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HumeLink

Bushfire Risk Assessment Report
Addendum
Technical Report 13

HumeLink

Technical Report 13 – Bushfire Risk Assessment Report Addendum

Transgrid

May 2024

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Executive summary

This Bushfire Risk Assessment Report Addendum, along with the *Technical Report 13 - Bushfire Risk Assessment Report* (Aurecon, 2023), supports the HumeLink Environmental Impact Statement (EIS) and identifies and assesses the bushfire risk during construction and operation of the amended project. Bushfire events have the potential to ignite vegetation and structures and pose a risk to life, assets, and commercial operations. Bushfire risk is influenced by regional fire weather and climate, vegetation, slope, and access. In accordance with the project's Planning Secretary's Environmental Assessment Requirements (SEARs), this Addendum constitutes an assessment of the risks to public safety from bushfire.

The bushfire assessment addendum includes surveys undertaken at areas within the amended project footprint, which have been identified as having an elevated bushfire risk, such as areas located within land classified as Bush Fire Prone Land (BFPL), and where project related personnel may work, sleep, or assemble. These include substations, construction compounds, and worker accommodation facilities. These bushfire survey areas have been assessed against the performance criteria outlined in *Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers* (PBP) (NSW RFS, 2019).

Due to the extensive, dynamic, and varying landscape across the transmission line easement, the transmission line has been conservatively classified as having the highest bushfire risk across its full extent. This is consistent with Transgrid's risk approach to asset management and assumes that every transmission line has the potential to be impacted by fire, or to initiate fire, including bushfire (Transgrid, 2023). Therefore, site specific assessments were not undertaken for the proposed transmission lines. Vegetation management within the transmission line easement would be applied uniformly across the entire transmission line and managed in accordance with Transgrid's existing vegetation management standards (as *per Transgrid Bushfire Formal Safety Assessment* (2020a), *Bushfire Risk Management Plan* (BRMP) (2021), *Overview of the 2019-20 Bushfire Damage to Transgrid's Network* (2020b), and *Maintenance Plan - Easements and access track*s (2022)) and in accordance with in *AS/NZS7000:2016 Overhead Line Design*.

Structures located on BFPL must satisfy the aims and objectives outlined in PBP (NSW RFS, 2019). These aims and objectives would be satisfactorily met provided mitigation measures outlined in Chapter 7 of this report and Chapter 9.9 of the EIS report are implemented for the amended project.

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Abbreviations

Abbreviation	Description
AEMO	Australian Energy Market Operator
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BCA	Building Code Australia
BFEMEP	Bush Fire Emergency Management and Evacuation Plan
BFMC	Bush Fire Management Committee
BFPL	Bush Fire Prone Land
BRMP	Bushfire Risk Management Plan
CSSI	Critical State Significant Infrastructure
DPE	Department of Planning and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure
EIS	Environmental Impact Statement
FFDI	Forest Fire Danger Index
km	kilometres
kV	kilovolt
kW/m^2	kilowatt per square metre
LGA	Local Government Area
m	metres
mm	millimetres
NCC	The National Construction Code
NSW	New South Wales
PBP	*Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers* (NSW RFS, 2019)
PCT	plant community type
RFS	Rural Fire Service
SEARs	Planning Secretary's Environmental Assessment Requirements
SFPP	Special Fire Protection Purpose development as defined under the *Rural Fires Act 1997*
VNI West	Victoria to NSW Interconnector West

Glossary of terms

Term	Description
access routes	Roads providing the access to and from the amended project footprint.
amended project (the)	The CSSI project "HumeLink", which is the subject of the Amendment Report and inclusive of the proposed amendments and project refinements to the project as described in the EIS. The project involves the construction and operation of high voltage transmission lines and associated infrastructure between Wagga Wagga, Bannaby and Maragle.
amended project footprint (the)	The area that has been assumed for the purpose of the Amendment Report to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
amendment	A change in what the proponent is seeking approval for following the public exhibition of the EIS. It requires changes to the project description in the EIS and amendments to the associated infrastructure application.
Amenity	'The pleasantness of a place as conveyed by desirable attributes including visual, noise, odour etc' (Australian Institute of Landscape Architects QLD, 2018).
Asset Protection Zone	A bushfire protection measure, providing a buffer around assets. APZs are designed and maintained to reduce fuel near assets, and to reduce the potential for damage from direct flame contact, smoke, radiant heat, and ember attack. The dimensions for APZs are designed in line with *Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers* (NSW RFS, 2019), and are determined by surrounding vegetation type, slope, and the type of asset/development.
brake and winch site	A brake and winch site is a temporarily cleared area where plant and equipment are located to spool and winch conductors into place on transmission line structures. The locations of the brake and winch sites may or may not be within the nominated transmission line easement. These sites are only required for construction of the amended project and do not need to be maintained during operation.
Bushfire Attack Level	A way of measuring the severity of potential ember attack, radiant heat, and direct flame contact, to a building. The BAL is used to specify the construction requirements necessary to protect buildings from bushfire in accordance with *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* and the *National Construction Code* (Australian Building Codes Board, 2019).
capacity	The volume a road is designed to accommodate.
climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed, largely, to the increased levels of atmospheric greenhouse gases.
construction compounds	Main construction compounds proposed for construction of the project. Each main construction compound would accommodate a range of facilities which may include (but not limited to): ■ laydown areas ■ site offices ■ amenities ■ construction support facilities such as vehicle and equipment storage, maintenance sheds, chemical/fuel stores and stockpile areas ■ concrete batching plants ■ helipads ■ crushing/screening plants ■ parking.
Critical State Significant Infrastructure	Critical State Significant Infrastructure (CSSI) projects are high priority infrastructure projects that are essential to the State for economic, social or environmental reasons.
EIS project (the)	The CSSI project "HumeLink", which was the subject of the EIS. The project involves the construction and operation of high voltage transmission lines and associated infrastructure between Wagga Wagga, Bannaby and Maragle
EIS project footprint (the)	The area that was assumed for the purpose of the EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
landscape	'*All aspects of a tract of land, including landform, vegetation, buildings, villages, towns, cities and infrastructure*.' (TfNSW, 2020)

Term	Description
refinement	An aspect of the project that is more specific than what has been described in the EIS and fits within the limits set by the project description and does not change what is being sought for approval for or require an amendment to the infrastructure application for the project.
the EIS report	Technical Report 13 – Bushfire Risk Assessment Report (Aurecon, 2023)
this report	Technical Report 13 – Bushfire Risk Assessment Report Addendum (Aurecon, 2024)
Transgrid	The amended project is proposed to be undertaken by NSW Electricity Networks Operations Pty Ltd (referred to as Transgrid). Transgrid is the operator and manager of the main high voltage transmission network in NSW and the ACT, and is the Authorised Network Operator for the purpose of an electricity transmission or distribution network under the provisions of the *Electricity Network Assets (Authorised Transactions) Act 2015*.
transmission line corridor	An area generally 200 metres wide that the transmission line route and easement would be located within.
Transmission line easement	A legal right attached to a parcel of land that enables the non-exclusive use of the land by a third party other than the owner. For transmission lines, an easement defines the corridor area where the lines are located and that allows access, construction and maintenance work to take place. The easements for the 500 kV transmission lines would typically be 70 metres wide. However, a few select locations would require wider easements up to 130 metres wide for specific engineering or property reasons. The easement grants a right of access and for construction, maintenance and operation of the transmission line and other operational assets.
transmission line route	The location of the transmission line structures along the middle of the transmission line easement.
transmission line structure	Proposed free standing structures to support the transmission lines.

1 Introduction

1.1 Background

Transgrid proposes to increase the energy network capacity in southern New South Wales (NSW) through the development of around 365 kilometres (km) of new 500 kilovolt (kV) high-voltage transmission lines and associated infrastructure between Wagga Wagga, Bannaby and Maragle. This project is collectively referred to as HumeLink. The project would be located across six Local Government Areas (LGAs) including Wagga Wagga City, Snowy Valleys, Cootamundra-Gundagai Regional, Upper Lachlan Shire, Yass Valley and Goulburn Mulwaree. HumeLink is a priority project for the Australian Energy Market Operator (AEMO) and the Commonwealth and NSW governments and has been declared as Critical State Significant Infrastructure (CSSI). The project would deliver a cheaper, more reliable and more sustainable grid by increasing the amount of renewable energy that can be delivered across the national electricity grid, helping to transition Australia to a low carbon future.

An EIS was prepared in accordance with the requirements of Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS was placed on public exhibition by the NSW Department of Planning, Housing and Infrastructure (DPHI) (formerly the NSW Department of Planning and Environment (DPE)) for a period of 42 days, between 30 August 2023 and 10 October 2023.

Transgrid has proposed amendments and refinements to the project as described in the EIS. The amendments provide functional improvements to the design and construction methodology of the project. The proposed amendments take into account submissions received during the public exhibition of the EIS and ongoing design and construction methodology development following the selection of the construction contractors. Project refinements have also been made as part of the ongoing design and construction methodology development since the EIS was exhibited. These amendments and refinements have been described and considered in relevant impact assessments.

1.2 Key features of the project (as publicly exhibited)

The key components of the project as outlined and assessed in the EIS included:

- construction and operation of around 360 kilometres of new double circuit 500 kV transmission lines and associated infrastructure between Wagga Wagga, Bannaby and Maragle
- construction of a new 500/330 kV substation at Gregadoo (Gugaa 500 kV substation) approximately 11 kilometres south-east of the existing Wagga 330/132 kV substation (Wagga 330 kV substation)
- demolition and rebuild of a section of Line 51 (around two kilometres in length) as a double circuit 330 kV transmission line connecting into the Wagga 330 kV substation
- modification of the existing Wagga 330 kV substation and Bannaby 500/330 kV substation (Bannaby 500 kV substation) to accommodate the new transmission line connections
- connection of transmission lines to the future Maragle 500/330 kV substation (Maragle 500 kV substation, approved under the Snowy 2.0 Transmission Connection Project (SSI-9717))
- provision of one optical repeater telecommunications hut and associated connections to existing local electrical infrastructure
- establishment of new and/or upgraded temporary and permanent access tracks
- ancillary works required for construction of the project such as construction compounds, worker accommodation facilities, utility connections and/or relocations, brake and winch sites, and helipad/helicopter support facilities.

1.3 Overview of the proposed amendments

Since the public exhibition of the EIS, several amendments and refinements to the project have been proposed.

The proposed amendments to the project include:

- changes to the transmission line corridor, including the realignment of the route through Green Hills State Forest to the west of Batlow
- change to the number and location of construction ancillary facilities, including worker accommodation facilities and construction compounds
- nomination of access tracks to support the construction and operation of the project
- additional telecommunications connections to existing substations.

The proposed refinements to the project include:

- transmission line and substation design refinements at Gregadoo
- identification of areas where controlled blasting may be required
- use of approved water sources
- use of helicopters and drones.

Refer to Chapter 2 of this report for a detailed description of amendments and refinements relevant to this assessment.

Figure 1-1 shows the location of the amended project and Figure 1-2 shows the key components of the amended project.

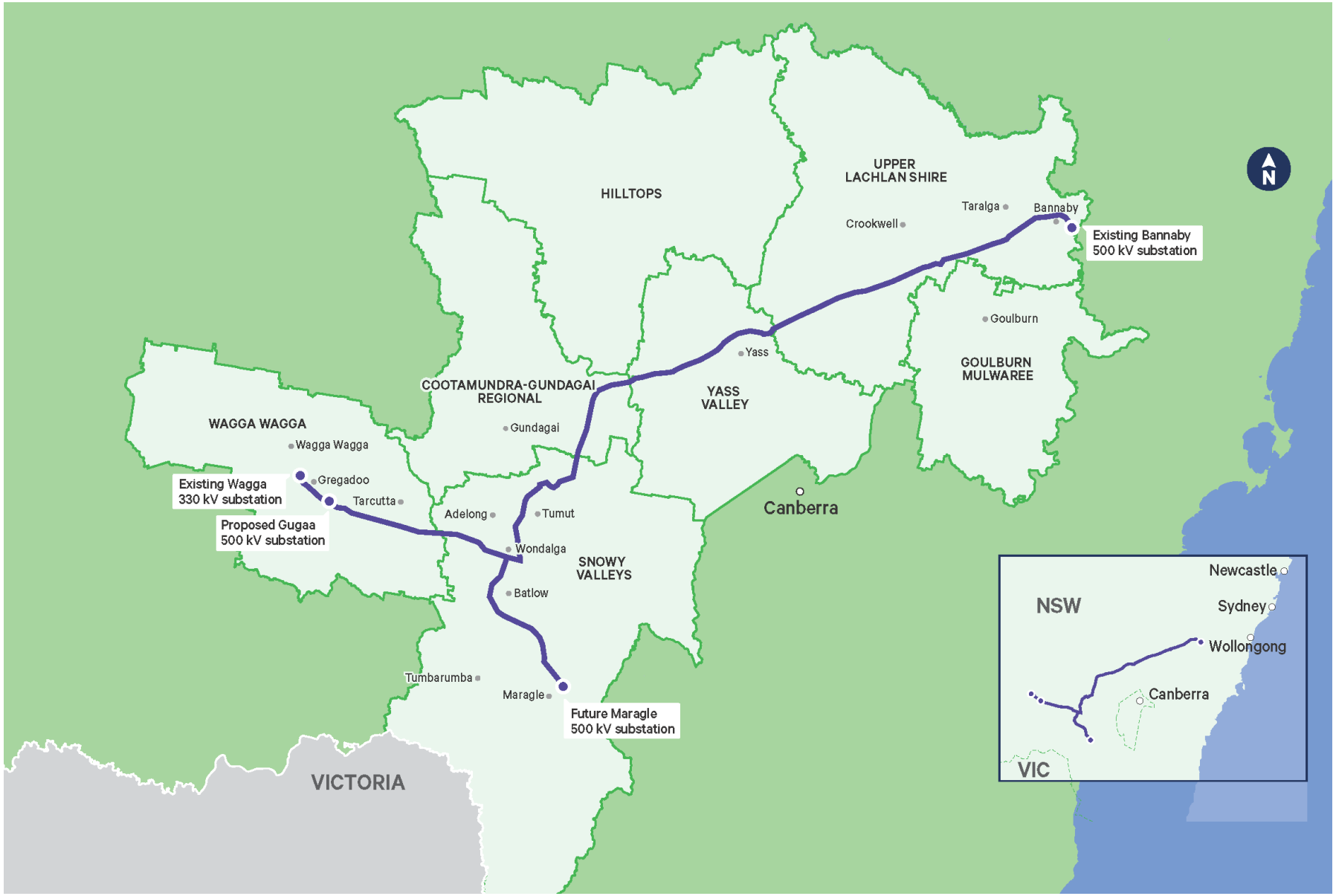
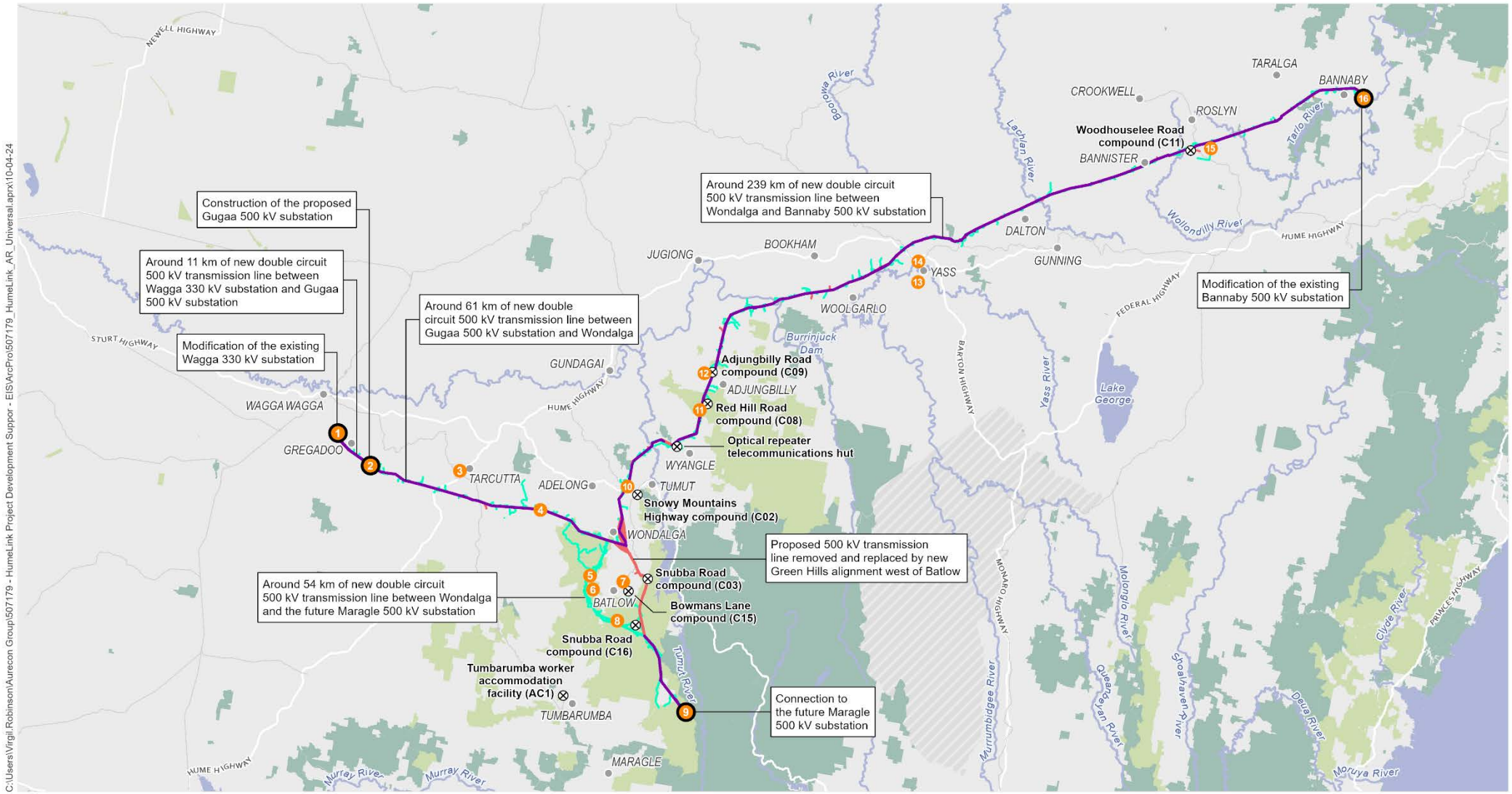


