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BUSHFIRE HAZARD ASSESSMENT

PROPOSED REZONING

LOT 9 DP 1219664,
157 ARAKOON ROAD,
SOUTH WEST ROCKS

CLIENTS:
B & M WALLS

JUNE 2022

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This report has been prepared by David Pensini – Building Certification and Environmental Services with all reasonable skill, care and diligence for B & M Walls.

The information contained in this report has be based upon a review of the plans and other information provided on behalf of B & M Walls and experience.

No inspection or assessment has been undertaken on other aspects of the proposed development outside the scope of this report.

This report does not imply, nor should it be implied, that the proposed development will comply fully with relevant legislation.

The report shall not be construed as relieving any other party of their responsibilities or obligations.

David Pensini – Building Certification and Environmental Services disclaims any responsibility B & M Walls and others in respect of any matters outside the scope of this report.

The report is confidential, and the writer accepts no responsibility of whatsoever nature, to third parties who use this report, or part thereof is made known. Any such party relies on this report at their own risk.

For and on behalf of David Pensini – Building Certification and Environmental Services.

Prepared by: David Pensini

Signed:

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1.0 INTRODUCTION

The land which comprises the subject site is currently known as Lot 9 DP 1219664, 157 Arakoon Road, South West Rocks.

It is proposed to rezone the subject site from its current Large Lot Residential (R5) zoning to a Residential (R1) land use zoning in order to support the future subdivision of the subject site for residential development purposes.

This report is based on a site assessment carried out on 2nd June 2022.

As the proposed rezoning of the subject site seeks to support its future use for residential developments, any future development of land for these purposes would be integrated development and would be subject to the issuing of a Bushfire Safety Authority under Section 100B of the *Rural Fires Act 1997*.

The purpose of this report is therefore to identify the bushfire hazard management planning principles and requirements which will be applicable to the future development of the subject land for residential development purposes.

This report therefore forms part of an overall planning process which will determine the suitability of the subject land for residential development and identify the bushfire related development principles and planning controls which will be applicable to any future development of the land for residential purposes.

NOTE

The report has been prepared with all reasonable skill, care and diligence.

The information contained in this report has been gathered from field survey, experience and has been completed in consideration of the following legislation.

- Rural Fires Act 1997.
- Environmental Planning and Assessment Act 1979.
- National Construction Code.
- Council Local Environment Plans and Development Control Plans where applicable.
- NSW Rural Fire Services, Planning for Bushfire Protection, 2019.
- AS 3959 - 2018 Construction of Buildings in Bushfire Prone Areas.

The report recognizes the fact that no property and lives can be guaranteed to survive a bushfire attack. The report examines ways the risk of bushfire attack can be reduced where the site falls within the scope of the legislation.

The report is confidential, and the writer accepts no responsibility of whatsoever nature, to third parties who use this report or part thereof is made known. Any such party relies on this report at their own risk.

This report has been based upon the vegetation characteristics observed at the time of site inspection. No responsibility is taken where the vegetation characteristics of the subject site or surrounding areas is changed or modified beyond that which is presented within this report.

1.1 Objectives

The objectives of this report are to:

- Ensure that the proposed rezoning of the land has measures sufficient to minimize the impact of bushfires; and

- Reduce the risk to property and the community from bushfire

1.2 Legislative Framework

On 1st August 2002 the Environmental Planning and Assessment Act 1979 and the Rural Fires Act 1997 were both amended to enhance bush fire protection through the development assessment process.

In broad terms, the planning considerations provide two main steps. These involve:

(a) Strategic Planning through;

• the mapping of bush fire prone;
• determining suitable bush fire requirements during the preparation of a Local Environmental Plan and/or Development Control Plan; and
• the identification of the extent to which land is bushfire prone.

(b) Development assessment through;

• obtaining a bush fire safety authority for residential or rural-residential subdivision and special fire protection purpose developments in bushfire prone areas from the Rural Fire Service (RFS);

• seeking advice from the RFS in relation to infill and other developments in bushfire prone areas that cannot comply with the requirements of NSW Rural Fire Service**, *Planning for Bushfire Protection***, 2019; and

• the application of additional requirements of the National Construction Code (NCC) in relation to construction standards for Class 1, 2, 3, 4 and some Class 9 buildings in bushfire prone areas.

It is noted that this report focuses upon the strategic planning processes associated with the proposed rezoning of the land which is identified as the subject site.

1.2.1 Strategic Planning Considerations

When preparing a draft LEP or planning proposal, local councils are required to apply the Environmental Planning and Assessment Act, 1979 - Section.9.1(2).

Direction 4.4 *Planning for Bush Fire Protection* applies to planning proposals that affect, or are in close proximity to, land mapped as Bush Fire Prone Land (BFPL). Under these directions, draft LEPs should follow the below objectives:

- to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush fire prone areas; and
- to encourage sound management of bush fire prone areas.

Under Direction 4.4, a relevant authority must consult with the Commissioner of the NSW Rural Fire Service during the preparation of a draft LEP and take into account any comments made. The draft LEP shall also have regard to NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019.

As part of the consultation process with the NSW RFS, a bush fire assessment is required to be submitted to demonstrate compliance with the Section 9.1(2) Directions and NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019. Where the proposal is of a strategic nature, this should take the form of a Strategic Bush Fire Study.

1.2.2 Planning for Bushfire Protection Guideline 2019

It is noted that NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019 provides the current bushfire threat management standards which are applicable in NSW.

NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019 provides the development standards for designing and building on BFPL in New South Wales (NSW) as follows;

- strategic land use planning to ensure that new development is not exposed to high bush fire risk;
- specific provisions for creating new residential and rural residential subdivision allotments;
- specific provisions for special fire protection purpose (SFPP) development taking account of occupant vulnerability;
- bush fire protection measures (BPMs) for new buildings;
- guidance in upgrading and maintaining existing development.

The general principles underlying NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019 are that:

- BPMs are required to reduce the impact of a bush fire;
- protection measures are governed by the degree of threat posed to a development and the vulnerability of occupants;
- reducing the interface of a development to the hazard reduces the bush fire risk to the development;
- good practice in planning, building and management reduces the risk to developments and their occupants and increases their resilience.

(i) Objectives for Residential Subdivision Developments

The specific objectives for residential subdivision developments as provided for by NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 are to**;**

- *minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);*
- *minimise vegetated corridors that permit the passage of bush fire towards buildings;*
- *provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;*
- *ensure that separation distances (APZs) between a bush fire hazard and future dwellings enable a radiant heat level not to exceed 29kW/m²;*
- *ensure the ongoing maintenance of APZs;*
- *provide adequate access from all properties to the wider road network for residents and emergency services;*
- *provide access to hazard vegetation to facilitate bush fire mitigation works and property protection; and*
- *ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.*

It is noted that the proposed rezoning is able to provide for a residential subdivision outcome which would be consistent with the above objectives and that the future development of the land can be undertaken so as to be compliant with the relevant acceptable solutions/standards which are applicable to residential subdivision development.

This report will therefore detail the relevant compliance issues associated with NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019 and AS 3959 - 2018 *Construction of Buildings in Bushfire Prone Areas* which are relevant to the proposed rezoning of land and the future residential subdivision development of the subject site.

1.3 Location and Site Description

The subject site is known as Lot 9 DP 1219664, 157 Arakoon Road, South West Rocks which is within the Kempsey local government area, on the mid north coast of New South Wales.

The subject site is located on the south-eastern fringe of the urbanized area of coastal township of South West Rocks, refer to **Figure 1** below

Figure 1 - Site Location

The subject site extends to the south of residentially developed land, (residential subdivision and seniors living development), which is present to the north of Athena Parade and to the west of vacant land associated with future stages of the already approved residential subdivision of Lot 801 DP 1270742 the staged development of which is proceeding. Residentially occupied rural residential sized allotments of land adjoin the subject site to the south and east whilst at distance to the south are larger allotments of land which form part of the Hat Head National Park. It is also noted that the South West Rocks Waste Management Centre is located on land at distance to the south of the subject site.

The residential occupation and use of the subject site is supported by a residential dwelling and associated infrastructure which is located in the southwestern portion of the subject site. Given its size and location it is probable that the subject site has a history of agricultural use.

Most of the subject site is covered by grasslands with some scattered and small clusters of trees however areas of highly modified forest vegetation are present along the far western portion of the subject site with multiple trees providing for a connecting canopy albeit that a grassy understorey is present. Vegetation to the north of the subject site is dominated by managed vegetation within the developing seniors living facility and historic rural residential lots in this aspect. It is however noted that small remnants of Coastal Swamp Forest and Tall Coastal Heath have been retained within the residentially occupied land to the northeast of the subject site.

Vegetation to the south of the subject site consists of managed grasslands with scattered and clusters of trees within the residentially occupied lots which adjoin the subject site to the south. At distance to the south are areas of Dry Sclerophyll Forest within the Hat Head National Park and residentially occupied allotments of land to the southwest of the subject site. Vegetation to the east of the subject site is dominated by managed vegetation associated with residential dwellings and associated structured which occupy large residential lots in this aspect. It is however noted that a narrow band of Dry Sclerophyll Forest is located within an unformed road reserve which separates the subject site from the historic residential lots to the east. Grasslands with scattered and clusters

of trees extend to the west of the subject site with this vegetation likely to be removed as part of the approved residential subdivision of this area of land.

The subject site is mapped as being subject to a variable soil landscapes conditions with the lower elevated areas of the subject site identified as having characteristics Clybucca and Korogoro soil landscapes whilst the higher elevated southern areas of the subject are shown to have the characteristics of the Big Smokey soil landscape. Variable soil conditions would be expected over the subject site.

Being located on the northern foot slopes of a hill/ridgeline feature, the crest of which is located at distance to the southwest of the subject site, the topography of the subject site provides for very gentle south to north downslope conditions with slopes becoming moderate with distance to the southwest of the subject site. The presence of a small northerly ridgeline 'saddle' in the southwestern portion of the subject site provides for gentle easterly and westerly slopes to be present on the batter of the 'saddle' with slope conditions flattening in the northern portion of the subject site and on adjoining and adjacent land to the north and east. Similar south to north downslope conditions is present on adjoining and adjacent land to the west whilst beyond the Arakoon Road reserve to the south the topography transitions to gentle to moderate southerly downslope conditions.

Access to the subject site has historically been via a narrow access handle which connects with Arakoon Road to the south. It is also noted that the subject site now has frontage to the recently constructed Athena Parade which adjoins the subject site to the north. In addition to the historic property access road which connects to Arakoon Road, a recently constructed property access road connects the existing dwelling on the subject site to Rosedale Avenue which services existing residential lots to the west of the subject site.

Gravel property access road connecting the subject site to Rosedale Avenue to the west

The closest Fire Service is located approximately 2km to the northwest of the subject site, (South West Rocks Fire Brigade), with the closest Fire Control Centre being at Kempsey which is approximately 35 kilometres southwest or 30 minutes by car from South West Rocks.

1.4 Site History

The subject site is irregular in shape with an area of some 24 hectares, refer to **Appendix 1**.

Being on the south-eastern fringes of the developed areas of South West Rocks land uses within the area have until recently been dominated by bushland/rural activities. In this regard it is

considered that active rural uses have predominated on the subject site and on adjoining and adjacent land for a considerable period of time with a more recent trend towards the large lot residential development of land in the locality.

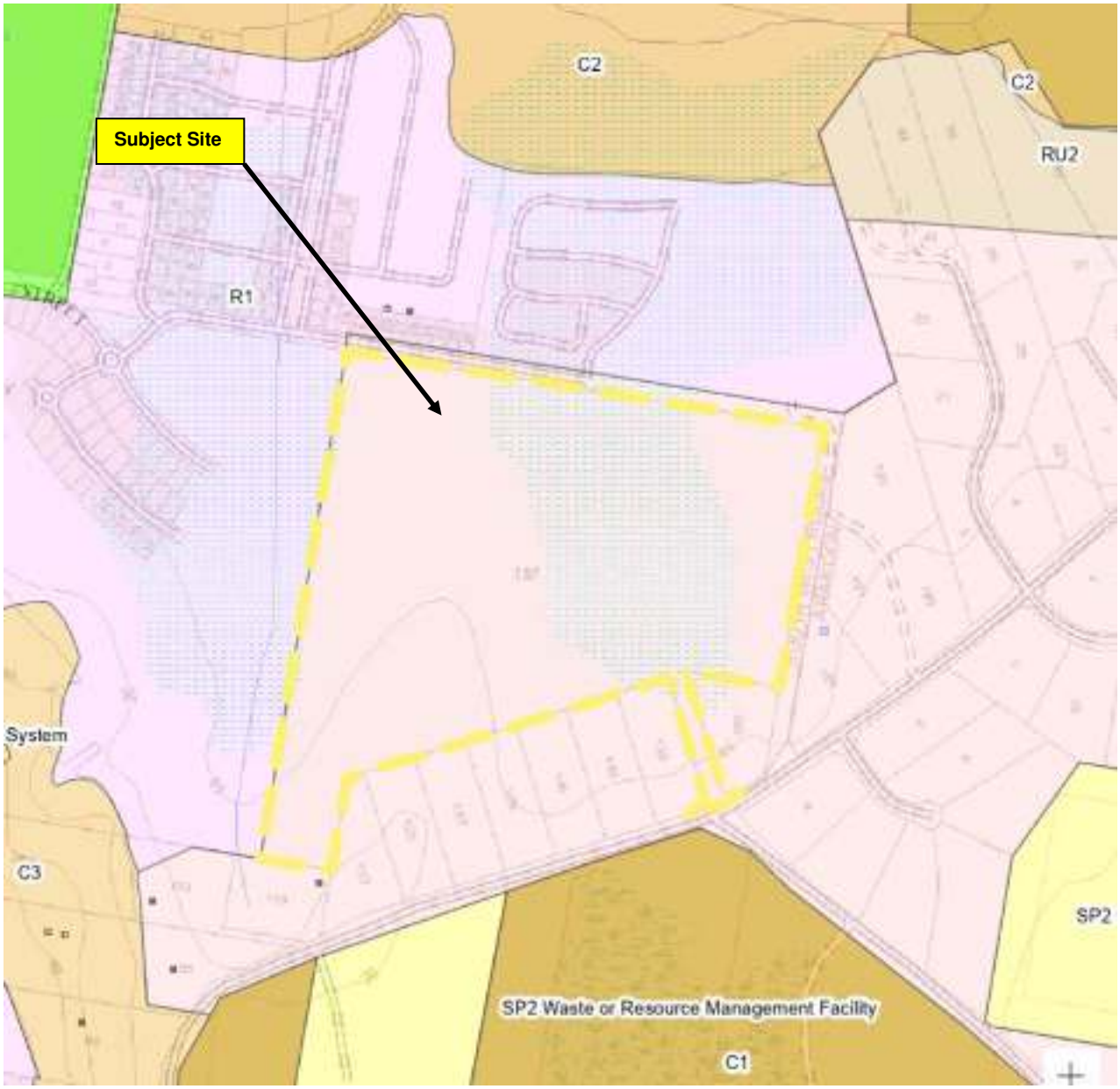
Improvements on the subject site include a residential dwelling and supporting infrastructure and gravel roads which have been used as part of the historical agricultural activities on the land.

