



BUSHFIRE
PLANNING
AUSTRALIA

STRATEGIC BUSHFIRE STUDY

FULLERTON COVE RESIDENTIAL SUBDIVISION

Cox Lane, Fullerton Cove



Bushfire Planning Australia

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BPA Reference: 2536 Fullerton Cove

Prepared for Roberts Development Group Pty Ltd
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This report is based on the site conditions surveyed at the time the document was prepared. The assessment of the bushfire threat made in this report is made in good faith based on the information available to Bushfire Planning Australia at the time.

The recommendations contained in this report are considered to be minimum standards and they do not guarantee that a building or assets will not be damaged in a bushfire. In the making of these comments and recommendations it should be understood that the focus of this document is to minimise the threat and impact of a bushfire.

Finally, the implementation of the adopted measures and recommendations within this report will contribute to the amelioration of the potential impact of any bushfire upon the development, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

Document Status: 2536 - Strategic Bushfire Study

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Certification

As the author of this Bushfire Threat Assessment (BAR), I certify this BAR provides the detailed information required by the NSW Rural Fire Service under Clause 45 of the Rural Fires Regulation 2022 and Appendix 1 of Planning for Bushfire Protection 2019 for the purposes of an application for a bush fire safety authority under section 100B(4) of the Rural Fires Act 1997.

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Date: 11 December 2025



In signing the above, I declare the report is true and accurate to the best of my knowledge at the time of issue.



Executive Summary

Bushfire Planning Australia (BPA) was engaged by Roberts Development Pty Ltd to prepare a Strategic Bushfire Study (SBS) in support of a Planning Proposal for the site known as 'The Sandpiper' at Fullerton Cove. The Planning Proposal seeks to enable a mix of residential accommodation (low, and medium density) and conservation land uses over approximately 26.12 hectares currently zoned RU2 Rural Landscape under the Port Stephens Local Environmental Plan 2013.

This SBS has been undertaken in accordance with the strategic planning principles in Chapter 4 of Planning for Bushfire Protection 2019 (PBP 2019), which aims to avoid inappropriate development on bushfire prone land and ensure a risk-based planning approach that prioritises resilience, life safety and appropriate land use. The bushfire hazard across the site is well understood and primarily relates to forest vegetation beyond the eastern boundary, separated by Nelson Bay Road. Additional hazards exist within the broader landscape, but the site is capable of being developed in a manner consistent with best-practice bushfire planning.

The study confirms that the Planning Proposal is consistent with Ministerial Direction 4.3 under Section 9.1(2) of the Environmental Planning and Assessment Act 1979. The proposal avoids inappropriate development, incorporates defendable space through Asset Protection Zones (APZs), provides for perimeter roads and multiple access/egress points, and ensures service infrastructure can be delivered to meet PBP 2019 requirements. The proposed zoning layout allows for APZs to be accommodated on land within the site and avoids reliance on adjoining properties for hazard separation.

Key findings include:

- ❑ The site is not exposed to an intolerable or unmanageable bushfire risk.
- ❑ Asset Protection Zones can be provided in accordance with PBP 2019.
- ❑ Future road networks allow for two-way egress and perimeter access.
- ❑ Fire hydrant spacing and water supply can comply with AS 2419.1-2021.
- ❑ The proposal does not rely on adjoining land for bushfire mitigation.

While the bushfire risk across parts of the broader landscape remains moderate to high, the site itself can be developed in a manner that reduces residual risk to an acceptable level through appropriate subdivision layout, building construction standards (to BAL-29 or lower), and bushfire protection measures.

The Strategic Bushfire Study demonstrates the Planning Proposal is suitable for progression and does not present an impediment to future rezoning. All recommendations contained within this report should be carried forward to inform the next stage of development assessment and detailed planning.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production.



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Appendix A: Proposed Land Use Zone

Appendix B: AHIMS Report

Appendix C: NBC Modelling Report



Terms and Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419-2021	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAR	Bushfire Assessment Report
BCA	Building Code of Australia
BC Act	NSW Biodiversity Act 2016
BDAR	Biodiversity Development Assessment Report
BMP	Bush Fire Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPLM	Bush Fire Prone Land Map
BPM	Bush Fire Protection Measures
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
NPWS	NSW National Parks and Wildlife Service
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
PBP 2019	Planning for Bushfire Protection 2019
PSC	Port Stephens Council
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RFS	NSW Rural Fire Service
VMP	Vegetation Management Plan

1. Introduction

Bushfire Planning Australia (BPA) has been engaged by Roberts Development Pty Ltd to prepare a Strategic Bushfire Study (SBS) to support a Planning Proposal to amend the Port Stephens Local Environmental Plan (PSLEP) 2013.

The site consists of 7 existing lots, applies to approximately 26.12 hectares of land north of Cox Lane that is currently zoned as RU2 Rural Landscape under the PSLEP. The Planning Proposal seeks to amend the PSLEP to enable residential accommodation (low density and medium density) and environmental conservation zones.

This assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required to deliver a residential development in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) that has been released and adopted through the *Environmental Planning and Assessment Amendment* (Planning for Bushfire Protection) *Regulation 2007* and the *Rural Fires Regulation 2022*.

2. Site Description

Fullerton Cove is a rural suburb of the Port Stephens local government area in the Hunter Region of New South Wales, Australia, located just north of Fern Bay and adjacent to Fullerton Cove.

The site is located north of Coxs Lane, east of Fullerton Cove Road and west of Nelson Bay Road. The site details are outlined in **Table 1** below.

Table 1: Site Details

Address & Title	Land north of Coxs Lane, Fullerton Cove	
Title	Lot 991 DP627179 Lot 3 DP111519 Lot 1 DP1142113 Lot 201 DP39968	Lot 1910 DP557701 Lot 1 DP794575 Lot 1 DP1006307
LGA	Port Stephens Council	
Site Area	26.12 ha	
Land Use Zone	RU2 Rural Landscape	
Bushfire Prone Land	Vegetation Category 1 and Vegetation Category 3	
Context	The site consists of 7 parcels of land, all being absent of dwellings or buildings. A large portion of the site is a former sand quarry which is lined with vegetation which extends beyond the site boundary to Nelson Bay Road. The two lots within the western-most portion of the site are also vegetated and located amongst rural residential properties. There are multiple easements that exists throughout the site. Overall, vegetation exists to the north of the site and is otherwise bound by Nelson Bay Road to the east, Coxs Lane to the south and rural residential properties and Fullerton Cove Road to the west.	
Topography	The site slopes upwards towards the mid-section of the site and to the north-east corner of the site surrounding the former quarry.	
Fire History	The site lies within a local government area with a Fire Danger Index (FDI) rating of 100.	

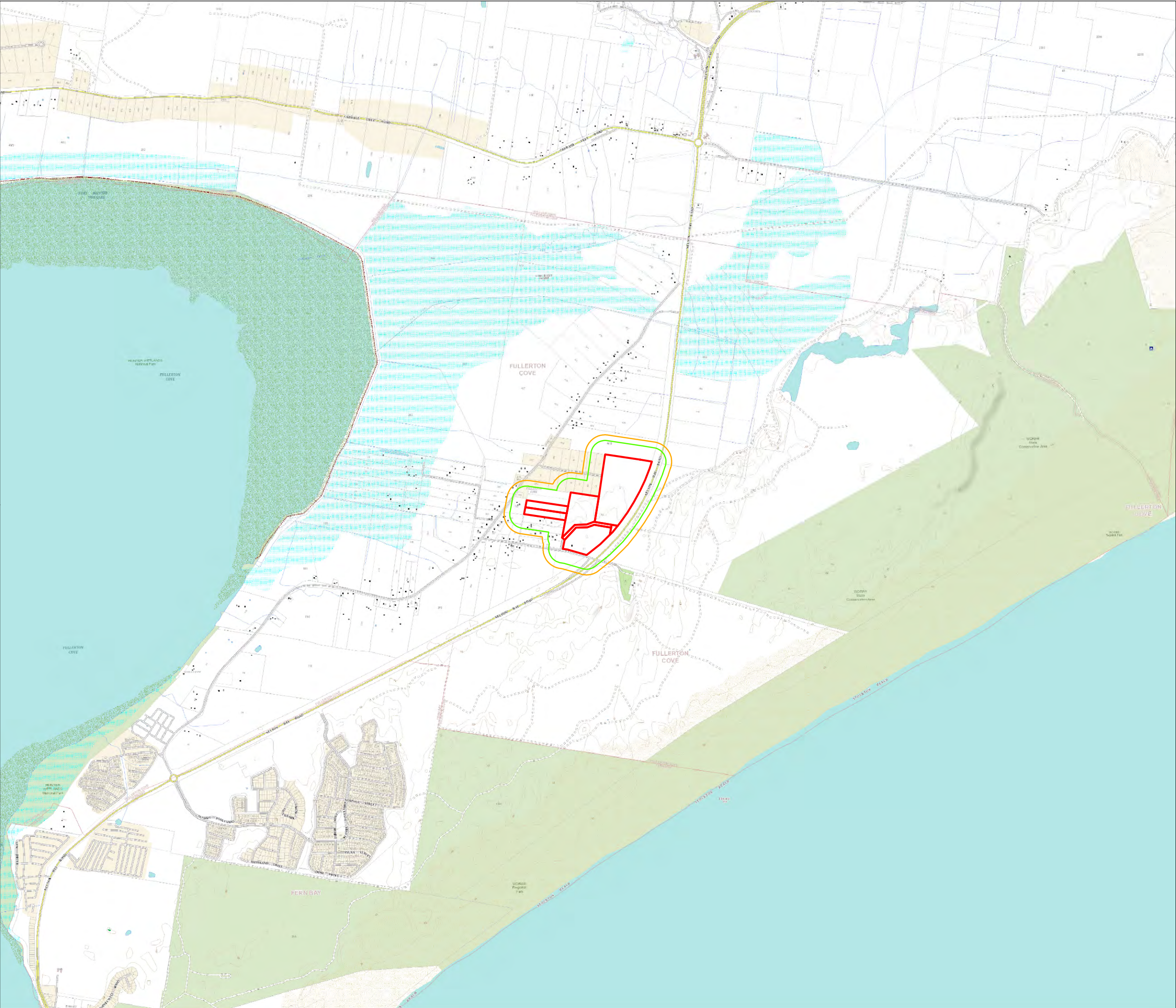
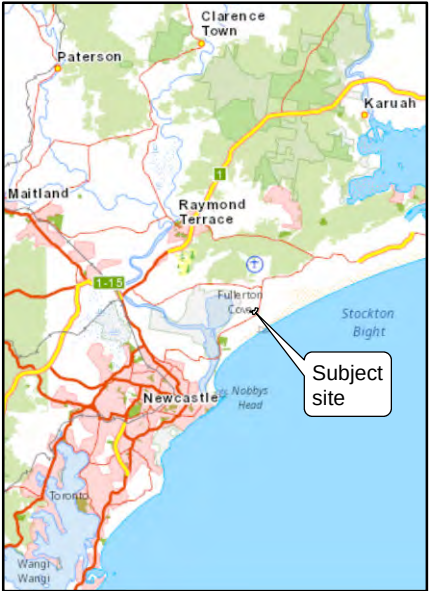


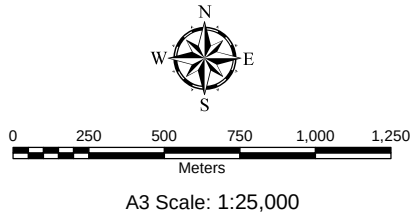
Figure 1

Site Location



- Subject site
- 100m buffer
- 140m buffer

SOURCE:
Base Map © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW) 2024



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2.1. Bushfire Prone Land

Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics of the hazard, the size and characteristics of the affected population, types of land use exposed to bushfire, predicted development growth pressures and other factors affecting bushfire risk.

Figure 2 confirms the site is identified as both Vegetation Category 1 and Vegetation Category 3 bushfire prone land.

Vegetation Category 1 bushfire prone land is located predominantly throughout the entire site including the north-eastern corner, largely the eastern, southern and western portion of the site. Vegetation Category 3 bushfire prone land exists throughout the middle of the site, north-eastern portion of the site and far western site boundary. The Vegetation Category 1 bushfire prone land external to the former sand quarry area, will be retained as part of the proposed development and therefore is identified as the closest, but not the primary, bushfire hazard.

An isolated parcel of Vegetation Category 1 bushfire prone land also exists to the north of the site within and beyond 140m, although is also surrounded by Vegetation Category 3 bushfire prone land which also extends to the west of the site.

Within and beyond 140m east and south of the site Vegetation Category 1 bushfire prone land exists, although separated by Nelson Bay Road and Coxs Lane respectively. The vegetation located on the eastern side of Nelson Bay Road is the largest and therefore is identified as the primary bushfire hazard.

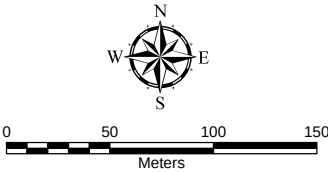


Figure 2
**NSW Bush
Fire Prone
Land**



- Subject Site
- Easement
- 100m buffer
- 140m buffer
- Bushfire Prone Land**
 - Vegetation Category 1
 - Vegetation Category 3

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2025
NSW Bush Fire Prone Land: NSW Rural Fire Service
2024
Aerial photo: NearMap 07/02/2025



A3 Scale: 1:3,650

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2.2. Proposed Development

The Planning Proposal relates to 7 individual property titles located along Cox's Lane, George Street, and Fullerton Cove Road, Fullerton Cove. All lots are currently zoned RU2 Rural Landscape under the PSLEP (**Figure 3**) and are proposed to be amended to enable residential accommodation (low density and medium density) and environmental conservation zones as seen in **Figure 4** and **Table 2**.

The Planning Proposal Precinct has also been further defined, as referred to by Council as 'land to the north of Cox's Lane', being those properties located between George Street to Cox's Lane within the Planning Proposal requirements letter issued by Council dated 17 June 2024.

The Planning Proposal will ensure the future rezoning and land development proposals are well-integrated, sustainable, and responsive to the specific needs and aspirations of the local community. It establishes a clear, evidence-based pathway to achieving balanced growth and long-term prosperity in the region. The Planning Proposal would not only investigate the best zone, yield and housing type for key sites, but would also holistically assess the site as a whole to ensure a logical and function road network with supporting urban form.

Table 2: Site Details & Proposed PSLEP Amendments

Address	Lot and DP	Proposed PSLEP Amendment
16 George Street, Fullerton Cove 2318	991/-/DP627179	R3 – Medium Density Residential R2 – Low Density Residential C2 – Environmental Conservation
21 Coks Lane, Fullerton Cove 2318	1/-/DP1142113	R3 – Medium Density Residential C2 – Environmental Conservation
	201/-/DP39968	C2 – Environmental Conservation
	1/-/1006307	R3 – Medium Density Residential C2 – Environmental Conservation
	1910/-/DP557701	R3 – Medium Density Residential
10 Fullerton Cove Road, Fullerton Cove 2318	3/-/DP111519	R2 – Low Density Residential R3 – Medium Density Residential C2 – Environmental Conservation
	1/-/DP794575	R2 – Low Density Residential R3 – Medium Density Residential C2 – Environmental Conservation

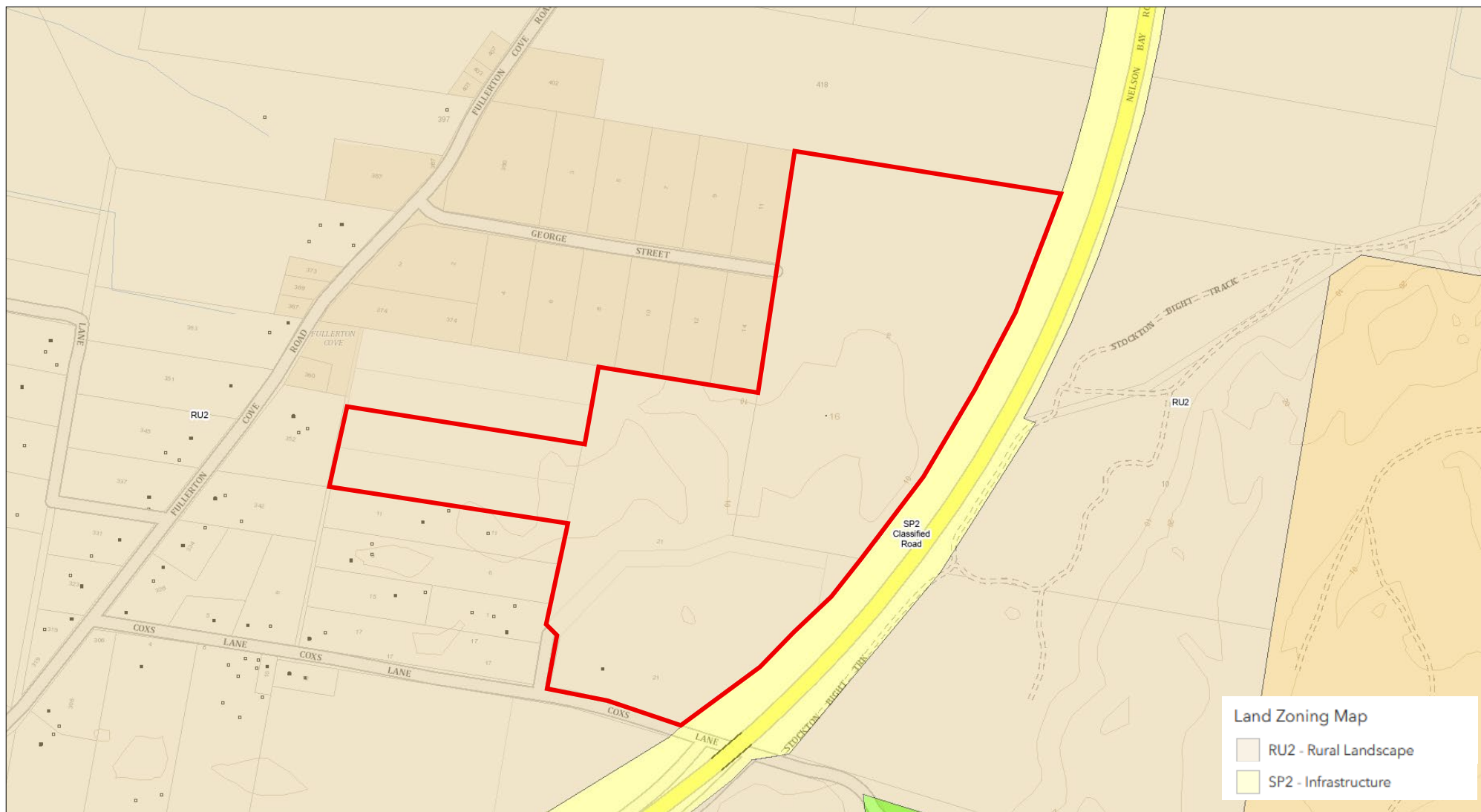


Figure 3: Existing Land Zoning Map (Port Stephens Council)