Figure 1-1 Overview of amended project location



EIS project footprint
Removed footprint
Amendments
Removed project facility
National park and reserve
State forest
Waterbody
Waterway
Major road
Railway

Construction ancillary facilities

1. Wagga 330 kV substation compound (C01)
2. Amended Gregadoo Road compound (C06)
3. Tarcutta accommodation facility and compound (AC03)
4. Ellerslie Road compound (C21)
5. Ardrossan Headquarters Road compound (C17)
6. Green Hills accommodation facility and compound (AC07)
7. Amended Memorial Avenue compound (C14)
8. Snubba Road compound (C18)
9. Maragle 500 kV substation compound (C05)
10. Gadara Road compound (C19)
11. Amended Honeysuckle Road compound (C07)
12. Adjungbilly accommodation facility and compound (AC04)
13. Yass substation compound (C10)
14. Yass accommodation facility and compound (AC05)
15. Crookwell accommodation facility and compound (AC06)
16. Amended Bannaby 500 kV substation compound (C12)

Source: *Aurecon, Transgrid, Spatial Services (DCS), ESRI Basemap*

1:925,000
0 20 40 km

Projection: GDA 1994 MGA Zone 55

HumeLink **Bushfire Assessment**

Figure 1-2: Key components of the amended project

1.4 Purpose and structure of this report

This report forms an addendum to *Technical Report 13 – Bushfire Risk Assessment Report* prepared for the EIS. The purpose of this report is to support the HumeLink Amendment Report by assessing the potential impacts to bushfire risk associated with the proposed amendments and refinements to the project

This report is structured as follows:

- Chapter 1 – Introduction: outlines the background and need for the project, and the purpose of this report.
- Chapter 2 – Summary of the proposed amendments and refinements: provides an outline and summary of the key components of the amended project
- Chapter 3 - Legislative and policy context: please refer to the EIS report.
- Chapter 4 – Methodology: provides an outline of the methodology used for the preparation of this report
- Chapter 5 – Existing environment: describes the existing environment with regards to bushfire risk.
- Chapter 6 – Assessment of impacts: please refer to the EIS report.
- Chapter 7 – Management of impacts: outlines the proposed mitigation measures for the amended project
- Chapter 8 – Conclusion: provides a conclusion on the potential bushfire risk to and from the amended project
- Chapter 9 – References: identifies the reports and documents used to generate this report.

1.5 Key project terms

The key project terms used in this assessment include:

- Amended project – The CSSI project “HumeLink”, which is the subject of the Amendment Report and inclusive of the proposed amendments and project refinements to the project as described in the EIS. The project involves the construction and operation of high voltage transmission lines and associated infrastructure between Wagga Wagga, Bannaby and Maragle.
- Amended project footprint – The area that has been assumed for the purpose of the Amendment Report to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
- EIS project footprint – The area that was assumed for the purpose of the EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.

2 Summary of the proposed amendments

Transgrid has identified several proposed amendments and refinements to the project as described in the EIS. These amendments and refinements reflect functional improvements to the design and construction methodology of the project. They consider:

- feedback received from stakeholders prior to and during the public exhibition of the EIS
- comments made in formal submissions on the EIS
- ongoing design and construction methodology development by the construction contractors.

Amendments to the project are defined as changes in what the proponent is seeking approval for following the public exhibition of the EIS. Project amendments require changes to the project description in the EIS and amendments to the associated infrastructure application.

The proposed amendments to the project include:

- changes to the transmission line corridor including the realignment of the route through Green Hills State Forest to the west of Batlow
- changes to the number and location of construction ancillary facilities including worker accommodation facilities and construction compounds
- nomination of access tracks to support the construction and operation of the project
- additional telecommunications connections to existing substations.

Refinements to the project are defined as aspects of the project that generally fit within the limits set by the project description in the EIS. Refinements do not change what is being sought approval for or require an amendment to the infrastructure application for the project. For completeness, these refinements have been considered in this report.

The proposed refinements to the project include:

- transmission line and substation design refinements at Gregadoo
- identification of areas where controlled blasting may be required
- use of approved water sources
- use of helicopters and drones.

Table 2-1 describes the proposed amendments and refinements relevant to this technical report. A full description of the amended project is provided in Chapter 3 (Description of the amended project) of the Amendment Report. The construction contractors will continue to refine and confirm the design and construction methodology during detailed design and construction planning.

Table 2-1 Key components of the proposed amendments and refinements

Amendment / refinement	Description
Amendments	
Changes to the transmission line corridor	The amended project includes the preferred western route through Green Hills State Forest. The new 32.5 km route extends from Wondalga through the Green Hills State Forest before travelling to the west and south of Batlow and connecting to the EIS project transmission line corridor in Bago State Forest. In addition, the following minor changes have been made to the transmission line corridor following design considerations and feedback from landholders: ■ 1.4 km realignment of the corridor to the north between Ashfords Road to Ivydale Road, Gregadoo ■ 2.5 km realignment of the corridor to the south across Kyeamba Creek and Tumbarumba Road, Book Book ■ 2.7 km realignment of the corridor to the east near Snowy Mountains Highway, Gadara ■ 1.4 km realignment of the corridor to the east adjacent Minjary National Park at Gocup ■ 5.9 km realignment of the corridor from north of the crossing of Tumut River to south of the crossing of Killimicat Creek, Killimicat (including a minor 50 m shift to the north for 2.1 km and a 2.6 km shift to the south from Brungle Road to before the crossing of Killimicat Creek) ■ 0.4 km realignment of the corridor to the north at Bannister, about 2.7 km west of Crookwell Road/Goulburn Road ■ narrowing of the project footprint at Wondalga, Gobarralong and Bowning.
Updates to construction ancillary facilities including worker accommodation facilities and construction compounds	**Changes to construction compounds** Following further construction planning and consultation with landowners, the following compounds described and assessed in the EIS have been removed from the project: ■ Snowy Mountains Highway compound (C02) ■ Snubba Road compound (C03) ■ Red Hill Road compound (C08) ■ Adjungbilly Road compound (C09) ■ Woodhouselee Road compound (C11) ■ Bowmans Lane compound (C15) ■ Snubba Road compound (C16). These have been replaced with the following compounds: ■ Ardrossan Headquarters Road compound (C17) – located about 7.6 km west of Batlow ■ Snubba Road compound (C18) – located about 7.7 km south of Batlow ■ Gadara Road compound (C19) – located about 4.9 km west of Tumut ■ Ellerslie Road compound (C21) – located about 13.1 km south-west of Adelong. The proposed footprint for the Gregadoo Road compound (C06), Honeysuckle Road compound (C07), Bannaby substation compound (C12) and Memorial Avenue compound (C14) have also been revised. Following these changes, there are now 11 standalone construction compounds proposed.
	Changes to accommodation facilities The Tumbarumba accommodation facility (AC01) is no longer required. The amended project includes the following new combined worker accommodation facilities and compounds: ■ Tarcutta accommodation facility and compound (AC03) – located about 1.5 km south-west of Tarcutta ■ Adjungbilly accommodation facility and compound (AC04) – located about 21.7 km east of Gundagai ■ Yass accommodation facility and compound (AC05) – located on the north-western outskirts of the Yass township ■ Crookwell accommodation facility and compound (AC06) – located off Graywood Siding Road, about 18.1 km north of Goulburn ■ Green Hills accommodation facility and compound (AC07) – located about 6.5 km west of Batlow.

Amendment / refinement	Description
Nomination of access tracks	New access tracks or upgrades to existing access tracks are proposed to connect construction areas and the transmission line easement to the existing road network. Existing unsealed local roads, forest roads, and tracks proposed for use as part of the access arrangements may also require minor improvement work, such as grading or resurfacing, or drainage work.
Additional telecommunications connections to existing substations	Removal of the telecommunications hut at Killimicat from the scope and inclusion of additional telecommunications connections to the following Transgrid substations: ■ Gadara 132 kV substation ■ Gullen Range 330 kV substation ■ Crookwell 2 330 kV substation.
Refinements	
Transmission line and substation design refinements at Gregadoo	The transmission line between the existing Wagga 330 kV substation and the proposed Gugaa 500 kV substation has been assessed as operating at 500 kV for the amended project. However, energisation to 500 kV would only occur at the commissioning stage of the Victoria to NSW Interconnector West (VNI West) project, which is subject to a separate Planning Approval. Until such time, the line will operate at 330 kV.
	Associated changes with energisation to 500 kV include additional infrastructure at the proposed and relocated Gugaa 500 kV substation. The area of land required for the proposed Gugaa 500 kV substation has also increased in size.

3 Legislative and policy context

There has been no change to the legislative and policy context presented in the EIS report.

4 Methodology

4.1 Key tasks

The methodology applied for this report is identical to that applied for the EIS report. Key steps taken in preparation of this report, based on the requirements of the *Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers* (PBP) (NSW Rural Fire Service (RFS) 2019), include:

- identification of specific bushfire survey areas, which include the areas within the amended project footprint that may experience exposure to bushfire risk during construction and operation
- desktop assessment of risks to amended project footprint through general vegetation assessment and climate data
- desktop assessment of risks to bushfire survey areas, including vegetation mapping, satellite imagery and contour data
- field investigations assessing existing vegetation, slope and access to bushfire survey areas
- desktop mapping of bushfire survey areas, including spatial analysis and modelling of bushfire values including Bushfire Attack Level (BAL) and Asset Protection Zones (APZs)
- identification of mitigation measures for bushfire risks for the amended project.

4.2 Survey areas

This amendment report assesses the following locations which constitute the bushfire survey areas for this amendment report:

- Crookwell accommodation facility and compound (AC06)
- Yass accommodation facility and compound (AC05)
- Gadara Road compound (C19)
- Green Hills accommodation facility and compound (AC07)
- Tarcutta accommodation facility and compound (AC03)
- Amended Honeysuckle Road compound (C07)
- Ellerslie Road compound (C21)
- Ardrossan Headquarters Road compound (C17)
- Amended Gregadoo Road Compound (C06)
- Adjungbilly accommodation facility and compound (AC04)
- Amended Bannaby 500 kV substation compound (C12)
- Snubba Road compound (C18) (the criteria adopted for this report is identical to that detailed in Section 4.2 of the EIS report).

4.3 Limitations and uncertainty

The limitations and uncertainty for this report are mostly identical to that detailed in Section 4.3 of the EIS report and must be referred to in the context of this report. Specific changes and/or additions to the information in the EIS report are detailed in the following sections.

4.3.1 Bushfire survey areas

Vegetation management within the transmission line easement is applied uniformly across the entire transmission line and is managed in accordance with Transgrid's existing vegetation management standards as per *Transgrid Bushfire Formal Safety Assessment* (Transgrid, 2020a), *Bushfire Risk Management Plan* (BRMP) (Transgrid, 2021), *Transmission Line Construction Manual – Major New Build TLCM-MNB* (Transgrid, 2020b), and *Maintenance Plan – Easements and access tracks* (Transgrid, 2022). The easement widths proposed in the amended project are consistent with, or greater than, the easement widths identified in national standards *AS/NZS7000:2016 Overhead Line Design*.

These management measures assume the highest potential bushfire risk across the entire transmission line route, including amendments made to this route.

4.3.2 Limitations of this report

As per the EIS report, this report is not a Bush Fire Emergency Management and Evacuation Plan (BFEMEP). Development of a BFEMEP would be addressed separately and should be consistent with *Development Planning: A guide to developing a bush fire emergency management and evacuation plan* (NSW RFS, 2014). This report does not assess controlled blasting, nor the impacts.

4.3.3 Survivability of structures

As per the EIS report, the measures identified in this assessment cannot guarantee that a building or structure would survive a bushfire event on every occasion. This is largely due to the degree of vegetation management within a site and adjoining lands, the unpredictable nature and behaviour of fire, and extreme weather conditions. The survivability of a building or structure is also dependent on a combination of measures such as landscaping, water supplies, access, building design and condition, and ongoing building maintenance.

5 Existing environment

This chapter summarises existing bushfire risks for the amended project footprint, specifically:

- regional fire weather and climate risk
- Bush Fire Prone Lands
- vegetation risk
- slope
- access.

The EIS report should be referred to for greater detail of the existing bushfire risks for the amended project footprint that remain relevant to this amendment, including:

- climate change
- historic fire occurrence
- bushfire ignition sources.

5.1 Regional fire weather and climate risk

There are several general climatic conditions that can increase the risk and spread of bushfires, including:

- wet spring and summer in the preceding year, increasing grass fuels
- dry winter and spring in the current year, reducing moisture
- blocking summer high pressure system, resulting in strong north-westerly winds.

The general climate across the amended project footprint is variable, with cooler weather generally experienced with higher elevation. Average annual rainfall conditions vary across the amended project footprint, between approximately 600 and 1,500 millimetres.

The Riverina Bush Fire Management Committee (BFMC) BRMP area (Riverina BFMC, 2018) extends from Wagga Wagga to Oberne Creek. The BRMP identifies the region as having:

- a temperate climate, with warm to hot and dry summers, and cool winters
- predominantly winter and autumn rainfall
- bushfire danger period between October and March
- prevailing bushfire weather conditions which include north-westerly winds, high daytime temperatures, low humidity, and dry lightning storms.

The Southern Tablelands BFMC BRMP area (Southern Tablelands BFMC, 2019) extends from approximately Berrima to Burrinjuck Nature Reserve and Burrinjuck Dam. The BRMP identifies the region as having:

- a temperate to cool climate, with warm to hot summers, and cool winters
- predominantly winter and spring rainfall
- bushfire danger period October and March
- prevailing bushfire weather conditions which include north/north-westerly winds, with late afternoon southerly and easterly winds, and frequent lightning strikes during storms.

