and their fuel load and management;
- Landscape scale land use;
- Inspection of proposed key site locations;
- Emergency egress routes;
- Adjacent human settlement area locations; and
- Potential firefighting water point locations.

Uncertainties and limitations during the on-ground site analysis included:

- Some construction had commenced at sites, however at many sites no construction had commenced. Therefore, all recommended principles (Section 5.4) for each site have come from written, verbal and GIS data provided by Entura supported by on-ground site assessments by FRC.

Uncertainties and limitations were managed with the following assistance:

- Constant written and verbal engagement with Entura's PHA Project Manager; and
- The Tasmania Fire Service were engaged to undertake Phoenix RapidFire computer modelling of the project area (Section 3.7).

3.2 Drivers of bushfire risk

Bushfires can start in a variety of ways, but there are three factors that contribute to the behaviour of a bushfire, weather, the vegetation and the terrain. The risks associated with a bushfire is determined by a combination of three elements, the hazards that the fire generates, your level of exposure to these hazards, and your vulnerability to these hazards. Understanding and recognising each element will support preparing for bushfire (Bushfire Best Practice Guide, 2021).

3.2.1 Bushfire attack mechanisms

Bushfire attack mechanisms are the characteristics of a bushfire that have potential to impact a building or asset where it can no longer provide a safe haven for occupants.

The four major bushfire attack mechanisms are:

1. Wind-blown burning debris (including ember attack);
2. Radiant heat which can ignite flammable materials ahead of the fire front and shatter glass;
3. Flame contact; and
4. Strong winds generated or intensified by the bushfire.

Ember attack is the most common cause of building damage or loss from bushfires.

The Australian Standard 3959 – 2018 Construction of buildings in bushfire-prone areas is primarily concerned with improving the ability of buildings in designated bushfire-prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself (Standards Australia Limited, 2018).

3.3 Treatable and untreatable bushfire fuels relative to Tarraleah Redevelopment Project

Vegetation (bushfire fuels) can be described as ‘treatable vegetation’ and ‘untreatable vegetation’. Treatable vegetation are those that can be safely treated with planned burning generally during the spring and autumn months. Treatable vegetation often includes dry eucalypt forest and woodland vegetation community groups. Untreatable vegetation means that the vegetation is not appropriate or practical to undertake fuel reduction burning. This may be due to typical species composition within each vegetation type, their known sensitivity to fire or that the fuels are simply too wet to burn safely during the safer planned burning weather windows of spring and autumn. Difficult terrain and asset distribution also influences bushfire fuel treatability.

At a landscape scale most fuels adjacent to the project area are untreatable fuels (Figure 7) and are dominated by the following vegetation community groups:

Vegetation Community Group	Considerations for non-treatability relative to project area
Plantations for silviculture – softwood and hardwood	Fire is generally excluded from timber plantations due to the timber’s vulnerability to fire damage which can result in loss of timber quality and financial loss.
Wet eucalypt forest and woodlands	Too wet to burn safely during the safer planned burning weather windows of spring and autumn.

Untreatable fuels will often be dry enough or ‘available’ to burn only during the warmer summer bushfire period. This poses potential increased levels of bushfire risk to the project area.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant fire risks associated with the project, satisfying Section 5.10 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks regarding untreatable fuels towards the project should not preclude approval.

3.3.1 Vegetation flammability ratings

TASVEG is a comprehensive digital map of Tasmania's vegetation. Fire flammability classes (low, moderate, high and very high) can be assigned to each TASVEG vegetation community. The general principle applied is the ability of the vegetation to burn throughout the year; that is, on how many days per year that the vegetation type will burn.

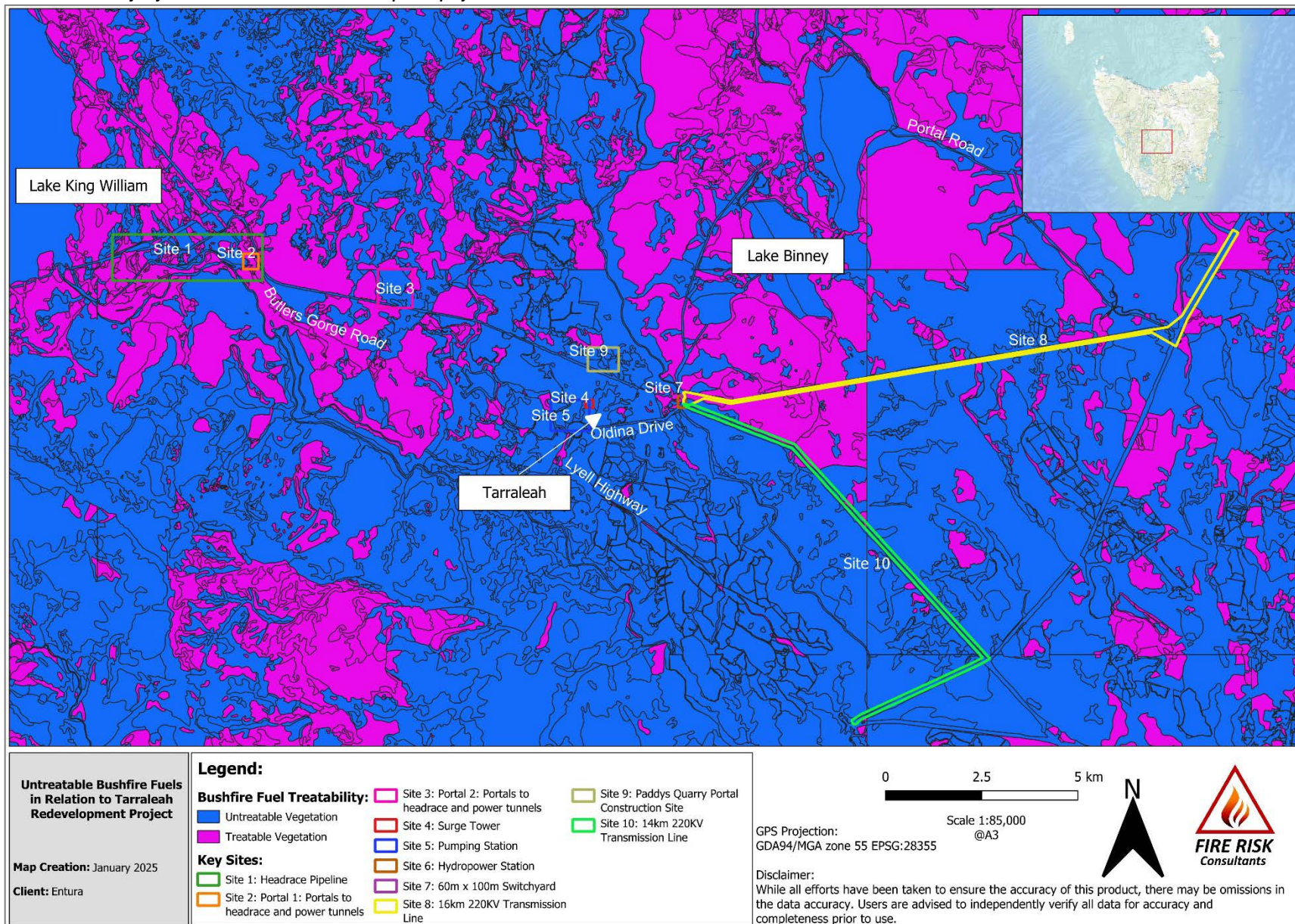
The project area and surrounds experiences high annual rainfall, suiting wetter forest types that can transition into rainforest. Wetter vegetation types are associated with a lower flammability, however even vegetation types in the low flammability class can burn with enormous intensity on rare occasions (Pyrke & Marsden-Smedley, 2005).

Understanding vegetation flammability is important to the project area as recently burnt vegetation classified as low or moderate flammability (e.g. wet eucalypt forest and rainforest) may have a higher availability for burning for many years after the initial fire due to increased exposure of the understorey to insolation or the changed floristics in the period immediately after the fire (Barker, 1991).

Vegetation flammability ratings relative to the project area and surrounds are shown on Figure 8.

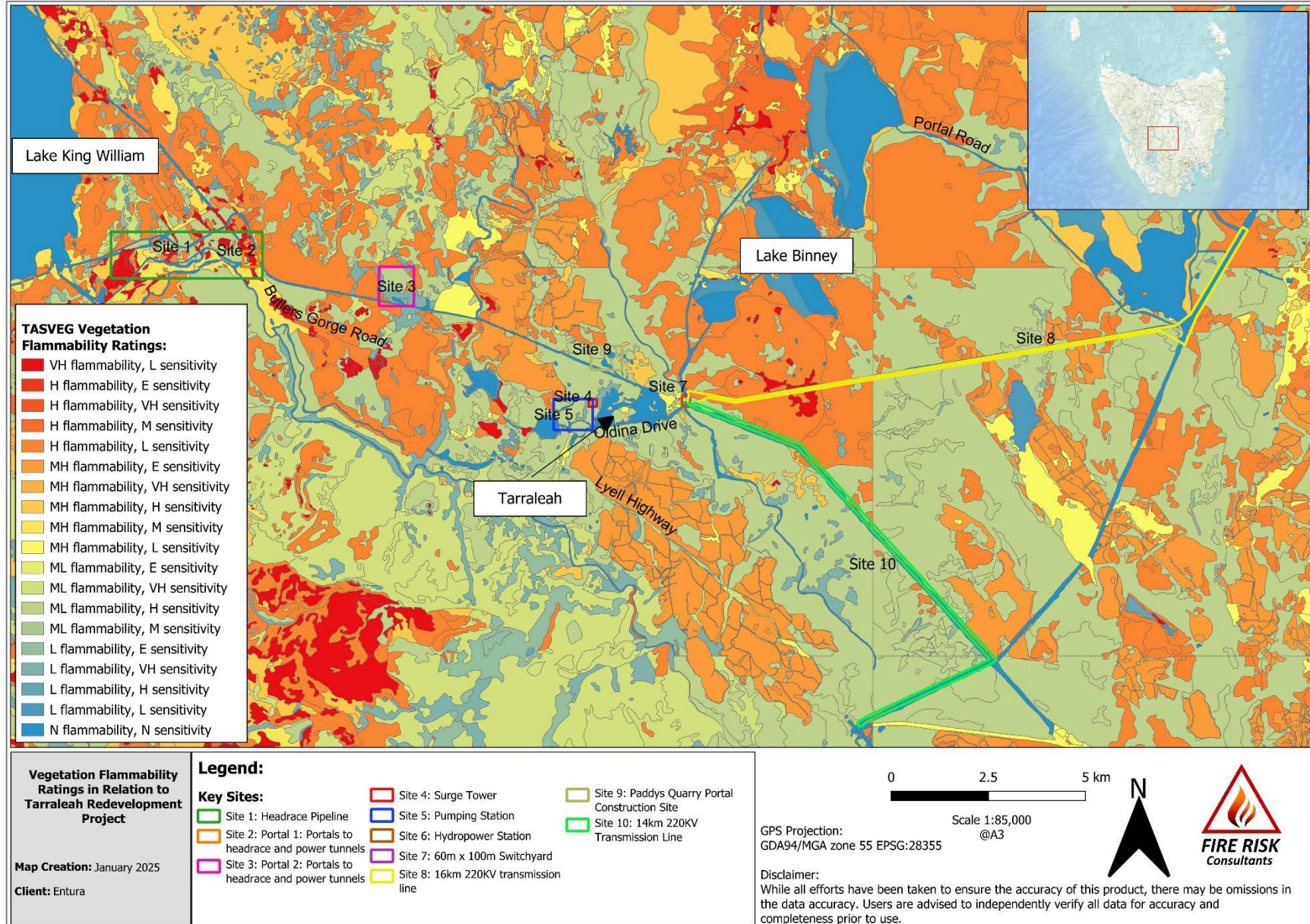
Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 7: Untreatable bushfire fuels relative to Tarraleah redevelopment project



Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 8: Vegetation flammability ratings relative to Tarraleah redevelopment project



3.4 Bushfire likelihood

Utilising TERAG as the primary guide for the application of the risk assessment, an assessment of the likelihood of a bushfire impacting the project area considers the below factors:

- Potential for an unplanned fire to occur;
- Potential for an ignition to develop and exhibit significant fire behaviour;
- Potential for that fire to destroy assets; and
- The potential for it to develop into a major fire.

Risk management principles for actions to reduce bushfire risk within the project area may be determined by several approaches depending on the level of assessed risk. The principles, if implemented, should demonstrate that bushfire risk levels should not preclude approval.

A likelihood scale refers to the potential of unplanned fire beginning in the area and spreading into the external environment. An assessment of likelihood considers factors such as:

- Sources of ignition;
- Land usage;
- History of ignitions; and
- Ability for fire to spread through the area.

Table 3: Bushfire likelihood table

Likelihood Scale	Description
Almost Certain	Fire will definitely occur, and/or high level of recorded incidents, or there is a strong likelihood that the event will occur.
Likely	High probability fire may occur; and/or some recorded incidents.
Unlikely	Probability fire may occur; limited recorded incidents.
Rare	Fire is not expected to occur, but it is not impossible.
Very Rare	Fire is not expected to occur, but it is not impossible.
Extremely Rare	Fire is not expected to occur, but it is not impossible.

3.5 Bushfire consequences

Consequence refers to the potential seriousness of the damage that could result from a bushfire occurring. In assessing the possible consequences, the assessment considers a variety of hazard, exposure and vulnerability factors including:

- Potential fuel levels present within the project area and external;
- Assets within and external to the project area;
- Proximity of assets; and
- The level of access into the area for suppression actions should a fire occur.

The consequence scale refers to the potential seriousness of the damage which could occur due to bushfire.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Table 4: Bushfire consequence table

Consequence scale	People: Injuries/illness
Catastrophic	More than 1 in 10,000 of the population critically injured with long-term or permanent incapacitation.
Major	More than 1 in 100,000 of the population critically injured with long-term or permanent incapacitation or 1 in 10,000 of the population seriously injured.
Moderate	More than 1 in 1,000,000 of the population critically injured with long-term or permanent incapacitation or 1 in 100,000 of the population seriously injured.
Minor	More than 1 in 10,000,000 of the population critically injured with long-term or permanent incapacitation or 1 in 1,000,000 of the population seriously injured.
Insignificant	Less than 1 in 1,000,000 of the population seriously injured or any minor injuries.

The risk rating table below is used to combine likelihood and consequence to obtain a risk score. The risk score is used to aid decision making by determining which areas/activities are at the greatest risk of a fire starting and spreading throughout the project area. Actions can be prioritised using this method to determine where risk mitigation works could occur.