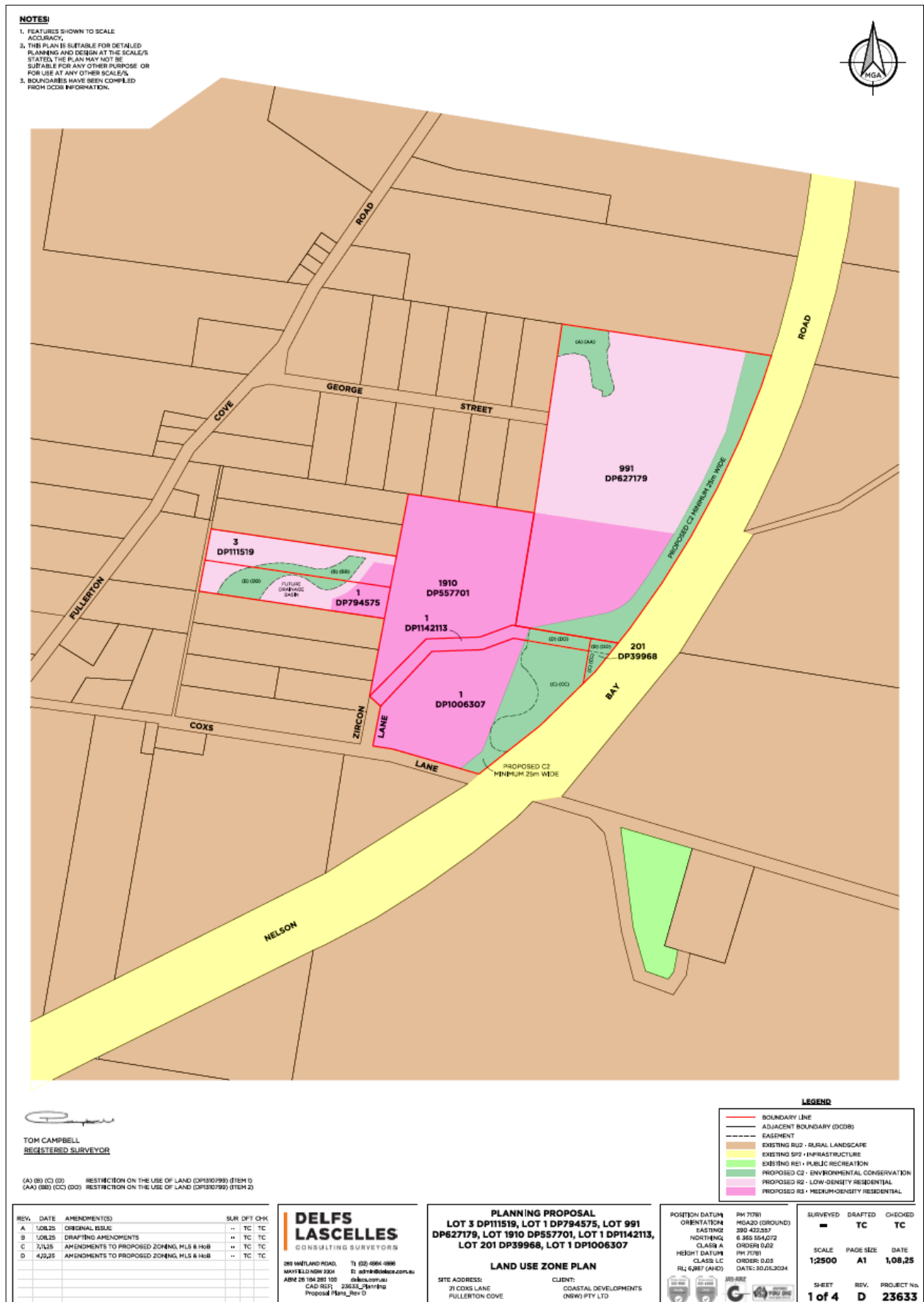


Figure 4: Proposed Land Zoning Plan

3. Strategic Bushfire Study

3.1. Establishing Risk and Applying Treatment

The Strategic Bushfire Study (SBS) was introduced in NSW by Planning for Bush Fire Protection 2019 (PBP 2019). The SBS follows the principles of strategic planning generally in taking a long-term approach to land use planning and development expectations. The SBS aims to minimise or avoid the impact of natural hazards by taking a risk-based approach to the assessment of strategic planning policies and proposals. The SBS uses a macro-scale assessment, creates a risk profile and seeks treatment strategies to respond to the risk.

There are a number of national level guidance documents which provide helpful guidance in preparing strategic studies for natural hazard resilience. At a high level, the stage is set for consideration for natural hazards in strategic planning by the *Sendai Framework for Disaster Risk Reduction 2015 - 2030* (UNDRR, 2015), *The National Disaster Risk Reduction Framework* (Australian Government Department of Home Affairs, 2018), *Profiling Australia's Vulnerability: The interconnected causes and cascading effects of systemic disaster risk* (Australian Government Department of Home Affairs, 2018) and the *National Strategy for Disaster Resilience* (COAG 2011).

The *Land Use Planning for Disaster Resilient Communities* (the Handbook) published in 2020 by the Australian Institute for Disaster Resilience (AIDR) focuses on reducing disaster risk by improving strategic planning processes. The handbook aims to reduce both vulnerability and exposure of communities to natural hazard scenarios.

By considering natural hazards early and through its processes, land use planning can evaluate and select land use mechanisms to treat disaster risk.

The actions proposed by the Handbook are to understand disaster risk, make accountable decisions, establish governance, ownership and responsibility and ultimately, attract enhanced investment to reduce the risk. Ultimately, the goal is to make decisions which avoid risk. However, accepting that some level of risk is inevitable, the concept of risk tolerance and acceptable risk is highlighted. The Handbook uses a key principle introduced by the Planning Institute of Australia *National Land Use Planning Guidelines for Disaster Resilient Communities* (2015) which is the ALARP principle (As Low As Reasonably Practicable). This revolves around identifying risks that are broadly acceptable, tolerable, or generally intolerable and requires the identification of risk treatment options to move more towards the tolerable or broadly acceptable categories.

The Handbook also highlights the role that land use planning can play in climate change mitigation and adaptation. Future climate change models should be identified and utilised in the process of data gathering and analysis, whilst also acknowledging the uncertainties associated with those models.

The relationship with emergency management principles is highlighted by the Handbook. The integration of risk management and land use planning is recommended. The National Emergency Risk Assessment Guidelines produced by AIDR sets out the following structure for evaluating risk and applying risk treatment (taken from NERAG):

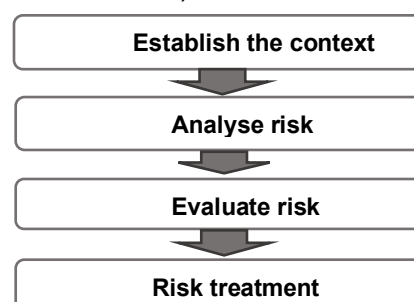


Figure 5: NERAG Risk Assessment Methodology

This process is appropriate for the SBS and will be followed to establish the risk and determine recommended risk treatments.

3.2. Ministerial Directions

Legislatively, planning proposals must follow the Ministerial Directions under Section 9.1(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Direction 4.3 requires a planning proposal, that is in proximity to land mapped as bushfire prone land, to have regard to PBP 2019, introduce controls that avoid placing inappropriate developments in hazardous areas and ensure that bushfire hazard reduction is not prohibited within the APZ.

A planning proposal must, where development is proposed, comply with the following provisions:

3(a) provide an Asset Protection Zone (APZ) incorporating at a minimum:

- i. an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and*
- ii. an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,*

3(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,

3(c) contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks,

3(d) contain provisions for adequate water supply for firefighting purposes,

3(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,

3(f) introduce controls on the placement of combustible materials in the Inner Protection Area.

The Planning Proposal demonstrates strategic alignment with Ministerial Direction 4.3 by avoiding inappropriate development on bushfire prone land and incorporating the necessary controls to mitigate bushfire risk in accordance with PBP 2019. The SBS provides sufficient evidence that the site can be developed in a manner that ensures life and property protection is achievable through subdivision design and bushfire protection measures.

3.3. Aim of the Strategic Bushfire Study

In accordance with PBP 2019, the Strategic Bushfire Study (SBS) is a high level assessment that identifies land affected by natural hazards and directs development away from inappropriate and constrained lands. In a bush fire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bush fires also needs to be provided for at the earliest stages of planning.

The bushfire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation will also be considered. Firefighting access and evacuation potential must be considered and an assessment of traffic volumes and evacuation routes will be required. The potential for these evacuation routes to be non-trafficable during a bush fire event will be factored into the assessment.

This SBS follows the considerations outlined within Table 4.2.1 of PBP 2019 to identify and analyse the risk profile and apply risk treatment measures.

The aim of the SBS is to meet the following principles:

- ☐ ensure land is suitable for development in the context of bush fire risk.
- ☐ ensure new development on bush fire prone land will comply with PBP 2019.
- ☐ minimise reliance on performance-based solutions.
- ☐ provide adequate infrastructure associated with emergency evacuation and firefighting operations.
- ☐ facilitate appropriate ongoing land management practices.

3.4. Bushfire Landscape Assessment

A bushfire landscape assessment considers the likelihood of a bushfire approaching an area, its potential severity and intensity, and the resultant impact on life and property in the context of the broader surrounding landscape.

With regard to proposed site, the bushfire hazard, potential fire behaviour, history of bushfires and fire runs, and operational response was assessed with the outcomes addressed in the following sections.

3.4.1. Vegetation

An assessment of vegetation is important in determining risk as different types of vegetation burn differently across the landscape. This is largely due to location and topography, structure and arrangement and available surface, elevated and canopy fuel loads.

Grasses and heath burn more quickly and erratically with fire consuming a large proportion of the plant matter, as they are influenced by finer fuels, open air, exposed drying conditions and variations in wind speed and direction, whilst forests burn with greater intensity due to substantial amounts of taller, dense and woodier fuels. The amount of plant matter consumed by forest fires also varies due to the availability of fine fuel loads, fuel moisture and localised wind conditions.

It is these traits in vegetation that determine potential radiant heat and flame characteristics which in turn define building setback requirements in accordance with PBP 2019.

Vegetation within the proposed site has been mapped by Department of Planning and Environment 2024. The vegetation communities within the subject site have been characterised into structural formations according to David Keith (2004) *Ocean Shores to Desert Dunes* and PBP 2019 to determine likely maximum fuel loads in accordance with the NSW RFS fact sheet *Comprehensive Vegetation Fuel Loads (2019)*. Refer to **Table 3** and **Figure 6** for Vegetation Types across and surrounding the site within a 5km radius.

Vegetation within the proposed site was verified by onsite field investigations in accordance with the site assessment methodologies within Appendix 1 of PBP 2019 (carried out by Bushfire Planning Australia on 11 April 2025).

Vegetation retained within the subject site is confirmed as a *forest*, namely *Coastal Dune Dry Sclerophyll Forest* and *Coastal Swamp Forest*. This vegetation also extends beyond the site, in varying levels, in all directions. Vegetation to the east of the site, separated by Nelson Bay Road, is identified as the primary bushfire hazard.

All residential dwellings and industrial buildings that exist within 140m of the site do not need to be considered for the purposes of PBP 2019.

Table 3: Vegetation Communities and Corresponding Structural Formations and Fuel Loads within 5kms of the Site

Vegetation Community	Structural formation (Keith 2004)	Structural formation (PBP 2019)	Overall fuel load Tonnes/ha (including surface, elevated, bark and canopy)
Forest Coastal Swamp Forest	Forested Wetlands	Forest	34.1
Forest Coastal Dune Sclerophyll Forest	Dry Sclerophyll Forest (Shrub/Grass)	Forest	31.1
Forested Wetlands Coastal Floodplain Wetlands	Forested Wetlands (Riverine forest)	Forested Wetlands	15.1
Short Heath Coastal Heath Swamps	Heathland	Short Heath	15.0
Short Heath Wallum Sand Heaths	Heathland	Short Heath	15.0
Short Heath Coastal Headland Heaths	Heathland	Short Heath	15.0
Freshwater Wetlands Coastal Freshwater Lagoons	Freshwater Wetlands	Freshwater Wetlands	4.4
Saltmarshes	Excluded - low threat	Excluded - low threat	N/A

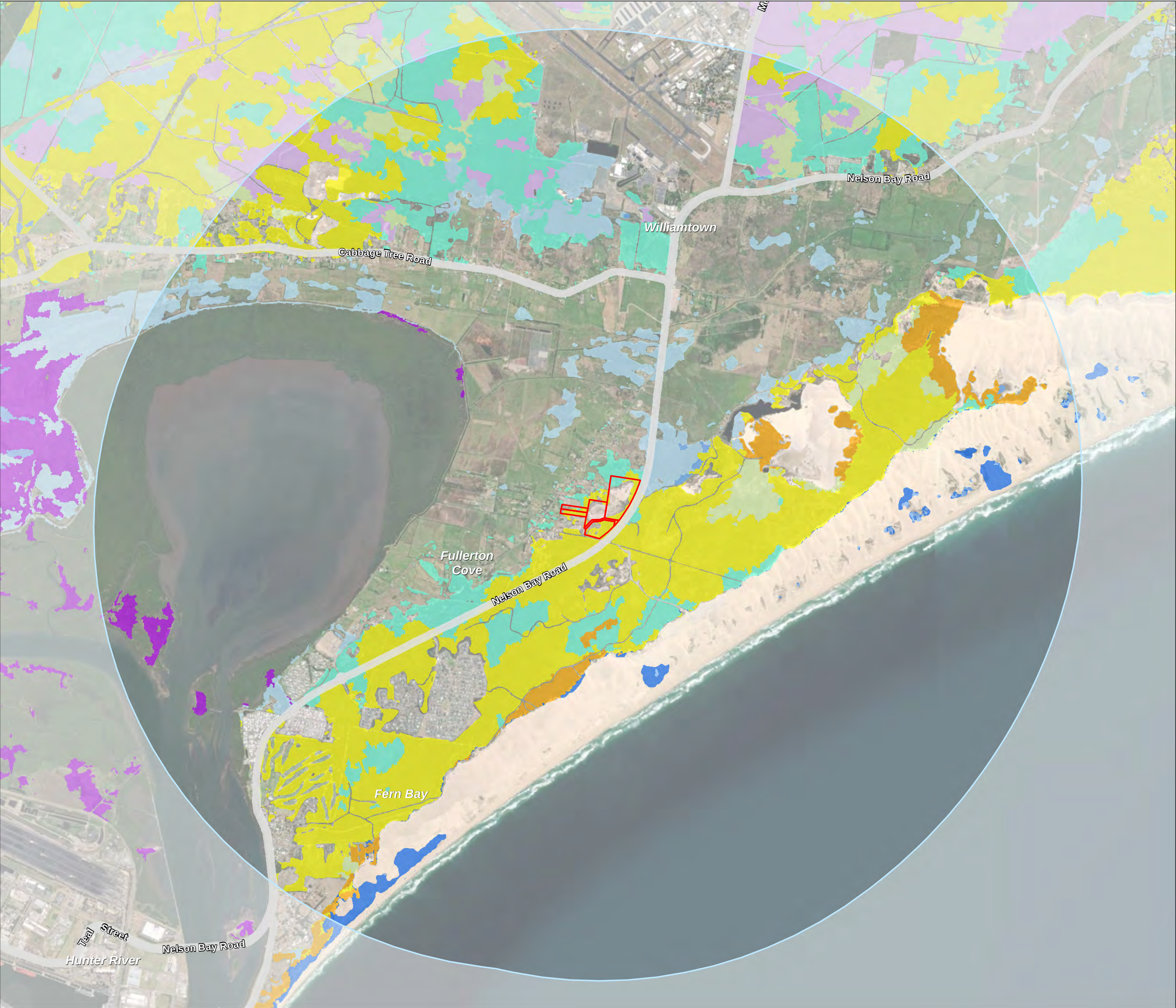


Figure 6
NSW State
Vegetation
Type - 5Km



- Subject site

5Km from subject site

Vegetation Class

Saltmarshes

Coastal Heath Swamps

Coastal Floodplain Wetlands

Coastal Freshwater Lagoons

Maritime Grasslands

Wallum Sand Heaths

Coastal Headland Heaths

Coastal Dune Dry Sclerophyll Forests

Coastal Swamp Forests
- SOURCE:
Aerial photo: Maxar 2023
Vegetation: © State Government of NSW and
Department of Planning and Environment 2023
-
- File:2535-FullertonCoveSBS-Fig5-Vegetation-NSW-SVT-5Km-250805
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3.4.2. Topography

Topography and slope play a significant role in influencing the rate of fire spread and fire behaviour in relation to the potential for canopy involvement.