The Snowy Valleys BFMC BRMP area (Snowy Valleys BFMC, 2018) extends from south of Cabramurra to Brungle to the south and north, Oberne Creek to the west, and Brindabella to the east. The BRMP identifies the region as having:

- a cool temperate climate
- predominantly winter rainfall

- bushfire danger period between November and March
- prevailing bushfire weather conditions which include north-westerly winds, high daytime temperatures, low humidity, and frequent dry lightning storms.

The South West Slopes BFMC BRMP area (South West Slopes BFMC, 2020) extends from Hilltops to Cootamundra-Gundagai. The BRMP identifies the region as having:

- a temperate climate
- winter and spring rainfall
- bushfire danger period between October and March
- prevailing bushfire weather conditions which include north-westerly to south-westerly winds, high daytime temperatures, low humidity, and frequent dry lightning storms.

The higher summer temperatures, and higher westerly wind gust speeds between spring and summer dry out and cure vegetation during summer months and increase the potential for fires to start and spread. The hot dry westerly and north-westerly winds experienced across the amended project footprint increase susceptibility to bushfires spreading from the west, south-west, and north-west.

5.2 Bush fire prone land

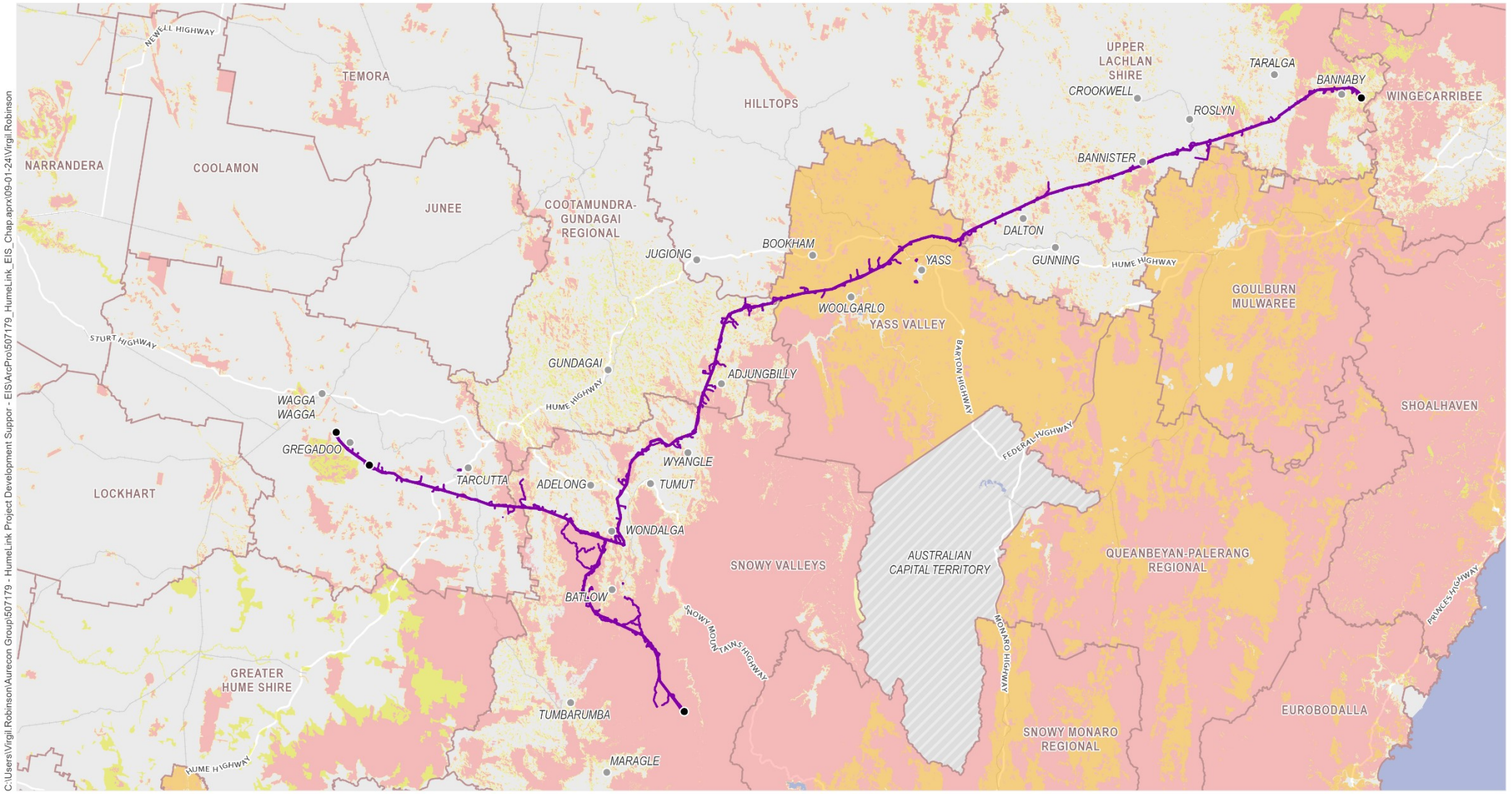
BFPL are areas that have been certified by the Commissioner of the NSW RFS as able to support a bushfire, and are categorised as follows:

- Vegetation Category 1 comprises areas of forests, woodlands, heaths (tall and short), forested wetlands, and timber plantations. These areas generally support the highest intensity bushfires and are considered the highest risk vegetation.
- Vegetation Category 2 comprises lower risk vegetation including rainforest, remnant vegetation, and vegetation separated from other larger tracts of vegetation.
- Vegetation Category 3 comprises grasslands, freshwater wetlands, semi-arid woodlands, alpine complex, and arid shrublands. This category includes grazed grasslands and woodlands. These areas can support faster moving bushfires than other categories in high winds.
- Buffer areas are either 30 metres from Vegetation Category 2 and 3, or 100 metres from Vegetation Category 1.

Low threat vegetation areas under Section 2.2.3.2 of *AS3959:2018 Construction of buildings in bushfire-prone areas* are not included as BFPL and are generally excluded following site assessment. Low threat vegetation includes areas such as golf courses, maintained public parks, sporting fields, and market gardens. The BFPL category mapped around the bushfire survey areas are outlined in Table 5-1 and Figure 5-1.

Table 5-1 BFPL category relevant to the bushfire survey areas (NSW RFS, 2022)

Site	LGA and BRMP	BFPL Category
Crookwell accommodation facility and compound (AC06)	■ Upper Lachlan Shire LGA ■ Southern Tablelands BRMP (Southern Tablelands BFMC, 2019).	Not on BFPL, but adjacent to Category 1 and Category 3 BFPL, and vegetation buffer
Yass accommodation facility and compound (AC05)	■ Yass Valley LGA ■ Southern Tablelands BRMP (Southern Tablelands BFMC, 2019).	Category 3 BFPL
Gadara Road compound (C19)	■ Snowy Valleys LGA ■ Snowy Valleys BRMP (Snowy Valleys BFMC, 2018).	Not on BFPL, but adjacent to Category 1 BFPL and vegetation buffer
Green Hills accommodation facility and compound (AC07)	■ Snowy Valleys LGA ■ Snowy Valleys BRMP (Snowy Valleys BFMC, 2018).	Not on BFPL, but adjacent to Category 1 BFPL and vegetation buffer
Tarcutta accommodation facility and compound (AC03)	■ Wagga Wagga City LGA ■ Riverina BRMP (Riverina BFMC, 2018).	Category 3 BFPL
Amended Honeysuckle Road compound (C07)	■ Snowy Valleys LGA ■ Snowy Valleys BRMP (Snowy Valleys BFMC, 2018).	Category 1 BFPL
Ellerslie Road compound (C21)	■ Snowy Valleys LGA ■ Snowy Valleys BRMP (Snowy Valleys BFMC, 2018).	Not on BFPL, but adjacent to Category 1 BFPL and vegetation buffer
Ardrossan Headquarters Road compound (C17)	■ Snowy Valleys LGA ■ Snowy Valleys BRMP (Snowy Valleys BFMC, 2018).	Category 1 BFPL
Amended Gregadoo Road compound (C06)	■ Wagga Wagga City LGA ■ Riverina BRMP (Riverina BFMC, 2018).	Category 3 BFPL
Adjungbilly accommodation facility and compound (AC04)	■ Cootamundra-Gundagai Regional LGA ■ South West Slopes BRMP (South West Slopes BFMC, 2020).	Not on BFPL, but adjacent to Category 1 BFPL and vegetation buffer
Amended Bannaby 500 kV substation compound (C12)	■ Upper Lachlan Shire LGA ■ Southern Tablelands BRMP (Southern Tablelands BFMC, 2019).	Not on BFPL
Snubba Road compound (C18)	■ Snowy Valleys LGA ■ Snowy Valleys BRMP (Snowy Valleys BFMC, 2018).	Category 1 BFPL



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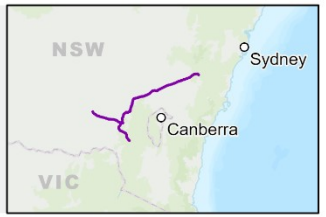
Amended project footprint
Local Government Area
Major road
Railway
Substation

Bush Fire Prone Land

Vegetation Category 1
Vegetation Category 2
Vegetation Category 3
Vegetation Buffer



Source: *Aurecon, Transgrid, NSW Rural Fire Service, Spatial Services (DCS), ESRI Basemap*

1:925,000
0 20 40km

Projection: GDA 1994 MGA Zone 55

HumeLink **Bushfire Assessment**

FIGURE 5-1: Bush Fire Prone Land

5.3 Vegetation assessment

Plant Community Type (PCTs) are the main vegetation classification system used in NSW. The PCT types occurring in the amended project footprint have been mapped by Niche (2022) and are outlined in the EIS *Technical Report 1 – Biodiversity Development Assessment Report* and *Technical Report 1 – Revised Biodiversity Development Assessment Report*. Non-native vegetation such as pine plantations are not included as a PCT, but they are classified as a 'Forest' formation under the Keith classification system (Keith, 2004), as in PBP (NSW RFS, 2019) when assessing bushfire risk. Vegetation within the amended project footprint is predominantly classified as either Forest or Woodland. Classifications are sourced from the BioNet Vegetation Classification PCT tool (DPE, 2021). In accordance with PBP requirements, vegetation formation (as per Keith, 2004) within 140 metres of the bushfire survey areas are outlined in Table 5-2.

5.4 Slope

Slope is an important risk factor that influences fire behaviour. Fires burning upslope are faster and more intense than those burning on even ground or downslope (NSW RFS, 2019), and are of greatest intensity in forest and woodland areas. Across the entire existing transmission line network, slope risk is addressed by the maintenance of vegetation management standards, and the clearance widths identified in *AS/NZS7000:2016 Overhead Line Design*. Slope is assessed within 100 metres of each bushfire survey area (refer to Table 5-2), to satisfy the aims and objectives outlined in PBP (NSW RFS 2019).

The effective slope is the slope of the land, under the vegetation hazard (as opposed to the slope of the land between the hazard and the asset) (NSW RFS, 2019) and is assessed when hazards are present on slopes less than 20 degrees.

In line with PBP (NSW RFS, 2019) requirements, slope is classified for each of the bushfire survey areas as one or more of the following:

- all upslope vegetation (considered 0 degrees)
- > 0 to 5 degrees downslope
- > 5 to 10 degrees downslope
- > 10 to 15 degrees downslope
- > 15 to 20 degrees downslope.

Slope classes were assessed using 10 metre contour data and confirmed by field assessment. Slope classes represent the effective slope under vegetation within 100 metres of the perimeter of bushfire survey areas (refer to Table 5-2).

Table 5-2 Bushfire hazard analysis and APZ requirements

Site	Direction	Slope Description	Slope Class	Vegetation description	Vegetation formation (Keith 2004)	Forest Fire Danger Index (FFDI)	Elevation	APZ requirement (BAL-29) (AS 3959-2018) or SFPP APZ
Crookwell accommodation facility and compound (AC06) (Special Fire Protection Purpose (SFPP))	**North**	Downslope to forest	>0-5º	Visual assessment confirmed grassland	Grassland	100	890 m	40 m
	South	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland			36 m
	East	Upslope to grassland and woodland	All flat/upslope	Visual assessment confirmed grazed grassland with some Eucalyptus regeneration	Woodland/ grassland			42 m
	West	Downslope to forest	>5-10º	Visual assessment confirmed forest in the south-west and grassland in the north-west	Forest/ grassland			93 m
Yass accommodation facility and compound (AC05) (SFPP)	**North**	Downslope to grassland	>0-5º	Visual assessment confirmed grassland	Grassland	100	485 m	40 m
	South	Downslope to woodland	>0-5º	Visual assessment confirmed grassland and woodland	Grassland			40 m
	East	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland			36 m
	West	Upslope to grassland	All flat/upslope	Visual assessment confirmed predominantly grassland, with a few trees	Grassland			36 m
Gadara Road compound (C19)	**North**	Upslope to woodland	All flat/upslope	Visual assessment confirmed woodland and grassland with some Eucalyptus regeneration	Grassland	80	325 m	10 m
	South	Downslope to grassland	>0-5º	Visual assessment confirmed grassland	Grassland			10 m
	East	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland			10 m
	West	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland			10 m

Site	Direction	Slope Description	Slope Class	Vegetation description	Vegetation formation (Keith 2004)	Forest Fire Danger Index (FFDI)	Elevation	APZ requirement (BAL-29) (AS 3959-2018) or SFPP APZ
Green Hills accommodation facility and compound (AC07) (SFPP)	**North**	Downslope to forest and grassland	>0-5º	Visual assessment confirmed forest and grassland	Forest	80	890 m	79 m
	South	Downslope to forest and managed land	>5-10º	Visual assessment confirmed forest and horticulture	Forest/ managed			93 m
	East	Downslope to forest	>0-5º	Visual assessment confirmed forest	Forest			79 m
	West	Downslope to forest, grassland, and managed land	>0-5º	Visual assessment confirmed forest, grassland, and horticulture	Forest/ grassland/ managed land			79 m
Tarcutta accommodation facility and compound (AC03) (SFPP)	**North**	Downslope to woodland and grassland	>0-5º	Visual assessment confirmed woodland and grassland	Grassland	80	245 m	40 m
	South	Upslope to forest	All flat/upslope	Visual assessment confirmed forest	Forest			67 m
	East	Downslope to grassland	>0-5º	Visual assessment confirmed grassland	Grassland			40 m
	West	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland			36 m
Amended Honeysuckle Road compound (C07)	**North**	Downslope to grassland and woodland	>0-5º, >5-10º	Visual assessment confirmed grazing grassland/ woodland	Woodland	80	775 m	10 m
	South	Downslope to forest	>5-10º	Visual assessment confirmed forest	Forest			31 m
	East	Upslope to forest	All flat/upslope	Visual assessment confirmed forest	Forest			10 m
	West	Downslope to forest	>5-10º	Visual assessment confirmed forest	Forest			25 m
Ellerslie Road compound (C21)	**North**	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland	80	350 m	10 m
	South	Downslope to grassland	>0-5º	Visual assessment confirmed forest	Forest			10 m
	East	Downslope to woodland	>0-5º	Visual assessment confirmed woodland	Woodland			17 m
	West	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland	Grassland			10 m
Ardrossan Headquarters Road compound (C17)	**North**	Downslope to forest	>0-5º	Visual assessment confirmed forest	Forest	80	790 m	31 m
	South	Downslope to forest	>5-10º	Visual assessment confirmed forest	Forest			25 m
	East	Downslope to forest	>5-10º	Visual assessment confirmed forest	Forest			31 m
	West	Downslope to forest	>0-5º	Visual assessment confirmed forest	Forest			31 m

Site	Direction	Slope Description	Slope Class	Vegetation description	Vegetation formation (Keith 2004)	Forest Fire Danger Index (FFDI)	Elevation	APZ requirement (BAL-29) (AS 3959-2018) or SFPP APZ
Amended Gregadoo Road compound (C06)	**North**	Downslope to grassland	>0-5º	Visual assessment confirmed grassland	Grassland	80	230 m	10 m
	South	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland wheat crop	Grassland			10 m
	East	Downslope to grassland	>0-5º	Visual assessment confirmed grassland wheat crop	Grassland			10 m
	West	Upslope to grassland	All flat/upslope	Visual assessment confirmed grassland wheat crop	Grassland			10 m
Adjungbilly accommodation facility and compound (AC04) (SFPP)	**North**	Upslope to forest	All flat/upslope	Visual assessment confirmed forest	Forest	80	590 m	67 m
	South	Downslope to forest and grassy woodland	>0-5º	Visual assessment confirmed forest and grassland	Forest/ grassland			79 m
	East	Downslope to forest	>0-5º	Visual assessment confirmed forest	Forest			79 m
	West	Downslope to forest and woodland	>0-5º	Visual assessment confirmed forest and woodland	Forest/ woodland			79 m
Amended Bannaby substation compound (C12)	**North**	Downslope to forest and grassland	>0.5, 5-10º	Visual assessment confirmed forest and grassland	Grassland	100	660 m	12 m
	South	Downslope to woodland	>5-10º	Visual assessment confirmed open woodland with grassland	Grassland			13 m
	East	Downslope to woodland	>0-5º, >5-10º	Visual assessment confirmed open woodland with grassland	Grassland			12 m
	West	Upslope to grassland and woodland	All flat/upslope	Visual assessment confirmed open woodland and grassland	Grassland			10 m
Snubba Road compound (C18)	**North**	Downslope to forest	>5-10º	Visual assessment confirmed forest plantation	Forest	80	1100 m	31 m
	South	Downslope to forest	>0-5º	Visual assessment confirmed forest plantation	Forest			31 m
	East	Downslope to forest	>0-5º, >5-10º	Visual assessment confirmed forest plantation	Forest			25 m
	West	Downslope to forest	>0-5º, >5-10º	Visual assessment confirmed forest plantation	Forest			25 m

5.5 Access

Road access is required for the construction and operation of the amended project, including construction equipment and worker vehicle access, emergency services access, and safe evacuation routes. The amended project contains several existing access routes including access from a range of several major roads:

- Hume Highway (M31) crosses the amended project footprint about 7.5 kilometres south-west of Tarcutta accommodation facility and compound (AC03) and 5 kilometres north-west of Yass accommodation facility and compound (AC05).
- Snowy Mountains Highway (B72) crosses the amended project footprint about 1.5 kilometres south of Gadara Road compound (C19).
- The amended project footprint crosses or is close to several other major roads as well as several local and private rural roads with varying speed limits and conditions.

