BUSHFIRE ASSESSMENT REPORT

Proposed Residential Subdivision

51, 134 & 146 Station Lane, Lochinvar

Prepared for: McCloy Project Management Pty Ltd

Bushfire Planning Australia

Stuart Greville
Accredited Bushfire Practitioner
BPAD-26202
✆ 0400 917 792
✉ stuart@bfpa.com.au

Reference: 2190
Version: FINAL – 4 May 2022

Disclaimer and Limitation

This report is prepared solely for the McCloy Project Management Pty Ltd (the 'Client') for the specific purposes of only for which it is supplied (the 'Purpose'). This report is not for the benefit of any other person; either directly or indirectly and is strictly limited to the purpose and the facts and matters stated in it and will not be used for any other application.

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: 2190 - Bushfire Assessment Report

Version	Status	Purpose	Author	Review Date
1	Draft	Draft for Review	Katrina Mukevski	15 April 2022
2	Draft	Draft for Client Review	Stuart Greville	27 April 2022
3	Final	Final for Submission	Stuart Greville	4 May 2022

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 44 of the Rural Fires Regulation 2013 and Appendix 2 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.

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

Stuart Greville

Accredited Bushfire Practitioner

BPAD-26202

Date: 4 May 2022

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) has been engaged by McCloy Project Management (the 'Client') to undertake a Bushfire Assessment Report (BAR) for the proposed residential subdivision located at 51, 134 and 146 Station Lane, Lochinvar (the 'subject site'); legally known as Lot 3 DP564631 and Lots 2 & 4 DP634523.

The proposed staged subdivision will create up to 353 residential lots, 1 residue lot and 5 public lots for ancillary services including roads, pathways and basins. The subdivision will be constructed across 10 stages.

This BAR found that the site is currently exposed to a low to medium bushfire hazard contained to the existing riparian corridor straddling the western boundary of the site. There is limited mature vegetation contained across the site, which has been highly modified for farming and grazing and is dominated by a mixture of exotic and native grasses with some scattered trees are spread across the existing pastures. The primary hazard compromises a corridor of vegetation within the riparian corridor. The available vegetation mapping identifies several vegetation formations throughout the watercourse including Coastal Floodplain Wetlands and Coastal Valley Grassy Woodlands.

Several areas within the site; including the western riparian corridor will be rehabilitated and revegetated. The vegetation formation to be established within these areas is commensurate with a Coastal Valley Grassy Woodland.

The site is identified as the Lochinvar Urban Release Area in the Maitland Local Government Area Bush Fire Planning – Urban Release Area Map. Accordingly, to benefit from the exemptions permitted under clause 273 of the Environmental Planning and Assessment Regulations 2000 (EP&A Regs) and in accordance with the NSW Rural Fire Service (RFS) User Guide for Subdivision of Urban Release Areas on Bush Fire Prone Land, a Subdivision BAL Plan has been prepared and is contained in **Appendix E**. As part of the application for a Bush Fire Safety Authority (BFSA) under section 100b of the Rural Fires Act 1997 (RF Act), we are also seeking endorsement of the Subdivision BAL Plan prior to the registration of the subdivision.

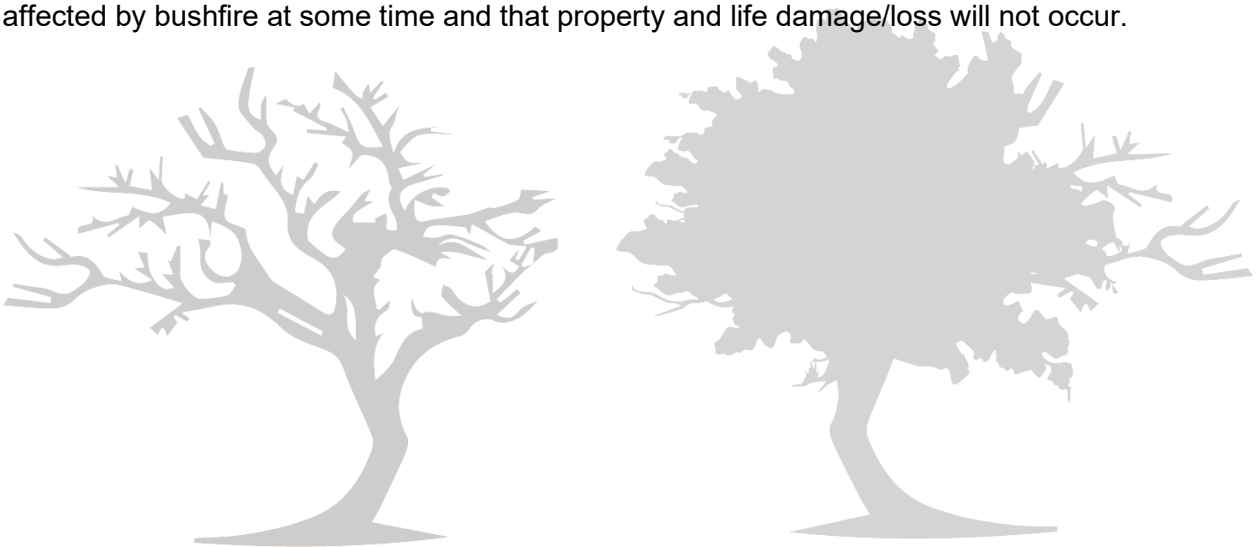
In summary, the following key recommendations have been designed to enable the proposed residential development to achieve the aims and objectives of PBP 2019:

1. All land within the site zoned R1 Residential; excluding the riparian corridors shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;
2. Asset Protection Zones shall be provided as indicated on **Figure 15** and **Appendix E**;
3. Access shall be provided in accordance with Table 5.3b of PBP 2019. This will require the provision of a minimum of two (2) separate road access points provided from the development site to the east and west to ensure safe evacuation for all residents. A temporary access road shall be provided during the staged construction of the development to Terriere Drive and temporary access provided to Station Lane or; depending on the location of the first stage to be constructed.
4. Any temporary turning heads shall be constructed in accordance Appendix A3.3 of PBP 2019;
5. Vegetation within road verges (including swales) to be consistent with a grassland vegetation classification with tree canopy less than 10% at maturity;
6. Vegetation with the stormwater basins; including associated batters shall be planted consistent with a grassland vegetation classification with tree canopy less than 10% at maturity;

7. All future dwellings to be constructed on the proposed lots shall have due regard to the specific considerations given in the National Construction Code: Building Code of Australia (BCA) which makes specific reference to Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and the NASH Standard Steel Framed Construction in Bushfire Prone Areas;
8. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 5.3.3 of PBP 2019; and
9. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (May 2022) and demonstrates the development has satisfied the aims and objectives of Planning for Bushfire Protection 2019.

Finally, should the above recommendations be implemented, the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site, but they do not and cannot guarantee that the area will not be affected by bushfire at some time and that property and life damage/loss will not occur.



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Terms and Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419-2005	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
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
DSF	Dry Sclerophyll Forest
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
MCC	Maitland City Council
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
PBP 2019	Planning for Bushfire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RFS	NSW Rural Fire Service
TSC Act	NSW Threatened Species Conservation Act 1995 (as repealed)

1. Introduction

Bushfire Planning Australia (BPA) has been appointed by McCloy Project Management (the 'Client') to undertake a Bushfire Assessment Report (BAR) for the proposed staged residential subdivision located at 51, 134 and 146 Station Lane, Lochinvar (the 'subject site'). The proposed staged development will create up to 353 residential allotments and construction of associated ancillary services.

The assessment aims to provide a bushfire risk assessment which considers and assesses the bushfire hazard and associated potential bushfire threat relevant to the proposed development on a landscape scale. The assessment outlines the minimum mitigative measures which would be required in accordance with the BAR, provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) and the *Rural Fires Regulation 2013*.

1.1. Aims and Objectives

This BAR aims to assess the bushfire threat and recommends a series of bushfire protection measures that aim to minimise the risk of adverse impact of bush fires on life, property and the environment.

This assessment has been undertaken in accordance with Appendix 2 of *Planning for Bushfire Protection 2019* and clause 44 of the *Rural Fires Regulation 2013*. This assessment also addresses the aim and objectives of PBP 2019, being:

- Afford buildings and their occupants protection from exposure to a bushfire;
- Provide for a defendable 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); and
- Ensure that utility services are adequate to meet the needs of firefighters.

2. Site Description

Table 1: Site Description

Address	51, 134 & 146 Station Lane, Lochinvar
Title	Lots 3 DP564631 and Lots 2 & 4 DP634523
LGA	Maitland City Council
Subject Site/ Study Area	101.3 ha
Development Site	~41 ha
Land Use Zone	R1 General Residential and C3 Environmental Management (**Figure 1**)
Bushfire Prone Land	Bushfire Prone Land. The entire site is mapped as Category 3 Vegetation (**Figure 3**)
Context	The development site is located to the west of Station Lane and historically been used for grazing and predominantly cleared. Each lot currently contains a dwelling and shed(s) that will be cleared prior to the commencement of the proposed development. Other residential subdivisions exist to the north, north east and west of the proposed development site. The site is identified as Lochinvar Urban Release Area in the Maitland Local Government Area Bush Fire Planning – Urban Release Area Map.
Topography	Undulating ~15m rise in elevation across the site
Fire Danger Index	100