Research shows that the speed of an advancing bushfire front will double with every 10 degree increase in slope, so that on a 20 degree slope, its speed of advancement is four times greater than on flat ground. This is because the radiation and convection a fire creates preheats the unburned fuel ahead of the fire front causing it to combust at a quicker rate. This is done more effectively upslope than down. Fuel distributed across every layer of the vegetation community, in effect creating a ladder, also contributes to the likelihood of fire transfer to the canopy. This transfer is also more effective on steeper slopes.

Digital Elevation Modelling (DEM) shows us the topography within the locality of Fullerton Cove region ranges from -1m below sea level with the highest elevation approximately 53m above sea level, north-east / east of the site (**Figure 7**).

An assessment of the effective slope (that which sits underneath the bushfire hazardous vegetation) impacting the study area was undertaken using LIDAR point cloud data, DEM (NSW LPI) and results from field investigations carried out in April 2025. An assessment of the slope over a distance of 5kms was undertaken. Results revealed slopes within the proposed site are mostly flat, although increase towards the southern and western site boundaries and around the former quarry (**Figure 8**).

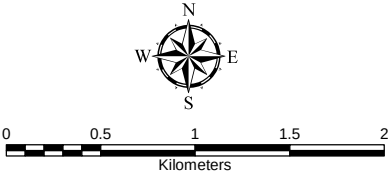
In accordance with PBP 2019, development on steeper slopes, where the bushfire threat is downhill and has the potential to increase the rate of spread and intensity of bushfire, requires larger setbacks. Section 4 of this report addresses APZs and building setbacks commensurate with slope surveyed within the study area to achieve radiant heat levels $\leq 29\text{kW/m}^2$.

Figure 7
Digital
Elevation
Model - 5Km



- Subject site
- 5Km from subject site
- Contour (10m)
- Contour (2m)
- Elevation (AHD)
High : 53m
Low : -1m

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2025
Surface analysis: Derived from LiDAR -
NEWCASTLE 2012 / 2013 / 2014, 1 metre
Resolution Digital Elevation Model © Department
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A3 Scale: 1:40,000

File:2535-FullertonCoveSBS-Fig7-DEM-5Km-250805
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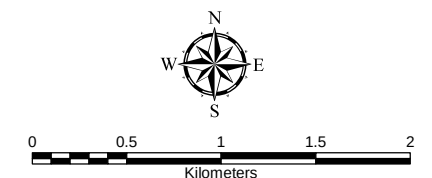
Figure 8

Slope Analysis: LiDAR - 5Km



- Subject site
- 5Km from subject site
- Slope**
- 0° - 5°
 - 5° - 10°
 - 10° - 15°
 - 15° - 20°
 - >20°

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2025
Aerial Photo: Maxar 2023
Surface analysis: Derived from LiDAR -
NEWCASTLE 2012 / 2013 / 2014, 1 metre
Resolution Digital Elevation Model © Department
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A3 Scale: 1:40,000

File:2535-FullertonCoveSBS-Fig9-Slope-LiDAR-5Km-250805

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3.4.3. Weather and Climate

The typical climate across the Port Stephens LGA is warm subtropical with the altitude areas tending toward warm temperatures. According to the *Lower Hunter Bush Fire Risk Management Plan (2009)* (BFRMP), which includes both Port Stephens and Dungog Council areas, the official bushfire season ordinarily begins on 1 October and ends on 31 March.

Prevailing weather conditions associated with the bushfire season in the Lower Hunter BFMC area are north-westerly winds accompanied by high daytime temperatures and low relative humidity. There are also frequently dry lightning storms in the western areas occurring during the bushfire season.

The Forest Fire Danger Index (FFDI) given to the Port Stephens region is 100. The index is calculated from weather station data and is based on representative values of wind speed, temperature, humidity and fuel conditions.

The index represents a 1:50 year fire weather scenario and is applied to methodologies in calculating anticipated bushfire attack levels. It is possible that due to local variations in elevation, slope, and aspect, FFDI values at any point location may reflect values which are higher or lower than 100 resulting in different rates of fire spread across a landscape. **Table 4** provides a brief overview of point location weather data recorded at Williamtown RAAF (closest open weather station with climate statistics to Fullerton Cove).

Table 4: Climate Statistics Recorded at Williamtown RAAF Weather Station (BOM Climate Statistics for Australian Locations, April 2025)

Weather Station	Williamtown RAAF
Mean maximum temperature (degrees)	Highest 28.3 (January), Lowest 17.2 (July)
Mean minimum temperature (degrees)	Highest 18.2 (January), Lowest 6.5 (July)
Highest temperature (degrees)	45.5 (11 February 2017)
Lowest temperature (degrees)	-3.9 (18 July 1970)
Mean number of days $\geq$ 30 degrees	75.0 (1942-2025)
Mean monthly rainfall (mm)	Highest 127.2 (March 2021), Lowest 60.2 (September 2008)
Mean 3pm relative humidity (%)	Highest 62 (February), Lowest 50 (August)
Mean 3pm wind speed (km/h)	Highest 23.5 (November), Lowest 15.8 (May)

Climate change is influencing the frequency and severity of dangerous bushfire conditions in Australia. Fire risk is affected by four main factors, fuel load, fuel dryness, weather and ignition. Understanding the impacts of climate change on bushfires in NSW, relies on how climate change might affect these factors.

- ❑ Vegetation (i.e. fuel) growth will be affected by global increases in greenhouse gas emissions such as carbon dioxide as well as changes to rainfall patterns.
- ❑ Climate models have predicted that NSW will experience warmer drier periods of weather, drying vegetation and increasing bushfire risk. The 2019/2020 Black Summer bushfire season was predeeded by three years of increasing drought conditions.
- ❑ The risk of fire is increased by low rainfall and humidity and high temperature and wind speeds. There have been significant changes observed in recent decades towards more dangerous bushfire weather conditions for various regions of Australia. Observed changes in southern and eastern Australia include an earlier start to the bushfire season with dangerous weather conditions occurring significantly earlier in spring than they ever used to.

- ❑ In relation to fire ignition, there is some indication that climate change could influence the risk of ignitions from dry-lightning storms. Additionally, there has recently been a number of devastating fire events in Australia associated with extreme pyroconvection (including thunderstorm development in a fire plume), with recent research indicating a long-term trend towards increased risk factors associated with pyroconvection in southeast Australia.

According to the BFRMP, temperatures have been increasing in the Lower Hunter Region since about 1970. 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.

In addition to the changing weather conditions, it is anticipated that the potential for wildfire ignition will increase and fuels may also change. There is increased capacity for lightning strikes within the landscape due to potentially more volatile weather conditions, increased ignition potential could lead to more challenging firefighting conditions. Over the longer term, fuels can become drier, areas of forest or forested wetland could become drier with a higher propensity to burn. The increased risk of hotter fires occurring on a more regular basis can also increase the risk of vegetation communities, such as forest, being impacted more frequently by fire and taking hundreds of years to recover (environment.nsw.gov.au).

In planning for a climate change future, the following mechanisms may be considered:

- ❑ Required setbacks from bushfire hazardous vegetation commensurate with an FFDI 100 or higher.
- ❑ Mechanical fuel reduction, where achievable, as opposed to controlled burning.
- ❑ Alternative landscaping initiatives and garden design that relies more on non combustible elements and use of succulent and drought resistant plantings, and
- ❑ Improved emergency management planning and procedures.

3.4.4. Bushfire Behaviour and Fire History

Information on fire history is a useful factor in understanding fire frequency and bushfire risk. Review of available fire history data within and surrounding the Fullerton Cove indicates there have been a number of bushfires of varying scales recorded over the last 25 years (**Figure 9**).

No bushfires have been recorded which have affected the site. The closest bushfire occurred in 2022 to the immediate east of the site, separated by Nelson Bay Road. The largest fire was recorded in 2013, approximately 2.5km north of the site and north of Cabbage Tree Road.



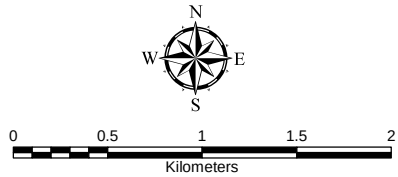
Figure 9

NSW State Fire History



	Subject site		2012
	5Km from subject site		2013
	Classified fire trail		2015
Year of Fire			2017
	2002		2018
	2003		2019
	2006		2020
	2009		2022
			2023

SOURCE:
Aerial photo: Maxar 2023
NSW State Fire History & Classified Fire Trail ©
State Government of NSW and NSW Rural Fire
Service 2024



A3 Scale: 1:40,000

File:2535-FullertonCoveSBS-Fig3-FireHistory-5Km-250805
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3.4.4.1. Lower Hunter Bush Fire Risk Management Plan

According to the Lower Hunter Bush Fire Risk Management Plan (BFRMP) the Port Stephens and Dungog regions have on average 200 bush fire per year, of which 3 on average can be considered to be major fires. The main sources of ignition include:

- ❑ Escapes from burning off
- ❑ Arson
- ❑ Arching electrical power lines

The BFRMP confirms the site is not identified as an asset within the Lower Hunter BFRMP (**Figure 10**) although surrounded by human settlements (red hatching) to the north, south and west.

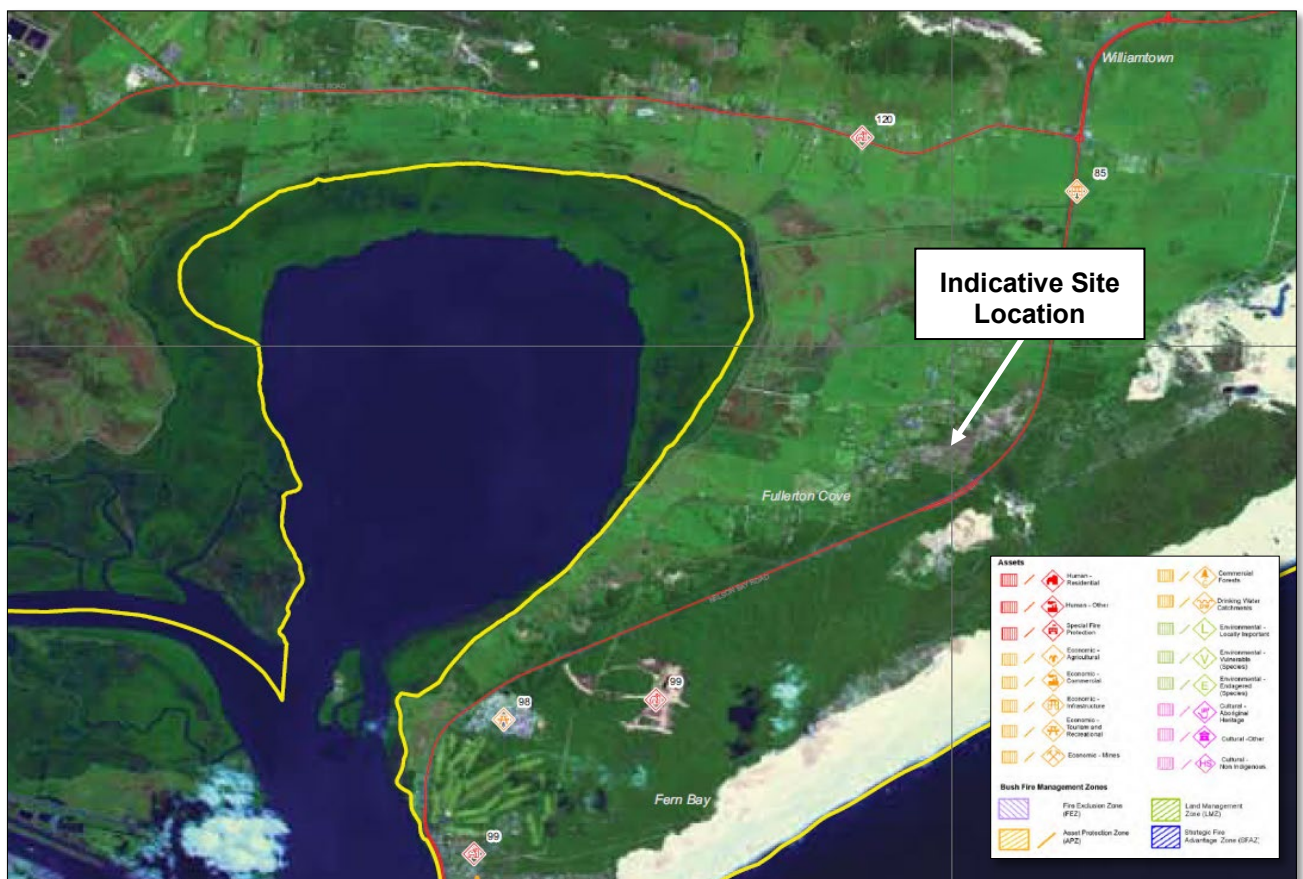


Figure 10: The Site within the Lower Hunter BFRMP (Map 3)

3.5. Land Use Assessment

A land use assessment identifies the appropriateness of siting different land uses in particular locations based on risk profiles. The planning proposal looks to allow for low and medium density residential development opportunities for a site separated by corridors of remnant vegetation.

The focus of the SBS is to assess the implications of alternate land use proposed on the site. The planning proposal seeks to rezone land to residential accommodation (low density and medium density), and conservation zones (environmental).

The existing landscape on the subject site has been assessed as having a low to moderate risk of bushfire impact as there are no human or cultural assets currently found on the majority of the site. The change of zoning and development for alternate land uses changes the risk profile for the asset in the following ways:

- ❑ The primary asset would be identified as a “residential” asset.
- ❑ The threat level would be reduced as there would be no change to the vegetation, but mitigation achieved through the planning process, such as the introduction of APZs and construction standards would reduce the threat. The threat level will therefore reduce to ‘low’.
- ❑ The vulnerability of the asset would increase with the addition of residential dwellings, but nevertheless, the vulnerability will remain low, providing the access and egress can be upgraded to an adequate level.
- ❑ The consequence level, derived by plotting threat level against vulnerability, would be minor, again assuming that the access can be upgraded to an adequate level.
- ❑ The likelihood - frequency of ignition and chance of spread (access, suppression capability, fire run, fire paths) would potentially increase slightly over and above the existing use. Additional people on the site may slightly increase the chance of human ignition, there would be greater need for suppression and good access. The likelihood would therefore increase and highlights the need for improved access and suppression capability.

Overall, the bushfire risk to the site will increase slightly with the introduction of varying residential accommodation densities to the site amongst other non-habitable developments. Whilst the threat would potentially reduce, the vulnerability, consequence and likelihood would increase slightly. The increase in risk would be offset by the introduction of APZ, construction requirements and other bushfire protection measures. The access is a key mitigation measure in reducing the bushfire risk to the development. Upgrades to the access and a full traffic assessment from an emergency perspective will really embed the low bushfire risk classification.

3.6. Access and Egress

PBP requires sufficient access with design objectives that enable safe evacuation away from an area whilst facilitating adequate emergency and operational response. All areas affected by bushfire prone land should have an alternate access or egress option dependant on bushfire risk, density of development, population and the chances of roads being cut-off by fire, smoke and accidents for prolonged periods of time.

Section 5.3.2 of PBP requires a development to provide safe operational access to structures and water supply for emergency services while residents are seeking to evacuate.

All new roads would need to comply with the following requirements, in accordance with Table 5.3b of PBP:

- ☐ All roads are two-wheel drive, sealed, all-weather roads.
- ☐ A secondary access is provided to the development.
- ☐ Traffic management devices do not prohibit access by emergency services vehicles.
- ☐ Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees.
- ☐ Carriageway width kerb to kerb shall be a minimum of 5.5 metres and have a minimum vertical clearance of 4 metres to overhanging obstructions and tree branches.
- ☐ All parking shall be provided outside of the carriageway width.
- ☐ Curves of roads shall have a minimum inner radius of 6 metres and crossfall shall not exceed 3 degrees.
- ☐ Dead end roads incorporate a minimum 12 metres outer radius turning circle and are clearly sign posted as a dead end.
- ☐ One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water.
- ☐ The capacity of roads/bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes) with bridges/causeways clearly indicating load rating.
- ☐ Perimeter roads are two-way with a minimum carriageway width of 8 metres kerb to kerb and non-perimeter roads are minimum 5.5m carriageway width kerb to kerb.
- ☐ Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.

Access and egress to the site is currently available from:

- ☐ George Street - within the northern section of the site
- ☐ Cox's Lane (provided from both Nelson Bay Road and Fullerton Cove Road) - along the site's southern boundary

Any further development must comply with PBP 2019 access requirements outlined above and in Section 5.3.2 PBP 2019.

