

LAND REZONING PROPOSAL

LOTS 70, 73 & 77 DP1006688

407 - 457 CROOKWELL ROAD

KINGSDALE. NSW. 2580

STRATEGIC BUSH FIRE STUDY



Prepared by SOWDES
19 November 2022

A: PO Box 619, Goulburn. NSW. 2580 | M: 0428 863 401 | E: sowdes@sowdes.com

Table of Contents

List of Abbreviations	2
Executive Summary	3
Figure 1. Recent aerial view of the development property showing the nature of the vegetation formations within and surrounding the site.	7
Figure 2. Goulburn Mulwaree Council Bush Fire Prone Lands map of the development property showing the extent of 'Category 3' vegetation formations that burden the site.	8
1. Overview of the Rezoning Submission, Description of the Land and Proposed Subdivision.	9
2/. An Assessment of the proposed land rezoning in accordance with Chapter 4 – 'Strategic Planning' of Planning for Bush Fire Protection (2019)	15
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).	26
Table 3a. Assessment of how the development complies with the acceptable solutions, performance requirements and relevant specific objectives within Chapter 5 of Planning for Bush Fire Protection (2019)	28
4. Conclusion.	39
 Bush Fire Assessment Site Plan (A1) – Ref: 0020421-01BF-A	 Loose

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 Planning Proposal submission to the Goulburn Mulwaree Council for the rezoning of a parcel of land identified as Lots 70, 73 & 77 DP1006688 – 407 - 457 Crookwell Road at Kingsdale from its current status of 'RU6 – Transition' to a mix of 'R2 – Low Density Residential' and 'R5 Large Lot Residential'. The land rezoning opportunity has been identified in the most 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 Crookwell Road and Chinamans Lane which is just on the northwestern outskirts of the city of Goulburn, directly opposite existing developed urban land release areas. The site is bordered by two separate formed roads; the Crookwell Road traffic corridor along the eastern boundary which is a Traffic for NSW (TfNSW) classified road, and Chinamans Lane along the southern boundary. The site covers an area of 50.85 hectares which is comprised of three separate registered portions – two of which are held in one ownership, and the other is held in separate ownership, however throughout this submission they will be referenced as though they are a single parcel of land.

The property which has historically been used for grazing by stock is predominantly set to open paddocks of improved pastures and native grasslands, however there is a few rows of discontinuous radiata pine trees throughout to serve as wind breaks, and there is a scattering of eucalyptus trees and several exotic trees around the curtilage of an existing dwelling within the eastern portion of the holding. The curtilage is in a defined area comprising several rural sheds and is predominantly surrounded by managed lands with access to the existing dwelling being from the Crookwell Road traffic corridor which borders the eastern boundary of the property.

The development property is burdened by several easements that influence the design of the proposed rezoning and future subdivision; a 24.385 metre wide easement for high pressure gas supply which traverses diagonally across the northern portion of the holdings, a separate 4.50 metre wide easement for optic fibre cable that sits immediately adjacent to the southern edge of the high pressure gas supply easement, and a 6 metre wide easement for 'water supply' that is used to transfer water from Wingecarribee Dam in the Southern Highlands to the city during periods of extreme drought. The water supply easement enters the property in the northeast quarter and sweeps through the northern portion of the property in a large radius curve before exiting into the neighbouring property to the west.

A conceptual subdivision design for the property prepared by Southern Regional Land Engineering (Ref: T02104-SK11/F) has been prepared which allows for varying Lots sizes based largely on the natural drainage regimes associated with the topography of the land and the proximity of environmentally sensitive areas, and the restrictions upon land development around the aforementioned easements. The largest portion of the site which is south of the gas supply easement has been identified as being suitable for 'R2 Low Density Residential' land zoning with minimum Lot sizes of at least 700m², whilst the land on the northern side of the gas supply easement has been identified as 'R5 Large Lot Residential' land zoning with the minimum Lot size of 2 hectares. A small portion of land on the western side of the site that drains toward the west but still on the southern side of the gas supply easement has been identified as future larger Lots that average 4,000m². The potential yield for all land zones is 265 Lots in the R2 zoned area, 5 Lots in the R5 zoned area, and a further 5 Lots in the western draining lands. In addition to the Lot yield potential the proposed development would include a new internal road network and several reserves for drainage, biodiversity values and vegetation management, and the protection of areas of Aboriginal Heritage.

At present the development site is not benefited by a Council maintained water supply or gravity sewer system however any future development of the land will require full reticulation of water supply for all Lots and the installation of reticulated sewer and interallotment stormwater drainage services and supporting infrastructure – particularly for the smaller R2 zoned Lots.

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 of a future subdivision of the land. 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 is 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).

The following key summaries apply to the land rezoning planning proposal 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 mix of 'R2 – Low Density Residential' and 'R5 – Large Lot Residential'
- The minimum Lot size for the R2 zoned Lots will be 700m² whilst the minimum Lot size for the R5 zoned Lots will be a blend of 4,000m² for Lots that can be fully serviced, and 2 hectares for the remaining Lots. Conceptual subdivision plans indicate a potential yield of 265 Lots in the R2 zone, 5 Lots in the 4,000m² R5 zone, and an additional 5 Lots in the 2 hectare R5 zone.
- In addition to the residential Lots the conceptual subdivision will create a network of new roads that will provide access around virtually the entire perimeter of the site plus an inter-connecting system, and there will be several reserves dedicated for drainage, biodiversity values and vegetation management, and the protection of areas of Aboriginal Heritage.
- The development property is set to grassland vegetation formations throughout having historically formed part of a larger grazing and farming enterprise. The neighbouring lands to the immediate north and west have also formed part of historical grazing and farming operations and as such are also set to open paddocks of grassland and improved pastures.
- Adjoining lands to the south of the property on the opposite side of existing road corridors form part of the urbanised land developments within the city of Goulburn, whilst land to the east and on the opposite side of an existing road corridor is primarily used for rural residential and light stock grazing purposes.
- The development site is located on the intersection of two named roads – Crookwell Road on the eastern aspect which is a TfNSW classified road that provides an important transport link between Goulburn and other regional cities and townships to the north such as Crookwell and Bathurst, and Chinamans Lane on the southern aspect of the development site commencing from the Crookwell Road traffic corridor and extending to the west where it links with Range Road which is a local road that services rural holdings between Goulburn and the village of Grabben Gullen.
- Future subdivision of the site will include fully serviced Lots with a reticulated water supply throughout along with gravity sewer and interallotment stormwater drainage infrastructure. The water supply system will be installed to meet the requirements of the Council's engineering standards – including design layout and achieving minimum pressures and flow rates, and this may necessitate the installation of additional water supply reservoirs on the site based on very preliminary discussions with Council. The reticulated water supply infrastructure will also need to meet the provisions of "AS2419.1.2021 - *Fire hydrant installations System design, installation and commissioning*" in relation to hydrant outlet spacing and locations.