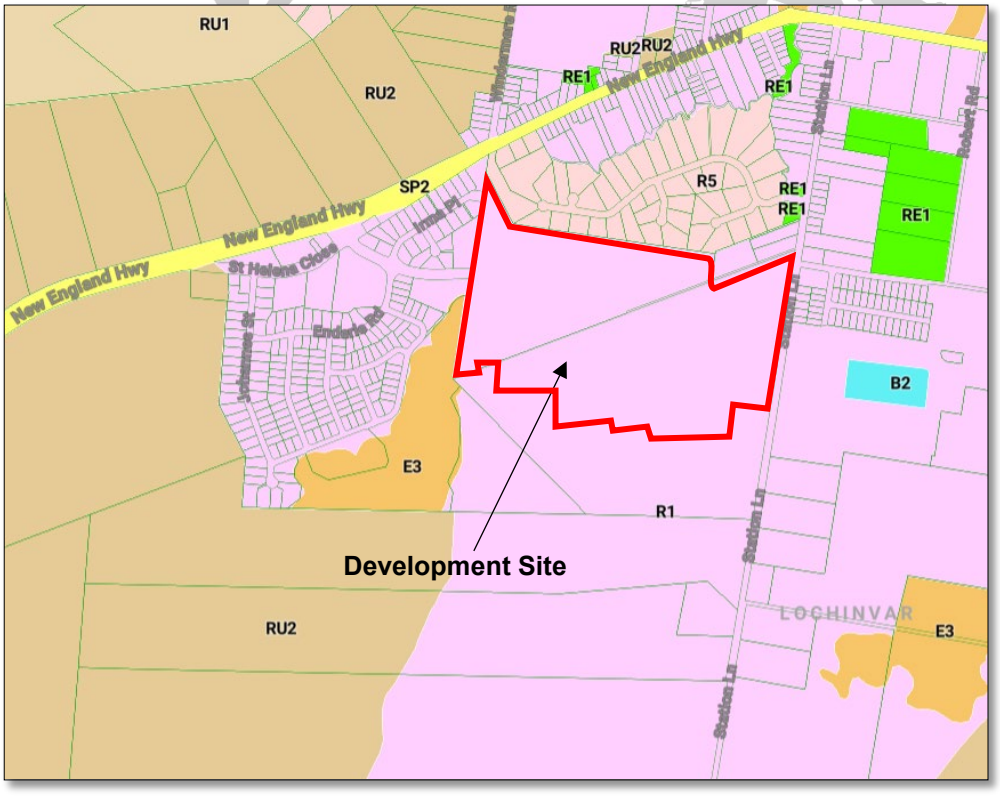

Figure 1: Land Use Zone Map (Maitland Local Environment Plan 2011)

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Figure 2

Site Location

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Development Site
Study Area
100m Buffer
140m Buffer

SOURCE:
Base Map © Department of Customer Service 2020

N
W E
S

0 250 500
Meters

A3 Scale: 1:10,000

File:2190 Lochinvar-Fig1-SiteLocation-220504 Date: 4/05/2022

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2.1. Background – Lochinvar Urban Release Area

The proposed development is within the Lochinvar North Urban Release Area which was designed to ensure urban growth takes place in a co-ordinated and sustainable manner. Maitland City Council prepared the master plan to provide a logical framework for the progressive development of the urban release area. In some instances, the development of certain parcels of land relied on adjoining landowners to provide public road connections to facilitate the orderly development.