A critical factor for the proposed development is the design of a road network that provides adequate emergency access and evacuation routes. Therefore, future traffic modelling should include an assessment of the road network's evacuation capacity under various bushfire scenarios.

3.7. Emergency Services

With an increase in population comes a growing demand on emergency services and it is prudent that consideration be given to the future impact on firefighter numbers, appliances, infrastructure, training and response time. Currently within a 20-kilometre radius of the site there are two Rural Fire Brigades, and two Fire and Rescue NSW fire stations (**Table 5**). This increases the likelihood of a rapid response to a potential bushfire emergency.

Whilst there are a number of emergency services located within the area, there is still a requirement for the community to understand their risk and ensure they have a bushfire survival plan that outlines their emergency arrangements and course of action.

Potential growth in population should also prompt Port Stephens Council and RFS District Office to assess the implications on resource capabilities and the need for extra bushfire management and community advisory roles, stations, firefighting volunteers, equipment and/or increased training opportunities to cater for future development and capacity.

Table 5: Fire Brigades within 20kms of the Site

Rural Fire Brigades	Address	Distance to Subject Site
Salt Ash	1 Michael Drive, Salt Ash	12km or 12 minutes
Medowie	47B Ferodale Road, Medowie	12.3km or 13 minutes

Fire & Rescue NSW Stations	Address	Distance to Subject Site
Mayfield West	Corner of Industrial Drive & Werribi Street	16.2km or 16 minutes
Raymond Terrace	5 Leisure Way, Raymond Terrace	17.4km or 16 minutes

3.8. Infrastructure

An assessment of the issues associated with infrastructure and utilities considers the life safety issues of fire in proximity to high voltage power lines and natural gas supply lines and the pressures a major bushfire event puts on flow rates of reticulated water systems and telecommunications infrastructure.

Above ground low and high voltage power lines exist in the Fullerton Cove / Williamstown region. Generally, the energy authority's vegetation management policies and procedures assist with managing fire risks associated with existing vegetation within proximity to powerlines to prevent ignitions.

Any new development as a result of rezoning can site electricity, and communication cables underground so as to both reduce the bushfire risk from sparking power lines and protect the infrastructure supply in a bushfire event.

The extent of the existing water supply is such that an increase in demand should not detrimentally impact water pressure and flow to the study area. Additional static water supply systems can be recommended with new development to lessen dependence on reticulated systems.

In accordance with Section 5.3.3 of PBP, any new development shall provide adequate services of water for the protection of buildings during and after the passage of a bushfire and will locate gas and electricity so as not to contribute to the risk of fire to any building.

- ☐ Fire hydrant spacing, sizing, flows and pressure will comply with AS 2419.1-2021. Hydrants will be located outside of parking reserves and road carriageways.
- ☐ All sites within proposed developments will be connected to the internal reticulated water supply.
- ☐ All electricity services will be located underground.
- ☐ Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596-2014.

3.9. Adjoining Land

Consideration of the implications of a change in land use on adjoining land, including increased pressure on bushfire protection measures, should also be undertaken.

The anticipated impact on adjoining land would be:

- ☐ An increase in traffic to the local area and added dependence on reticulated water supply, both of which have been addressed in the sections above, and
- ☐ Pressures on landowners and management agencies to more frequently manage bushfire hazardous vegetation on their properties.

The adjoining land to the south of Coxs Lane, also forms part of The Sandpiper Masterplan and known as Precinct 2. The proposed use will be for educational and sporting purposes and will be assessed under an independent Planning Proposal.

All bushfire mitigation measures will be provided within the site and not rely on any adjoining land to undertake bushfire management. Furthermore, the broader bushfire risks the adjoining land users are currently exposed to will be minimised as a direct result of the Planning Proposal.

4. Bushfire Hazard Assessment

4.1. Aims and Objectives

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) and the *Rural Fires Regulation 2022*.

This Bushfire Assessment Report (BAR) also addresses the aims and objectives of PBP 2019, being:

- ☐ Afford buildings and their occupants protection from exposure to a bushfire.
- ☐ Provide a defensible space to be located around buildings.
- ☐ Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.
- ☐ Ensure that appropriate operational access and egress for emergency service personnel and occupants is available.
- ☐ Provide for ongoing management and maintenance of bushfire protection measures (BPMs).
- ☐ Ensure that utility services are adequate to meet the needs of firefighters.

4.2. Vegetation Assessment

Vegetation classification over the site and surrounding area has been carried out as follows:

- ❑ Aerial Photograph Interpretation to map the vegetation classification
- ❑ Reference to NSW State Vegetation Type, Department of Planning, Industry and Environment 2024 (**Figure 11**)
- ❑ Reference to Ground-truthed Vegetation Mapping completed by Total Earth Care on 23 January 2023 for a portion of the site (**Figure 12**)
- ❑ Site inspection completed by Bushfire Planning Australia on 11 April 2025 (**Plates 1-12**)

In accordance with PBP 2019, an assessment of the vegetation over a distance of 100m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the development footprint. The vegetation classification is based on the revised Table 2.3 in AS3959-2018 and Appendix 1 of PBP 2019. The unmanaged fuel loads detailed in the *RFS Comprehensive Fuel Loads Fact Sheet* (March 2019) have been adopted for the purpose of assessing the bushfire hazard. The findings of the site inspection were compared to the available vegetation mapping. The inconsistencies between the mapping sources and hazardous vegetation mapped on the NSW RFS Bushfire Prone Land maps were quantified during the site inspection.

4.2.1. Reliability Assessment

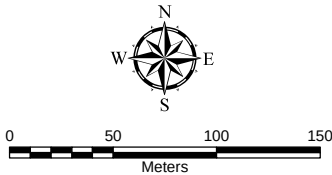
Although the bushfire prone land mapping is intended to be regularly updated, land use and vegetation cover that contribute to bushfire hazards are subject to change. A reliability assessment was undertaken for the subject site and all land within 140m. In this instance the bushfire prone land mapping is not consistent with existing vegetation present within the site.

Figure 11
NSW State
Vegetation
Type (Class)



- Subject site
- Easement
- 100m buffer
- 140m buffer
- Vegetation Class**
 - Coastal Dune Dry Sclerophyll Forests
 - Coastal Floodplain Wetlands
 - Coastal Swamp Forests

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2025
Vegetation: © State Government of NSW and Department of Planning and Environment 2024
Aerial photo: Nearmap 07/02/2025



A3 Scale: 1:3,650

File: 2535-FullertonCoveSBS-Fig4-Vegetation-NSW-SVT-250805
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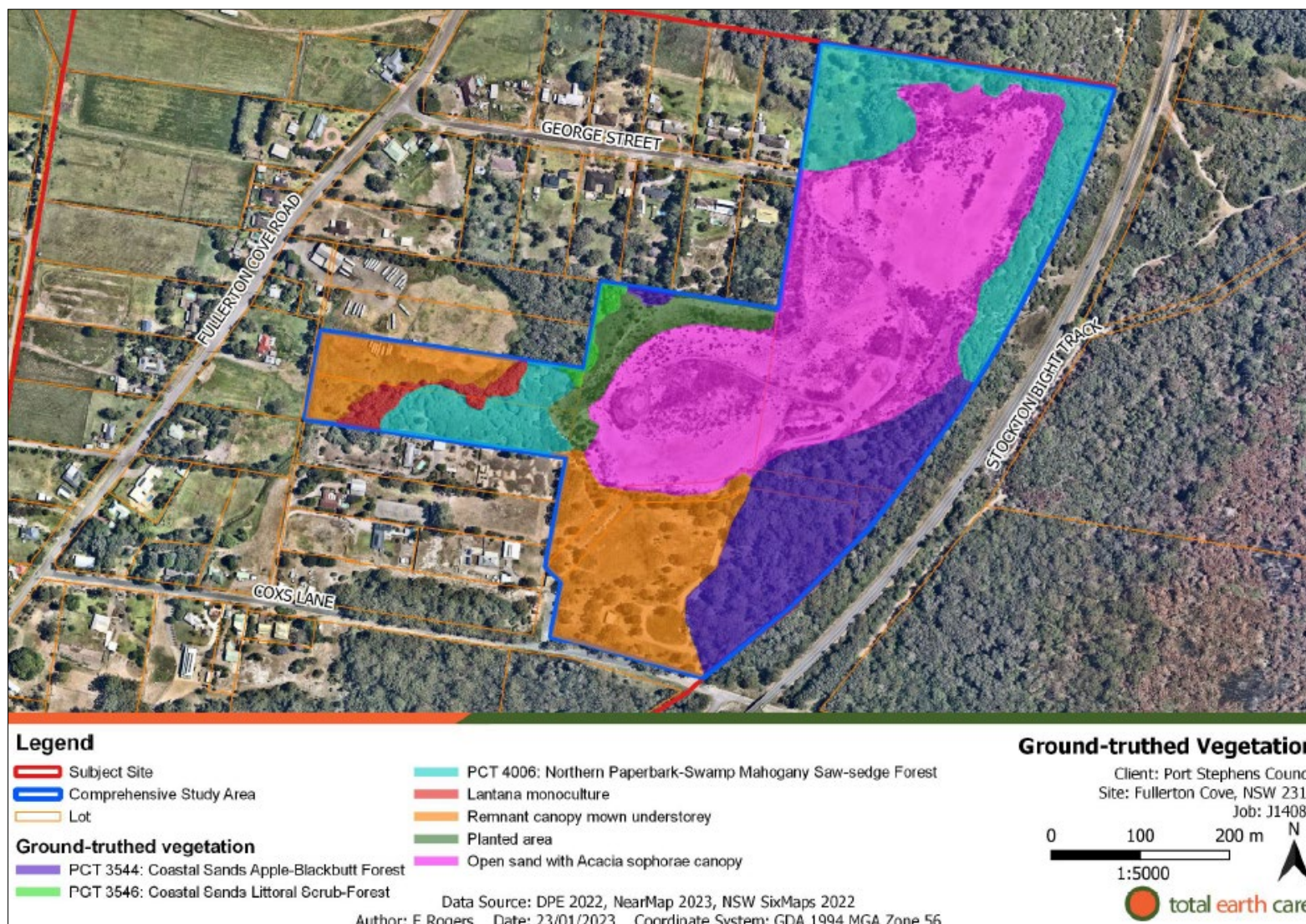


Figure 12: Ground-Truthed Vegetation (Total Earth Care 2023)



Plate 1: The Site - looking to the south-west from the north-eastern corner



Plate 2: Overlooking the Site from the eastern boundary



Plate 3: Forest vegetation north of the site (T2)



Plate 4: Coastal Dune Dry Sclerophyll Forest vegetation - looking south along the sites eastern boundary (T4 & T6)



Plate 5: Forest vegetation south-eastern corner of the site (along T9)



Plate 6: Looking east at forest vegetation on the eastern side of Nelson Bay Road



Plate 7: The primary bushfire hazard east of the site (Coastal Dune Dry Sclerophyll Forest)



Plate 8: Coastal Swamp Forest along the Stockton Bight Track (eastern side of Nelson Bay Road)



Plate 9: Typical forest vegetation south of Cocks Lane (T14)



Plate 10: The rear of George Street dwellings looking at retained on-site vegetation (T10)



Plate 11: The rear of George Street dwellings looking at Coastal Dune Dry Sclerophyll Forest vegetation (start of T10)

4.3. Slope Assessment

The slope assessment was undertaken as follows:

- ❑ Review of LiDAR point cloud data – including DEM (NSW LPI).
- ❑ Detail survey of existing and design contours.
- ❑ Site inspection completed by Bushfire Planning Australia on 11 April 2025.

An assessment of the slope over a distance of 140m in the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation where there was a fire run greater than 50m. The topography of the site has been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

The effective slope in all directions is shown in **Figure 13, Figure 14** and **Table 5**.

The final bushfire hazard assessment defining vegetation classifications and effective slope is shown in **Figure 15**.

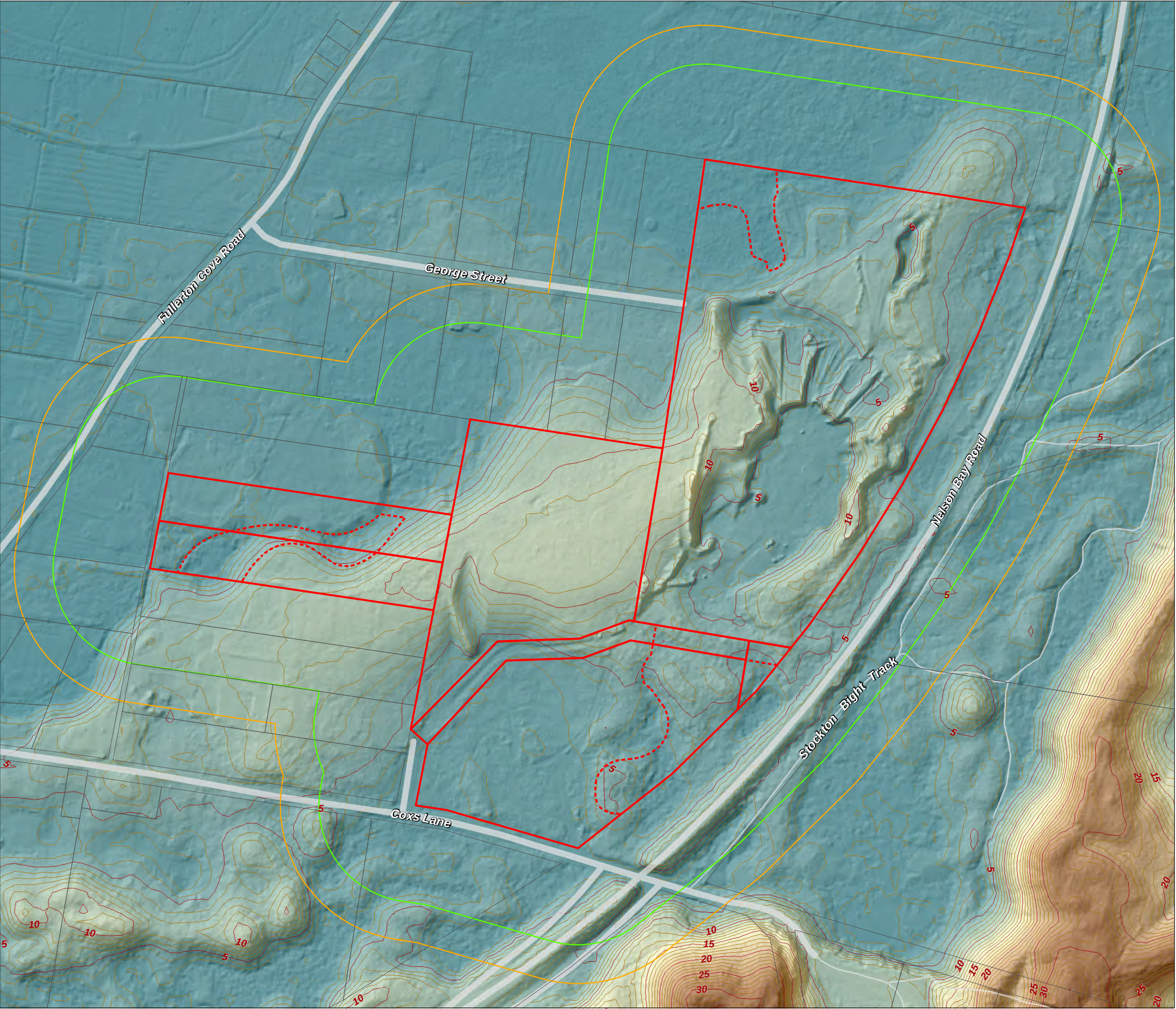


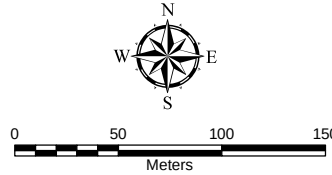
Figure 13

Digital Elevation Model



- Subject site
- Easement
- 100m buffer
- 140m buffer
- Contour (5m)
- Contour (1m)
- Elevation (AHD)
 - High : 37m
 - Low : 0m