- In relation to the land rezoning proposal and the future subdivision development it may be prudent for the Goulburn Mulwaree Council and the NSW Rural Fire Service to consider early in the assessment process to exclude the entire developed site from the mapped bush fire prone lands as the vegetation structure and classification will be significantly different under a change in land use which will be dominated by managed lands and roads. By recognising this change of land use and vegetation structure early in the assessment and approval process it will avoid unnecessarily burdening future Lot owners with bush fire protection measures that may not have any significant long-term benefits.

Whilst this report has based its determinations and recommendations on a conceptual subdivision design that has primarily been prepared to support a Planning Proposal for the rezoning of the subject site it is recognised that in accordance with the provisions of Section 100B of the RF Act once the land is rezoned a separate subdivision assessment may be required for submission and determination by the NSW Rural Fire Service which will incorporate any planning and development controls considerations that may be generated during the rezoning process.

It is considered that the Planning Proposal for the rezoning of the land from RU6 – '*Transition*' to a mix of both '*R2 – Low Density Residential*' and '*R5 – Large Lot Residential*' and a subsequent subdivision of the land to create new residential allotments plus an internal access road network 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. It is further considered that each of the newly created Lots associated with a future subdivision of the land 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) if deemed necessary at the time of lodging a formal development application to Council.

Paul Johnson

Paul Johnson (JP)
Bachelor of Science Agriculture/Irrigation (CSU)
Graduate Diploma Bush Fire Protection (UWS)
(FPAA Member – Level 3 - BPAD27823)
Graduate Certificate Engineering – Water (UTS)



19 November 2022



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

**REFER TO THE ACCOMPANYING PLAN TITLED 'LAND REZONING PROPOSAL –
CONCEPTUAL SUBDIVISION PLAN' – REF: 0020421-01BF-A FOR DETAILS OF
THE PROPOSED LOT AND ROAD LAYOUT AND THE BUSH FIRE ATTACK
LEVEL RATINGS THAT AFFECT THE SITE**

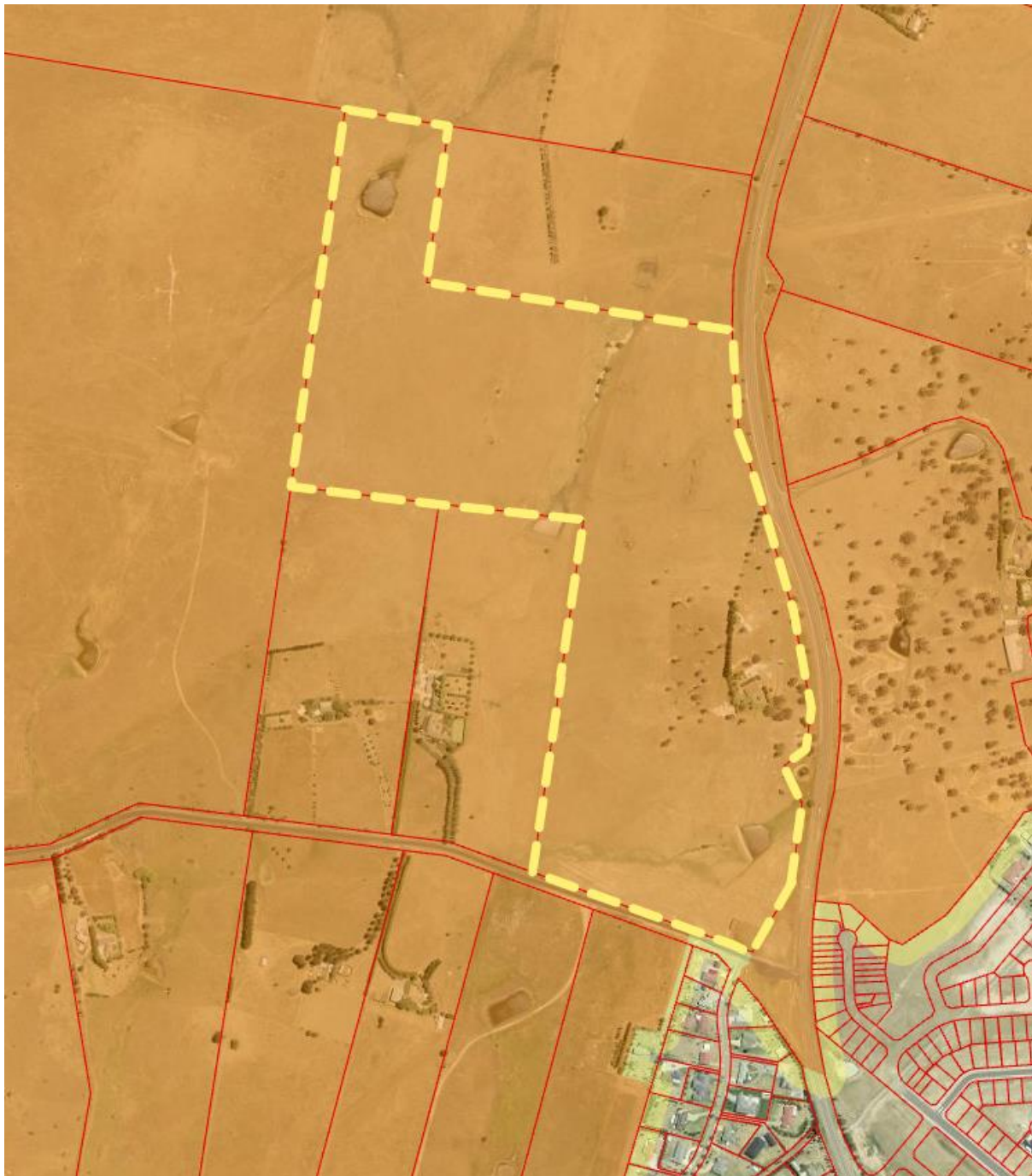


Figure 2. Goulburn Mulwaree Council Bush Fire Prone Lands map of the development property and surrounding holdings showing the extent of 'Category 3' (grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands) vegetation formations that burden the site.