Existing dwelling and supporting infrastructure on the subject site

It is however noted that significant recent development of land has occurred to the north of the subject site with the residential subdivision of land together with a large seniors living development having been constructed within the past 5 years refer to **Appendix 2**. It is also noted that land to the west of the subject site has been approved for residential subdivision with the staged development of residential lots proceeding, refer to **Appendix 2**.

The subject site has a Large Lot Residential (R5) land use zoning with the R5 zoning extending to include adjoining and adjacent land to the south and east whilst land with a Residential (R1) land use zoning is present to the north and west of the subject site. At distance to the south of the subject site are C1 and SP2 land use zonings which reflect the presence of the Hat Head National Park and the South West Rocks Waste Management Centre respectively. Land with an Environmental Management (C3) zoning is present at distance to the southwest of the subject site, refer to **Figure 2** below.

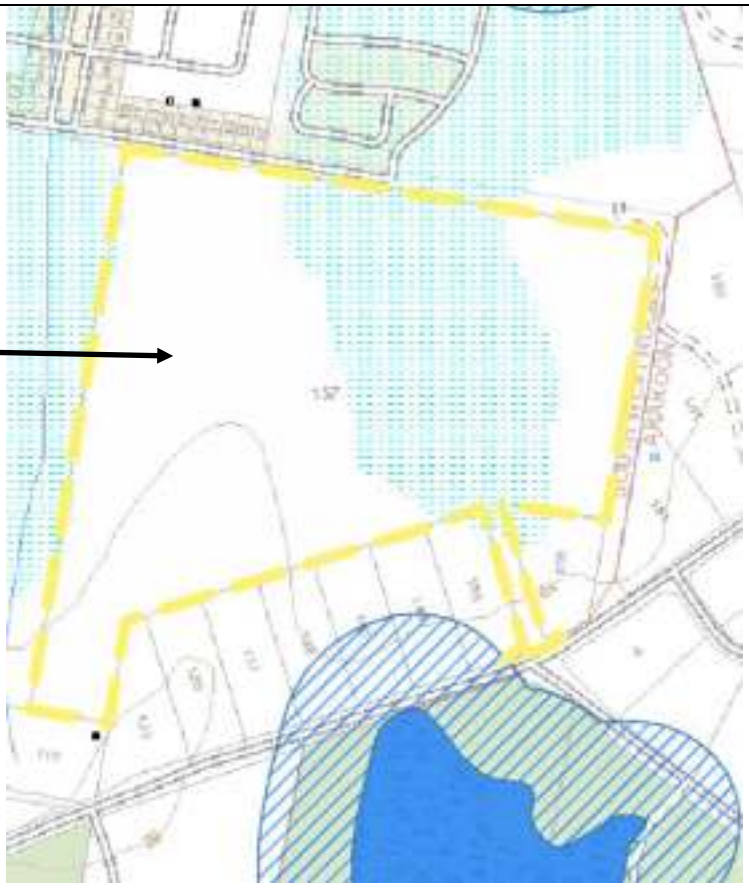
Figure 2 – Land Use Zoning



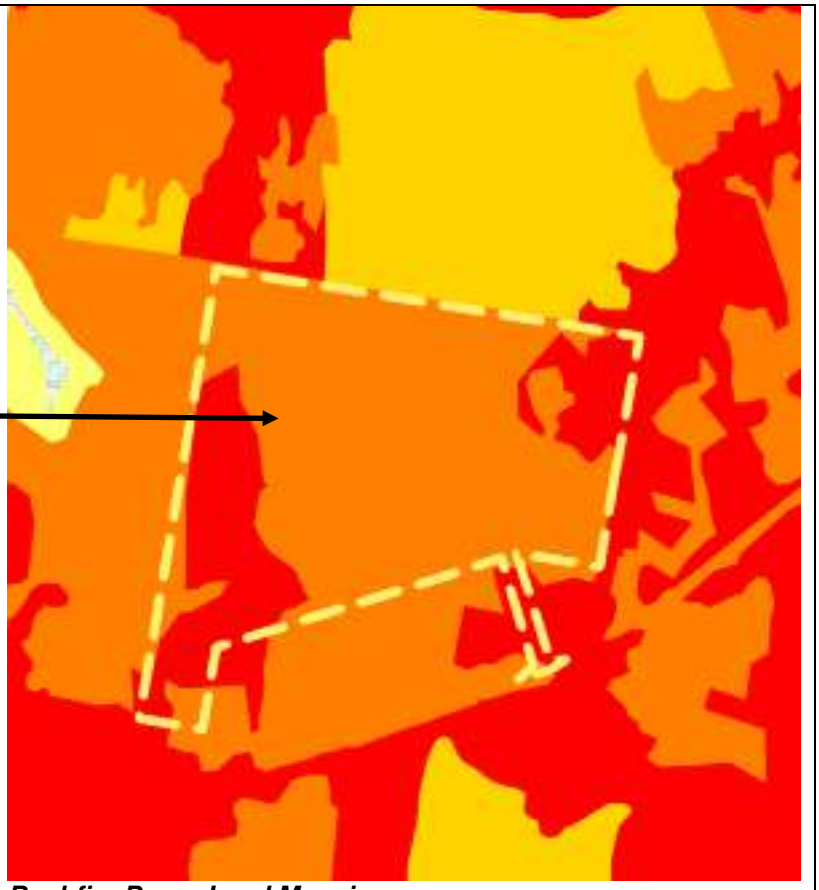
The environmental and heritage features of the areas of the subject site which forms the basis of this report are summarized as follows;

Table 1 – Environmental and Heritage Features

ENVIRONMENTAL/HERITAGE FEATURE	COMMENT
Riparian Corridors	There are no riparian corridors on the subject site in the area of land which is the subject of this report.
SEPP (Resilience and Hazards) 2021	A small portion of the subject site is identified as being within the Coastal Wetlands buffer area of the SEPP and accordingly the provisions of the SEPP are relevant to the subject site.

	 ***Coastal Wetlands Mapping***
SEPP (Biodiversity and Conservation) 2021	The relevance of the provisions of the SEPP are outside the scope of this report and is the subject of separate ecological assessment where vegetation clearing is to be undertaken. It is however noted that the subject site has been predominately cleared of most native vegetation.
Areas of geological interest	Potential acid sulphate soils (Class 4) and 5) are indicated as being possibly present on the subject site, refer below.

	 Acid Sulphate Soils Mapping However, based upon the nature of the proposed future development of the subject site and the various construction and land use management options available it is considered that land contamination issues, (including the disturbance of acid sulphate soils), will not be an impediment to the proposed rezoning of the subject site so as to allow for future residential occupation and use.
Environmental Protection Zones	The subject site is zoned pursuant to Kempsey Shire LEP, (2013) as Large Lot Residential (R5), refer to **Figure 2** above.
Land slip	Given the gentle topography of the subject site and surrounding areas land slip is not considered to be an issue for the subject site.
Bushfire Prone Land	Bushfire Prone Land Risk Mapping provides that areas of Category 3 bushfire hazard vegetation are located over the majority of the subject site with some small areas of Category 1 hazard vegetation present in the far north-eastern and western portions of the subject site. Areas of Category 3 hazard vegetation dominate on adjoining land to the south and west albeit that some small areas of Category 1 vegetation are shown in these aspects. To the east of the subject site are areas of Category 1 and 3 vegetation whilst a large area of Category 2 hazard vegetation is shown to dominate to the north of the subject site with some areas of Category 1 and 3 vegetation to the northwest; refer below

	 ***Bushfire Prone Land Mapping*** It is however noted that the above mapping does not reflect the removal of significant areas of hazard vegetation to the north of the subject site as part of the residential development of adjacent land in this aspect nor does the mapping reflected the areas of managed vegetation which now exist in conjunction with residential dwellings which are present on adjoining and adjacent land to the south and east of the subject site. The identification of Category 3 hazard vegetation to the west of the subject site is also considered to be conservative given the commencement of residential subdivision construction activities on this land.
Flood prone land	The subject site is not identified as being flood prone.
National Park Estate or other Reserves	The subject land does not form part of the National Park Estate or other Reserves. It is however noted that the Hat Head National Park is present at distance to the south of the subject site.
Threatened species, populations, endangered ecological communities and critical habitat	The relevance of this issue is outside the scope of this report and is the subject of separate assessment. However, given the level of disturbance of the subject site no threatened flora or fauna species are expected to be present on the subject site.
OEH Key Habitats and Corridors	Given the level of disturbance, the subject site is unlikely to form part of OEH key habitats and corridors. The relevance of this issue is outside the scope of this report and

	is the subject of separate assessment.
Aboriginal Heritage	Items of aboriginal heritage are unlikely to be present given the active vegetation modification and management which has occurred on the subject site and the level of site disturbance which has occurred. The relevance of this issue is outside the scope of this report and is the subject of separate assessment.

1.5 Development Proposal

It is proposed to rezone the land known as Lot 9 DP 1219664, 157 Arakoon Road, South West Rocks from its current Large Lot Residential (R5) land use zoning to a Residential (R1) zone.

Being located on the south-eastern fringes of South West Rocks, the general area has and will continue to experience significant residential development with the character of the area being consistent with that which would be expected for urban fringe areas. The proposed rezoning is therefore entirely consistent with the context and character of the area with the proposed rezoning reflecting a desire to provide for the logical development of suitable land which adjoins existing residential areas.

In support of the proposed rezoning of the subject site, a preliminary development concept has been prepared, refer to **Appendix 3.**

It is noted that the development concept for the subject site provides for typically sized residential lots which are serviced by a network of public roads which provide for vehicle movement to and from the north, south and west using a through road configuration which provides for multiple access and egress options from the future residential subdivision of the subject site.

Given that the nature and extent of any future residential subdivision development of the subject site is variable, this report will focus upon detailing the strategic bushfire issues and constraints for the subject site and the identification of the bushfire threat management requirements which will be applicable to any future development of the land in order to allow for an assessment of the subject site's suitability for rezoning.

1.6 Fauna and Flora Issues

A fauna and flora evaluation has not been undertaken in conjunction with this bushfire hazard assessment and as such issues pertaining to fauna and flora are outside the scope of this report.

2.0 STRATEGIC BUSHFIRE STUDY

It is noted that NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 provides that for strategic development proposals in bush fire prone areas a Strategic Bush Fire Study is to be prepared.

The level of information required within such a study is dependent upon the nature of the LEP amendment, scale of the proposal, the bush fire risk and its potential impact upon the wider infrastructure network. The Strategic Bush Fire Study provides the opportunity to assess whether new development is appropriate in the bush fire hazard context. It also provides the ability to assess the strategic implications of future development for bush fire mitigation and management.

In accordance with Table 4.2.1 of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 the following Strategic Bushfire Study is provided;

2.1 Landscape Assessment

2.1.1 Assessment Methodology

In order to determine 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 following methodology was taken.

(i) Stage 1 - Desktop Survey.

The identification and assessment of existing and historic information pertaining to the subject site in relation to;

- Weather
- Vegetation.
- Topographic features.

(ii) Stage 2 - Field Survey.

Detailed inspections of the subject site were undertaken by David Pensini - Building Certification and Environmental Services on 19th November 2020 and 10th December 2020 in order to identify relevant bushfire hazard factors and characteristics such as;

- Topographic conditions.
- Vegetation characteristics.
- Weather
- Fire Danger

The assessment of slope and vegetation characteristics has been carried out in accordance with Appendix 1 of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019.

Each of the above factors need to be considered in determining the bushfire hazard for the subject site and proposed rezoning. These factors must be reviewed in determining the bushfire protection measures which are applicable to the subject site and the proposed rezoning of the subject site.

2.1.2 Topography

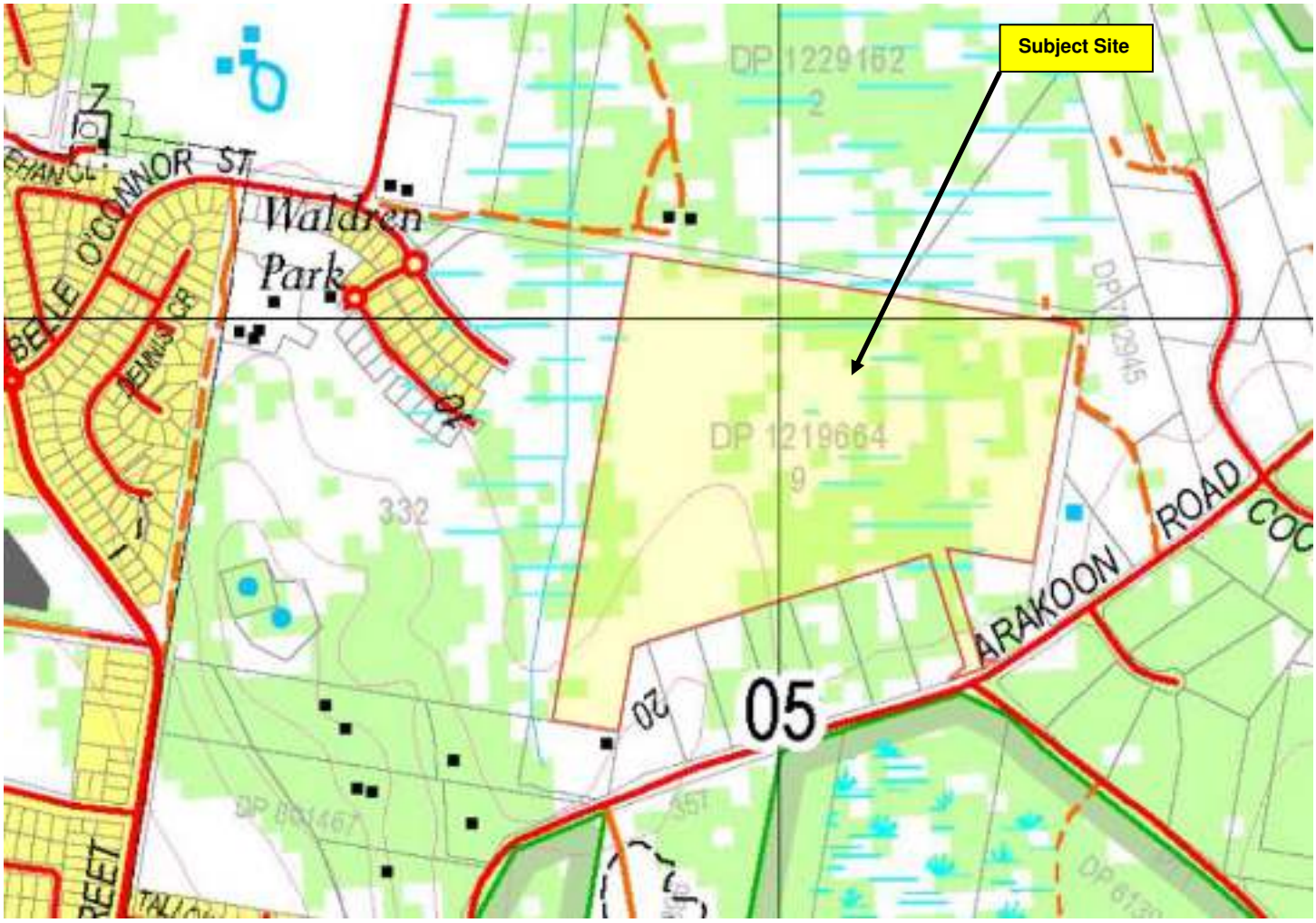
Topography is a major factor to consider when assessing the bushfire risk of any development which is subject to compliance with the requirements of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019. Therefore, the slope of the subject site and surrounding area, (to a distance of 100m), was measured using a Suunto PM-5/360 PC Clinometer.