Access routes assessed in this assessment were limited to the access routes to bushfire survey areas, consistent with the aims and objectives outlined in PBP (NSW RFS, 2019).

Primary and secondary access provide a route for emergency response as well as evacuation, with secondary access providing an alternative option should primary access become cut off by fires or fallen burnt trees. Existing primary and secondary access routes were considered for the bushfire survey areas as outlined in Table 5-3. Refer to Section 7.2 for access requirements and compliance for bushfire survey areas, in accordance with the aims and objectives outlined in PBP (NSW RFS, 2019).

Table 5-3 Existing access routes associated with bushfire survey areas

Site	Access route	Approximate distance	Type	Description
Crookwell accommodation facility and compound (AC06)	**Primary:** Graywood Siding Road	2 km	■ unsealed ■ two-way	Graywood Siding Road is an unsealed two-way local road. Access to Graywood Siding Road includes: ■ northern access from Woodhouselee Road (site access 2 km from Woodhouselee Road) ■ southern access from Woodhouselee Road (site access 5 km from Woodhouselee Road).
	Secondary: Crookwell 3 Windfarm secondary emergency access	3.3 km	■ unsealed ■ two-way	Current Crookwell 3 Windfarm secondary emergency access is an unsealed two-way private access road and includes: ■ western access from Woodhouselee Road (site access is 3.3 km from Woodhouselee Road via Turbine 10 and Steeves Creek and Pejar Creek).
	Secondary (to be constructed): Crookwell East access track and tracks to the transmission line corridor (to be constructed)	N/A	■ unsealed (proposed) ■ two-way	Crookwell East access track and tracks to the transmission line corridor is to be constructed and would include: ■ north-eastern access from AC06 to Middle Arm Road.
Yass accommodation facility and compound (AC05)	**Primary:** Faulder Avenue (south)	0.3 km	■ sealed ■ two-way	Faulder Avenue is a sealed two-way road. Access to Faulder Road includes: ■ southern access from Yass Valley Way (site access 0.3 km from Yass Valley Way).

Site	Access route	Approximate distance	Type	Description
	Secondary: Faulder Avenue (north)	2.6 km	■ sealed ■ two-way	Faulder Avenue is a sealed two-way road. Access to Faulder Road includes: ■ northern access from Cooks Hill Road (site access 2.6 km from Cooks Hill Road).
Gadara Road compound (C19)	**Primary:** Gadara Road (south)	2 km	■ unsealed ■ two-way	Gadara Road is an unsealed two-way road. Access to Gadara Road includes: ■ southern access from Snowy Mountains Highway (site access 2 km from Snowy Mountains Highway).
	Secondary: Gadara Road (north)	5.2 km	■ unsealed ■ two-way	Gadara Road is an unsealed two-way road. Access to Gadara Road includes: ■ northern access from Reka Road (site access 5.2 km from Reka Road).
Green Hills accommodation facility and compound (AC07)	**Primary:** Green Hills Access Road	2 km	■ sealed ■ two-way	Green Hills Access Road is a sealed two-way road. Access to Green Hills Access Road includes: ■ northern access to Wondalga Road (site access 3 km from Wondalga Road) ■ southern access to Batlow Road (site access 2 km from Batlow Road).
	Secondary: Lower Bago Road	2.2 km	■ sealed ■ two-way	Lower Bago Road is a sealed two-way road that can be accessed from the site on a 0.7 km stretch of an unnamed, unsealed two-way road. Access to Lower Bago Road is includes: ■ western access to Wondalga Road (site access 1.5 km from Wondalga Road) ■ eastern access to Batlow Road (site access 2.6 km from Batlow Road).
Tarcutta accommodation facility and compound (AC03)	**Primary:** Mates Gully Road (east)	2 km	■ sealed ■ two-way	Mates Gully Road is a sealed two-way road. Access Mates Gully Road includes: ■ eastern access to Sydney Street (site access approximately 1 km from Sydney Street).
	Secondary: Mates Gully Road (west)	14.5 km	■ sealed ■ two-way	Mates Gully Road is a sealed two-way road. Access Mates Gully Road includes: ■ western access to Sturt Highway (site access 13.5 km from Sturt Highway).
Amended Honeysuckle Road compound (C07)	**Primary:** Honeysuckle Road (west)	9.5 km	■ unsealed ■ local road	Honeysuckle Road is an unsealed two-way road. Access to Honeysuckle Road includes: ■ western access to Bungle Creek Road (site access 9.5 km from Brungle Creek Road).
	Secondary: Honeysuckle Road (south and east)	1.2 km	■ unsealed ■ local road	Honeysuckle Road is an unsealed two-way road. Access to Honeysuckle Road includes: ■ southern access to Wee Jasper Road. (site access 4 km from Wee Jasper Road which joins Red Hill Road) ■ eastern access to Red Hill Road (site access 1.2 km from Red Hill Road).

Site	Access route	Approximate distance	Type	Description
Ellerslie Road compound (C21)	**Primary:** Yaven Creed Road	0.8 km	■ sealed ■ two-way	Yaven Creek Road is a sealed two-way road. Access to Yaven Creek Road includes: ■ northern access to Spyglass Trail (site access 0.8 km from Spyglass Trail).
	Secondary: Ellerslie Road	0.8 km	■ unsealed ■ two-way	Ellerslie Road is an unsealed two-way road. Access to Ellerslie Road includes: ■ northern access to One Tree Hill Trail (site access 0.8 km from One Tree Hill Trail).
Ardrossan Headquarters Road compound (C17)	**Primary:** Ardrossan Headquarters Road	0.8 km	■ sealed ■ two-way	Ardrossan Headquarters Road is a sealed two-way road. Access to Ardrossan Headquarters Road includes: ■ western access to Wondalga Road (site access 0.8 km from Wondalga Road).
	Secondary: Back Camp Road	2.8 km	■ unsealed ■ two-way	Back Camp Road is an unsealed two-way road. Access to Back Camp Road includes: ■ eastern access to Bridge Road (site access 2.8 km from Bridge Road).
Amended Gregadoo Road compound (C06)	**Primary:** Livingstone Gully Road (north)	0.8 km	■ unsealed ■ two-way ■ local road	Livingstone Gully Road is an unsealed two-way road. Access to Livingstone Gully Road includes: ■ northern access to Gregadoo E Road (site access 1 km from Gragadoo E Road).
	Secondary: Livingstone Gully Road (south)	11.4 km	■ unsealed ■ two-way ■ local road	Livingstone Gully Road is an unsealed two-way road. Access to Livingstone Gully Road includes: ■ southern access to Compton Road (site access 11.1 km from Compton Road).
Adjungbilly accommodation facility and compound (AC04)	**Primary:** Adjungbilly Road (south and east)	5.2 km	■ sealed ■ two-way ■ local road	Adjungbilly accommodation facility and compound is accessible directly from Adjungbilly Road. Access to Adjungbilly Road includes: ■ southern access (site access 5.2 km from Fern Hill Road) ■ eastern access (site access 5.2 km from Nanangroe Road).
	Secondary: Adjungbilly Road (north-west)	13.8 km	■ sealed ■ local road ■ rural road	Adjungbilly accommodation facility and compound is accessible directly from Adjungbilly Road: Access to Adjungbilly Road includes: ■ north-western access to Gobarralong Road (site access 13.8 km from Gobarralong Road).
Amended Bannaby 500 kV substation compound (C12)	**Primary:** Hanworth Road (west)	6.3 km	■ sealed ■ local road ■ rural road	Hanworth Road is a sealed road. Access to Hanworth Road includes: ■ western access from Bannaby Road (site access approximately 6.3 km from Bannaby Road).
	Secondary: Hanworth Road (west)	11 km	■ sealed ■ local road ■ rural road	Hanworth Road is a sealed road. Access to Hanworth Road includes: ■ eastern access from unsealed rural road providing property access, 16 km to Wollondilly River.

Site	Access route	Approximate distance	Type	Description
Snubba Road compound (C18)	**Primary:** Kopsens Road	2 km	■ unsealed ■ two-way	Kopsens Road is an unsealed two-way road. Access to Kopsens Road includes: ■ western access from Central Logging Road (site access approximately 2 km from Central Logging Road).
	Secondary: Bago Forest Way	3.3 km	■ unsealed ■ two-way	Bago Forest Way is an unsealed two-way road. Access to Bago Forest Way includes: ■ northern access from Old Telegraph Track (site access approximately 3.3 km from Old Telegraph Track).

6 Assessment of impacts

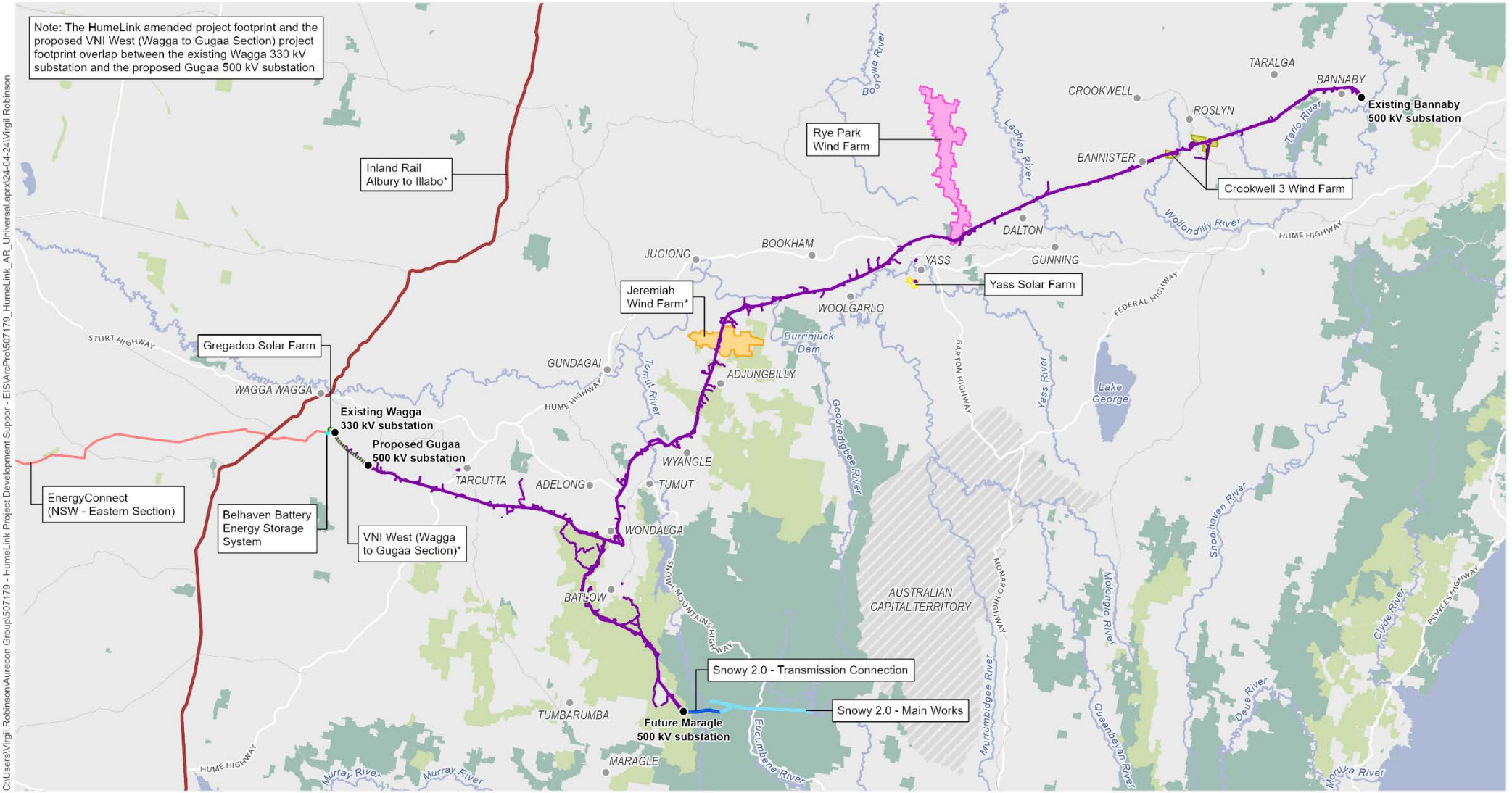
Assessment of construction and operational impacts is detailed in the EIS report and are applicable to the proposed amendments and refinements.

Assessment of cumulative impacts remain unchanged except for two newly identified proposed projects.

The following two projects have been added to the cumulative impact consideration, with details summarised in Table 6-1 below and shown in Figure 6-1. These additions do not contribute to an increase in the cumulative bushfire risk as determined in the EIS.

Table 6-1 Summary of cumulative impacts identified

Project	Details	Status	Distance and Interface	Cumulative impacts
Belhaven Battery Energy Storage System	Construction and operation of a 400 MW / 800 MWh Battery Energy Storage System including transmission connection and associated infrastructure	■ EIS being prepared ■ SEARs issued on 18/05/2023	The main site is located about 1.5 km west of the existing Wagga 330 kV substation, but a connection from BESS to the substation (most likely underground) is proposed. Based on publicly available information there are likely to be overlapping construction programs.	No elevated impacts on landscape bushfire risk, provided the project adheres to the requirements and mitigation measures of this report and the EIS report.
Yass Solar Farm	The construction, operation and decommissioning of a 100 MW solar photovoltaic energy generating facility with an associated battery energy storage system	■ EIS being prepared ■ SEARs issued on 22/12/2023	The site surrounds the Yass substation, and based on publicly available information, there are likely to be overlapping construction programs. However, given the proximity and likely impacts, cumulative impacts are likely limited to the establishment and use of HumeLink's combined worker accommodation facility and construction compound proposed at Yass during construction only.	No elevated impacts on landscape bushfire risk, provided the project adheres to the requirements and mitigation measures of this report and the EIS report.