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.

Further to the demand for the typical 700sqm house block, there is an emerging trend for more compact living close to the urban core. Recent development activity and increasing supply in this form of higher density development indicate the acceptance of the market to sacrifice large block sizes for more compact living with improved proximity and access.

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."

4 - Sooley constraints and opportunities

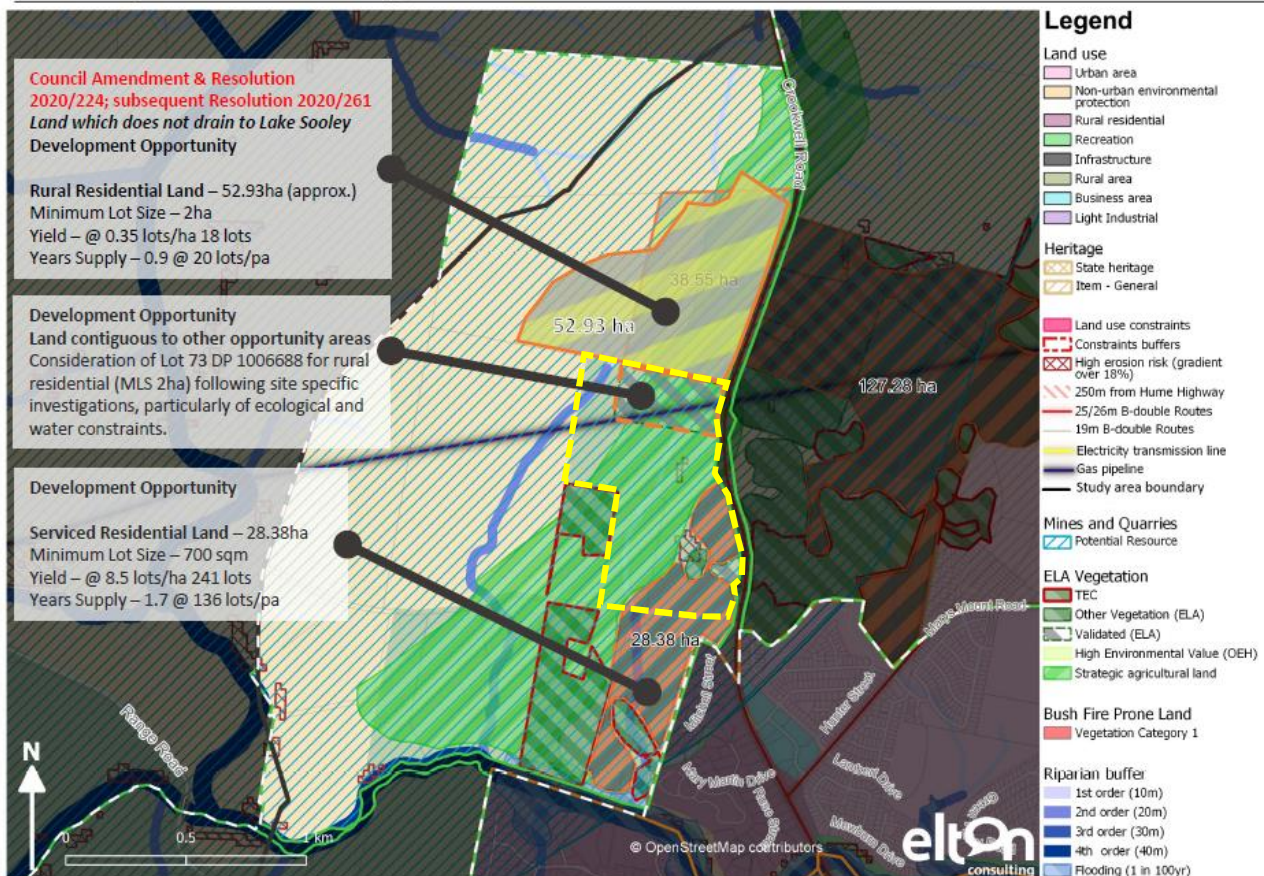


Image from the *Urban and Fringe Housing Strategy* report prepared by Elton Consulting showing the 'Sooley' development precinct and identified land rezoning opportunities. The boundary of the development site is highlighted by the dashed yellow lines in the centre of the image.

The development property is located on the northwestern outskirts of the city of Goulburn and is identified within the *Urban and Fringe Housing Strategy* study as a locality suitable for rezoning to a mix of both 'R2 -Low Density Dwelling' and 'R5 – Large Lot Residential' to help meet future land and housing demands. The property which falls within the *Sooley* development precinct and is currently zoned 'RU6 – Transition' has been identified within the study with an overall potential yield of 241 smaller Lots not less than 700m² in area, and 18 large Lots with a minimum area of 10 hectares – however these numbers may have been modified since the study was originally released. The development property is located within the eastern portion of the *Sooley* development precinct which is situated on the northwestern edge of the city and is an ideal location to leverage off existing services and utilities infrastructure that presently extends to established urban land developments to the immediate south of the site.

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. The site is burdened by two separate but adjacent easements for high-pressure gas supply and optic fibre cables that run diagonally through the northern portion of the holding which in part regulates the potential subdivision design and Lot sizes due to various constraints and permissible activities within specified distances around the easements. A third easement for water supply that is designed to transfer raw water from the Wingecarribee Dam in the Southern Highlands during periods of extreme drought also burdens the property – but to a lesser extent due its alignment and location through the site.

