Strategic Bushfire Study: 48 Jervis Bay Road, Falls Creek

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Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Description
APZ	Asset Protection Zone
BFMC	Bush Fire Management Committee
BFPL	Bush Fire Prone Land
BFRMP	Bush Fire Risk Management Plan
DCP	Development Control Plan
DEM	Digital Elevation Model
ELA	Eco Logical Australia
EP&A Act	*Environmental Planning and Assessment Act 1979*
FCNSW	Forestry Corporation of NSW
FFDI	Forest Fire Danger Index
GEV	Generalised Extreme Value
IPA	Inner Protection Area
LGA	Local Government Area
NPWS	NSW National Parks and Wildlife Service
NSP	Neighbourhood Safer Place
NSW	New South Wales
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection
RFS	NSW Rural Fire Service
RF Act	*Rural Fires Act 1997*

1. Introduction

1.1 Background

This Strategic Bushfire Study (the 'Study') contributes to the Planning Proposal for 48 Jervis Bay Road, Falls Creek (herein referred to as 'subject land') being prepared for public exhibition by Shoalhaven City Council. **Figure 1** shows the location of the subject land while **Figure 2** contains a concept plan of the proposed development.

The subject land is identified as bush fire prone land by Shoalhaven City Council (**Figure 3**) and certified by the Commissioner of the NSW Rural Fire Service. Therefore, Council must consider bushfire requirements in relation to the Planning Proposal under Section 9.1 'Directions by the Minister' of the *Environmental Planning and Assessment Act 1979.*

The minimum components of a Study are listed in Table 4.2.1 of 'Planning for Bush Fire Protection 2019' (PBP) have been provided herein with additional information where necessary (RFS 2019).

1.2 Study area

The Study Area includes bushfire risk assessment within 5 km of the subject land (**Figure 4** – **Figure 8**). The subject land is located within Lot 3 DP 846470 and owned solely by Theo Pasialis.

The subject land is in the south-eastern corner of the locality of Falls Creek within the Shoalhaven City Local Government Area (see **Figure 1**). Rural residential development exists to the north of the subject land with rural landholdings to the west and Tomerong State Forest adjoining the southern boundary.

In addition to bushfire constraints the subject land is affected by other development constraints including environmental considerations. These combined constraints determine the extent of the area suitable for residential development potential.

1.3 Planning Proposal process

The Planning Proposal being considered for 48 Jervis Bay Road, Falls Creek seeks to amend the Shoalhaven Local Environmental Plan (LEP) 2014 (see concept plan in **Figure 2**).

The purpose of the Planning Proposal is to request that Shoalhaven City Council:

- Reduce the minimum lot mapping for the subject land to a minimum of 4,000 m^2 to enable up to a maximum of 13 residential allotments, and a Community Lot in accordance with the Plan of Subdivision (Annexure 1);
- Enable the erection of dwelling house on each allotment.

The Study provides an assessment of the landscape bushfire risk and the residual risk for development following the provision of bushfire protection measures. It includes the following strategic assessment requirements from PBP:

- ensuring land is suitable for development in the context of landscape scale bush fire risk;
- ensuring new development on bush fire prone land (BFPL) will comply with PBP;
- minimising reliance on performance-based solutions;

- providing adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitating appropriate ongoing land management practices.

The planning proposal considers bushfire risks strategically in the landscape rather than just site specific bushfire risk and in so doing facilitates a better outcome compared to that under the current LEP provisions.

The subject site is already identified by the Shoalhaven LEP 2014 as an area where rural residential development is appropriate, being mostly zoned R5 – Large Lot Residential allowing for lots with an area of 2 ha, and thus allowing for up to 13 lots to be created. This Planning Proposal is generally consistent with the R5 zone, with the exception that it seeks to develop the predominantly cleared portion of the site into 13 smaller lots, with the balance of the site being retained as a Community Lot and managed for its ecological and passive recreational value.

A Concept Layout Plan for the site is provided as **Figure 2**.