Being located on the northern foot slopes of a hill/ridgeline feature, the crest of which is located at distance to the southwest of the subject site, the topography of the subject site provides for very gentle south to north downslope conditions with slopes becoming moderate with distance to the southwest of the subject site. The presence of a small northerly ridgeline ‘saddle’ in the southwestern portion of the subject site provides for gentle easterly and westerly slopes to be

present on the batter of the 'saddle' with slope conditions flattening in the northern portion of the subject site and on adjoining and adjacent land to the north and east. Similar south to north downslope conditions is present on adjoining and adjacent land to the west whilst beyond the Arakoon Road reserve to the south the topography transitions to gentle to moderate southerly downslope conditions.

Slope conditions over the subject site and on adjoining and adjacent land can be seen in **Figure 3** below;

Figure 3 – Topographic Conditions



The following table indicates the slopes measured within the areas of bushfire hazard vegetation affecting the site of the proposed rezoning.

Table 2 - Slope Assessment Results

DIRECTION OF HAZARD	SLOPE degrees)	UPSLOPE/DOWN SLOPE
Northeast	0˚	Flat
South	4˚ - 5˚	Down slope
East	1˚ - 3˚	Down slope
West	1˚ - 2˚	Down slope
Southwest	5˚ - 6˚(0˚)	Upslope

The above slopes were considered when assessing the required defendable spaces and indicative Bushfire Attack Levels, (BAL's), for any future development/s within the area nominated for rezoning.

2.1.3 Vegetation Assessment

The vegetation on and surrounding the area of the subject site which is proposed to be rezoned was assessed over a distance of 140m from the proposed development.

The vegetation formations were classified using the system adopted as per Keith (2004) and in accordance with Appendix 1 of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019. The following information is provided in relation to the floristic characteristics of the subject site and adjoining and adjacent land in the area which is the subject of the rezoning proposal.

In adopting a conservative approach to bushfire hazard assessment, worst case vegetation characteristics have been identified.

(i) Vegetation within Development Site

Most of the subject site is covered by grasslands with some scattered and small clusters of trees however an area of highly modified forest vegetation is present along the far western portion of the subject site with multiple trees providing for a connecting canopy albeit that a grassy understorey is present.

Grasslands with scattered and clusters of trees over the central portion of the subject site

Grasslands with scattered and clusters of trees over the eastern portion of the subject site

Remnant highly disturbed and modified forest vegetation in the western portion of the subject site

It is however assumed that for the purposes of this assessment all areas of hazard vegetation would be removed from the future residential lots and supporting infrastructure so as to provide for a post development outcome which is consistent with a managed land classification. This includes any land identified as being set aside for public recreation purposes.

It is however noted that in adopting a conservative approach to bushfire hazard assessment a Rainforest specification has been adopted for any areas of vegetation which would be established within the stormwater management infrastructure which is nominated in the development concept. This approach provides for a level of conservatism in the assessment of bushfire threats and the identification of bushfire threat management strategies.

(ii) Vegetation on Adjoining and Adjacent Land to Development Area

The following vegetation characteristics were identified as being relevant to the proposed rezoning of the subject site having regard to the vegetation characteristics of adjoining and adjacent land.

Vegetation to the north of the subject site is dominated by managed vegetation within the developing seniors living facility and historic rural residential lots in this aspect. Managed land extends for >140m to the north of the subject site. It is however noted that small remnants of Coastal Swamp Forest and Tall Coastal Heath have been retained within the historic residentially occupied land to the northeast of the subject site.

Managed vegetation within the recently completed stages of the senior's living development to the north of the subject site

Final stages of the seniors living development under construction to the north of the subject site

Development residential lots to the northwest of the subject site

Remnant Tall Coastal Heath and Forested Wetland vegetation within residentially occupied lots to the northeast of the subject site

Vegetation to the south of the subject site consists of landscaping and managed grasslands with scattered and clusters of trees within the residentially occupied lots which adjoin the subject site to the south. However, at distance to the south are areas of Dry Sclerophyll Forest within the Hat Head National Park and residentially occupied allotments of land to the southwest of the subject site.

Managed vegetation within residential lots to the southeast of the subject site

Managed vegetation within residential lots to the southwest of the subject site

Dry Sclerophyll Forest to the southwest of Arakoon Road (within the Hat Head National Park)

Grasslands to the south of Arakoon Road (within the South West Rocks Waste Management Centre)

Dry Sclerophyll Forest to the southeast of Arakoon Road (within the Hat Head National Park)

Vegetation to the east of the subject site is dominated by managed vegetation associated with residential dwellings and associated structured which occupy large residential lots in this aspect. It is however noted that a narrow band of Dry Sclerophyll Forest is located within an unformed road reserve which separates the subject site from historic residential lots to the east.

managed vegetation within residentially occupied lots to the east of the subject site. However note the presence of the narrow band of forest vegetation which separates the subject site from the residential lots

Grasslands with scattered and clusters of trees extend to the west of the subject site with this vegetation likely to be removed as part of the recently commenced construction of the already approved residential subdivision of this area of land. Notwithstanding the impending removal of this area of hazard vegetation in adopting a worst-case approach to bushfire hazard assessment, a Grassland classification has been adopted for the western aspect. Areas of Dry Sclerophyll Forest within larger residentially occupied allotments of land extend to the southwest of the subject site.

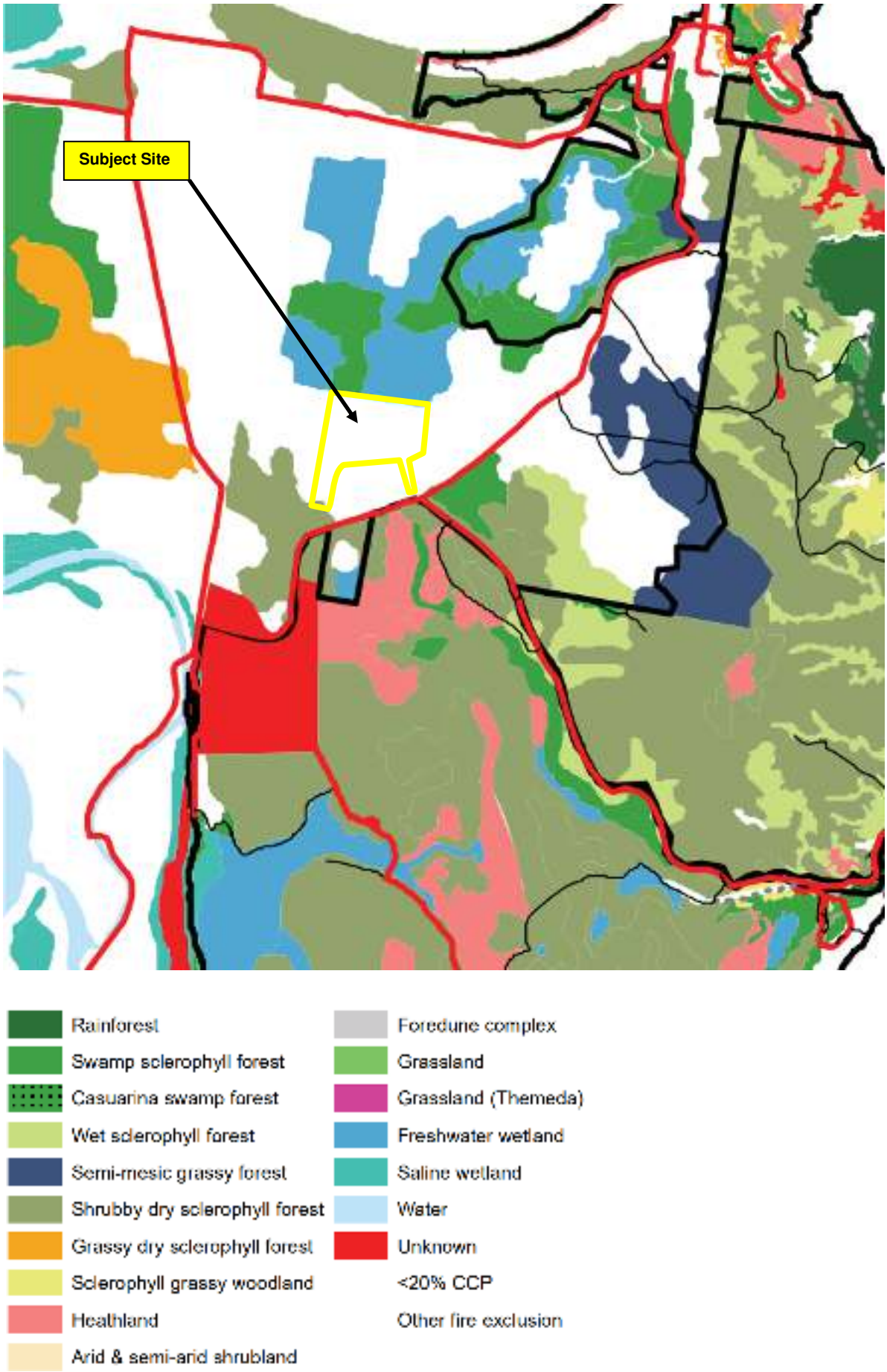
Grasslands to the west of the subject site

Recently commenced subdivision construction activities on adjoining land to the west of the subject site

Dry Sclerophyll Forest vegetation within residentially occupied lots to the southwest of the subject site

Historic vegetation mapping of the subject site is shown as follows. It is however noted that the nature and extent of vegetation on adjoining and adjacent land to the north is significantly reduced from that shown in the following mapping.

Figure 4 – Historic Vegetation Mapping of Area



An indication of the relationship of the vegetation of bushfire significance to the area of the proposed rezoning is presented in **Figure 5** below.

Figure 5 - Vegetation Relationships to the Subject Site

The following table summarizes the various vegetation structures which are of bushfire significance to the area of land which is the subject of the proposed rezoning.

Table 3 – Summary of Vegetation Characteristics

ASPECT	VEGETATION DESCRIPTION	VEGETATION CLASSIFICATION – (Keith, 2004)
Within the Subject Site	Vegetation established within stormwater management infrastructure required to service the future residential subdivision of the subject site.	Similar in specification to Rainforest
Northeast	Remnant Tall Coastal Heath/Forested Wetland vegetation on developed residential lots on adjoining/adjacent land.	Similar in specification to Rainforest
South	Dry Sclerophyll Forest within the Hat Head National Park.	Dry Sclerophyll Forest

East	Remnant Dry Sclerophyll Forest vegetation within unformed road reserve and within developed residential lots on adjoining land to the east.	Similar in specification to Rainforest
West	Grasslands within area of approved but as yet undeveloped residential subdivision of adjoining land.	Grasslands
Southwest	Dry Sclerophyll Forest on developed residential lots on adjoining/adjacent land.	Dry Sclerophyll Forest

2.1.4 Climate/Weather

The typical/average climate of the South West Rocks area is a humid subtropical climate characterised by warm humid summers and mild winters. The average daily maximum temperature is around 21.5^{0}C, while the average daily minimum temperature is around 10^{0}C - 11^{0}C.

Long-term average annual rainfall is around 1,500mm whilst annual pan evaporation is estimated to be approximately 1,400mm.

Based on long-term, (1910–2011), observations, temperatures have been increasing in the North Coast Region since about 1970, with higher temperatures experienced in recent decades. This warming trend is expected to continue, with anticipated considerable rainfall variability across seasons and from year to year. These projected changes include increasing maximum and minimum temperatures, increasing number of hot days, decreasing number of cold nights together with winter rainfall and increasing autumn and spring rainfall. Average fire weather and severe fire weather days are projected to increase in summer and spring.

The bush fire season for the area generally runs from July to November, however, can extend into December or January with low rainfalls. Strong northwest to southwest winds often prevail within that time of year. Longer bush fire seasons occur when summer rainfall is lower than normal, with the bush fire season extending through summer to early autumn. Serious fires have occurred late in the season under dry summer conditions.

Prevailing weather conditions associated with the bush fire season are characterised by dry north-westerly winds, usually associated with high pressure systems and the passage of cold fronts. Extended periods of low rainfall, and the resultant fuel moisture deficiencies, combined with summer temperatures and hot dry westerly winds form the circumstances for high intensity fires to develop. Although summer rains generally bring an end to the fire season, short dry spells can create extensive wildfires in the area as late as April. Generally, these fires have proved to be less damaging than those occurring in spring/early summer. The climate projections indicate that there is a likelihood of more frequent and higher intensity bushfires occurring when low seasonal rainfall occurs.

