Appendix 11a_Strategic Bush Fire Study

LAND REZONING PROPOSAL

'ALLFARTHING'

LOTS 61 TO 64 & 71 TO 77 DP976708 AND LOT 60 DP1090981

2 BRISBANE GROVE ROAD

BRISBANE GROVE. NSW. 2580

STRATEGIC BUSH FIRE STUDY

Prepared by SOWDES
19 October 2021

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List of Abbreviations that may be used throughout this report

APZ	Asset Protection Zone
AS 3959	AS3959 - 2018 Construction of Buildings in Bush Fire Prone Area
BAL	Bush Fire Attack Level
BCA	Building Code of Australia
BFSA	Bush Fire Safety Authority
BPMs	Bush Fire Protection Measures
CC	Construction Certificate
DA	Development Application
DCP	Development Control Plan
EP&A ACT	Environmental Planning & Assessment Act (1979)
FDI	Fire Danger Index
IPA	Inner Protection Area
LEP	Local Environmental Plan
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection (2019)
RF Act	NSW Rural Fires Act (1997)
RF Reg	NSW Rural Fires Regulation (2008)
RFS	NSW Rural Fire Service
RHF	Radiant Heat Flux
ROS	Rate of Spread
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose

It is acknowledged that certain parts of this report contain images and directly quoted information from a range of sources including but not limited to; Planning for Bush Fire Protection (2019), Planning for Bush Fire Protection (2006), AS3959 (2018) Construction of Buildings in Bushfire Prone Areas, and a range of other NSW Rural Fire Service resources and publications.

Executive Summary.

This *Strategic Bush Fire Study* has been prepared in support of a submission to the Goulburn Mulwaree Council for the rezoning of a parcel of land identified as Lots 61 to 64 & 71 to 77 DP976708 and Lot 60 DP1090981 – 2 Brisbane Grove Road, Brisbane Grove from its current status of 'RU6 – Transition' to 'R5 Large Lot Residential'. The land rezoning opportunity has been identified in the recently commissioned *Urban and Fringe Housing Strategy* undertaken on behalf of the Goulburn Mulwaree Council by Elton Consulting which was adopted by Council in July 2020. The development site contains portions of land that are designated as bush fire prone hence this submission has been undertaken in accordance with the criteria of both the Goulburn Mulwaree Council and the New South Wales Rural Fire Service's (NSW RFS) publication titled "Planning for Bush Fire Protection" (2019).

This report provides an independent assessment of the proposed rezoning of the site and suitability for future residential development with regard to protection of life and property, the potential impact on services and infrastructure within bush fire prone areas and follows the relevant guidelines and information requirements from Chapter 4 'Strategic Planning', and Chapter 5 'Residential and Rural Residential Subdivisions' of the NSW RFS's publication "Planning for Bush Fire Protection" (2019) (PBP). The submission of a *Strategic Bush Fire Study* to the NSW Rural Fire Service for assessment of the land rezoning proposal also satisfies the Ministerial Directions obligations under the Section 9.1 of the Environmental Planning and Assessment Act (1979) – Direction 4.4 Planning for Bush Fire Protection.

The subject site is located at the intersection of the Braidwood Road and Brisbane Grove Roads which is just on the southern outskirts of the city of Goulburn, approximately 400 metres south of where the Mulwaree River crosses under Thorns Bridge. The site is bordered by three separate formed roads; the Braidwood Road traffic corridor along the western boundary which is a Traffic for NSW (TfNSW) classified road, Brisbane Grove Road along the northern boundary, and Johnsons Lane along the southern boundary. The property covers a total area of 34.863 hectares which is comprised of twelve separate registered portions totalling 33.981 hectares plus a separate 8,828m² portion of freehold land still held in the name of a former land owner that was subdivided for possible future road allocation but was never been dedicated as such.

The property which is set to open paddocks of improved pastures and native grasslands with a discontinuous row of old radiata pine trees along the western roadside boundary has historically been used for grazing by stock, however the past 5 or so years has seen only light grazing and minor silage production.

The site has a *locally significant* heritage listed homestead (Goulburn Mulwaree LEP – Schedule 5, Part 1 – Heritage Items – Item # 1009) that is located at the crest of a hillock within the southern half of the holding. A conceptual subdivision design for the property has been prepared which allows for the existing homestead to be the focal point of the development and provides for proposed future residential dwellings to be established in a manner that is sympathetic to the heritage values of the area. The conceptual subdivision design will create a total of sixteen allotments, of which fifteen will be seeking new residential dwelling permissibility whilst the remaining Lot will house the existing homestead. All proposed Lots will have a minimum land area of 2 hectares and each will have separate access from either Johnsons Lane along the southern boundary of the current holding or via a proposed new internal access road.

The development property is not serviced by the Council's reticulated water supply and therefore all Lots will be required to provide a dedicated water supply for firefighting purposes in accordance with Table 5.3d *'Water supply requirements for non-reticulated development or where reticulated water supply cannot be guaranteed'*, Planning for Bush Fire Protection (2019), page 48. It is noted that all proposed Lots will be greater than 10,000m² in area and therefore in accordance with Table 5.3d will require a minimum dedicated water storage provision of 20,000 litres. The requirement for dedicated firefighting water supply is in excess of any storage provisions required for potable purposes.

This Strategic Bush Fire Study is effectively divided into three sections; the first being an overview and the triggers for the rezoning submission, a detailed description of the development property and surrounding landscape, and a general discussion on how the proposal meets or deviates from the provisions of both the Goulburn Mulwaree Council's Development Control Plan and the NSW Rural Fire Service guidelines; the second section is an assessment of the proposed land rezoning submission in accordance with the requirements of Chapter 4 - '*Strategic Planning*' and Table 4.2.1 of "Planning for Bush Fire Protection" (2019); and the third section being an assessment of the proposed subdivision with regard to the acceptable solutions of Chapter 5 - '*Residential and Rural Residential Subdivision'* and Tables 5.3a, 5.3b, and 5.3c also of "Planning for Bush Fire Protection" (2019).

Within this bush fire protection assessment a 'potential building envelope' having a nominal area of 600m² has been identified within each of the proposed Lots seeking residential permissibility which is based on a combination of considerations including (but not limited to) the requirements of Planning for Bush Fire Protection (2019) and particularly addressing matters such as asset protection, vegetation, topography, proximity to mapped bush fire prone land, access and egress, and general bush fire protection measures.

The following key summaries apply to the development and are detailed in the following pages:

- The proponent is seeking to rezone the land in accordance with Section 4.4.1 of the *Urban and Fringe Housing Strategy* study and in doing so establish the basis upon which to undertake a subdivision of the land that will create a total of sixteen allotments each with a minimum Lot size of 2 hectares
- The subject development property has an existing 'locally significant' heritage listed homestead that must be considered within the context of any future subdivision of the property.
- The development property is set to grassland vegetation formations throughout having historically formed part of a larger grazing and farming enterprise. The surrounding lands to the immediate east and south have also formed part of historical grazing and farming operations and as such are generally also set to open paddocks of grassland and improved pastures – with the exception of a small stand of open grassy woodlands to the southeast. Adjoining lands to the northern and west of the property on the opposite side of the respective road corridors form part of an ongoing rural enterprise that is focused on cattle grazing and crop production.
- The proposed land rezoning to large Lot residential would yield a total of sixteen Lots, fifteen of which would be seeking new residential dwelling permissibility. The additional Lot yield would not warrant an increase in the provision of existing emergency service facilities or capabilities, nor would the small number of Lots being the subject of this assessment, and even allowing for the potential of additional land rezoning to similar Lots sizes within adjoining properties in the Brisbane Grove development precinct place a significant impact on the ability of local emergency services to undertake their functions
- The development site is presently bordered along three of its four frontages by named and formed roads that are predominantly bitumen sealed and constructed to both local Council and TfNSW engineering standards. The proposed subdivision will include the construction of a new internal access road to local Council engineering standards within the northern portion of the site that will service ten of the proposed sixteen Lots. The network of formed roads around and within the subject site will allow suitable access for firefighting resources to combat any grass fire.
- It is expected for the immediate foreseeable future that the development property will not be connect to or serviced by Council utilities or reticulated water supply and therefore each Lot will be required to provide a static water supply for firefighting purposes in accordance with Table 5.3d of Planning for Bush Fire Protection (2019). Within the subdivision design it is proposed that approximately twelve farm dams will be distributed throughout the Lots with the majority of the dams to be located in the front of the benefited Lot and therefore would be accessible and available if required by the NSW Rural Fire Service as a supplementary resource for the purposes of firefighting.

Whilst this report has based its determinations and recommendations on a conceptual subdivision design that is subject to a raft of considerations and approvals, and on the location of a 'potential building envelope' within the proposed new Lots it is recognised that in accordance with Section 100B of the RF Act and Section 4.46 of the EP&A Act that any future development application for the construction of a residential dwelling may be required to submit an independent bush fire assessment in support of any such development at the time of lodging a formal development application to Council if the future Lot is designated as containing bush fire prone land or at the request of the consenting authority.

It is considered that the proposed rezoning of the land from RU6 – '*Transition*' to R5 – *Large Lot Residential'* and a subsequent subdivision of the land to create a total of sixteen allotments plus internal access road will generally be able to satisfy the requirements of Planning for Bush Fire protection (2019), in particular the 'acceptable solutions', 'performance requirements' and 'specific objectives' contained in Chapter 5 of the publication with some minor variations to specific conditions. It is further considered that each of the newly created Lots will be able to support a complying development for residential developments undertaken in bush fire prone land in accordance with Chapter 7 – '*Residential Infill Development'* of Planning for Bush Fire Protection (2019).