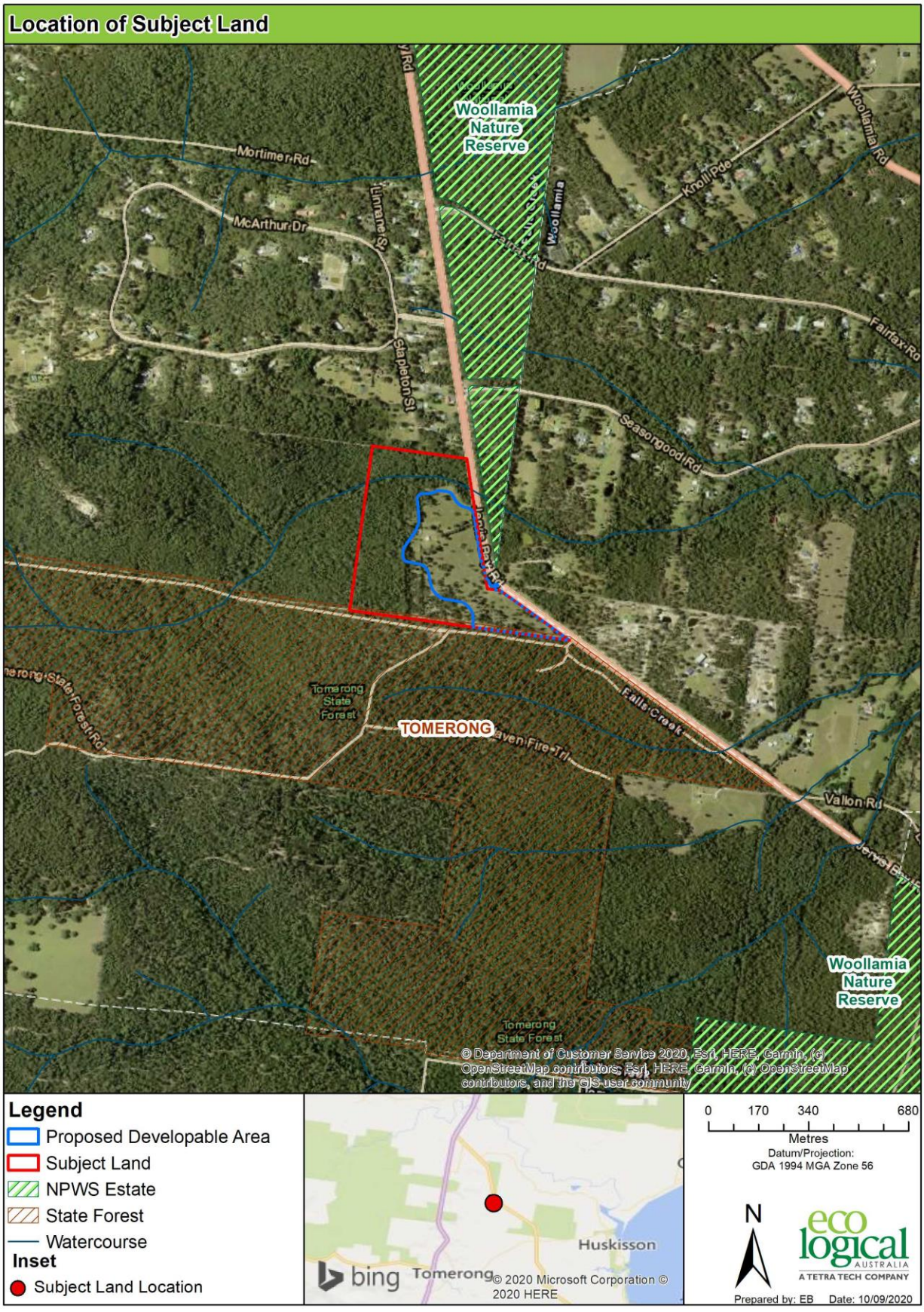

Figure 1: Location of subject land

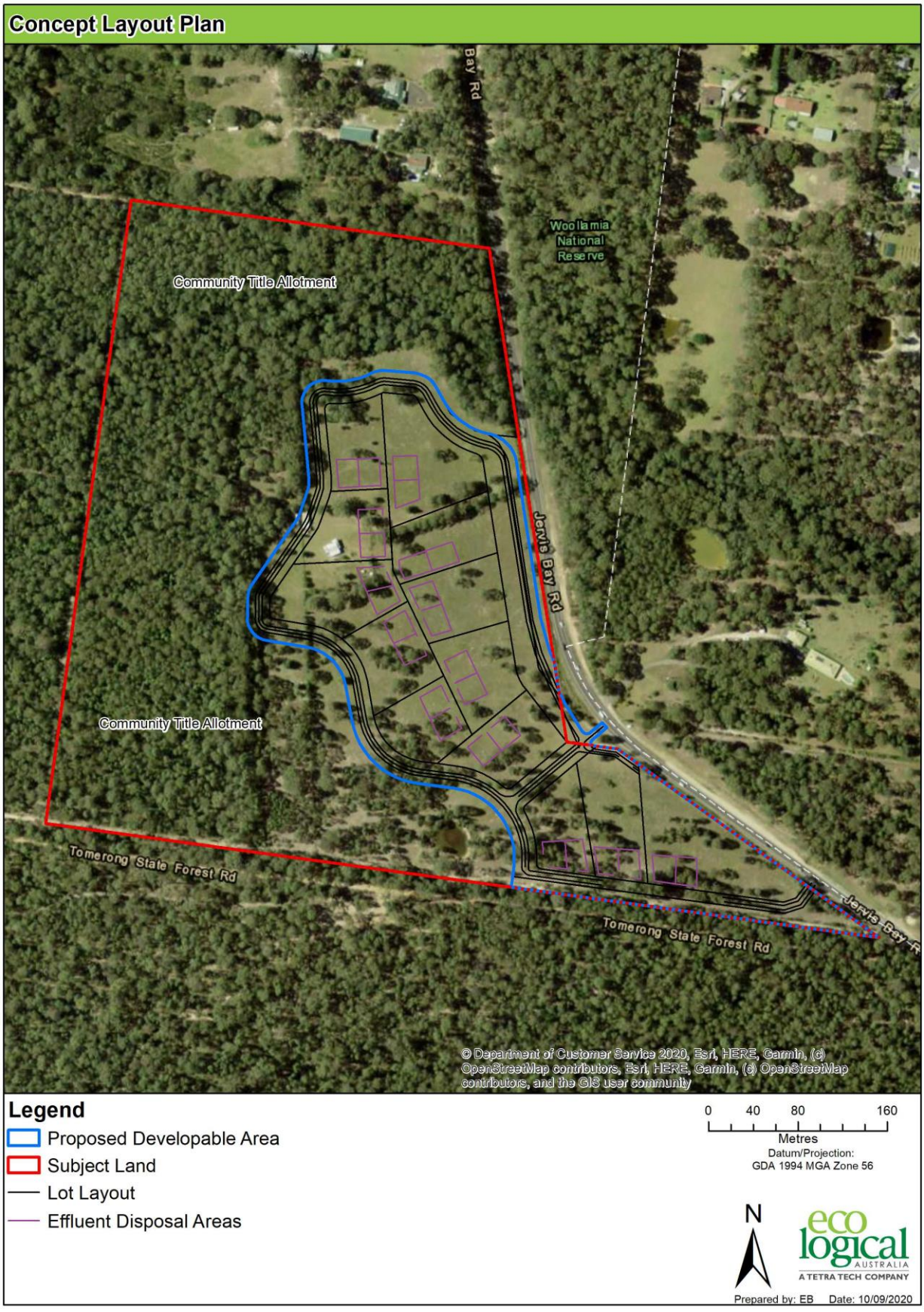

Figure 2: Concept Layout Plan

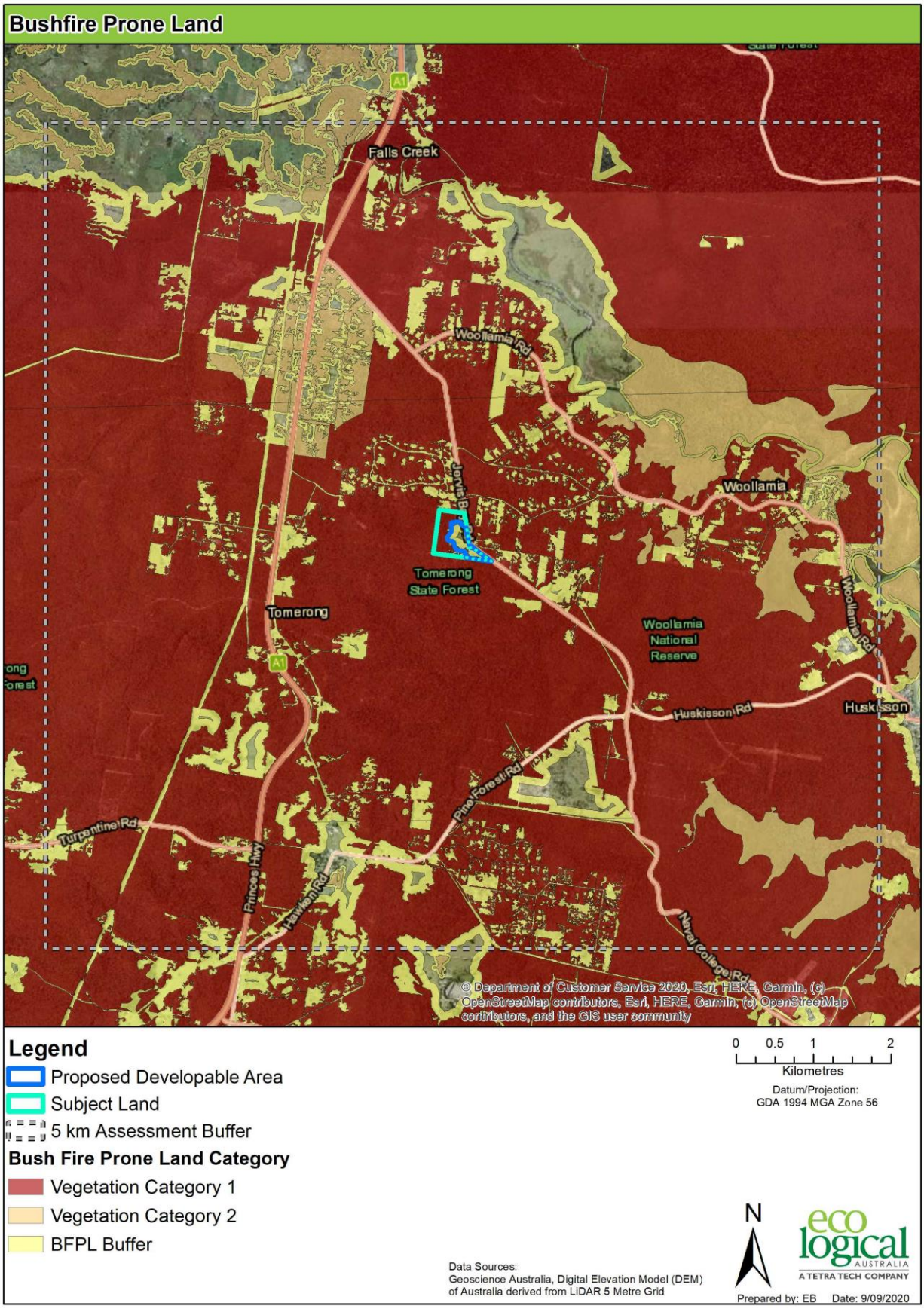

Figure 3: Bush Fire Prone Land Map

2. Bushfire landscape risk assessment

The landscape bushfire risk includes assessment of bushfire hazard, potential fire behaviour and bushfire history within at least a 5 km radius of the subject land, herein called the 'study area'.

The subject land is bounded by Tomerong Stage Forest to the south, a thin wedge of Woollamia Nature Reserve to the north-east beyond Jervis Bay Road, private forested land to the west, existing rural-residential development to the north and existing rural development to the south-east beyond Jervis Bay Road.

2.1 Bushfire hazard

The subject land adjoins a more extensive area of bush fire prone land as shown in the vegetation map in **Figure 4**. The bushfire hazard is most extensive to the west and south and has the potential to expose the subject land to larger sized bushfires. Larger potential fire catchments such as these increase the risk of exposure to landscape wide bushfires which are typically more difficult to control.

There also are significant forest hazards to the north, but these are mitigated to some extent by rural residential development immediately to the north of the subject land.

To a lesser extent, there are also bushfire hazards to the east, but these are interspersed with lower hazard managed hobby farms/agricultural properties and generally fires from this direction occur under less adverse fire weather conditions.

The bushfire hazard has been classified below using the PBP assessment methodology for vegetation and slope.

2.1.1 Vegetation

The subject land is within a landscape comprised predominantly of wet sclerophyll forest (shrubby and grassy) in most directions with areas of dry sclerophyll forest further afield to the north and west. Similarly, there are areas of both wet and dry sclerophyll forest to the east and tapering down to forested wetlands and saline environments to the east associated with Currambene Creek and Jervis Bay (**Figure 4**).

Fires within forest vegetation, particularly wet sclerophyll forest (WSF), have the potential for maximum bushfire intensity compared with other vegetation types such as woodland or grassland. Forest fires typically have large flame heights due to the height of trees, greater spotting potential and may experience significant crown fire particularly in shrubby forest types with significant understorey fuel. Forest fires can be difficult (or impossible) to control under adverse fire weather conditions and pyrocumulonimbus formation is possible.

The Bushfire Attack Level (BAL) for forest is the highest of all vegetation types as the flame heights associated with the burning of trees are typically higher in forests and therefore the extent (or panel) of radiant heat buildings can be exposed to is higher. Shrubby forest vegetation types also typically produce higher levels of burning ember debris which is a significant risk to buildings even under less severe fire weather conditions.