Table 5: Bushfire risk matrix

CONSEQUENCE LEVEL					
LIKELIHOOD	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC
Almost Certain	MEDIUM	MEDIUM	HIGH	EXTREME	EXTREME
Likely	LOW	MEDIUM	HIGH	EXTREME	EXTREME
Unlikely	LOW	LOW	MEDIUM	HIGH	EXTREME
Rare	VERY LOW	LOW	MEDIUM	HIGH	HIGH
Very Rare	VERY LOW	VERY LOW	LOW	MEDIUM	HIGH
Extremely Rare	VERY LOW	VERY LOW	LOW	MEDIUM	HIGH

The outcomes of the risk assessment are used to inform the recommended principles (Tables 7 & 8) aimed at providing guidance to reducing bushfire risk to a tolerable level within the project area.

3.6 Bushfire hazard identification

Both desktop and on-ground site assessments were undertaken by FRC to support the identification of bushfire risk levels to each site.

The bushfire hazard identification process acknowledges that a level of bushfire risk already exists within the project area and surrounding landscape. On-ground site assessments supported identifying principles, strategies and actions that could be implemented to reduce bushfire risks the project poses. Some bushfire risks identified by FRC in the bushfire hazard identification process do not sit under the control of Entura or Hydro Tasmania as they are on land not controlled by Hydro Tasmania.

Table 6 of this PHA identifies the key bushfire risks to the project at time of assessment.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Table 6: Key bushfire risks to project

Key Risk to Project Area	Cause/Comment	Likelihood	Possible Results	Consequences	Risk Rating
Tarraleah Redevelopment Project staff, contractors & environment	<ul style="list-style-type: none"> • Bushfire originating external the project area and directly impacting some/all key sites. • Limited mobile phone reception potentially hindering early bushfire detection, delaying warnings and evacuations, and potentially causing entrapment of occupants. • The accidental ignition of a fire during construction or operational activities including hot works, plant & machinery, smoking, poor maintenance of infrastructure resulting in fire entering the external environment. • Butlers Gorge Road is an approx. 17km long dead-end road providing access to multiple sites in a highly forested area. Potential for Butlers Gorge Road to be impacted during a fire event, making egress not possible and entrapment occurring. • The level of training may be insufficient for Tarraleah Redevelopment Project staff and contractors to undertake firefighting duties. 	Likely	<ul style="list-style-type: none"> • Fire behaviour and intensity could be erratic if the fire occurs during elevated fire weather conditions. • Under elevated fire weather conditions, bushfire could travel some distance with increased fire intensity before impacting on the project area. • It is expected that a peak construction workforce of up to 250 staff could be within the project area during construction. Potential loss of life/injury. • Potential loss of life/injury due to entrapment within Butlers Gorge Road Sites and surrounds during a bushfire event. • Fire sensitive natural and/or cultural values are significantly impacted by unplanned fire. 	Major	Extreme

3.7 Phoenix RapidFire computer modelling

Phoenix RapidFire is a research tool developed by the University of Melbourne (Kevin Tolhurst and Derek Chong). It is used for both incident prediction through capturing the nature of a fire as it spreads across the landscape, and as a key tool for bushfire risk assessment and strategic bushfire management planning at a landscape level.

During October 2024 Fire Risk Consultants requested the Tasmania Fire Service (TFS) run a series of Phoenix RapidFire bushfire simulator modelling within, and external to, the project area. The objective was to support the risk identification process and analysis and evaluation of the potential effectiveness of the high-level principles recommended to reduce bushfire risk (Table 7).

The request included a modelling brief identifying project scope, objectives and target audience. The modelling scope included:

- Consideration to bushfire originating external to each site and the potential impacts to each site as a result;
- Consideration to consequences of bushfire starting within each site and spreading to the external environment;
- Potential environmental impacts from modelled bushfire scenarios;
- Identification of any limitations and assumptions of bushfire simulator modelling;
- Modelling be undertaken using a scenario where each polygon is maintained as a hazard management area, and a separate scenario where each polygon is maintained in maximum fuel condition; and
- Modelling is undertaken for each site independently considering adjacent sites are in maximum fuel condition.

The inclusion of Site 10 within this PHA came after the completion of the Phoenix RapidFire bushfire simulator modelling. However, modelling results have been considered in a broader context in respect to Site 10.

3.7.1 Phoenix RapidFire methodology

The methodology for the Phoenix RapidFire analysis followed the same basic principles as outlined in 'Appendix B' of the publicly available 'Bushfire Risk Management Planning Guidelines 2020' (<https://www.sfmcc.tas.gov.au/document/bushfire-risk-managementplanning-guidelines-2020>).

3.7.2 Phoenix RapidFire Fireshed maps

Fireshed maps estimate burn probability by displaying the number of times a location is impacted by modelled bushfires. The level of bushfire exposure is determined by analysing how management areas and assets overlap with burn probability estimates.

Fireshed maps are particularly useful when they are produced for different fuel management scenarios. This provides the opportunity to compare exposure levels under different scenarios, to assess the effectiveness of fuel management strategies, and to understand the potential exposure in the absence of fuel reduction (Tasmania Fire Service, 2024).

Individual fireshed maps were created for each key site by the TFS (excluding Site 10). Figure 9 shows a fireshed map identifying sites 1-9 with a modelled bushfire intensity of >3,000 kilowatts per metre. This map has been included within this report as it gives a visual 'summary' of the modelled level of bushfire exposure to sites 1-9.

Analysing and evaluating each firemap supported identifying the potential effectiveness of each recommended high-level principle to reduce bushfire risk (Table 7) to each site. Where some principles require the modification of vegetation i.e. hazard management areas, the perpetual maintenance is critical in maintaining a state of reduced risk.

3.7.3 Phoenix RapidFire isochrone and intensity maps

Isochrone and intensity maps are a visual representation of areas a bushfire can reach within a given time or distance including the potential intensity of the bushfire.

Isochrone and intensity maps were created for sites 1-9 by the TFS. Maps identified a potential ignition point/s within each of the sites 1-9 and modelled the potential fire spread each hour following ignition. Also displayed is the potential intensity of bushfire impact as a result from the modelled ignition.

Modelled bushfire intensity used three different fire conditions:

1. Exposure to any fire, that is where modelled fire intensities at each grid cell were greater than 0 kilowatts per metre.
2. Exposure to fire that is difficult or impossible to suppress, that is where modelled fire intensities exceeded 3,000 kilowatts per metre.
3. Exposure to fire that is likely to result in house losses, where modelled fire intensities exceeded 10,000 kilowatts per metre.

Each isochrone and intensity map used scenarios where sites 1-9 were maintained as a hazard management area (minimal fuel condition), and a separate scenario where sites 1-9 were maintained in maximum fuel condition (no treatment to reduce bushfire risk).

This allowed an analysis and evaluation to occur of the effectiveness of the recommended high-level principles to reduce bushfire risk to tolerable level (Table 7) if implemented (and where required, perpetually maintained).

4 Analysing and evaluating bushfire risk

4.1 Bushfire risks to Butlers Gorge and Tarraleah human settlement areas

The human settlement areas as identified within the Midlands Fire Management Area Bushfire Risk Management Plan (BRMP) relevant to the project include:

- Butlers Gorge; and
- Tarraleah.

The bushfire risk level for the Butlers Gorge human settlement area as identified within the Midlands Fire Management Area BRMP Risk Register is very low.

The bushfire risk level for the Tarraleah human settlement area as identified within the Midlands Fire Management Area BRMP Risk Register is low.

It is anticipated during the peak construction phase of the project bushfire risk levels to both the Butlers Gorge and Tarraleah human settlement areas will have a significant interim increase due to:

- Construction of the project is anticipated to take six years, with a peak construction workforce of up to approximately 250 people; and
- Temporary occupancy of the workers accommodation at the existing Tarraleah Village.

Bushfire risk assessments regarding the workforce accommodation are outside of this PHA's scope. It is understood the EPC Contractor will be managing associated risks to the workers accommodation through a separate planning process external to this PHA.

This PHA has not been written in isolation and acknowledges that landscape scale management of bushfire-related risk relative to the above human settlement areas is a collective responsibility by adjacent land managers and coordinated through the Midlands Fire Management Area Committee. The authority land managers relevant to the human settlement areas include Hydro Tasmania, Parks and Wildlife Service, and Sustainable Timber Tasmania (Figure 3).

The Midlands Fire Management Area BRMP is the existing tool that facilitates cooperation and the coordination of actions between the authority land managers to reduce bushfire risk relevant to the human settlement areas.

Existing treatments within the BRMP include Hydro Tasmania's Vegetation Management Plan's annual works program, Sustainable Timber Tasmania's preparedness treatments including planned burning, road management, fire towers and physically patrolling areas on days of elevated fire risk, and Parks and Wildlife Service's planned burning programs and road management.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant fire risks associated with the project, satisfying Section 5.10 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks towards the project and adjacent human settlement areas should not preclude approval.

4.2 External bushfires impacting Tarraleah Redevelopment Project

Firshed mapping supplied by the TFS indicated that bushfire exposure levels resulting from fires impacting key sites from the external environment was at the greatest to the southeast of Site 3 at Site's 4, 5, 6, 7, 8, 9 and 10 (Figure 9).

Factors associated with the increased exposure levels include:

- Much of the area east and southeast of Site 3 is wet eucalypt forest and woodland vegetation, and plantation which is untreatable vegetation for fuel reduction burning (Section 3.3); and
- There is an extended period of time since fire has impacted much of this area indicating that fuels have the potential to be in maximum fuel condition.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant fire risks associated with bushfires impacting the project from the external environment, satisfying Section 5.10 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks towards the project should not preclude approval.

4.3 Bushfires originating within and exiting Tarraleah Redevelopment Project

Isochrone and intensity mapping supplied by the TFS indicated that when maintaining sites 1-9 each as hazard management areas, there was a clear reduction in potential bushfire rate of spread and the potential area impacted by fire as a direct result from an unplanned ignition within each site (Figures 10 & 11).

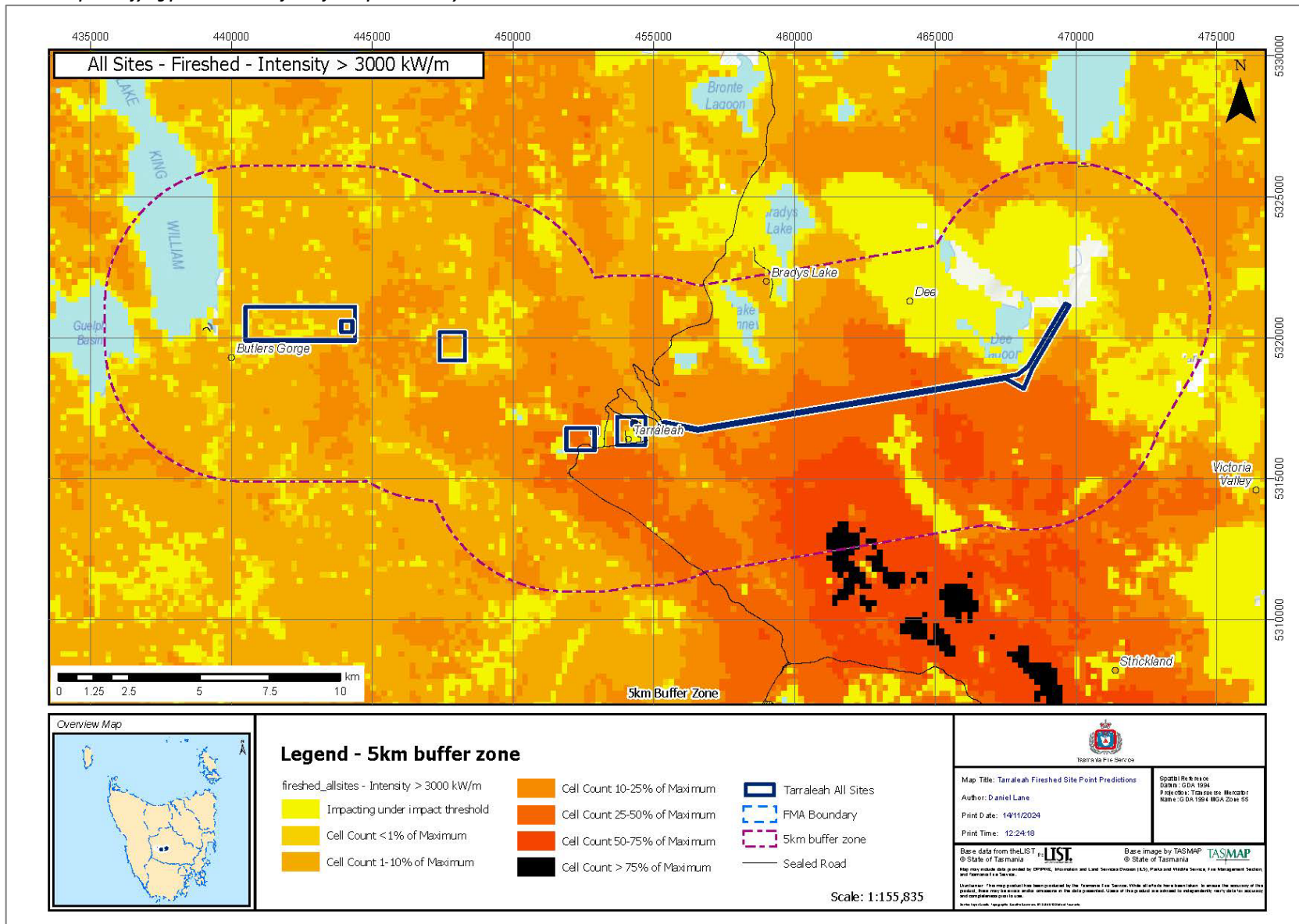
This is important as:

- It can support quick and effective suppression of bushfires reducing risk to frontline firefighters whilst providing improved outcomes for the community;
- Reduces potential disruption to the critical community infrastructure the project provides;
- Reduces potential adverse impacts to conservation significant flora and fauna; and
- Demonstrates the potential effectiveness of vegetation management within the key sites when aligned with State Government guidelines and industry best practices.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant fire risks associated with bushfires originating within the project and exiting into the external environment, satisfying Section 5.10 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks towards the project should not preclude approval.