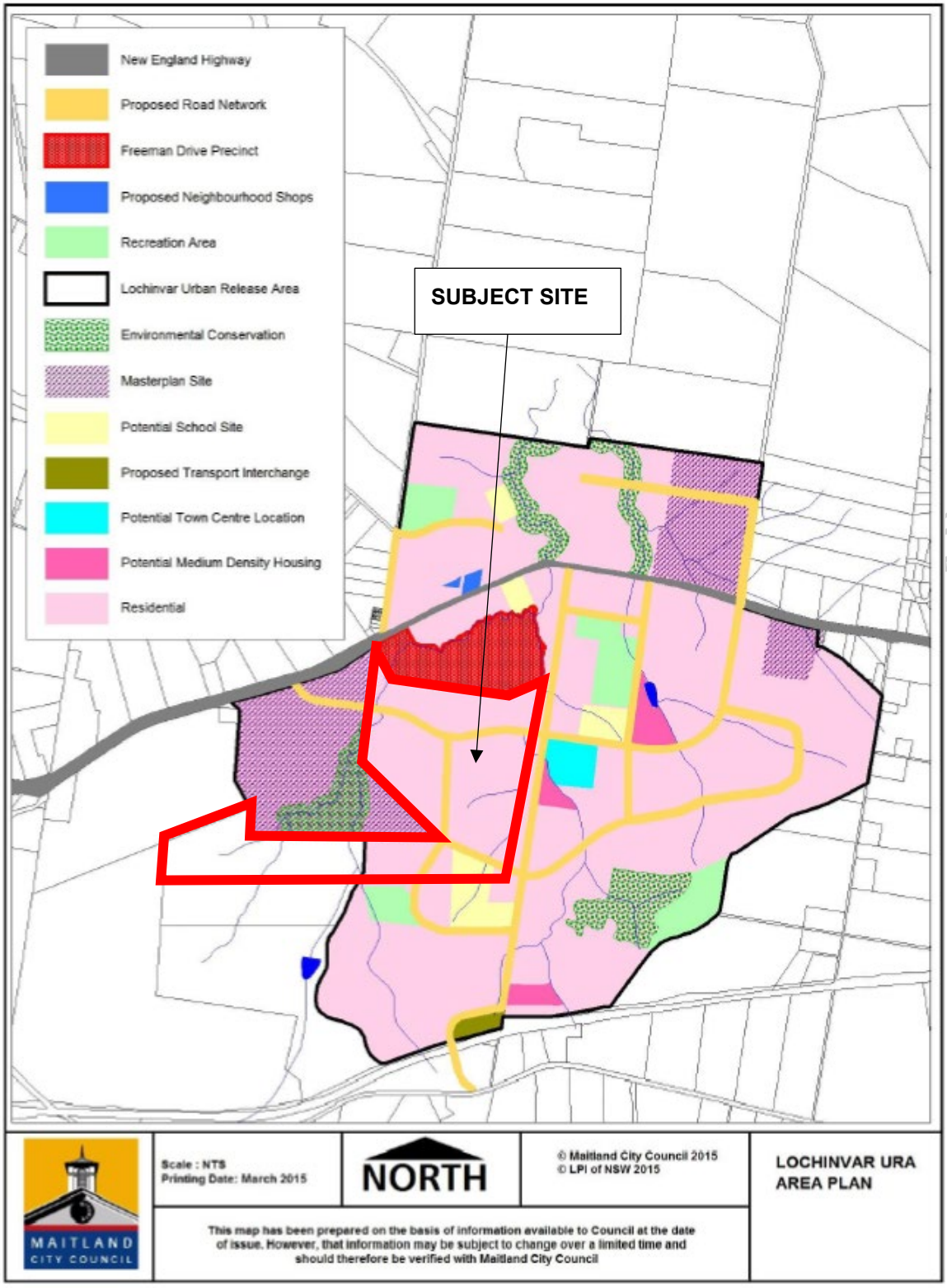

Figure 3: Lochinvar URA Area Plan (Maitland DCP 2011)

2.2. 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 4 demonstrates most of the development site is mapped as Category 3 Vegetation. Aside from the existing residential development to the north and north-west, all land within 140m of the site is also mapped as Vegetation Category 3. It is noted as part of the development the riparian corridor along the western boundary will be revegetated and would likely be re-classified as Category 1 Vegetation.

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Figure 4

NSW Bush Fire Prone Land

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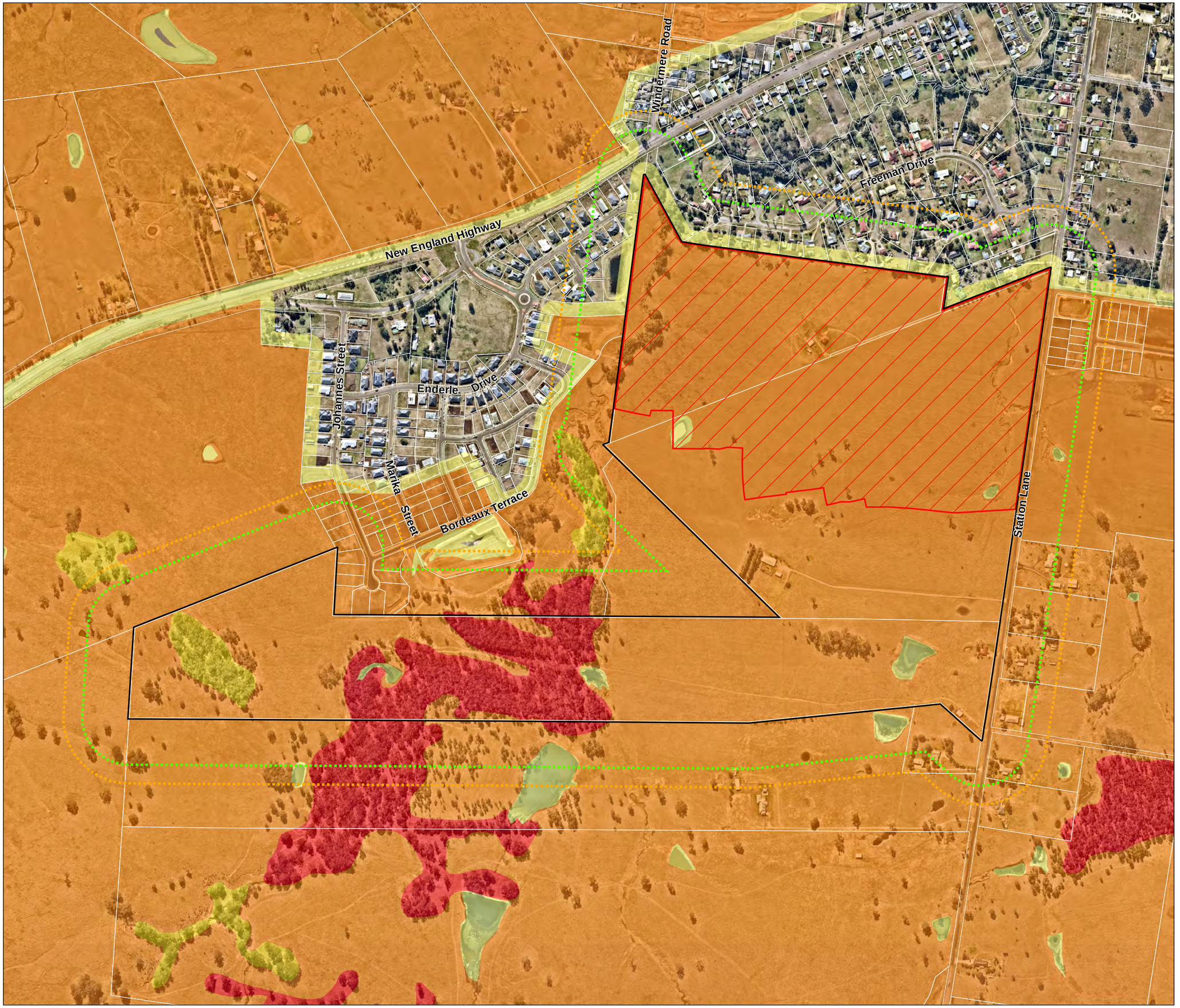