The conceptual subdivision design will potentially create a total of 265 smaller residential Lots not being less than 700m² and 5 Lots that average slightly more than 4,000m² on the southern side of the high-pressure gas and optic fibre easements, and an additional 5 Lots of at least 2 hectares in area on the northern side of the easements. Separate to the proposed residential allotments will be several reserves for drainage, biodiversity values and vegetation management, and the protection of areas of Aboriginal Heritage along with a network of new internal roads. It is assumed that an existing dwelling and several rural structures will be demolished, and therefore all new Lots will be seeking residential dwelling permissibility.

The development site is bordered by two separate named and formed roads that have a minimum corridor width of 20 metres:

1/. Crookwell Road along the eastern boundary which is a TfNSW classified road that provides an important transport link between Goulburn and other regional cities and townships to the north such as Crookwell and Bathurst. The road is a bitumen sealed formation that provides access to many rural land holdings between Goulburn and Crookwell, and to several smaller localities that lie between Crookwell and Bathurst. The posted speed limit along the section of Crookwell Road that lies parallel to the eastern boundary of the site is presently 100kph commencing from the southeast corner of the holding, however any rezoning and subdivision of the land would need to include a reduction in the speed limit along the entire length of the eastern boundary to a point adjacent to the northeastern corner of the site to help facilitate a proposed entrance to the site. It is noted that the width of the road reserve is variable along the property frontage with the minimum width at any point being 36 metres, and in some locations the width increases to be greater than 50 metres.

2/. Chinamans Lane which runs along the southern boundary of the development site commencing from the Crookwell Road traffic corridor and extending to the west where it links with Range Road which is a local road that services rural holdings between Goulburn and the village of Grabben Gullen. Chinamans Lane services several small and large rural holdings between the banks of the Wollondilly River and city's raw water storage facility at Sooley Dam. The development property covers a total area of 50.85 hectares which is comprised of three separate portions: Lots 70, 73 and 77 in Deposited Plan 1006688. Lots 70 and 77 which comprise the bulk of the lands (41.18 hectares) are under the one ownership whilst Lot 73 which is in the northern portion of the holding is under separate ownership. The proponent of the rezoning submission has the option to purchase both sites upon successful approval of the application.

The existing dwelling within the site is currently accessed via a sealed carriageway that enters the property from the eastern aspect off the Crookwell Road traffic corridor. The carriageway is formed along the crest of a hill and meanders through a defined curtilage comprised of several rural sheds and structures before gradually sweeping down a part of the hill on the southern aspect and terminating at the existing dwelling. The property is burdened by an overhead power transmission line that enters the property from the southern aspect and runs north → south through the site to service several adjoining properties further to the north with a feed line branching of this supply to service the existing dwelling. As mentioned previously, the development property is burdened by several easements that influence the design of the proposed rezoning; a 24.385 metre wide easement for high pressure gas supply which traverses diagonally across the northern portion of the holdings, a separate 4.50 metre wide easement for optic fibre cable that sits immediately adjacent to the southern edge of the high pressure gas supply easement, and a 6 metre wide easement for 'water supply' that can be used to transfer water from Wingecaribee Dam in the Southern Highlands during periods of extreme drought that enters the property in the northeast quarter and sweeps through the northern portion of the property in a large radius curve before exiting into the neighbouring property to the west.

The terrain throughout the property has a general fall from the northeast toward the south-southwest and is dominated by a series of defined drainage depressions located at three distinct locations across the site. The first of the systems runs through the northern half of the site in a northeast to southwest alignment and exits the property where there is a right-angled bend in the boundary that forms the southern aspect of the northern half. The second system is located in the northwest corner of the holding and stays on the northern aspect of the high-pressure gas supply easement thereby only burdening one of the proposed larger 2 hectare Lots in a future subdivision of the land. The final mapped drainage corridor is located in the southeast quarter of the property which directs surface water runoff from the Crookwell Road traffic corridor and adjoining lands on the opposite side of the road through the lower southern half of the property. The first and third identified drainage systems merge just outside the lower southwestern corner of the site within the neighbouring property to the west. The conceptual subdivision design has identified the natural flow of stormwater across the site and accordingly has included dedicated reserves for the purposes of drainage at strategic locations.

On either side of the main drainage line that runs through the northern half of the property is a series of slopes and ridges that combine to form a 'moderately' undulating topography through the central portion of the site. The slopes on the eastern and western sides of the central drainage depression are variable and, in some cases, terraced with the average slope being around 10° - however there are areas where the slope may exceed 15° in small sections. The elevation changes between the drainage depression through the centre of the site and the top of the adjoining ridge lines vary by approximately 20 to 25 metres whilst the distance from the centre of the drainage line to the top of the ridge lines averages between 110 and 120 metres, although some distances are slightly longer. In the northwestern portion of the site there is a gentle and somewhat consistent fall averaging 5° from the crest of the western ridge line toward the western boundary and toward the drainage depression that runs through this portion of the site.

The southern portion of the site has a general fall from the crest of a hillock where the existing dwelling and curtilage are located in an arc formation from the west and around to the southwest and then to the south at variable grades that average between 10° and 15°, the steeper section being the slopes to the west. The lower southeast corner of the site has significantly less slope with a more pronounced east to west fall of less than 5° following the alignment of the drainage depression that burdens the southern aspect of the site.

The vegetation formations throughout the property which has historically been used for grazing by sheep and cattle are dominated open paddocks of improved pastures and native grasslands, however over the past 5 or so years the property has seen less pasture improvement and only light grazing. There are a few rows of old radiata pine trees across the site, one in the northern portion where the larger 2 hectares Lots are proposed, and another along the ridge line around the curtilage in the central-eastern portion of the site. The pine trees are formed in single rows however due to their age; many are now displaying signs of necrosis and die-back with gaps appearing between some of the trees. Scattered across the slopes that surround the existing dwelling and curtilage are numerous eucalyptus trees that are quite well spaced and without overlapping canopies. The existing dwelling is located within a defined house paddock that is set to a blend of managed lawns and gardens with several native and exotic tree species that provide an element of seclusion from passing vehicle traffic as well as form a windbreak.