Vegetation has been classified into Keith Formations and Keith Class (Keith 2004) and assigned a potential total fuel load (tonnes/hectare) using Table A1.2.8 from PBP. **Figure 4** and **Table 1** (overleaf) show the vegetation within the study area. Fuel loads, structure and composition are a major contributor to wildfire behaviour.

Table 1: Vegetation formation, class and fuel allocation for the study area

Vegetation formation	Keith Class	Overall fuel including bark and canopy (t/ha)*
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	Southern Lowland Wet Sclerophyll Forests (WSF); South Coast WSF; Coastal Swamp Forest; Central Gorge Dry Sclerophyll Forest (DSF); Sydney Coastal DSF; South Coast Sands DSF; North Coast WSF; Central Gorge DSF.	36.1
Woodland (grassy and woody)	Coastal Valley Grassy Woodland	20.2
Forested Wetland	Coastal Floodplain Wetlands	15.1
Freshwater Wetland	Coastal Heath Swamps	4.4
Saline Wetlands	Saltmarshes, Mangrove Swamps	Not specified

*Overall fuel load including Bark and Canopy from Table A1.12.8 from PBP 2019 (RFS 2019)

2.1.2 Topography and slope

The subject land slopes down from south to north and slightly down from west to east with a north-easterly aspect with slopes ranging from 'all upslopes and flat land' to the west and '>0-5 degrees downslope' to the north.

Figure 5 (elevation map) shows that for a fire to approach the site from a distance (e.g. a larger fire) it would need to predominantly burn downhill or across slope with only a short upslope fire run to the north-west and north which mitigates the fire intensity to some extent. The position of the subject land in the bush fire prone landscape (from a slope perspective) is relatively advantageous in that there are not slopes of significance where fire can run steeply uphill at increased intensity on a long fire run towards the proposed development.

Figure 6 illustrates the slope variation across the site and landscape. This figure is based upon GIS algorithms that are useful at a landscape scale but the zoomed in image within **Figure 6** is somewhat misleading. The slope categories are calculated from the Geoscience Australia 5 m grid cell Digital Elevation Model based off LiDAR data, so it is calculated based on the elevation difference between 5 m cells. In some cases, there may be some exaggeration or underestimation of slope in areas and slope transects over greater distances provides a better indication of the slope most affecting fire behaviour within and surrounding the subject land.

The steepest slope within the site from south to north and immediately surrounding the site actually falls into the PBP slope category 'downslope >0-5 degrees' as ground truthed during the site inspection.

2.1.3 Bushfire weather

The timing and length of bushfire seasons is driven by seasonal climate and weather factors. However, the behaviour of fires is also strongly influenced by the weather conditions at the time the fire is burning, and wind speed/direction is the primary weather factor determining rate of spread and difficulty of

control. The historical weather patterns also provide an understanding of the potential bushfire behaviour, and its direction, intensity, and rate of spread.

The Shoalhaven region experiences mild temperatures throughout the year, with higher mean temperatures from November to March.