Source: *Aurecon, Transgrid, Spatial Services (DCS), ESRI Basemap*

1:925,000

0 20 40km

Projection: GDA 1994 MGA Zone 55

HumeLink **Biodiversity Assessment**

FIGURE 6-1: Relevant future projects

7 Management of impacts

Management of the following impacts remain the same as the EIS report.

- Project Bush Fire Emergency Management and Evacuation Plan
- maintenance of asset protection zones
- transmission line vegetation management
- preparedness and emergency response
- summary of mitigation measures.

7.1 APZ requirements

APZs are assessed for each bushfire survey area in accordance with the PBP performance criteria and acceptable solutions (NSW RFS, 2019) (refer to Table 7-1). APZs and the specific APZ landscaping requirements are not required to be assessed for the entire transmission line easement or other areas of the amended project. For each bushfire survey area, nominated APZs are based on a BAL-29 separation distance, with the exception of the worker accommodation facilities (AC03, AC04, AC05, AC06, AC07), which as SFPP developments require a larger APZ. SFPP developments are to be provided with a 10 kilowatt per square meter (kW/m^2) APZ (based on a flame temperature of 1,200 Kelvin) and constructed to a minimum BAL 12.5 construction standard. Dimensions for APZs are provided in Table 5-2. Buildings with a BAL 29 rating would be exposed to associated radiant heat levels exceeding 29 kW/m² (based on a flame temperature of 1,090 Kelvin).

Table 7-1 Performance criteria and acceptable solutions for APZs and Landscaping (NSW RFS, 2019)

Performance criteria	Acceptable solution	Bushfire survey area	Notes	Complies / Will comply
Asset Protection Zone				
Potential building footprints for substations and construction compounds must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot (substations and construction compounds)	APZs for construction compounds are provided in accordance with Tables A1.12.2 and A1.12.3 based on the Forest Fire Danger Index (FFDI).	Gadara Road compound (C19)	-	✓
		Amended Honeysuckle Road compound (C07)	-	✓
		Ellerslie Road compound (C21)	-	✓
		Ardrossan Headquarters Road compound (C17)	-	✓
		Amended Gregadoo Road compound (C06)	-	✓
		Amended Bannaby 500 kV Substation compound (C12)	-	✓
		Snubba Road compound (C18)	-	✓
Potential building footprints for accommodation facilities must not be exposed to radiant heat levels exceeding 10 kW/m² for SFPP developments (worker accommodation facilities)	The worker accommodation buildings are provided with an APZ in accordance with Table A1.12.1 in Appendix 1 of PBP.	Crookwell accommodation facility and compound (AC06)	SFPP development and requires larger APZ, as outlined in Table 5-2	✓
		Yass accommodation facility and compound (AC05)	SFPP development and requires larger APZ, as outlined in Table 5-2	✓
		Green Hills accommodation facility and compound (AC07)	SFPP development and requires larger APZ, as outlined in Table 5-2	✓

Performance criteria	Acceptable solution	Bushfire survey area	Notes	Complies / Will comply
		Tarcutta accommodation facility and compound (AC03)	SFPP development and requires larger APZ, as outlined in Table 5-2	✓
		Adjungbilly accommodation facility and compound (AC04)	SFPP development and requires larger APZ, as outlined in Table 5-2	✓
APZs are managed and maintained to prevent the spread of a fire towards the building	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	Crookwell accommodation facility and compound (AC06)	-	✓
		Yass accommodation facility and compound (AC05)	-	✓
		Gadara Road compound (C19)	-	✓
		Green Hills accommodation facility and compound (AC07)	-	✓
		Tarcutta accommodation facility and compound (AC03)	-	✓
		Amended Honeysuckle Road compound (C07)	-	✓
		Ellerslie Road compound (C21)	-	✓
		Ardrossan Headquarters Road compound (C17)	-	✓
		Amended Gregadoo Road compound (C06)	-	✓
		Adjungbilly accommodation facility and compound (AC04)	-	✓
		Amended Bannaby 500 kV Substation compound (C12)	-	✓
		Snubba Road compound (C18)	-	✓
The APZs is provided in perpetuity	APZs are wholly within the boundaries of the development site.	Crookwell accommodation facility and compound (AC06)	-	✓
		Yass accommodation facility and compound (AC05)	-	✓
		Gadara Road compound (C19)	-	✓
		Green Hills accommodation facility and compound (AC07)	-	✓
		Tarcutta accommodation facility and compound (AC03)	-	✓
		Amended Honeysuckle Road compound (C07)	-	✓
		Ellerslie Road compound (C21)	-	✓
		Ardrossan Headquarters Road compound (C17)	-	✓
		Amended Gregadoo Road compound (C06)	-	✓
		Adjungbilly accommodation facility and compound (AC04)	-	✓
		Amended Bannaby 500 kV Substation compound (C12)	-	✓
		Snubba Road compound (C18)	-	✓

Performance criteria	Acceptable solution	Bushfire survey area	Notes	Complies / Will comply
	Other worker accommodation facility structures located within the APZ need to be located further than 6 m from the refuge building.	Crookwell accommodation facility and compound (AC06)	-	✓
		Yass accommodation facility and compound (AC05)	-	✓
		Green Hills accommodation facility and compound (AC07)	-	✓
		Tarcutta accommodation facility and compound (AC03)	-	✓
		Adjungbilly accommodation facility and compound (AC04)	-	✓
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	APZs are located on lands with a slope less than 18°.	Crookwell accommodation facility and compound (AC06)	-	✓
		Yass accommodation facility and compound (AC05)	-	✓
		Gadara Road compound (C19)	-	✓
		Green Hills accommodation facility and compound (AC07)	-	✓
		Tarcutta accommodation facility and compound (AC03)	-	✓
		Amended Honeysuckle Road compound (C07)	-	✓
		Ellerslie Road compound (C21)	-	✓
		Ardrossan Headquarters Road compound (C17)	-	✓
		Amended Gregadoo Road compound (C06)	-	✓
		Adjungbilly accommodation facility and compound (AC04)	-	✓
		Amended Bannaby 500 kV Substation compound (C12)	-	✓
		Snubba Road compound (C18)	-	✓
Landscaping				
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	Landscaping is in accordance with Appendix 4; and fencing is constructed in accordance with Chapter 7.6 of PBP.	Crookwell accommodation facility and compound (AC06)	-	✓
		Yass accommodation facility and compound (AC05)	-	✓
		Gadara Road compound (C19)	-	✓
		Green Hills accommodation facility and compound (AC07)	-	✓
		Tarcutta accommodation facility and compound (AC03)	-	✓
		Amended Honeysuckle Road compound (C07)	-	✓
		Ellerslie Road compound (C21)	-	✓
		Ardrossan Headquarters Road compound (C17)	-	✓
		Amended Gregadoo Road compound (C06)	-	✓
		Adjungbilly accommodation facility and compound (AC04)	-	✓

Performance criteria	Acceptable solution	Bushfire survey area	Notes	Complies / Will comply
		Amended Bannaby 500 kV Substation compound (C12)	-	✓
		Snubba Road compound (C18)	-	✓

The APZ requirements, and the bushfire hazards, which inform APZ dimensions for each bushfire survey area are detailed in Table 5-2. Where APZs differ in each direction depending on distance to vegetation, the largest APZ is listed). Refer to Figure A-1 to Figure A-12 for detailed APZ.

7.2 Access

Access routes are only considered in relation to the bushfire survey areas in accordance with PBP (NSW RFS, 2019). The worker accommodation facilities (AC03, AC04, AC05, AC06, AC07), are classified as National Construction Code (NCC) Class 3 buildings and SFPP developments, and therefore are subject to specific bushfire protection requirements. Although potential structures within the bushfire survey areas are identified as NCC Class 8 buildings under the Building Code Australia (BCA), which have no specific bushfire protection requirements, structures located on BFPL must be assessed to satisfy the aims and objectives outlined in PBP (NSW RFS, 2019). Therefore, access routes were assessed for all bushfire survey areas (substations, construction compounds, worker accommodation facilities) to satisfy the aims and objectives outlined in PBP (NSW RFS, 2019).

In accordance with the PBP (NSW RFS, 2019), primary and secondary access routes should be provided for locations with buildings where people may work or use for accommodation purposes (which comprise the bushfire survey areas). The amended project contains several existing primary and secondary access routes to the bushfire survey areas (refer to Table 5-3). New and upgraded temporary and permanent access tracks and roads would be constructed in areas where there are no existing roads or tracks.

In accordance with the PBP (NSW RFS, 2019), access roads should have adequate capacity for firefighting vehicles, and firefighting vehicles should have safe all-weather access to hazards and assets. Access roads are designed to allow safe access and egress for emergency services vehicles and evacuating personnel. Primary and secondary roads are required to be in accordance with the criteria outlined in the PBP (NSW RFS, 2019) and/or *NSW Fire Trail Standards* (NSW RFS, 2016) *and NSW RFS Fire Trail Construction and Design Maintenance Manual* (Soil Conservation Service, 2017). Existing primary and secondary access routes for bushfire survey areas are outlined in Section 5.5. Access tracks within State forests which are the responsibility of Transgrid must meet Forestry Corporation of NSW requirements (State Forest NSW, 1999; Soil Conservation Service, 2017).

Table 7-2 Performance criteria and acceptable solutions for access routes

Performance criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
General access requirements			
Firefighting vehicles are provided with safe, all-weather access to structures	Property access roads are two-wheel drive, all-weather roads.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Access is provided to all structures.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Traffic management devices are constructed to not prohibit access by emergency services vehicles.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Access roads must provide suitable turning areas in accordance with Appendix 3 of PBP.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Perimeter roads are provided for residential subdivisions of three or more allotments.	N/A	-

Performance criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
	Subdivisions of three or more allotments have more than one access in and out of the development.	N/A	-
	Traffic management devices are constructed to not prohibit access by emergency services vehicles.	N/A	-
	Maximum grade for sealed roads is 15°, and maximum average grade is 10° (or other gradient specified by road design standards).	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	All roads are through roads, and where dead ends are unavoidable, the maximum length should be 200 m, minimum 12 m outer radius turning circle, with appropriate signage.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.	N/A	-
	Secondary access each to an alternate point on the existing public road system, where access/egress is through forest, woodland, or heath vegetation.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	One way only public access roads are no less than 3.5 m wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
The capacity of access roads is adequate for firefighting vehicles	Road surfaces and bridges/causeways adequate to carry up to 23 tonnes, load rating clearly marked.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
There is appropriate access to water supply	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07) unless static water and hydrant supply is provided	✓
	Hydrants are provided in accordance with the relevant clauses of *Australian Standard 2419.1:2005* (*AS2419.1:2005*) *Fire hydrant installations – System design, installation, and commissioning* (Standards Australia, 2005a).	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07) unless static water and hydrant supply is provided	✓
	There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Perimeter roads			
	Two-way sealed roads.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Minimum 8 m width carriageway.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Appropriate parking areas and hydrant access (outside carriage way and parking, ideally opposite side of the road from the hazard).	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Hydrants are located clear of parking areas.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓

Performance criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface	Through roads, and linked to internal road system at minimum every 500 m.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Curves of roads have a minimum inner radius of 6 m.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	The maximum grade road is 15° and average grade of not more than 10°.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Road crossfall maximum 3°.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Unobstructed vehicle clearance height minimum 4 m.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Non-perimeter roads			
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating	Minimum 5.5 m width carriageway.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Appropriate parking areas and hydrant access (outside carriage way and parking, ideally opposite side of the road from the hazard); hydrants located clear of parking areas.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Through roads, and linked to internal road system at minimum every 500 m.	Relevant for all accommodation facilities (AC06, AC05, AC07, AC03, AC04)	✓
	Curves of roads have a minimum inner radius of 6 m.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Road crossfall maximum 3°.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Unobstructed vehicle clearance height minimum 4 m, including tree branches.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Property access			
Firefighting vehicles can access the dwelling and exit the property safely	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70 m) is provided between the most distant external part of the proposed residence and the nearest part of the public access road (where the road speed limit is not greater than 70 kph) that supports the operational use of emergency firefighting vehicles. Or the following apply: ■ minimum 4 m width carriageway ■ in forest, woodland and heath situations, rural property access roads have passing bays every 200 m that are 20 m long by 2 m wide, making a minimum trafficable width of 6 m at the passing bay ■ unobstructed vehicle clearance height minimum 4 m Road crossfall maximum 10° ■ provide a suitable turning area in accordance with Appendix 3 of PBP (NSW RFS, 2019)	N/A. The bushfire survey areas would have public road access points	-

Performance criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
	■ curves of roads have a minimum inner radius of 6 m, minimal curves; the minimum distance between inner and outer curves is 6 m ■ maximum grade for sealed roads is 15°, and maximum grade for unsealed is 10° ■ a development comprising more than three residences has access by dedication of a road and not by right of way.		

7.3 Water supply and services

Adequate water supply is essential to put out unwanted spot ignitions and to provide potential water sources for firefighting agencies within bushfire survey areas. Temporary water supplies may be required during construction, including spray packs or vehicle mounted tanks. These requirements would be detailed in the contractor's Construction Environmental Management Plan and the HumeLink BFEMEP.

Water supply for the bushfire survey areas would be sourced from several locations. Adequate water supply is to be maintained in accordance with PBP requirements (NSW RFS, 2019) throughout construction and operation of the amended project. Appropriate water supply for firefighting and appropriate location of utilities are important mitigation measures of bushfire risk during construction. Performance criteria and acceptable solutions for utilities (water supply, electricity, and gas) for the bushfire survey areas are extracted from PBP (NSW RFS, 2019) and outlined in Table 7-3.

Table 7-3 Performance criteria and acceptable solutions for water, electricity, and gas (NSW RFS, 2019)

Performance criteria	Acceptable solutions	Comments	Complies/ will comply
Water services			
Adequate water supplies for firefighting purposes	Reticulated water is to be provided to the development where available.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07) unless static water and hydrant supply is provided	✓
	A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Static water supplies shall comply with Table 5.3d in PBP.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	A minimum of 20,000 litre static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓

Performance criteria	Acceptable solutions	Comments	Complies/ will comply
Water supplies are located at regular intervals, and are accessible and reliable for firefighting operations	Fire hydrant, spacing, design and sizing complies with the relevant clauses of *AS2419.1:2005 Fire hydrant installations System design, installation, and commissioning.*	Relevant for substations and accommodation facilities (AC03, AC04, AC05, AC06, AC07) unless static water and hydrant supply is provided	✓
	Hydrants are not located within any road carriageway.	Relevant for substations and accommodation facilities (AC03, AC04, AC05, AC06, AC07) unless static water and hydrant supply is provided	✓
	Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Flows and pressure are appropriate	Fire hydrant flows and pressures comply with the relevant clauses of *AS2419.1:2005 Fire hydrant installations System design, installation, and commissioning.*	Relevant for substations and accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Integrity of the water supply is maintained	All above-ground water service pipes are metal, including and up to any taps.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Above-ground water storage tanks shall be of concrete or metal.	Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
SFPP: Water supplies are adequate in areas where reticulated water is not available	A connection for firefighting purposes is located within the inner protection area of the APZ, or the non-hazard side, and is located away from the structure. A 65-mm Storz outlet with a ball valve is fitted to the outlet. Ball valve and pipes are adequate for water flow and are metal.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Supply pipes from tank to ball valve have the same bore size to ensure flow volume.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Underground tanks have an access hole of 200 mm to allow tankers to refill direct from the tank; and are clearly marked.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	A hardened ground surface for truck access is supplied within 4 m of the access hole.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Unobstructed access is provided at all times.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓

Performance criteria	Acceptable solutions	Comments	Complies/ will comply
	Where pumps are provided- minimum 5 hp or 3 kW petrol or diesel-powered pump and are shielded against bushfire attack. Any hose and reel for firefighting connected to the pump-19 mm internal diameter.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Fire hose reels are constructed in accordance with *Australia/New Zealand Standard 1221:1997* (*AS/NZS1221:1997*) *Fire hose reels* and installed in accordance with the relevant clauses of *Australian Standard 2441:2005* (*AS2441:2005*) *Installation of fire hose reels* (Standards Australia, 2005b).	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Electricity services			
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings	Where practicable, electrical transmission lines are underground.	It is noted that the PBP acceptable solution is referring to distribution lines to buildings, not transmission lines Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Where overhead, electrical transmission lines are proposed as follows: ■ Lines are installed with short pole spacing of 30 m, unless crossing gullies, gorges, or riparian area ■ No part of a tree is closer to a power line than the distance set out in *ISSC3 – Guideline for Managing Vegetation in the Vicinity of Electrical Assets* (Resources and Energy NSW, 2016) for managing vegetation near power lines.	Referring to distribution lines to buildings, not transmission lines. Relevant for all bushfire survey areas including accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
Gas services			
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	Reticulated or bottled gas is installed and maintained in accordance with *Australia/New Zealand Standard 1596:2014* (*AS/NZS1596:2014*) *The storage and handling of LP Gas*, the requirements of relevant authorities, and metal piping is used.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Connections to and from gas cylinders are metal.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Polymer-sheathed flexible gas supply lines are not used.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	Above-ground gas service pipes are metal, including and up to any outlets.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓
	If gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2 m away from any combustible material, so they do not act as a catalyst to combustion.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓

7.4 Construction standards and building requirements

Construction standards and building requirements are measures to prevent loss of life and loss of structures, through adequately accounting for environmental conditions. Construction standards in accordance with *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* are necessary to protect buildings within bushfire survey areas from fire.