Based upon the above it is considered that climatic conditions are at times conducive to supporting bushfire with the subject land being located adjacent to areas of vegetation which provide for fuel loads sufficient to support and promote bushfires. In this regard the most likely bushfire risk scenario would be a fire moving from the south within the Forest vegetation contained within the Hat Head National Park. This risk is however tempered by the presence of managed vegetation within residentially developed and occupied land which separates the subject site from the hazard vegetation to the south of Arakoon Road within the National Park. The presence of upslope conditions to the southwest of the subject site together with the topographic screening available in the southern aspect are also bushfire risk reducing factors which are relevant to the impacts of bushfire on the subject site.

Additionally, the presence of remnants of Forest and Coastal Heath vegetation on adjoining land to the northeast and east does provide for conditions which would support bushfire with the possibility of bushfires moving from adjoining and adjacent land to the northeast/east towards the west under the influence of north-easterly/easterly wind conditions. This risk is however tempered by the significantly reduced fuel loads associated with these areas of vegetation. The fragmentation and

disruption of fire run conditions due to the presence of managed vegetation associated with the residential occupation and use of adjoining and adjacent land to the northeast and east are also bushfire risk reducing factors which are relevant to the potential impacts of bushfire on the subject site.

Whilst grasslands are present to the west of the subject site the significance of this area of vegetation in supporting bushfire activity is significantly reduced due to the impeding development of this land as part of the approved residential subdivision of the vacant land immediately to the west of the subject site, refer to **Appendix 2.**

In accordance with NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019, NSW Rural Fire Service, ***NSW Local Government Areas FDI,*** May 2017 and Table 2.1 of AS 3959 - 2018, the fire weather for the site is based upon the 1:50 year fire weather scenario and has a Fire Danger Index (FDI) of 80.

2.2 Bushfire Risk Assessment

2.2.1 Overview of Bushfire Attack Mechanisms

Bushfires have long remained a fundamental characteristic of the Australian bush landscape, and likewise Australians have long retained a strong affinity with bush environments.

There remain a number of common factors which are associated with bushfire hazard and events, and these include the incidence of fire weather, availability of fuel along with its type, structure and continuity or fragmentation, and the context of development at the urban / bushland interface.

Bushfire attack refers to the various methods in which bushfire may impact upon life and property and principally encompass the following modes of attack:

(i) Direct flame contact

Direct flame attack refers to flame contact from the main fire front, where the flame which engulfs burning vegetation is one and the same as that which assumes contact with the building. It is estimated that only 10 to 20 per cent of buildings lost to bushfire occur as a direct result of flame attack.

(ii) Ember and firebrand attack

The convective forces of bushfire raise burning embers into the atmosphere on prevailing winds and deposit them to the ground ahead of the fire front.

Typically, ember attack occurs approximately 30 minutes prior to the arrival of the fire front and continues during the impact of the fire front and for several hours afterwards, thus it is the longest lasting impact of bushfire attack. Firebrands occur in a very similar manner but relate to larger items of debris that may still be carried by the wind when alight, such as candle and ribbon barks. In essence, building loss via ember attack relates largely to the vulnerabilities and peculiarities of each building, its distance from hazardous vegetation and whether an occupant (or the like) is present to actively defend it. It is estimated by the CSIRO that approximately 80 to 90 per cent of buildings lost by bushfire are lost as a result of ember attack either in isolation or in combination with radiant heat impact.

(iii) Radiant heat flux

Exposure to radiant heat remains one of the leading causes of fatalities associated with bushfire events. Measured in kilowatts per m2, radiant heat is the heat energy released from the fire front which radiates to the surrounding environment, deteriorating rapidly over distance. In terms of impact on buildings, radiant heat can pre-heat materials making them more susceptible to ignition or can cause non-piloted ignition of certain materials if the energy transmitted reaches a threshold level. Radiant heat can also damage building materials such as window glazing, allowing openings into a building through which embers may enter. Radiant heat impact is an especially important factor in building-to-building ignition.

In terms of radiant heat exposure for humans, it can cause pain to unprotected skin in milder situations or life threatening and fatal injury in higher exposure thresholds.

(iv) Fire-driven wind

The convective forces of bushfire typically result in strong to gale force fire-driven winds which in itself, can lead to building damage. The typical effects of fire driven wind include the conveyance of embers, damage from branches and debris hitting the building, as well as direct damage to vulnerable building components such as lifting roofs or roof materials and the damage / breakage of windows.

(v) Smoke

Smoke emission remains a secondary effect of bushfire and is one which is typically not addressed by bushfire assessments. Irrespective, it is important to note the potentially severe impact of smoke emission on the human respiratory system. It can lead to difficulties in breathing, severe coughing, blurred or otherwise compromised vision, and can prove fatal. It is also important to note that toxic smoke can occur during bushfire, particularly where buildings or materials are ignited. With regard to evacuation, it can reduce visibility and create difficulties for particularly vulnerable persons.

In the progression of a bushfire event, the above five methods interact either exclusively or in concert. It is estimated that approximately 80 to 90 per cent of buildings lost to bushfire are located within 100m of the bushland interface, hence the relevance of statutory provisions and recommendations implemented across Australia which respond to various types of buildings within 100m of adjacent classifiable vegetation.

2.2.2 Bushfire Activity History

The main sources of ignition in the mid north coast area, (includes the subject site), are considered to be:

- Escapes from Legal Burning off
- Incendiarism/arson
- Re ignition of previous wildfire or hazard reduction
- Illegal burning off
- Lightning

Many of the abovementioned fires occur as a result of private ‘Hazard Reduction’ burns by private landowners, which by act or omission have escaped into forested areas requiring major suppression efforts.

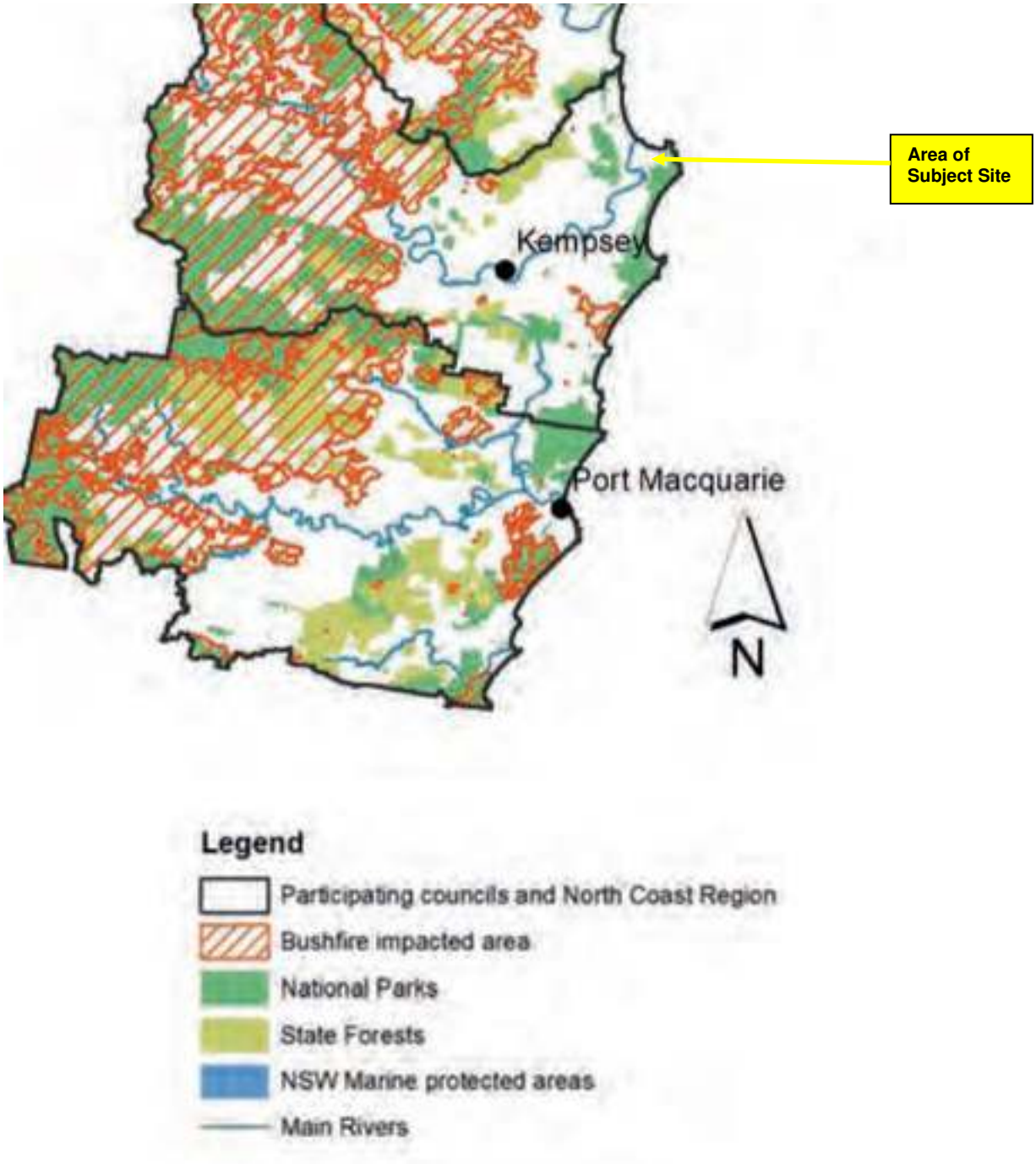
Incendiarism/arson commonly occurs in both grassland and forested areas. Increased visitation is thought to be a contributing factor to increased incidence of incendiarism.

Lightning activity in the area is mainly associated with late spring and summer thunderstorm activity, which is normally, (but not always), accompanied by rainfall.

The subject site and surrounds are not known to have an extensive history of bushfire.

The is no indication of recent fire activity on the subject site or on adjoining and adjacent land. This includes the bushfire activity during the 2019/2020 bushfire season whereby large landscape scale bushfires were not recorded in the general locality, refer to **Figure 6** below;

Figure 6 – Bushfire Activity (2019/2020)



The Mid Coast BFMC Bush Fire Risk Management Plan 2019 does not identify any particular 'at risk' assets on or immediately adjacent to the subject site nor does it identify any specific bushfire threat management actions for the locality. It is however noted that the South West Rocks Waste management Centre to the south of Arakoon Road is identified as an 'Asset Protection Zone whilst the Hat Head National Park to the south of Arakoon Road in the vicinity of the subject site is nominated as a Strategic Fire Advantage Zone.

2.2.3 Potential Fire Behaviour

Whilst each bushfire event is different, fire spreads by responding to changes in fuel, terrain, and weather conditions. Therefore, based on landscape conditions and fire history, potential fire behaviour can be determined.

The most likely bushfire risk scenario for the subject site, (and any future residential development), would be a fire moving from the south within the Forest vegetation contained within the Hat Head National Park. This risk is however tempered by the presence of managed vegetation within residentially developed and occupied land which separates the subject site from the hazard vegetation to the south of Arakoon Road within the National Park. The presence of upslope conditions to the southwest of the subject site together with the topographic screening available in the southern aspect are also bushfire risk reducing factors which are relevant to the impacts of bushfire on the subject site.

Additionally, the presence of remnants of Forest and Coastal Heath vegetation on adjoining land to the northeast and east does provide for conditions which would support bushfire with the possibility of bushfires moving from adjoining and adjacent land to the northeast/east towards the west under the influence of north-easterly/easterly wind conditions. This risk is however tempered by the significantly reduced fuel loads associated with these areas of vegetation. The fragmentation and disruption of fire run conditions due to the presence of managed vegetation associated with the residential occupation and use of adjoining and adjacent land to the northeast and east are also bushfire risk reducing factors which are relevant to the potential impacts of bushfire on the subject site.

Whilst grasslands are present to the west of the subject site the significance of this area of vegetation in supporting bushfire activity is significantly reduced due to the impeding development of this land as part of the approved residential subdivision of the vacant land immediately to the west of the subject site, refer to **Appendix 2.**

Notwithstanding the above the subject site does have the potential to be exposed to landscape scale bushfires due to the extent of bushland which extends to the south of the subject site.

The bushfire risk which is relevant to the subject site and proposed rezoning is summarized as follows;

Table 4 – Bushfire Behaviour Risk Summary

ASPECT	VEGETATION DESCRIPTION	SLOPE CONDITION	WORST CASE WIND INFLUENCE
Within the subject site	Vegetation associated with the stormwater management infrastructure integrated into the residential subdivision of the subject site.	0˚ Flat	Northerly/North-easterly
Northeast	Remnant Tall Coastal Heath/Forested Wetland vegetation on developed residential lots on adjoining/adjacent land.	0˚ Flat	North-easterly
South	Dry Sclerophyll Forest within the Hat Head National Park.	4˚ - 5˚ Down slope	Southerly
East	Remnant Dry Sclerophyll Forest vegetation within unformed road reserve and within developed residential lots on adjoining land to the east.	1˚ - 3˚ Down slope	North-easterly
West	Grasslands within area of approved but as yet undeveloped residential subdivision of adjoining land.	1˚ - 2˚ Down slope	South-westerly
Southwest	Dry Sclerophyll Forest on developed residential lots on adjoining/adjacent land.	5˚ - 6˚ (0˚) Upslope	South-westerly

2.2.4 Impacts of Climate Change

Climate change influences bushfires in the following four ways:

- **A longer fire season.** Hotter conditions mean a longer fire season, leading to more dangerous bushfires and leaving less time for hazard reduction.
- **Hotter temperatures.** Australia is getting hotter, with more extreme hot days and longer, hotter heatwaves. These conditions are increasing the risk of bushfires in many areas.
- **Drier vegetation & 'fuel'.** Hotter conditions and periods of low rainfall dry out soil and vegetation, increasing fire risk.
- **More lightning.** A warmer climate increases the chance of lightning, which is a key factor in starting fires.

The climate projections indicate that there is a likelihood of more frequent and higher intensity bushfires occurring when low seasonal rainfall occurs.

2.2.5 Summary of Landscape Bushfire Risk Assessment

The landscape assessment indicates the potential for bushfire attack of the subject site given the presence of bushfire hazard vegetation within the subject site and on adjoining and adjacent lands.

Available information indicates a limited fire history for the subject site and within the immediately surrounding area.

The risk of bushfire impact can however be reduced in terms of the future development of the subject site through the integration of appropriate fire mitigation via the provision of appropriate bushfire protection measures within the subject site as part of its future development. In particular, the subject site can facilitate APZ's without extensive vegetation clearing whilst other design mechanisms including perimeter roads and a connected public road network can be integrated into the future development of the subject site.