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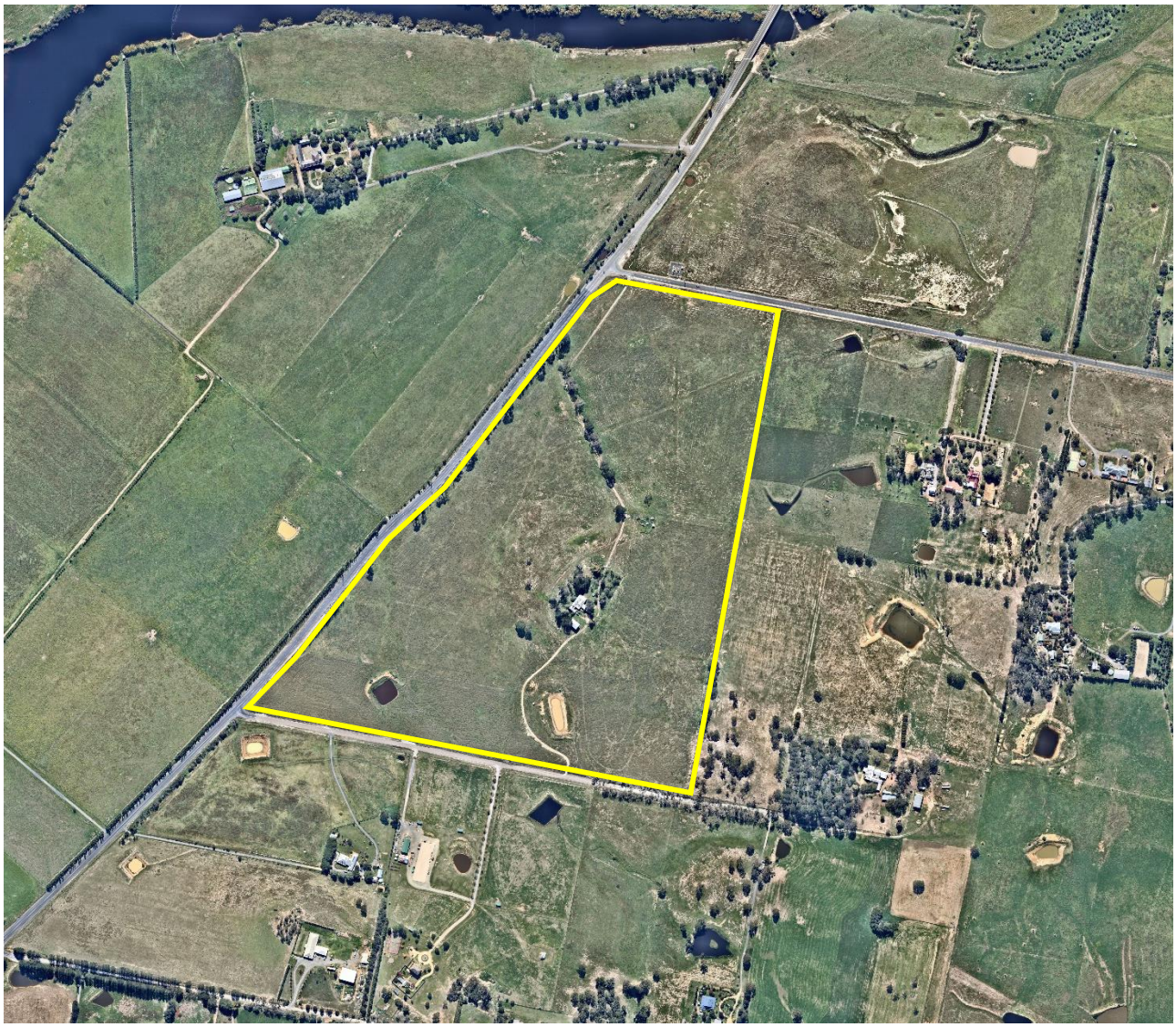


Figure 1. Recent aerial view of the development property showing the nature of the vegetation formations within and surrounding the site.

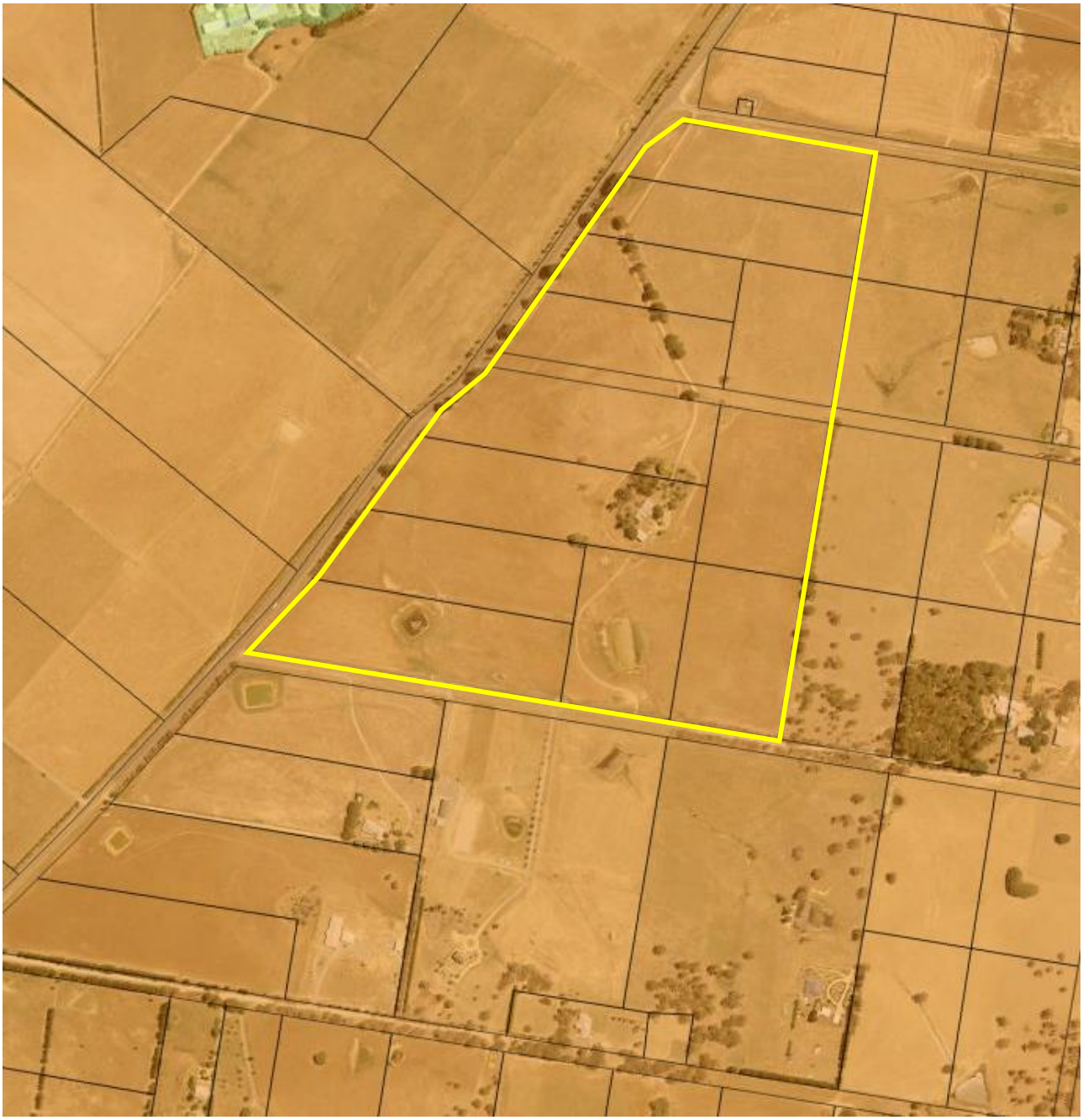


Figure 2. Goulburn Mulwaree Council Bush Fire Prone Lands map of the development property and surrounding holdings showing the extent of 'Category 3' (grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands) vegetation formations that burden the site.

1/. Overview of the Rezoning Submission, Description of the Land and Proposed Subdivision.

The Goulburn Mulwaree Council commissioned *Elton Consulting* to undertake an *Urban and Fringe Housing Strategy* study for the urban centres of both Goulburn and Marulan which was completed and adopted by Council in July 2020. To gain an appreciation of how the aforementioned study triggers the submission of the land rezoning application being the subject of this assessment the following extracts have been taken directly from the completed report to provide context;

"This Urban and Fringe Housing Strategy (Strategy) investigates and identifies areas suitable for the provision of additional housing to assist Goulburn Mulwaree Council (Council) meet the housing demands generated by expected continued population growth.

The Strategy has been prepared in response to both the limited supply of residential land available to meet the short and medium term needs of the community and the directions of the South East and Tablelands Regional Plan 2036.

The scope of the Strategy includes looking at the urban areas of Goulburn and Marulan and identifying opportunities for an additional recommended 3,500 dwellings over the next 18 years to 2036. The Strategy also considers land for large lot residential development (typically greater than 2ha and often referred to as rural residential development) particularly on the urban fringe of Goulburn.

Growth across the LGA has been strong over the past decade increasing by 14 percent. In Marulan population growth has been significant with an increase in population between 2006 and 2016 of 27 percent.

With the Goulburn Mulwaree LGA expected to reach between 33,350 and 37,202 residents by 2036, approximately 5,000 to 7,000 additional residents are expected. Given the drivers of growth include proximity to economically viable regions and affordable housing, these growth rates may increase over time if prices in Sydney and the ACT continue to rise. Advances in technology and improvements in transport, for example higher speed rail, may further stimulate growth.

The majority of recent growth has been through residential subdivisions in Goulburn and Marulan. These new subdivisions have typically provided R2 Low Density Residential zoned land with a minimum lot size of 700sqm. The market responded well to these releases driving demand for additional land as the currently zoned land nears full utilisation.

Anecdotal evidence gained through the initial community and stakeholder engagement process indicated demand for large lot residential blocks (2ha). This was corroborated by Council analysis of rural residential lot uptake on the western and south western Goulburn fringes over the past decade. Council found that 200 of the 290 lots registered had a dwelling approved, or a development application lodged. Most of which were within 2 years of lot registration. The relatively low subdivision costs associated with creating these lots has resulted in this form of development being the preference of proponents looking to rezone land. These products offer diversity in lifestyle choice. Given the current and expected demand for residential land in Goulburn and Marulan it would be anticipated that small volumes of large lot residential land will be absorbed by the market, however, the actual annual demand is difficult to determine."

The development property is located on the southern outskirts of the city of Goulburn and is identified within the *Urban and Fringe Housing Strategy* study as a locality suitable for rezoning to 'R5 – Large Lot Residential' to help meet future land and housing demands. The property falls within the *Brisbane Grove* study precinct which is currently zoned 'RU6 – Transition' and has been identified with an overall potential yield of 132 Lots at a minimum area of 2 hectares. The Brisbane Grove development precinct is located on the southern side of both the Hume Highway traffic corridor and the Mulwaree River which is prone to periodic flooding which according to the study logistically separates this area from the urban areas of Goulburn and would therefore adversely impact any extension of existing utilities and services necessary for continued urban development in this zone - thereby leaving it ideally suited for the development of large-Lot self-sufficient residential blocks.

The proponent is seeking to rezone the land in accordance with Section 4.4.1 of the *Urban and Fringe Housing Strategy* study and in doing so establish the basis upon which to undertake a subdivision of the land that will create a total of sixteen allotments each with a minimum Lot size of 2 hectares, plus a new internal access road. Of the sixteen Lots fifteen will be seeking residential dwelling entitlements whilst the remaining Lot will comprise an existing homestead and curtilage that is listed within the Goulburn Mulwaree LEP as being a *local significant* heritage item.