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2025
Surface analysis: Derived from LiDAR -
NEWCASTLE 2012 / 2013 / 2014, 1 metre
Resolution Digital Elevation Model © Department
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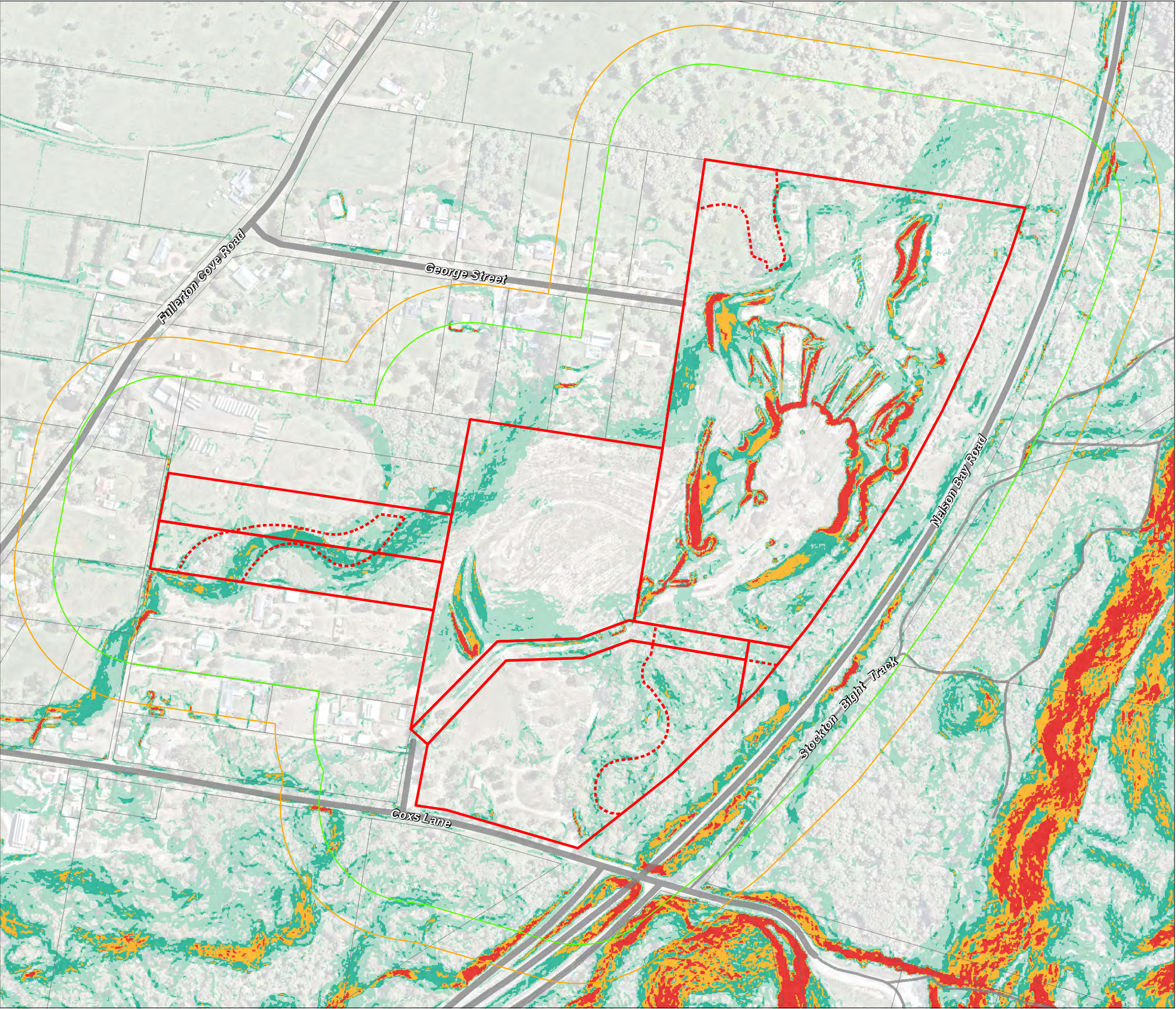


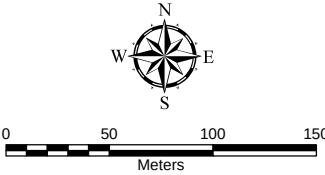
Figure 14

Slope
Analysis:
LiDAR



- Subject site
- Easement
- 100m buffer
- 140m buffer
- Slope**
 - 0° - 5°
 - 5° - 10°
 - 10° - 15°
 - 15° - 20°
 - >20°

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2025
Aerial Photo: Nearmap 07/02/2025
Surface analysis: Derived from LiDAR -
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A3 Scale: 1:3,650

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4.4. Significant Environmental Features

The required bushfire protection measures to protect future development shall be designed to minimise any unacceptable impacts on a significant environmental feature.

4.5. Threatened Species, populations or ecological communities

The area of the site to be affected by the proposed Precinct has been identified to minimise impact on any threatened species, population or EEC. All bushfire mitigation measures, including APZs will consider the existing and potential biodiversity values to minimise impact where possible.

4.6. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix B**) revealed there is potentially one Aboriginal site or place recorded within the subject site located within the mid-section of the site. All bushfire mitigation measures, such as APZs have considered this and been designed to minimise disturbing any artefacts if identified.

4.7. Slope & Vegetation Assessment Results

Vegetation within the site that surrounds the former sand quarry along the northern and eastern boundaries and within the southern and western portions of the site will be retained as part of the proposed development. This vegetation is identified as a forest, namely *Coastal Dune Dry Sclerophyll Forest*, according to Keith (2004). Additionally, in the northern and western sections of the site *Coastal Swamp Forest* vegetation also exists in a less dominant state.

Within and beyond 140m north of the site, *Coastal Swamp Forest* exists and transitions to *Coastal Dune Dry Sclerophyll Forest* further to the north-east. North-east of the site, on the eastern side of Nelson Bay Road, Forested Wetlands, namely *Coastal Floodplain Wetlands*, exists before transitioning to forest vegetation further south.

A narrow corridor (approximately 45m wide) of *Coastal Dune Dry Sclerophyll Forest* exists to the immediate east of the site and extends beyond Nelson Bay Road. An ecotone of forest, *Coastal Swamp Forest* surrounded by *Coastal Dune Dry Sclerophyll Forest*, within 140m of the site located on the eastern side of Nelson Bay Road is identified as the primary bushfire hazard.

Similarly, *Coastal Dune Dry Sclerophyll Forest* extends within and beyond 140m south of the site, although separated by Coss Lane. To the immediate west of the site, *Coastal Dune Dry Sclerophyll Forest* exists at the rear of rural residential properties and transitions to *Coastal Swamp Forest* or otherwise managed land.

Whilst on-site vegetation is still identified as a bushfire hazard, the primary bushfire hazard is identified within and beyond 140m to the east of the site, separated by Nelson Bay Road.

The results of hazard assessment are detailed in **Table 6** and shown in **Figure 15**.

Table 6: Slope and Vegetation Assessment Results

Transect	Vegetation or Other Infrastructure	Vegetation Classification (PBP 2019)	Slope
T1	Sparse forest vegetation extended from within the site external to the sites northern boundary	<i>Forest</i> (Coastal Swamp Forest)	0.1° Downslope
T2	Forest vegetation north-east of the site	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	3.4° Downslope
T3	Vegetation north-east of the site separated by Nelson Bay Road	<i>Forested Wetland</i> (Coastal Floodplain Wetland)	0.2° Downslope
T4	Forest vegetation from the edge of the former quarry to the edge of Nelson Bay Road	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	1.8° Downslope
T5	Forest vegetation on the eastern side of Nelson Bay Road identified as the primary bushfire hazard	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	1.5° Downslope
T6	Forest vegetation from the edge of the former quarry to the edge of Nelson Bay Road	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	0.9° Downslope
T7	Narrow corridor (~46m wide) of forest vegetation from the sites boundary to Nelson Bay Road	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-1.1° Upslope
T8	Forest vegetation on the eastern side of Nelson Bay Road identified as the primary bushfire hazard	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	2.1° Downslope
T9	Forest vegetation within the sites south-eastern corner	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	2.0° Downslope
T10	Retained forest vegetation within the mid-section of the between existing rural residential properties and the former quarry	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-0.1° Upslope
T11	Retained forest vegetation within the mid-section of the between existing rural residential properties and the former quarry	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	1.0° Downslope
T12	Retained forest vegetation within the mid-section of the between existing rural residential properties and the former quarry	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	4.6° Downslope
T13	Retained forest vegetation within the mid-section of the between existing rural residential properties and the former quarry	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-2.5° Upslope
T14	Existing rural residential dwellings located west of the site	Excluded (Managed Land)	0.2° Downslope
T15	Forest vegetation south of the site separated by Coxs Lane	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-0.9° Upslope

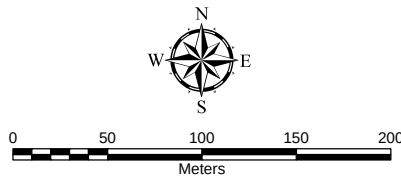
Figure 15
Slope &
Vegetation
Assessment



BUSHFIRE
PLANNING
AUSTRALIA

- | | | | |
|--|--------------|-------------------------|--------------------------------------|
| | Subject site | | Downslope transect |
| | Easement | | Upslope transect |
| | 100m buffer | Vegetation Class | |
| | 140m buffer | | Coastal Dune Dry Sclerophyll Forests |
| | Contour (5m) | | Coastal Floodplain Wetlands |
| | Contour (1m) | | Coastal Swamp Forests |
| | RL | | |

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2025
Vegetation: © State Government of NSW and Department of Planning and Environment 2024
Aerial photo: Nearmap 07/02/2025
Surface analysis: Derived from LIDAR - NEWCASTLE 2012 / 2013 / 2014, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation



A3 Scale: 1:4,000

File:2535-FullertonCoveSBS-Fig10-SlopeVeg-250806

Date: 6/08/2025

The information shown on this plan may be insufficient for some types of design. GEOVIEW should be consulted as to the suitability of the information shown herein prior to the commencement of any works based on this plan.

This map is not guaranteed to be free from error or omission. GEOVIEW hereby disclaims liability for any act done or omission made on the basis of the information in this plan, and any consequences of such acts or omissions

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5. Bushfire Protection Measures

This SBS has adopted the methodology to determine the appropriate Bushfire Protection Measures (BPMs) detailed in PBP 2019. As part of the SBS, the recommended BPMs demonstrate the aims and objectives of PBP 2019 have been satisfied, including the matters considered by the RFS necessary to protect persons, property and the environment from the danger that may arise from a bushfire.

- ☐ APZs
- ☐ Access
- ☐ Water Supply and Utilities
- ☐ Building Construction and Design
- ☐ Landscaping
- ☐ Emergency Management Arrangements

5.1. Asset Protection Zones

An Asset Protection Zone (APZ) is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an inner protection area (IPA) and an outer protection area (OPA) as shown in **Figure 16** and **Figure 17**.

An APZ can include the following:

- ☐ Lawns
- ☐ Discontinuous gardens
- ☐ Swimming pools
- ☐ Roads, driveways and managed verges
- ☐ Unattached non-combustible garages with suitable separation from the dwelling
- ☐ Open space / parkland
- ☐ Car parking

The presence of a few shrubs or trees in the APZ is acceptable provided that they:

- ☐ Do not touch or overhang any buildings
- ☐ Are well spread out and do not form a continuous canopy
- ☐ Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
- ☐ Are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc. are not recommended in the APZ.

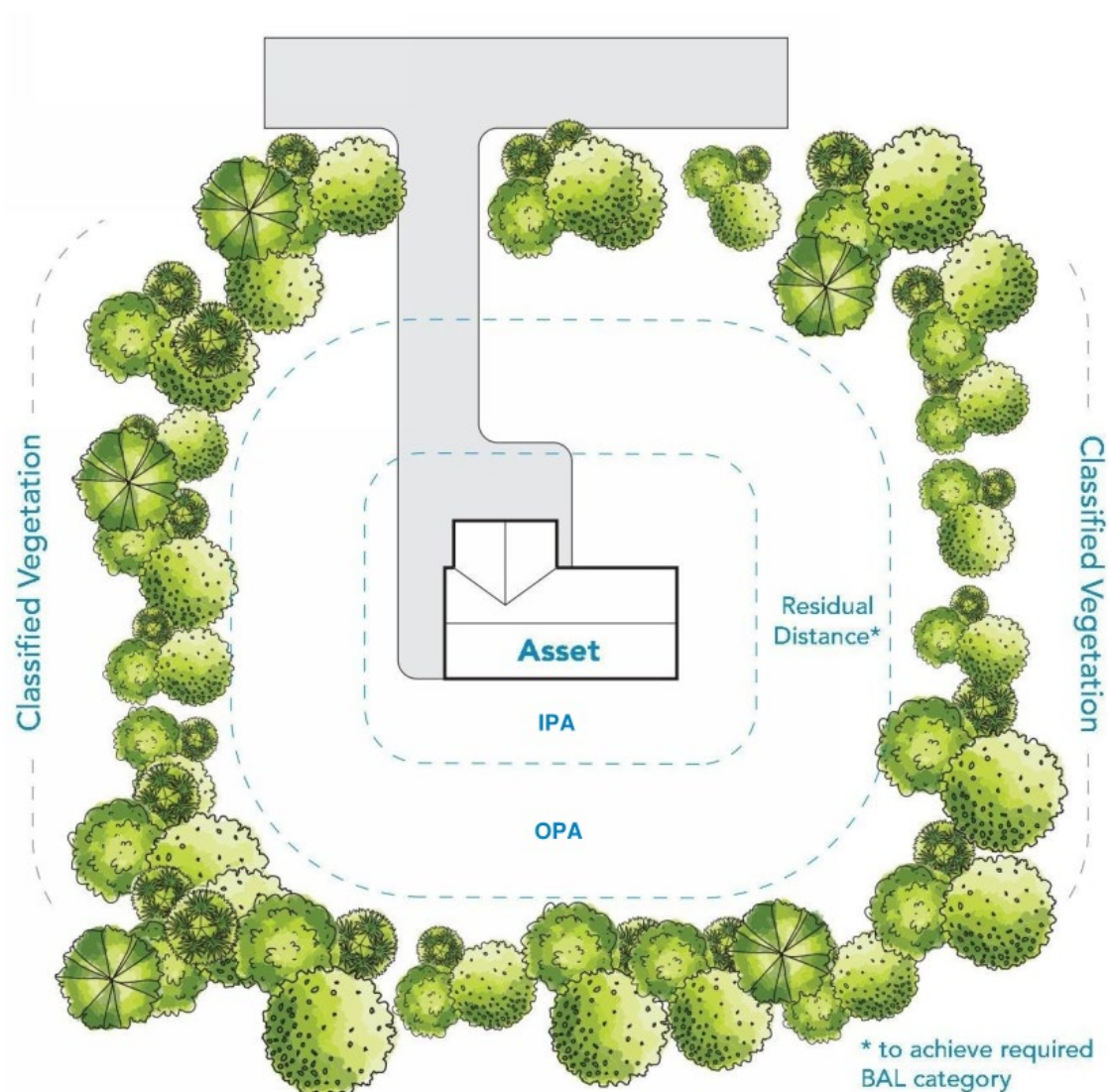


Figure 16: Inner and Outer Asset Protection Zones

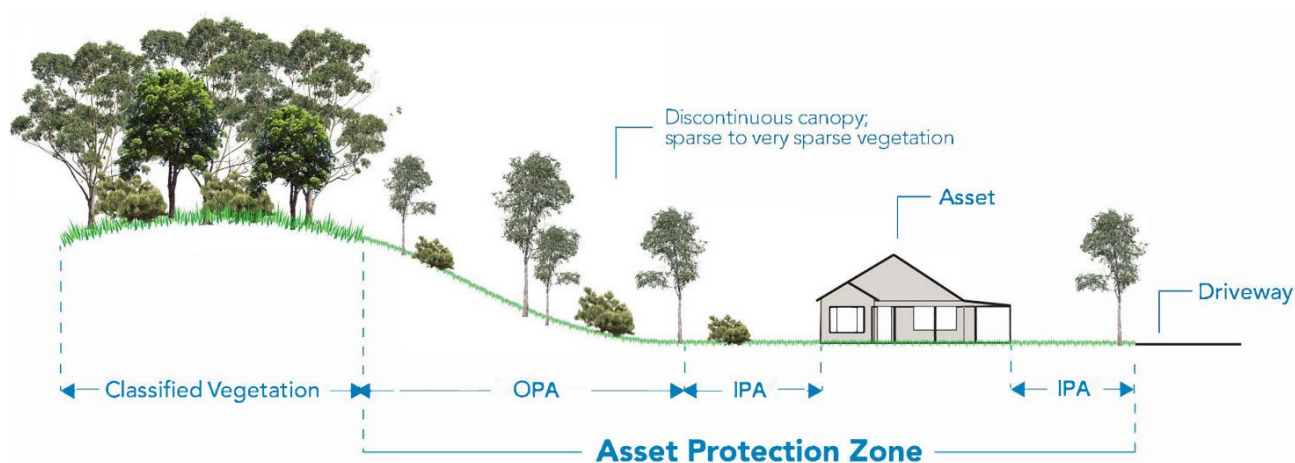


Figure 17: Example of the APZ profile

5.1.1. Determining the Appropriate Setbacks

To achieve compliance with the performance criteria for APZs (Table 5.3a), the Acceptable Solutions outlined in Table A1.12.2 of PBP 2019 may be adopted as a deemed-to-satisfy solution.

Alternatively, the appropriate APZ setback may be determined to achieve the Performance Criteria by adopting a performance-based solution. Based on the unique site characteristics identified by the BAR, the intensity of a bushfire event presented as the radiant heat exposure was calculated at several locations throughout the development site using the NBC Bushfire Attack Assessor V4.1. The nominated fuel loads for the respective vegetation classifications as published by the RFS in March 2019 have been used to determine the APZs and the effective slope obtained from the Digital Elevation Model (DEM) for each transect.

As the site lies within Port Stephens Council LGA, it is assessed under a FDI rating of 100. The Detailed Method (Method 2) outlined in Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas* was used to calculate the potential level of radiant heat flux generated at the nominated locations (see transects T1-T15). The NBC Bushfire Attack Assessor report detailing the inputs used is contained in **Appendix C**.

However for the purpose of ensuring the land is suitable for development, the APZs provided in Table A1.12.2 have been adopted. Nevertheless, radiant heat modelling has been undertaken to accurately calculate the maximum radiant heat exposure generated across the site at various locations.

Refer to **Table 7** for the sites required APZs.