The landscape assessment indicates that it is feasible to design and build resilience into the planned community that matches or exceeds the bushfire protection requirements provided for by NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019.

2.3 Land Use Assessment

2.3.1 Existing and Future Land Use Contexts

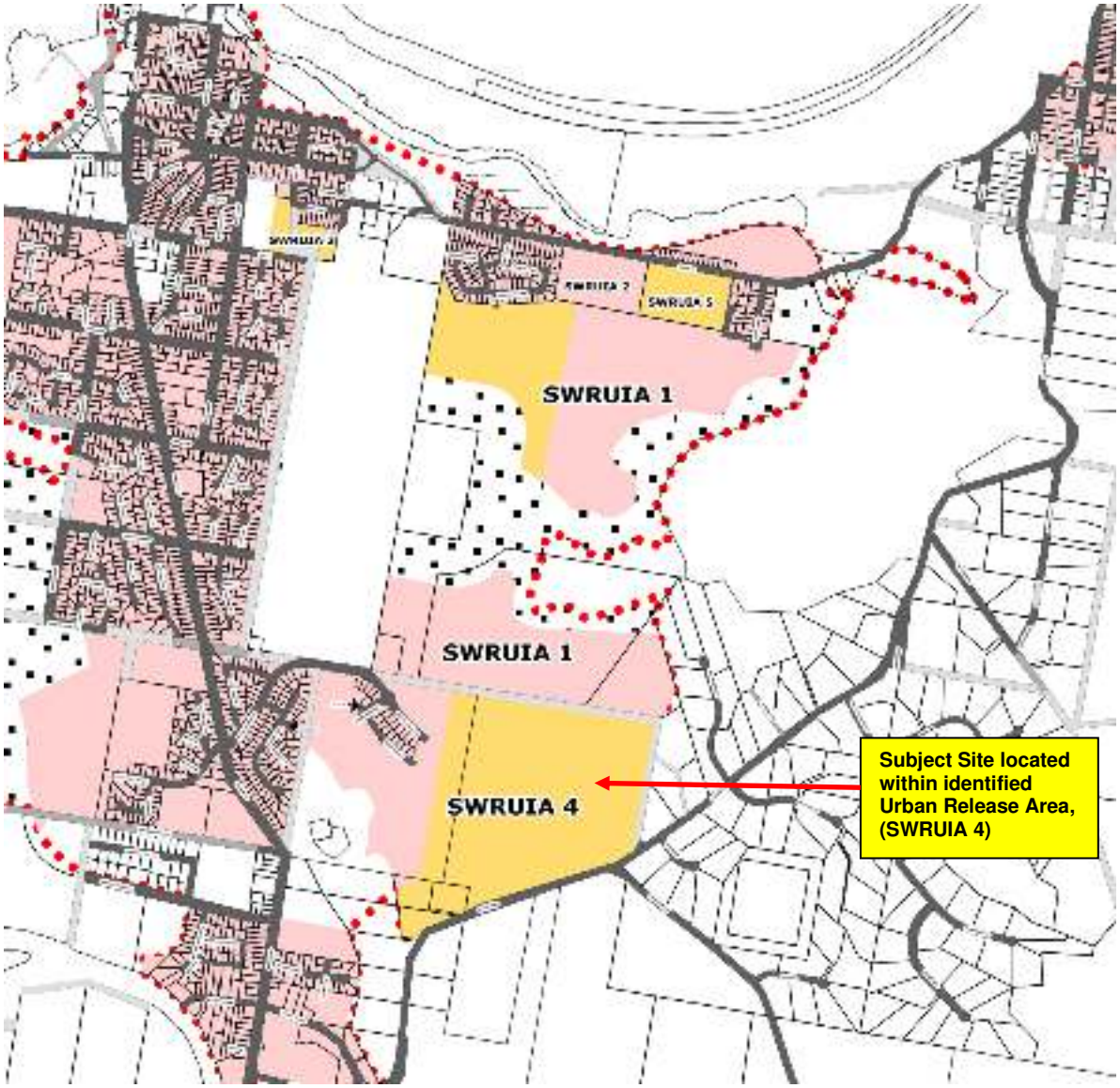
Being located on the south-eastern fringes of the urbanized area of South West Rocks, the land within this area has and will continue to experience significant urban expansion with a transitional land use setting and context now prevailing.

It is noted that the subject site is bounded by recent residential subdivision and seniors living residential developments to the north with the development of an already approved residential subdivision proceeding on adjoining land to the west. Historic large lot residential development adjoins or is adjacent to the south and east of the subject site.

Therefore, the area of land which is proposed to be rezoned has a direct context and relationship with existing developed residential areas with the area of land which is proposed to be rezoned being a logical extension to existing residential development patterns within the area. The presence of large areas of historic and recently approved residential development adjacent to the subject site reinforces the orderly and progressive development of land within the locality.

The suitability of the subject site for rezoning is reflected in the fact that the subject site is identified as an Urban Release Area, (SWRUIA 4), within the Kempsey Shire Rural Council Local Growth Management Strategy – Residential Component 2010, refer below;

Figure 7 – KSC Growth Management Strategy Extract



It is however acknowledged that the subject site does and will continue to have an interface with areas of land containing bushfire hazard vegetation. In this regard the ongoing presence of the areas of bushfire hazard vegetation adjacent to the north-eastern, eastern and southwestern boundaries of the subject site together with hazard vegetation on adjacent land to the south needs to be taken into consideration in the identification of bushfire threat management responses which are relevant to the future residential development of the area of land which is the subject of this report.

Notwithstanding the above, the generally cleared nature of the land which is the subject of this report and the absence of major constraints in terms of landform and topography to the residential development of the subject site suggests that the proposed rezoning of the land is consistent with sound town planning outcomes.

It is noted that the proposed rezoning is intended to facilitate the development of the subject site for residential dwelling development via separate Torrens Title lots. In this regard it would be expected that the density of future development and the characteristics of occupants would be entirely consistent with that expected within urban residential areas.

The typical permitted land uses under a Residential (R1) land use zoning would be;

2 Permitted without consent

Environmental protection works; Home-based child care; Home occupations

3 Permitted with consent

Attached dwellings; Boarding houses; Centre-based child care facilities; Community facilities; Dwelling houses; Group homes; Home industries; Hostels; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Residential flat buildings; Respite day care centres; Roads; Semi-detached dwellings; Seniors housing; Shop top housing; Tank-based aquaculture; Any other development not specified in item 2 or 4

Whilst the permitted land uses could support higher densities of development and involve occupants with characteristics which may reduce their abilities to respond in an emergency, the form of future development, refer to **Appendix 3**, may not support these forms of development. Notwithstanding this, future development proposals which contemplate Special Fire Protection Purpose development would need to be assessed on their own merits in terms of responding to development specific bushfire threat and management.

Based upon the above information and the development concept provided as **Appendix 3** there would appear to be no major land use planning constraints to the proposed rezoning of the land and its future development as residential lots.

2.3.2 Defining 'Acceptable' Land Use Planning Risk

With respect to land use planning for natural hazards, defining exactly what represents 'acceptable' risk can be a difficult task. Understanding community expectation of what represents acceptable risk versus unacceptable risk is the basis of much research both in Australia and internationally.

It is noted that in NSW, NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 has been adopted as the appropriate risk management standard in relation to land use planning and development control in relation to property and life safety albeit that there remains an understanding that despite this combination of planning, building and other bushfire protection measures provided for in NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019, asset loss may still occur in more extreme events.

Having regard to the above, the bushfire risk to assets can be minimized through compliance with the relevant threat management measures contained within NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 as this represents the appropriate land use planning and development control standards albeit that a level of property loss is 'accepted' to a degree by existing land use planning and building construction frameworks.

Property and infrastructure may be lost in a catastrophic event, but the key determinate of 'acceptable' risk is life safety risk, and whether the proposed land use rationale, density and settlement pattern supports and enables life safety, including safe evacuation.

In analysing the question of life safety, the following key points are considered to be relevant as to the suitability of the subject site for rezoning:

- the nature of urban growth is such that in regional coastal locations the rezoning of land will inevitably provide for a bushland interface. On a local level this is evident in recent residential developments in the eastern and south-eastern fringes of South West Rocks, whereby new residential developments have an interface with areas of bushfire hazard vegetation. Accordingly, the issue for consideration is whether the bushfire risk posed to new development is consistent with community expectation and reflects the relevant bushfire threat management requirements which are provided for by current development standards.

  As provided for in the landscape assessment there are no major constraints to the proposed residential subdivision development of the subject site as proposed via the rezoning as it is feasible to design and build resilience into the planned community that matches or exceeds the bushfire protection requirements provided for by NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019.

The landscape characteristics of the subject site and surrounding land are therefore entirely consistent with that contemplated by NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 for new development as follows.

- the current and future population demographics for the area does not present as particularly 'vulnerable';

- the limited fire history within the subject site and surrounding areas;

- the generally cleared nature of the land which is the subject of this report and the absence of major constraints in terms of landform and topography to the development of the subject site;

- the risk benefit in relation to existing development in the area.

  The majority of historical residential development land to the east and south of the subject site has occurred without the benefit of more recent land use planning considerations from a bushfire perspective. In this regard the rezoning of the subject site and its future residential subdivision development provides an opportunity to provide for improved bushfire threat management outcomes for historical and more recent residential development in the locality;

- the proposed evacuation options provide for high levels of movement to and from the subject site with alternative means of access to and egress from the subject site available via existing and proposed public road infrastructure. This issue is further discussed in **Section 2.4** of this report;

  It is also noted that given the size of the subject site opportunities will exist for future occupants to remain onsite and be protected from the impacts of bushfire;

- the opportunities to reduce life safety risk through the application of accepted and tested bushfire threat management measures which respond to the level of bushfire threat; and

- the close proximity of existing emergency services. This issue is further discussed in **Section 2.5** of this report;

Having regards to the above it is considered that the level of asset and life safety risk associated with the proposed rezoning of the subject site is consistent with the relevant community expectations and the relevant land use planning and development control standards.

Based upon the above information there would appear to be no major land use planning constraints to the proposed rezoning of the land and its future development as residential lots

2.4 Access and Egress

The development concept for the area of land which is the subject of this report provides for the construction of new public road infrastructure which will connect with existing and proposed public road networks.

Access and egress from the future residential subdivision development of the subject site involves the movement of vehicles to and from the public road system which will service the development of the already approved residential subdivision of land to the west of the subject site. In this regard the future public road infrastructure within the residential subdivision of the subject site will connect with Belle O'Connor Street and Burrawong Drive which will be extended to the western boundary of the subject site as part of the development of the already approved residential subdivision to the west.

The residential subdivision development concept for the subject site also envisages connection of the internal public road system with Athena Parade which currently adjoins the majority of the northern boundary of the subject site with the easterly extension of Athena Parade providing for two separate northern connections adjacent to the eastern and western boundaries of the subject site.

The southerly movement of vehicles to and from the future residential subdivision of the subject site would be provided for by way of a single public road connection with Arakoon Road via the existing access handle.

Belle O'Connor Street, Arakoon Road and Athena Parade are major connecting roads in the locality.

Arakoon Road to the south of the subject site

Anthena Parade to the north of the subject site

Connection of the proposed new public road infrastructure servicing the future residential subdivision of the subject site to Belle O'Connor Street, Arakoon Road and Athena Parade will provide for alternatives in vehicle movement to and from the subject site from areas which have been developed for residential occupation and use. Movement to and from the proposed development will therefore be available from the north, west and south from areas protected from the impacts of bushfire.

It is further noted that the concept design provides for a through road configuration which provides for multiple alternative access and egress opportunities towards the north, south and west and encourages movement away from areas of bushfire hazard vegetation to areas which would be protected/sheltered from the impacts of bushfire.

It is understood that all new roads within the future residential subdivision of the subject site will be two-way and will be constructed to normal residential street standards.

Importantly the integration of access and egress infrastructure with other existing residential development areas to the north and west of the subject site not only provides access and egress options for the future residential subdivision development of the subject site but also supports and improves access and egress opportunities for existing development in general areas. In this regard the provision of a southerly connection of existing and proposed residential developments in the locality to Arakoon Road is seen as an important strategic bushfire management outcome.

2.5 Emergency Services

The proposed rezoning of the land does not significantly increase the demand for emergency services on the basis that the proposed rezoning of land does not significantly increase the interface between residential development and areas of bushfire hazard vegetation when considered in the context of the nature and extent of existing and approved but yet to be constructed development in the locality.

The proposed rezoning of the subject site, in conjunction with the continued development of land to the north and west of the subject site provides an opportunity to reduce the existing extent of hazard vegetation interfaces and significantly improve access and asset protection outcomes for existing development in the area whilst providing for new development which reflects best practice from a bushfire threat management perspective.

Accordingly, any increase in demand for emergency services associated with the proposed rezoning of land, (and its subsequent development), needs to be considered in the context of the desirability for the logical and progressive development of land for residential purposes which is adjacent to existing areas of residential development. As mentioned previously the subject site is bounded by recent residential subdivision and seniors living residential developments to the north with the development of an approved residential subdivision proceeding on adjoining land to the west. Historic large lot residential development also adjoins or is adjacent to the south and east of the subject site.

It is however noted that the nature of urban expansion which is associated with the rezoning and development of land for residential purposes is such that increases in demand for emergency services is inevitable as emergency services are required for a range of population safety and health protection issues associated with population growth. For example, in an urban context, firefighting resources are required not only to respond to bushfire incidents but also in relation to responding to a range of building fire scenarios and causes.

It is noted that South West Rocks is already serviced by a NSW Fire and rescue Brigade together with a Rural Fire Service Brigade, Ambulance Service, Police Service and Sate Emergency Service.

2.6 Infrastructure

Given that the proposed rezoning and future subdivision of land provides for residential allotments, all future lots will have access to the reticulated water supply, the extension of which will be required by Kempsey Shire Council to service future subdivisions. It is however noted that the determination of a guaranteed water supply is to be made by the water supply authority where mains water supply is available.

It is however noted that there are no apparent water servicing issues which would preclude the proposed rezoning of land and subsequent development of land particularly when considered in the context of the already approved residential development to the north and west of the subject site.

Electricity supply and communications infrastructure is available in the locality and will be accessible for extension to the future development of the subject areas of land.

It is however noted that an overhead electricity transmission powerline bisects the eastern, (north to south), portion of the subject land with the presence of this infrastructure being a risk in terms of bushfire ignition and spread not only to the subject site but adjoining and adjacent land. It is also noted that an electivity transmission powerline is located adjacent to the northern boundary of the subject site within the Athena Parade road reserve.