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 9: Fireshed map identifying potential level of bushfire exposure to key sites



Data provided by Tasmania Fire Service, © State of Tasmania

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 10: Site 1 - Isochrone and intensity map showing no treatment to reduce bushfire risk

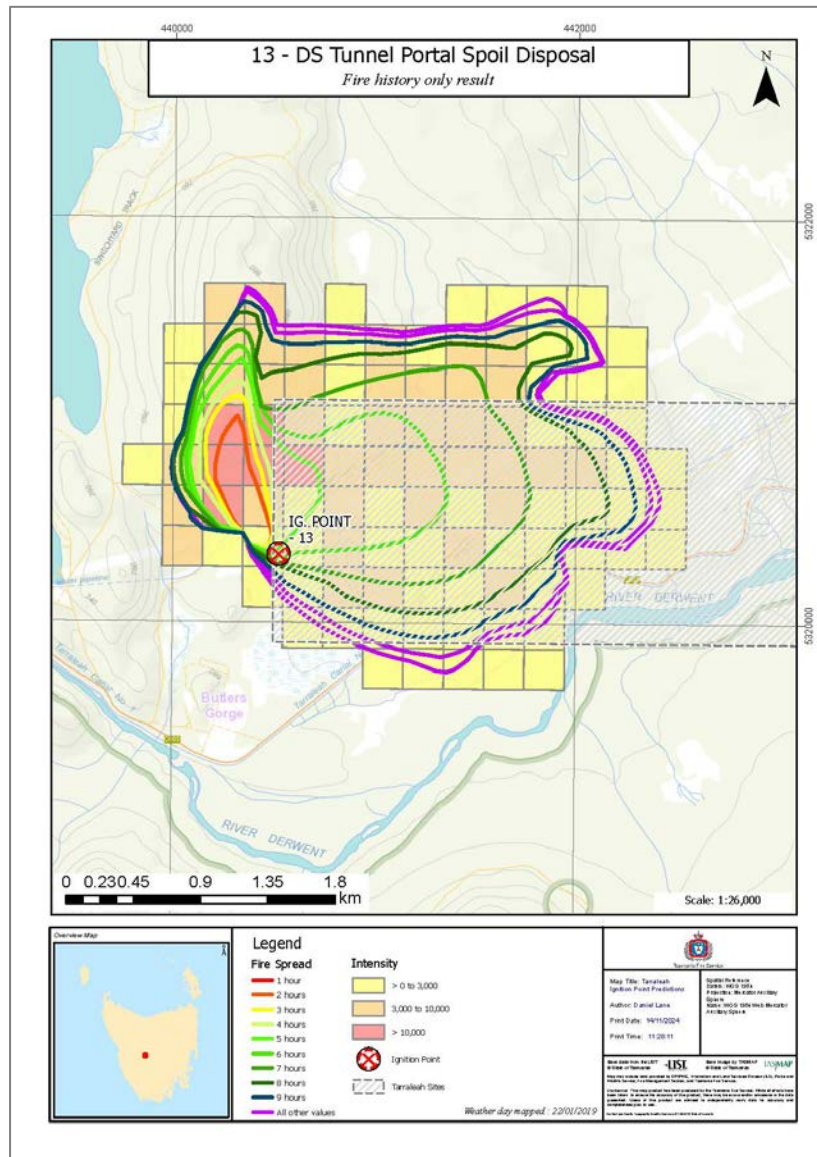
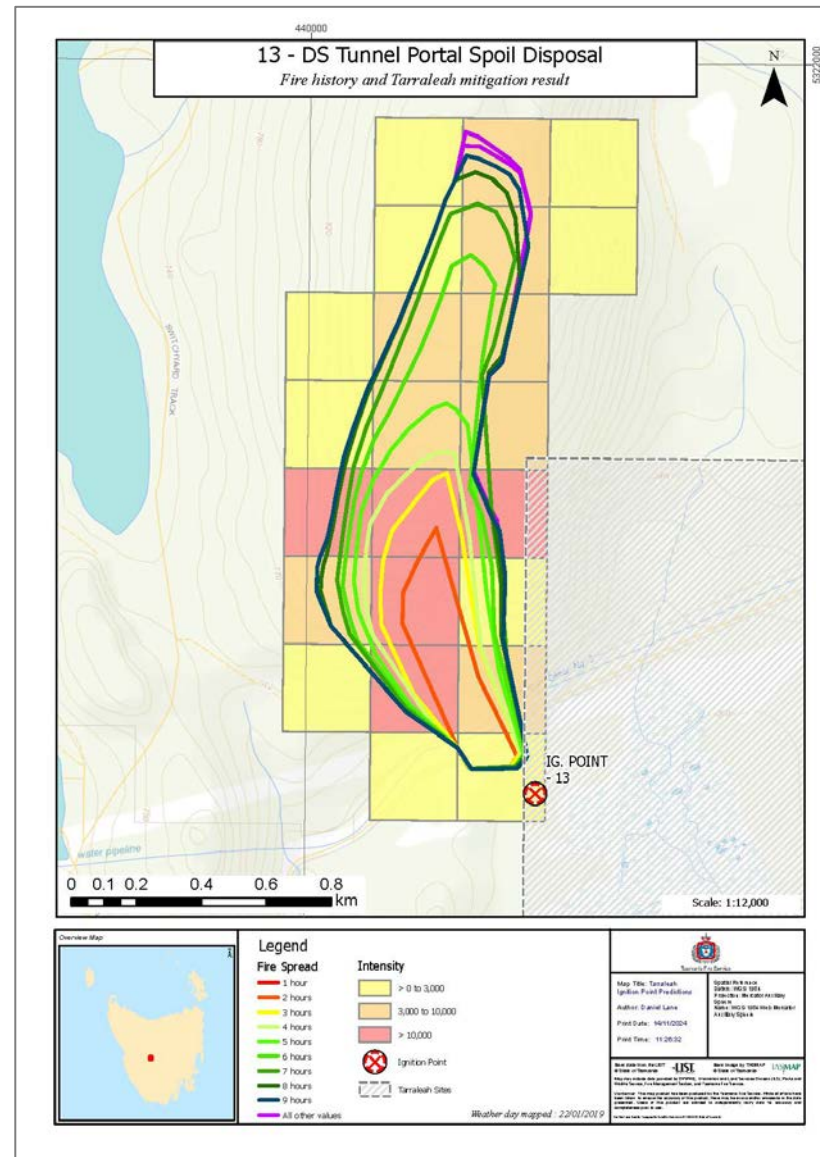


Figure 11: Site 1 - Isochrone and intensity maps showing Site 1 maintained as hazard management area



Data provided by Tasmania Fire Service, © State of Tasmania

4.4 Bushfire risk to Tarraleah Redevelopment Project key sites

Both desktop and on-ground assessment of the proposed key sites occurred during September and October 2024 and January 2025. Some construction had commenced at sites, however at many sites no construction had commenced. Therefore, bushfire hazard identification for each site have come from written, verbal and GIS data provided by Entura supported by on-ground site assessments by FRC.

The five most significant risks identified to the key sites include:

- Bushfire originating external the project area and directly impacting some or all key sites;
- The accidental ignition of a fire during construction or operational activities including hot works, plant & machinery, smoking, poor maintenance of infrastructure resulting in fire entering the external environment;
- Limited mobile phone reception potentially hindering early bushfire detection, delaying warnings and evacuations, and potentially causing entrapment of occupants;
- Butlers Gorge Road is an approx. 17km long dead-end road providing access to multiple sites in a highly forested area. Potential for Butlers Gorge Road to be impacted during a fire event, making egress not possible and entrapment occurring; and
- The level of training may be insufficient for Tarraleah Redevelopment Project staff and contractors to undertake firefighting duties.

Table 7 of this PHA includes a summary of recommended high-level principles to reduce bushfire risk to tolerable levels following the bushfire hazard identification process. Table 8 provides recommended site-specific principles and measures.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant fire risks associated with the project, satisfying Section 5.10 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks towards the project should not preclude approval.

4.5 Bushfire risk to natural assets

The main bushfire risk to natural assets within and external to the project area is considered to come from fire regimes (planned or unplanned) that are outside tolerable fire intervals. Tolerable fire intervals within thresholds of a particular vegetation community will help maintain long-term viability, whereas fire intervals outside thresholds are likely to lead to progressive changes in the structure and floristics of the vegetation community, and loss of habitat for fauna favouring that vegetation community.

High intensity bushfires that burn some or the entire project area can damage or destroy valuable fauna habitat including:

- tree hollows used as nests and dens by many birds and arboreal mammals;
- mature, senescing or dead trees that can be important invertebrate, bird and reptile habitat, and take a long time to replace;
- understorey species that provide nest and shelter sites as well as a food source for many bird and mammal species; and
- fallen logs, bark and leaf litter that provide shelter and a food source for invertebrates, frogs, reptiles, birds, and mammals.

Recommended principles and measures to reduce bushfire risks at key sites may require natural and cultural values assessments to assess what potential impacts a particular principle or measure may have on known values within the area of works.

Natural and cultural values assessments are outside of this PHA's scope, however Section 5.5 of this PHA identifies indicative ecological assessment zones for each site which should support informing potential natural and cultural value assessment footprints.

4.6 Conclusion based on Phoenix RapidFire results

The Phoenix RapidFire modelling simulated the spread and behaviour of bushfires under different fuel and weather conditions. It allowed to identify the potential for bushfire impact on identified assets as a result from fires entering the key sites from the external environment, and unplanned ignitions within the sites spreading to the external environment.

The modelling identified a potential reduction in relative risk as a direct result from implementing the recommended high-level principles identified within Table 7 of this report. Relative risk measures how bushfire impacts change in response to fuel reduction.

The modelling provides evidence to suggest the main driver for the reduction in relative risk is maintaining areas in minimal fuel state (hazard management areas).

The modelling supports to identify the criticalness of implementing the high-level principles (Table 7) to reduce bushfire risk to tolerable levels that should not preclude approval.

5 Bushfire risk treatment

5.1 Bushfire suppression within Tarraleah Redevelopment project area

Bushfire suppression responsibilities within the project area is a combination of Parks and Wildlife Service, Sustainable Timber Tasmania, and Tasmania Fire Service (the fire suppression agencies). The closest Tasmania Fire Service brigade is Bradys Lake Volunteer Fire Brigade, located approx. 7km northeast from the Tarraleah human settlement area.

It is probable, although not guaranteed, on a day of increased bushfire risk fire suppression agencies may have additional firefighting resources stood up at strategic locations within the Midlands Fire Management Area for rapid response.

Land tenure may influence which fire suppression agency initially responds to a bushfire. A likely bushfire scenario is that a bushfire is reported to 000 within proximity to the project area, the relevant fire suppression agency will be tasked to respond. Available resources may be dependent on time of day, remoteness of fire location, or other fires burning within the landscape. Additional resources may be requested from other fire suppression agencies to assist. A combination of both ground based, and air-based resources may be utilised to respond to the fire. Depending on the complexity of the fire an Incident Management Team may be enacted which would be responsible for the functions of operations, planning, and logistics of the fire. Given the remoteness of the project area and the good availability of water, aerial suppression is likely to be utilised.

5.2 Aerial fire suppression

Aerial firefighting dates back to the 1930s and has now developed into a highly effective method for assisting across all of the prevention, preparedness, response and recovery phases of bushfire management. In Australia, both fixed wing and rotary wing aircraft are used to conduct a multitude of roles in the management of bushfires, each has their strengths and weaknesses. As bushfires in Australia increase in frequency, intensity and duration due to the changing climate, aviation assets are becoming increasingly important in the critical role of fire suppression during the response phase of a bushfire event.

Aerial firefighting is a highly dynamic environment that carries inherent risks that are required to be managed both throughout the planning and operational phases of bushfire response. The individual risks attached to an aerial firefighting operation are dependent on the type of aircraft being utilised and the specific role being conducted.

It is common for aerial firefighting operations are conducted near transmission and distribution powerlines. Transmission lines are often a hazard that firefighting pilots manage regularly depending on the location of the fire incident.

Helicopters with their inherent manoeuvrability can operate in very close proximity to transmission lines. However, transmission lines become a far greater hazard for aircraft when visibility is limited, especially due to smoke as wires can become invisible to the naked eye. In this situation, once a fire nears a powerline easement additional strategies would be developed utilising both aerial and ground-based assets in a manner that exposes each to the least amount of risk possible whilst maintaining operational effectiveness.

It is important to note that aerial firefighting is just one tool in the bushfire management toolkit. It must be considered that aircraft alone very rarely extinguishes a fire and bushfire control requires a coordinated effort between aerial and ground-based personnel and assets.

Figure 12: Medium firebombing helicopter (Commercial Helicopters 2013)



5.3 Bushfire emergency planning

A Bushfire Emergency Plan is a document that contains operational procedures designed to guide occupant behaviour in a way that minimises risk to life and safety. In Tasmania, planning and building laws specifically require Bushfire Emergency Plans to be developed for Hazardous Uses and Vulnerable Uses.

Even if a development is not a Hazardous Use or Vulnerable Use, a Bushfire Emergency Plan can still be seen as industry best practice to support lowering bushfire risk to a tolerable level to occupants.

Bushfire Emergency Plans must be consistent with the Tasmania Fire Service's Bushfire Emergency Planning Guidelines, prepared by a person who holds the accreditation in accordance with the *Chief Officer's Scheme for the Accreditation of Bushfire Hazard Practitioners* and must be approved by the Tasmania Fire Service.

In response to bushfire threat, there is the choice of one of two primary emergency management actions that must be identified within a Bushfire Emergency Plan:

1. Shelter-in-place; or
2. Evacuate.

Shelter-in-place is the process of relocating people to an on-site refuge. An on-site refuge is a designated location on-site, which is within close vicinity of where people occupy, but provides sufficient protection. Evacuating is the process moving people to a safer location.

The decision to evacuate or shelter-in-place is a fundamental consideration and integral to the Bushfire Emergency Plan. The decision must therefore be based on an informed analysis of bushfire risk posed individually to each site.

Given the remoteness of the project area, the potential for Butlers Gorge Road being impacted during a fire event and making egress not possible and entrapment occurring, the evacuation of occupants to a safer location during a bushfire may not be possible.

Evaluation of bushfire risk and the safety of occupants at the sites has determined that the primary action to follow under normal bushfire conditions should be to shelter-in-place at onsite refuge/s.

Table 7 of this PHA identifies high level principal ID 1 (development and adoption of a Bushfire Emergency Plan). Table 8 identifies the need for high level principal ID 1 to be applied for each and every site.

5.4 Recommended principles to reduce bushfire risk at key sites

Bushfire risk to the project's key sites can be reduced to a tolerable level that does not preclude approval.

- Table 7 summarises recommended high-level principles that can be assigned to each site to reduce bushfire risk.
- Table 8 identifies each site, and it's assigned high-level principal/s identified within Table 7 and additional site-specific measures.

Recommended high-level principles and site-specific measures shall conform with state government guidelines and industry best practices relevant to the level of risk bushfire poses to each site. Each site has been assigned high-level principles and site-specific measures which are discussed in this section of the PHA.

The recommended high-level principles and site-specific measures have been summarised into Tables 7 & 8 of this PHA and have been prepared utilising all available information at time of assessment. These types of principles have been applied at other large infrastructure projects across Australia where the development is occurring within a bushfire environment.

A more detailed Construction Bushfire Mitigation Plan is outside of this PHA's scope; however, the later Construction Bushfire Mitigation Plan must discuss operationally how each high-level principle and site-specific measure for each site will be implemented including specifications, specific planning requirements, and should be based on strategic asset management principles with the overriding priority being preservation of life.