The subject site is surrounded by a mix of both small and large rural holdings to the north, east, and west that are also set to open grasslands and improved pastures with some scattered trees – particularly on the eastern aspect. The southern aspect of the site is dominated urban land developments with small Lots and few small rural holdings. The two road corridors that border the eastern and southern boundaries of the site and are variable in width form a physical barrier between the development property and the vegetation formations on those respective aspects.

Future Subdivision Proposal.

The conceptual subdivision design for the development property will include a mix of 'R2 – Low Density Residential' Lots with a minimum Lots size of 700m² and 'R5 – Large Lot Residential' allotments that will vary between 4,000m² and 2 hectares in area.

The location of the existing easements for high-pressure gas supply and optic fibre cable in the northern portion of the site significantly influences the distribution of land use zones and the design of the future subdivision, including Lot layout and road locations. There are certain restrictions related to permissible activities around and near both easements, the most limiting of which is generally associated with the high-pressure gas supply line as it is the wider of the two and has very specific and documented controls. The third easement that houses the water supply lines is less of a concern for the subdivision design as it is predominantly located along the margins of the defined drainage depression that runs the northern portion of the site and therefore sits within an area that realistically is not suited for any other type of development purpose.

In lieu of the limitation imposed by the existing easements in the northern portion of the site and in combination with the natural topography the land area to the north of the easements is proposed to be zoned as 'R5 – Large Lot Residential' with a minimum Lot size of 2 hectares. The available land area on the northern side of the easements less provisions for a perimeter access road will generate no more than 5 Lots in this zone. The northwestern portion of the site that sits on the western side of the ridge line but also on the southern side of the gas and communications easements will also be zoned as 'R5 – Large Lot Residential', however the Lot sizes here will be 4,000m² as it is possible that these Lots could be benefited by water and sewer services. Again, the available land area in this portion of the site less provisions for a perimeter access road will generate no more than 5 Lots.

The southern side of the two main easements comprises approximately 35.40 hectares of the overall land holding and is proposed to be zoned as 'R2 – Low Density Residential'. The conceptual subdivision design has demonstrated that approximately 265 residential allotments could be created in this area along with provisions for an internal road network and dedicated reserves in strategic locations for drainage, biodiversity values and vegetation management, and for the protection of areas of Aboriginal Heritage. The road network through this portion of the site will occupy approximately 8 hectares of land whilst the dedicated reserves will cover a combined area of 5.23 hectares. The resulting available land area for residential purposes therefore becomes 22.17 hectares which yields an average Lot size of 836m².

Access to the development site will be from the existing road corridors on the southern and eastern aspects with new entrances to be created at each location via round-about formations. The Crookwell Road traffic corridor is presently sign-posted with a 100kph speed limit commencing from the southeast corner of the development property – just north of the intersection with Chinamans Lane. Any future land development of the property would need to include a restricted speed limit of no more than 60kph for the portion of the Crookwell Road traffic corridor that lies adjacent to the eastern boundary of the site and beyond the proposed round-about at the entrance on that aspect – possibly reverting back to 100kph once beyond the northeast corner of the site. The internal road network will be formed in corridors that have a minimum width of at least 20 metres with the sealed portion being at least 9 metres wide between kerbs. There is a possible exception for 'Road 3' which is proposed to be a short 15 metre wide access road to service four of the residential allotments – subject to final design confirmation.

Future subdivision of the site will include fully serviced Lots with a reticulated water supply throughout along with gravity sewer and interallotment stormwater drainage infrastructure. The water supply system will be installed to meet the requirements of the Council's engineering standards – including design layout and achieving minimum pressures and flow rates, and this may necessitate the installation of additional water supply reservoirs on the site based on very preliminary discussions with Council. The reticulated water supply infrastructure will also need to meet the provisions of "AS2419.1.2021 - *Fire hydrant installations System design, installation and commissioning*" in relation to hydrant outlet spacing and locations.

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 Chapter 4 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.	<ul style="list-style-type: none"> • The bush fire hazard in the surrounding area, including: <ul style="list-style-type: none"> ○ Vegetation ○ Topography ○ Weather 	<p>The vegetation formations throughout the property which has historically been used for grazing by sheep and cattle are dominated open paddocks of improved pastures and native grasslands, however over the past 5 or so years the property has seen less pasture improvement and only light grazing. There are a few rows of old radiata pine trees across the site that are formed in single rows however due to their age; many are now displaying signs of necrosis and die-back with gaps appearing between some of the trees. Scattered across the slopes that surround the existing dwelling and curtilage are numerous eucalyptus trees that are quite well spaced and without overlapping canopies. The existing dwelling is located within a defined house paddock that is set to a blend of managed lawns and gardens with several native and exotic tree species that provide an element of seclusion from passing vehicle traffic as well as form a windbreak.</p> <p>The subject site is surrounded by a mix of both small and large rural holdings to the north, east, and west that are also set to open grasslands and improved pastures with some scattered trees – particularly on the eastern aspect. The southern aspect of the site is dominated by smaller urban land developments and a few small rural holdings. The two road corridors that border the eastern and southern boundaries of the site and are variable in width form a physical barrier between the development property and the vegetation formations on those respective aspects.</p>

			<p>The terrain throughout the property has a general fall from the northeast toward the south-southwest and is dominated by a series of defined drainage depressions located at three distinct locations across the site. The first of the systems runs through the northern half of the site in a northeast to southwest alignment and exits the property along the southern aspect of the northern half. The second system is located in the northwest corner of the holding and stays on the northern aspect of the high-pressure gas supply easement whilst the final mapped drainage corridor is located in the southeast quarter of the property which directs surface water runoff from the Crookwell Road traffic corridor and adjoining lands on the opposite side of the road through the lower southern half of the property. On either side of the main drainage line that runs through the northern half of the property is a series of slopes and ridges that combine to form a 'moderately' undulating topography through the central portion of the site. The slopes on the eastern and western sides of the central drainage depression are variable but average around 10°. The elevation changes between the drainage depression through the centre of the site and the top of the adjoining ridge lines vary by approximately 20 to 25 metres whilst the distance from the centre of the drainage line to the top of the ridge lines averages between 110 and 120 metres, although some distances are slightly longer. In the northwestern portion of the site there is a gentle and somewhat consistent fall averaging 5° from the crest of the western ridge line toward the western boundary and toward the drainage depression that runs through this portion of the site.</p>
--	--	--	--