Construction standards are based on the following:

- PBP (NSW RFS, 2019) performance criteria and acceptable solutions for APZs and landscaping, access routes, and services (water, electricity, and gas) (refer to Sections 9.3, 9.5, and 9.6 respectively of the EIS report)
- NCC performance requirements for the construction of buildings in bushfire prone areas: performance requirements apply to buildings designated Class 1-4, some designated Class 10, and buildings considered SFPP. For buildings in designated BFPL areas, the NCC references the *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* and the *NASH Standard: Steel Framed Construction in Bushfire Areas 2014*. There are no specific bushfire protection requirements for NCC Class 5-8 buildings under the BCA, however, structures located on BFPL must satisfy the aims and objectives outlined in PBP (NSW RFS, 2019).

Design and construction of transmission lines would be in accordance with the *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* and *Transmission Line Design Standard* (Transgrid, 2018).

7.4.1 NCC bushfire protection requirements

The accommodation facilities (AC06, AC05, AC07, AC03, AC04) are considered NCC Class 3 buildings under the BCA and SFPP developments under the *Rural Fires Act 1997* as short-stay use is anticipated and occupants may be unfamiliar with the area. Buildings anticipating short-stay use are considered a higher risk than long-stay use and therefore short-stay use has been applied to provide a conservative assessment. SFPP developments are subject to specific bushfire protection requirements with reference to construction standards (refer to Table 7-4).

Table 7-4 Performance criteria and acceptable solutions for construction standards: SFPP developments (NSW RFS, 2019)

Performance criteria	Acceptable solutions	Comments	Complies/ will comply
The proposed building can withstand bushfire attack in the form of wind, embers, radiant heat, and flame contact	A construction level of BAL-12.5 under AS 3959 or NASH Standard and section 7.5 of PBP is applied.	Relevant for all accommodation facilities (AC03, AC04, AC05, AC06, AC07)	✓

All other bushfire survey areas are identified as NCC Class 8 buildings under the BCA (refer to Table 7-5) and therefore have no specific bushfire protection requirements under the BCA. However, all proposed buildings must be constructed in accordance with BAL under *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas*. The NCC building classification (ABCB, 2019), and the FFDI, the APZ, and the BAL for each bushfire survey area are outlined in Table 7-5.

7.4.2 Bushfire Attack Levels

All proposed buildings must be constructed in accordance with BAL under *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas*. BAL is a way of measuring the severity of potential ember attack, radiant heat, and direct flame contact, to a building. BAL is used to specify the construction requirements necessary to protect buildings from bushfire in accordance with *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* and the NCC (Australian Building Codes Board (ABCB), 2022). There are six levels of BAL across a 100 metre guideline radius, with buildings designated BAL-40 and BAL-Flame Zone at highest risk of bushfire effects due to the geography of the surrounding area and proximity of vegetation generating the greatest flame and radiant heat impacts. The 100 metre guideline shown on BAL mapping (refer to Figure A-1 to Figure A-12) is the edge of the extent to which the BAL ratings apply – beyond which *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* does not apply.

BAL is determined based on the worst-case scenario, as per PBP (NSW RFS, 2019) Table A1.12.5 and A1.12.6 (Forested residential 80 and 100 FFDI). The BAL and bushfire assessment values (Building Class and FFDI) for the bushfire survey areas are outlined in Table 7-5. BAL contour maps were prepared using Commonwealth Scientific and Industrial Research Organisation's Spark BAL mapping tool in accordance with Table 2.4 of *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* for the bushfire survey areas.

Table 7-5 Building classification, FFDI, and BAL for the bushfire survey areas

Bushfire survey area	Building Class	FFDI	BAL
Crookwell accommodation facility and compound (AC06)	Class 3 SFPP	100	BAL-12.5
Yass accommodation facility and compound (AC05)	Class 3 SFPP	100	BAL-12.5
Gadara Road compound (C19)	Class 8	80	BAL-29
Green Hills accommodation facility and compound (AC07)	Class 3 SFPP	80	BAL-12.5
Tarcutta accommodation facility and compound (AC03)	Class 3 SFPP	80	BAL-12.5
Amended Honeysuckle Road compound (C07)	Class 8	80	BAL-29
Ellerslie Road compound (C21)	Class 8	80	BAL-29
Ardrossan Headquarters Road compound (C17)	Class 8	80	BAL-29
Amended Gregadoo Road compound (C06)	Class 8	80	BAL-29
Adjungbilly accommodation facility and compound (AC04)	Class 3 SFPP	80	BAL-12.5
Amended Bannaby 500 kV Substation compound (C12)	Class 8	100	BAL-29
Snubba Road compound (C18)	Class 8	80	BAL-29

8 Conclusion

This report constitutes an addendum to the EIS report for the amended project, identifying and assessing the risk from bushfire to assets within the amended project footprint and providing mitigation measures that would be applied during construction and operation in accordance with the PBP (NSW RFS, 2019). The assessment includes surveys undertaken at areas within the amended project footprint, which have been identified as having an elevated bushfire risk, such as areas located within land classified as BFPL, and where project related personnel may work, sleep, or assemble. These include:

- Crookwell accommodation facility and compound (AC06)
- Yass accommodation facility and compound (AC05)
- Gadara Road compound (C19)
- Tarcutta accommodation facility and compound (AC03)
- Amended Gregadoo Road compound (C06)
- Green Hills accommodation facility and compound (AC07)
- Ellerslie Road compound (C21)
- Ardrossan Headquarters Road compound (C17)
- Snubba Road compound (C18)
- Amended Honeysuckle Road compound (C07)
- Adjungbilly accommodation facility and compound (AC04)
- Amended Bannaby 500 kV substation compound (C12).

In accordance with the SEARs, this report constitutes an assessment of the risks to public safety, paying particular attention to bushfire risks including reducing the potential amended project related ignitions, which may impact the broader community, confirming emergency egress and evacuation and mechanisms for the handling and use of any dangerous goods.

This report considers a range of existing risk factors associated with the amended project, including fire weather and climate, ignition sources, vegetation, slope, and access, as well as construction and operation, and cumulative bushfire impacts. Management and mitigation measures include APZs, transmission line clearances and construction requirements in accordance with BAL and required emergency procedures.

Structures located on BFPL must satisfy the aims and objectives outlined in PBP (NSW RFS, 2019). Provided recommendations outlined in Chapter 9 of the EIS report and Chapter 7 of this report are implemented, they are considered to satisfy the aims and objectives of the PBP (NSW RFS, 2019), *AS 3959:2018* and associated requirements. Mitigation measures identified to no longer be required are identified and ~~struck out~~ and any new or revised mitigation measures are marked in **bold** in Table 8-1. The removal of the telecommunications hut is detailed in Table 2-1.

Table 8-1 Removed, revised and/or new mitigation measures

Impact	Environmental safeguard	Timing	Relevant location
Protection zones and landscaping	**Asset protection zones** (APZs) will be managed in accordance *with Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers requirements* (NSW RFS 2019) (PBP), and associated criteria.	Detailed design, construction and operation	Substations and project buildings within construction compounds and the temporary **worker** accommodation ~~facility~~ **facilities**
~~Ancillary buildings~~	~~The final location of the telecommunications hut will need to be assessed with a visual inspection to confirm potential bushfire risk.~~	~~Detailed design~~	~~Telecommunications hut~~
Bush Fire Emergency Management and Evacuation Plan (BFEMEP)	The project will be designed and constructed in accordance with a **Bush Fire Emergency Management and Evacuation Plan** (BFEMEP). The BFEMEP will be prepared by a suitably qualified person and will include: ■ Bushfire Emergency Evacuation Plan ■ Bush Fire Risk Management Plan (BRMP) protocols during construction, considering activities during days with fire danger rating 'high' or greater ■ bushfire response and notification measures to report fires at the earliest opportunity ■ bushfire mitigation measures including maintaining **asset protection zones** (APZs) and mechanisms for the handling and use of any dangerous goods ■ bushfire risk induction and training for personnel, including risks and management measures associated with construction equipment and activities ■ fire reporting, emergency areas, on-site refuges, and evacuation procedures and is to be consistent with *Development Planning: A guide to developing a bush fire emergency management and evacuation plan* (NSW RFS, 2014). The BFEMEP will be consistent with relevant Australian standard and development plans and guides. For the Special Fire Protection Purpose (SFPP), the BFEMEP will include planning for the early relocation of occupants in the event of a potential bushfire or other emergency situation. A copy of the BFEMEP will be provided to the Local Emergency Management Committee for its information prior to occupation of the development.	Detailed design **and** construction ~~and operation~~	All locations
Bushfire	**A minimum of 20,000 litre static water supply for firefighting purpose will be provided for each construction compound and worker accommodation facility where no reticulated water is available in accordance with *Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers* (NSW RFS, 2019)**	**Construction**	**Construction compounds and worker accommodation facilities**

9 References

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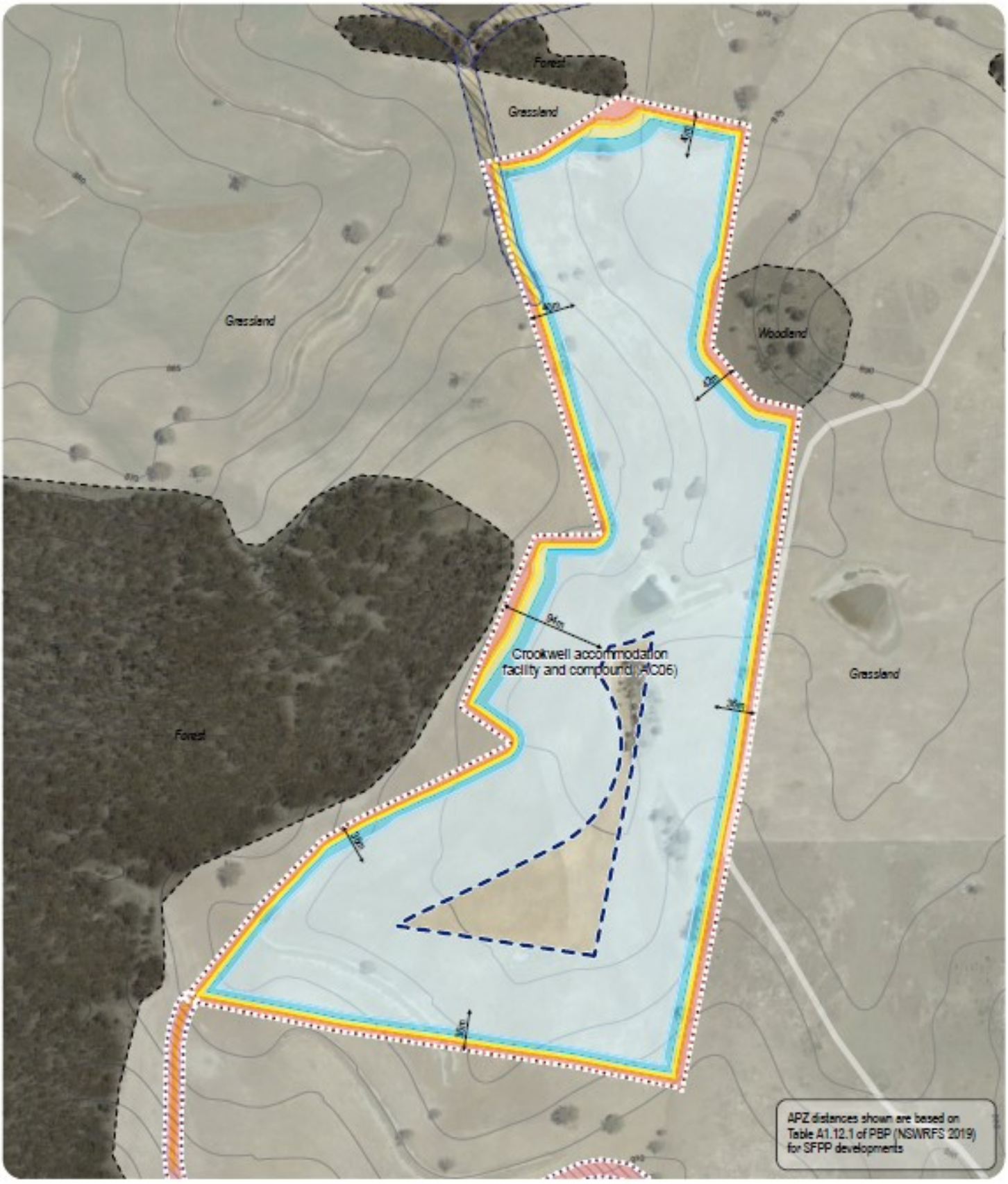
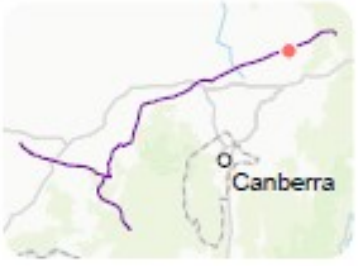
Attachments

Attachment A
BAL mapping



Compound locations
Access tracks
Contour (m)
Vegetation - Forest
Vegetation - Woodland
Vegetation - Grassland
100 m guideline
APZ distance
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone



