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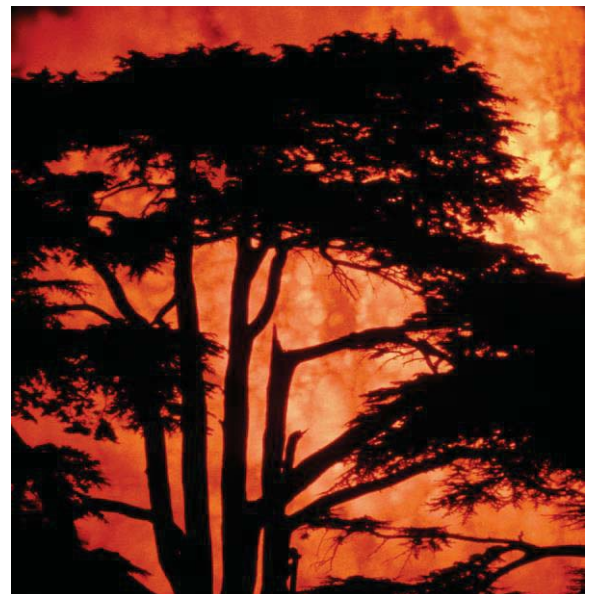


Bushfire Protection Assessment

'Riverside' – Stage 1 Subdivision, Bushman Drive, Jimboomba
QLD

Prepared for
Celestino Pty Ltd

30 November 2017





DOCUMENT TRACKING

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1 Property and proposal

Name:	Celestino Pty Limited		
Street or property Name:	'Riverside' Stage 1 Subdivision, Bushman Drive		
Suburb, town or locality:	Jimboomba, QLD	Postcode:	4280
Lot/DP no:	Lot 101 SP254145; Lots 102-105 SP254145; Lot 23 SP142997		
Local Government Area:	Logan City Council (previously Beaudesert Shire)		
Type of area:	Urban Residential		
Type of development:	Subdivision		

1.1 Introduction

Celestino Pty Limited commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed residential subdivision known as the 'Riverside' – Stage 1 site, off Bushman Drive at Jimboomba, Queensland (hereafter referred to as the subject land).

This assessment has been prepared by ELA Senior Bushfire Consultant, Daniel Copland (FPAA BPAD Level 3 Certified Practitioner No. BPAD28853-L3).

1.2 Location and description of subject land

The subject land is part of a 7,000 hectare site located approximately 40 kilometres to the north-west of the Gold Coast, as shown in **Figure 1**, and 40 kilometres south of the Brisbane CBD. The site was formerly rural residential and agricultural land and will be subjected to extensive earth and rehabilitation works to ensure its suitability as a location for residential development and infrastructure.

The subject land is bounded to the northern and north-western aspects by existing rural-residential allotments and associated infrastructure, including Bushman Drive and Glynton Road. Immediately to the south-west are larger rural properties associated with Gittins Road, while to the east and south of the subject land is the Logan River and associated tributaries – which will be incorporated as part of the masterplan design - effectively making these areas a feature within the landscape. Beyond the river are further rural areas proposed for future stages of the residential masterplan development.

The subject land is located in the Local Government Area of Logan City Council (formerly known as Beaudesert Regional Council).

1.3 Description of proposal

The proposal is for the Stage 1 residential subdivision, known as the 'Riverside'. The applicant, Celestino, is undertaking the proposed development within lands classified as a 'Priority Development Area' (PDA) within the Economic Development Queensland (EDQ) planning and approval framework. The objective of these areas is to urgently increase the available residential housing stock onto the public market to meet local demand.

The overall approved masterplan development consists of 5,500 residential lots within multiple stages.

In addition to the residential lots, there is also residual allotments associated with the main town centre development, higher density residential uses and community uses, such as a community centre, school and public open space.

Proposed Stage 1 consists of 509 residential allotments, a residual Special Use lot (for community use), associated infrastructure and public open space. Details of the proposed Stage 1 development are displayed within **Figure 2**.