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8 of this PHA, the PHA should address the relevant fire risks associated with the project, satisfying Section 5.10 of the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks towards the project should not preclude approval.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Table 7: Summary of recommended high-level principles to reduce bushfire risk to tolerable level

High-level Principle ID	Recommended high-level principle
1	<p>Prior to the construction phase commencing the EPC Contractor develops and adopts a Bushfire Emergency Plan for the site which should include (but not limited to):</p> <ul style="list-style-type: none"> • How site operations are altered during total fire bans and days of high, extreme and catastrophic fire danger ratings; • Consideration be given to downsizing the number of personnel at the site on high fire danger rating days and above, including days of total fire ban; • Pre-emptive triggers to shut the site on days of extreme and catastrophic fire danger ratings; and • Refuge locations during a bushfire emergency. <p>The Bushfire Emergency Plan should be:</p> <ul style="list-style-type: none"> • Prepared by a person accredited in accordance with the <i>Chief Officer's Scheme for the Accreditation of Bushfire Hazard Practitioners</i>; and • Approved by the TFS.
2	<p>Bushfire Response Plans are developed for use during the construction phase for the site by a suitably trained and experienced person. These plans should identify responsible officers and procedures to occur when an accidental fire occurs on site.</p>
3	<p>The Principal Contractor facilitates a high standard of communication with fire response agencies and ensures the agencies are aware of the project's Bushfire Emergency Plans, and Bushfire Response Plans.</p>
4	<p>During the fire danger period, the Principle Contractor includes bushfire risk within each site's induction process including:</p> <ul style="list-style-type: none"> • An overview of each site's Bushfire Emergency Plan, and Bushfire Response Plans, and any site-specific bushfire procedures; and • As appropriate, nationally recognised training in basic bushfire awareness 22541VIC - Course in Basic Wildfire Awareness.
5	<p>During the fire danger period, daily briefings are delivered to site staff by the Principal Contractor in relation to bushfire risk levels to the project area.</p>
6	<p>Fire response agencies and relevant surrounding land managers are briefed prior to the bushfire period including familiarity with access and egress to the sites, access difficulties for larger firefighting appliances and areas restricted to smaller fire appliances.</p>
7	<p>The Principal Contractor ensures all activities undertaken during the fire danger period are compliant with relevant legislation including the <i>Fire Service Act 1979</i> and Total Fire Ban Declarations.</p>
8	<p>Ensure all site access roads and tracks are compliant with State Government guidelines and industry best practices for bushfire-prone areas including signage, width and construction standards.</p>
9	<p>Ensure roadside vegetation management is compliant (at a minimum) with State Government guidelines and industry best practices for bushfire-prone areas within the project area (Figure 13). The extent of roadside clearing and perpetual management should be based on the level of risk bushfire poses to each site.</p>
10	<ul style="list-style-type: none"> • Ensure asset protection zones, hazard management areas, fuel breaks are compliant with State Government guidelines and industry best practices. Ensure strategic asset management is considered into the design stage; and • Ensure auditing and maintenance occurs by a suitably trained and experienced person pre and during the fire danger period.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

High-level Principle ID	Recommended high-level principle
11	During the construction phase, the Principal Contractor is to provide initial bushfire response capabilities to enhance bushfire response within the project area.
12	The Principal Contractor provides sufficient static firefighting water supply and equipment fill points throughout the project area for the purposes of supporting any firefighting requirements. Static firefighting water supply and equipment fill points must be sufficient to the level bushfire risk poses to the site and meet State Government guidelines for bushfire-prone areas and industry best practices.
13	Hazardous Materials Report is developed for the site by a suitably qualified and experienced person that identifies the minimum fire protection measures required to address identified risks.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Table 8: Recommended site-specific high-level principles to reduce bushfire risk to tolerable levels

Site ID	Planned Construction Activities	Recommended Site-specific Measures	Recommended High-level Principal ID (Refer Table 7)
Site 1	See Appendix A.	<ul style="list-style-type: none"> • Adjacent service roads to pipe alignment be constructed to industry best practices for bushfire-prone areas including the following design and construction requirements: <ul style="list-style-type: none"> a) all-weather construction; b) load capacity of at least 20 tonnes, including for bridges and culverts; c) minimum carriageway width of 4 metres; d) minimum vertical clearance of vegetation of 4 metres; e) minimum horizontal clearance of vegetation of 0.5 metres from the edge of the carriageway, excluding gate posts; f) cross falls of less than 3 degrees (1:20 or 5%); g) dips less than 7 degrees (1:8 or 12.5%) entry and exit angle; h) curves with a minimum inner radius of 10 metres; i) maximum gradient of 15 degrees (1:3.5 or 28%) for sealed roads, and 10 degrees (1:5.5 or 18%) for unsealed roads; and j) terminate with a turning area for vehicles provided by one of the following: <ul style="list-style-type: none"> i. a turning circle with a minimum outer radius of 10 metres; or ii. a hammerhead “T” or “Y” turning head 4 metres wide and 8 metres long. • Consider using non-flammable resins within GRP construction to enhance fire resistant of the pipeline. • Where pipeline may be above ground, vegetation beneath is maintained in minimal fuel condition as per industry best practices during fire danger period. • During the construction period, the site office, fuel and chemical storage areas are maintained as hazard management areas with a minimum separation distance to bushfire-prone vegetation to achieve a Bushfire Attack Level (BAL) 12.5 separation distance based on a Fire Danger Index (FDI) 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • Maintain roadside verge clearing along Butlers Gorge Road to a 6m horizontal width either side of the carriageway during both construction phase and perpetually following practical completion. • All laydown yards must be cleared of vegetation. 	1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Planned Construction Activities	Recommended Site-specific Measures	Recommended High-level Principal ID (Refer Table 7)
Site 2	See Appendix A.	<ul style="list-style-type: none"> • During the construction period the site office area is maintained as a hazard management area with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • During construction and following practical completion of the portal, the vegetation adjacent to the portal is maintained perpetually as a hazard management area with a minimum separation distance from the portal to the bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. 	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,12, 13.
Site 3	See Appendix A.	<ul style="list-style-type: none"> • During the construction period the site office area is maintained as a hazard management area with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • During construction and following practical completion of the portal, the vegetation adjacent to the portal is maintained perpetually as a hazard management area with a minimum separation distance from the portal to the bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. 	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,12, 13.
Site 4	See Appendix A.	<ul style="list-style-type: none"> • During construction and following practical completion of the surge tower, the vegetation adjacent to the surge tower is maintained perpetually as a hazard management area with a minimum separation distance from the surge tower to the bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. 	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
Site 5	See Appendix A.	<ul style="list-style-type: none"> • During the construction period the site office area is maintained as a hazard management area with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • The above ground elements of the pump house should be constructed to <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i> with at a minimum consideration to ember protection. 	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Planned Construction Activities	Recommended Site-specific Measures	Recommended High-level Principal ID (Refer Table 7)
		<ul style="list-style-type: none"> Following practical completion of the pump house, the vegetation adjacent to the pump house is maintained perpetually as a hazard management area with a minimum separation distance from the pump house to the bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. Where pipeline may be above ground, vegetation beneath is maintained perpetually in minimal fuel condition as per industry best practices during fire danger period. 	
Site 6	See Appendix A.	<ul style="list-style-type: none"> During the construction period, the site office area is maintained as a hazard management area with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. The power station building (inclusive of the power station, offices and amenities for works as well as the assembly for future machine refurbishment) be constructed to <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. Construction requirements must reflect the level of risk bushfire poses to the location, it's occupants, characteristics, nature and scale of the use. Consideration must be given to refuge area requirements for the power station building as per State Government requirements. The power station building must include hazard management area/s maintained in perpetuity following practical completion with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. 	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.
Site 7	See Appendix A.	<ul style="list-style-type: none"> During the construction period, the site office area is maintained as a hazard management area with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. Following practical completion of the switchyard, the vegetation adjacent to the switchyard is maintained perpetually as a hazard management area with a minimum separation distance from the switchyard to the bushfire-prone vegetation to achieve a BAL-12.5 separation distance 	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Planned Construction Activities	Recommended Site-specific Measures	Recommended High-level Principal ID (Refer Table 7)
		based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i> .	
Site 8*	See Appendix A.	<ul style="list-style-type: none"> • The siting of site offices and laydown areas must consider topography and strongly avoid being sited with adjacent downslope effective slopes (the slope under the bushfire-prone vegetation). • During the construction period, site office areas are maintained as hazard management areas with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • Following practical completion of the Tungatinah 220 kV Substation, the vegetation adjacent to the substation is maintained perpetually as a hazard management area with a minimum separation distance from the substation to the bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • During construction of the transmission line, all laydown areas must be cleared of vegetation. • Vegetation removed during the construction phase of the transmission line must not be stockpiled onsite. The exception being where vegetation has been mulched, mulched residue is acceptable to be left in situ during (and post) mulching operations. Mulched residue cannot be heaped into piles and left. Lay down areas must not include mulched residue. • Following practical completion of the transmission line, the minimum width of the easement should be based on industry best practices as prescribed by the asset manager. This may include being 30 metres wide on either side of the centre point of the transmission tower, being a total width of 60 metres (Appendix D). 	<p>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.</p> <p>Note: Dedicated Bushfire Emergency Plan must recognise the remoteness and bushfire-prone nature of the landscape and work zone, including the length of the asset and associated work zones applicable during construction.</p>
Site 9	See Appendix A.	<ul style="list-style-type: none"> • During the construction period the site office area is maintained as a hazard management area with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 100 within Table 2.4 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • During construction and following practical completion of the portal, the vegetation adjacent to the portal is maintained perpetually as a hazard management area with a minimum separation distance from the portal to the bushfire-prone vegetation to achieve a BAL-12.5 separation 	<p>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.</p>

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Planned Construction Activities	Recommended Site-specific Measures	Recommended High-level Principal ID (Refer Table 7)
		distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i> .	
Site 10*	See Appendix A.	<ul style="list-style-type: none"> • The siting of site offices and laydown areas must consider topography and strongly avoid being sited with adjacent downslope effective slopes (the slope under the bushfire-prone vegetation). • During the construction period, site office areas are maintained as hazard management areas with a minimum separation distance to bushfire-prone vegetation to achieve a BAL-12.5 separation distance based on a FDI 50 within Table 2.6 of <i>AS3959:2018 Construction of Buildings in Bushfire-prone Areas</i>. • During construction of the transmission line, all laydown areas must be cleared of vegetation. • Vegetation removed during the construction phase of the transmission line must not be stockpiled onsite. The exception being where vegetation has been mulched, mulched residue is acceptable to be left in situ during (and post) mulching operations. Mulched residue cannot be heaped into piles and left. Lay down areas must not include mulched residue. • Following practical completion of the transmission line, the minimum width of the easement should be based on industry best practices as prescribed by the asset manager. This may include being 30 metres wide on either side of the centre point of the transmission tower, being a total width of 60 metres (Appendix D). 	<p>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.</p> <p>Note: Dedicated Bushfire Emergency Plan must recognise the remoteness and bushfire-prone nature of the landscape and work zone, including the length of the asset and associated work zones applicable during construction.</p>

*Not being assessed within EIS.

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project

Figure 13: State Government guidelines for roadside vegetation management (Source: Tasmania Fire Service)

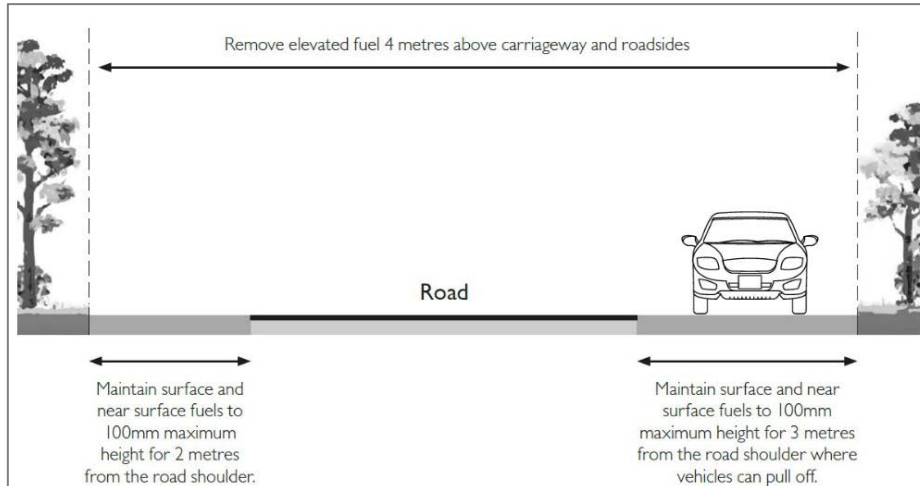


Figure 14: Butlers Gorge Road, compliant roadside vegetation management (October 2024)



5.5 Indicative ecological assessment zones

An indicative ecological assessment zone (within the context of this PHA) is a recommended area where natural and cultural values assessments relevant to this PHA may be required. The zones will support contextualising the project's potential footprint.

Indicative ecological assessment zones are the potential areas where disturbance may be required to reduce bushfire risk towards the project. Zones have been developed as an output of both desktop and on-ground risk assessments and the recommended principles to reduce bushfire risk to each site.

Table 9 of this PHA provides a summary of each site's indicative ecological assessment zone, Appendix E includes maps to provide visual context.

It is recommended natural and cultural values assessments are undertaken for each zone. Assessments should consider industry best practices, including adjacent water courses, and raptor nests and potential nesting requirements that may include assessment buffers greater than those recommended within Table 9 and Appendix E.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Indicative ecological assessment zones within this PHA are suggestive. They must be further evaluated by a suitably qualified and experienced person during the development stage of the Construction Bushfire Mitigation Plan when principles within Table 8 enter the operational planning phase.

Table 9: Summary of indicative ecological assessment zones

Site ID	Area (ha)
Site 1	67 ^{ha}
Site 2	12 ^{ha}
Site 3	34 ^{ha}
Site 4	5 ^{ha}
Site 5	8 ^{ha}
Site 6	7 ^{ha}
Site 7	6 ^{ha}
Site 8	374 ^{ha}
Site 9	25 ^{ha}
Site 10	345 ^{ha}
Total area:	883^{ha}

6 Engagement

6.1 Key stakeholders

Engagement related to bushfire risk and the supporting the development of this PHA included four key stakeholders:

- Tasmania Fire Service;
- Hazel Bros Group;
- Entura; and
- Hydro Tasmania.

Further engagement will occur through future revisions of this PHA including the incorporation of key feedback.

7 Conclusion of Preliminary Bushfire Hazard Analysis

This PHA has provided a comprehensive overview of the potential risk bushfire poses to the Tarraleah Redevelopment Project and the high-level principles necessary to mitigate these risks to a tolerable level. Bushfire risk towards the project cannot be entirely mitigated.

The analysis of risk, along with a detailed understanding of the project's key construction elements, allowed for a strategic comprehension of the project area.