- Study Area
- Development Site
- 140m Buffer
- 100m Buffer

Required Bushfire Attack Levels (PBP 2019 Table A1.12.5)

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Buffer

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 06/08/2021
NSW Bush Fire Prone Land: NSW Rural Fire Service 2018

N W E S

0 100 200 300 400
Meters

A3 Scale: 1:7,500

File:2190 Lochinvar-Fig2-BFPL-220504 Date: 4/05/2022

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2.3. Fire History

There is no recorded evidence of recent bushfires at the site itself and the surrounding area.

2.4. Proposed Development

The proposed development seeks consent for a residential subdivision that will create 373 residential and 5 public services lots over 13 stages on the existing Lot 3 DP564631 and a portion of Lot 4 DP634523.

The proposed development will also include construction of both public through roads and non-perimeter roads, providing access to each lot, associated pathways and ancillary services including water basins.

The plan of subdivision is contained in **Appendix A** and shown in **Figure 5.** The landscape masterplan identifying the areas of the site to be revegetated is contained in **Appendix F.**

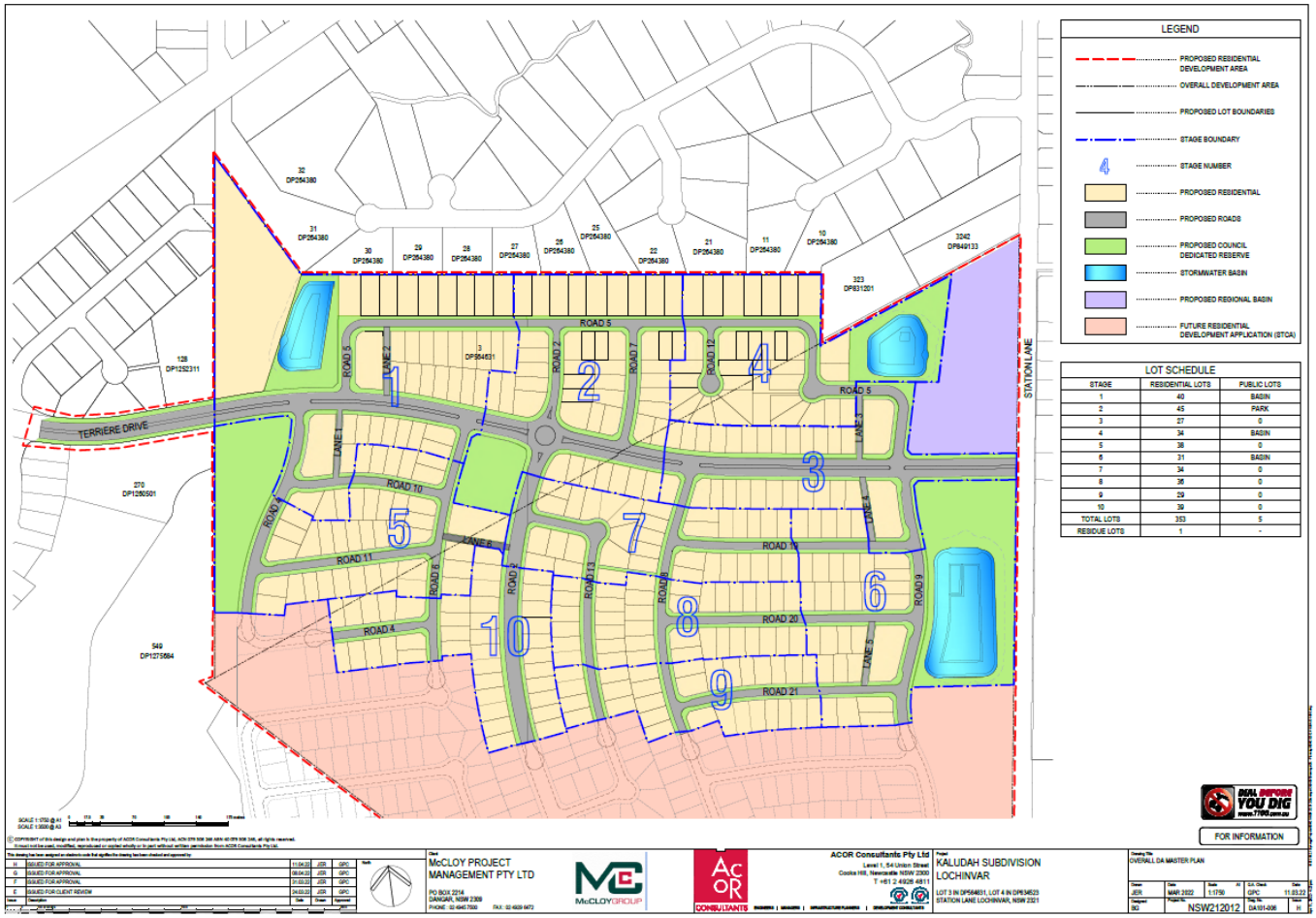

Figure 5: Plan of Proposed Subdivision - Stages 1 to 10

3. Bushfire Hazard Assessment

The bushfire hazard assessment will involve quantitative and qualitative assessments of the site. The quantitative assessment includes a detailed site inspection to record and review vegetation communities, slope and aspect both within and surrounding the site. The qualitative assessment will be based on the known bushfire behaviour of the subject land.