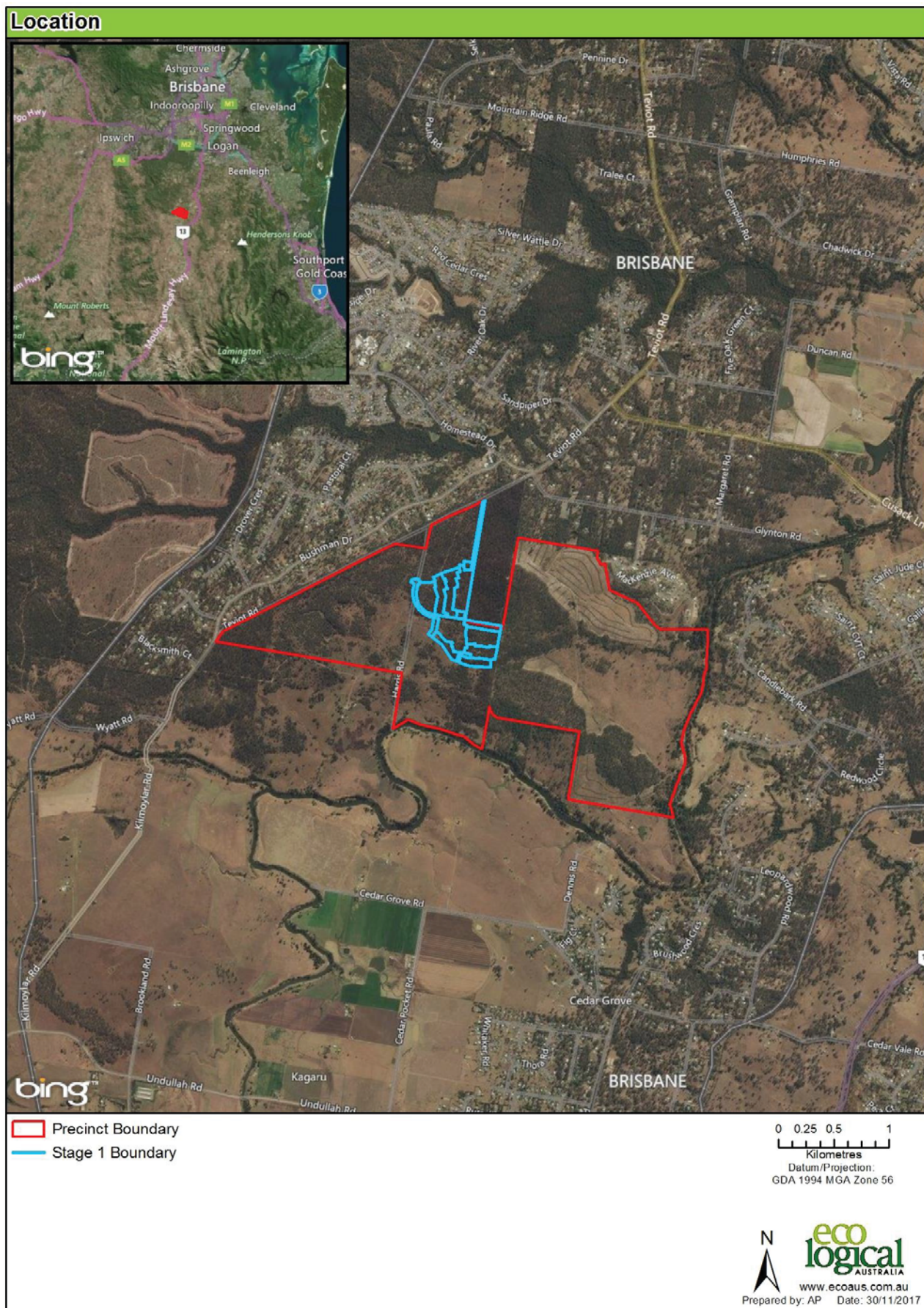


Figure 1: Location of the 'Riverside' Stage 1 residential subdivision

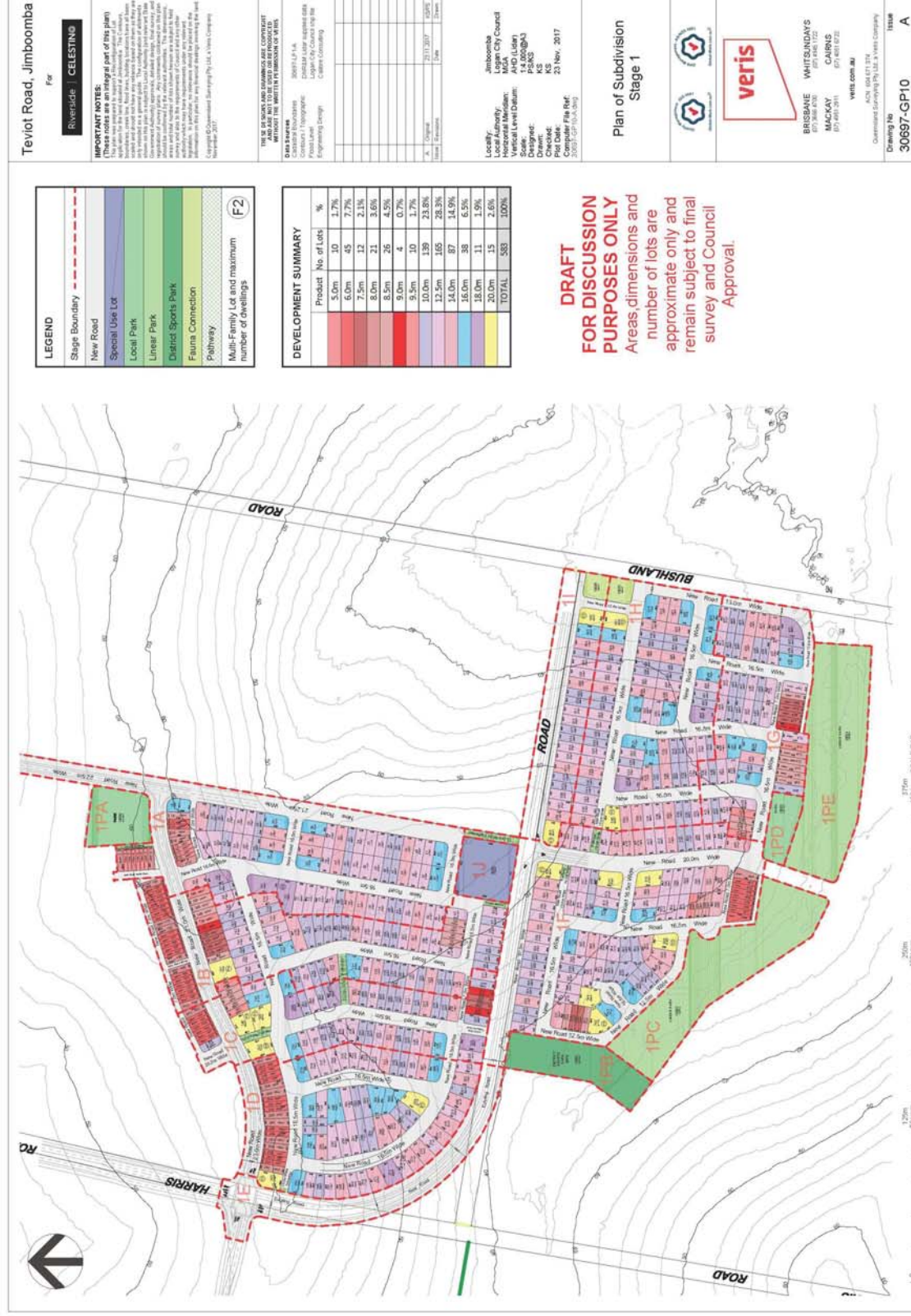


Figure 2: Proposed development layout for the 'Riverside' Stage 1 residential subdivision