Rainfall is variably distributed throughout the year, with a drier season typical from mid-winter to mid-summer. This pattern normally supports a predominantly spring to summer fire season with slightly higher rainfall during the months preferred for fuel reduction burning (i.e. autumn and early winter).

Relative humidity is also variable, with higher humidity recorded in summer and early autumn, probably as a result of the higher incidence of on-shore winds. However, very low relative humidity can occur these same months and significantly increase bushfire risk.

The weather data (BoM 2016), local knowledge of fire weather patterns, and previous analysis of weather within the area (ELA 2013a), indicate that:

- Adverse fire weather conditions are most common in early spring, sometimes with a slight lessening in late spring and early summer and then building to another peak in mid to late summer;
- Southerly 'blusters' may adversely affect fire behaviour;
- Strong onshore winds may adversely affect fire behaviour during higher bushfire risk periods almost at any time outside of winter;
- Forest Fire Danger Index (FFDI) calculated from Point Perpendicular data is often significantly less than that of Nowra (as shown in **Table 2**);
- Wind speed/direction is the greatest influence/threat for forest fires; and
- The study area will have both inland and coastal influences.

Climate change is expected to bring longer bushfire season to parts of Australia, with an increasing number of extreme fire weather days, and increasing fire intensity.

Table 2: FFDI for a 1 in 50-year event

Weather Station	Max Recorded FFDI	All directions	N to SE	SE to SW	SW to N
Nowra	120	117	47	64	117