3.1. Vegetation Assessment

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

- Aerial Photograph Interpretation to map the vegetation classification and extent (NearMap historical series);
- Reference to Greater Hunter Native Vegetation Mapping v4.0 VIS ID 3855 OEH 2009 (**Figure 6**);
- Reference to NSW State Vegetation Type Formation Department of Planning, Industry and Environment 2021 (**Figure 7**);
- Landscape Masterplan, GSP Project No. GSP210301 April 2022 (**Appendix F**); and
- Site Inspection on 13 December 2021 by Stuart Greville (BPA).

In accordance with PBP 2019, an assessment of the vegetation over a distance of 100m in all directions from the site was undertaken. As the subject site is in a regional area, an additional assessment over a 2km distance in all directions was also completed.

Vegetation that may be considered a bushfire hazard was identified in all directions from the development footprint. The vegetation classification is based on Appendix 1 of PBP 2019; per Keith (2004). The unmanaged fuel loads detailed in the *Comprehensive Vegetation Fuel Loads* published by the RFS in March 2019 have been adopted for the purpose of assessing the bushfire hazard. The findings of the site inspection were compared to the Keith Vegetation Formations mapping provided by the NSW RFS. The inconsistencies between the mapping sources were quantified during the site inspection.

The proposed development will revegetate several portions of the site that will not be utilised for an urban use. The proposed revegetation treatment as outlined in the Landscape Masterplan has been considered and the vegetation formations identified adopted for the purpose of this hazard assessment.

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Figure 6

Greater Hunter Native Vegetation

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- Study Area
- Development Site
- 140m Buffer
- 100m Buffer
- Cleared / Managed land
- Hunter-Macleay Dry Sclerophyll Forests
- Sydney Sand Flats Dry Sclerophyll Forests

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 24/03/21
Vegetation: Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855 OEH 2009