The development site is bordered by three separate named and formed roads that have a minimum corridor width of 20 metres:
1/. Braidwood Road along the western boundary that is a TfNSW classified road that provides an important transport link between Goulburn and the south coast region of the state. The road is a bitumen sealed formation that also provides access to many rural land holdings between Goulburn and Braidwood, and to several smaller localities that lie in between. The posted speed limit along the section of Braidwood Road that lies parallel to the western boundary of the site is 100kph and therefore access and egress from this aspect is not likely to be granted by TfNSW, and there is also optic fibre communication lines that run parallel to the same boundary.
2/. Brisbane Grove Road along the northern boundary of the site which runs between the Braidwood Road and the Windellama Road transit route to the east. There are several rural holdings accessed via the Brisbane Grove Road traffic corridor and more recently it has been used an alternate route to the city whilst major road and bridge works were being undertaken on a section of road that affected normal traffic movements to and from the southeastern aspect of the city. The posted speed limit along Brisbane Grove Road is 80kph, and it is proposed that a new access road to service the Lots within the northern portion of the development will be formed midway along the length of the northern boundary – approximately 140 metres east from the intersection with Braidwood Road.
3/. Johnsons Lane that borders the southern boundary of the property which junctions off Braidwood Road and terminates approximately 130 metres to the east of the development property. Johnsons Lane that does not have a posted speed limit but is assumed be the same as the Brisbane Grove Road at 80kph is bitumen sealed for the majority of its formation with the exception that the last 230 metres is still gravel. Six of the proposed Lots will be accessed from this roadway.

The development property covers a total area of 34.863 hectares which is comprised of twelve separate registered portions totalling 33.981 hectares plus a separate 8,828m² portion of freehold land still held in the name of a former landowner that was created for possible future road allocation but has never been dedicated as such. The untitled freehold portion of land is located approximately 150 metres north of the homestead and is 20.115 metres wide running in an east → west alignment. The proponent has commenced application for the possessory acquisition of the untitled freehold portion of land through the NSW Land Registry Services under 'possessory title' provisions.

The homestead within the site is currently accessed via a gravel carriageway that enters the property on the northwestern corner of the block, just east of the junction of Braidwood and Brisbane Grove Roads with a second gravel access formed from the Johnsons Lane aspect to the south. The primary carriageway meanders along the western boundary of the block for a short distance and then veers to the southeast and gradually winds up to the curtilage that surrounds the homestead. The site is burdened by a single-phase overhead power transmission line that runs north → south through the site with optic fibre and telecommunications services along the western boundary and across the northwest corner of the block that are identified by posted markers.

The terrain around the subject site is comprised of two small hillocks; one in the southeast corner that continues to rise into the neighbouring property to the east, and the other centrally within the southern half where the existing homestead is located. From these hillocks the terrain falls at relatively minor grades of less than 5°, particularly in the northern, southern and western portions where the slope is less than 2°, however there are a few small areas around the peak of the hill upon which the homestead sits where the slope increases slightly but still less than 10°. The northern portion of the site has a general slope from the southwest toward the north-northeast whilst the southern and western aspects have a general fall in a westerly pattern. The southwestern quarter and northern portion of the site are relatively flat such that they are imperfectly drained and therefore during large rain and storm events can retain shallow pools of surface water for a period of time after the event.

The vegetation formations throughout the property which has historically been used for grazing by cattle are dominated open paddocks of improved pastures and native grasslands, however over the past 5 or so years the property has seen only light grazing and minor silage production. The western boundary that lies parallel to the Braidwood Road traffic corridor, plus the western aspect of the existing homestead and parts of an internal access carriageway are lined with discontinuous single rows of old radiata pine trees – many of which are now displaying signs of necrosis and die-back. The curtilage that surrounds the existing homestead has previously been set to established gardens and lawns, however these have been neglected over time and consequently have lost some of the appeal and character of the historic period in which the homestead was constructed. The owner of the property intends to perform extensive repairs to the homestead and undertake significant ground maintenance to return the site to its former grandeur.

Future Subdivision Proposal.

The conceptual design for the subdivision of the land will include the construction of a new internal access road that will junction off Brisbane Grove Road approximately midway along the northern boundary and terminate in a large radius cul-de-sac formation. The internal road will provide direct access to ten of the proposed Lots whilst the remaining six Lots will be accessed from the Johnsons Lane carriageway to the south. Access from the Braidwood traffic corridor has not been considered as it would require consent from TfNSW which is unlikely to be supported due to the posted speed limit of 100kph, and the need to cross over existing optic fibre and telecommunication services that are installed just inside the western boundary of the site.

The alignment of the new internal access road has largely been designed to follow the path of an existing overhead power transmission line that traverses all the way through the site - entering from the northern aspect and continuing through to the southern aspect where it then exits the property and services adjoining lands on the southern side of the Johnsons Lane traffic corridor. By designing the new access road to follow the alignment of the exiting power lines within the northern portion of the property it means that the proposed new Lots within that area will essentially be free of any easement restrictions that could otherwise impact the location of possible future dwelling sites, and it also negates any reason to relocate the lines. The continuation of the overhead power lines within the southern portion of the property has a minor impact on two of the proposed Lots, however the Lot configuration is such that there is still ample space for the location of suitable dwelling envelopes within the burdened Lots.

All identified dwelling envelopes within the proposed Lots have been placed such that the distance from the front entrance to the site does not exceed 200 metres, and for almost all Lots with the exception of one (proposed Lot 11) it is not possible to construct a dwelling more than 150 metres from the respective front entrances due to the actual depths of the individual blocks whilst also satisfying the Council's Development Control Plan setback provisions.

Section 5.9.1.1 'Buffer Distances' and Table 5.1 'Buffers Between Rural Activities and Rural Dwellings' of the Council's Development Control Plans require prescribed separation distances from various forms of rural land use depending upon which category or categories are most applicable to the neighbouring and/or surrounding properties. The development site is surrounded by 'RU1 – Primary Production' zoned lands on the western aspect of the Braidwood Road traffic corridor, and similarly on the northern aspect of the Brisbane Grove Road traffic corridor which are used for grazing of livestock and seasonal production of fodder crops and silage, whilst the adjoining lands to the immediate east of the site and lands on the southern aspect of the Johnsons Lane road reserve are all zoned 'RU6 – Transition'. Referencing Table 5.1 of the Council's Development Control Plan the minimum setback from 'grazing lands' is 80 metres, or alternatively 60 metres with a 20-metre-wide vegetated buffer zone in the outer 20 metres. The subdivision design has shown an 80 metre separation distance from the boundary fences of the neighbouring western and northern properties, which is essentially an effective internal buffer zone of 60 metres due to the 20-metre width of the road reserves on the respective aspects which has been included in the distance measurements.

For the eastern and southern aspects of the site the subdivision development proposal will be seeking a variation to the provisions of Table 5.1 in accordance with Section 5.9.1.2 'Variations to Buffers' as the adjoining lands are smaller holdings which are not capable of supporting 'rural enterprises' as defined in the DCP, and realistically are essentially hobby farms and/or lifestyle blocks.

The following Table summarises the details of the adjoining land holding to the east and south of the development site, and it can be assumed by the individual land sizes that these blocks are not large enough to support extensive agricultural or rural activities of a type that could cause nuisance or disturbance to any future dwellings within the proposed subdivision:

Address	Lot & DP	Zoning	Land area (ha)
54 Brisbane Grove Road	Lots 58, 58, 65 & 66 DP976708	RU6	9.064
83 Johnsons Lane	Lots 68 – 70 & 78 – 80 DP976708	RU6	16.88
5342 Braidwood Road	Lots 87 & 88 DP976708	RU6	6.77
40 Johnsons Lane	Lot 1 DP834851	RU6	10.46
82 Johnsons Lane	Lot 2 DP834851	RU6	10.79
70 Harringtons Lane	Lots 81, 82 & 96 - 102 DP976708	RU6	37.24

However, as an alternative to the prescriptive separation distances within Table 5.1 of the DCP it is proposed that the new Lots within the subdivision on the eastern and southern aspects would establish minimum building setbacks of at least 50 metres from the boundaries which is designed to achieve several outcomes. Apart from general amenity, the most significant of these outcomes is from a bush fire protection perspective where the establishment of a 50 metre setback within a grassland vegetation environment reduces the construction standards and allows for the establishment of large asset protection zones within the boundaries of the individual allotments. This is a particular consideration for proposed Lots 1 to 4 of the subdivision design where the nominated dwelling envelopes which will be completely surrounded by grasslands can achieve a 50 metre asset protection zone on all aspects that are still within the boundaries of the individual allotments, and therefore at the time of future residential development can comply with the '*Grassland Deeming Provisions'* as prescribed in Section 7.9 of "Planning for Bush Fire Protection" (2019).

The subdivision design proposes a total of sixteen residential Lots, and therefore in accordance with the provisions of Table 5.3b of Planning for Bush Fire Protection (2019) a perimeter road is required around the site. It is proposed as a variation to this requirement that the exiting three roads that border the site – two of which are main traffic thoroughfares, plus the addition of the new internal access road will be sufficient for the purposes of bush fire protection. If a perimeter road was to be formed along the eastern boundary of the property there is a potential for traffic travelling west along Brisbane Grove Road to turn into the development property and then use the perimeter road as another means of access to Braidwood Road via Johnsons Lane to the south, effectively bypassing the intersection of the Braidwood Road traffic corridor which can at times get busy particularly during summer holiday periods. The same traffic management issues are equally possible for vehicles travelling in the opposite direction.

This 'potential' traffic bypass situation creates both a safety and general amenity issue with respect to the proposed new Lots and controlling the speed of such traffic movements would be highly problematic.

The other consideration for not including a perimeter road is that the proposed Lots 1 to 5 along the eastern boundary are bordered by privately owned and effectively managed lands that are set to grassland vegetation formations with the exception of a small stand of open grassy woodland vegetation adjacent to the proposed Lot 5. The terrain to the east of the proposed Lot 5 is upslope, and the woodland vegetation formation upslope of the proposed Lot extends for approximately 100 metres from the eastern boundary before transitioning into a forested formation that surrounds the neighbouring residential dwelling precinct. At the time of the site inspection the neighbouring property to the east of Lot 5 was grazed by a few horses. The terrain within the neighbouring land holdings to the east of proposed Lots 1 to 4 are slightly downslope to flat, and in some cases upslope in relation to the nominated building envelopes within the respective Lots and therefore any bush fire event that was travelling from this direction would be a relatively low risk and should be managed with minimal resources, particularly with established and managed asset protection zones of 50 metres within the boundaries of the blocks. It is also recognised that access for fire suppression activities would also be available directly from these neighbouring Lots.