Electricity can start bushfires when infrastructure is damaged or foreign objects contact powerlines. This can cause arcing and generate sparks that can ignite dry vegetation. While the number of bushfires ignited by electricity is very low, (<3% of bushfires), once started they have the potential to burn large areas.

Whilst the risks posed to future development in the area from bushfires associated with the overhead electricity transmission powerlines will be reduced because the area of unmanaged land will be reduced in the locality, it is acknowledged that the presence of the overhead electricity transmission powerlines is an issue in terms of bushfire threat management albeit that the bushfire risk associated with the power line is considered to be low by virtue of the history of fire ignition associated with power lines in the area, the nature and extent of fuel loads adjacent to the route of the line and the high levels of access to the power line route. Notwithstanding this, the rezoning and future development of the subject site provides an opportunity to reduce the bushfire risk via relocation and/or provision of replacement underground services.

It is noted that the proposed rezoning of the subject site and its future residential occupation would provide for increased surveillance of bushfire ignition at a local level which in combination with the integration of the minimum bushfire threat management strategies which are relevant to new residential subdivision would assist in reducing the risk associated with vegetation ignition by electricity supply infrastructure.

Reticulated gas services are not available in the locality and are therefore not available to the subject areas of land.

It is noted that the rezoning and subdivision approval processes incorporate consideration of relevant servicing requirements and capabilities by relevant service providers/authorities with the relevant approval processes able to accommodate any issues which maybe relevant to any future development which is proposed.

2.7 Adjoining Land

It is noted that the rezoning of land will not change or alter the ability of adjoining and adjacent land to carry bushfire nor will the proposed rezoning of the subject land place increased pressure on adjoining landowners to introduce or implement Bushfire Management Plans as a result of the proposed rezoning.

The rezoning of the subject site will provide for residential development to be present to the north and west whilst large lot residential development will continue to be present on adjoining and adjacent land to the south and east.

It is noted that the rezoning of the subject site and its subsequent development as residential lots will not change or alter the ability of adjoining land to carry a bushfire as vegetation characteristics will remain relatively unchanged from the existing assessed level of bushfire threat albeit that a grassland vegetation classification has been adopted for the area of land which is in the process of being developed as residential lots. Importantly the rezoning and future development of the subject site will provide for improved bushfire threat management outcomes for adjoining land and adjacent land via the removal of a significant area of bushfire hazard vegetation within the subject site and the removal/reduction of interfaces between residential lots and other infrastructure with areas of bushfire hazard vegetation.

In this regard the proposed rezoning and future development of the subject site will impose no additional bushfire threat management obligations or responsibilities on adjoining land managers

from that which currently exists and will reduce the pressures on adjoining landowners to introduce or implement Bushfire Management Plans.

It is further noted that the management of the Hat Head National Park which is located at distance to the south of the subject site is already subject to a Bushfire Management Strategy, refer to **Appendix 4.**

3.0 BUSHFIRE THREAT REDUCTION MEASURES

3.1 NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019

The following issues and constraints have been identified through considering the requirements of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 as they apply to the proposed rezoning of the subject site and its future residential subdivision and development.

It is noted that for the purposes of this report it has been assumed that future development concepts of the proposed lots do not contain uses which are Special Fire Protection Purpose development in accordance with NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019.

3.1.1 Defendable Space/Asset Protection Zone

To ensure that the aims and objectives of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 are achieved for the proposed rezoning and future subdivision of the subject areas of land, an Asset Protection Zone (APZ) between the asset and the hazard should be provided.

An APZ provides for; minimal separation for safe firefighting, reduced radiant heat, reduced influence of convection driven winds, reduced ember viability and dispersal of smoke. The APZ consists of an Inner Protection Area (IPA) and Outer Protection Area (OPA). The IPA is an area closest to the buildings that incorporates defendable space and is used for managing heat intensities at the building surface. The OPA is positioned adjacent to the hazard and the purpose of the OPA is to reduce the potential length of flame by slowing the rate of spread, filtering embers and suppressing the crown fire.

NSW Rural Fire Service**, *Planning for Bushfire Protection*,** 2019 provides that a defendable space is;

An area adjoining an asset that is managed to reduce combustible elements and is free from constructed impediments. It is a safe working environment in which active firefighting can be undertaken to defend the structure, before and after the passage of a bush fire.

The following assessment of APZ requirements which are relevant to the proposed rezoning and future subdivision of the subject site is provided as follows;

(i) Residential Subdivision Development

It is noted that the future residential subdivision of the subject site will need to provide for APZ's in accordance with the residential subdivision requirements of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019. APZ's in residential situations must be such that radiant heat levels of greater than 29kW/m² will not be experienced at a residential building on a proposed residential allotment.

The following table indicates the minimum 'Deemed to Satisfy' Asset Protection Zones required from the identified areas of bushfire hazard vegetation to future residential buildings on future residential lots within the area which is proposed to be rezoned. The table is based upon the vegetation type, slopes, and fire weather (FDI) which is applicable to this assessment

Table 5 – APZ Requirements for Residential Subdivision Developments (29kW/m²)

DIRECTION OF HAZARD	VEGETATION TYPE	SLOPE	IPA	OPA	TOTAL REQUIRED APZ	MINIMUM APZ ACHIEVABLE (to future dwellings within Lots)	COMPLIANCE (with Minimum APZ Requirements)
Within the subject site	Similar in specification to Rainforest	0˚ Flat	9m	-	9m	Minimum 9m	✔
Northeast	Similar in specification to	0˚ Flat	9m	-	9m	Minimum 9m	✔

	Rainforest						
South	Dry Sclerophyll Forest	4˚ - 5˚ Down slope	15m	10m	25m	>150m	✔
East	Similar in specification to Rainforest	1˚ - 3˚ Down slope	12m	-	12m	Minimum 12m	✔
West	Grasslands	1˚ - 2˚ Down slope	10m	-	10m	Minimum 10m	✔
Southwest	Dry Sclerophyll Forest	5˚ - 6˚ (0˚) Upslope	10m	10m	20m	Minimum 20m	✔

Having regard to the above it is possible to locate future residential dwellings on future proposed residential lots and comply with the relevant APZ performance requirements of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019 albeit that the final design and spatial relationships of future residential lots and buildings will need to be confirmed.

In this regard the size of the presence of existing and proposed perimeter public roads to the north of the subject site and adjacent to the eastern and southwestern boundaries of the future residential subdivision of the subject site would provide for APZ compliance in these aspects.

The APZ performance criteria and acceptable solution provisions which would apply to any future residential subdivision development on the area of land which is proposed to be rezoned are detailed in the following table:

Table 6 – Residential Subdivision Development APZ Performance Requirements 2019

Intent of measures: to provide sufficient space and maintain reduced fuel loads to ensure radiant heat levels at the buildings does not exceed 29kW/m².		
Performance Criteria	**Acceptable Solutions**	**Compliance Comment**
The intent may be achieved where:		
• potential building footprints will not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot	•APZs are provided in accordance with Tables A1.12.2 and A1.12.4 based on the FDI	✔ To be complied with in relation to the design of future development.
• APZs are managed and maintained to prevent the spread of a fire towards the building.	•APZs are managed in accordance with the requirements of 'Appendix 4	✔ To be complied with in relation to the design of future development
• the APZ is provided in perpetuity	•the APZ is wholly within the boundaries of the development site.	✔ To be complied with in relation to the design of future development All APZ's can be provided in accordance with PfBP Guideline requirements
• APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is	• APZ's is located on lands with a slope less than 18 degrees.	✔ To be complied with in relation to the design of future development

minimised		All APZ's can be provided on lands with a slope less than 18 degrees.

Whilst the required APZ's may not be achieved within the boundaries of future proposed residential lots, it is considered that suitable APZ's can be available having regard to the opportunities to utilize managed infrastructure on adjoining and adjacent land as part of meeting the minimum required APZ's for future residential development.

Having regard to the above it will be necessary to ensure that the future design of any residential subdivision provides for compliance with the minimum APZ requirements specified in **Table 5** above. In this regard indicative concept plans for the provision of APZ's to the subject site is included as **Appendix 5**.

It is further noted that the future subdivision of the subject areas may require the preparation and implementation of property/vegetation management plans for those areas which are nominated as open space and public reserve or where staging of future residential subdivision development requires temporary APZ's. The property/vegetation management plans are to provide for the ongoing management of any areas which form part of the minimum required APZ's with the ongoing implementation of the property/vegetation management plans to be imposed upon the landowners via positive covenants pursuant to section 88B of the Conveyancing Act, 1919.

Notwithstanding the above, based upon the size and shape of the subject area of land, which is to be rezoned for residential purposes it is considered that the intent of the requirement for the provision of Asset Protection Zones as required by NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019 can be satisfied for the future development for residential subdivision purposes albeit that the location, nature and form of construction of future development must reflect the performance objectives of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019.

3.1.2 Defendable Space/Asset Protection Zone Management

Areas identified as forming part of future APZ's and defendable spaces for any future residential subdivision developments must be managed so as to comply with the standards which are applicable to Asset Protection Zones as follows;

(i) Inner Protection Area (IPA)

An IPA should provide a tree canopy cover of less than 15% and should be located greater than 2 metres from any part of the roofline of a building.

Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10m from an exposed window or door.

Trees should have lower limbs removed up to a height of 2 metres above the ground

(ii) Outer Protection Area (OPA)

An OPA should provide a tree canopy cover of less than 30% and should have the understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September).

Based upon the size and shape of the subject site, compliance with the minimum APZ requirements is achievable for the future residential subdivision development of the proposed rezoning area having regard to their size and the characteristics of the hazard vegetation which are relevant to any future residential developments.

3.1.3 Operational Access and Egress

The development concept for the area of land which is the subject of this report provides for the construction of new public road infrastructure which will connect with existing and proposed public road networks.

Access and egress to and from the subject site involve the movement of vehicles to and from the public road system which will service the development of the approved residential subdivision of land to the west of the subject site. In this regard the future public road infrastructure within the subject site will connect with Belle O'Connor Street and Burrawong Drive each of which will be extended to the western boundary of the subject site as part of the development of the approved residential subdivision to the west.

The development concept also envisages connection of the future internal public road system with Athena Parade which currently adjoins the majority of the northern boundary of the subject site with the easterly extension of Athena Parade providing for two separate northern connections adjacent to the eastern and western boundaries of the subject site. The southerly movement of vehicle to and from the future residential subdivision of the subject site would be provided for by way of single public road connection with Arakoon Road via the existing access handle.

Belle O'Connor Street, Arakoon Road and Athena Parade are major connecting roads in the locality.

Connection of the proposed new public road infrastructure servicing the future residential subdivision of the subject site to Belle O'Connor Street, Arakoon Road and Athena Parade will provide for alternatives in vehicle movement to and from the subject site from areas which have been developed for residential occupation and use. Movement to and from the proposed development will therefore be from the north, west and south from areas protected from the impacts of bushfire.

It is understood that all new roads within the future residential subdivision of the subject site will be two-way and will be constructed to normal residential street standards.

It is further noted that the concept design provides for a through road configuration which provides for multiple alternative access and egress opportunities towards the north, south and west and encourages movement away from areas of bushfire hazard vegetation to areas which would be protected/sheltered from the impacts of bushfire.

Importantly the integration of access and egress infrastructure with other existing residential development areas not only provides access and egress options for the future residential subdivision development of the subject site but also supports and improves access and egress opportunities for existing development in general areas. In this regard the provision of a southerly connection of existing and proposed residential development in the locality to Arakoon Road is seen as an important strategic bushfire management outcome.

It is noted that the development concept for the residential subdivision of the subject site provides for the use of perimeter roads to separate areas of hazard vegetation from residential lots with this approach being entirely consistent with the requirements of NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019 with the proposed internal public road design providing for perimeter roads to areas of hazard vegetation within the subject site and on adjoining and adjacent land to the east and southwest. The proposed extension of Athena Parade to the eastern boundary of the subject site provides for a perimeter road approach to hazard vegetation to the northeast of the subject site whilst the presence of Arakoon Road to the south provides for a perimeter road approach to the areas of hazard vegetation to the south of the subject site.

It will be necessary to construct all new public roads within the future residential subdivision development of the subject site so as to comply with Section 5.3.2 of NSW Rural Fire Services**,** ***Planning for Bushfire Protection***, 2019. The relevant public road provisions which are applicable to the proposed residential subdivision development of the subject site are summarized as follows;

Table 7 - Public Road Requirements (PfBP 2019)

Performance Criteria	Acceptable Solutions	Compliance Comment
The intent may be achieved where:		
(i) General Requirements		
• firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation	• property access roads are two-wheel drive, all-weather roads; and • perimeter roads are provided for residential subdivisions of three or more allotments; and • subdivisions of three or more allotments have more than one access in and out of the development; and • traffic management devices are constructed to not prohibit access by emergency services vehicles; and • maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; and • all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; and • where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; and • where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.	✔ Future design of road infrastructure to comply
• 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.	✔ Future design of road infrastructure to comply
• there is appropriate access to water supply	• hydrants are located outside of parking reserves and road carriageways to ensure	✔ Future design of road infrastructure to comply

	accessibility to reticulated water for fire suppression; • hydrants are provided in accordance with AS 2419.1:2005; • there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	
(ii) Perimeter Roads		
• access roads are designed to allow safe access and egress for medium rigid 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	• perimeter roads are two-way sealed roads; and • 8m carriageway width kerb to kerb; and parking is provided outside of the carriageway width; and hydrants are located clear of parking areas; and • there are through roads, and • these are linked to the internal road system at an interval of no greater than 500m; and • curves of roads have a minimum inner radius of 6m; and the maximum grade road is 15° and average grade is 10°; and • the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	✔ Future design of road infrastructure to comply
(iii) Non-Perimeter Roads		
• access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating	• minimum 5.5m width kerb to kerb; and • parking is provided outside of the carriageway width; and • hydrants are located clear of parking areas; and roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; and curves of roads have a minimum inner radius of 6m; and • the road crossfall does not exceed 3°; and • a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	✔ Future design of road infrastructure to comply

Subject to compliance with the requirements of **Table 7** above in relation to the design and construction of new public roads, it is considered that the proposed access and egress arrangements will be acceptable for any future subdivision development of the area of land which is proposed to be rezoned given the nature, construction and extent of the existing public road infrastructure which is present in the locality and the future public road systems which will be required to be provided to service any future residential subdivision development of the subject site.