N W E S

0 100 200 300 400
Meters

A3 Scale: 1:7,500

File:2190 Lochinvar-Fig3-Vegetation-VIS3855-220504 Date: 4/05/2022

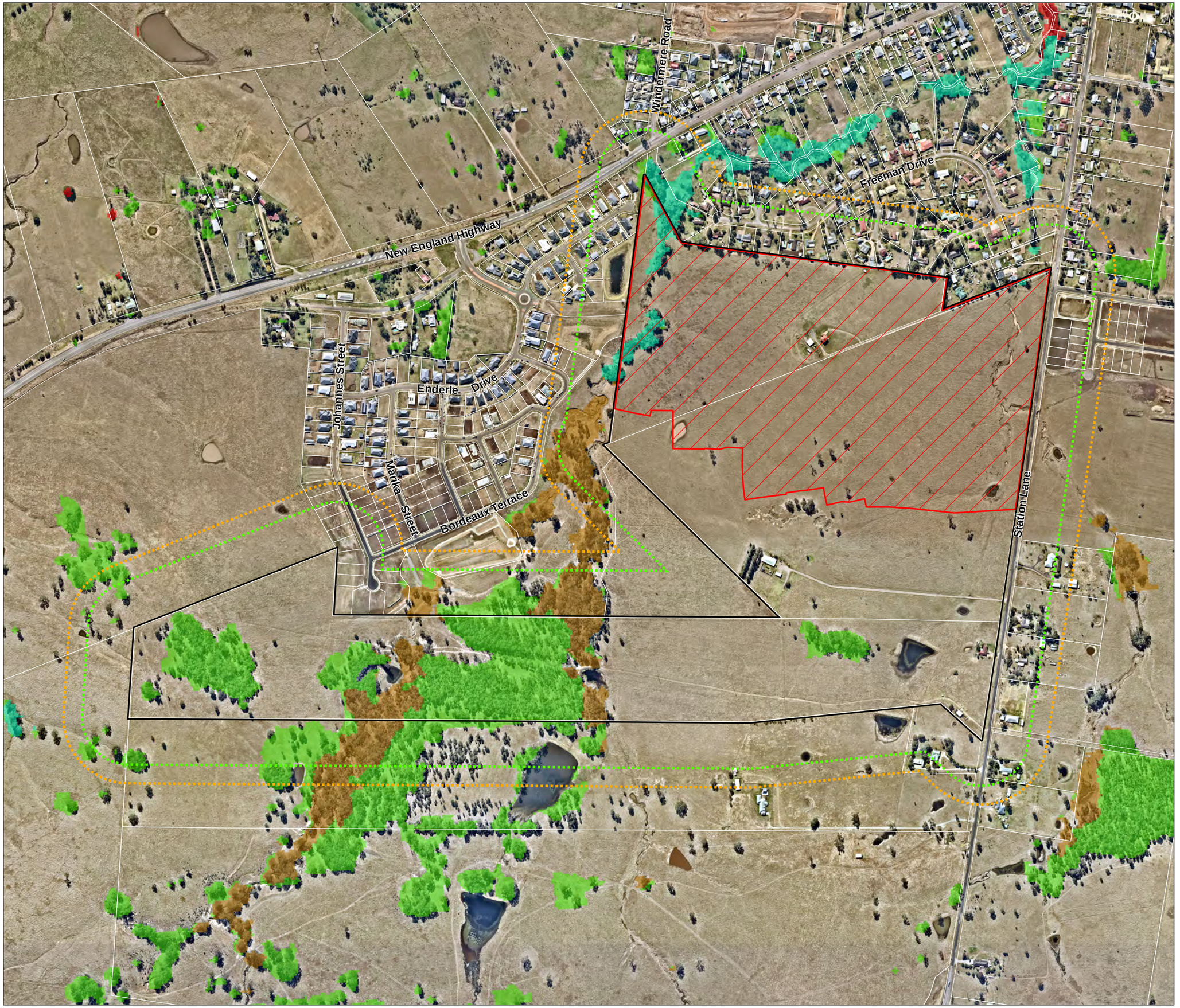

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Figure 7

NSW State Vegetation Type (Formation)

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- Study Area
- Development Site
- 140m Buffer
- 100m Buffer

Vegetation Formation

- Dry Sclerophyll Forests (Shrub/grass sub-formation)
- Forested Wetlands
- Grassy Woodlands
- Not native vegetation
- Rainforests

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 24/03/21
Vegetation: Pre-Release v1.1.0 Eastern NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2021

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Meters

A3 Scale: 1:7,500

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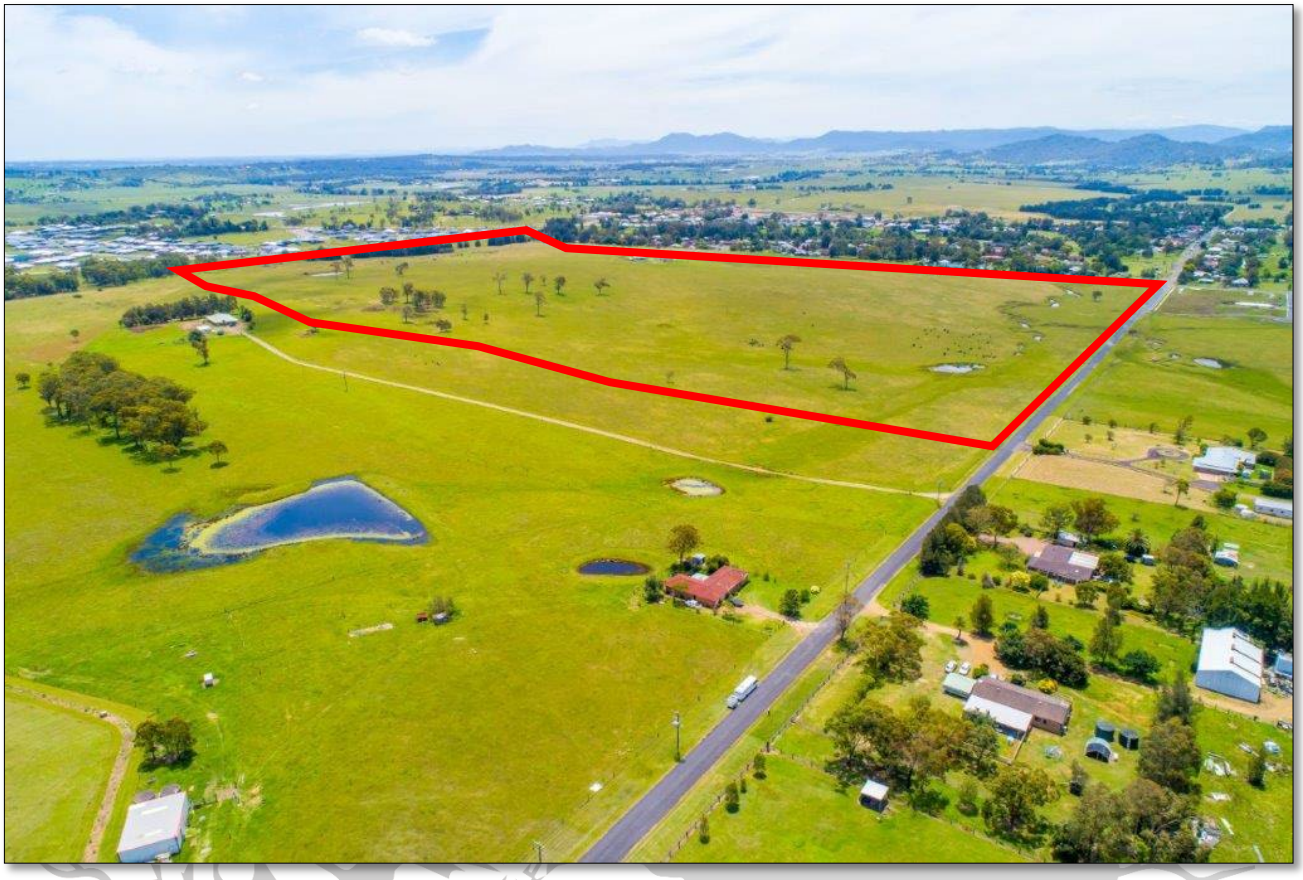

Plate 1: Indicative development footprint looking north west

Plate 2: Riparian corridor along western boundary to be revegetated as a woodland

Plate 3: Existing vegetation within proposed lot 140 – looking north across riparian corridor to be revegetated as a woodland

Plate 4: Existing grassland to the south of the development site to be managed as an APZ

3.2. Slope Assessment

The slope assessment was undertaken as follows:

- Review of LiDAR point cloud data – including DEM (NSW LPI).