The development property is not directly burdened by any mapped drainage depressions as defined in topographical mapping instruments however the lower southern and western portions of the property are subject to periodic inundation during large rain and storm events, particularly the southern aspect where external sources of water enter the site. There are presently two moderate sized dams within the southern third of the site which are proposed to be decommissioned and replaced by a series of smaller and strategically placed farm dams that will be distributed across several of the new Lots. The placement of the dams will be both a feature of the new Lots and also assist with managing the flows of water across the site within a defined corridor that in-turn will allow greater land use within the individual allotments. The new dams and inter-connecting grass-lined drainage swales will be located in the front portion of the new Lots and will be formed with concrete causeways and/or piped culverts to allow all-weather crossing of the systems. The combined surface area and storage capacity of the new dams will be very similar to the configuration of the existing dams.

2/. An Assessment of the proposed land rezoning in accordance with Chapter 4 – 'Strategic Planning' of Planning for Bush Fire Protection (2019)

A Strategic Bush Fire Study for the rezoning of land for residential and human habitation purposes is an opportunity to undertake a preliminary risk assessment to identify and minimise or reduce the potential for creating development situations that expose the occupants of the land to an increased exposure from a bush fire event.

The information sought by the Strategic Bush Fire Study is intended to identify at the preliminary planning stage land areas within the proposed rezoning application that are either unsuitable or not conducive for residential or special fire protection purposes developments due to the surrounding vegetation, terrain, bush fire history, access and egress provisions, and/or the availability of utilities and resources – in particular emergency services.

The submission of a Strategic Bush Fire Study for consideration by the NSW Rural Fire Service also fulfills the Ministerial Directions obligations under the Section 9.1 of the Environmental Planning and Assessment Act (1979) – Direction 4.4 Planning for Bush Fire Protection.

An assessment of the proposed land rezoning as a direct result of the *Urban and Fringe Housing Strategy* that was commissioned and adopted by the Goulburn Mulwaree Council address the specific information requirements of Chapter 4 – 'Strategic Planning' of Planning for Bush Fire Protection (2019) with site specific responses to Table 4.2.1 addressed in the following section. It is concluded through an assessment of the site conditions against the matters for consideration within Table 4.2.1 of Chapter4 of Planning for Bush Fire Protection (2019) that the proposed land rezoning and future subdivision of the site will have an inherently 'Low' risk and therefore can support residential development within Bush Fire Prone Lands.

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS	DEVELOPMENT SPECIFIC RESPONSES
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	• The bush fire hazard in the surrounding area, including: o Vegetation o Topography o Weather	The development property is set to grassland vegetation formations throughout having historically formed part of a larger grazing and farming enterprise. The western boundary that lies parallel to the Braidwood Road traffic corridor, plus the western aspect of the existing homestead and parts of an internal access carriageway are lined with discontinuous single rows of old radiata pine trees – many of which are now displaying signs of necrosis and die-back. The surrounding lands to the immediate east and south have also formed part of historical grazing and farming operations and as such are generally also set to open paddocks of grassland and improved pastures – with the exception of a small stand of open grassy woodlands to the southeast. Adjoining lands to the northern and west of the property on the opposite side of the respective road corridors form part of an ongoing rural enterprise that is focused on cattle grazing and crop production. The terrain across the development site and surrounding landscape is slightly undulating to flat with small hillocks and relatively level plains where the surface slopes generally does not exceed 5°. The site has two distinct terrain precincts; the southern half of the property which tends to fall from the southeast corner toward the west at an average grade of 3°; and the northern half below the homestead that has a general fall from the southwest toward the north-northeast at grades of less than 2°. The Goulburn geographical weather patterns are cold winters (~11.5°) with moderate to hot summers (~28°), the prevailing winds are typically from the west-southwest, rainfall average is 620mm, and humidity is generally low.

		• The potential fire behaviour that might be generated based on the above;	The potential for large-scale fire events of a nature that would be deemed a high-risk is relatively low given the nature of the surrounding grassland and cropping activities, and, with the exception of the western and northern aspects the surrounding Lots are generally small holdings that are relatively well managed. The land holdings to the west and north of the subject site form part of a viable rural enterprise that practices traditional farming activities of cultivation, sowing, and crop production followed by rotational grazing and then periods where the land is left to lie fallow to improve soil conditions, so the vegetation structure, density, and curing rates is quite variable and therefore not static.
		• Any history of bush fire in the area;	There is no recorded bush fire history affecting the site or surrounding area for the past 25 years with the most recently recorded local bush fire event of any significance being in the early 1980's that burnt through some of the surrounding grazing properties and farmlands. It is believed that no houses were lost in that particular fire event. A small grass fire occurred in the southwestern corner of the subject property approximately 15 years ago that started as a result of a single vehicle collision which was quickly contained and extinguished by local firefighting units.
		• Potential fire runs into the site and the intensity of such fire runs; and	The nominated building envelopes within all proposed Lots would be setback from the existing outer boundaries of the property by at least 50 metres which would thereby reduce any potential fire run toward the dwelling envelope by an equivalent distance through the establishment of individual asset protection zones. The northern, western and southern aspect of the property are each bordered by 20-metre-wide road reserves for the entire lengths which

			creates an additional buffer zone on those respective aspects, and whilst a bush fire doesn't necessary recognise or respect prevailing weather and fire aspects, these three aspects are the most likely to support a fire event that would impact the site.
		• The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.	The development site is presently bordered along three of its four frontages by named and formed roads that are predominantly bitumen sealed and constructed to both local Council and TfNSW engineering standards. The proposed subdivision will include the construction of a new internal access road to local Council engineering standards within the northern portion of the site that will service ten of the proposed sixteen Lots. The network of formed roads around and within the subject site will allow suitable access for firefighting resources to combat any grass fire. The proposed subdivision will not need to alter or cause segregation within the existing grassland vegetation regimes that dominate the landscape, however it would be a realistic expectation that development of residential dwellings within the individual Lots over the course of time will provide an improved management of the vegetation by way of established asset protection zones that in turn would reduce the overall risk of fire ignition and/or spread.

Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	• The risk profile of different areas of the development layout based on the above landscape study;	The development property is comprised of homogenous vegetation formations and topographical features therefore rezoning to 'Large Lot Residential' land use will ultimately reduce the risk and likelihood of a sustained bush fire within the current holding and surrounding areas as the development of smaller Lot sizes will facilitate greater management of the vegetation through the creation and maintenance managed lands and asset protection zones within the residential curtilages.
		• The proposed land use zones and permitted uses;	The overall size of the current landholding is 34.86 hectares and the rezoning proposal is seeking to only create a single land use of 'Large Lot Residential' with minimum Lot sizes of 2 hectares and therefore not resulting in any land use conflict with neighbouring Lots which are of similar land size and use. To maintain the rural fabric of the area restrictions will be established on the proposed Lots via Council's Development Control Plans that will limit the type and size of structures of permissible activities that can be undertaken within the proposed new allotments.
		• The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and	The terrain is slightly undulating to flat and therefore does not pose any specific constraints or restricted development areas that warrant identification from a bush fire protection perspective. The site will establish large development setbacks from existing and new perimeter boundaries to maintain the general amenity of the area.
		• The impact of the siting of these uses on APZ provision.	All Lots will be able to establish suitable asset protection zones within the boundaries of the individual holdings that will ensure that the bush fire attack level rating for each Lot does not exceed BAL-29, and in most cases the effective BAL rating will be less.

Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	• The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;	The development site is located on two separate road intersections: the northern end being on the junction of the Braidwood and Brisbane Grove Roads – less than 1 kilometre from the 60kph speed limited zone on the outskirts of the city, and the southern end of the site a further 870 metres from the northern intersection on the junction of Braidwood Road and Johnsons Lane. The road network that borders the development property provides adequate access and egress options for emergency evacuation if required, and a separate Traffic Management Report prepared by *Positive Traffic Pty Ltd* (Ref: PT21012r01) concludes that the additional traffic generation for the proposed subdivision development would be 'low', and that there would not be an adverse impact on the current road network, and as such there would be no need to undertake any upgrades to the roads or intersections associated with the three existing perimeter roads.
		• The location of key access routes and direction of travel; and	The Braidwood Road traffic corridor is a major classified road that provides important transit connectivity between Goulburn and its neighbouring southern villages and townships, and south coast centres such as Batemans Bay, Moruya and Bega. Brisbane Grove Road is a local road that connects traffic from the Braidwood Road corridor with local rural landholdings and the regional villages of Windellama and Bungonia to the east and southeast of the Goulburn and offers an alternate route to enter city from the southeastern aspect. Johnsons Lane is a local road that provides access to several adjoining and neighbouring property that terminates approximately 130 metres to the east of the development property's eastern boundary.

		• The potential for development to be isolated in the event of a bush fire.	The unique situation of the property being benefited by two separate access and egress options located at either end of the development site in combination with the conceptual subdivision design that has ten Lots accessed from the northern aspect and the remaining six Lots from the southern aspect reduces the potential for traffic congestion in an emergency situation that could be generated from a single access network, and it also allows emergency services multiple locations and fronts to access the property to undertake their vital work. The multiple egress options, travel routes, and the proximity of the site to the city of Goulburn would reasonably suggest that in a major bush fire event future residential Lots or their occupants would not become isolated.

Emergency services	An assessment of the future impact of new development on emergency services.	• Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and	The proposed land rezoning to large Lot residential would yield a total of sixteen Lots, fifteen of which would be seeking new residential dwelling permissibility. The additional Lot yield would not warrant an increase in the provision of existing emergency service facilities or capabilities, nor would the small number of Lots being the subject of this assessment, and even allowing for the potential of additional land rezoning to similar Lots sizes within adjoining properties in the Brisbane Grove development precinct place a significant impact on the ability of local emergency services to undertake their functions.
		• Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.	It reasonable to conclude that the creation of the large Lot residential properties would result in a reduced bush fire risk due to the proliferation of residential dwellings and associated managed landscapes within defined curtilages that would include an asset protection zone. The increased level of land occupancy provides an increased ability to fight and supress bush fire events which in turn would provide an additional element of resources and protection for adjoining and neighbouring properties.