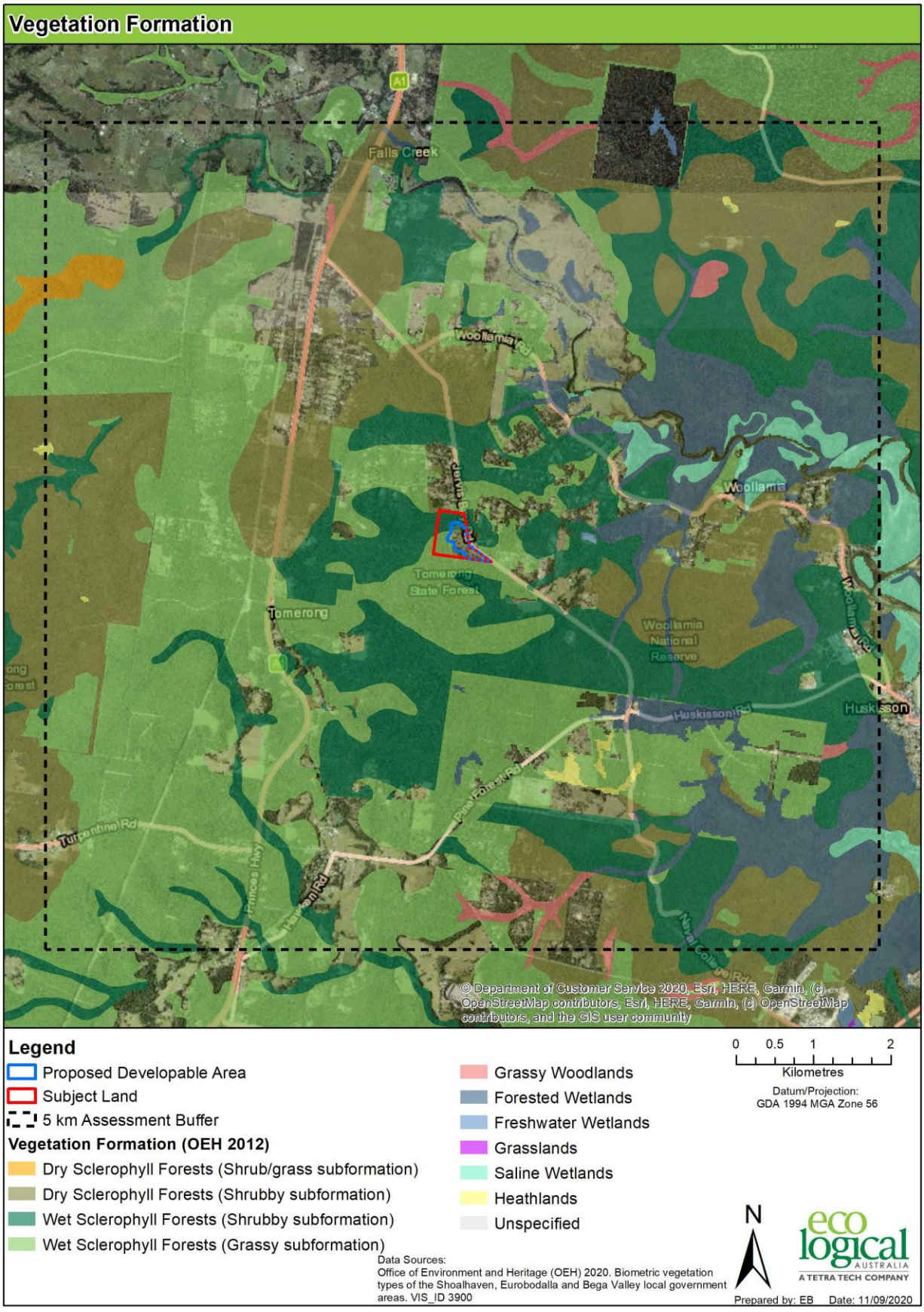

Figure 4: Vegetation map

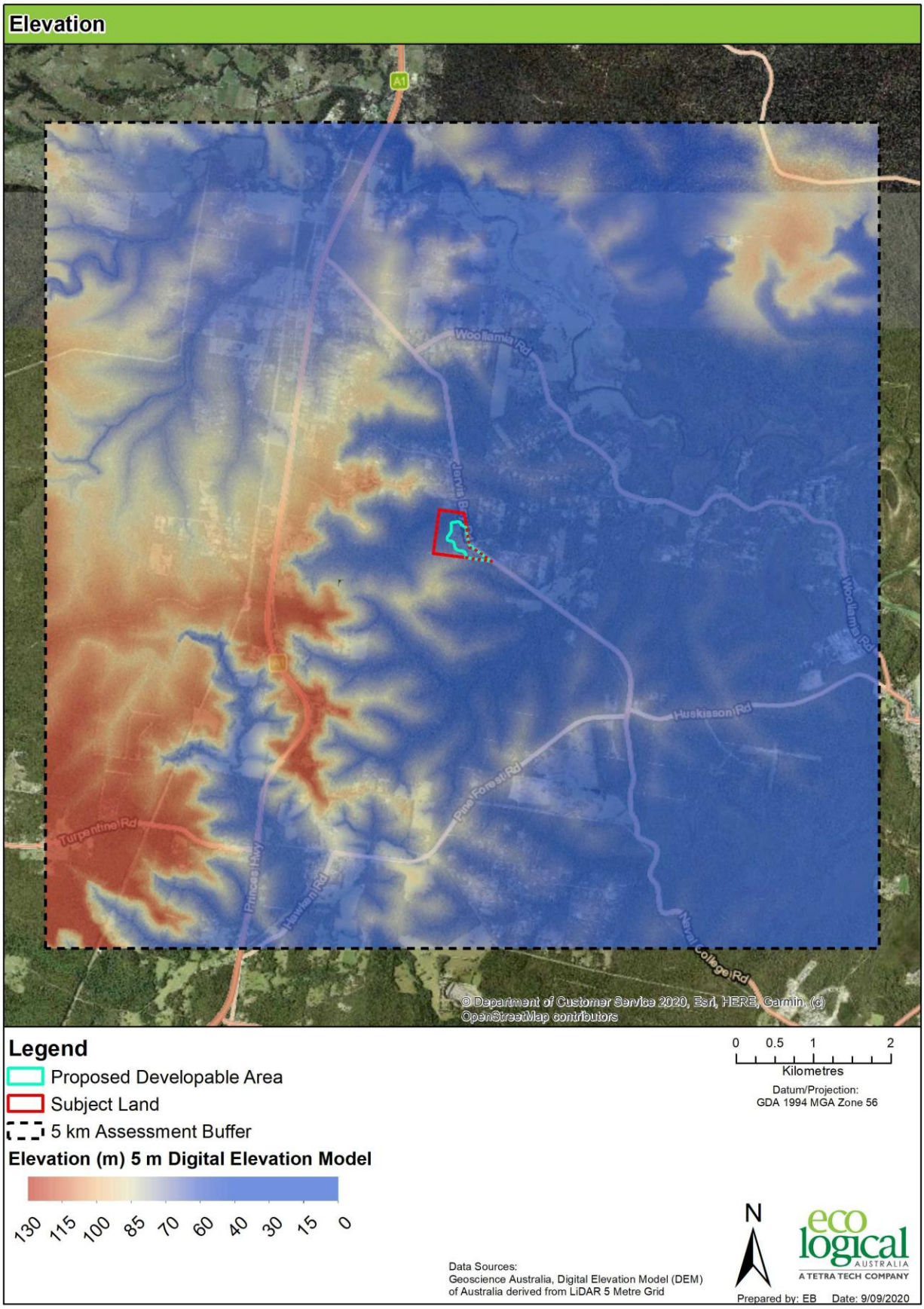

Figure 5: Elevation map

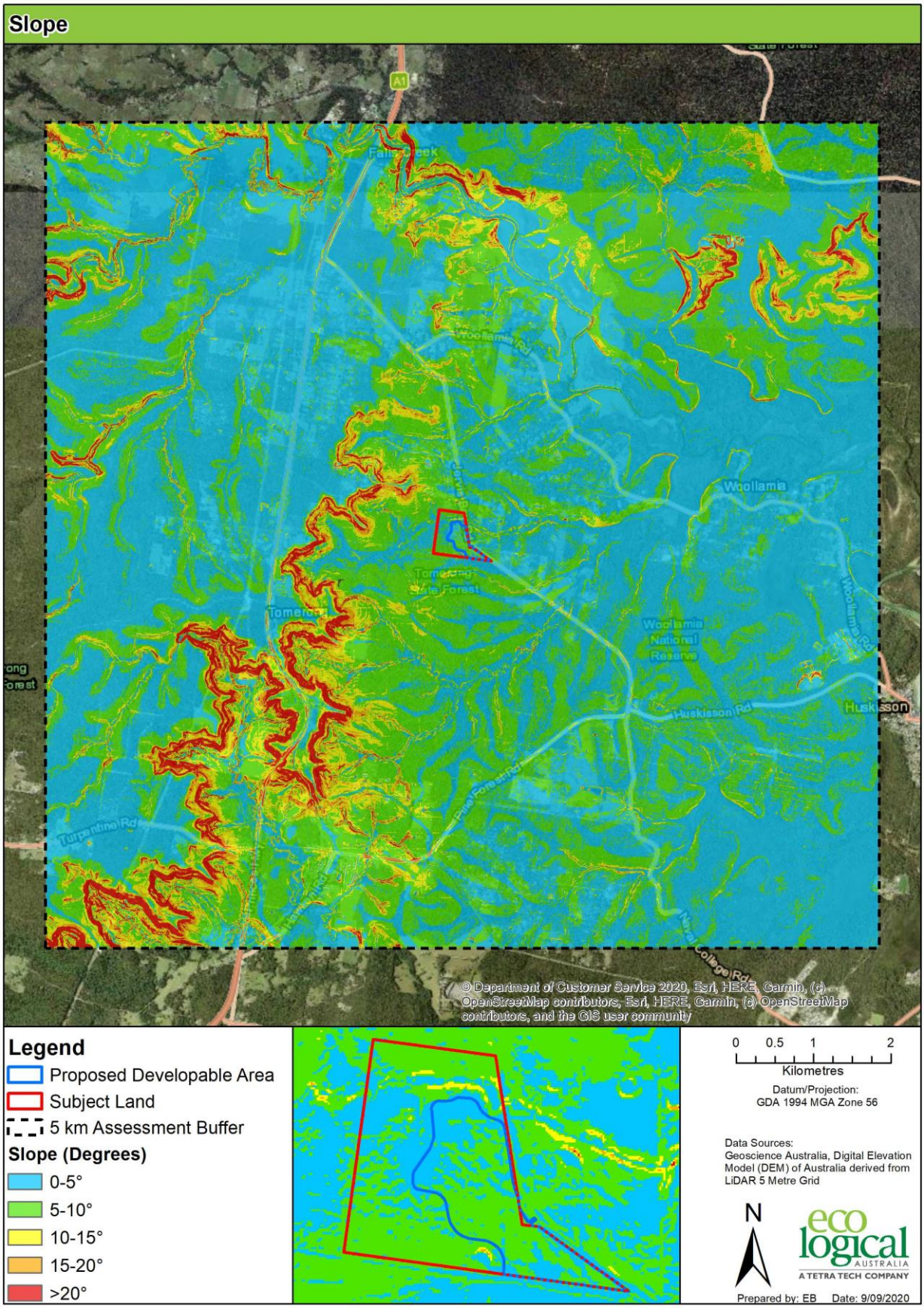

Figure 6: Slope

2.2 Potential fire behaviour

Uncontrollable fire intensities can occur in the forest vegetation abutting the development site particularly to the west and the south of the site.

All native vegetation communities have the potential to burn at uncontrollable intensities unless they are burned at a very high frequency e.g. annually. This frequency of burning is rarely feasible and is inappropriate within the adjoining Tomerong State Forest due to ecological thresholds.

Given the infrequent burning typically prescribed for forest vegetation within a State Forest (e.g. >5-7 years depending on specific forest vegetation type and other silvicultural management influences) the subject land will be at risk of higher intensity bushfire attack in most years. However, this is the premise that PBP assumes in its design and standard for Asset Protection Zone (APZ) and building construction.

2.3 Bushfire history

The Shoalhaven Local Government Area (LGA) has on average 600 bush fires per year, of which an average of twenty fires can be considered to be major fires requiring response by two or more fire authorities. The Shoalhaven can experience significant fire activity any time of the year and fires in isolated parts of the LGA may burn for several days or weeks.