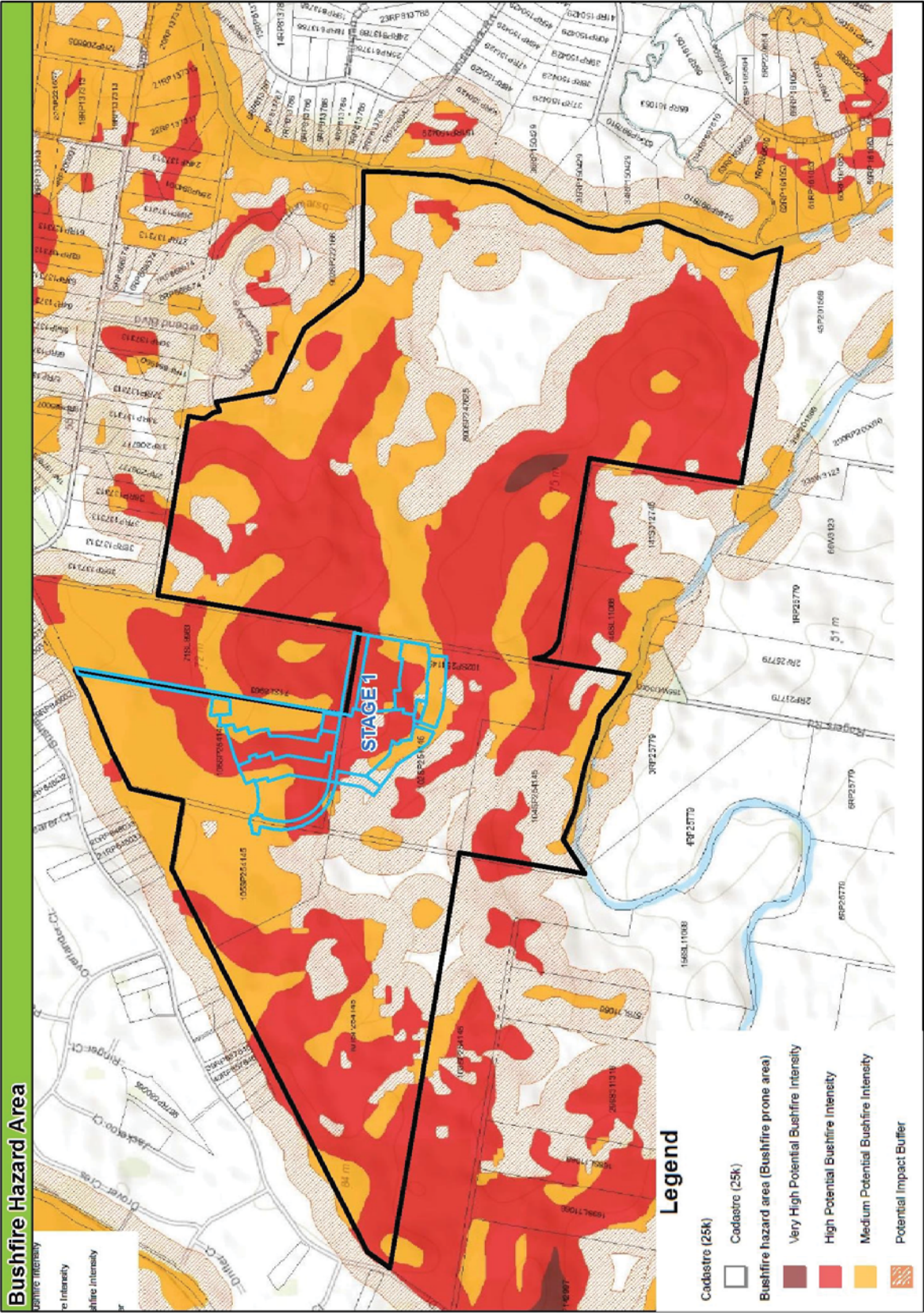


Figure 3: Bushfire Hazard influencing the 'Riverside' Stage 1 residential subdivision (extract from Logan City / Beaudesert Regional Council)