			<p>The southern portion of the site has a general fall from the crest of a hillock where the existing dwelling and curtilage are located in an arc formation from the west and around to the southwest and then to the south at variable grades that average between 10° and 15°, the steeper section being the slopes to the west. The lower southeast corner of the site has significantly less slope with a more pronounced east to west fall of less than 5° following the alignment of the drainage depression that burdens the southern aspect of the site.</p> <p>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.</p>
		<ul style="list-style-type: none"> • The potential fire behaviour that might be generated based on the above; 	<p>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 vegetation formations and the regular cropping activities that occur in the lands to the north and west of the site. The southern and eastern aspects of the development property are bordered by named roads that separate the site from existing urban and peri-urban developments which are unlikely to be a source of major bush fire events.</p>
		<ul style="list-style-type: none"> • Any history of bush fire in the area; 	<p>There is no recorded bush fire event affecting the site or nearby surrounding area within the publicly available records held by the NSW Parks and Wildlife Service 'Fire History' database.</p>

		<ul style="list-style-type: none"> • Potential fire runs into the site and the intensity of such fire runs; and 	<p>The development site is surrounded by open grasslands and improved pastures associated with viable rural enterprises on the northern and western aspects, whilst the southern and eastern aspects are bordered by existing formed roads that separate both urban and peri-urban developments on those respective aspects. There are no continuous stands of forested or wooded vegetation on any aspect of the development site that would create a potential fire run that is likely to generate intense fires</p>
		<ul style="list-style-type: none"> • 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. 	<p>The development site is presently bordered along two of its frontages by named and formed roads that are bitumen sealed and constructed to both local Council and TfNSW engineering standards. The proposed subdivision will include the construction of a new internal road network to local Council engineering standards – some of which will also form a perimeter road around the development site which will improve access to virtually all aspects for firefighting purposes.</p> <p>Any future development of the subject land will effectively push the extent of existing mapped bush fire prone lands away from the edge of the city and existing urban development, and the increased road network will improve access for firefighting purposes that may eventuate in the surrounding grassland environments.</p> <p>Development of the subject site would also extend the network of reticulated water supply to the margins of the rezoned lands which will support active firefighting efforts.</p>

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.	<ul style="list-style-type: none"> • The risk profile of different areas of the development layout based on the above landscape study; 	A future subdivision development of the property would include a mix of 'R2 – Low Density Residential' and 'R5 – Large Lot Residential' allotments. The location of the different land zonings is based on existing and identified constraints associated with easements, surface water drainage, biodiversity values, and protecting areas of Aboriginal Heritage.
		<ul style="list-style-type: none"> • The proposed land use zones and permitted uses; 	The subdivision proposal is solely for residential dwelling purposes and does not include any provision for other land uses such as schools, commercial or industrial precincts, special fire protection purpose developments, or critical services infrastructure.
		<ul style="list-style-type: none"> • 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 subdivision of the development property for the purposes of satisfy future housing demands within the city is deemed to be the most appropriate use of the site. Many constraints to residential land development were previously identified within the original <i>Urban and Fringe Housing Strategy</i> submission which conversely also identified sites suitable for residential dwelling development purposes – which includes the subject site
		<ul style="list-style-type: none"> • The impact of the siting of these uses on APZ provision. 	The conceptual subdivision design for the site incorporates perimeter roads around the majority of the holding which satisfies the requirements for the NSW Rural Fire Service regarding access for firefighting purposes. The perimeter road network in combination with the greater internal road system and the requirement for maintenance of vegetation over the existing easements also offer a default asset protection zone for the new residential allotments from the vegetation formations within the adjoining lands. All internal Lots will be expected to manage vegetation as an asset protection zone for the benefit of all adjoining Lots.

Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	<ul style="list-style-type: none"> The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; 	<p>The development site is located on the intersection of two named roads – Crookwell Road on the eastern aspect and Chinamans Lane on the southern aspect. The Crookwell Road traffic is a TfNSW classified road that provides an important transport link between Goulburn and other regional cities and townships to the north such as Crookwell and Bathurst. Chinamans Lane which runs along the southern boundary of the development site commencing from the Crookwell Road traffic corridor and extending to the west where it links with Range Road which is a local road that services rural holdings between Goulburn and the village of Grabben Gullen.</p> <p>The existing road network that borders the development property in combination with the proposed internal road network which is effectively continuous provides adequate access and egress options for emergency evacuation - if required.</p> <p>A separate Traffic Management Report prepared by <i>Positive Traffic Pty Ltd</i> (Ref: PT21013r01) concludes that the additional traffic generation for the proposed subdivision development would not be an adverse impact on the current road network, and as such there would be no need to undertake any upgrades to these roads apart from proposed new entrances to the site.</p>
		<ul style="list-style-type: none"> The location of key access routes and direction of travel; and 	<p>Access to the development site will be from the existing road corridors on the southern and eastern aspects with new entrances to be created at each location via round-about formations. The Crookwell Road traffic corridor is presently sign-posted with a 100kph speed limit commencing from the southeast corner – just north of the intersection with Chinamans Lane.</p>

			Any future land development of the property would need to include a restricted speed limit of no more than 60kph for the portion of the Crookwell Road traffic corridor that lies adjacent to the eastern boundary of the site and beyond the proposed round-about at the entrance on that aspect – possibly reverting back to 100kph once beyond the northeast corner of the site. The internal road network will be formed in corridors that have a minimum width of at least 20 metres with the sealed portion being at least 9 metres wide between kerbs. There is a possible exception for 'Road 3' which is proposed to be a short 15 metre wide access road to service four of the residential allotments – subject to final design confirmation.
		<ul style="list-style-type: none"> The potential for development to be isolated in the event of a bush fire. 	The development property is located on the northwestern outskirts of the city of Goulburn and therefore any future subdivision development of the site would effectively extend the edge of the city's limits to the northern end of the current holding. The proximity of the development property to the city and the network of existing roads ensures that the site would not become isolated in a bush fire event.