Across the LGA the main sources of fire ignition are identified as:

- Lightning strikes;
- Arson; and
- Accidental ignitions (i.e. escaped pile burns, burning without a permit or associated construction activities.

Any of these potential ignition sources is possible in the vicinity of the site.

Figure 7 shows the wildfire history for the study area for the past 50 years from the NPWS fire history mapping data set. The only recorded fire to have burnt through the subject land during this period was the Hylands Fire in December 2001/January 2002 which burnt through a total of 83,836 ha over 29 days.

During the proposed development site construction and operations, the following are potential ignition sources:

- Earth moving equipment;
- Vehicles;
- Power tools (such as welders, grinders);
- Mowers and slashers; and
- Accidental ignitions (such as discarded cigarettes).

2.4 Summary of landscape bushfire risk assessment

The subject land is exposed to a bushfire risk from the nearby forest. As these vegetation communities will not be managed in a way that will reliably lower the bushfire risk, it can be assumed that higher intensity fires will impact the future development periodically.

The subject land benefits from bushfire protection from the north in the form of the existing rural-residential subdivision associated with Macarthur Drive and from its position in the landscape requiring all potential larger fires to spread downhill toward the site. The fire history, showing that only one of the multiple fires that have occurred in the study area over the 50 year period has directly impacted the subject land, supports that the position within the landscape has such bushfire protection benefits.

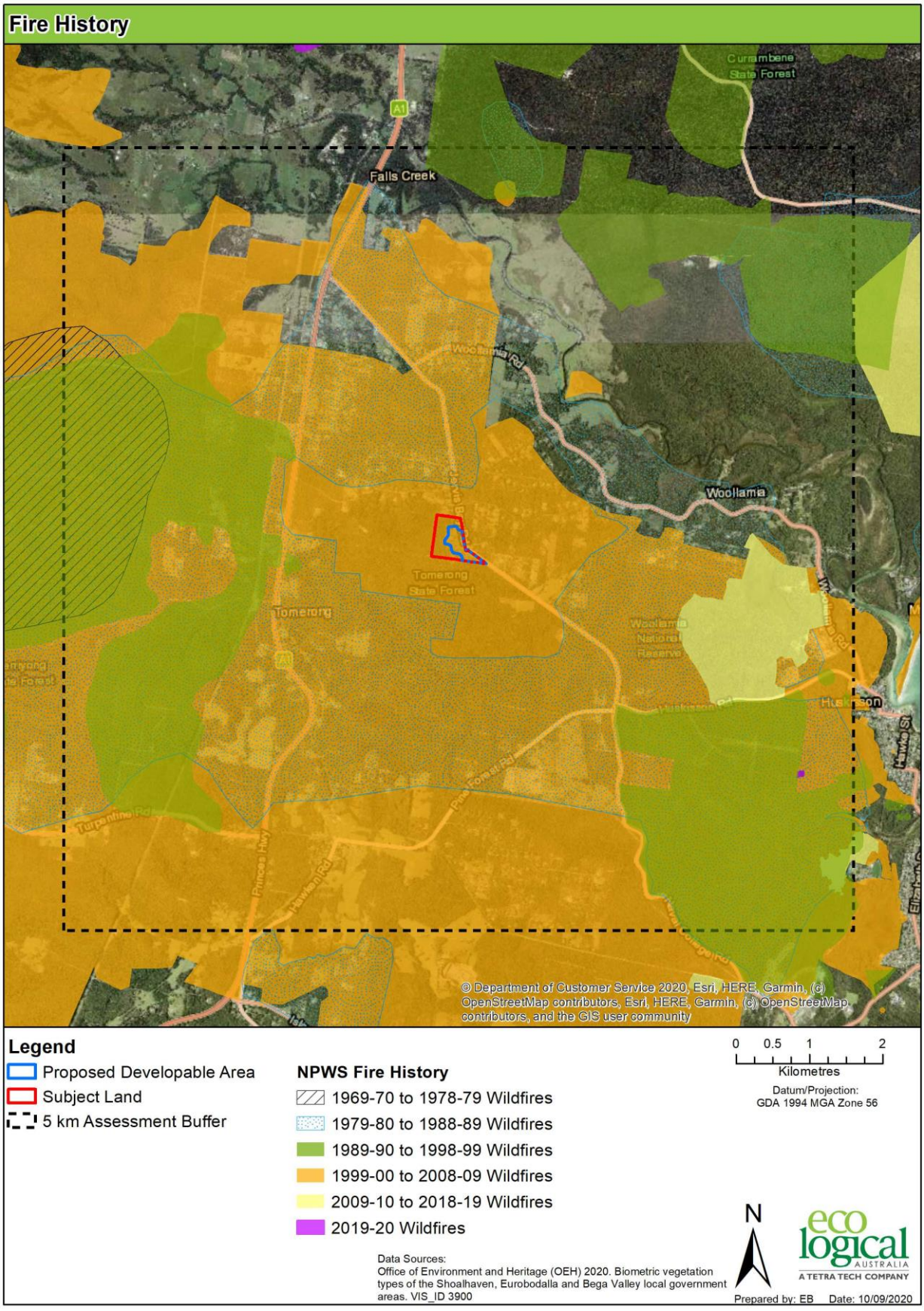

Figure 7: Fire history

3. Land use assessment

The subject land is currently occupied by one residential dwelling that was constructed prior to bushfire planning requirements (no bushfire construction standard). Large lot rural-residential development of the proposed site will increase the density of residents within the subject land, however, the land is capable of providing the necessary APZ setbacks to ensure that all future dwellings will be exposed to no greater than 29 kW/m^2 of radiant heat flux from a surrounding bushfire. Furthermore, all dwellings will be constructed to the requisite bushfire construction standard as determined by PBP.

Whilst the proposal adjoins State Forest and may potentially add some concern to its fire management, the increased resilience of any proposed development designed under PBP will potentially lower the life and property risk currently posed by fire in Tomerong State Forest to properties to its north. There is no need for the State Forest to provide APZ or other fuel measures abutting the site beyond what is currently undertaken within the Forestry Corporation of NSW 'Hardwood Forests Division Fuel Management Plan' (FCNSW 2020).

The establishment of a Community Title (CT) allotment to the west and north of the proposed development may also provide an opportunity for the establishment of a Strategic Fire Advantage Zone (SFAZ) to benefit the proposed subdivision which will also provide the opportunity for a reduction in the rate of fire spread across the landscape.

Consideration should also be given to slashing a 20 m buffer along the subdivision interface to reduce the impact of a fire from the west or north impacting on the access to the development and reducing the potential for crown fire impact on the edge of the development APZ.

The loop road perimeter access proposed for the development will also provide improved access for fire suppression and mitigation within the local landscape and for the existing dwelling.