Table 7: Required APZ setbacks

Transect	Vegetation Classification (PBP 2019)	Slope	APZ Table A1.12.2	APZ 29kW/m²
T1	<i>Forest</i> (Coastal Swamp Forest)	>0.0° - <5.0° (0.1°) Downslope	29m	24m
T2	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (3.4°) Downslope	29m	26m
T3	<i>Forested Wetland</i> (Coastal Floodplain Wetland)	>0.0° - <5.0° (0.2°) Downslope	12m	10m
T4	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (1.8°) Downslope	29m	24m
T5	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (1.5°) Downslope	29m	24m
T6	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (0.9°) Downslope	29m	23m
T7	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-1.1° Upslope	24m	21m
T8	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (2.1°) Downslope	29m	24m
T9	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (2.0°) Downslope	29m	24m
T10	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-0.1° Upslope	24m	21m
T11	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (1.0°) Downslope	29m	23m
T12	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	>0.0° - <5.0° (4.6°) Downslope	29m	28m
T13	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-2.5° Upslope	24m	19m
T14	Excluded (Managed Land)	>0.0° - <5.0° (0.2°) Downslope	N/A	N/A
T15	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	-0.9° Upslope	24m	21m

5.2. Access

In the unlikely event of a serious bushfire, it will be essential to ensure that adequate ingress / egress and the provision of defendable space are afforded in the site.

Access and egress to the site is currently available from:

- ☐ George Street - within the northern section of the site
- ☐ Coxs Lane (provided from both Nelson Bay Road and Fullerton Cove Road) - along the sites southern boundary

The following design specifications detailed in PBP 2019 are relevant to the site:

- ☐ Internal roads are two-wheel drive all weather roads.
- ☐ internal perimeter roads are provided with a minimum carriageway width of 8m.
- ☐ be through roads, but if unavoidable then dead ends should be no more than 100 metres in length, incorporate a minimum 12 metres turning circle (either in cul-de-sac or T-head formation) and should be clearly sign posted as dead ends.
- ☐ the capacity of road surfaces is sufficient to carry fully loaded fire fighting vehicles (15 tonnes).
- ☐ curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres and minimal in number, to allow for rapid access and egress.
- ☐ maximum grade for sealed roads do not exceed 12.5°.
- ☐ have a minimum vertical clearance to a height of four metres at all times.

A critical factor for the proposed development is the design of a road network that provides adequate emergency access and evacuation routes. Therefore, future traffic modelling should include an assessment of the road network's evacuation capacity under various bushfire scenarios.

Any further development must comply with PBP 2019 access requirements outlined above and in Section 5.3.2 PBP 2019.

5.3. Emergency Services

The Salt Ash Rural Fire Service is located at 1 Michael Drive, Salt Ash, approximately 12kms (12 mins) from the site (**Figure 18**). A second emergency response being Medowie Rural Fire Station is located at 47B Ferodale Road, Medowie, approximately 12.3km (13 mins) from the site (**Figure 19**). In an emergency, either or both services could attend the site.

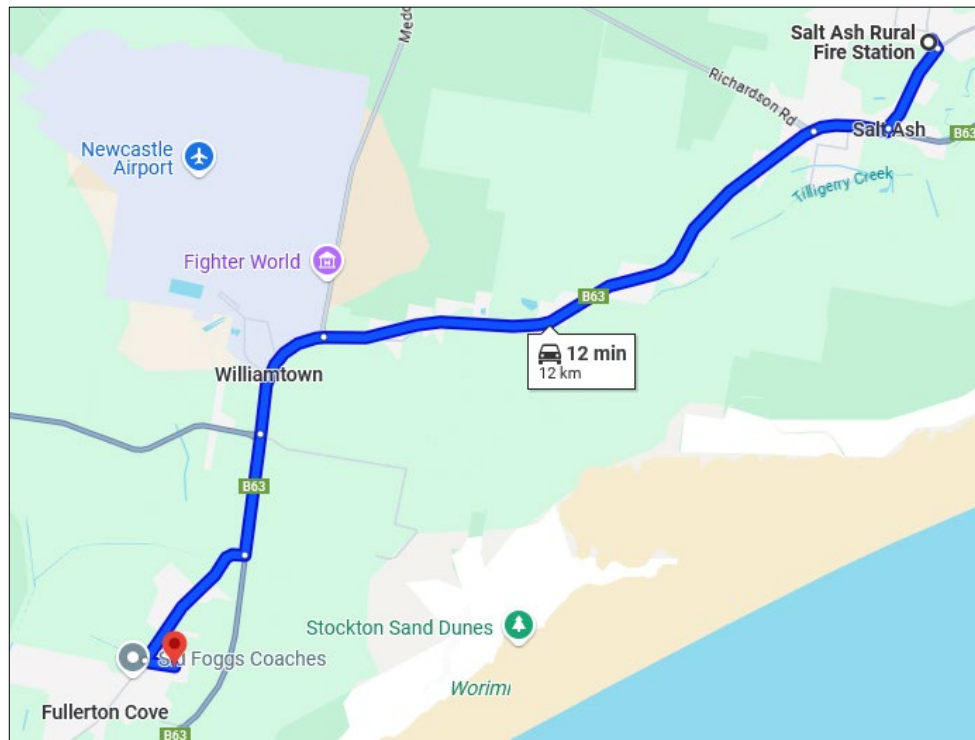


Figure 18: NSW Rural Fire Service - Salt Ash

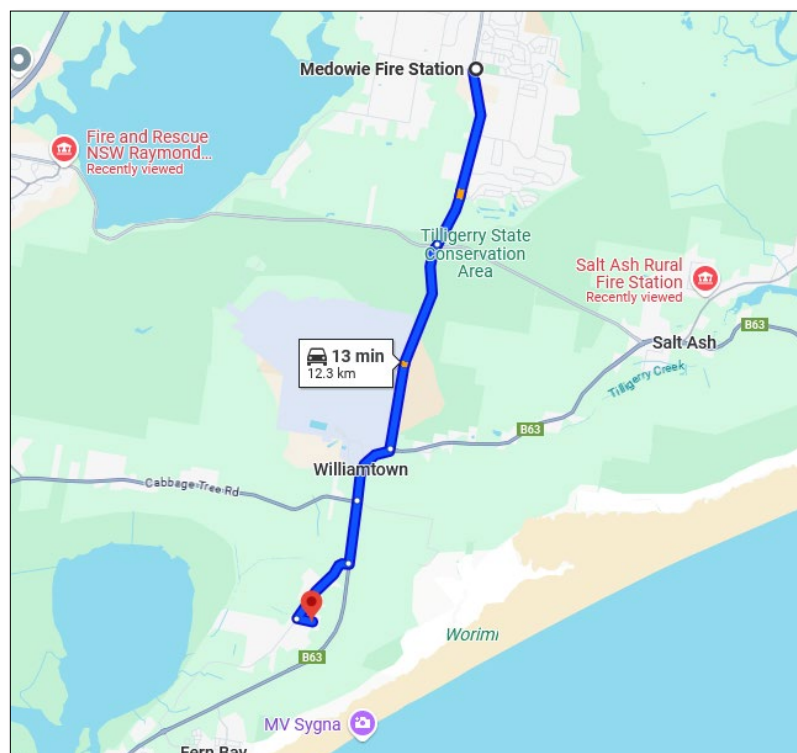


Figure 19: NSW Rural Fire Service - Medowie

5.4. Services - water, electricity and gas

5.4.1. Water

Fire hydrant spacing, sizing and pressure should comply with AS 2419.1-2021. Hydrants are not to be located within any road carriageway.

All sites within the subject site will need to be connected to the internal reticulated water supply.

5.4.2. Electricity

Any new electricity services will be located underground.

5.4.3. Gas

Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596-2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.

5.5. Construction Standards - Bushfire Attack Level

All buildings, including single dwellings, constructed within the site are required to satisfy the Performance Requirements of the National Construction Code: Building Code of Australia (NCC).

Accordingly, all forthcoming habitable buildings shall satisfy the requirements of Part 3.10.5 of the NCC. The *Deemed-to-Satisfy* (DTS) provision of the NCC can only be achieved if dwellings in bushfire prone areas are constructed in accordance with Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas*. Alternatively, the DTS provisions can also be achieved if the habitable building is constructed in accordance with the NASH Standard 'Steel Framed Construction in Bushfire Areas'.

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2018, and accordingly the designer/architect should be made aware of this recommendation.

The determinations of the appropriate bushfire attack level (BAL) is based on the maximum potential radiant heat exposure (**Figure 20**). BALs are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the BAL is derived by assessing the:

- ☐ Relevant FDI = 100
- ☐ Flame temperature = 1090K
- ☐ Slope = majority is >0.0°- <5.0° downslope
- ☐ Vegetation classification = predominantly *forest*
- ☐ Building location

The greatest bushfire hazard is a forest located within and beyond 140m to the east of the site and separated by Nelson Bay Road. By applying PBP 2019 Acceptable Solutions (Table A1.12.2), all parts of the development with the site shall be located to BAL-29 or less.

Refer to **Table 8** for the recommended Bushfire Attack Levels (BAL).

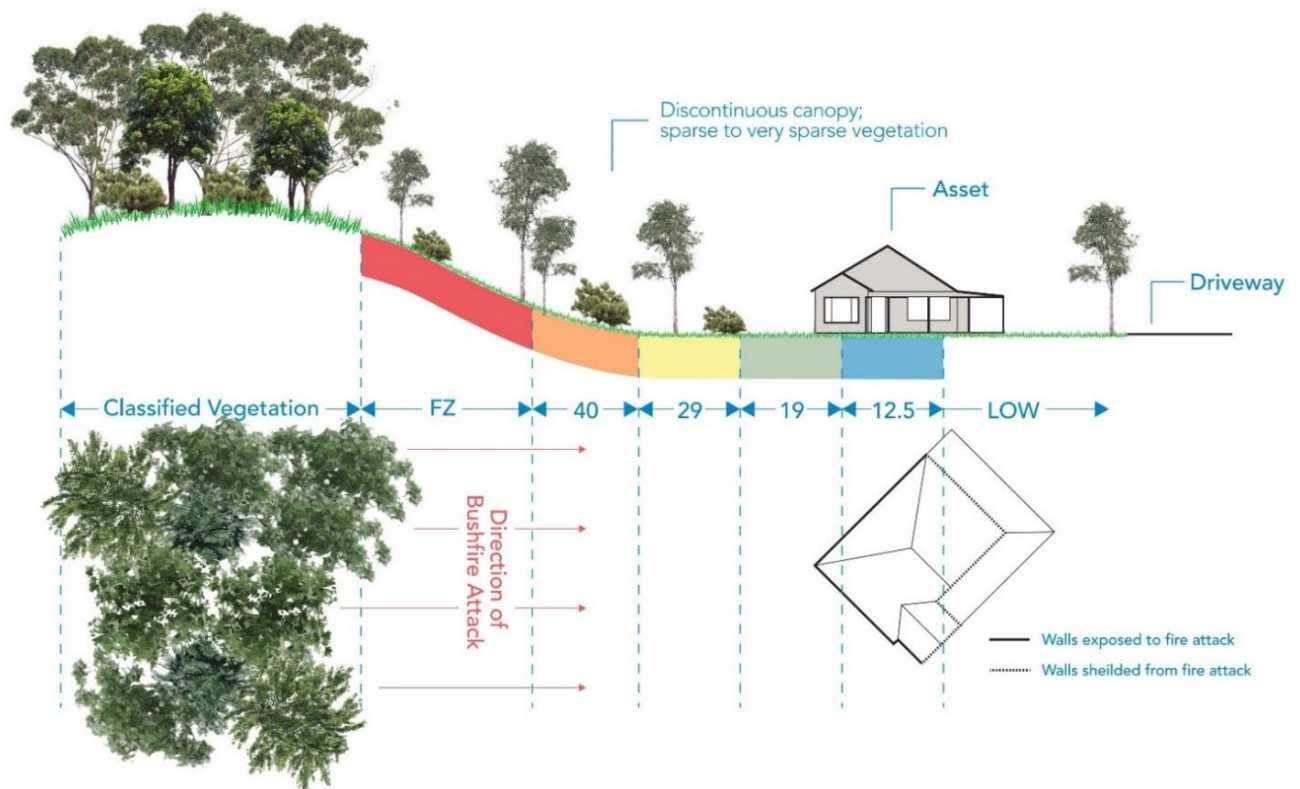


Figure 20: BAL example

Table 8: Bushfire Attack Levels

Transect	Vegetation Classification (PBP 2019)	Slope	APZ Required (29kW/m ²)	Distance from Hazard	Bushfire Attack Level (BAL)
T7, T10, T13 & T15	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	Upslope	19m-21m	0m-<19m	BAL-FZ
				19m-<21m	BAL-40
				21m-<29m	BAL-29
				29m-<41m	BAL-19
				41m-<100m	BAL-12.5
T2, T4-T6 & T8, T9, T11 & T12	<i>Forest</i> (Coastal Dune Dry Sclerophyll Forest)	0.0° < 5.0° Downslope	23m-28m	0m-<24m	BAL-FZ
				24m-<26m	BAL-40
				26m-<35m	BAL-29
				35m-<47m	BAL-19
				47m-<100m	BAL-12.5
T1	<i>Forest</i> (Coastal Swamp Forest)	0.0° < 5.0° (0.1°) Downslope	24m	0m-<22m	BAL-FZ
				22m-<24m	BAL-40
				24m-<33m	BAL-29
				33m-<44m	BAL-19
				44m-<100m	BAL-12.5
T3	<i>Forested Wetlands</i> (Coastal Floodplain Wetlands)	0.0° < 5.0° (0.2°) Downslope	10m	0m-<9m	BAL-FZ
				9m-<10m	BAL-40
				10m-<14m	BAL-29
				14m-<21m	BAL-19
				21m-<100m	BAL-12.5
T14	Excluded (Managed Land)	N/A	N/A	N/A	BAL-LOW

5.6. Landscaping and Vegetation Management

In APZs and IPAs, the design and management of the landscaped areas in the vicinity of buildings have the potential to improve the chances of survival of people and buildings. Reduction of fuel does not require the removal of all vegetation. Trees and plants can provide some bushfire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns.

Generally landscaping in and around a bushfire hazard should consider the following:

- ☐ Priority given to retaining species that have a low flammability.
- ☐ Priority given to retaining species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season.
- ☐ Priority given to retaining smooth barked species over stringy bark.
- ☐ Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

Landscaping within APZs and IPAs should give due regard to fire retardant plants and ensure that fuel loads do not accumulate as a result of the selected plant varieties.

The principles of landscaping for bushfire protection aim to:

- ☐ Prevent flame impingement on dwellings.
- ☐ Provide a defensible space for property protection.
- ☐ Reduce fire spread and wind speed.
- ☐ Deflect and filter embers.
- ☐ Provide shelter from radiant heat.

Plants that are less flammable have the following features:

- ☐ High moisture content.
- ☐ High levels of salt.
- ☐ Low volatile oil content of leaves.
- ☐ Smooth barks without 'ribbons' hanging from branches or trunks.
- ☐ Dense crown and elevated branches.

Avoiding understorey planting and regular trimming of the lower limbs of trees also assists in reducing fire penetration into the canopy. Rainforest species such as *Syzygium* and figs are preferred to species with high fine fuel and/or oil content. Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage ground fire to spread up to, and then through the crown of trees.

Consideration should be given to vegetation fuel loads present on site with particular attention to APZs. Careful thought must be given to the type and physical location of any proposed site landscaping. Inappropriately selected and positioned vegetation has the potential to 'replace' any previously removed fuel load.

Bearing in mind the desired aesthetic and environment sought by site landscaping, some basic principles have been recommended to help minimise the chance of such works contributing to the potential hazard on site. Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered.

It is reiterated again that it is essential that any landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.

6. Conclusion and Recommendations

6.1. Conclusion

This Strategic Bushfire Study (SBS) has been prepared in accordance with Planning for Bushfire Protection 2019 (PBP 2019) to assess the suitability of land at Fullerton Cove for rezoning under the Planning Proposal. The assessment has followed the strategic principles outlined in Chapter 4 of PBP 2019, which promote the avoidance of inappropriate development on bushfire prone land, the application of risk-based land use planning decisions, and the prioritisation of measures that reduce vulnerability and enhance resilience.

The study has determined that while bushfire hazards are present within and around the site - most notably to the east, across Nelson Bay Road - the strategic design of the precinct can facilitate the delivery of a resilient development outcome that does not exacerbate risk to life or property. The retained vegetation within the site has been identified, and asset protection zones (APZs) have been modelled to confirm that radiant heat exposure can be managed to $\leq 29 \text{ kW/m}^2$ through a combination of perimeter roads, internal setbacks, and appropriate landscaping.

The SBS confirms that the proposed land uses (low and medium density residential and conservation zones) do not constitute inappropriate development under Chapter 4 of PBP 2019, provided that future development complies with the Bushfire Protection Measures identified in this report. Furthermore, the proposal avoids areas of unacceptably high bushfire hazard and applies principles of hazard separation and urban design that are consistent with the intent of long-term, resilient planning.

The assessment also demonstrates that the Planning Proposal is consistent with Ministerial Direction 4.3 - Planning for Bushfire Protection, as follows:

- ❑ APZs are incorporated into the design through internal building setbacks, perimeter roads, and landscape buffers, with both Inner and Outer Protection Areas feasible and supportable.
- ❑ The road layout is capable of achieving multiple two-way access points, perimeter road links, and connections to the regional road network via George Street and Coxs Lane.
- ❑ Water supply, including reticulated hydrants, can be provided in accordance with AS 2419.1-2021.
- ❑ The perimeter interface with the hazard is minimised by clustering residential development and placing higher order roads and public open space between dwellings and the bushfire hazard.
- ❑ Landscaping and development controls can be introduced through the LEP and/or DCP to restrict the location of combustible materials in APZs.