In the context of the location of the subject site and its relationship with existing and approved urban development it is considered that access and egress to and from any future development of the subject site can be provided in compliance with the relevant requirements of NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019.

3.1.4 Services - Water, Gas and Electricity

As set out in Section 5.1.3 of NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019, developments in bushfire prone areas must maintain a water supply reserve dedicated to firefighting purposes.

Given that the proposed rezoning and future subdivision of the land provides for residential allotments, all proposed lots will have access to the reticulated water supply, the extension of which will be required by Kempsey Shire Council to service the proposed subdivision. It is however noted that in accordance with NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019 the determination of a guaranteed water supply is to be made by the water supply authority where mains water supply is available.

Electricity supply is available and will be accessible to the residential and business/commercial development of the land.

Reticulated gas services are not available in the locality and are therefore not available to the subject site.

The incorporation into the future residential subdivision development of subject site of the relevant provisions of the following acceptable solutions as provided for by Section 5.3.4 of NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019 will ensure compliance with the intent for the provision of services to the future lots which will result as a consequence of the proposed rezoning.

Table 8 – Service Provision Requirements (PfBP 2019)

Intent of measures: to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.		
Performance Criteria	**Acceptable Solutions**	**Compliance Comment**
The intent may be achieved where:		
Water Supply • a water supply is provided for firefighting purposes	• reticulated water is to be provided to the development, where available; • a static water supply is provided where no reticulated water is available.	✔ To comply
• water supplies are located at regular intervals • the water supply is accessible and reliable for firefighting operations	• fire hydrant spacing, design and sizing comply with the Australian Standard AS 2419.1:2005; • hydrants are not located within any road carriageway; reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	✔ To comply
• flows and pressure are appropriate	• fire hydrant flows and pressures comply with AS 2419.1:2005.	✔ To comply
• the integrity of the water supply is	• all above-ground water service pipes are metal, including and up to any	✔ To comply

maintained	taps.	

Electricity Services
 	
• location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings
	• where practicable, electrical transmission lines are underground;
	
	• where overhead, electrical transmission lines are proposed as follows:
	  • lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas;
	  • 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.
		✔ To comply

Gas services • location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	• reticulated or bottled gas is installed and maintained in accordance with 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.	✔ To comply (where applicable)

It is considered that the intent of the requirement for the provision of services as required by NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019 can be satisfied for the future residential subdivision of the subject site which is proposed to be rezoned.

3.1.5 Landscaping

Landscaping is a major cause of fire spreading to buildings, and therefore any landscaping proposed in conjunction with the future development of the subject areas will need consideration when planning, to produce gardens that do not contribute to the spread of a bushfire.

When planning any future landscaping surrounding any future development on the subject areas, consideration should be given to the following:

- The choice of vegetation – consideration should be given to the flammability of the plant and the relation of their location to their flammability and ongoing maintenance to remove flammable fuels.
- Trees as windbreaks/firebreaks – Trees in the landscaping can be used as windbreaks and also firebreaks by trapping embers and flying debris.
- Vegetation management – Maintain a garden that does not contribute to the spread of bushfire.
- Maintenance of property – Maintenance of the property is an important factor in the prevention of losses from bushfire.

Appendix 4 of NSW Rural Fire Services**, *Planning for Bushfire Protection***,2019 contain the standards that are applicable to the provision and maintenance of landscaping.

Any landscaping proposed to be undertaken in conjunction with any future development of the areas which are the subject of this report is to comply with the principles contained in Appendix 4 of NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019**.**
Compliance with Appendix 4 of NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019 will satisfy the intent of the bush fire protection measures that are applicable to the provision of landscaping as part of the future residential subdivision of the subject site which is proposed to be rezoned.

3.2 Construction of Buildings in Bushfire Prone Areas

3.2.1 General

The 'Deemed-to-Satisfy' provisions for construction requirements are detailed in AS 3959-2018 however in NSW the relevant Bushfire Attack Level and construction requirements must be determined in accordance with Appendix 1 of NSW Rural Fire Services**, *Planning for Bushfire Protection*,** 2019 (in particular Table A1.12.6), rather than in accordance with Section 2 of AS 3959 - 2018.

However, given that the proposed rezoning proposal which is the subject of this report does not involve the erection of any buildings, the determination of Bushfire Attack Levels (BAL's) that would be applicable to future buildings on the future residential lots is not relevant at this time.

It is however noted that compliance with the minimum Asset Protection Zone requirements for the future residential lots, as nominated in **Table 5** of this report, will provide for opportunities for future dwellings to be constructed upon each of the proposed allotments in compliance with the requirements provided for in AS 3959 – 2018 (as modified by NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019).

The information presented in Section 3.1.1 of this report indicates that where the minimum required APZ's are provide in accordance with **Table 5** of this report, future buildings erected within each future lot would be subjected to a worst-case Bushfire Attack Level of BAL 29. This is consistent with the acceptable solution requirements of NSW Rural Fire Services**, *Planning for Bushfire Protection***, 2019.

4.0 SUMMARY OF FINDINGS

The following recommendations are provided in response to the proposed rezoning and associated residential subdivision concept layout for land known as Lot 9 DP 1219664, 157 Arakoon Road, South West Rocks, as provided in **Appendix 3** of this report;

(i) The design and construction of future residential subdivision/s of the subject site is to provide for compliance with the relevant requirements of Chapter 5 of NSW Rural Fire Services**,** ***Planning for Bushfire Protection*****,** 2019.

(ii) Asset Protection Zones are to be provided to future residential lots in accordance with Section 3.1.1 of this report.

(iii) Vegetation Management Plans (VMP's) are to be prepared for areas nominated as open space and public reserve within the subject site. The VMP's are to provide for the ongoing management of any areas which form part of the minimum required APZ's. The ongoing implementation of VMP's is to be imposed upon the landowners via a positive covenant pursuant to section 88B of the Conveyancing Act, 1919.

(iv) The design and construction of all public roads within the future residential subdivision of the subject site are to comply with the acceptable solutions provided for in Section 5.3.2 of NSW Rural Fire Services**,** ***Planning for Bushfire Protection*****,** 2019.

(v) Water and other services are to be provided to the future residential development lots in accordance with the requirements detailed in Section 3.1.4 of this report.

(vi) Adopt Landscaping principals in accordance with Section 3.1.5 of this report.

(vii) The determination of the Bushfire Attack level (BAL) and corresponding construction standards for future residential lots should be the subject of an individual bushfire hazard assessment conducted in conjunction with the development on each of the lots created as a result of the proposed rezoning.

5.0 CONCLUSION

It is considered that the proposed rezoning of land known as Lot 9 DP 1219664, 157 Arakoon Road, South West Rocks is at risk of bushfire attack; however, it is in our opinion that with the implementation of the bushfire threat reduction measures and consideration of the recommendations in this report, the bushfire risk is manageable for the proposed rezoning albeit that the design and construction of any future residential development of the subject site will need to demonstrate compliance with the relevant requirements of NSW Rural Fire Service**, *Planning for Bushfire Protection*,** 2019**.**

With the implementation of the recommendations, it is considered that it will be possible for the future development of the subject site to meet the applicable residential subdivision performance objectives and acceptable solutions as provided for in NSW Rural Fire Service**, *Planning for Bushfire Protection*,** 2019**.**

This report is however contingent upon the following assumptions and limitations.

Assumptions

(i) For a satisfactory level of bushfire safety to be achieved regular inspection and testing of proposed measures, building elements and methods of construction, specifically nominated in this report, is essential and is assumed in the conclusion of this assessment.

(ii) There are no re-vegetation plans in respect to hazard vegetation and therefore the assumed fuel loading will not alter.

(iii) Any future developments are constructed and maintained in accordance with the risk reduction strategy in this report.

(iv) The vegetation characteristics of the subject site and surrounding land remains unchanged from that observed at the time of inspection.

(v) The information contained in this report is based upon the information provided for review, refer to **Appendix 3**.

No responsibility is accepted for the accuracy of the information contained within the above plans.

Limitations

(i) The data, methodologies, calculations and conclusions documented within this report specifically relate to the building and must not be used for any other purpose.

(ii) A reassessment will be required to verify consistency with this assessment if there is building alterations and/or additions, change in use, or changes to the risk reduction strategy contained in this report.

6.0 REFERENCES

NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019

AS 3959-2009, ***Construction of Buildings in Bushfire Prone Areas***

AS 3959-2018, ***Construction of Buildings in Bushfire Prone Areas***

Keith David 2004, Ocean ***Shores to Desert Dunes, The Native Vegetation of New South Wales and the ACT***, Department of Environment and Conservation

NSW State Government***, Rural Fires Act***, 1997

Port Macquarie-Hastings Councils, ***Bushfire Prone Land Mapping***

NSW Rural Fire Service, ***Guideline for Bushfire Prone Land Mapping***, 2002

Australian Building Codes Board, ***National Construction Code***, 2019

NSW Rural Fire Service – *Guideline for Bushfire Prone Land Mapping 2002*

NSW Rural Fire Service, ***NSW Local Government Areas FDI***, May 2017

Disclaimer

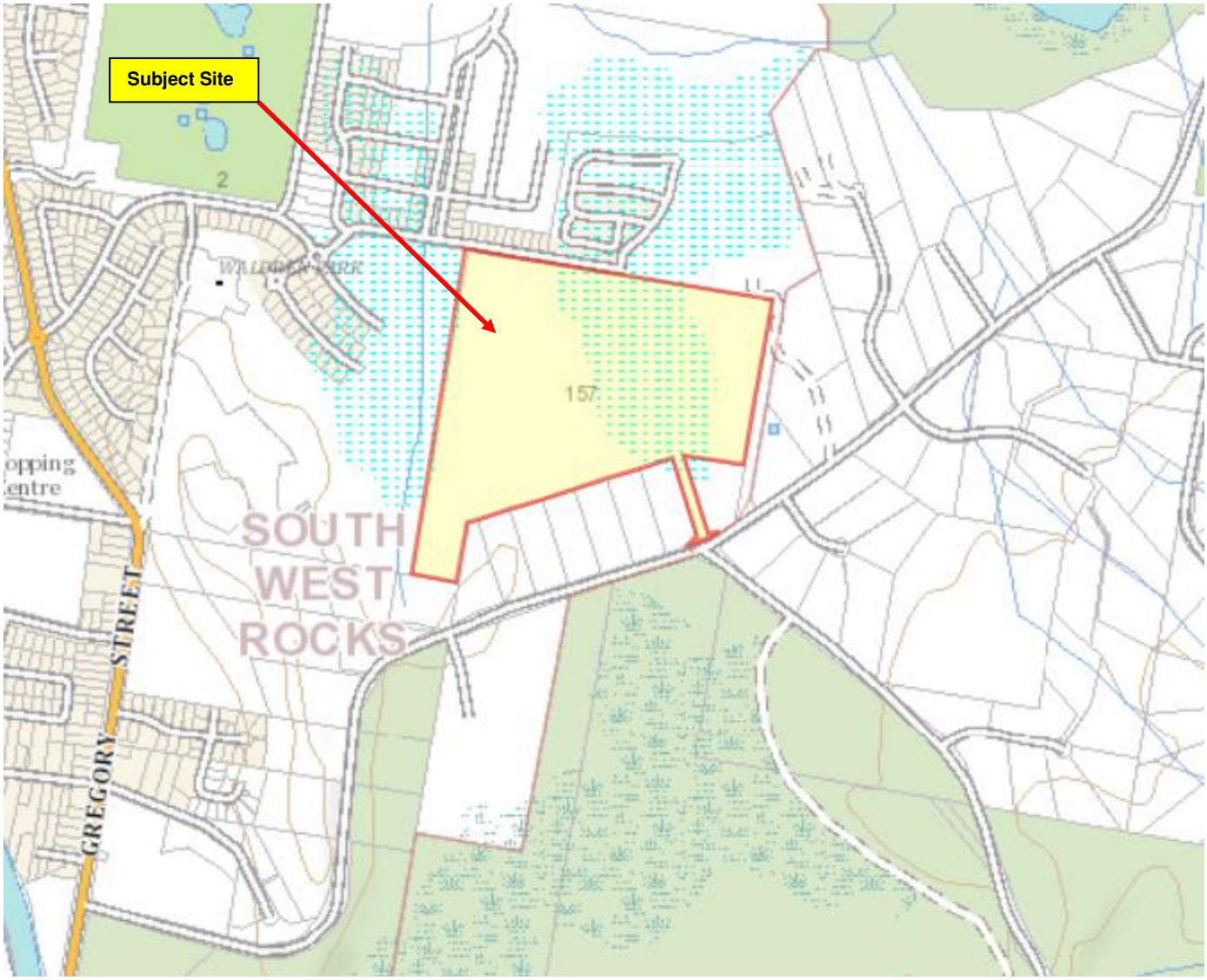
The findings referred to in this report are those which, in the opinion of the author, are required to meet the requirements of NSW Rural Fire Service, ***Planning for Bushfire Protection***, 2019. It should be noted that the Local Authority having jurisdiction for the area in which the property is located may, within their statutory powers, require different, additional or alternative works/requirements to be carried out other than those referred to in this report.

This report has been prepared partially on information provided by the client. Information provided by the client in respect of details of construction.