1:4,800
0 75 150 m

Projection: GDA 1994 MGA Zone 55

HumeLink Bushfire Assessment

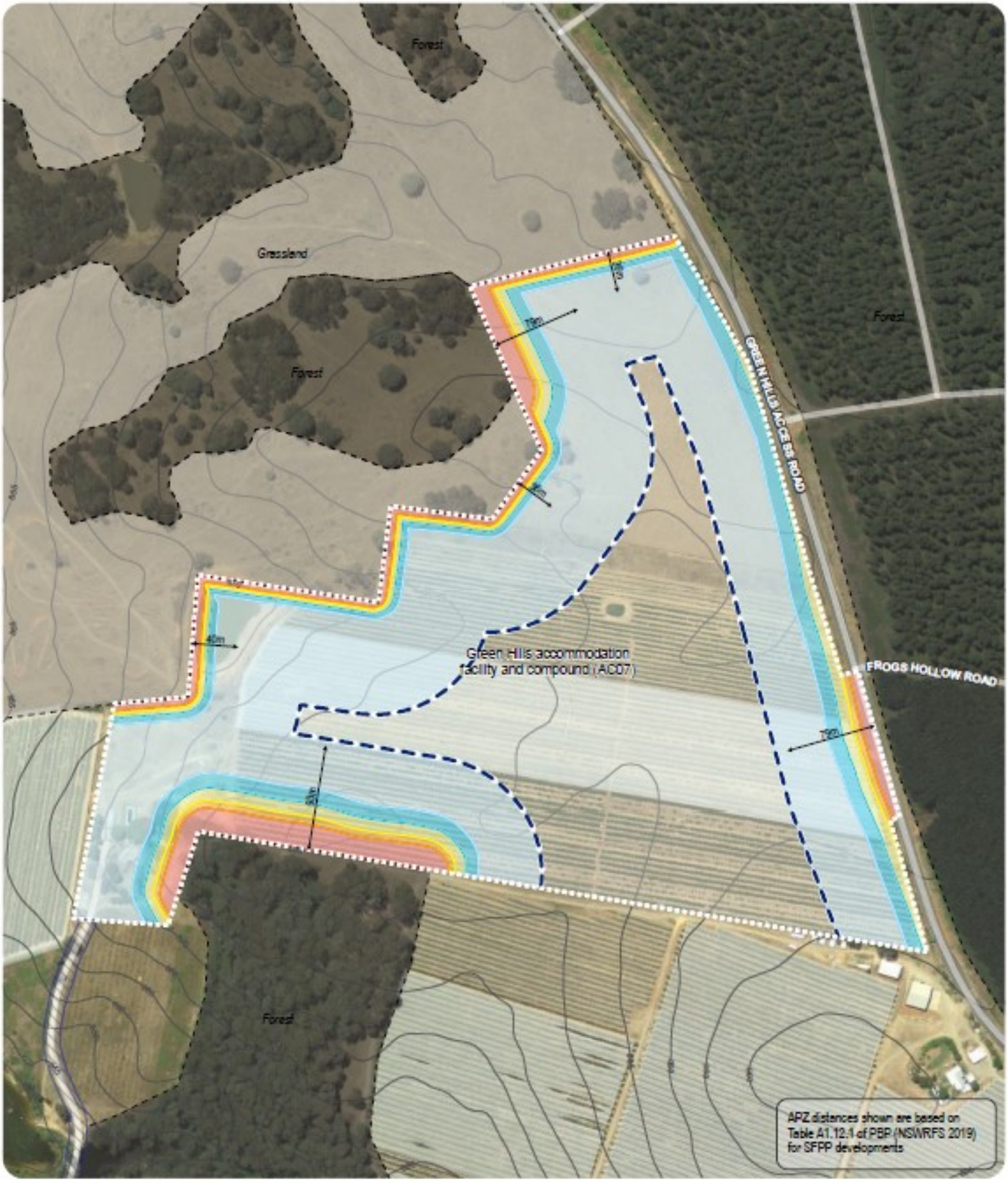
Figure A-1: Crookwell accommodation facility and compound (AC06)
Vegetation Type: Forest, Woodland, and Grassland *FDI:* 100

Compound locations
Access tracks
Contour (m)
Vegetation - Grassland
100 m guideline
APZ distance
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:3,200
0 50 100 m

Projection: GDA 1994 MGA Zone 55

Figure A-3: Gadara Road compound (C19)
Vegetation Type: Grassland *FDI*: 80



Compound locations
Access tracks
Contour (m)
Vegetation - Forest
Vegetation - Grassland
100 m guideline
APZ distance

BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:4,800
0 75 150 m

Projection: GDA 1994 MGA Zone 55

Figure A-4: Green Hills accommodation facility and compound (AC07)
Vegetation Type: Forest and Grassland *FDI:* 80

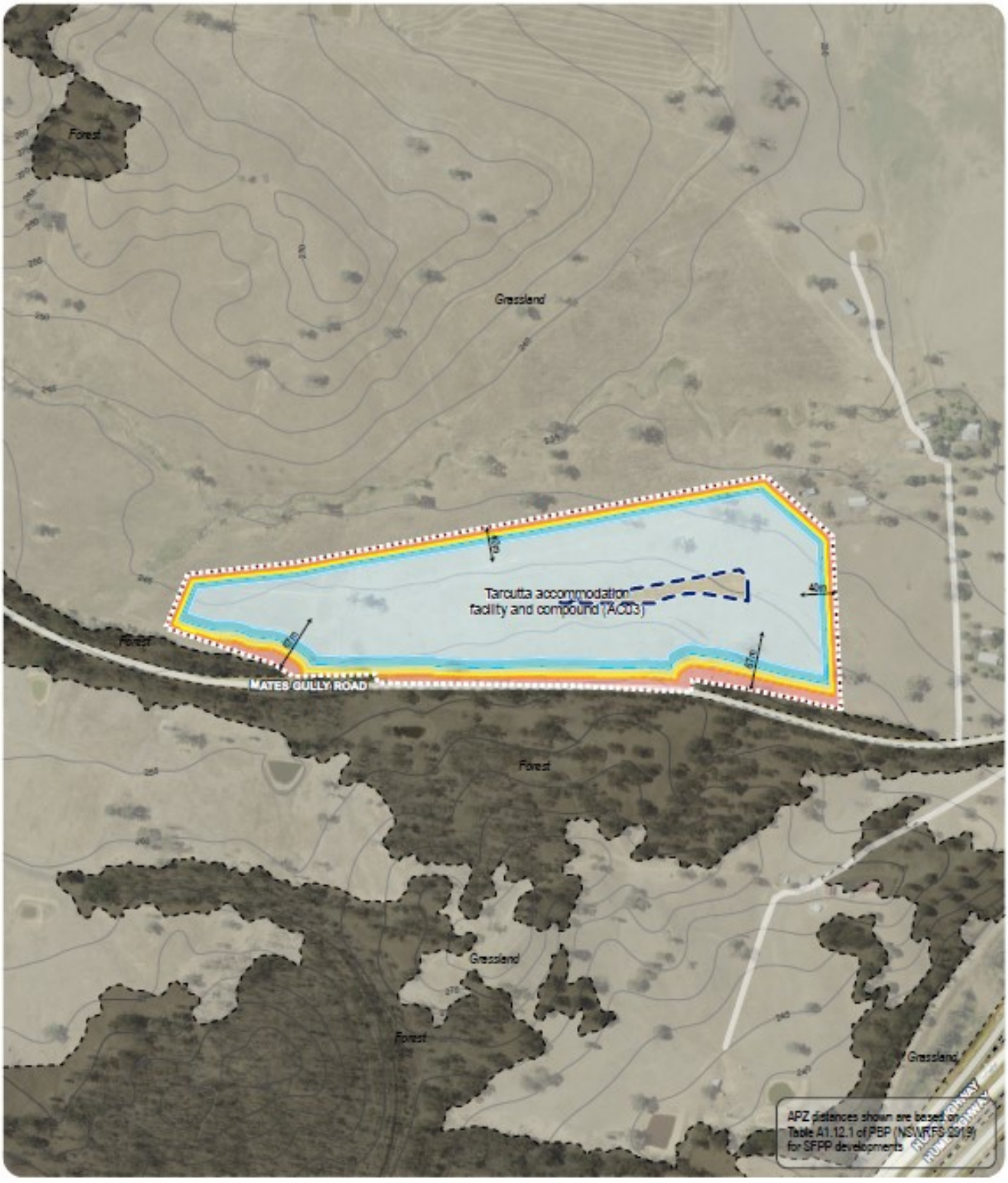
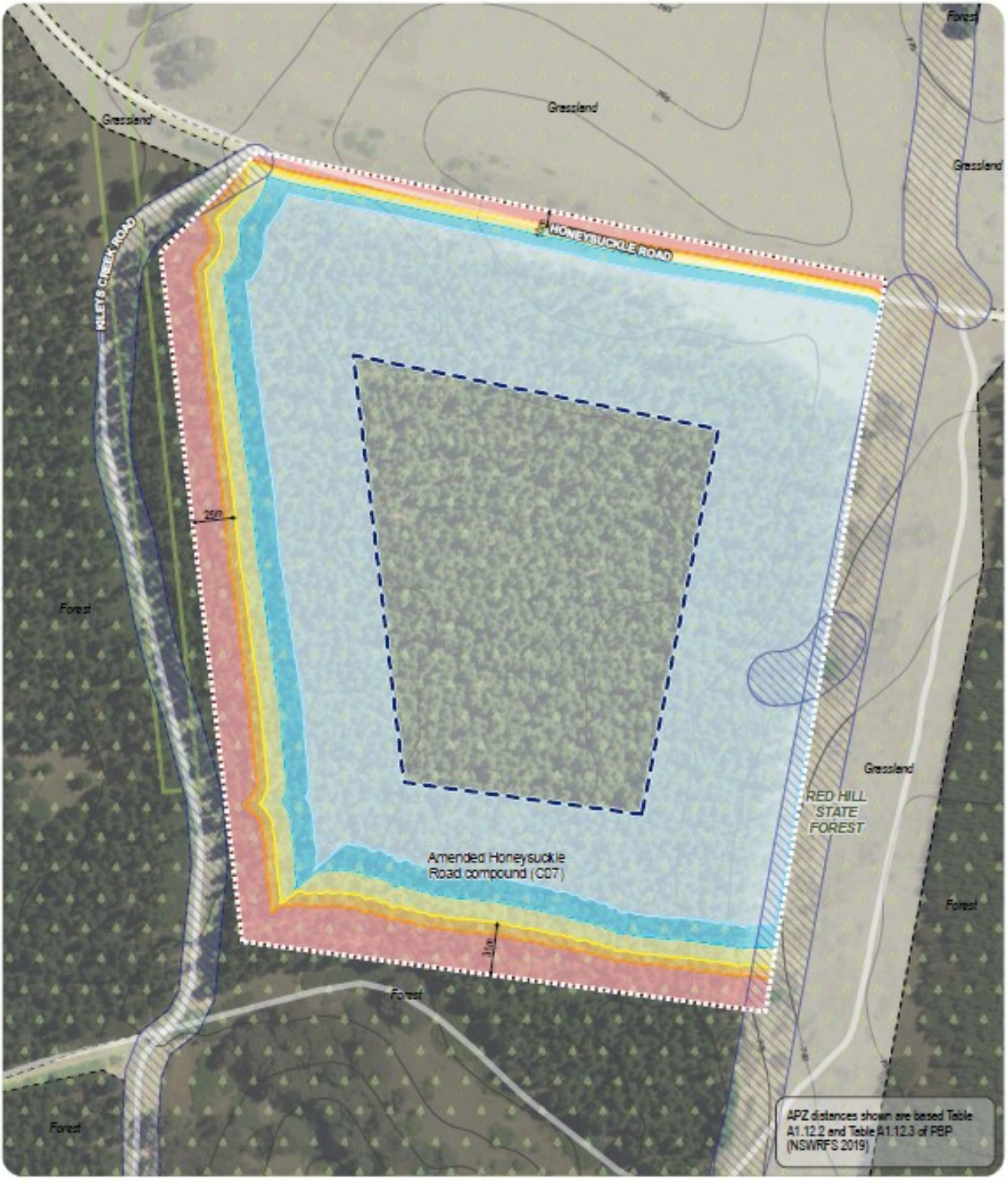


Figure A-5: Tarcutta accommodation facility and compound (AC03)

Vegetation Type: Forest and Grassland *FDI:* 80



Compound locations
Access tracks
Contour (m)
State Forest

Vegetation - Forest
Vegetation - Grassland
100 m guideline
APZ distance

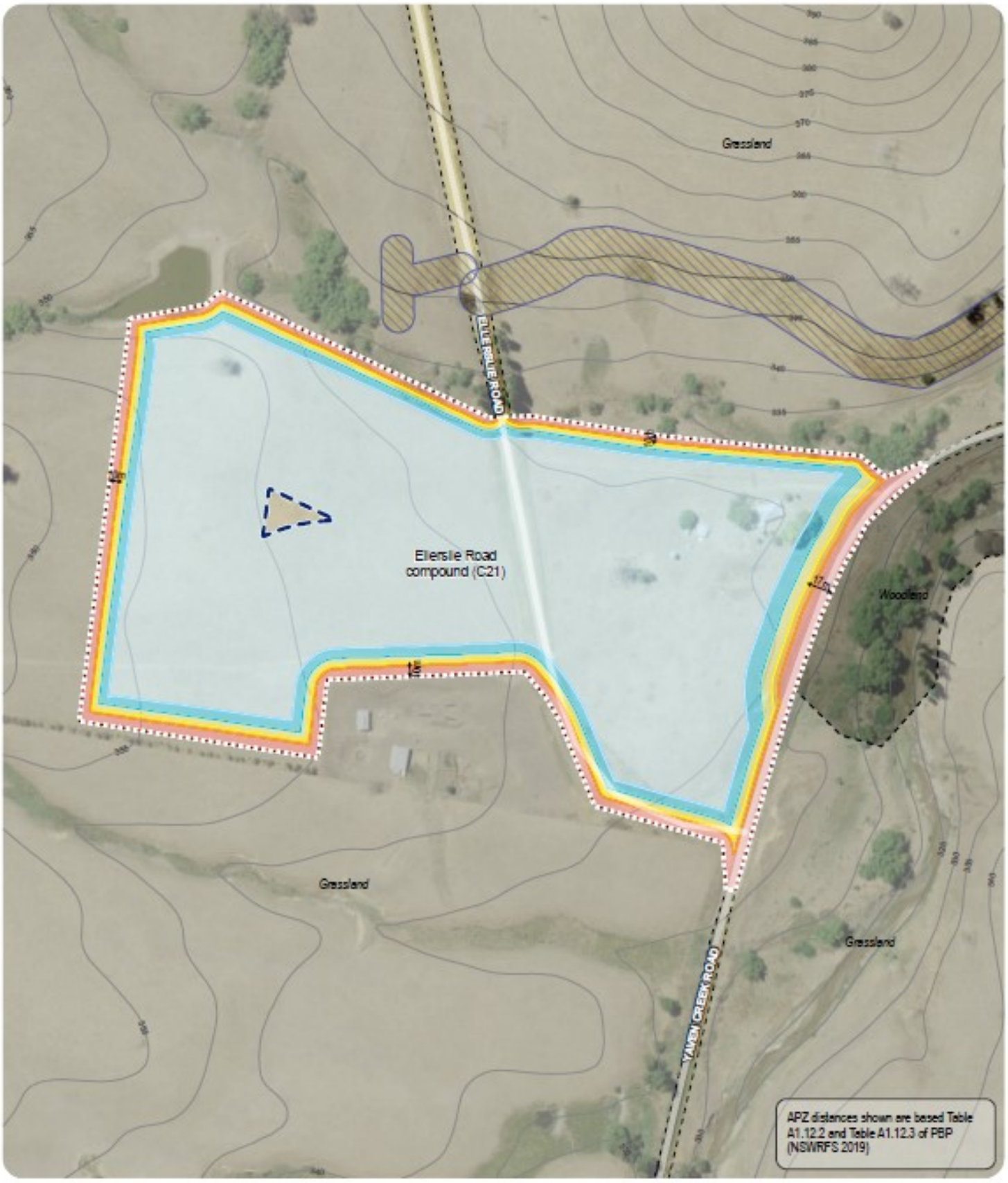
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:3,000
0 50 100 m

Projection: GDA 1994 MGA Zone 55

HumeLink Bushfire Assessment

Figure A-6: Amended Honeysuckle Road compound (CD7)
Vegetation Type: Forest and Grassland *FDI:* 80



Compound locations
Access tracks
Contour (m)
Vegetation - Woodland
Vegetation - Grassland
100 m guideline
APZ distance
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:3,400
0 50 100 m

Projection: GDA 1994 MGA Zone 55

HumeLink Bushfire Assessment

Figure A-7: Ellerslie Road compound (C21)
Vegetation Type: Woodland and Grassland *FDI:* 80