The key bushfire risks to the project are identified within Table 6 and include:

- Bushfire originating external the project area and directly impacting some or all key sites;
- The accidental ignition of a fire during construction or operational activities including hot works, plant & machinery, smoking, poor maintenance of infrastructure resulting in fire entering the external environment;
- Butlers Gorge Road is an approx. 17km long dead-end road providing access to multiple sites in a highly forested area. Potential for Butlers Gorge Road to be impacted during a fire event, making egress not possible and entrapment occurring; and
- The level of training may be insufficient for Tarraleah Redevelopment Project staff and contractors to undertake firefighting duties.

Most of the vegetation adjacent to the project area can be classified as untreatable for fuel reduction burning. This has the potential to pose increased levels of bushfire risk to the project area. The greater landscape surrounding the project area has experienced significant bushfires over the past sixty years. There are documented fire history records available to the north, east, south, and west of the project area.

Based on the frequency of bushfires within the project area's surrounding landscape, it is clear this is an area that will continue to be impacted by bushfires in years to come and that the area can be considered at risk from bushfire.

Although the bushfire risk level for the Butlers Gorge, and Tarraleah human settlement areas as identified within the Midlands Fire Management Area BRMP Risk Register is low and very low, these risk levels are expected to increase significantly during the project's construction period due to an increase in site occupancy by an expected 250 people and the subsequent increase in likelihood of unplanned ignitions.

State government guidelines and industry best practices in bushfire risk management have been incorporated into high-level principles and site-specific measures to support addressing the relevant bushfire risks associated with the project. These are summarised in Tables 7 & 8 and include Bushfire Emergency Plans, Bushfire Response Plans, training, and management of vegetation. When implemented, bushfire risk levels to the project and occupants will be considerably reduced.

A more detailed Construction Bushfire Mitigation Plan is outside of this PHA's scope; however, the later Construction Bushfire Mitigation Plan must discuss operationally how each high-level principle and site-specific measure for each site will be implemented including specifications, specific planning requirements, and should be based on strategic asset management principles with the overriding priority being preservation of life.

Indicative ecological assessment zones have been recommended within this PHA. These are areas where natural and cultural values assessments relevant to this PHA may be required. There are ten zones totalling approx. 883^{ha}. The zones will support contextualising the project's potential footprint and will need to be further investigated during the Construction Bushfire Mitigation Plan development stage.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Subject to the implementation of the recommended high-level principles and site-specific measures identified within Tables 7 & 8, this PHA should address the relevant fire risks associated with the project. By doing so, this should satisfy the bushfire requirements within the *EPA Environmental Impact Statement Guidelines, Hydro Tasmania Tarraleah Redevelopment Project, Western and upstream component Tarraleah*. Bushfire risks towards the project should not preclude approval.

8 References

Attorney-General's Department (2015) *National Emergency Risk Assessment Guidelines*. Commonwealth of Australia.

Australian fire danger rating system (no date) *AFDRS*. Available at: <https://afdrs.com.au/> (Accessed: November 4, 2024).

Barker, M.J. (1991). *The Effect of Fire on West Coast Lowland Rainforest*. Tasmanian NRCP Technical Report No. 7. Forestry Commission, Tasmania, and Department of the Arts, Sport, the Environment, Tourism and Territories, Canberra.

Bushfire best practice guide. (2021). *Bushfire risk environments - Bushfire best practice guide*. [online] Available at: <https://research.csiro.au/bushfire/bushfire-basics/bushfire-risk-environments/> [Accessed 25 Sep. 2024].

Bushfire Risk Unit (no date) *Roadside Management for Bushfire Risk Mitigation*. Hobart, Tasmania: Tasmania Fire Service.

Leonard, S.W.J. (2021) Fire severity mapping and bushfire impacts on natural values in Tasmania 2019-20. Nature Conservation Report 2021/6. Department of Primary Industries, Parks, Water and Environment, Hobart.

(No date) *Tasmania Fire Service*. Available at <https://www.fire.tas.gov.au/Show?pageId=colBushfireProneAreas> (Accessed: 24 September 2024).

Pyrke, A.F. and Marsden-Smedley, J.B. (2005) 'Fire-attributes categories, fire sensitivity, and flammability of Tasmanian vegetation communities', in *Tasforests*. Hobart, Tasmania: Forestry Tasmania.

Standards Australia Limited. (2018). *AS 3959-2018 Construction of buildings in bushfire-prone areas (incorporating Amendments Nos 1, 2 and 3)*. Sydney: SAI Global Limited.

State Fire Management Council (2023). *Midlands Fire Management Area Bushfire Risk Management Plan 2020*. State Fire Management Council, p.9.

Tasmania's draft Climate change action plan 2023-25 (2023). Hobart, Tasmania: Department of State Growth.

Tasmanian Emergency Risk Assessment Guidelines TERAG 2017 VERSION 1.0 Department of Police, Fire and Emergency Management. (n.d.). Available at: <https://d2tv960yzi0spr.cloudfront.net/uploads/2018/10/TERAG-Guidelines-V-1.0-Web.pdf> [Accessed 25 Sep. 2024].

Tasmania Fire Service (2024) *TFS Risk Modelling Tarraleah Redevelopment Project Report (DRAFT)*. rep. Hobart, Tasmania.

Appendices

Appendix A: Key site construction elements

Site ID	Site Details	Site key construction materials and elements
<p>Site 1</p>	<p>An approximately 4.2km headrace pipeline.</p>	<p>The pipeline will consist of steel and GRP sections. The nominal diameter of the pipe will be 4.0 m. Four bends are proposed along the alignment of the pipeline requiring the construction of reinforced concrete thrust blocks. Service roads will be constructed either side of the pipe alignment to facilitate construction and future access as well as a laydown area to the eastern end of the pipeline, to facilitate construction and future operational requirements. The laydown area will have connections to Butlers Gorge Road. Pre-existing laydown areas at the downstream portal for Lake King William tunnel will also be used to service the western areas of the pipeline works.</p> <p>At each end of the pipe, steel sections will be installed within the tunnels. A removable section of pipeline will be located adjacent to the lake king William tunnel connection to facilitate future access.</p> <p>Subject to topography the pipeline will either be buried (either partially or wholly) or located above ground, where it is not within a tunnel. Where the pipeline is above ground, it will be located on plinths which will have either shallow footing or pile foundations depending on the ground.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Batching plant - Crushing and screening plant - Fuel storage (approx. 20,000L) - Water treatment and storage (inc. potentially acid and alkaline chemicals for dosing) - Site offices including car parks - Fuel or chemical storage – approx. volume? - Fixed generation - Fuel storage – pipeline and village - 30t ADT - 12t tipper - 20t franna cranes - Concrete pumps - 2-3t twin compactor

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Site Details	Site key construction materials and elements
		- Telehandler dry hire cranes
Site 2	Portal 1: Portals to the headrace and power tunnels (note: temporary infrastructure [e.g. site offices, water treatment plants etc.] will be located at tunnel portal during construction)	<p>The excavations will be supported by a combination of anchors, soil nails, rock bolts and shotcrete as dictated by encountered ground conditions.</p> <p>Portals will be re-vegetated following prior to completion using a combination of topsoiling and hydro seeding depending on the slope angles to be stabilised and the presence of shotcrete.</p> <p>Other ancillary works at the portals that can be expected which include surface drainage construction, minor concreting, construction of temporary offices, service and utilities reticulation etc. as required to operate the construction site.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Water treatment and storage (inc. potentially acid and alkaline chemicals for dosing) - Ventilation fans - Site offices including car parks - 33-38t excavator - 30t ADT - D8, D9 and D10 dozers - 30kL Arctic Water Cart - 2-3t compactor - 13t smooth compactor - 15t pad compactor - WA200 loader
Site 3	Portal 2: Portals to the headrace and power tunnels (note: temporary infrastructure [e.g. site offices, water treatment plants etc.] will be located at tunnel portal during construction).	
Site 4	A surge tower, approximately 70m high (above ground level) and 16m diameter.	<p>A surge shaft will be constructed using a raise borer. This consists of drilling a pilot hole down to the connection chamber.</p> <p>Shaft lining with shotcrete and steel will be installed to complete the shaft construction upon completion of the shaft excavation.</p> <p>The surge tower construction (same location) will commence after the shaft construction operation has been completed and demobilised. Reinforced concrete foundations will be constructed to receive the tower</p>

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Site Details	Site key construction materials and elements
		<p>sections. The surge tower will be constructed of welded steel sections at a diameter of 14 m and a height of approximately 70m.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Raised boring equipment - 60t slew crane - Concrete pumps - Telehandler dry hire cranes
Site 5	<p>A pumping station and approximately 1.1km long pipeline to transfer water from the existing No.2 Pond to the surge tower.</p>	<p>The pump house will be partially buried requiring excavation and following the construction of base slab and retaining walls. The above ground elements of the pump house will be constructed of a steel framed and clad building.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Water treatment and storage (inc. potentially acid and alkaline chemicals for dosing) - Site offices including car parks - 33-38t excavator - 30t ADT - D8, D9 and D10 dozers - 30kL Arctic Water Cart - 2-3t compactor - 13t smooth compactor - 15t pad compactor - WA200 loader
Site 6	<p>A new hydropower station with an installed capacity of approximately 190MW located adjacent to the</p>	<p>The power station is a multi-story building predominantly below ground level. It houses the generating equipment (2x 90MW Francis Turbines) and balance of plant and control systems to operate the power plant. The power station is tanked to RL 349 AHD to protect against flooding. Above this level, the building consists of steel framing with cladding. The building also houses offices and amenities for works as well as an assembly for future machine refurbishment.</p>

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Site Details	Site key construction materials and elements
	existing Tarraleah Power Station.	<p>Due to the size of the site, construction of the power station will be done using a approach i.e. not all of the machinery listed below will be in use all at the same time.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Water treatment and storage (inc. potentially acid and alkaline chemicals for dosing) - Site offices including car parks - 33-38t excavator (for rock excavation – drill and blast) - 45-50t excavator (for soil excavation) - 65-75t excavator (for rock excavation – drill and blast) - 28-35 hammer excavator - 30t ADT - 32t Quad axle truck and trailer - 38t Quad axle truck and trailer - D9 & D10 dozers - 815 compactor - 10-15kL watercart - 20t Franna crane - Concrete pumps - 13t smooth compactor - Telehandler dry hire crane
Site 7	An up to approximately 60m by 100m switchyard located either adjacent to the existing Tungatinah Power Station or within the easement of the existing	<p>The switchyard will be constructed using conventional air-insulated switchgear within the power station site, including concrete foundations for equipment structures, concrete oil bunds for transformers, oil/water containment (e.g. SPEL tank), and steel gantries for termination of the transmission lines.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Water treatment and storage (inc. potentially acid and alkaline chemicals for dosing) - Site offices including car parks - Grader

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Site Details	Site key construction materials and elements
	Liapootah to Palmerston transmission line.	<ul style="list-style-type: none"> - 30kL Artic watercart - WA200 loader - 13t smooth compactor
Site 8	A new, approximately 16km long 220 kilovolt (kV) transmission line connecting the new Power Station to the existing Liapootah to Palmerston transmission line located to the east.	<p>Transmission infrastructure required to connect to the existing 220kV network at Dee Lagoon (Liapootah to Palmerston transmission line) will include:</p> <ul style="list-style-type: none"> • Tungatinah 220 kV Substation: 220 kV indoor switchyard/substation at Tungatinah. This will be a compact gas-insulated switchyard (GIS) to be constructed in the space currently occupied by the toilet block between Tungatinah 110 kV switchyard and the Nive River bridge. • Tarraleah – Tungatinah 220 kV T/L: a short 0.3 km double-circuit transmission line from the power station to Tungatinah 220 kV Switchyard. This will be constructed with steel poles largely in the existing easement, involving rationalisation of the existing 110kV lines to allow space for the 220 kV lines. • Tungatinah – Dee Lagoon Tee 220 kV T/L: A 14 km double circuit transmission line from Tungatinah 220 kV Switchyard to the tee at Dee Lagoon. This will run alongside the existing 110 kV transmission lines in an extended easement. This will be constructed either with steel poles or lattice towers with a maximum structure height of 50 m. A hardstand pad at each pole location will be built, to allow a crane to be used to erect the poles.
Site 9	<p>Portal 3:</p> <p>Portals to the headrace and power tunnels (note: temporary infrastructure [e.g. site offices, water treatment plants etc.] will be located at tunnel portal during construction).</p>	<p>The excavations will be supported by a combination of anchors, soil nails, rock bolts and shotcrete as dictated by encountered ground conditions.</p> <p>Portals will be re-vegetated following prior to completion using a combination of topsoiling and hydro seeding depending on the slope angles to be stabilised and the presence of shotcrete.</p> <p>Other ancillary works at the portals that can be expected which include surface drainage construction, minor concreting, construction of temporary offices, service and utilities reticulation etc. as required to operate the construction site.</p> <p>Plant, equipment and machinery onsite may include:</p> <ul style="list-style-type: none"> - Water treatment and storage (inc. potentially acid and alkaline chemicals for dosing)

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**

Site ID	Site Details	Site key construction materials and elements
		<ul style="list-style-type: none"> - Ventilation fans - Site offices including car parks - 33-38t excavator - 30t ADT - D8, D9 and D10 dozers - 30kL Arctic Water Cart - 2-3t compactor - 13t smooth compactor - 15t pad compactor - WA200 loader
Site 10	A new, approximately 14km long 220 kilovolt (kV) transmission line connecting the new Power Station to the existing Tarraleah to Liapootah transmission line, terminating at the existing Liapootah Power Station located to the southeast.	This will involve widening an existing easement between 30m and 60m to accommodate a new 220kV transmission line.

Appendix B: Tasmanian Vegetation Fire Management Policy 2017



Tasmanian Vegetation Fire Management Policy

The purpose of the Policy is to enable the safe and effective conduct of vegetation fire management activities on public and private land across Tasmania to achieve a range of community, cultural, agricultural, silvicultural and environmental objectives.



The Principles and Strategies by which vegetation fire management will occur in Tasmania:

Principles

All stakeholders acknowledge and accept that:

- P-1** Bushfire occurs and will continue to occur in the Tasmanian landscape.
- P-2** Bushfire can be a threat, not only to people and response agencies, but also to the landscape, Aboriginal and other Tasmanian cultural heritage and the Tasmanian economy.
- P-3** A risk management approach will be applied to vegetation fire management in Tasmania.
- P-4** The paramount priority is to protect human life.
- P-5** Other priorities reflect identified community values including the protection of assets, infrastructure, cultural, historical, ecological and environmental values. The order of priority for these other values will be determined in each case using a risk-based approach.
- P-6** Bushfire does not recognise tenure. Consequently, all land owners, occupiers and managers have a responsibility to work cooperatively to manage risk.
- P-7** Fire can be used as an effective tool for vegetation fire management, risk mitigation, ecological management, silvicultural burning and as part of Aboriginal cultural practices.