Bushfire Hazard Assessment and Asset Protection Zone

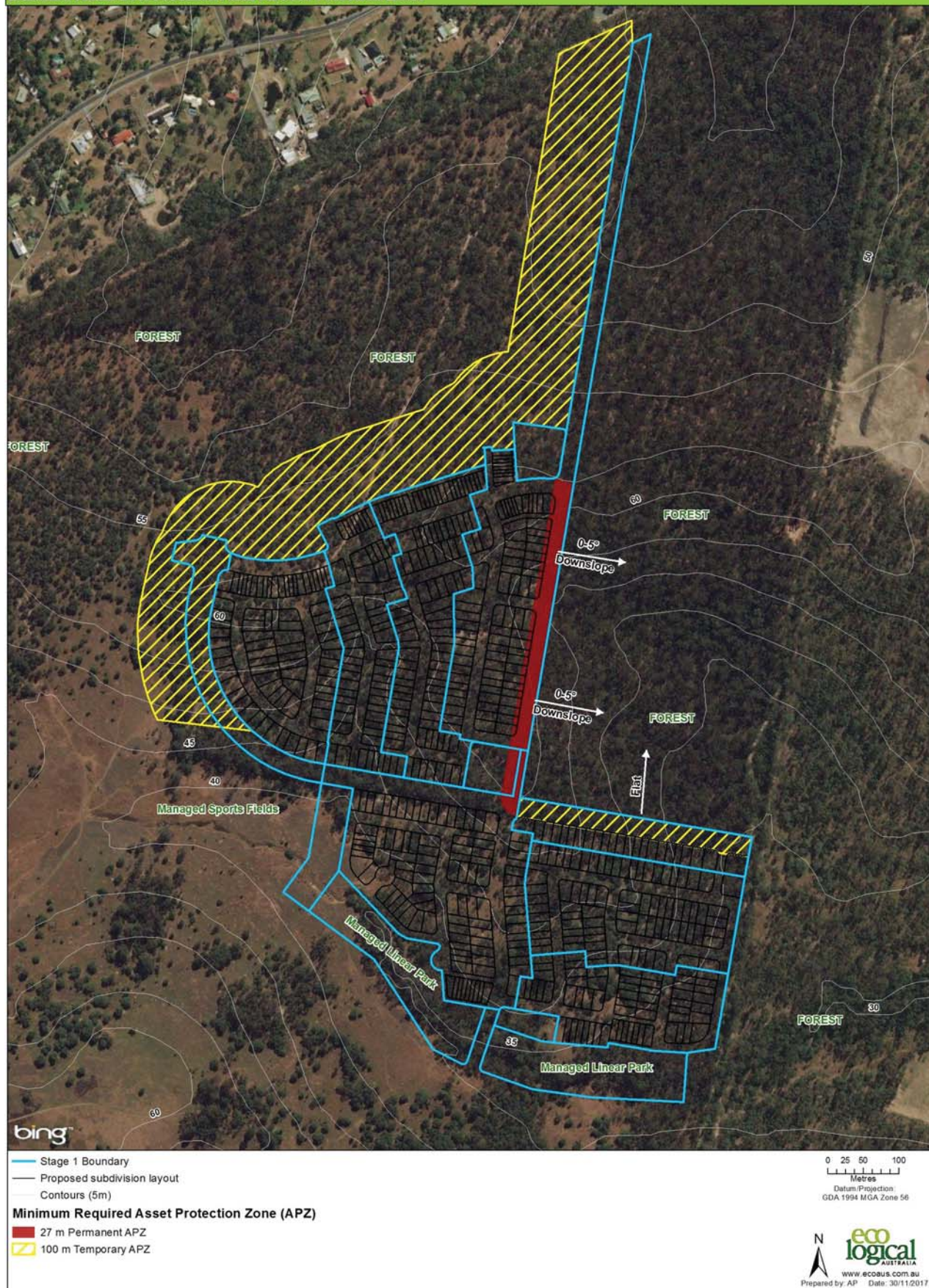


Figure 4: Bushfire Hazard Assessment and Asset Protection Zones (APZs) for the 'Riverside' residential subdivision (as per AS 3959-2009 BAL-29 for future dwelling construction)

Bushfire Hazard Assessment and Bushfire Attack Level

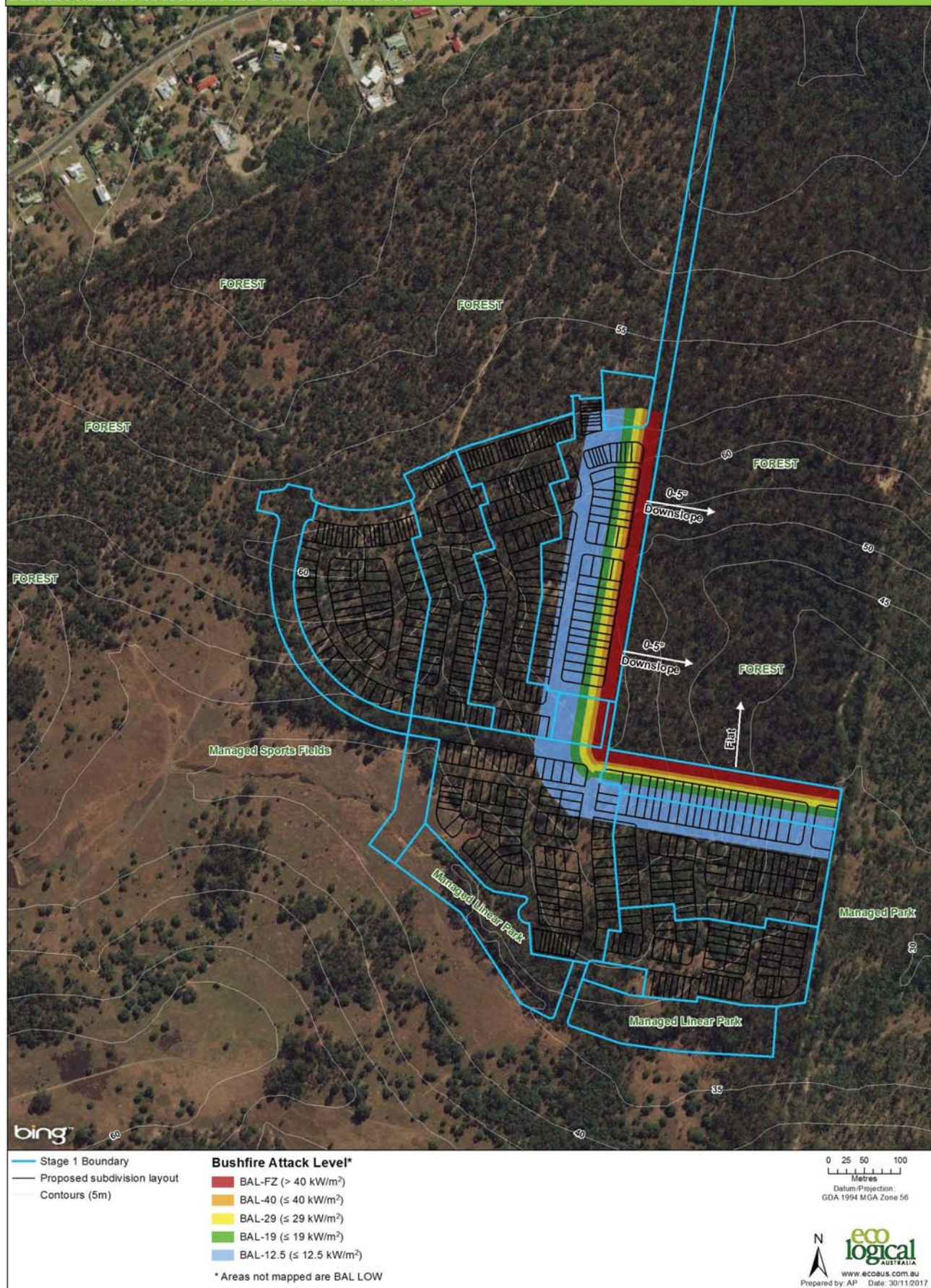


Figure 5: Bushfire Attack Levels (BAL) ratings applicable within the proposed 'Riverside' residential subdivision (as per AS 3959-2009)

2 Bushfire threat assessment

2.1 Assessment requirements / Justification

The vegetation surrounding the subject land is mapped showing the presence of both Medium and High Hazard areas within the Logan City Council Hazard Mapping (as shown within **Figure 3**). Due to the bushfire-prone nature of the subject site, a bushfire protection assessment has been requested (by Celestino) for the site.