4. Feasibility of Asset Protection Zones (APZs)

Figure 8 shows the location of 7 transects used to assess the APZ requirements under PBP for the site and the resultant APZs/BALs. **Table 3** identifies the slope and vegetation type used to determine these APZ. It is concluded that the required APZ under PBP for residential subdivision shown in **Figure 8** are achievable without the need for performance solutions or for off-site work by other land managers or agencies.

Table 3: Indicative APZs to achieve BAL 29

Direction	Transect #	Slope[1]	Vegetation[2]	PBP 2019 required APZ (residential)[3]	Available APZ	Comments
North, east, south, west and north-west	1-4, 6-7	>0-5° downslope	Forest	29 m	≥29 m	APZ provided within subject land within roads and building setbacks aside from to the east where majority of APZ is provided by Jervis Bay Road.
South-west	5	All upslopes/flat land	Forest	24 m	≥24 m	APZ provided within subject land

[1] Slope most significantly influencing the fire behaviour of the site having regard to vegetation found as per PBP.

[2] Predominant vegetation is identified, according to PBP.

[3] Assessment according to Table A1.12.2 of PBP 2019.

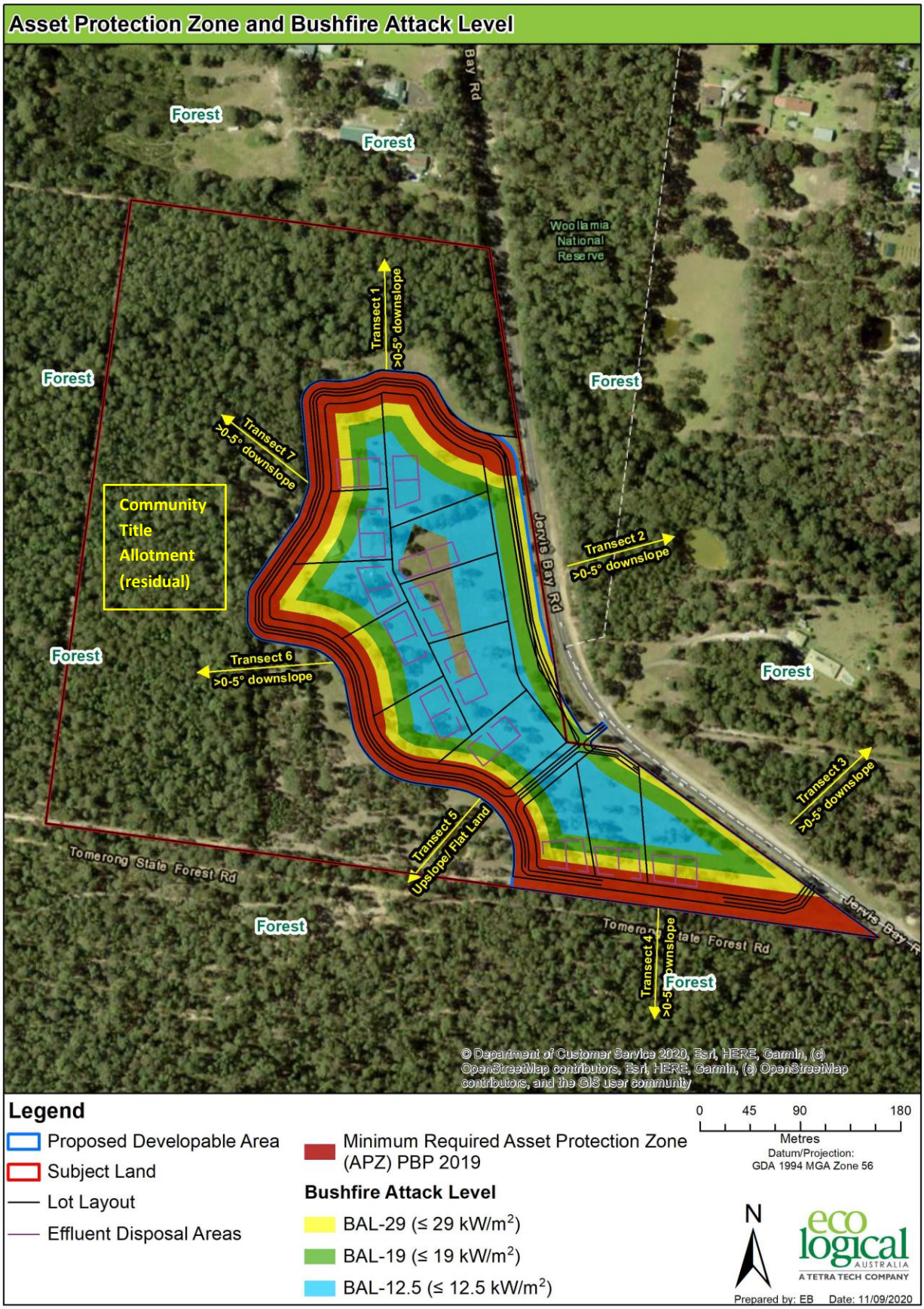

Figure 8: APZs/BALs for residential subdivision

5. Access and egress

The Conceptual Development Layout (**Figure 2**) provides:

- two egress routes; a central road off the primary access road to the east to Jervis Bay Road and a perimeter road to the south-east to Jervis Bay Road; and
- 8 m wide perimeter road between the bushfire hazard and all future buildings.

The Conceptual Development Layout is capable of meeting the compliance criteria of Table 5.3b of PBP as per **Table 4**.

Table 4: Performance Criteria for residential development.

Performance Criteria	Acceptable Solutions	Compliance notes
General access requirements		
The intent may be achieved where:		
Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads;	**Can comply**, detail not provided in concept.
	Perimeter roads are provided for residential subdivisions of three or more allotments;	**Concept plan complies** – see **Figure 2**.
	Subdivisions of three or more allotments have more than one access in and out of the development;	**Concept plan complies**, access provided to Jervis Bay Road in 2 places – see **Figure 2**.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles;	**Can comply**, detail not provided in concept.
	Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient;	**Can comply**, detail not provided in concept.
	All roads are through roads;	**Concept plan complies** – see **Figure 2**.
	Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;	**Not applicable** All roads are through roads.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;	**Can comply**, detail not provided in concept.
	Where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system;	**Concept plan complies**, access provided to 2 places on Jervis Bay Road and doesn't traverse forest/woodland/heath – see **Figure 2**.
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	**Not applicable**