Strategies

All stakeholders agree that:

- S-1** Bushfire risk will be assessed and, where appropriate, managed by actions to reduce the risk of bushfire occurring and/or to reduce the intensity and impact of bushfires when they do occur.
- S-2** In a bushfire emergency, all stakeholders will unite in their efforts to protect human life and to protect other values.

Vegetation fire management activities will:

- S-3** Aim to achieve outcomes identified by a science-based, risk management approach.
- S-4** Apply across tenures and jurisdictions and will take a landscape approach.

Organisations conducting vegetation fire management activities will:

- S-5** Share responsibility by involving stakeholders in planning and decision-making processes.
- S-6** Ensure that communities play an active role in fuel management and are engaged, educated, and supported to contribute to effective bushfire management activities.
- S-7** Actively engage with and consider the values of affected stakeholders.

Decisions about vegetation fire management will:

- S-8** Be process-based and undertaken in good faith.
- S-9** Apply a risk-based approach in accordance with *AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines*, *National Emergency Risk Assessment Guidelines (NERAG)* and *Tasmanian Emergency Risk Assessment Guidelines (TERAG)*.
- S-10** Be informed by evidence, research and contemporary practices to promote adaptability and continuous improvement.
- S-11** Seek to preserve and/or strike a balance between identified community values.

All stakeholders in vegetation fire management activities will:

- S-12** Collaborate and cooperate, including by appropriate sharing of information and resources.
- S-13** Act in good faith.

Responsibility

- R-1** The organisation conducting a vegetation fire management activity is responsible for ensuring that the Principles and Strategies are applied and for determining how to apply the Principles and Strategies in the context of the activity.

www.sfmc.tas.gov.au



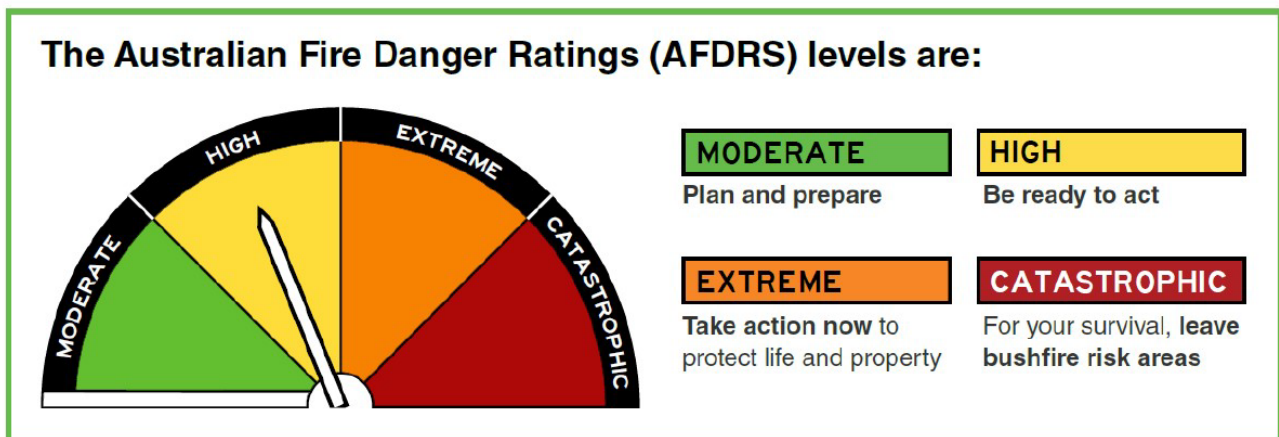
Appendix C: Australian Fire Danger Rating System

The new Australian Fire Danger Rating System (AFDRS) commenced in September 2022. The previous system operated for 60 years and was based on the forest and grassland fire spread and danger meters models developed by A.G. McArthur (CSIRO). Fire danger ratings predict and describe the potential level of danger, should a bushfire start.

The AFDRS has four Fire Danger Ratings: MODERATE, HIGH, EXTREME and CATASTROPHIC.

Forecasted fire danger ratings for your area can be accessed from the Tasmania Fire Service website www.fire.tas.gov.au during the bushfire season.

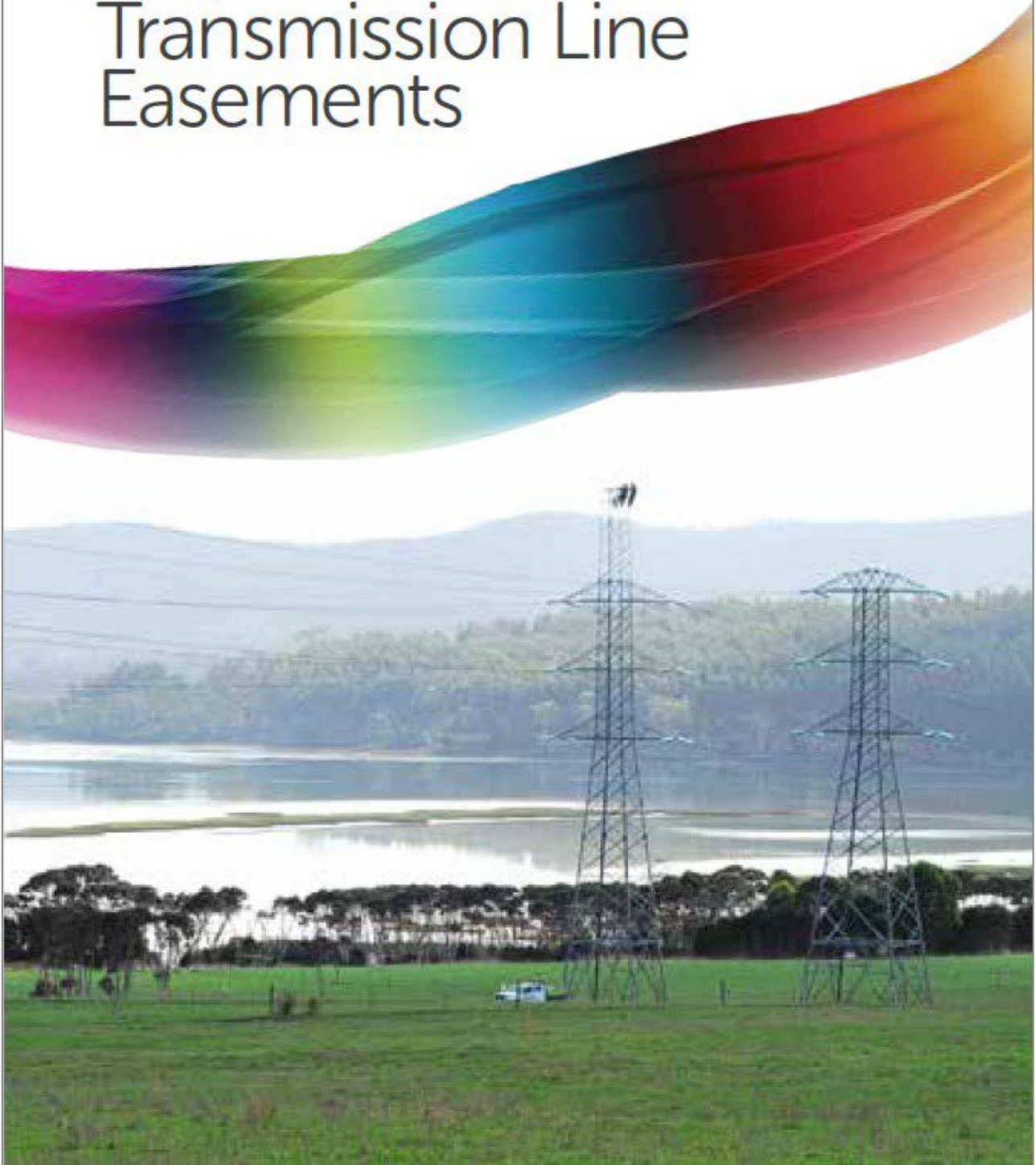
Figure 15: Australian Fire Danger Rating System
(Source: <https://afdrs.com.au/>)



Appendix D: Transmission Line Easement – TasNetworks



Transmission Line Easements





About TasNetworks

TasNetworks is the owner and operator of the regulated electricity network in Tasmania, with the exception of the Bass Strait Islands.

TasNetworks supplies the power from the generation source to homes and businesses through a network of transmission towers, substations and powerlines. Information in this handout relates to the transmission section of the network.

Our transmission lines cross public and private land. Wherever we have transmission lines, we also have transmission line easements, which are rights of way along the routes of electricity transmission lines.

As with other types of easements, such as water, gas and sewerage, transmission line easements impact on property use and development. We restrict activities within easements for land owners' safety and to ensure that we can safely operate our transmission system.

Access to easements

TasNetworks, its agents and contractors have the right to access transmission line easements at any time to ensure safe operation. This includes routine tasks such as inspecting the lines and making any necessary repairs and alterations.

We also need to manage vegetation and remove structures that could interfere with lines. Sometimes we might need to place protective structures around equipment. In addition to these easements, we also have statutory rights to carry out other necessary work on electricity infrastructure located on public land, including council land.

This brochure provides a guide to the activities that are permitted, controlled or not permitted within our transmission line easements. If you're thinking of building a fence, planting trees or doing something that might affect the transmission lines within an easement, please give us a call before proceeding.

Who these guidelines apply to

These guidelines are TasNetworks' **minimum requirements** for when work is to be performed near TasNetworks' electricity network by third parties (persons not working for TasNetworks), such as:

- councils;
- contractors to third parties;
- other infrastructure owners;
- land owners where TasNetworks' electrical assets cross their property; and
- any other persons who work in the vicinity of TasNetworks' electrical assets as or on behalf of a third party.

For simplicity, councils, contractors to third parties, other infrastructure owners and other third parties working near TasNetworks' electrical assets are referred to as 'Contractors' in this document.

These guidelines do not apply to privately-owned electrical assets.

Easements and the Act

All transmission line easements in Tasmania are subject to the *Electricity Wayleaves and Easements Act 2000* (the Act).

The types of transmission line easements we hold can be summarised into three classes:

- **Registered easements** – The details of these easements are registered on your land title documents.
- **Unregistered easements** – These easements were created by agreement with the landowners at the time the easements were acquired. They are not usually registered on land title documents, but we hold a record of them. We can provide you with copies of the agreements that relate to your property.
- **Statutory easements** – Section 11 of the Act creates easements for any transmission infrastructure erected before 6 November 1996 for which TasNetworks holds no registered or unregistered easement.

Under the Act, TasNetworks is obliged to provide a search service that locates easements throughout the transmission network. TasNetworks charges a small fee for conducting a search.

Our responsibilities within our easements

We accept responsibilities to you as owners of the land on which we have easements.

- We, our agents and our contractors can only access our easements on your property for electricity transmission related purposes, including to inspect, maintain, demolish, alter or add to infrastructure; to manage vegetation; and to remove structures that could interfere with the lines.
- Except in an emergency, we must endeavour to notify you in advance about the need for work in our easements.
- We will be diligent and careful on your property.
- We will repair any damage to your property and compensate you for any damage to crops that may result from transmission line work.
- We will cooperate with you on routes for access to easements and timing of maintenance work.
- We will maintain our fences and gates.





Transmission line inspections

We patrol all our transmission lines at least once a year to inspect the equipment and monitor vegetation growth. Ground patrols are complemented by aerial patrols, using a helicopter.

When we're planning helicopter patrols we give you advance notice through advertisements in the local newspapers.

If you have any animals that could be affected by a helicopter flying overhead, please contact us on 1300 13 7008.

We can then inform you in advance of patrols, giving you the opportunity to move your animals to a different part of your property.

Living and working with transmission lines

You can do many things within our transmission line easements. Please remember that our vehicles and those of our authorised agents and contractors must always be able to get to our lines and towers.

Please don't place any obstructions within 15 metres of transmission towers. We need to ensure that we have clear access to our towers at all times.

You can:

- Conduct normal agricultural activities (subject to restrictions on the height of mobile plant and equipment).
- Undertake most domestic recreational activities (excluding flying kites and model aircraft).
- Plant a garden, provided that trees and shrubs are below three (3) metres when fully grown.
- Park vehicles, provided they are no taller than 4.2 metres and you have taken adequate precautions to protect towers from accidental damage.
- Erect minor structures provided they are less than two metres tall and that metallic parts are earthed.
- Store non-flammable materials, subject to a height limitation of two metres.

Some activities within TasNetworks easements are controlled and require written permission from us before proceeding. For more information see 'Controlled activities' over page.

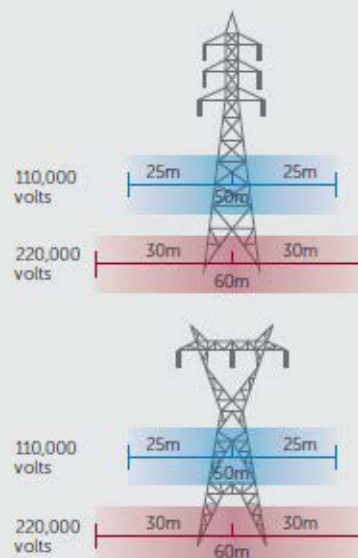
There are some restrictions on activities that may be unsafe or that could restrict us from accessing transmission line towers to undertake regular maintenance.

Width of transmission line easements

TasNetworks has a number of different types of steel transmission towers, but the two types shown in the diagram below are the most common.

> **110,000 volt transmission lines** –
The minimum width of the easement is 25 metres on either side of the centre point of the transmission tower, a total width of 50 metres.

> **220,000 volt transmission lines** –
The minimum width of the easement is 30 metres on either side of the centre point of the transmission tower, a total width of 60 metres.





Controlled activities near transmission lines

To protect you from danger and to ensure we can operate our transmission system safely and effectively, you will need to contact us on **1300 13 7008** before:

- laying or using irrigation equipment
- constructing fences, including electric fences
- constructing utility services such as electricity, telephone and water, whether overhead, buried or on the surface
- erecting unroofed verandahs and pergolas attached to residences
- erecting sporting and recreational facilities
- using machinery and equipment associated with the construction of outbuildings including sheds, stables, roofed and unroofed verandahs and pergolas attached to residences that encroach on the easement area
- planning subdivisions for residential or industrial purposes
- excavating close to towers
- operating a quarry, undertaking earthworks or building a dam.

You will need to wait for our **written** permission before you go ahead with any of these activities.

You can't:

- Construct houses, buildings or other substantial structures or parts of structures in line easements.
- Install fixed equipment, such as galvanised sheds or swimming pools.
- Plant or cultivate trees or shrubs that grow to more than three (3) metres.
- Place obstructions of any type within 15 metres of any transmission tower.

For safety reasons, it is important that you don't load vehicles or secure loads underneath transmission lines.