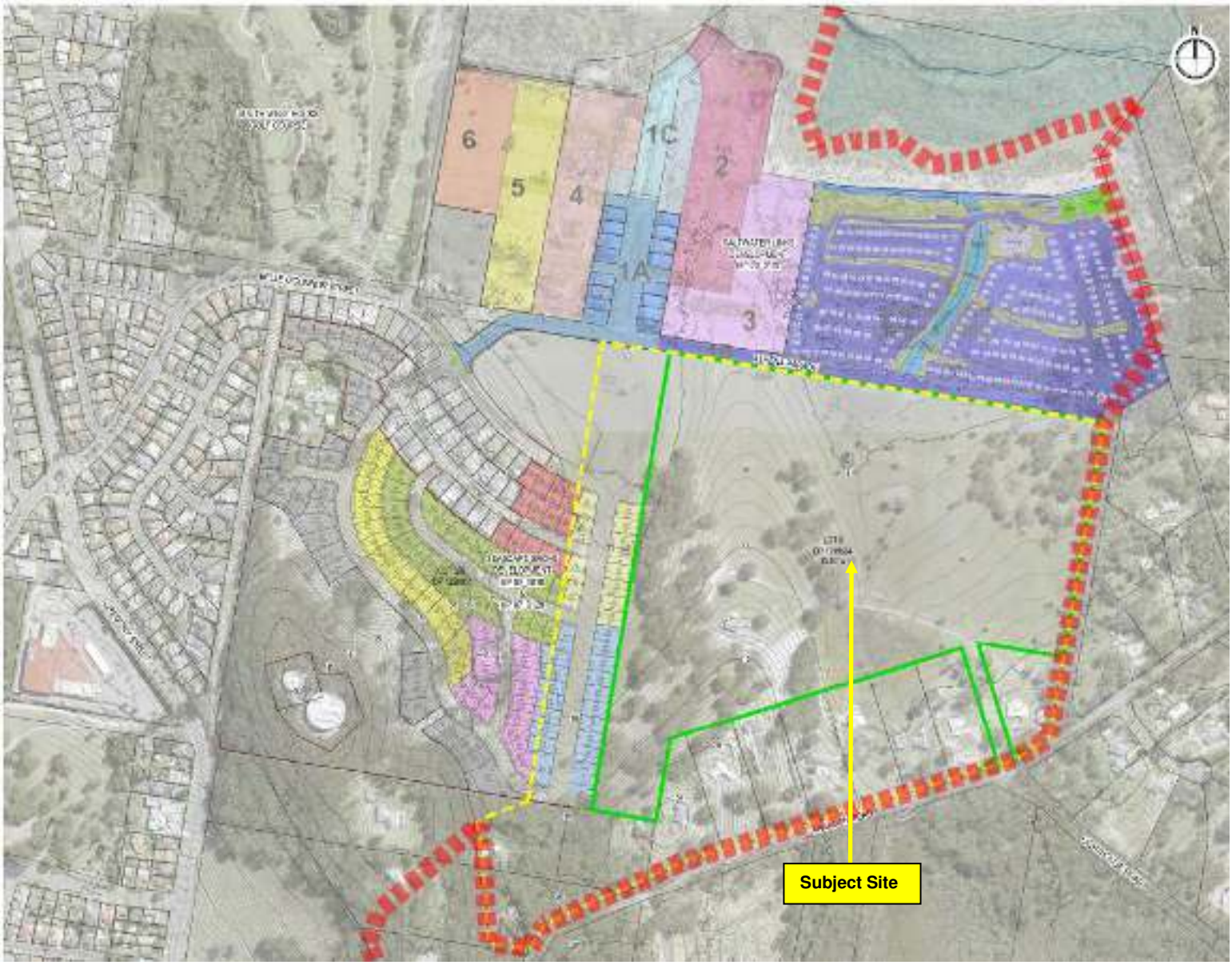
The author denies any legal liability for action taken as a consequence of the following:

- The Local Authority requiring alternative or additional requirements to those proposed or recommended in this report.
- Incorrect information, or mis-information, provided by the client with regard the proposed development which is in good faith included in the strategies proposed in this report and later found to be false.

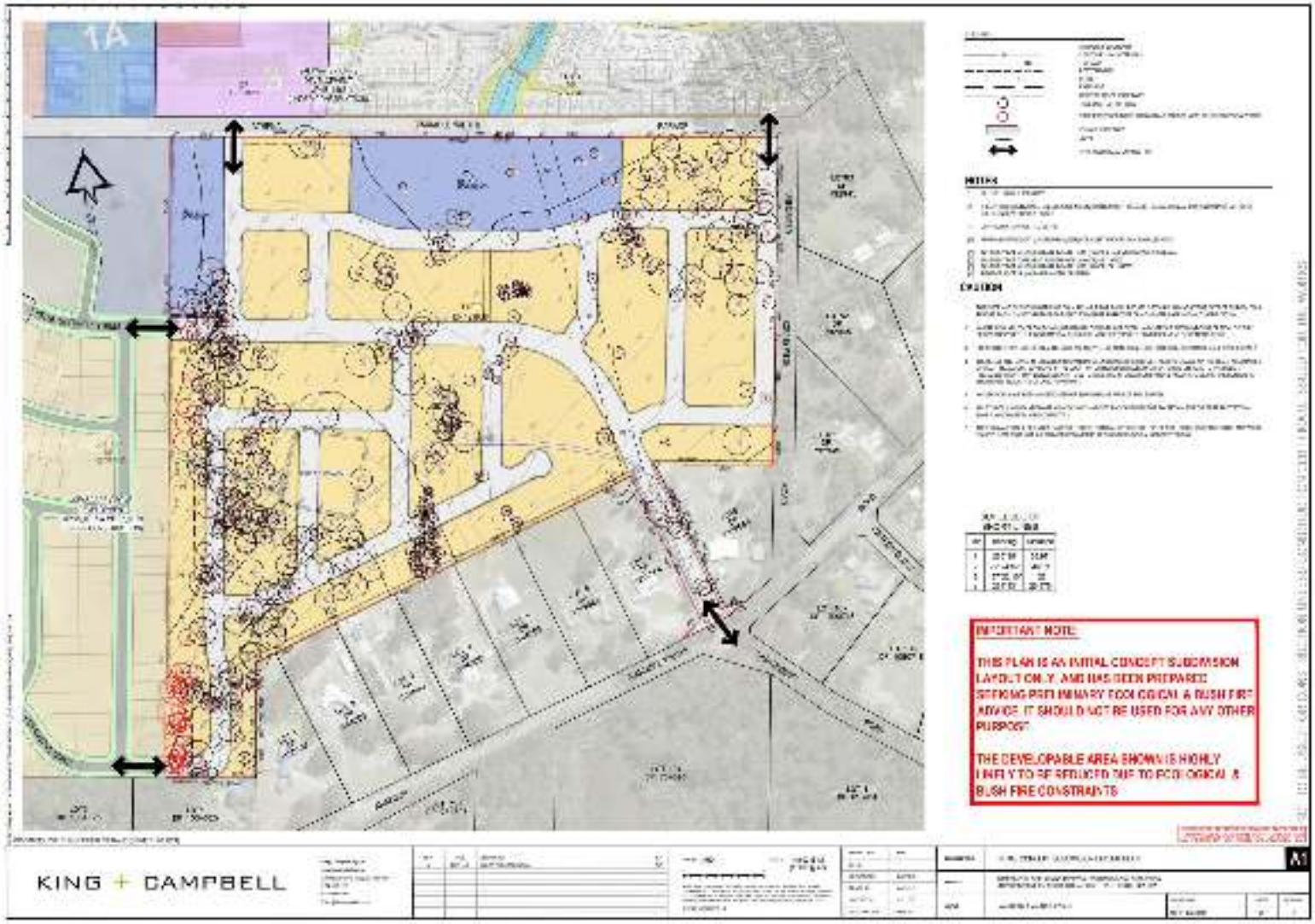
APPENDIX 1
Subject Site



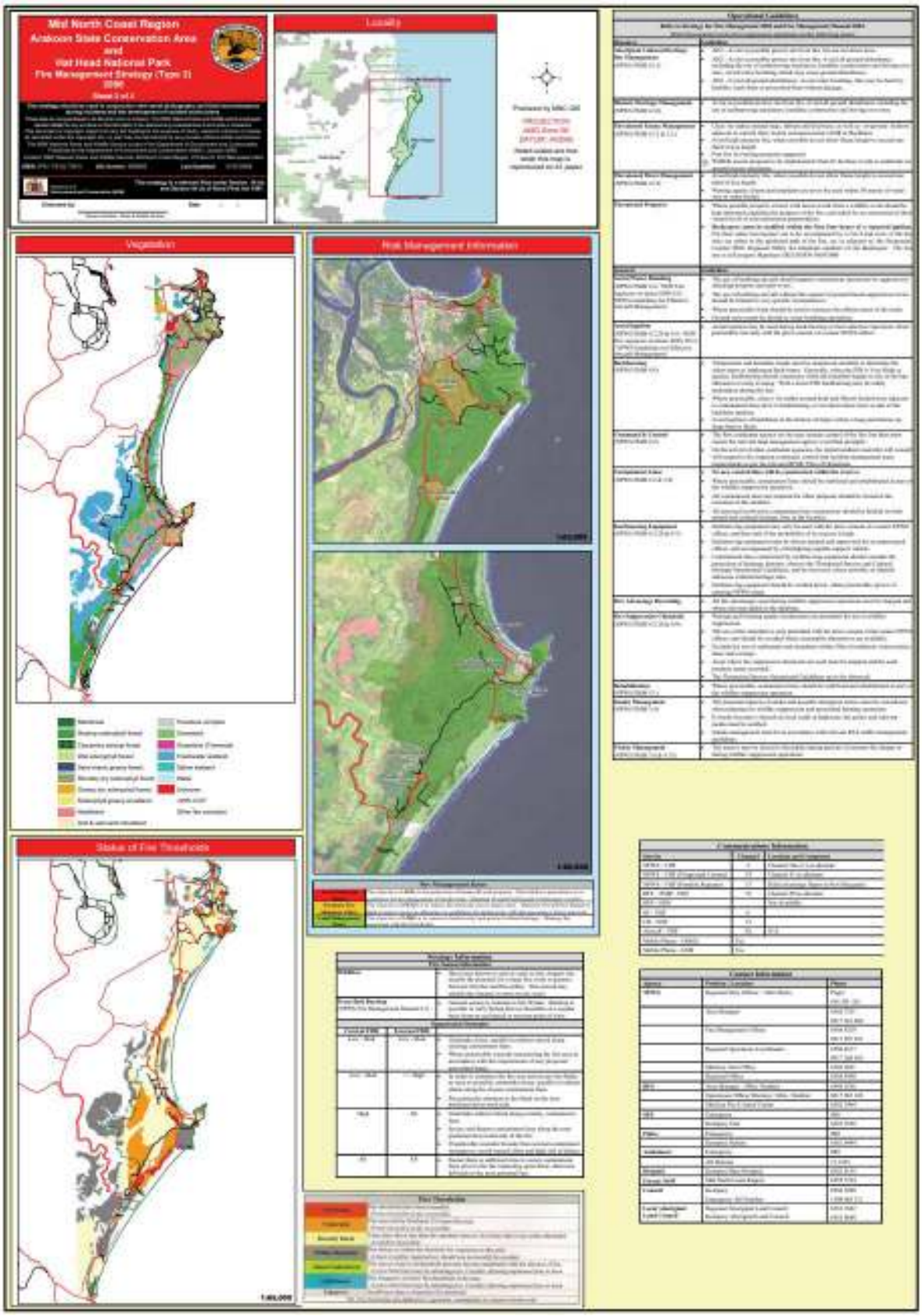
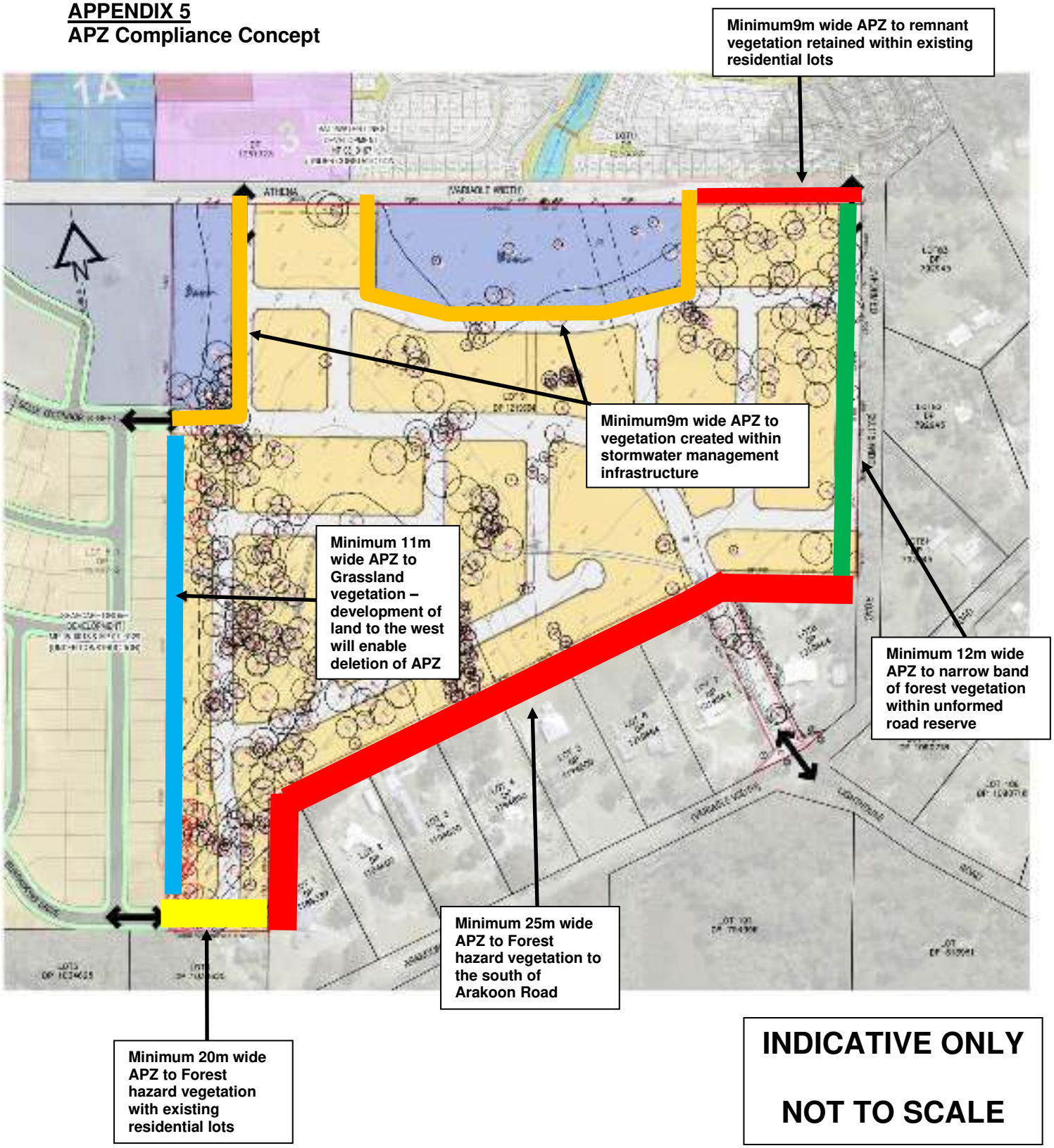
APPENDIX 2
Existing Approved Development on Adjoining Land to the North and West



APPENDIX 3
Preliminary Development Concept Plan



APPENDIX 4
Fire Management Plan – Hat Head National Park



APPENDIX 5
APZ Compliance Concept