Infrastructure	An assessment of the issues associated with infrastructure and utilities.	• The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and	It is expected for the immediate foreseeable future that the development property will not be connect to or serviced by Council utilities or reticulated water supply as has been highlighted in the Urban and Fringe Housing Study (paragraph 1, page 112) and therefore each Lot will be required to provide a static water supply for firefighting purposes in accordance with Table 5.3d of Planning for Bush Fire Protection (2019). Within the design of the subdivision it is proposed that approximately twelve farm dams will be distributed throughout the Lots with the majority of the dams to be located in the front of the benefited Lot and therefore would be accessible and available if required by the NSW Rural Fire Service as a supplementary resource for the purposes of firefighting.
		• Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.	Creation and servicing of the proposed subdivision would not require the extension of high voltage power lines, and the area is not serviced by a reticulated gas supply therefore negating these issues as a potential concern or constraint for the immediate or foreseeable future.

Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	• Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.	It reasonable to conclude that the creation of the large Lot residential properties would result in a reduced bush fire risk due to the proliferation of residential dwellings and associated managed landscapes within defined curtilages that would include an asset protection zone. The increased level of land occupancy provides an increased ability to fight and supress bush fire events which in turn would provide an additional element of resources and protection for adjoining and neighbouring properties. Development of the proposed new Lots could only be considered as a benefit for bush fire protection purposes as it provides greater opportunity to manage the land in a practical and responsible manner by adhering to a set of asset protection zone standards, and to provide an improved range of resources including access and water supply for the protection of life and property within the surrounding precincts.

3/. An Assessment of the Proposed Subdivision of Land in Accordance with Chapter 5 – 'Residential and Rural Residential Subdivision Planning' of Planning for Bush Fire Protection (2019).

A subdivision of land for residential purposes is designated as 'integrated development' in accordance with Section 4.46 of the EP&A Act. As integrated development a formal application must be submitted to the NSW Rural Fire Service under Section 100B of the RF Act seeking a 'Bush Fire Safety Authority' for the proposed development which will assess the proposal for compliance with PBP and the combined bush fire protection measures aimed at the protection of life and property. A 'Bush Fire Safety Authority' (BFSA) requires assessment of the development against set criteria as set out in Clause 44 of the Rural Fires Regulation (2008).

The information requirements to be assessed within a 'Bush Fire Safety Authority' must at a minimum include the following:

1. **A description of the property**
- provide Lot No., DP of subject land
- street address with locality map
- zoning of subject land and any adjoining lands
- staging issues, if relevant, and description of the whole proposal
- aerial or ground photographs of subject land including contours and existing and proposed cadastre

2. **Identification of any significant environmental features - these could include the presence of:**
- riparian corridors
- SEPP 14 – Coastal Wetlands, SEPP 26 Littoral rainforests, SEPP 44 – Koala Habitat
- areas of geological interest
- environmental protection zones or steep lands (>18°)
- land slip or flood prone areas
- national parks estate or various other reserves.

3. **Details of threatened species, populations, endangered ecological communities and critical habitat known to the applicant**
- details of some threatened species can be found on the web (www.environment.nsw. gov.au)
- past and/or present studies or surveys for the area (eg local environment studies)
- documentation supplied to council in relation to flora and fauna

4. **Details of Aboriginal heritage known to the applicant**
- past surveys and information held by the DEC.

5. **A bush fire assessment for the individual Lots that addresses –**
- the classification of vegetation out to 140 metres from the development
    - provide a structural description consistent with the identification key in Keith D (2004) and PBP.
    - identify any past disturbance factors and any future intended land uses that could alter the vegetation classification in the future.

- an assessment of the effective slope to a distance of 100 metres
    - usually 5m contours will suffice for subdivisions, 10 metres should be used only if there has not been a survey undertaken by a registered land surveyor.
    - the effective slope is the slope under the vegetation assessed as being a hazard in relation to the development and not the slope within the asset protection zone.
- asset protection zones (including any management arrangements, any easements including those contained on adjoining lands)
- siting and adequacy of water (in relation to reticulation rates or where dedicated water storage will be required)
- capacity of public roads (especially perimeter roads and traffic management treatments)
- whether public roads link to fire trails and have two way access
- adequacy of access and egress
- adequacy of maintenance plans (eg; landscaping) and emergency procedures (especially SFPP developments)
- construction standards to be used (where non-conformity to the deemed-to-satisfy arrangement is envisaged, which aspects are not intended to conform)
- adequacy of sprinkler systems (only as an adjunct to other passive controls).

6. **An assessment of how the development complies with the acceptable solutions, performance requirements and relevant specific objectives within Chapter 5 of PBP.**

It is considered that matters 1, 2 and 5 listed above have been adequately addressed within the earlier sections of the Strategic Bush Fire Study, hence they do not specifically need to be repeated again. Matters 3 and 4 are addressed by reports prepared by others and can be referenced for detailed assessment, suffice to say that neither of the matters being assessed identified any issues that would be a constraint or limitation to the proposed subdivision of the land. The 'Biodiversity Assessment' prepared by Woodlands Environmental Management (dated 18th February 2019) addressed matter 3 (*Details of threatened species, populations, endangered ecological communities and critical habitat known to the applicant*) whilst the 'Due Diligence Investigation' assessment (dated April 2021) undertaken by Black Mountain Projects Heritage Consultants addresses matter 4 (*Details of Aboriginal heritage known to the consultant*).

The following Table (3a) provides a summary based on the location of the nominated dwelling envelope within the individual Lots for slope, distance from the to the respective boundaries, and the assessed BAL rating. Immediately following is Table 3a which provides an assessment of the how the development complies with the acceptable solutions, performance requirements, and relevant specific objectives of Chapter 5 – 'Residential and Rural Residential Subdivision Planning' of Planning for Bush Fire Protection (2019)'. It is noted that an assessment of the existing heritage listed homestead for compliance with basic bush fire protection measures would be submitted at the time of lodging a formal subdivision application and would include specific details of how the proposal satisfies the objectives of Section 8.2.3 '*Historic Buildings*' of Planning for Bush Fire Protection (2019). General information from Planning for Bush Fire Protection (2019) regarding infill development for the future residential Lots forms the balance of the assessment for the benefit of the proponents.

Table 3a. Summary of the bush fire site conditions from the nominated dwelling envelopes for each of the proposed Lots within the conceptual design for the subdivision of the land.

Lot #	Characteristics	North	South	East	West
1	Slope	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°	D/S 0 - 5°
	Distance to boundary	>80	50	50	>50
	BAL rating	BAL-LOW	BAL-12.5	BAL-12.5	BAL-LOW
2	Slope	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°	D/S 0 - 5°
	Distance to boundary	>50	>50	50	>60
	BAL rating	BAL-LOW	BAL-LOW	BAL-12.5	BAL-LOW
3	Slope	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°	U/S - Flat
	Distance to boundary	>50	>50	50	>50
	BAL rating	BAL-LOW	BAL-LOW	BAL-12.5	BAL-LOW
4	Slope	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°	U/S - Flat
	Distance to boundary	50	50	50	>70
	BAL rating	BAL-12.5	BAL-12.5	BAL-12.5	BAL-LOW
5	Slope	D/S 0 - 5°	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	>50	>100	50	>30
	BAL rating	BAL-LOW	BAL-LOW	BAL-12.5	BAL-12.5
6	Slope	U/S - Flat	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	40	>100	>35	>40
	BAL rating	BAL-12.5	BAL-LOW	BAL-12.5	BAL-12.5
7	Slope	U/S - Flat	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	50	>100	>30	>40
	BAL rating	BAL-12.5	BAL-LOW	BAL-12.5	BAL-12.5
8	Slope	U/S - Flat	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	>35	>100	30	50
	BAL rating	BAL-12.5	BAL-LOW	BAL-12.5	BAL-12.5
9	Slope	D/S 0 - 5°	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	>40	>100	30	50
	BAL rating	BAL-12.5	BAL-LOW	BAL-12.5	BAL-12.5
10	Slope	D/S 0 - 5°	U/S - Flat	U/S - Flat	D/S 0 - 5°
	Distance to boundary	>100	50	25	>70
	BAL rating	BAL-LOW	BAL-12.5	BAL-12.5	BAL-LOW
11	Slope	D/S 0 - 5°	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	>50	>50	50	>100
	BAL rating	BAL-LOW	BAL-LOW	BAL-12.5	BAL-LOW
12*	Slope	D/S 5° - 10°	D/S 5° - 10°	D/S 0 - 5°	D/S 5° - 10°
	Distance to boundary	>70	>35	40	>80
	BAL rating	BAL-LOW	BAL-12.5	BAL-12.5	BAL-LOW
13	Slope	D/S 0 - 5°	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°
	Distance to boundary	30	25	>100	90
	BAL rating	BAL-12.5	BAL-12.5	BAL-LOW	BAL-LOW
14	Slope	D/S 0 - 5°	U/S - Flat	U/S - Flat	D/S 0 - 5°
	Distance to boundary	>35	30	>100	>90
	BAL rating	BAL-12.5	BAL-12.5	BAL-LOW	BAL-LOW
15	Slope	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°	D/S 0 - 5°
	Distance to boundary	>40	>25	>100	>60
	BAL rating	BAL-12.5	BAL-12.5	BAL-LOW	BAL-LOW
16	Slope	D/S 0 - 5°	U/S - Flat	D/S 0 - 5°	D/S 0 - 5°
	Distance to boundary	>80	25	>30	>100
	BAL rating	BAL-LOW	BAL-12.5	BAL-12.5	BAL-LOW

Table 3b. An assessment of how the development complies with the acceptable solutions, performance requirements and relevant specific objectives within Chapter 5 of PBP (2019)

ASSET PROTECTION ZONES		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
Potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot.	APZ's are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	The proposed subdivision has considered the requirement of providing suitable asset protection zones for each Lot such that the nominated dwelling sites would not be exposed to a radiant heat level exceeding BAL-12.5.
APZ's are managed and maintained to prevent the spread of a fire towards the building	APZ's are managed in accordance with the requirements of Appendix 4, and in particular in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2006). ***	All future Lots would be required to demonstrate provision of a suitable asset protection zone at the time of lodging a formal application to Council for the construction of a residential dwelling. The subdivision design will ensure that all Lots are provided with a suitable area for the establishment of an asset protection zone in accordance with the standards.
The APZ's are provided in perpetuity	APZ's are wholly within the boundaries of the development site	The proposed Lot boundaries, building setbacks and asset protection zones have been considered in the design of the subdivision to ensure that all asset protection zones are within the individual allotments and therefore eliminating the need to register restrictions on the title of neighbouring Lots for the establishment of such.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	The APZ's are located on lands with a slope less than 18°	The development property doers not have any slopes that exceed 10° and therefore all proposed Lots will comply with this condition

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	All future Lots would be required to provide a detailed landscaping plan that is suitable for developments in bush fire prone areas at the time of lodging a formal application to Council for the construction of a residential dwelling. The landscaping plan would be an effective tool to ensure compliance with this provision.
	Fencing is constructed in accordance with section 7.6.	