Emergency services	An assessment of the future impact of new development on emergency services.	<ul style="list-style-type: none"> • 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 of the site to residential land use is not expected to result in an increase in demand for bush fire emergency services or support infrastructure as the amount of land area that immediately fronts bush fire prone lands will effectively reduce, and the extension of services such as water supply plus the transition of grasslands to managed lands within the development precinct will help to reduce any risks. The future subdivision of the land will result in urbanisation of the existing land area which will effectively provide an element of reduced fire risk once the majority of the Lots are developed as the transition in vegetation formations from grasslands to managed lands will have a corresponding reduction in the amount of bush fire prone lands that may need protecting.
		<ul style="list-style-type: none"> • Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency. 	Based on the conceptual subdivision design for the development property the provision of perimeter roads around the majority of the site in combination with the internal road network and the extension of reticulated water supply throughout the development precinct will offer greater vehicular access and improved water resources for active firefighting purposes if required.

Infrastructure	An assessment of the issues associated with infrastructure and utilities.	<ul style="list-style-type: none"> 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 	<p>Future subdivision of the site will include fully serviced Lots with a reticulated water supply throughout. The water supply system will be installed to meet the requirements of the Council's engineering standards – including design layout and achieving minimum pressures and flow rates, and this may necessitate the installation of additional water supply reservoirs on the site based on very preliminary discussions with Council. The reticulated water supply infrastructure will also need to meet the provisions of "AS2419.1.2021 - <i>Fire hydrant installations System design, installation and commissioning</i>" in relation to hydrant outlet spacing and locations.</p>
		<ul style="list-style-type: none"> Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc. 	<p>The development property is not burdened by the proximity of any high-voltage power supply lines, and it is assumed that any future subdivision development of the site would include inground installation of all associated electricity supply. There is however an easement through the northern portion of the site for high-pressure gas mains, and a separate easement for optic fibre cable immediately adjacent to the gas main easement. The section of existing high-pressure gas mains traversing the property does not include any above-ground inspection or servicing / monitoring points, and the supply line is installed at suitable depths in the ground so as not to be affected by a bush fire event.</p>

Adjoining land	<p>The impact of new development on adjoining landowners and their ability to undertake bush fire management.</p>	<ul style="list-style-type: none"> • 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. 	<p>It reasonable to conclude that subdivision of the development property would not have any adverse impact on adjoining properties as the site is effectively a corner allotment bordered by existing road reserves on the southern and eastern aspects, and the neighbouring lands to the immediate north and west are set to existing large rural enterprises or smaller rural residential allotments. The nearest residential dwelling within the adjoining properties is located to the west and it is approximately 150 metres from the nearest boundary associated with the development site. The development property is located on the northwestern outskirts of the city of Goulburn which is already highly urbanised and developed hence a future subdivision of the site would effectively complement existing land use in the general area.</p>
-----------------------	---	--	---

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
 - o provide a structural description consistent with the identification key in Keith D (2004) and PBP.
 - o 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
 - o 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.
 - o 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 Items 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. Items 3 and 4 are addressed by reports prepared by others and can be referenced for detailed assessment, suffice to say that the findings from both assessments have been incorporated into the conceptual design of the subdivision with dedicated reserves and exclusions zones identified. The 'Biodiversity Assessment' prepared by Hayes Environmental (Ref: 21009) addresses Item 3 (*Details of threatened species, populations, endangered ecological communities and critical habitat known to the applicant*) whilst the 'Aboriginal Cultural Heritage Assessment Report' undertaken by Black Mountain Projects Heritage Consultants and dated November 2022 addresses Item 4 (*Details of Aboriginal heritage known to the consultant*).

The following Table addresses Item 6 from the information requirements and provides an assessment of the how the development as a whole 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)'.

Table 3a. 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/m ² 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 'R5' zoned Lots along the northern and northwestern aspect of the site will be large holdings that can establish a suitable asset protection zone around a future dwelling envelope to ensure that all buildings are not exposed to a radiant heat level exceeding 29kW/m ² . At the time of lodging a subdivision application for the rezoned land it is recommended that a submission be made to the NSW Rural Fire Service for the existing bush fire prone land maps to be amended to exclude the entire development site to avoid the future need to assess each individual Lot for bush fire protection measures.
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 still if deemed to be burdened by mapped bush fire prone lands 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 APZ's are provided in perpetuity	APZ's are wholly within the boundaries of the development site	The proposed 'R5' zoned Lots along the northern and northwestern aspect of the development site will be large enough to allow for the establishment of dwelling envelopes that include suitable asset protection zones that are entirely within the individual allotments.
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 does not have any slopes that exceed 18° and therefore all proposed Lots around the northern and northwestern aspects of the development site 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 that are within mapped bush fire prone areas 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 or will be bitumen sealed all-weather surfaces that are suitable for all types of vehicle movements
	Perimeter roads are provided for residential subdivisions of three or more allotments	The conceptual subdivision design allows for the formation of a new internal road system that will enter and exit the property from two existing road frontages – one each on the southern and eastern aspects. The proposed road system facilitates a perimeter road around virtually all parts of the site by using a combination of existing external and proposed internal roadways with the only portion of the site not to be directly benefited from a perimeter road being in the northwest corner of the holding around one of the proposed larger Lots. It is noted that the adjoining lands on both the northern and northwestern aspects of the site are agricultural holding with access to the common boundary accessible through these properties if required.
	Subdivisions of three or more allotments have more than one access in and out of the development;	The proposed subdivision design allows for a network of roads that provide two entrance and exit points to existing road systems – Chinamans Lane to the south and Crookwell Road to the east.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles	The road network servicing the site will incorporate several round-about intersections to facilitate the smooth movement of traffic. All roads and round-about intersections will be designed to meet Council and AustRoad specifications.
	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 15° and therefore satisfy this condition.