There are various exemptions that apply in relation to local government planning provisions, due to the masterplan being lodged within the jurisdiction of EDQ and the process association Priority Development Areas (PDAs). However, due consideration should also be given to appropriate assessment and mitigation of bushfire risk, especially at the subdivision stage. Therefore, a detailed mitigation approach has been recommended based on relevant policies and standards.

The subject land is located in the Local Government Area of Logan City Council (formerly known as Beaudesert Regional Council) and has a Fire Danger Index (FDI) of 40 (when assessed in accordance with AS 3959-2009). However, it should be noted, that Queensland Rural Fire Service (QRFS), in conjunction with the relevant planning authorities, including Queensland Department of Infrastructure, Local Government and Planning (DILGP), are currently reviewing the use of this relatively low, and not entirely accurate FDI, particular within the South-east Queensland areas where an FDI of 70-80 is considered to be a more appropriate measure of potential fire behavior. In these south-eastern portions of Queensland, the expected fire weather is generally expected to be consistent with the north coast areas of NSW, where an FDI of 80 currently applies. For the purpose of this assessment an FDI of 80 has been utilised.

In response to the context outlined above, the following assessment has been prepared in accordance with intent of *QLD State Planning Policy 2016* (SPP). However, due to the broad nature of the mitigation framework within the policy, a conscious and proactive decision was taken to search for appropriate mitigation measures considered to be ‘detailed mitigation practice’. As such, in this instance, it has been agreed that the proposed subdivision should be assessed in accordance with a combination of the assessment methodologies and bushfire protection measures within ‘*Planning for Bush Fire Protection 2006*’ (NSW RFS 2006) herein referred to as PBP, and ‘*AS 3959-2009 Construction of buildings in bushfire-prone areas*’, herein referred to as AS 3959-2009.

Following further investigations into the above statement and the method of operation of both QRFS and the state and local government jurisdictions, the practical implications are that where an improved and more comprehensive method of assessment and mitigation is demonstrated, then this will be acceptable to the local authorities. In this instance, the proposal is to utilise a more developed, performance-based planning framework from NSW (PBP), in combination with a nationally-recognised and implemented Standard (AS 3959).

A brief comparative analysis has been provided below within **Table 1**. The information contained within outlines the various bushfire mitigation measures that may be applicable for implementation within the proposed development, and indicates how these measures are addressed under the differing policy approaches. Refer to **Figure 4** and **Figure 5** for further illustration of the requirements outlined below.

Table 1: Comparative analysis of bushfire protection requirements (SPP 2016 and 'detailed mitigation practice')

Bushfire Protection Measures	Queensland Bushfire Policy (SPP 2016)	Current 'Detailed Mitigation Practice' Bushfire Policy (PBP 2006 and AS 3959-2009)
Asset Protection Zones (APZs)	30-40 metre minimum (based 1.5 times the height of the Forest mature canopy vegetation)	21 metre minimum (based on Forest vegetation with slopes ranging from upslope to 5-10 degrees downslope from the development)
Building Design and Construction	BAL 12.5 (previously Level 1) (the area of influence for this mapped Medium & High Hazard is 100 metres)	BAL-12.5 to BAL-29 (based on 21 metre APZ with an area of influence out to 100 metres)
Access Arrangements	- Efficient emergency access for fire-fighting appliances - Perimeter road along interface areas – 20m cleared width - Road width and all weather standard as per local and state government requirements	- Public roads are two-wheel, all weather roads - Perimeter roads to have a minimum carriageway of 8 metres - Non-perimeter roads to have a minimum carriageway of 6.5 metres - All roads to be through-roads. Where dead-ends are unavoidable, they should not be more than 200 metres in length
Water Supplies and other services	- Reliable reticulated water supply that has sufficient flow and pressure characteristics for fire fighting purposes at all times (minimum of 10 Litres per second at 200 kPa); OR - Onsite water storage of minimum 5,000 Litres	- For reticulated water supplies - fire hydrant spacing, sizing and pressures comply with AS2419.1-2005 - For non-reticulated supplies – a minimum 5,000 Litre static water supply shall be supplied for each occupied building - Where practicable, electrical transmission lines are underground - Reticulated or bottled gas is installed and maintained in accordance with AS1596 and the requirements of the relevant authorities. Metal piping is to be used
Evacuation and Emergency Management	No specific provisions	Responsibility of individual property owners and local fire authorities
Landscaping	No specific provisions	Comply with the principles of landscaping within Appendix 5 of PBP 2006, including: - Prevent flame impingement - Defendable space for property protection - Reduce fire spread - Deflect and filter embers - Provide shelter from radiant heat - Reduce wind speed

Bushfire Protection Measures	Queensland Bushfire Policy (SPP 2016)	Current 'Detailed Mitigation Practice' Bushfire Policy (PBP 2006 and AS 3959-2009)
Comments	* <u>NOTE 1</u> : The above requirements are not a comprehensive list of requirements but are provided to allow comparison of the main features of each policy approach.	

2.2 Vegetation types and slopes

The vegetation and slope have been assessed outwards from the boundaries of the proposed subdivision in the direction of any bushfire hazards. In accordance with PBP / AS 3959 the predominant vegetation class has been assessed for a distance of at least 140 m out from the boundary of the subject land and the slope class *“most significantly affecting fire behaviour having regard for vegetation found [on it]”* determined for a distance of at least 100 m. The predominant vegetation and effective slope assessments are shown below in **Table 2**.

The areas of hazardous vegetation are situated primarily to the north-west, north and north-east of the site in the form of a 300 m wide corridor which extends further to the north towards Teviot Road. There are also areas of residual riparian vegetation associated with the Logan River to the south, south-east and east of the subject site, ranging in width from 10 to 100 metres, before transitioning to grassland areas further east and south.