*** http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf

PUBLIC ROADS		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
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	All roads, both existing and proposed are bitumen sealed all-weather surface that are suitable for all types of vehicle movements
	Perimeter roads are provided for residential subdivisions of three or more allotments	The subdivision design proposes a total of sixteen residential Lots, and therefore in accordance with the provisions of Table 5.3b of Planning for Bush Fire Protection (2019) a perimeter road is required around the site. It is proposed as a variation to this requirement that the exiting three roads that border the site – two of which are main traffic thoroughfares, plus the addition of the new internal access road will be sufficient for the purposes of bush fire protection. If a perimeter road was to be formed along the eastern boundary of the property there is a potential for traffic travelling west along Brisbane Grove Road to turn into the development property and then use the perimeter road as another means of access to Braidwood Road via Johnsons Lane to the south, effectively bypassing the intersection of the Braidwood Road traffic corridor which can at times get busy particularly during summer holiday periods. The same traffic management issues are equally possible for vehicles travelling in the opposite direction. This 'potential' traffic bypass situation creates both a safety and general amenity issue with respect to the proposed new Lots and controlling the speed of such traffic movements would be highly problematic. The other consideration for not including a perimeter road is that the proposed Lots 1 to 5 along the eastern boundary are bordered by privately owned and effectively managed lands that are set to grassland vegetation formations with the exception of a small stand of open grassy woodland vegetation adjacent to the proposed Lot 5. The terrain to the east of the proposed Lot 5 is upslope, and the woodland vegetation formation upslope

		of the proposed Lot extends for approximately 100 metres from the eastern boundary before transitioning into a forested formation that surrounds the neighbouring residential dwelling precinct. At the time of the site inspection the neighbouring property to the east of Lot 5 was grazed by a few horses. The terrain within the neighbouring land holdings to the east of proposed Lots 1 to 4 are slightly downslope to flat, and in some cases upslope in relation to the nominated building envelopes within the respective Lots and therefore any bush fire event that was travelling from this direction would be a relatively low risk and should be managed with minimal resources, particularly with established and managed asset protection zones of 50 metres within the boundaries of the blocks, and access for fire suppression activities would also be available directly from these neighbouring Lots.
	Subdivisions of three or more allotments have more than one access in and out of the development;	The development property is benefited by two separate access and egress options located at either end of the development site which in combination with the proposed new internal access road provides alternate egress options in an emergency situation. Ten of the sixteen Lots will have access via the proposed new internal roadway whilst the remaining six Lots will have access from the Johnsons Lane road corridor along the southern aspect which reduces the potential for traffic congestion in an emergency situation that could be generated from a single access network. The dual access provisions also allow emergency services multiple locations and fronts to access the property to undertake their vital work. The multiple egress options, travel routes, and the proximity of the site to the city of Goulburn would reasonably suggest that in a major bush fire event future residential Lots or their occupants would not become isolated.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles	There are no traffic management devices proposed for the subdivision development.

	Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10° or other gradient specified by road design standards, whichever is the lesser gradient	The proposed new internal access road will have finished surface grades of less than 10° and therefore satisfy this condition.
	All roads are through roads	The proposed new internal access road will terminate in a cul-de-sac formation, the main reason being for the safety of the landowners and to eliminate the potential for non-related through traffic using the new internal road system as a means of bypassing the main traffic network and intersections. The site will be affected by three separate speed limits which would be difficult to monitor and regulate with a through-road structure. Due to the proximity of existing perimeter roads on the northern, southern and western aspects and the inclusion of the new internal access road a through-road is not considered an essential element for this proposed subdivision.
	Dead end roads are not recommended, but if unavoidable, 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	The proposed internal access road will follow the alignment of existing overhead power transmission lines and terminate in a cul-de-sac formation in front of the heritage listed homestead which will form the focal point of the development. The distance from the commencement of the internal access road and the end of the cul-de-sac measures 412 metres, however the road will be constructed within a grassland vegetation environment and the road will be constructed to Council's rural road standards which includes a 20 metre wide reserve with 11 metre wide road and shoulder formation and grass lined verges on either side. The development property is surrounded by grassland and cropping lands on all aspects and the risk of a major bush fire event is considered to be low.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road	Not applicable to the proposed subdivision development.

	Where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system	Not applicable to the proposed subdivision development.
	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 to the proposed subdivision development.
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	All existing roads presently satisfy this condition, and the proposed internal access road will also meet the criteria as it will be bitumen sealed and there are no bridge or causeway crossings.
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 to the proposed subdivision development as the site will not be serviced by a Council maintained 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*	Not applicable to the proposed subdivision development as the site will not be serviced by a Council maintained reticulated water supply.
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available	The development site will not be serviced by a Council maintained reticulated water supply therefore each Lot will be required to provide a static water supply in an approved storage vessel and some Lots will have a farm dam. Access will need to be satisfied in accordance with this provision

PERIMETER ROADS		
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	The perimeter roads used for the development are existing formations that border the northern, southern, and western boundaries of the property. The road formations are comprised of a bitumen sealed surface of at least 8 metres including shoulders within a 20 metre wide road reserve. As a general condition, parking is not provided within the road reserves due to grass lined drainage swales that are formed on the side of the road carriageways, and due to the posted speed limits of 80kph and 100khph. The geometric road designs satisfy both local Council engineering and TfNSW requirements and therefore satisfy this condition. All road have vegetation clearances of at least 4 metres in the vertical plane.
	Minimum 8 metre carriageway width kerb to kerb	
	Parking is provided outside of the carriageway width	
	Hydrants are located clear of parking areas	
	Are through roads, and these are linked to the internal road system at an interval of no greater than 500 metres	
	Curves of roads have a minimum inner radius of 6 metres	
	The maximum grade road is 15° and average grade of not more than 10°	
	The road crossfall does not exceed 3°	
	Minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided	

NON-PERIMETER ROADS		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Minimum 5.5 metre carriageway width kerb to kerb	The only internal road will be the proposed access road that will terminate in a cul-de-sac formation. The roadway will be approximately 412 metres in length (subject to final design considerations) and will be constructed to satisfy the geometric road requirements of the Council's engineering standards. As a general condition parking is not provided within the road reserve due to grass lined drainage swales that are formed on the side of the road carriageway, and the roadway will have vegetation clearances of at least 4 metres in the vertical plane as it is located within an existing grassland vegetation environment.
	Parking is provided outside of the carriageway width	
	Hydrants are located clear of parking areas	
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500 metres;	
	Curves of roads have a minimum inner radius of 6 metres	
	The road crossfall does not exceed 3°	
	a minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided.	

PROPERTY ACCESS		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
Firefighting vehicles can access the dwelling and exit the property safely	*Note: There are no specific access requirements in a urban area where an unobstructed path (no greater than 70 metres) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).*	
	In circumstances where this cannot occur, the following requirements apply	
	Minimum 4 metre carriageway width	
	In forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by 2metres wide, making a minimum trafficable width of 6 metres at the passing bay;	All proposed Lots will have access carriageways of less than 200 metres, and based on the location of the nominated dwelling envelopes, the access length for the majority of the Lots will be no greater than 150 metres with the average distance being 70 metres.
	A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches	All Lots will be set in grassland vegetation environments that have few if any trees and therefore clearances in the vertical plane will be satisfied.
	Provide a suitable turning area in accordance with Appendix 3;	The design of the individual carriageways will need to consider these conditions as part of the site plan when preparing and submitting an application to Council for the construction of a residential dwelling.
	Curves have a minimum inner radius of 6 metres and are minimal in number to allow for rapid access and egress	
	The minimum distance between inner and outer curves is 6 metres	
	The crossfall is not more than 10°	

	Maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads	
	A development comprising more than three dwellings has access by dedication of a road and not by right of way	Not applicable as all Lots will separate access provisions to one of the two identified access roads.
	Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.	

SERVICES – WATER, GAS & ELECTRICITY		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
WATER SUPPLIES		
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available	Not applicable to the proposed subdivision development as the site will not be serviced by a Council maintained reticulated water supply.
	A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	The development site will not be serviced by a Council maintained reticulated water supply therefore each Lot will be required to provide a static water supply in an approved storage vessel in accordance with Table 5.3d, and some Lots will have a farm dam. Suitable access for firefighting vehicles and personnel will need to be provided in accordance with Table 7.4a of Planning for Bush Fire Protection (2019)
	Static water supplies shall comply with Table 5.3d.	
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 2419.1:2005	Not applicable to the proposed subdivision development as the site will not be serviced by a Council maintained reticulated water supply.
	Hydrants are not located within any road carriageway	
	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads	
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005	
The integrity of the water supply is maintained	All above-ground water service pipes are metal, including and up to any taps	To be undertaken as a matter of compliance at the time of residential dwelling development.
	Above-ground water storage tanks shall be of concrete or metal	To be undertaken as a matter of compliance at the time of residential dwelling development.

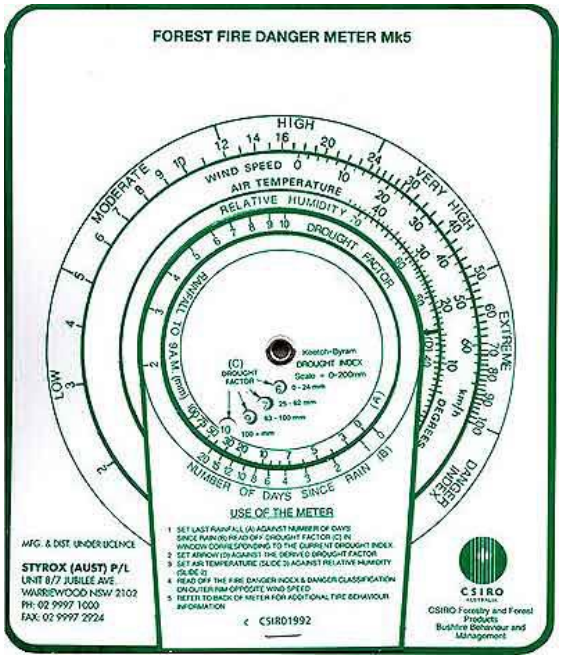
ELECTRICITY		
Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings	Where practicable, electrical transmission lines are underground.	The development property is presently serviced by an overhead power transmission line that runs through the entire length of the site running in a north → south alignment. Future subdivision of the property will need to undertake a full electricity demand and design model to assess the capacity of the existing supply provisions, and where necessary upgrade or undertake additional supply augmentations. The design of the mains power supply should be in accordance with the supply authority's requirements for developments in bush fire prone areas.
	Where overhead electrical transmission lines are proposed: - lines are installed with short pole spacing (30 metres), 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 accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.	