Contacting us

If you are unsure about what you can and cannot do on an easement or work you are about to undertake near a transmission line, please err on the side of caution and contact us.

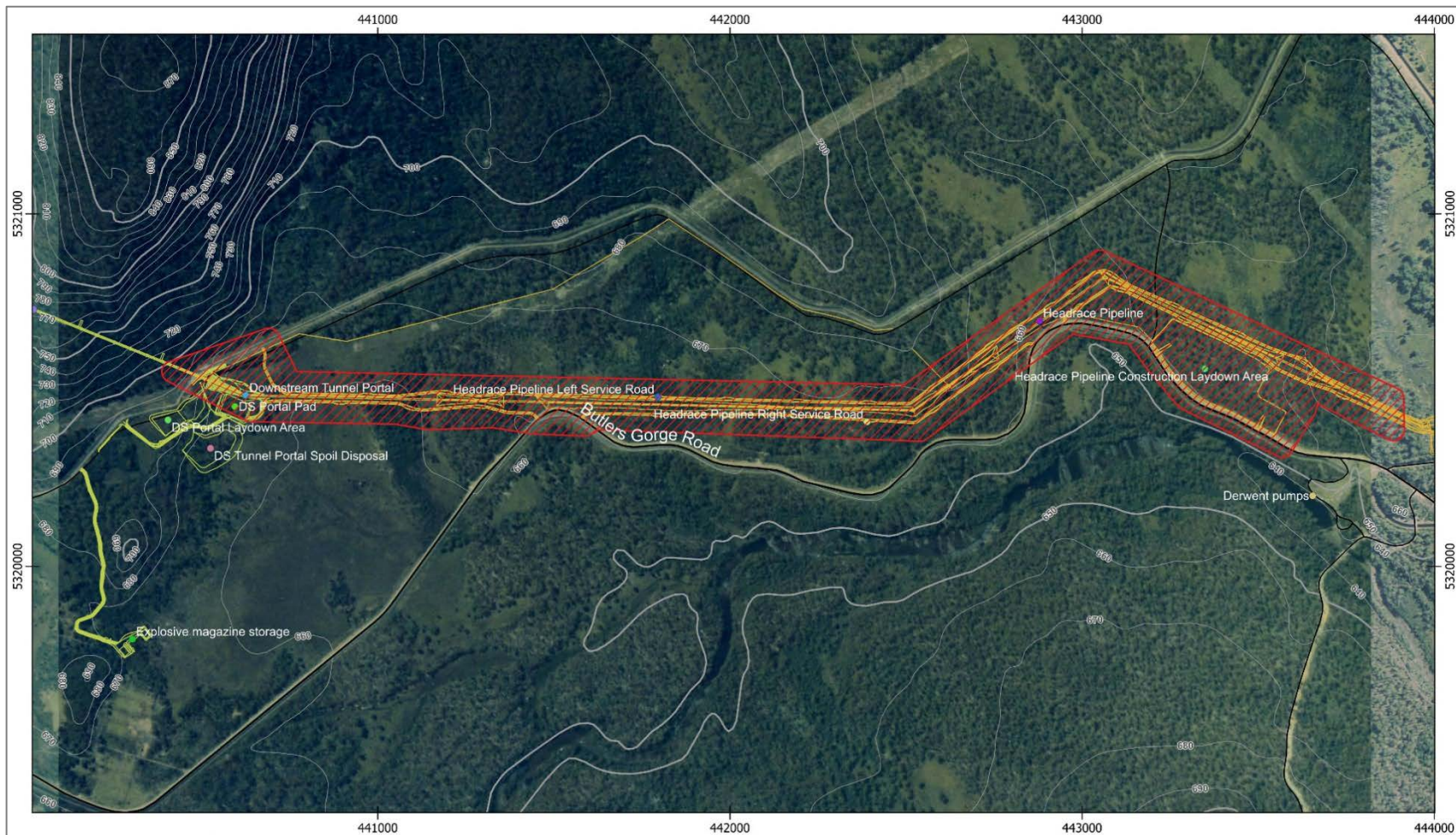
**We can be contacted on 1300 13 7008.
Ask to speak to an asset area manager.**



Tasmanian Networks Pty Ltd

Appendix E: Indicative Ecological Assessment Zones

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project



<p>Tarraleah Redevelopment Project Indicative Ecological Assessment Zone Map</p> <p style="text-align: center;">Site 1</p> <p>Map Creation: November 2024 Client: Entura</p>	<p>Legend:</p> <ul style="list-style-type: none"> PROPOSED INFRASTRUCTURE SITE 1 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 67HA <p>Contours:</p> <ul style="list-style-type: none"> 10m CONTOUR <p>Transport Segments:</p> <ul style="list-style-type: none"> ACCESS ROAD
---	--

0 250 500 m

Scale 1:10,000
@A3

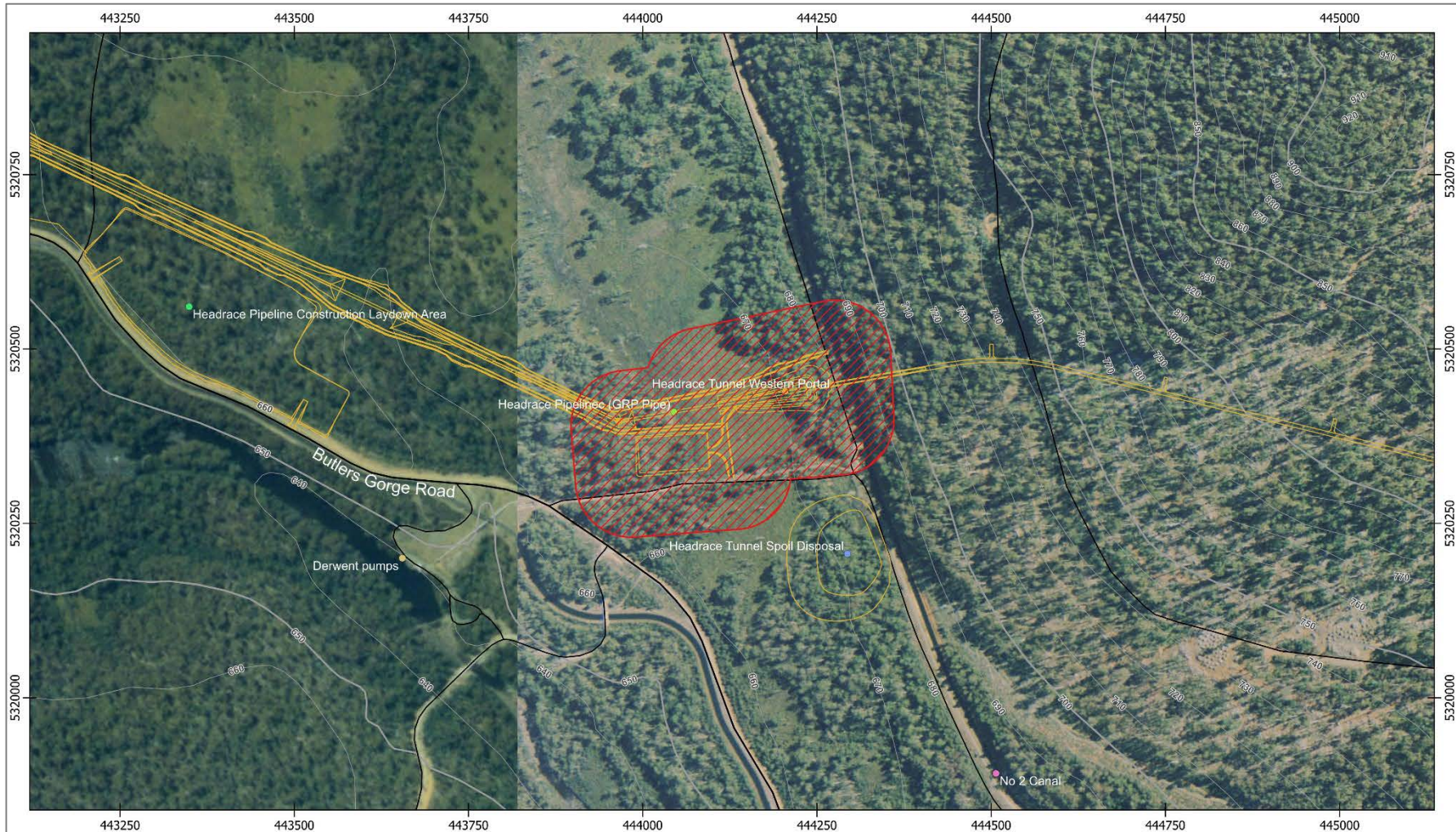
N

FIRE RISK
Consultants

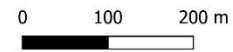
GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project



<p>Tarraleah Redevelopment Project Indicative Ecological Assessment Zone Map</p> <p style="text-align: center;">Site 2</p> <p>Map Creation: November 2024</p> <p>Client: Entura</p>	<p>Legend:</p> <ul style="list-style-type: none"> PROPOSED INFRASTRUCTURE SITE 2 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 12HA <p>Contours:</p> <ul style="list-style-type: none"> 10m CONTOUR <p>Transport Segments:</p> <ul style="list-style-type: none"> ACCESS ROAD
--	--



Scale 1:5,000
@A3



GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**



Tarraleah Redevelopment Project
Indicative Ecological Assessment Zone Map
Site 3
Map Creation: November 2024
Client: Entura

Legend:

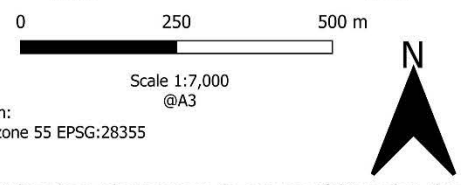
- PROPOSED INFRASTRUCTURE
- SITE 3 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 34HA

Contours:

- 10m CONTOUR

Transport Segments:

- ACCESS ROAD



GPS Projection:
GDA94/MGA zone 55 EPSG:28355

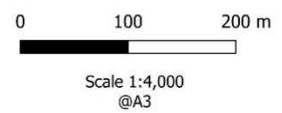
Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**



Tarraleah Redevelopment Project
Indicative Ecological Assessment Zone Map
Site 4
Map Creation: November 2024
Client: Entura

Legend:
 — PROPOSED INFRASTRUCTURE
 [Red Hatched Box] SITE 4 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 5HA
Contours:
 — 10m CONTOUR
Transport Segments:
 — ACCESS ROAD



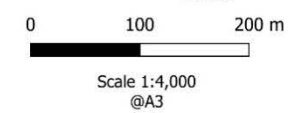
GPS Projection:
 GDA94/MGA zone 55 EPSG:28355

Disclaimer:
 While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**



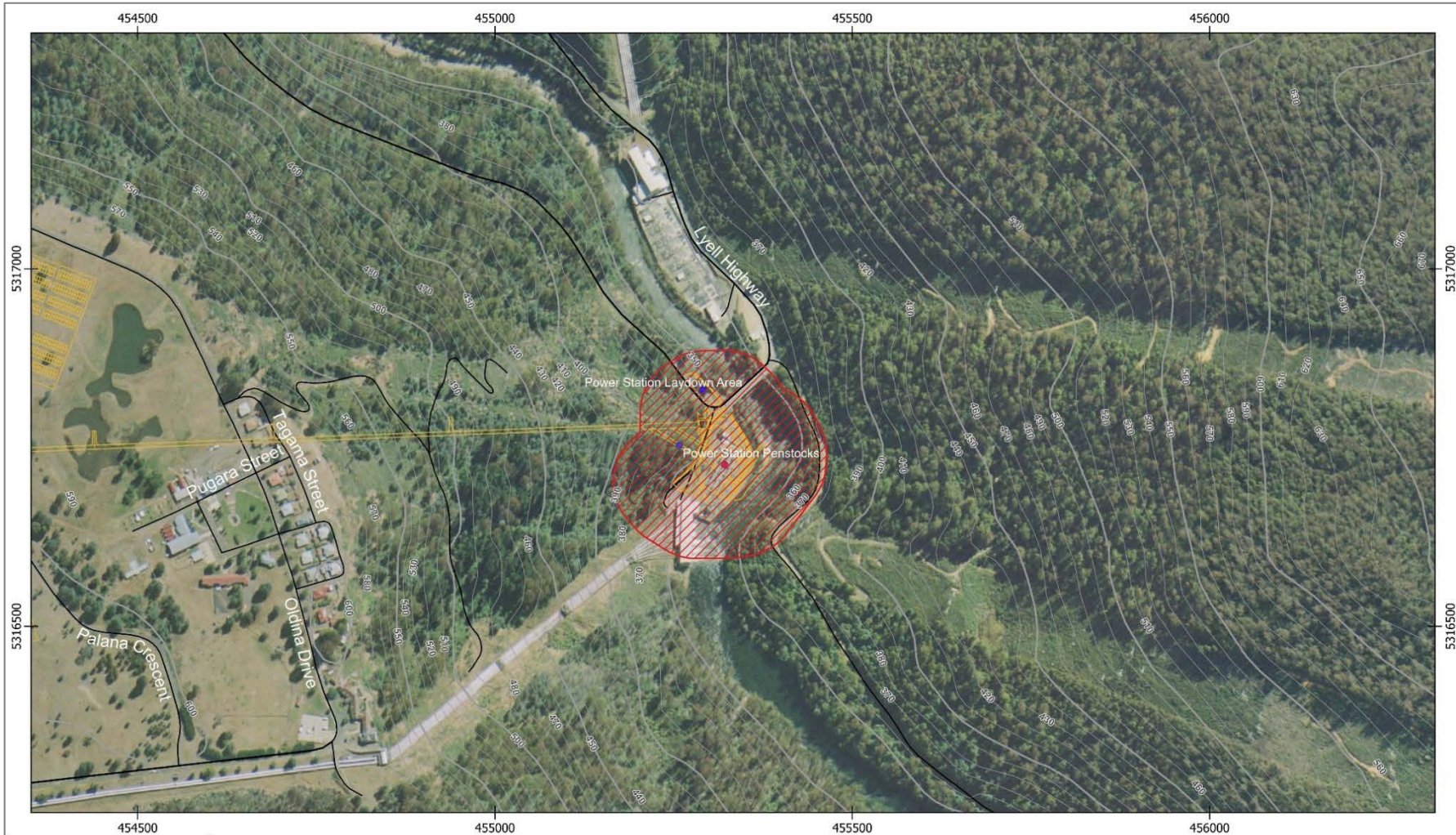
<p>Tarraleah Redevelopment Project Indicative Ecological Assessment Zone Map</p> <p align="center">Site 5</p> <p>Map Creation: November 2024 Client: Entura</p>	<p>Legend:</p> <p>— PROPOSED INFRASTRUCTURE</p> <p>▨ SITE 5 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 8HA</p>
	<p>Contours:</p> <p>— 10m CONTOUR</p>
	<p>Transport Segments:</p> <p>— ACCESS ROAD</p>



GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project



Tarraleah Redevelopment Project
Indicative Ecological Assessment Zone Map

Site 6

Map Creation: November 2024
Client: Entura

Legend:

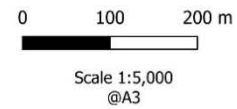
- PROPOSED INFRASTRUCTURE
- SITE 6 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 7HA

Contours:

- 10m CONTOUR

Transport Segments:

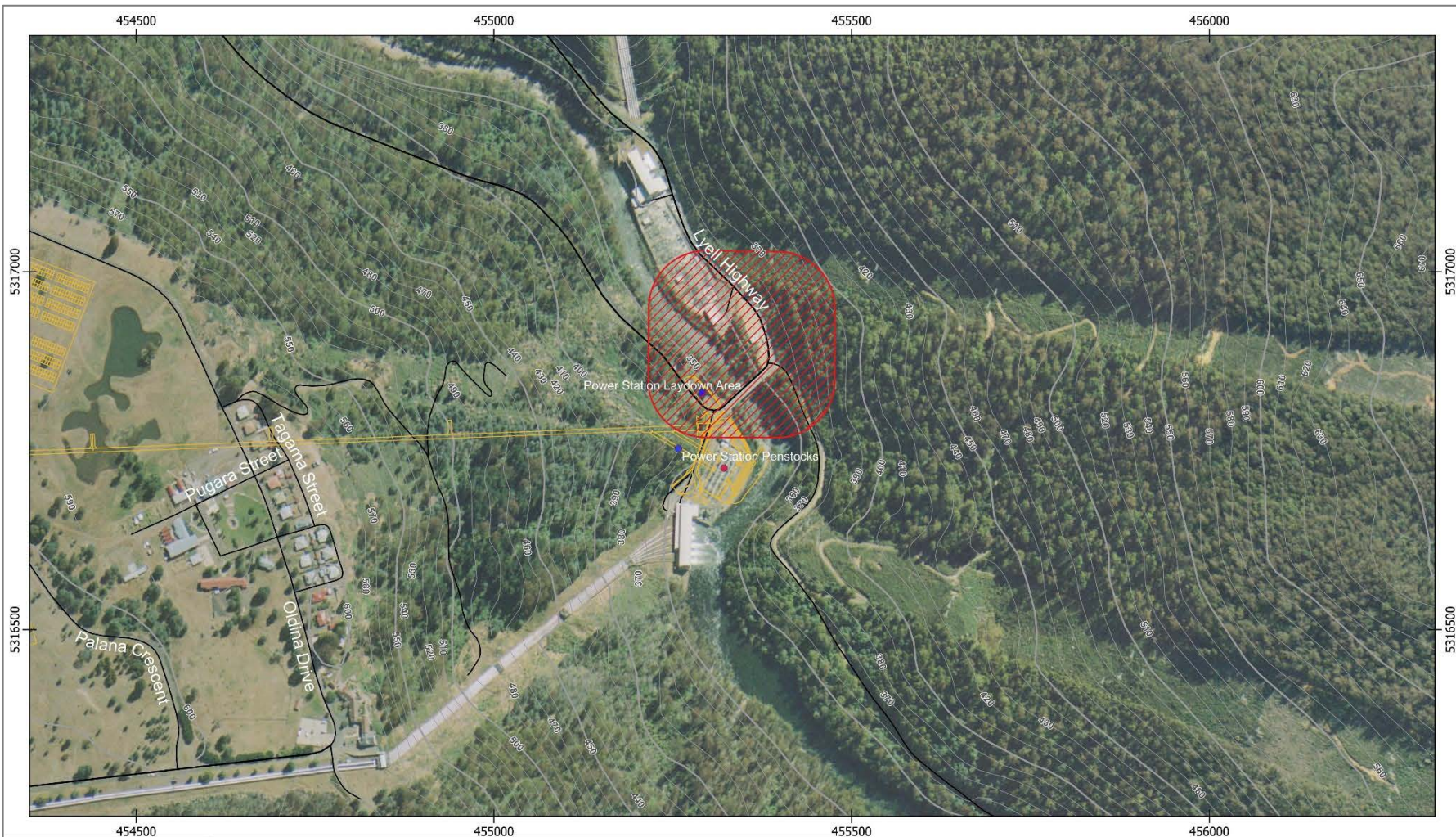
- ACCESS ROAD



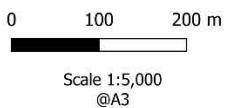
GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**



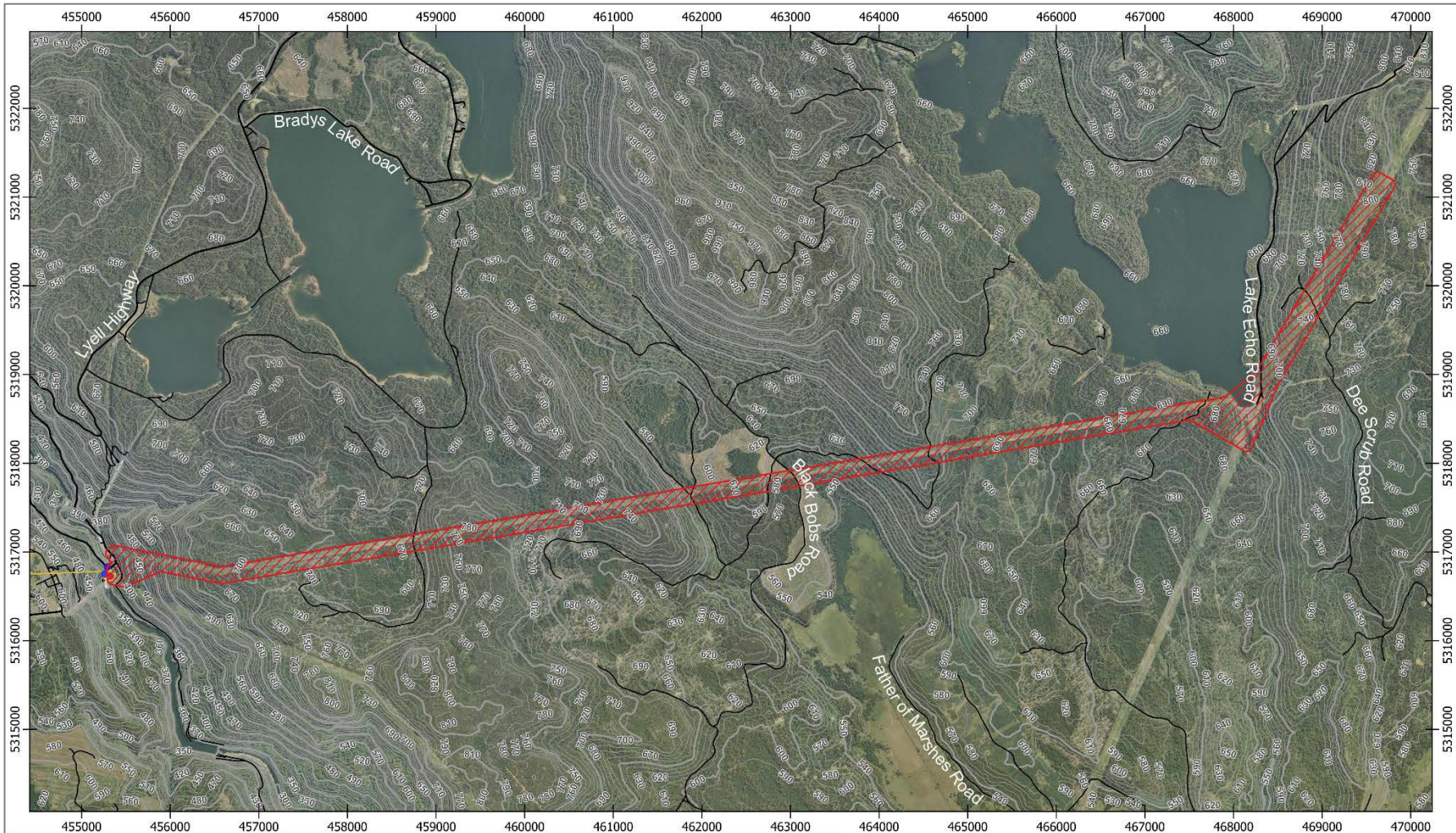
<p>Tarraleah Redevelopment Project Indicative Ecological Assessment Zone Map</p> <p align="center">Site 7</p> <p>Map Creation: November 2024 Client: Entura</p>	<p>Legend:</p> <ul style="list-style-type: none"> — PROPOSED INFRASTRUCTURE SITE 7 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 6HA <p>Contours:</p> <ul style="list-style-type: none"> — 10m CONTOUR <p>Transport Segments:</p> <ul style="list-style-type: none"> — ACCESS ROAD
--	---



GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**



Tarraleah Redevelopment Project
Indicative Ecological Assessment Zone Map
Site 8
Map Creation: November 2024
Client: Entura

Legend:

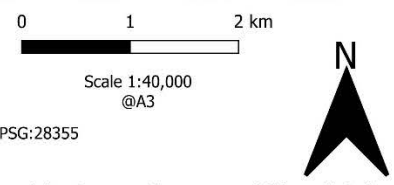
- PROPOSED INFRASTRUCTURE
- SITE 8 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 374HA

Contours:

- 10m CONTOUR

Transport Segments:

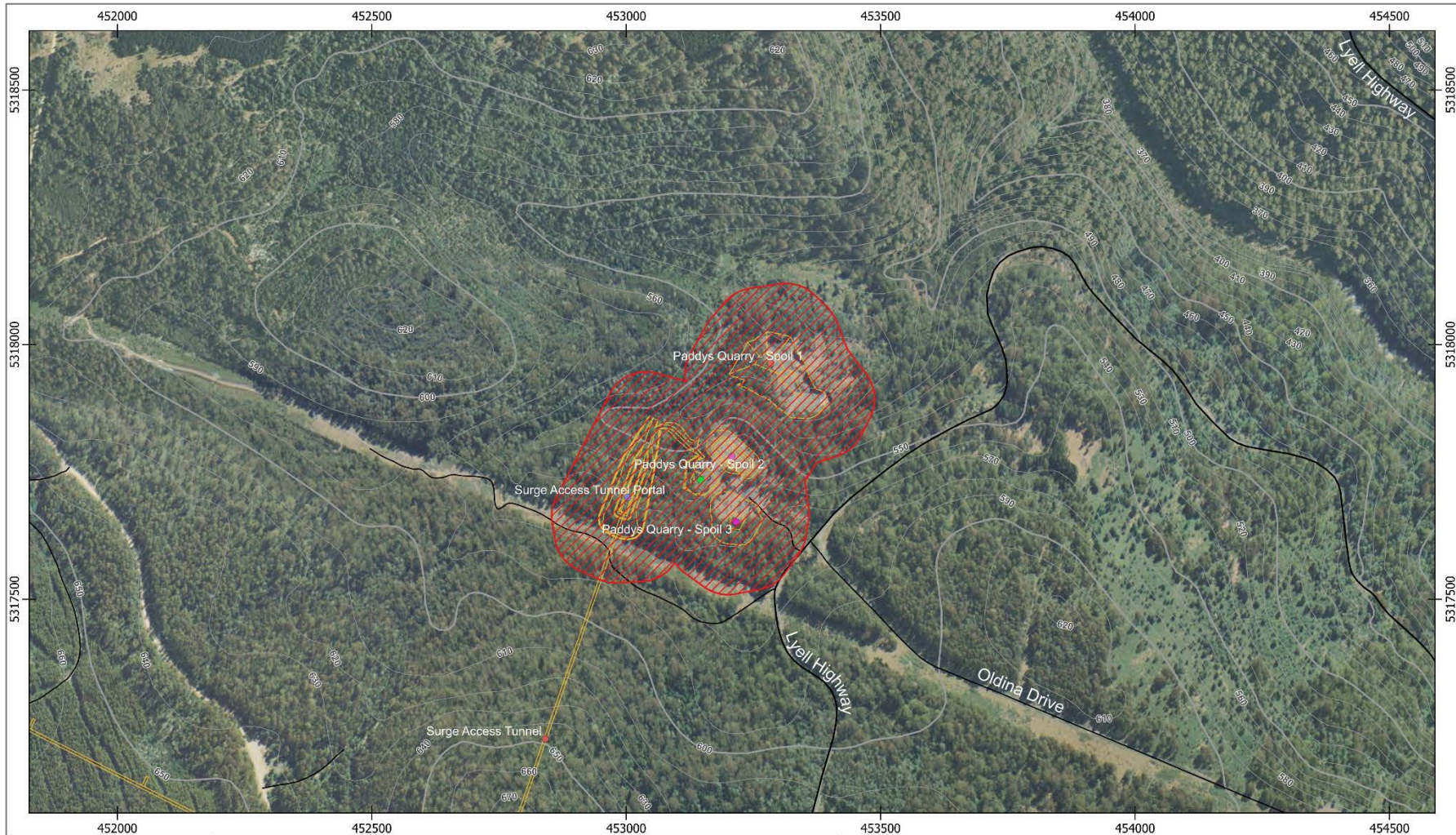
- ACCESS ROAD



GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

**Preliminary Bushfire Hazard Analysis
Tarraleah Redevelopment Project**



<p>Tarraleah Redevelopment Project Indicative Ecological Assessment Zone Map</p> <p align="center">Site 9</p> <p>Map Creation: November 2024 Client: Entura</p>	<p>Legend:</p> <ul style="list-style-type: none"> PROPOSED INFRASTRUCTURE SITE 9 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 25HA <p>Contours:</p> <ul style="list-style-type: none"> 10m CONTOUR <p>Transport Segments:</p> <ul style="list-style-type: none"> ACCESS ROAD
--	--

0 250 500 m

Scale 1:7,000
@A3

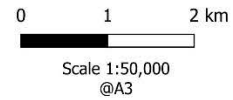
GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.

Preliminary Bushfire Hazard Analysis Tarraleah Redevelopment Project



<p>Tarraleah Redevelopment Project Indicative Ecological Assessment Zone Map</p> <p>Site 10</p> <p>Map Creation: February 2025</p> <p>Client: Entura</p>	<p>Legend:</p> <ul style="list-style-type: none"> — PROPOSED INFRASTRUCTURE SITE 10 INDICATIVE ECOLOGICAL ASSESSMENT ZONE APPROX. 345HA <p>Contours:</p> <ul style="list-style-type: none"> — 20m Contour <p>Transport Segments:</p> <ul style="list-style-type: none"> — ACCESS ROAD
---	---



GPS Projection:
GDA94/MGA zone 55 EPSG:28355

Disclaimer:
While all efforts have been taken to ensure the accuracy of this product, there may be omissions in the data accuracy. Users are advised to independently verify all data for accuracy and completeness prior to use.