The SBS has demonstrated that bushfire risk across the site is tolerable and manageable, provided the recommendations below are adopted and implemented through future detailed planning, subdivision, and development design.

6.2. Recommendations

1. Planning Controls

- a) Introduce LEP and DCP provisions to embed the protection measures described in this SBS, including minimum APZ widths, access design standards, and vegetation management controls.
- b) Ensure zoning enables the retention of vegetated buffers and open space to maintain separation from bushfire hazards.

2. Asset Protection Zones

- a) Maintain APZs of up to 29 m (or greater where required by slope or vegetation type), consistent with Table A1.12.2 of PBP 2019 and radiant heat flux modelling outputs ($\leq 29 \text{ kW/m}^2$).
- b) Design perimeter roads to form part of the APZ and separate dwellings from the bushfire hazard wherever feasible.

3. Access & Egress

- a) Ensure all new public roads comply with Section 5.3.2 and Table 5.3b of PBP 2019, including two-way access, perimeter loops, and compliance with turning radius, gradient, and vertical clearance requirements.
- b) Complete a traffic and evacuation study at the subdivision stage to demonstrate adequacy of access and emergency evacuation routes.

4. Water Supply & Services

- a) Provide reticulated water supply throughout the development with hydrants installed in accordance with AS2419.1-2021.
- b) Require underground electricity and compliant gas infrastructure to minimise ignition risk.

5. Construction Standards

- a) All future habitable buildings to be constructed to AS3959-2018 or equivalent (e.g., NASH Standard) and comply with Part 3.10.5 of the NCC.
- b) Construction to BAL-29 or lower is achievable based on proposed APZs.

6. Vegetation Management

- a) Vegetation retained within or adjacent to the development must be managed in accordance with APZ and IPA/OPA guidelines in Appendix 4 of PBP 2019.
- b) Landscaping controls should discourage plantings that contribute to high fine fuel loads or continuous canopy coverage within APZs.

7. Emergency Management

- a) At the development application stage, Bushfire Emergency Management and Evacuation Plans (BEMEPs) should be prepared consistent with the RFS Guidelines.
- b) Coordinate with the NSW RFS and Port Stephens Council on future capacity planning for emergency services infrastructure in the locality.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (August 2025).

The outcomes of this Strategic Bushfire Study confirm that the land subject to the Planning Proposal at Fullerton Cove is suitable for urban development, provided that the bushfire protection measures detailed in this report are implemented. The Planning Proposal aligns with the strategic principles of *Planning for Bushfire Protection 2019* and meets the requirements of Ministerial Direction 4.3. The implementation of a coordinated and risk-based land use strategy will ensure that future development does not present an unacceptable risk to life, property or the environment from bushfire.

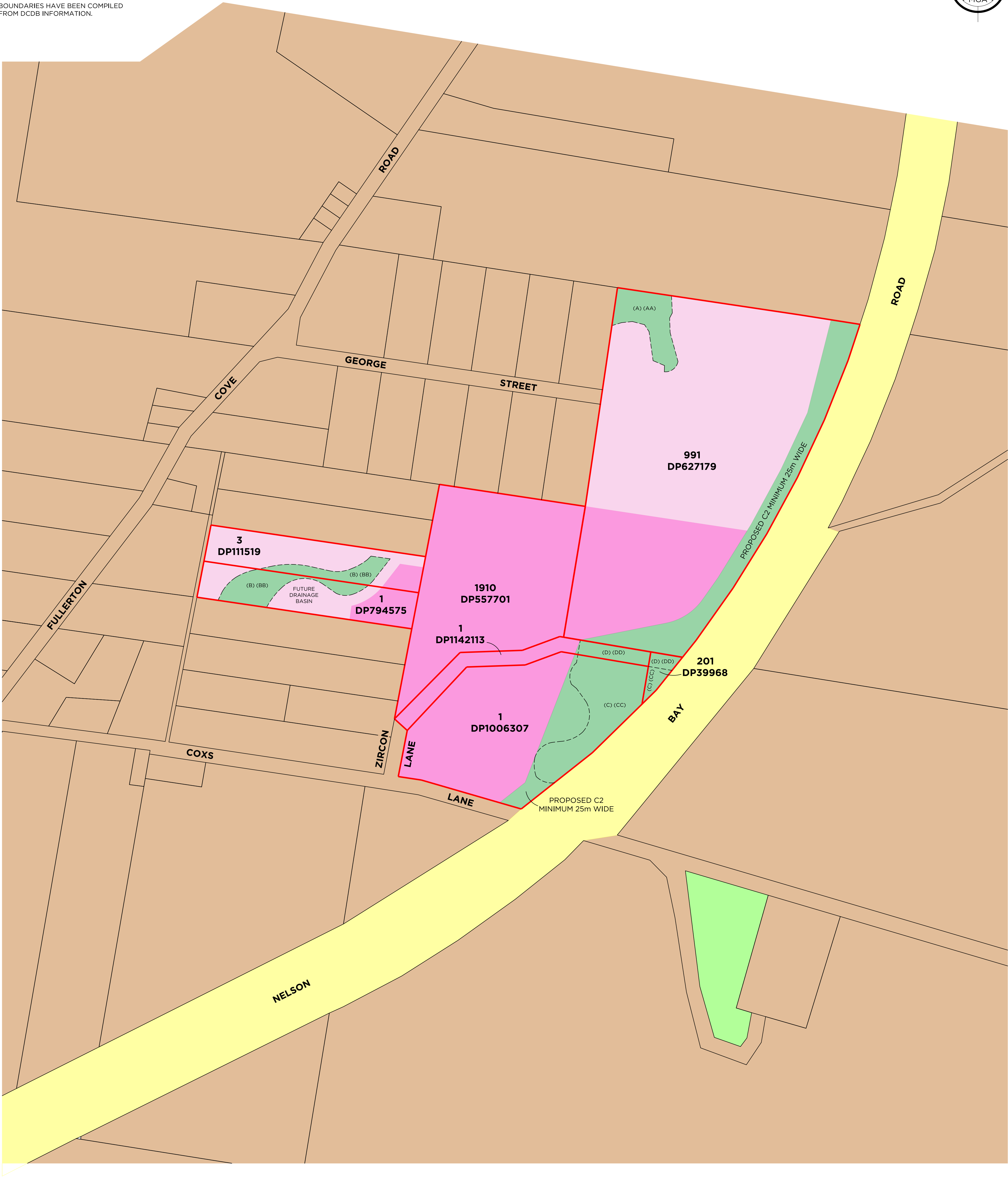
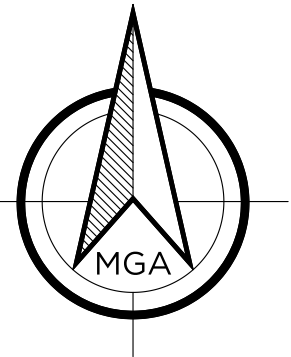
7. References

- ❑ Keith, D. (2004). Ocean Shores to Desert Dunes - The Native Vegetation of New South Wales and the ACT.
- ❑ NSW Rural Fire Service (2005). Standards for Asset Protection Zones. NSW Rural Fire Service.
- ❑ NSW Rural Fire Service (2019). Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.
- ❑ Ramsay, GC and Dawkins, D (1993). Building in Bushfire-prone Areas – Information and Advice. CSIRO and Standards Australia.
- ❑ Rural Fires and Environmental Assessment Legislation Amendment Act 2002.
- ❑ Standards Australia (2018). AS 3959 – 2018: Construction of Buildings in Bushfire-prone Areas.

Appendix A: Proposed Land Use Zone

NOTES:

1. FEATURES SHOWN TO SCALE
ACCURACY.
2. THIS PLAN IS SUITABLE FOR DETAILED
PLANNING AND DESIGN AT THE SCALE/S
STATED. THE PLAN MAY NOT BE
SUITABLE FOR ANY OTHER PURPOSE OR
FOR USE AT ANY OTHER SCALE/S.
3. BOUNDARIES HAVE BEEN COMPILED
FROM DCDB INFORMATION.




TOM CAMPBELL
REGISTERED SURVEYOR

(A) (B) (C) (D) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 1)
(AA) (BB) (CC) (DD) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 2)

LEGEND

- BOUNDARY LINE
- ADJACENT BOUNDARY (DCDB)
- EASEMENT
- EXISTING RU2 - RURAL LANDSCAPE
- EXISTING SP2 - INFRASTRUCTURE
- EXISTING RE1 - PUBLIC RECREATION
- PROPOSED C2 - ENVIRONMENTAL CONSERVATION
- PROPOSED R2 - LOW-DENSITY RESIDENTIAL
- PROPOSED R3 - MEDIUM-DENSITY RESIDENTIAL

REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	1.08.25	ORIGINAL ISSUE	--	TC	TC
B	1.08.25	DRAFTING AMENDMENTS	--	TC	TC
C	7.11.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
D	4.12.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
E	10.12.25	HoB PLAN AMENDED	--	TC	TC

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MAYFIELD NSW 2304 E: admin@delacs.com.au
ABN: 28 164 260 100 delacs.com.au
CAD REF: 23633_Planning
Proposal Plans_Rev E

PLANNING PROPOSAL
LOT 3 DP111519, LOT 1 DP794575, LOT 991
DP627179, LOT 1910 DP557701, LOT 1 DP1142113,
LOT 201 DP39968, LOT 1 DP1006307

LAND USE ZONE PLAN

SITE ADDRESS:
21 COXS LANE
FULLERTON COVE

CLIENT:
COASTAL DEVELOPMENTS
(NSW) PTY LTD

POSITION DATUM: PM 71781
ORIENTATION: MGA20 (GROUND)
EASTING: 390 422.557
NORTHING: 6 365 554.072
CLASS: A
HEIGHT DATUM: PM 71781
CLASS: LC
RL: 6.987 (AHD)
ORDER: 0.02
DATE: 30.05.2024



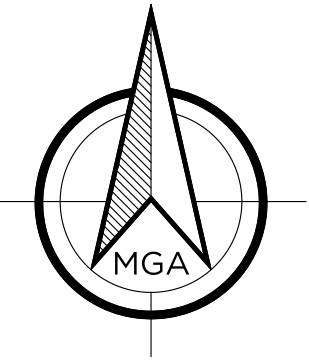
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-- TC TC

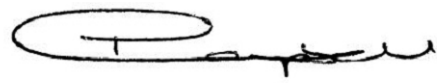
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SHEET REV. PROJECT No.
1 of 4 E 23633

NOTES:

1. FEATURES SHOWN TO SCALE
ACCURACY.
2. THIS PLAN IS SUITABLE FOR DETAILED
PLANNING AND DESIGN AT THE SCALE/S
STATED. THE PLAN MAY NOT BE
SUITABLE FOR ANY OTHER PURPOSE OR
FOR USE AT ANY OTHER SCALE/S.
3. BOUNDARIES HAVE BEEN COMPILED
FROM DCDB INFORMATION.





TOM CAMPBELL
REGISTERED SURVEYOR

(A) (B) (C) (D) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 1)
(AA) (BB) (CC) (DD) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 2)

DATE OF NEARMAP IMAGE - 7.08.2024

LEGEND

- BOUNDARY LINE
- ADJACENT BOUNDARY (DCDB)
- EASEMENT
- EXISTING RU2 - RURAL LANDSCAPE
- EXISTING SP2 - INFRASTRUCTURE
- EXISTING RE1 - PUBLIC RECREATION
- PROPOSED C2 - ENVIRONMENTAL CONSERVATION
- PROPOSED R2 - LOW-DENSITY RESIDENTIAL
- PROPOSED R3 - MEDIUM-DENSITY RESIDENTIAL

REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	1.08.25	ORIGINAL ISSUE	--	TC	TC
B	1.08.25	DRAFTING AMENDMENTS	--	TC	TC
C	7.11.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
D	4.12.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
E	10.12.25	HoB PLAN AMENDED	--	TC	TC

**DELFS
LASCELLES**
CONSULTING SURVEYORS

260 MAITLAND ROAD, T: (02) 4964 4886
MAYFIELD NSW 2304 E: admin@delacs.com.au
ABN: 28 164 260 100 delacs.com.au
CAD REF: 23633_Planning
Proposal Plans_Rev E

PLANNING PROPOSAL
LOT 3 DP111519, LOT 1 DP794575, LOT 991
DP627179, LOT 1910 DP557701, LOT 1 DP1142113,
LOT 201 DP39968, LOT 1 DP1006307

LAND USE ZONE PLAN WITH AERIAL

SITE ADDRESS:
21 COXS LANE
FULLERTON COVE

CLIENT:
COASTAL DEVELOPMENTS
(NSW) PTY LTD

POSITION DATUM: PM 71781
ORIENTATION: MGA20 (GROUND)
EASTING: 390 422.557
NORTHING: 6 365 554.072
CLASS: A
HEIGHT DATUM: PM 71781
CLASS: LC
RL: 6.987 (AHD)
ORDER: 0.02
ORDER: 0.03
DATE: 30.05.2024



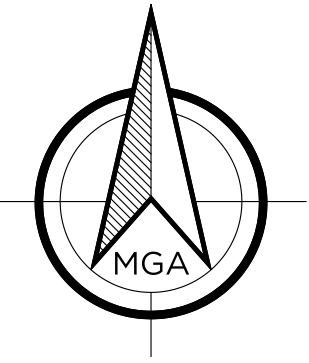
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-- TC TC

SCALE PAGE SIZE DATE
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SHEET REV. PROJECT No.
2 of 4 E 23633

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TOM CAMPBELL
REGISTERED SURVEYOR

(A) (B) (C) (D) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 1)
(AA) (BB) (CC) (DD) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 2)

LEGEND

- BOUNDARY LINE
— ADJACENT BOUNDARY (DCDB)
- - - EASEMENT
— EXISTING MINIMUM LOT SIZE - 20 Ha
— PROPOSED MINIMUM LOT SIZE - 20 Ha
— PROPOSED MINIMUM LOT SIZE - 250m²

REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	1.08.25	ORIGINAL ISSUE	--	TC	TC
B	1.08.25	DRAFTING AMENDMENTS	--	TC	TC
C	7.11.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
D	4.12.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
E	10.12.25	HoB PLAN AMENDED	--	TC	TC

**DELFS
LASCELLES**
CONSULTING SURVEYORS

260 MAITLAND ROAD,
MAYFIELD NSW 2304
ABN: 28 164 260 100
T: (02) 4964 4886
E: admin@delacs.com.au
delacs.com.au
23633_Planning
Proposal Plans_Rev E

PLANNING PROPOSAL
LOT 3 DP111519, LOT 1 DP794575, LOT 991
DP627179, LOT 1910 DP557701, LOT 1 DP1142113,
LOT 201 DP39968, LOT 1 DP1006307

MINIMUM LOT SIZE PLAN

SITE ADDRESS:
21 COXS LANE
FULLERTON COVE

CLIENT:
COASTAL DEVELOPMENTS
(NSW) PTY LTD

POSITION DATUM: PM 71781
ORIENTATION: MGA20 (GROUND)
EASTING: 390 422.557
NORTHING: 6 365 554.072
CLASS: A
HEIGHT DATUM: PM 71781
CLASS: LC
RL: 6.987 (AHD)
ORDER: 0.02
ORDER: 0.03
DATE: 30.05.2024



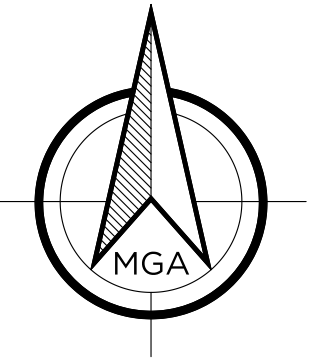
SURVEYED DRAFTED CHECKED
-- TC TC

SCALE PAGE SIZE DATE
1:2500 A1 1.08.25

SHEET REV. PROJECT No.
3 of 4 E 23633

NOTES:

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TOM CAMPBELL
REGISTERED SURVEYOR

(A) (B) (C) (D) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 1)
(AA) (BB) (CC) (DD) RESTRICTION ON THE USE OF LAND (DP1310799) (ITEM 2)

LEGEND

	BOUNDARY LINE
	ADJACENT BOUNDARY (DCDB)
	EASEMENT
	PROPOSED HEIGHT LIMIT - 9.5m
	PROPOSED HEIGHT LIMIT - 15m

REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	1.08.25	ORIGINAL ISSUE	--	TC	TC
B	1.08.25	DRAFTING AMENDMENTS	--	TC	TC
C	7.11.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
D	4.12.25	AMENDMENTS TO PROPOSED ZONING, MLS & HoB	--	TC	TC
E	10.12.25	HoB PLAN AMENDED	--	TC	TC

**DELFS
LASCELLES**

CONSULTING SURVEYORS

260 MAITLAND ROAD,
MAYFIELD NSW 2304
ABN: 28 164 260 100

T: (02) 4964 4886
E: admin@delacs.com.au
delacs.com.au
23633_Planning
Proposal Plans_Rev E

PLANNING PROPOSAL
LOT 3 DP111519, LOT 1 DP794575, LOT 991
DP627179, LOT 1910 DP557701, LOT 1 DP1142113,
LOT 201 DP39968, LOT 1 DP1006307