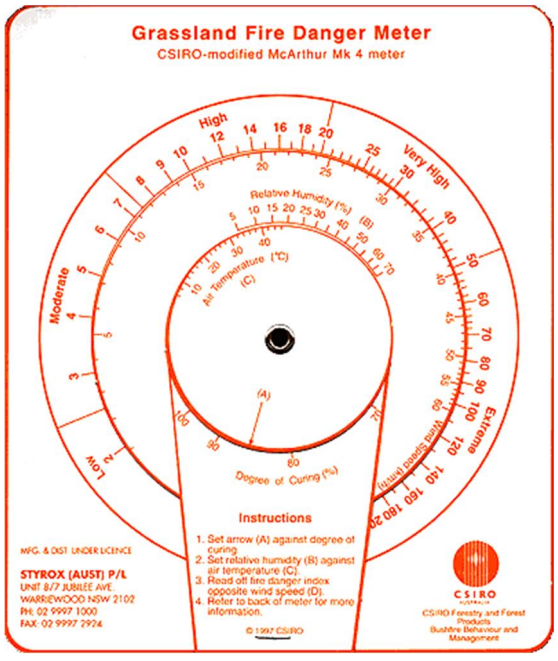
GAS		
Location of gas services will not lead to ignition of surrounding bush land or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with *'AS 1596 – 2014 – The Storage and Handling of LP Gas'* and the requirements of relevant authorities. Metal piping is to be used.	The development property is not serviced by a reticulated gas supply therefore any future residential dwelling seeking to install gas operated appliances will need to install bottled LPG. It is assumed that all plumbing and gas-fitting works will be undertaken by licenced installers and therefore all installations will meet the relevant standards and guidelines, including the certification of the installations and the fixing of compliance plates adjacent to the connection point of the bottles.
	All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.	
	Connections to and from gas cylinders are metal.	
	Polymer sheathed flexible gas supply lines are not to be used.	
	Above-ground gas service pipes are metal, including and up to any outlets.	

4. Fire Weather.

The FDI (Fire Danger Index) rating system was developed by McArthur (CSIRO) in the 1960's to help predict the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression according to the various combinations of air temperature, relative humidity, wind speed and both the long and short term drought effects. An FDI of 100 was considered to be the maximum danger rating given the worst possible combination of fire conditions when the Forest Fire Danger Index was initially introduced, and still stands as the fire weather indicator for all NSW local government areas despite the fact that the maximum potential FDI ratings have been calculated well in excess of 100 in some weather districts. The warning classifications have been updated recently in line with improved knowledge of weather and fire behaviour to the extent that the classification system introduced a new level of danger being "Catastrophic" which reflects conditions in excess of an FDI of 100.

The Goulburn Mulwaree Council is located within the Southern Ranges fire area of NSW which has an FDI rating of 100 assumed as a 1:50 year event.

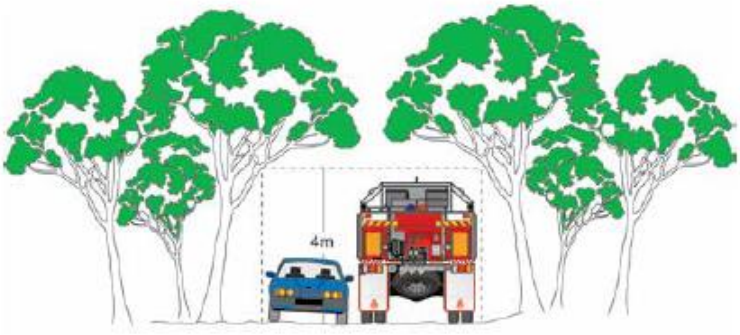




5. General design and construction considerations for each Lot as 'infill' developments under Section 4.14 of the Environmental Planning and Assessment Act 1979.

a. Access and Egress.

Table 7.4a 'Access' of "Planning for Bush Fire Protection" (2019) requires that an alternate escape route be made available if the distance from the nearest arterial road to the dwelling site is greater than 200 metres, and that the minimum width for internal access roads be four metres plus one metre either side which is maintained to provide a clear opening of four metres between ground level and any overhanging vegetation in accordance with the below Figure. There must also be a turning provision of not less than 12 metres near to the dwelling site which will allow emergency services vehicles clear access to the dwelling.



General construction requirements for internal property access roads in rural areas as prescribed by the NSW Rural Fire Service

b. Water Supply.

In rural areas where the development block is not located within a service area that has access to reticulated water supply, the provision of a dedicated and static water supply is considered essential. The provision of a dedicated waters supply in rural areas provides opportunities for fire fighters to replenish their tanker supplies and also aims to ensure that there is adequate water provisions for the property owners to undertake their own protection activities. As a general rule the capacity of the static water requirement is based on the Lot size and the type of development, with the typical requirements summarised in Table 1.

It should be emphasised that the water requirements listed in Table 1 are a minimum requirement, and where site specific firefighting systems have been installed such as fire hose reels, drencher systems and other fire suppression measures, additional water storage will be required - and the overall capacity of this additional requirement should be based on a site specific design. The minimum water storage requirements applicable for all Lots in this particular development without any site-specific fire protection detail is highlighted in Table 1.

Table 1. Water supply requirements - adopted from Table 5.3d of "Planning for Bush Fire Protection (2019).

Development Type	Residential Lots <1000m²)	Residential Lots (1000 - 10,000m²)	Large Rural / Lifestyle Lots (>10,000m²)	Multi-housing dwellings and Dual Occupancy
Water Requirement	5,000 litres / Lot	10,000 litres / Lot	20,000 litres / Lot	5,000 litres / Unit

The following items are adopted from Table 7.4a of "Planning for Bush Fire Protection (2019)" and are considered mandatory installation conditions where they are applicable to the development:

- where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d;
- a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet;
- ball valve and pipes are adequate for water flow and are metal;
- supply pipes from tank to ball valve have the same bore size to ensure flow volume;
- underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank;
- a hardened ground surface for truck access is supplied within 4m;
- above-ground tanks are manufactured from concrete or metal;
- raised tanks have their stands constructed from non combustible material or bush fire resisting timber (see Appendix F of AS 3959);
- unobstructed access can be provided at all times;
- underground tanks are clearly marked;
- tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters;
- all exposed water pipes external to the building are metal, including any fittings;
- where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack;
- any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.
- Where a Static Water Supply (SWS) is provided, an "SWS" sign should be installed in a visible location on the street front.

From a firefighting point of view, any source of available water may be used during a bush fire event and tanks are not always the most practical option. In light of the above, and the increasing demand for sustainable and efficient use of our water resources, the NSW RFS prefers that water is solely dedicated for firefighting purposes. As such, water holding structures such as tanks, swimming pools and dams can be considered as long as they are accessible, reliable and adequate. Nevertheless, where a water supply is provided it must be available for the lifetime of the development.
Water capacities, access for firefighters (tanker or pedestrian) and the provision of appropriate connections must also be considered when determining if a proposed water source is suitable. Where a Static Water Supply (SWS) is provided, a SWS sign should be installed in a visible location on the street front. Regular testing of firefighting equipment should also occur to ensure that it is maintained in working order.

Source: (Section 3.5, page 30 of Planning for Bush Fire Protection (2019).

It is also important to remember that whilst the protection and defensive measures addressed in this report are principally focused on the requirements for bush fire events, other fires including general household fires can occur at any time and therefore the provisions of this report are intended to extend to all probable fire events. It is for this reason that firefighting measures, such as firefighting pumps being connected to the water supply, should be in place at all times and not simply in the recognised bush fire season.

Example of a storz connection associated with a dedicated water storage tank used for dedicated firefighting purposes and a standard "Static Water Supply" sign to be placed at the front of the property.

c. Gas Supply.

Gas and other combustible materials should not be stored within the inner protection area of the dwelling or close to significant stands of vegetation formations. In particular, Table 7.4a of "Planning for Bush Fire Protection (2019)" states the following:

- reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and 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 10m and shielded on the hazard side;
- connections to and from gas cylinders are metal
- polymer sheathed flexible gas supply lines are not used
- above-ground gas service pipes are metal, including and up to any outlets.

d. Vegetation Assessment.

The vegetation around the dwelling site should be classified using recommended references including "Ocean Shores to Desert Dunes" (Keith, 2004), "AS3959 - 2018 Construction of Buildings in Bushfire Prone Areas", and "Planning for Bushfire Protection" (2019). Where applicable, the dominant vegetation types and formations should be identified for each aspect or elevation of the proposed dwelling to a distance of 140 metres, or the nearest distance if the assessable vegetation formation is less than 140 metres from the development site.

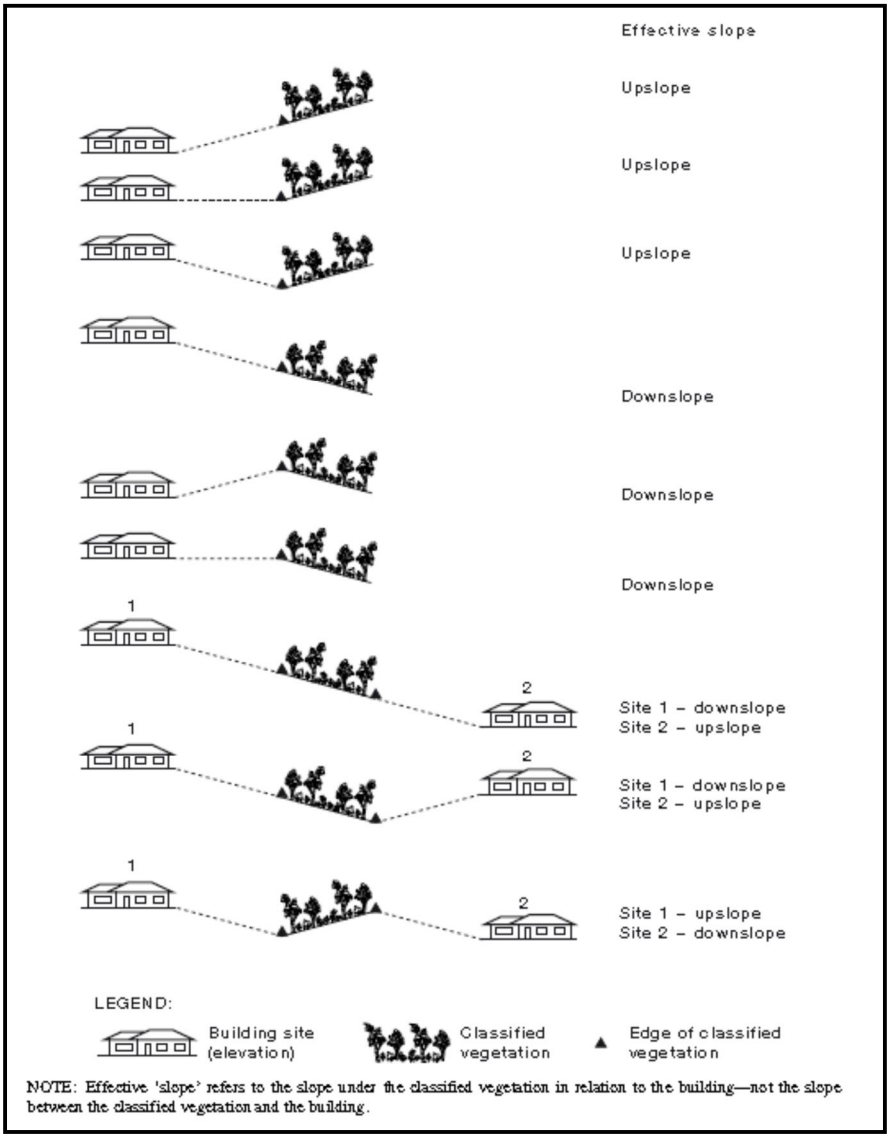
As a general rule of the assessment process, the vegetation assessment that is deemed manageable by the property owners shall only be conducted to the extents of the boundaries of the subject property if the distance to the property boundary is less than 140 metres as the property owners normally do not have any direct control on the vegetation that lies in adjacent properties.