The vegetation through the majority of these areas is highly disturbed from past land uses and fringe impacts from Bushland Drive, Teviot Road and Gittins Road. Due to the intent to create areas of ‘active Open Space’ it is likely that the areas of hazard associated with the Logan River will be managed, with the council-owned areas to the north likely to be rehabilitated and/or left unmanaged to allow the natural vegetation structure to return.

It is important to note, that whilst there are currently significant areas of hazard currently within the development areas, these will be removed as future stages of the subdivision are implemented. Temporary Asset Protection Zones (APZs) will be utilised where necessary in order for appropriate mitigation measures to be implemented for new development, without the need for any future stages or lots to be encumbered with a permanent management arrangement (APZ) for a hazard that will be removed in the near future. The Temporary APZs shown within **Figure 4** provide a 100m separation distance, which is required in order to avoid any increased construction standards for areas of new development (located away from the bushland interface). The Temporary APZ should remain in place until these adjoining stages of development are completed.

The vegetation to the north-west, north and north-east (within the overall masterplan site – to be removed) is predominantly Forest vegetation structure with a mixture of both grassy and shrubby understorey. There is also a level of invasive weed species present, particularly in close proximity to the drainage lines and roads. For the purpose of assessment in accordance with PBP 2006, the vegetation is categorised as ‘Forest’, refer to **Figure 4** and **Figure 5**.

The general topography across the site and surrounds is gently undulating. The slope of the land to the west, south west, south and south east has localised undulations associated with the existing drainage lines and infrastructure present within the landscape, and the disturbances caused through the previous land uses within the site. These local variations mean there are some small areas within the vegetation to the north that is a gentle downslope in relation to the proposed development, however, the predominant effective slope within these areas is considered to be in the PBP slope class of ‘0-5 degrees downslope’ or ‘upslope/flat’ (refer to **Figure 4**). The vegetation further from the site, particularly on the southern and eastern sides of Logan River (Grassland), is also considered to exhibit more of an effective ‘upslope’ and this has been considered.

All other aspects of the proposed Stage 1 residential subdivision are surrounded by unmanaged rural or rural-residential grasslands.

3 Asset Protection Zones (APZ)

The requirements within AS 3959 have been used to determine the width of Asset Protection Zones (APZ) for the proposed Stage 1 residential subdivision (based on a BAL-29 construction outcome). **Table 2** below shows the required APZ calculation, with the locations of the APZs shown in **Figure 5**.

It is important to note that Temporary APZs will be utilised as part of the Stage 1 residential subdivision development areas. The use of Temporary APZs allows appropriate mitigation measures to be implemented for areas of new development on an adjoining undeveloped stage (that may still contain a hazard) as opposed to requiring permanent setbacks within the stage being developed. The purpose is to minimise the need for future stages or lots to be encumbered by ongoing management arrangements (APZs) for a hazard that will be removed by future stages of development in the near term.

Where Temporary APZs are able to be implemented to a distance of 100 m (or greater), the requirement for construction standards (as per AS 3959) for future dwellings in these locations, would be removed.

Table 2: Threat assessment, APZ and category of bushfire attack

Location within site (Refer to Figure 4)	Slope ¹	Vegetation ²	AS 3959 Setback (for BAL-29) ³	Proposed APZ	Comment
North / West Interface (Western precinct)	Downslope >0-5°	Forest	27 m	≥100 m	'Temporary' APZ to be implemented on adjoining future stages of subdivision development. The APZ can be extinguished once the hazard is removed and development occurs. The APZ will consist of a managed vegetation buffer. A Temporary APZ width of 100 m or more, removes the requirement for bushfire related dwelling construction standards in these locations.

Location within site (Refer to Figure 4)	Slope ¹	Vegetation ²	AS 3959 Setback (for BAL-29) ³	Proposed APZ	Comment
Access Road Interface (Western precinct)	Upslope	Forest	21 m	≥100 m	‘Temporary’ APZ to be implemented on adjoining future stages of subdivision development. The APZ can be extinguished once the hazard is removed and development occurs. The APZ will consist of a managed vegetation buffer. The managed buffer will improve the level of safety for site access/egress for residents and emergency services until future development of adjoining stages removes the hazard.
North Interface (Central precinct)	Downslope >0-5°	Forest	27 m	≥100 m	‘Temporary’ APZ to be implemented on adjoining future stages of subdivision development. The APZ can be extinguished once the hazard is removed and development occurs. The APZ will consist of a managed vegetation buffer. A Temporary APZ width of 100 m or more, removes the requirement for bushfire related dwelling construction standards in these locations.
East Interface (Central precinct)	Downslope >0-5°	Forest	27 m	≥27 m	APZ will likely consist of a combination of building setbacks, managed open space, public perimeter road reserves, including pathways and landscaping.

Location within site (Refer to Figure 4)	Slope ¹	Vegetation ²	AS 3959 Setback (for BAL-29) ³	Proposed APZ	Comment
North Interface (Eastern precinct)	Upslope	Forest	21 m	≥50 m	‘Temporary’ APZ to be implemented on adjoining future stages of subdivision development. The APZ can be extinguished once the hazard is removed and development occurs. The APZ will consist of a managed vegetation buffer. Should the Temporary APZ width be increased to 100m or more, then the requirement for increased dwelling construction standards in these locations would be removed.
East Interface (Eastern precinct)	Downslope >0-5°	Forest	27 m	≥100 m	APZ will likely consist of a combination of building setbacks, managed open space, public perimeter road reserves, including pathways and landscaping. The APZ will consist of a managed vegetation buffer. A Temporary APZ width of 100 m or more, removes the requirement for bushfire related dwelling construction standards in these locations
South Interface (Managed Open Space)	Downslope >0-5°	Managed	-	-	Adjoining lands will consist of a combination of managed open space, public perimeter road reserves, including pathways and landscaping.
All other aspects	All other aspects of the proposed subdivision are surrounded by future managed lands in the form of future stages of development and / or associated infrastructure.				

¹ Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to AS3959-2009.