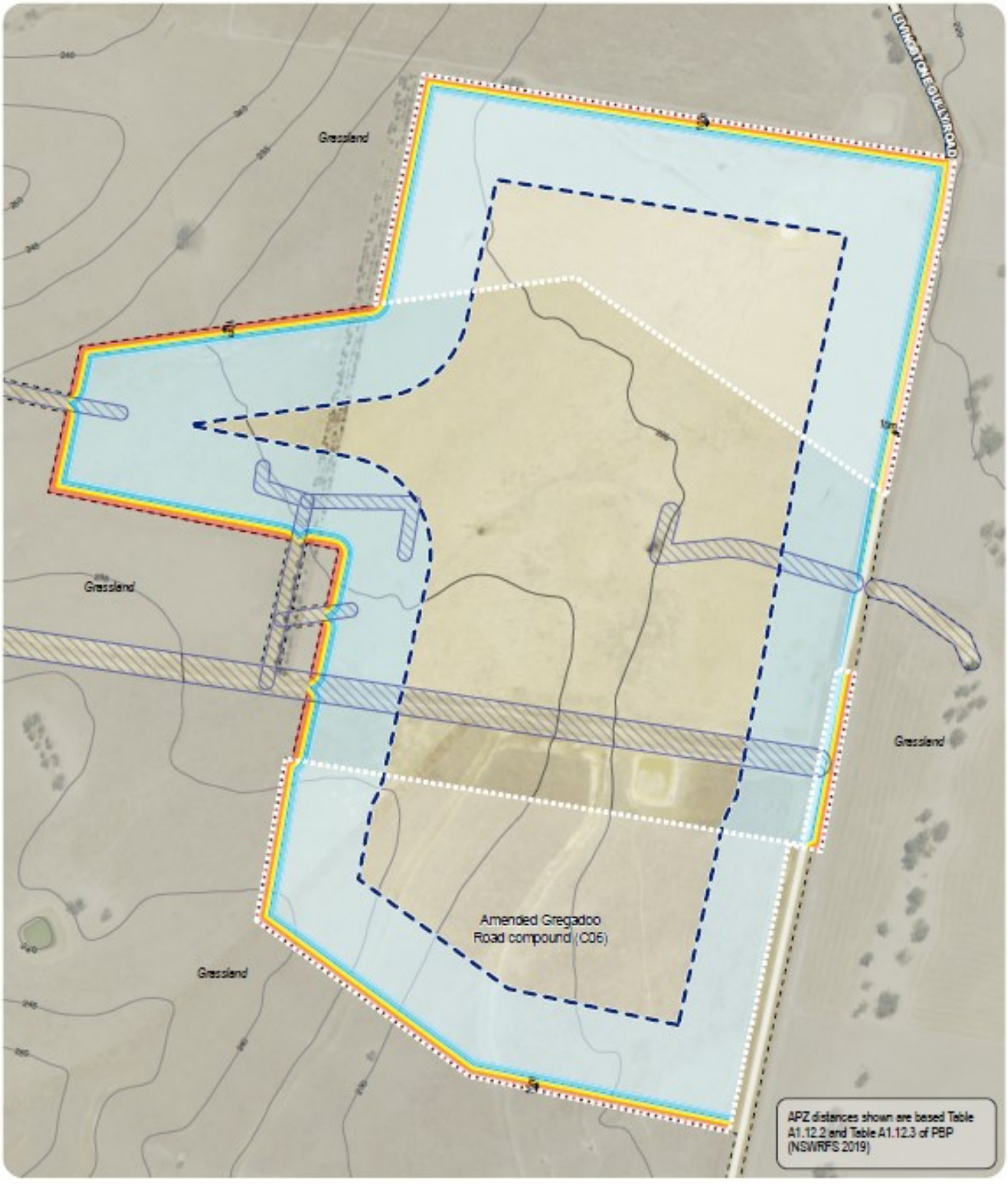
Compound locations
Access tracks
Contour (m)
Vegetation - Forest
100 m guideline
APZ distance
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:2,600
0 40 80 m

Projection: GDA 1994 MGA Zone 55

HumeLink Bushfire Assessment

Figure A-8: Ardrossan Headquarters Road compound (C17)
Vegetation Type: Forest *FDI:* 80



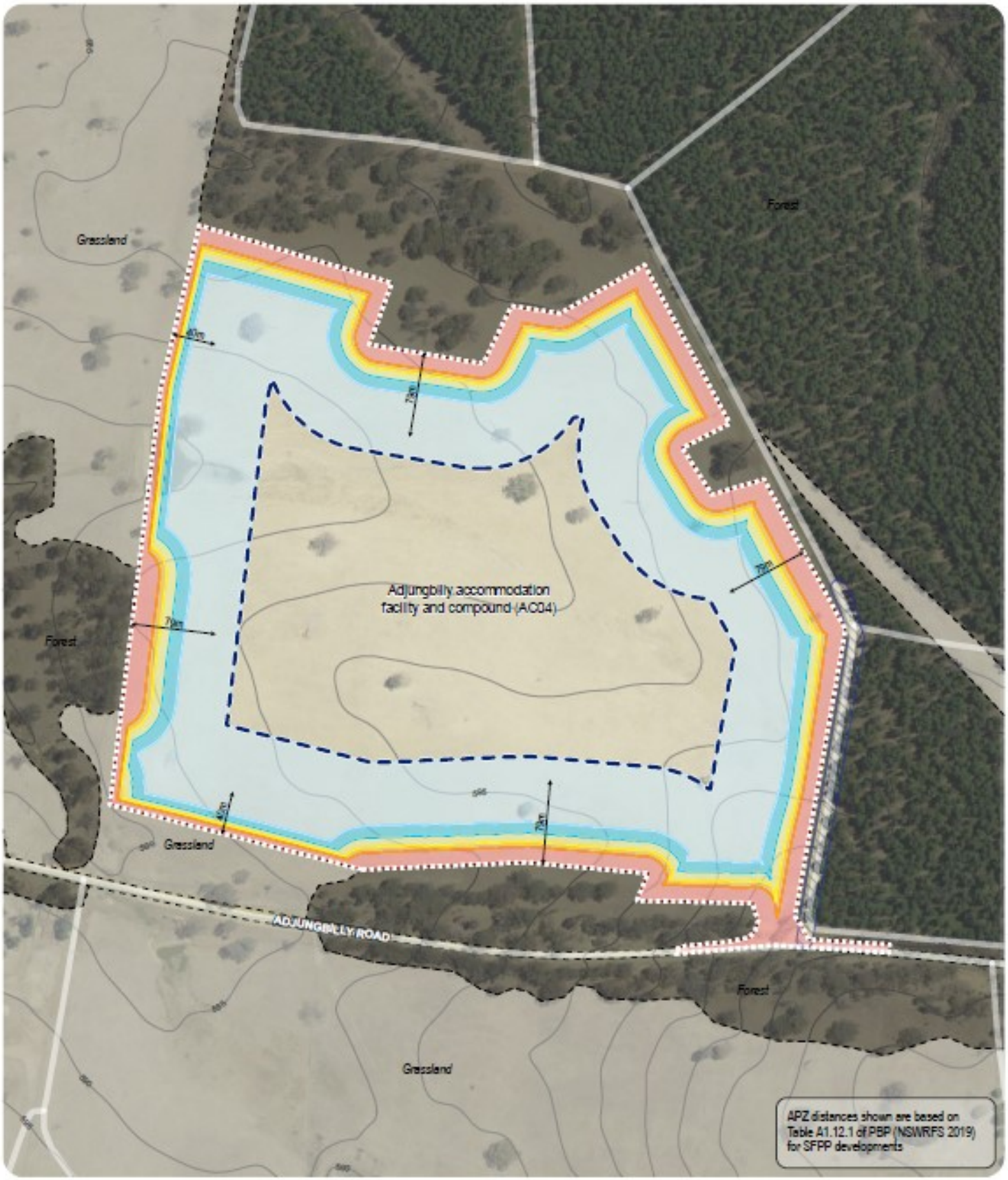
Compound locations
Access tracks
Contour (m)
Vegetation - Grassland
100 m guideline
APZ distance
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:5,800
0 90 180 m

Projection: GDA 1994 MGA Zone 55

HumeLink Bushfire Assessment

Figure A-9: Amended Gregadoo Road compound (C06)
Vegetation Type: Grassland *FDI:* 80



Compound locations
Access tracks
Contour (m)

Vegetation - Forest
Vegetation - Grassland
100 m guideline
APZ distance

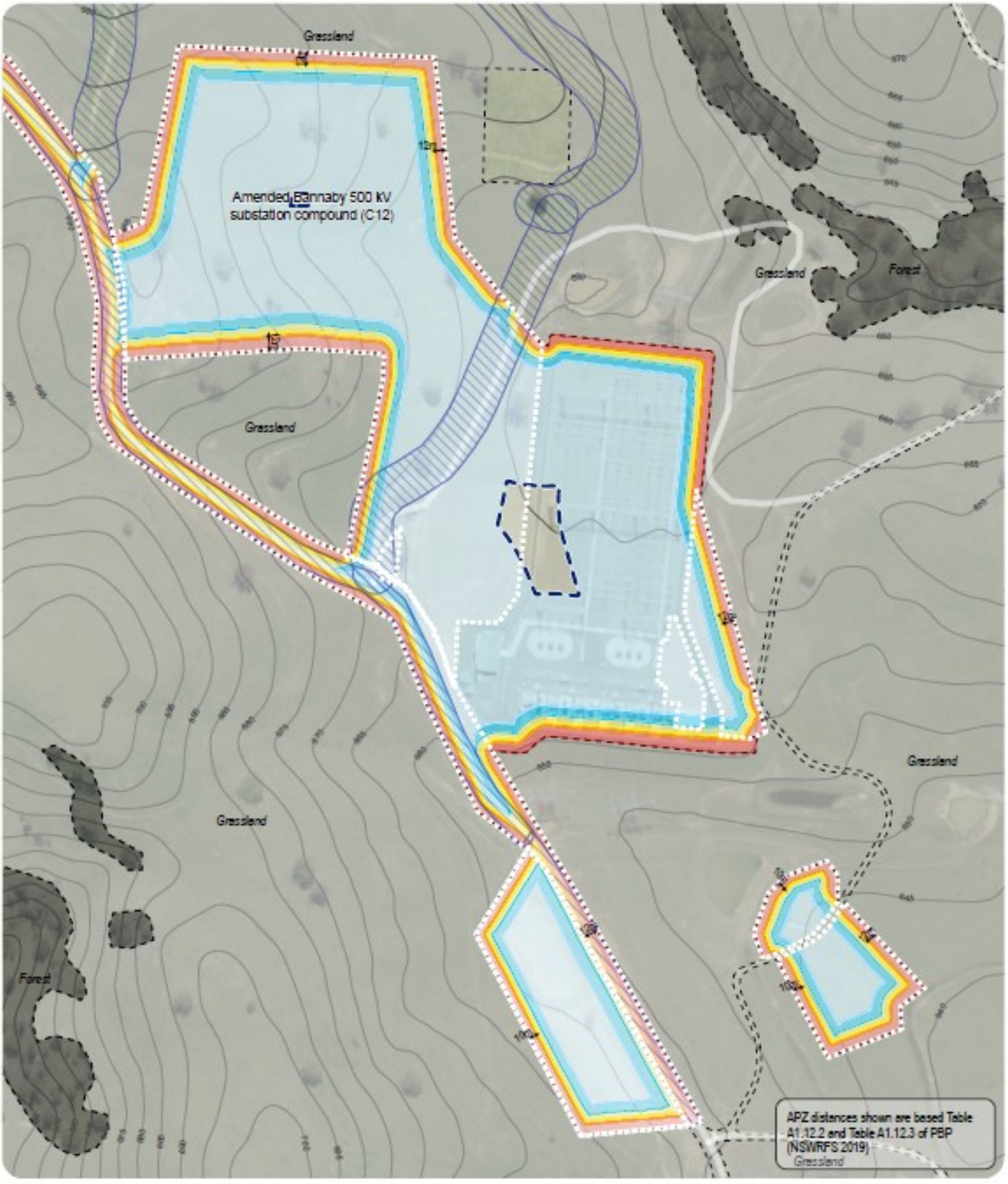
BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:5,100
0 80 160 m

Projection: GDA 1994 MGA Zone 55

Figure A-10: Adjungbilly accommodation facility and compound (AC04)

Vegetation Type: Forest and Grassland *FDI:* 80



Compound locations
Access tracks
Contour (m)
Vegetation - Forest
Vegetation - Grassland
100 m guideline
APZ distance

BAL Radiant Heat (kw/m2)
BAL 12.5
BAL 19
BAL 29
BAL 40
Flame zone

1:3,800
0 60 120 m

Projection: GDA 1994 MGA Zone 55

HumeLink Bushfire Assessment

Figure A-11: Amended Bannaby 500 kV substation compound (C12)

Vegetation Type: Forest and Grassland *FDI:* 100

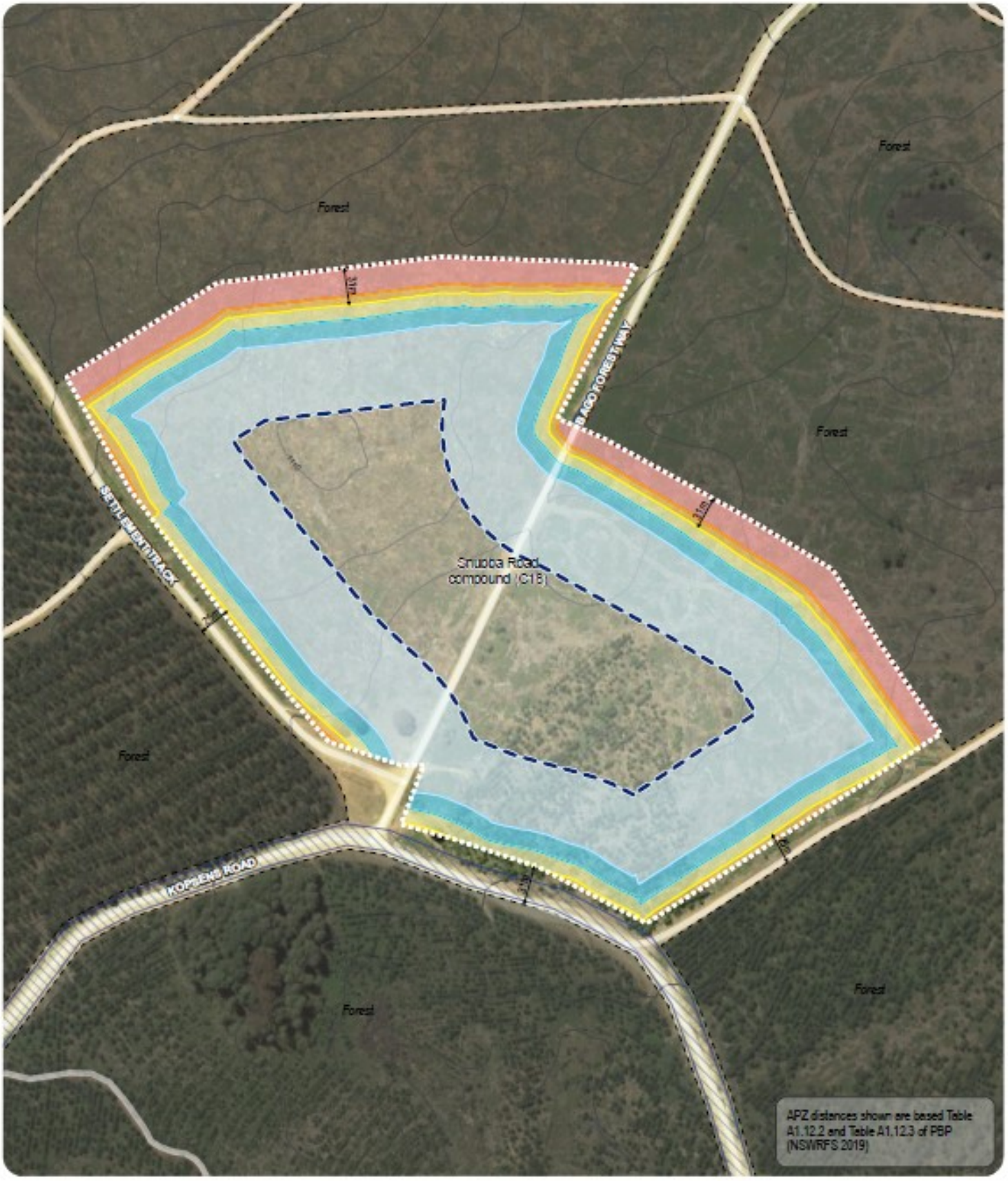


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Figure A-12: Snubba Road compound (C18)

Vegetation Type: Forest *FDI:* 80

Document prepared by

Aurecon Australasia Pty Ltd
ABN 54 005 139 873

Level 11, 73 Miller Street
North Sydney 2060 Australia

PO Box 1319
North Sydney NSW 2059
Australia

T +61 2 9465 5599
F +61 2 9465 5598
E sydney@aurecongroup.com
W aurecongroup.com

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