Where the distance from the development site to the property boundary is less than 140 metres and the assessable vegetation formation is immediately on the neighbouring side of that boundary, it is presumed that for the lifetime of the development that this vegetation will be a 'constant' within the assessment process irrespective of any agreement between the two property owners to undertake any clearing or maintenance within the area. An exception applies if the area is to be maintained by a supply authority as part of a service easement - such as overhead power lines.

e. Asset Protection Zone.

Asset protection zones are areas of reduced fuel accumulation between the assessable vegetation classification and the dwelling site. This separation area provides a defendable space whereby persons attempting to combat the fire will have some protection from the radiant heat that the burning fuel might generate in an intense fire event. The establishment and maintenance of the asset protection zone is required to achieve specific bushfire attack level ratings (BAL) which in turn is used to determine the relevant construction requirements. There are two protection areas within an asset protection zone: the inner protection area and the outer protection area, and the following details should be applied as appropriate to the particular development.

The inner protection area is that area immediately around the building envelope that aims to reduce the combustible fuel levels and thereby reduce the possible impacts of direct flame contact and radiant heat to the building elements. The inner protection area should have a tree canopy of less than 15% with no part of any tree within 2 metres of the roofline of the dwelling. Gardens with shrubs and other woody plant materials should not be located under trees such that they could provide a ladder for fire to reach the tree canopy, and they should also not be planted within 10 metres of any exposed window or door of the defendable structure. All trees should be maintained such that there are no limbs below 2 metres from the ground surface.



Example of the methods used for determining the effective slope under the vegetation formation.

The outer protection area should have a tree canopy of less than 30% and should have the lower strata vegetation mowed and managed to reduce the rate of fire spread. The aim of reducing the density of the tree canopy is to reduce the rate of crown fire spread, and to help filter some of the flying embers by the remaining trees.

The asset protection zones should be calculated with reference to Table A1.12.2 "Minimum Distances for APZ's – Residential Development (m) FFDI 100 Areas (≤29kW/m², 1090K)" and 'Table A1.12.4 "Allowable Outer Protection Area Distances (m) within an APZ for Forest Vegetation", page 90 of "Planning for Bush Fire Protection" (2019).

f. Bushfire Attack Level (BAL)

The Bushfire Attack Level (BAL) is defined as "a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire. There are several 'levels' within the range of BAL assessments, each with differing construction standards - and these are explained in Appendix A at the end of this report for reference purposes.

g. Construction Standards (for Buildings of Classes 1, 2, 3, 4 and Certain Class 9 Buildings that are Deemed Special Fire Protection Purpose (SFPP)).

"AS3959 - 2018 Construction in Bushfire Prone Areas" sets out the construction requirements for building elements in order to reduce the likelihood of ignition of the building during a bushfire event. The level of building construction is defined as Bushfire Attack Level (BAL) and is equivalent to the BAL rating derived from the above-mentioned processes and assessments.

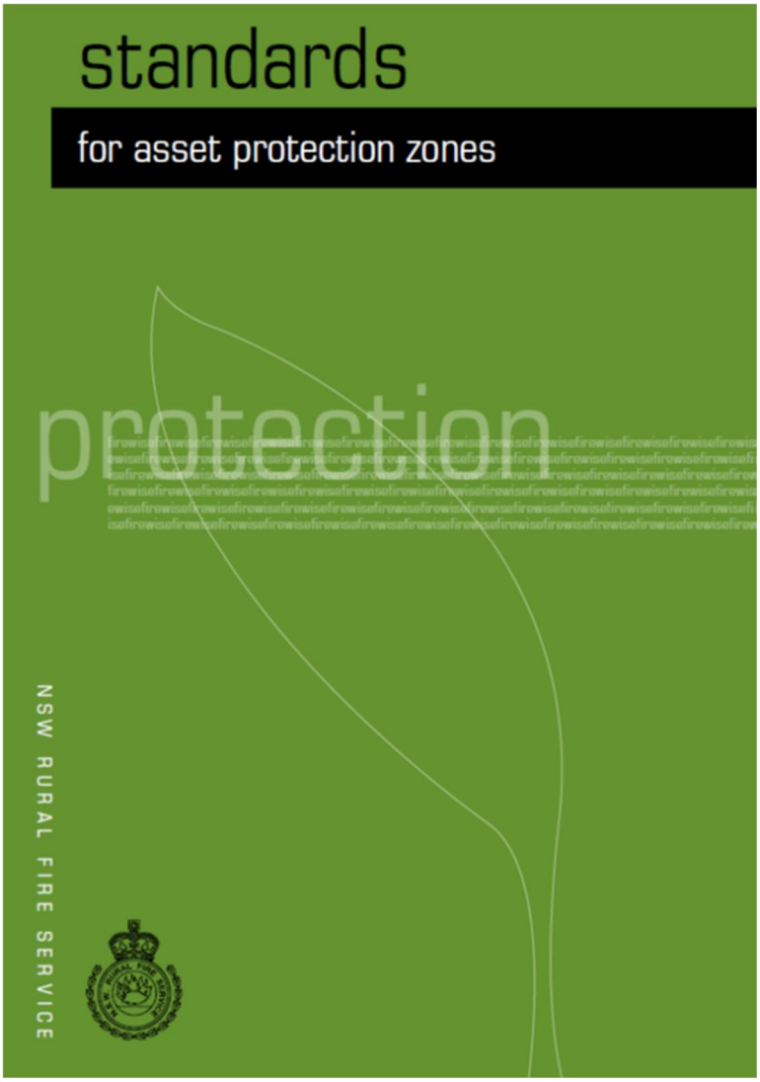
In addition to the construction standards set out in the relevant Sections of "AS3959 - 2018 Construction in Bushfire Prone Areas", the requirements previously discussed in this summary pertaining to access and egress, water supply, gas supply and the asset protection zones must also be undertaken as each of the bush fire protection measures must be considered as a 'whole of system' approach to bush fire protection rather than undertaking individual components in isolation.

**** It is noted that there are several requirements in New South Wales where the construction standards of Section 5 (BAL 12.5) and Section 6 (BAL 19) of "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas" have been superseded and replaced with additional construction standards equal to the construction standards as set out in Section 7 (BAL 29) of "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas". For further details refer to Chapter 7.5.2 of Planning for Bush Fire Protection (2019) [page 70]. These variations are to be applied to the individual dwelling constructions as applicable based on specific siting and design details at the time of lodging a formal development application to Council.**

h. General Maintenance and Landscaping.

The establishment of gardens and lawns are often a dominant part of the rural lifestyle choice as they help to provide seclusion, shelter and a general beautification of the landscape, however consideration needs to be given to the type and structure of the landscaping components to ensure that they do not form a continuum between the classified vegetation formations and the building elements. Selection of appropriate vegetation types and form for landscaping purposes are important considerations, as is the location and positioning of various plantings. It is important that critical asset protection areas are not compromised by the establishment of landscaping features, and that the longer term maintenance requirements of established gardens do not in fact add to the potential fire fuel loads around the property.

The publication "Standards for Asset Protection Zones" (2006) from the NSW Rural Fire Service provides good advice and guidelines for the establishment of asset protection areas, landscaping and longer term maintenance requirements and should be referenced prior to the design and installation of landscaping features.



6. Conclusion.

It is the formal assessment of this report that the proposed rezoning of the subject property from RU6 – 'Transition' to R5 – 'Large Lot Residential' land use and the subsequent subdivision of land to create sixteen separate allotments within a parcel of land identified as Lots 61 to 64 & 71 to 77 DP976708 and Lot 60 DP1090981 – 2 Brisbane Grove Road at Brisbane Grove will generally be able satisfy the requirements of 'Planning of Bush Fire Protection (2019)'.

It is further considered that any potential future residential development undertaken within the proposed Lots once the subdivision is registered and the Lots created will be able to comply with the acceptable solutions, performance requirements, and specific objectives provisions of Chapter 7 – '*Residential Infill Development'* of Planning for Bush Fire Protection (2019) and "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas" if applicable.

Following rezoning of the land, registration of the subdivision, and creation of the individual Lots any subsequent development within the established Lot supporting the heritage listed homestead may be required to provide an independent bush fire hazard assessment that addresses the requirements of the appropriate standards and legislation at the time of a formal development application to Council if it is deemed that the Lot is located within mapped bush fire prone lands.

Appendix C

BUSH FIRE ATTACK LEVELS (BAL's) EXPLAINED

The 2018 edition of AS 3959 "Construction of Buildings in Bush Fire Prone Areas" explains Bush Fire Attack Levels (BAL's) as follows:

(a) **BAL—LOW** The risk is considered to be **VERY LOW**.
There is insufficient risk to warrant any specific construction requirements but there is still some risk.

(b) **BAL—12.5** The risk is considered to be **LOW**.
There is a risk of ember attack. The construction elements are expected to be exposed to a heat flux not greater than 12.5 kW/m2.

(c) **BAL—19** The risk is considered to be **MODERATE**.
There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m2.

(d) **BAL—29** The risk is considered to be **HIGH**.
There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 29 kW/m2.

(e) **BAL—40** The risk is considered to be **VERY HIGH**.
There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux not greater than 40 kW/m2.

(f) **BAL—FZ** The risk is considered to be **EXTREME**.
There is an extremely high risk of ember attack and burning debris ignited by windborne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux greater than 40kW/m².