² Predominant vegetation is identified, according to AS 3959-2009. It is also noted that “Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate”.

³ Assessment according to AS 3959-2009 (based on achieving a maximum construction outcome of BAL-29).

4 APZ maintenance plan

The proposed APZs include vegetated and landscaped areas and as such, will require vegetation clearance and tree removal to support the proposed development or for ongoing APZ maintenance. Fuel management within the APZ is to be as follows:

- No tree or tree canopy is to occur within 2 m of future dwelling rooflines;
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
 - o are well spread out and do not form a continuous canopy;
 - o are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
 - o are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species;
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (*fine fuel* means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter); and
- Any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris.

5 Construction standards

Method 1 of AS 3959-2009 '*Construction of buildings in bushfire-prone areas*' has been used to determine the bushfire construction levels required for the subdivision (Standards Australia 2009). The Bushfire Attack Level (BAL) as per AS 3959 Table 2.4.3 varies dependant on the separation distances as in **Table 3** below, and shown in **Figure 5**.

One of the key bushfire protection principals contained within this report is represented by the increased construction standards, compliant with the Australian Standard (AS) 3959-2009. In practical terms, all future dwellings situated within 100 metres of a bushfire hazard will be required to achieve the relevant bushfire construction standard, as indicated within **Table 3** and as shown in **Figure 5**.

Table 3: BAL separation distances in relation to the proposed subdivision (FDI 80)

Subject land area / Vegetation & Slope	BAL-FZ Distance	BAL-40 Distance	BAL-29 Distance	BAL-19 Distance	BAL-12.5 Distance
East Interface (Central precinct) Forest / >0-5° downslope	<20 m	20-<27 m	27-<37 m	37-<50 m	50-<100 m
North Interface (Eastern precinct) Forest / Upslope	<16 m	16-<21 m	21-<31 m	31-<42 m	42-<100 m
All other aspects >100 m from hazard / Managed Land / Open Space / No hazard	BAL-LOW				

Information according to AS 3959-2009 '*Construction of buildings in bushfire-prone areas*' Table 2.4.3 pg. 31.

The following details within **Table 4** are intended to provide guidance on the implications and requirements for the increased construction standards contained within AS 3959-2009. It is important to note that the details provided are not comprehensive in any way, but rather intended to highlight the key components of each BAL. **Table 4** should be read in conjunction with a complete and current version of AS 3959-2009 in order to interpret the requirements accurately.

Table 4: Summary overview of BAL construction requirements as per AS3959-2009

Bushfire Attack Levels (BALs)	BAL Objective	Abridged Construction Requirements
BAL-LOW	No Requirements	No Requirements
BAL-12.5	Protection against ember attack and wind-blown debris. Some low levels of radiant heat may be experienced.	- External wall covering to be non-combustible or complying timber species within 400mm of surface level. All joints are to be less than 3 mm and vents to be screened. - Openable portions of windows screened with aluminium, steel or bronze fly screen. All glazing may be annealed except where within 400 mm of the ground or deck/roof/awning where Grade A safety glass. Metal frames (or complying timber) required. - Doors have similar requirements to windows in regards to frames and glazing. Screening not required. - Roof material to be a non-combustible and fully sarked. All joints to be sealed and roof penetrations to be screened to prevent the entry of embers.
BAL-19	Protection against some radiant heat exposure and ember / wind-blown debris impacts. Low to moderate levels of radiant heat may be experienced.	- External wall covering to be non-combustible or complying timber species within 400mm of surface level. All joints are to be less than 3 mm and vents to be screened. - Openable portions of windows screened with aluminium, steel or bronze fly screen. All glazing to be 5 mm toughened glass within metal frames (or complying timber). - Doors have similar requirements to windows in regards to frames and glazing. Screening not required. - Roof material to be a non-combustible and fully sarked. All joints to be sealed and roof penetrations to be screened to prevent the entry of embers.
BAL-29	Protection against high-level radiant heat exposure and ember / wind-blown debris impacts. Moderate to high levels of radiant heat will be experienced.	- External wall covering to be non-combustible or complying timber species. All joints are to be less than 3 mm and vents to be screened. - Openable portions of windows screened with aluminium, steel or bronze fly screen. All glazing to be 5 mm toughened glass in metal frames (or complying timber). - Doors have similar requirements to windows in regards to frames and glazing. Screening is required for all glazing within 400 mm of the ground or verandah. - Roof material to be a non-combustible and fully sarked. All joints to be sealed and roof penetrations to be screened to prevent the entry of embers.

Bushfire Attack Levels (BALs)	BAL Objective	Abridged Construction Requirements
BAL-40	Protection against intermittent direct <u>flame contact</u> , extreme-level radiant heat exposure, high winds and ember / wind-blown debris impacts. Extreme levels of radiant heat will be experienced.	- External wall covering to be completely non-combustible or non-combustible cladding which is sarked between the cladding and wall frame. All joints are to be less than 3 mm and vents to be screened. - Windows to have complying shutter system or 6mm toughened glass with steel or bronze screens over openable and fixed portions. All glazing to be in metal frames. - Doors to be non-combustible or 35mm solid core, with similar requirements to windows in regards to frames and glazing. - Roof material to be a non-combustible and fully sarked. All joins to be sealed and roof penetrations to be screened to prevent the entry of embers.
BAL-FZ	Protection against direct <u>flame immersion</u> , extreme-level radiant heat exposure, high winds and ember / wind-blown debris impacts. Extreme levels of radiant heat will be experienced.	- External walls to be non-combustible material, a system complying with AS1530.8.2, a fire rated system (to 30/30/30 or -/30/30), or any combination of the above. - Windows shall be protected with a non-combustible shutter (compliant with section 3.7) and openable portions to be screened with steel or bronze mesh, 5mm toughened glass within metal frames to be used. - External Doors shall be protected with a non-combustible shutter (compliant with section 3.7) and where glazing is used it shall be 6mm toughened glass, metal frames are to be used. Screening not required. - Roof material to be a non-combustible with all joins to be sealed and roof penetrations to be screened to prevent the entry of embers. In accordance with diagrams within Appendix I of AS3959-2009.