	All roads are through roads	The conceptual subdivision design allows for a network of inter-connecting roads that provide continued movement throughout the site with the exception of the southern portion of the site where a short cul-de-sac road formation is proposed.
	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 cul-de-sac road measures just over 200 metres in length; however the end of the road formation is adjacent to the Crookwell Road traffic corridor to the east and adjoining urban land development on the opposite side of the road corridor hence the risk of bush fire from this aspect is considered to be extremely low. It is also noted that the southern aspect of the Lots accessed by the cul-de-sac road formation adjoin the Chinamans Lane road corridor. The geometric design of the cul-de-sac formation satisfies the turning radius provisions
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road	It is anticipated that all new roads servicing the proposed Lots will be formed with a lay-back or roll-top kerb and gutter system.
	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 as the site is not burdened by 'Category 1' vegetation formations.
	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 as there are no one-way roads.

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. The proposed internal road system will also meet the criteria as it will be bitumen sealed and any crossings of drainage lines will require appropriately sized culverts to cater for the peak flows along the drainage lines, and heavy vehicle traffic loadings over the top in accordance with Council's engineering standards.
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	Hydrant outlets associated with the new reticulated water supply will be installed outside the trafficable areas of the new road system.
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - <i>Fire hydrant installations System design, installation and commissioning</i>	Hydrant outlets and spacing will be in accordance with AS2419.1.2021 - <i>Fire hydrant installations System design, installation and commissioning</i> which is the current version of the standard.
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available	Not applicable for the 'R2' zoned portion of the site as the proposed reticulated water supply and hydrant distribution will be sufficient for firefighting purposes. The Larger 'R5' zoned Lots may be required to provide a static water supply for firefighting purposes due to separation distances being outside the provisions of AS2419.1.2021 - <i>Fire hydrant installations System design, installation and commissioning</i> in which case the requirements for a suitable access around the water supply point for firefighting vehicles will be required at the time of infill development.

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	<p>The existing road network around the perimeter of the site satisfy all the acceptable solution provisions.</p> <p>The internal perimeter roads will be bitumen sealed with a width of at least 8 metres between kerbs within a 20 metre wide dedicated road reserve.</p> <p>Street-side parking will be parallel to the kerb, and the hydrant outlets over the water mains will be in the verges between the edge of the kerb and gutter system and the property boundary lines.</p> <p>The proposed internal perimeter roads are all through roads, and there is a network of inter-connecting roads at regular intervals of less than 500 metres.</p> <p>The geometric road designs satisfy both local Council engineering and AustRoad requirements and therefore satisfy this condition. All road have vegetation clearances of at least 4 metres in the vertical plane.</p>
	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 internal non-perimeter roads will be bitumen sealed with a width of at least 8 metres between kerbs within a 20 metre wide dedicated road reserve.
	Parking is provided outside of the carriageway width	
	Hydrants are located clear of parking areas	Street-side parking will be parallel to the kerb, and the hydrant outlets over the water mains will be in the verges between the edge of the kerb and gutter system and the property boundary lines.
	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 proposed internal perimeter roads are all through roads, and there is a network of inter-connecting roads at regular intervals of less than 500 metres.
	The road crossfall does not exceed 3°	
	a minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided.	The geometric road designs satisfy both local Council engineering and AustRoad requirements and therefore satisfy this condition. All roads will have vegetation clearances of at least 4 metres in the vertical plane.

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	<i>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).</i>	All proposed Lots within the 'R2' zoned portion of the development site will be able to satisfy this condition. The Proposed 'R5' zoned Lots along the northern and northwestern aspect of the site may be required to address the following provisions within this section.
	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;	Not applicable as all Lots are located within grassland vegetation environments, and each will have access carriageways that are less than 200 metres in length.
	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 have separate access provisions from the internal road network.
<i>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.</i>		

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	The proposed subdivision development will be serviced by the Council's reticulated water supply.
	A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	The larger 'R5' zoned Lots along the northern and northwestern aspects of the site may be required to provide a static water supply for firefighting purposes due to separation distances between the dwelling footprints and the water mains being outside the provisions of AS2419.1.2021 - <i>Fire hydrant installations System design, installation and commissioning</i> in which case the size of the static water supply will need to be in accordance with Table 5.3d of PBP.
	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	Hydrant outlets and spacing will be in accordance with AS2419.1.2021 - <i>Fire hydrant installations System design, installation and commissioning</i> which is the current version of the standard. Hydrant outlets will be installed in the road verges between the kerb and gutter system and the property boundaries. All reticulated water supply design and supply flows and pressures will need to be in accordance with the Council's engineering requirements and the relevant clauses of AS2419.1.2021 - <i>Fire hydrant installations System design, installation and commissioning</i> .
	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 AS2419.1:2005	
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 where applicable.

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 and where possible and practical incorporate underground services.
	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 <i>Guideline for Managing Vegetation Near Power Lines</i> .	

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 – <i>The Storage and Handling of LP Gas</i> ' and the requirements of relevant authorities. Metal piping is to be used.	It is envisaged that any future subdivision development of the land will include an extension of the reticulated gas supply from the adjoining urban land developments to service the new Lots.
	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.	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.
	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. Conclusion.

It is the formal assessment of this report that the proposed rezoning of the subject property identified as Lots 70, 73 & 77 DP1006688 – 407 - 457 Crookwell Road at Kingsdale from 'RU6 – Transition' to a mix of 'R2 – Low Density Residential and 'R5 – Large Lot Residential' land use and the subsequent subdivision of the rezoned land will 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.

In relation to the land rezoning proposal and the future subdivision development it may be prudent for the Goulburn Mulwaree Council and the NSW Rural Fire Service to consider early in the assessment process to exclude the entire developed site from the mapped bush fire prone lands as the vegetation structure and classification will be significantly different under a change in land use which will be dominated by managed lands and roads. By recognising this change of land use and vegetation structure early in the assessment and approval process it will avoid unnecessarily burdening future Lot owners with bush fire protection measures that may not have any significant long-term benefits.

Following rezoning of the land, registration of the subdivision, and creation of the individual Lots any subsequent development within each of the proposed Lots 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.