Performance Criteria	Acceptable Solutions	Compliance notes
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.	**Can comply**, detail not provided in concept.
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;	**Not applicable** – no reticulated water supply
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 – Fire hydrant installations system design, installation and commissioning; and	
	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.	**Can comply** – each lot to be provided with a 10,000 L static water supply
Perimeter road requirements		
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.	Are two-way sealed roads;	**Can comply**, detail not provided in concept.
	Minimum 8 m carriageway width kerb to kerb;	**Concept plan complies** – >8 m wide perimeter road is proposed, see **Figure 2**.
	Parking provided outside of the carriageway width;	**Can comply**, detail not provided in concept.
	Hydrants are located clear of parking areas;	**Can comply**, detail not provided in concept.
	There are through roads, and these are linked to the internal road system at an internal of no greater than 500 m;	**Not applicable** – no internal road system.
	Curves of roads have a minimum inner radius of 6 m;	**Can comply**, detail not provided in concept.
	The maximum grade road is 15 degrees and average grade is 10 degrees;	**Can comply**, detail not provided in concept.
	The road crossfall does not exceed 3 degrees;	**Can comply**, detail not provided in concept.
	A minimum vertical cleared of 4 m to any overhanging obstructions, including tree branches, is provided.	**Can comply**, detail not provided in concept.
Non-perimeter road requirements		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Minimum 5.5 m width kerb to kerb;	**Can comply**, detail not provided in concept.
	Parking is provided outside of the carriageway width;	**Can comply**, detail not provided in concept.
	Hydrants are located clear of parking areas;	**Can comply**, detail not provided in concept.
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500 m;	**Can comply**, detail not provided in concept.
	Curves of roads have a minimum inner radius of 6 m	**Can comply**, detail not provided in concept.

Performance Criteria	Acceptable Solutions	Compliance notes
	The road crossfall does not exceed 3 degrees;	**Can comply**, detail not provided in concept.
	A minimum vertical clearance of 4 m to any overhanging obstructions, including tree branches, is provided.	**Can comply**, detail not provided in concept.

6. Emergency services

The planning proposal and the increase in buildings and occupants is relatively small and is not considered likely to increase the 'load' on emergency services requiring an upgrade of their services. The proximity of emergency services to the precinct are also considered adequate, subject to the of completion of all access roads prior to construction and occupation of new dwellings. There are two RFS brigades within 6 minutes travel time of the subject site:

- Falls Creek Brigade (2.9 km, 2 minutes travel time to north); and
- Huskisson Brigade (7.3 km, 6 minutes travel time to south-east).

The development increases the density of dwellings on the site from 1 to 13 but provides more resilient buildings and access. The potential fire suppression workload resulting from the additional 12 dwellings is considered more than compensated for by the interface buildings being constructed to contemporary bushfire protection standards and the interface having a wider (safer) perimeter road i.e. 8 m wide.

7. Evacuation

Future residents will be located <600 m from egress onto Jervis Bay Road which leads north back to the Princes Highway and onto Nowra, or south to the villages of the Bay and Basin area. Evacuation of future residents is unlikely to occur for fire emanating in the bushland to the east, however it is reasonably foreseeable for evacuation from bushfire threats from the NW - N – NE.

As uncontrolled fire over consecutive days is very unlikely from the NE (due to the subsidence pattern of NE winds overnight), the need for evacuation under NE winds is considered low. The primary evacuation risk is likely to be associated with a NW approaching fire and under a fire threat from this direction the egress routes from the proposed development are not likely to be cut as they are located on the eastern side of the development. Even a fire from the south under a southerly wind is likely to impact directly on only one of the evacuation points onto Jervis Bay Road.

Evacuation of the proposed site is also unlikely to complicate or adversely affect evacuation from existing surrounding residents as they similarly have the option for relocation to Nowra or relocation towards the villages of the Bay and Basin.

8. Infrastructure

8.1 Water

The proposal is to be serviced by static water supplies. **Table 5** identifies the acceptable solution requirements of Section 5.3 of PBP.

The PBP acceptable solution requirements for water is achievable.

Table 5: Water supply requirements (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available; A static water supply and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and Static water supplies shall comply with Table 5.3d of PBP.	**Not applicable** – no reticulated water supply. **Can comply** **Can comply** – 10,000 L minimum for each lot.
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1 (SA 2017); Hydrants are not located within any road carriageway; and Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	**Not applicable** – no reticulated water supply.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1 (SA 2017).	**Not applicable** – no reticulated water supply.
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps; and Above-ground water storage tanks shall be of concrete or metal.	**Can comply** **Can comply**

8.2 Electricity

Electricity supply to the proposal will be underground. **Table 6** identifies the acceptable solution requirements of Section 5.3 of PBP.

The PBP acceptable solution requirements for electricity is achievable.

Table 6: Requirements for the supply of Electricity services (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
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; Where overhead, electrical transmission lines are proposed as follows: Lines are installed with short pole spacing (30 m), unless crossing gullies, gorges or riparian areas; and No part of a tree is closer to a power line than the distance set out in ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3 2016).	**Can comply** While electricity supply to the subject land is overhead, electricity services within the subject site are to be located underground.

8.3 Gas services

The compliance for any gas services (reticulated or bottle gas) is to comply with Section 5.3.4 of PBP as detailed in **Table 7**.

Table 7: Requirements for the supply of gas services (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
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 AS/NZS 1596:2014 – The Storage and handling of LP gas, the requirements of relevant authorities, and metal piping is used; All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side; Connections to and from gas cylinders are metal; Polymer-sheathed flexible gas supply lines are not used; and Above-ground gas service pipes are metal, including and up to any outlets.	**Can comply** The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 5.3c of PBP.

9. Adjoining land

Future development will not be reliant on any off-site bushfire mitigation measures. All buildings and use will be designed to be resilient to bushfire attack in circumstances where no additional fuel management occurs outside of APZs etc.

Local Bushfire Management Committees will be updated annually of the bushfire protection measures in-built and proposed for the development.

The proposed land uses should not have a deleterious impact on the ability for bushfire management activities to be undertaken on adjoining land. Given the adherence to PBP and other land use planning requirements, the proposed land uses should not increase bushfire management needs for retained and/or adjoining bushfire prone vegetation.

Tomerong State Forest to the south of the proposed development is well serviced by a perimeter access track and a network of internal tracks that provide access for fire mitigation and suppression activities including backburning.

10. Conclusion

A number of strategies can be provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets the deemed to satisfy bushfire protection requirements.

The strategies assessed to reduce the bushfire risk associated with the rezoning, include:

- PBP compliant setbacks from bushfire prone vegetation (APZs);
- A PBP compliant road system designed to provide safe access and egress from the site;
- Underground electricity and gas services where possible;
- Compliant water supplies; and
- Appropriate design for emergency and evacuation response.

Given the potential for intense wildfire behaviour from the north-west and west, and to a lesser extent from the south, consideration may need to be given to additional strategies to complement those outlined above including:

i Establishment of a Strategic Fire Advantage Zone (SFAZ) over the Community Title (CT) allotment around the western and northern sides of the development to allow for more frequent hazard reduction burning within this area;

ii Consideration should be given to slashing an additional 20 m buffer along the interface with the subdivision biannually (August/December) to further reduce the potential for intense wildfire impact on the access/APZs for the proposed subdivision; and

iii A Bushfire Emergency and Evacuation Management Plan should be considered for the development including provisions for relocation of residents/pets on days of higher Fire Danger Rating (FDR).

More detailed bushfire protection design is required at the subdivision stage however, the rezoning application has provisions that allow this more detailed design to achieve the deemed-to-satisfy requirements of PBP.

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11. References

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