HEIGHT OF BUILDING PLAN

SITE ADDRESS:
21 COXS LANE
FULLERTON COVE

CLIENT:
COASTAL DEVELOPMENTS
(NSW) PTY LTD

POSITION DATUM:
ORIENTATION:
EASTING:
NORTHING:
CLASS: A
HEIGHT DATUM:
CLASS: LC
RL: 6.987 (AHD)

PM 71781
MGA20 (GROUND)
390 422.557
6 365 554.072
ORDER: 0.02
PM 71781
ORDER: 0.03
DATE: 30.05.2024

SURVEYED	DRAFTED	CHECKED
--	TC	TC
SCALE 1:2500	PAGE SIZE A1	DATE 1.08.25
SHEET 4 of 4	REV. E	PROJECT No. 23633

Appendix B: AHIMS Report

Katrina Greville

Date: 15 April 2025

21 Costata Crescent

Adamstown New South Wales 2289

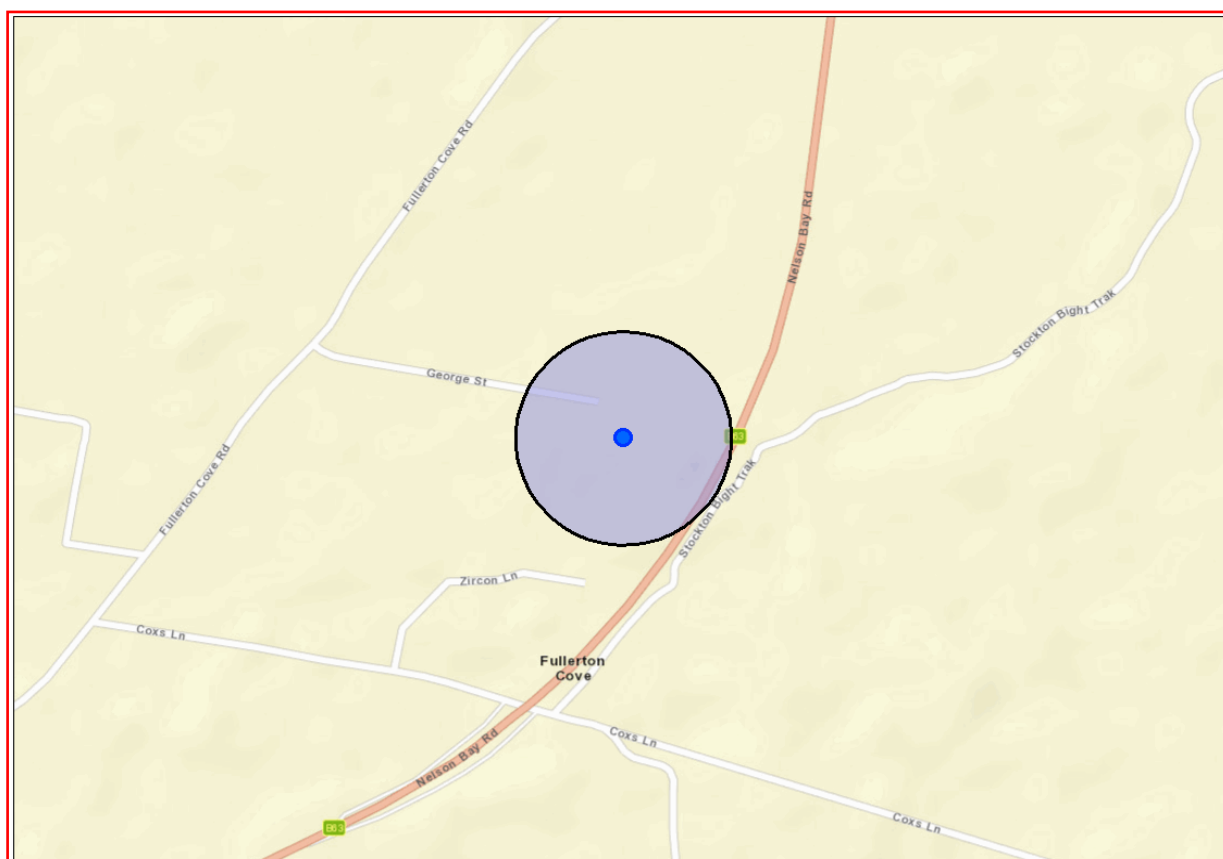
Attention: Katrina Greville

Email: klmukevski@bigpond.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 16 GEORGE STREET FULLERTON COVE 2318 with a Buffer of 200 meters, conducted by Katrina Greville on 15 April 2025.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

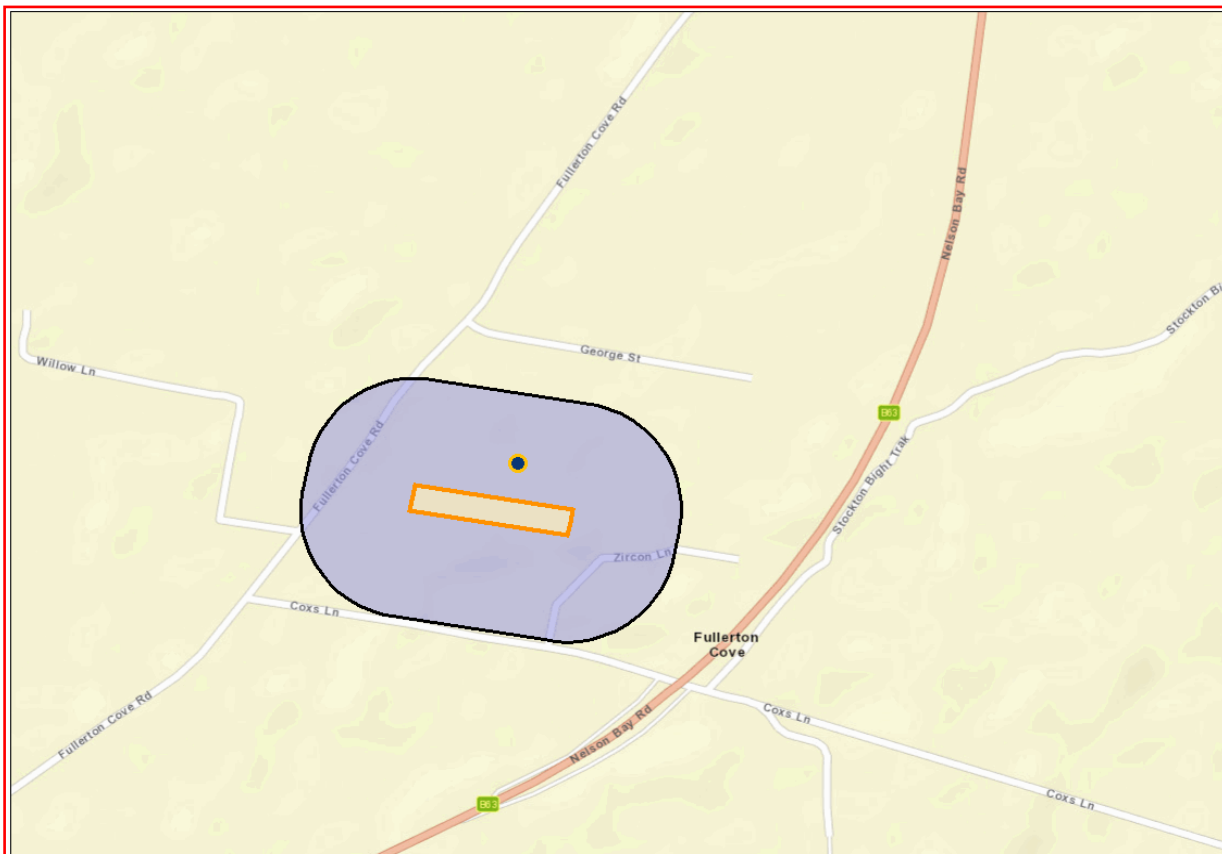
Katrina Greville
 21 Costata Crescent
 Adamstown New South Wales 2289
 Attention: Katrina Greville
 Email: klmukevski@bigpond.com

Date: 15 April 2025

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 1, DP:DP794575, Section : - with a Buffer of 200 meters, conducted by Katrina Greville on 15 April 2025.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

1	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(https://www.legislation.nsw.gov.au/gazette\)](https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Appendix C: NBC Modelling Report



NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 6/08/2025

Assessment Date: 15/04/2025

Site Street Address: 2536 Coxs Lane Fullerton Cove SBS, Fullerton Cove

Assessor: Stuart Greville; Bushfire Planning Australia

Local Government Area: Port Stephens

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: T1

Vegetation Information

Vegetation Type: Coastal Swamp Forests

Vegetation Group: Forested Wetlands

Vegetation Slope: 0.1 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 22.6

Overall Fuel Load(t/ha): 34.1

Vegetation Height(m): 1.4

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 24

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 9.38

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 61

Flame Length(m): 21.45

Maximum View Factor: 0.455

Rate Of Spread (km/h): 2.67

Inner Protection Area(m): 0

Transmissivity: 0.837

Outer Protection Area(m): 0

Fire Intensity(kW/m): 47126

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 18 23 33 44 67 6

Run Description:	T10				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	0.1 Degrees	Vegetation Slope Type:	Upslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	26		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	8.96		
Radiant Heat(kW/m2):	22.91	Flame Angle (degrees):	66		
Flame Length(m):	19.61	Maximum View Factor:	0.365		
Rate Of Spread (km/h):	2.44	Inner Protection Area(m):	15		
Transmissivity:	0.825	Outer Protection Area(m):	11		
Fire Intensity(kW/m):	39256				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	16	21	30	42	63
					6

Run Description:	T11				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	1 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	23		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	9.14		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	61		
Flame Length(m):	20.89	Maximum View Factor:	0.455		
Rate Of Spread (km/h):	2.64	Inner Protection Area(m):	0		
Transmissivity:	0.839	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	42352				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	17	23	32	44	66
					6

Run Description:	T12				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	4.6 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	28		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	11.13		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	60		
Flame Length(m):	25.7	Maximum View Factor:	0.46		
Rate Of Spread (km/h):	3.38	Inner Protection Area(m):	0		
Transmissivity:	0.829	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	54294				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	21	27	37	50	74
					6

Run Description:		T13			
<u>Vegetation Information</u>					
Vegetation Type:		Coastal Dune DSF			
Vegetation Group:		Dry Sclerophyll Forests (Shrubby)			
Vegetation Slope:		2.5 Degrees	Vegetation Slope Type:		Upslope
Surface Fuel Load(t/ha):		20.5	Overall Fuel Load(t/ha):		31.1
Vegetation Height(m):		2	Only Applicable to Shrub/Scrub and Vesta		
<u>Site Information</u>					
Site Slope:		0 Degrees	Site Slope Type:		Downslope
Elevation of Receiver(m):		Default	APZ/Separation(m):		19
<u>Fire Inputs</u>					
Veg./Flame Width(m):		100	Flame Temp(K):		1090
<u>Calculation Parameters</u>					
Flame Emissivity:		95	Relative Humidity(%):		25
Heat of Combustion(kJ/kg)		18600	Ambient Temp(K):		308
Moisture Factor:		5	FDI:		100
<u>Program Outputs</u>					
Level of Construction:		BAL 29	Peak Elevation of Receiver(m):		7.59
Radiant Heat(kW/m2):		29	Flame Angle (degrees):		62
Flame Length(m):		17.19	Maximum View Factor:		0.45
Rate Of Spread (km/h):		2.07	Inner Protection Area(m):		0
Transmissivity:		0.847	Outer Protection Area(m):		0
Fire Intensity(kW/m):		33265			
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):		15	19	28	38
				58	6

Run Description:		T15			
<u>Vegetation Information</u>					
Vegetation Type:		Coastal Dune DSF			
Vegetation Group:		Dry Sclerophyll Forests (Shrubby)			
Vegetation Slope:		0.9 Degrees	Vegetation Slope Type:		Upslope
Surface Fuel Load(t/ha):		20.5	Overall Fuel Load(t/ha):		31.1
Vegetation Height(m):		2	Only Applicable to Shrub/Scrub and Vesta		
<u>Site Information</u>					
Site Slope:		0 Degrees	Site Slope Type:		Downslope
Elevation of Receiver(m):		Default	APZ/Separation(m):		21
<u>Fire Inputs</u>					
Veg./Flame Width(m):		100	Flame Temp(K):		1090
<u>Calculation Parameters</u>					
Flame Emissivity:		95	Relative Humidity(%):		25
Heat of Combustion(kJ/kg)		18600	Ambient Temp(K):		308
Moisture Factor:		5	FDI:		100
<u>Program Outputs</u>					
Level of Construction:		BAL 29	Peak Elevation of Receiver(m):		8.28
Radiant Heat(kW/m2):		28.13	Flame Angle (degrees):		62
Flame Length(m):		18.76	Maximum View Factor:		0.44
Rate Of Spread (km/h):		2.31	Inner Protection Area(m):		12
Transmissivity:		0.841	Outer Protection Area(m):		9
Fire Intensity(kW/m):		37148			
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):		16	21	29	40
				61	6

Run Description:	T2					
<u>Vegetation Information</u>						
Vegetation Type:	Coastal Dune DSF					
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)					
Vegetation Slope:	3.4 Degrees	Vegetation Slope Type:		Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):		31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta				
<u>Site Information</u>						
Site Slope:	0 Degrees	Site Slope Type:		Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):		26		
<u>Fire Inputs</u>						
Veg./Flame Width(m):	100	Flame Temp(K):		1090		
<u>Calculation Parameters</u>						
Flame Emissivity:	95	Relative Humidity(%):		25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):		308		
Moisture Factor:	5	FDI:		100		
<u>Program Outputs</u>						
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):		10.37		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):		60		
Flame Length(m):	23.95	Maximum View Factor:		0.458		
Rate Of Spread (km/h):	3.11	Inner Protection Area(m):		0		
Transmissivity:	0.832	Outer Protection Area(m):		0		
Fire Intensity(kW/m):	49979					
<u>BAL Thresholds</u>						
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:						
Asset Protection Zone(m):	19	25	35	48	71	6

Run Description:	T3				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Floodplain Wetlands				
Vegetation Group:	Forested Wetlands				
Vegetation Slope:	0.2 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	8.2	Overall Fuel Load(t/ha):	15.1		
Vegetation Height(m):	0.9	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	10		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	3.74		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	64		
Flame Length(m):	8.31	Maximum View Factor:	0.437		
Rate Of Spread (km/h):	1	Inner Protection Area(m):	0		
Transmissivity:	0.873	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	7784				
<u>BAL Thresholds</u>					
	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m):	6	9	14	21	35
					6

Run Description:	T4				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	1.8 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	24		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	9.56		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	61		
Flame Length(m):	21.87	Maximum View Factor:	0.456		
Rate Of Spread (km/h):	2.79	Inner Protection Area(m):	0		
Transmissivity:	0.836	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	44755				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	18	24	33	45	67
					6

Run Description:	T5				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	1.5 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	24		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	9.39		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	61		
Flame Length(m):	21.48	Maximum View Factor:	0.456		
Rate Of Spread (km/h):	2.73	Inner Protection Area(m):	0		
Transmissivity:	0.837	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	43838				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	18	23	33	44	67
					6

Run Description:	T6				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	0.9 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	23		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	9.08		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	61		
Flame Length(m):	20.76	Maximum View Factor:	0.455		
Rate Of Spread (km/h):	2.62	Inner Protection Area(m):	0		
Transmissivity:	0.839	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	42061				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	17	22	32	43	65
					6

Run Description:	T7				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	1.1 Degrees	Vegetation Slope Type:	Upslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	21		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	8.19		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	62		
Flame Length(m):	18.55	Maximum View Factor:	0.452		
Rate Of Spread (km/h):	2.28	Inner Protection Area(m):	0		
Transmissivity:	0.844	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	36639				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	16	21	29	40	61
					6

Run Description:	T8				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	2.1 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	24		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	9.7		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	61		
Flame Length(m):	22.19	Maximum View Factor:	0.456		
Rate Of Spread (km/h):	2.84	Inner Protection Area(m):	0		
Transmissivity:	0.836	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	45691				
<u>BAL Thresholds</u>					
	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m):	18	24	33	44	68
					6

Run Description:	T9				
<u>Vegetation Information</u>					
Vegetation Type:	Coastal Dune DSF				
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)				
Vegetation Slope:	2 Degrees	Vegetation Slope Type:	Downslope		
Surface Fuel Load(t/ha):	20.5	Overall Fuel Load(t/ha):	31.1		
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta			
<u>Site Information</u>					
Site Slope:	0 Degrees	Site Slope Type:	Downslope		
Elevation of Receiver(m):	Default	APZ/Separation(m):	24		
<u>Fire Inputs</u>					
Veg./Flame Width(m):	100	Flame Temp(K):	1090		
<u>Calculation Parameters</u>					
Flame Emissivity:	95	Relative Humidity(%):	25		
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308		
Moisture Factor:	5	FDI:	100		
<u>Program Outputs</u>					
Level of Construction:	BAL 29	Peak Elevation of Receiver(m):	9.65		
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	61		
Flame Length(m):	22.06	Maximum View Factor:	0.456		
Rate Of Spread (km/h):	2.82	Inner Protection Area(m):	0		
Transmissivity:	0.836	Outer Protection Area(m):	0		
Fire Intensity(kW/m):	45377				
<u>BAL Thresholds</u>					
BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:					
Asset Protection Zone(m):	18	24	33	45	68
					6