6 Water supply

The subject land is to be serviced by reticulated water. The furthest point from any future dwellings to a hydrant is to be less than 90 m. The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP (in order to address the intent of SPP 2016):

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the QFRS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The [PBP] provisions of parking on public roads are met.

7 Gas and electrical supplies

In accordance with PBP, and in order to address the intent of SPP 2016, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies, and
- No part of a tree should be closer to a powerline than the distance specified in “*ISSC3: Guide for the Management of Vegetation in the Vicinity of Electrical Assets*” issued by Ausgrid (November 2016).

Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2014 (Standards Australia 2014).

8 Access and egress

The overall 'Riverside' masterplan development is provided with multiple access and egress points by way of public roads, for both residents and emergencies services. These arrangements include direct access to the existing public road network via Teviot Road, Gittins Road and Riverbend Boulevard.

In relation to the Stage 1 residential subdivision, access arrangements are primarily via Teviot Road which provides access from the north.

A 'Temporary APZ' has been proposed either side of the primary access handle to minimise the impact of a 'pinch point' of vegetation within undeveloped future subdivision stages, and mitigate against the opportunity for the access road to be cut off during a bushfire event. The intent is for the Temporary APZ to remain in place until the surrounding vegetation is cleared and the future stages of development completed. Importantly, once the surrounding stages are completed, the entire site will have multiple access / egress points to the surrounding existing road network. Where possible, it is recommended that the Temporary APZ be maintained to 100m (or greater), until the adjoining development occurs.

Furthermore, the proposed internal road network seeks to provide perimeter access roads throughout much of the subdivision, especially adjacent to areas of permanent bushfire hazards, such as the reserve to the north-east. Perimeter roads have not been provided adjacent to hazards within future stages of development, as these will be removed as the overall development progresses.

The aforementioned roads can all be accessed for fire fighting purposes and provide safe access and egress for both residents and fire fighters within the subdivision and surrounds.

The access and egress surrounding the proposed subdivision comply with PBP and address the intent of SPP 2016.

The proposed roads within the subdivision itself are to comply with the PBP design and construction standards listed in **Table 5** on the following page (or alternative SPP requirements as directed).

Table 5: Performance criteria for proposed public roads*1

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	public roads are two-wheel drive, all weather roads
public road widths and design that allows safe access for firefighters while residents are evacuating an area	- urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) - the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas - traffic management devices are constructed to facilitate access by emergency services vehicles - public roads have a cross fall not exceeding 3 degrees - public roads are through roads. 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 and direct traffic away from the hazard - curves of roads (other than perimeter roads) are a minimum inner radius of six metres - 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 - there is a minimum vertical clearance to a height of four metres above the road at all times
the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles	the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	- public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression - public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression

Performance Criteria	Acceptable Solutions
there is clear access to reticulated water supply	- public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression - one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression
parking does not obstruct the minimum paved width	- parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays - public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

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9 Assessment of environmental issues

At the time of assessment, there were no additional known significant environmental features, threatened species or Aboriginal relics identified under the *Nature Conservation Act 1992* or the *Plant Protection Act 1989* that will affect or be affected by the bushfire protection proposals in this report.

EDQ is the determining authority for this masterplan; they will assess or provide advice more thoroughly in relation to any potential environmental and heritage issues.

10 Bushfire maintenance plans and fire emergency procedures

The areas determined to provide the required separation distances (APZ's) from the hazard are to be maintained in perpetuity for the life of the masterplan / and future subdivisions.

The APZs will be managed by either private land holders where the APZ falls within the residential lots, or managed by Council where the APZ falls within the public road reserve or landscaped areas.

Specific maintenance or management plans for the APZs have not been prepared for this subdivision planning application. Such plans are not required as the land will be cleared and operational and as such is unlikely to regenerate to create or add to the surrounding bushfire hazard.

The preparation of bushfire emergency procedures is the responsibility of future occupants.

11 Recommendations and conclusion

11.1 Recommendations

The following recommendations have been made within this report to ensure the proposed Stage 1 residential subdivision is compliant with the intent, and exceeds the level of standard, of the *QLD State Planning Policy 2016* while implementing the 'detailed mitigation practice' bushfire protection measures within '*Planning for Bush Fire Protection 2006*' (NSW RFS 2006) and '*AS 3959-2009 Construction of buildings in bushfire-prone areas*':

Recommendation 1- Asset Protection Zones are to be provided to the proposed subdivision as shown in **Figure 5** and listed in **Table 2**;

Recommendation 2- Permanent Asset Protection Zones and landscaping should be managed in perpetuity in accordance with the fuel management principles listed in **Section 4** of this report;

Recommendation 3- A hydrant water supply should be installed in accordance with AS 2419.1;

Recommendation 4- Dwellings are to be constructed to comply with AS 3959-2009 and the relevant BAL as listed within **Table 3** and **Table 4**, and as shown in **Table 5**. These are to be assessed in more detail at new dwelling planning application stage;

Recommendation 5- Road layouts and widths for the proposed public roads shown within **Figure 2** are to be followed, and should be consistent with the intent of the requirements as listed in **Section 8** of this report;

Recommendation 6- Electrical and gas services should comply with the specifications detailed in **Section 7** of this report.

11.2 Conclusion

In the author's professional opinion the bushfire protection requirements listed in this assessment provide an 'detailed and conservative' standard of bushfire protection for the proposed subdivision development, a standard that is consistent with intent of *QLD State Planning Policy 2016*, and when implemented in full, compliant with the intent and objectives of '*Planning for Bush Fire Protection*' (RFS 2006) and '*AS 3959-2009 Construction of buildings in bushfire-prone areas*'.



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12 References

Ausgrid. 2016. *ISSC3: Guide for the Management of Vegetation in the Vicinity of Electrical Assets*. Sydney.

NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra.

Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009. *Construction of buildings in bushfire-prone areas*, AS 3959-2009, Standards Australia International Ltd, Sydney

Standards Australia. 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014, Standards Australia International Ltd, Sydney



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