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.

A series of figures were produced that demonstrate the slope within 140m from the subject site in several formats, including:

- Digital Elevation Model - **Figure 8**; and
- Slope analysis in gradients of 5 degrees - **Figure 9**.

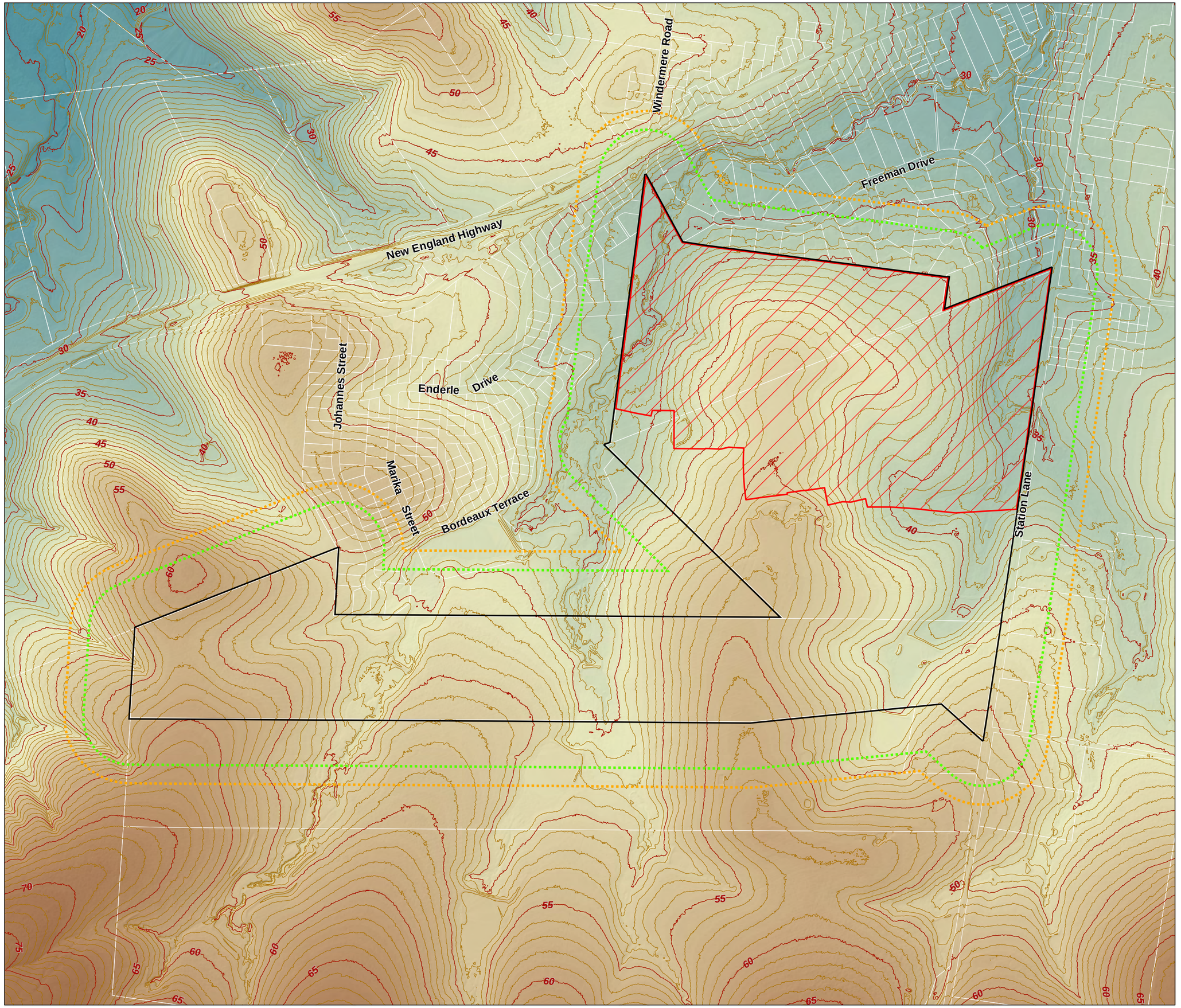

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Figure 8

Digital Elevation Model

BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Development Site
- 140m Buffer
- 100m Buffer
- Contour (5m)
- Contour (1m)

Elevation (AHD)
High : 80m
Low : 18m

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Surface analysis: Derived from LiDAR - CESSNOCK, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

N W E S

0 100 200 300 400
Meters

A3 Scale: 1:7,500

File:2190 Lochinvar-Fig6-DEM-220504 Date: 4/05/2022

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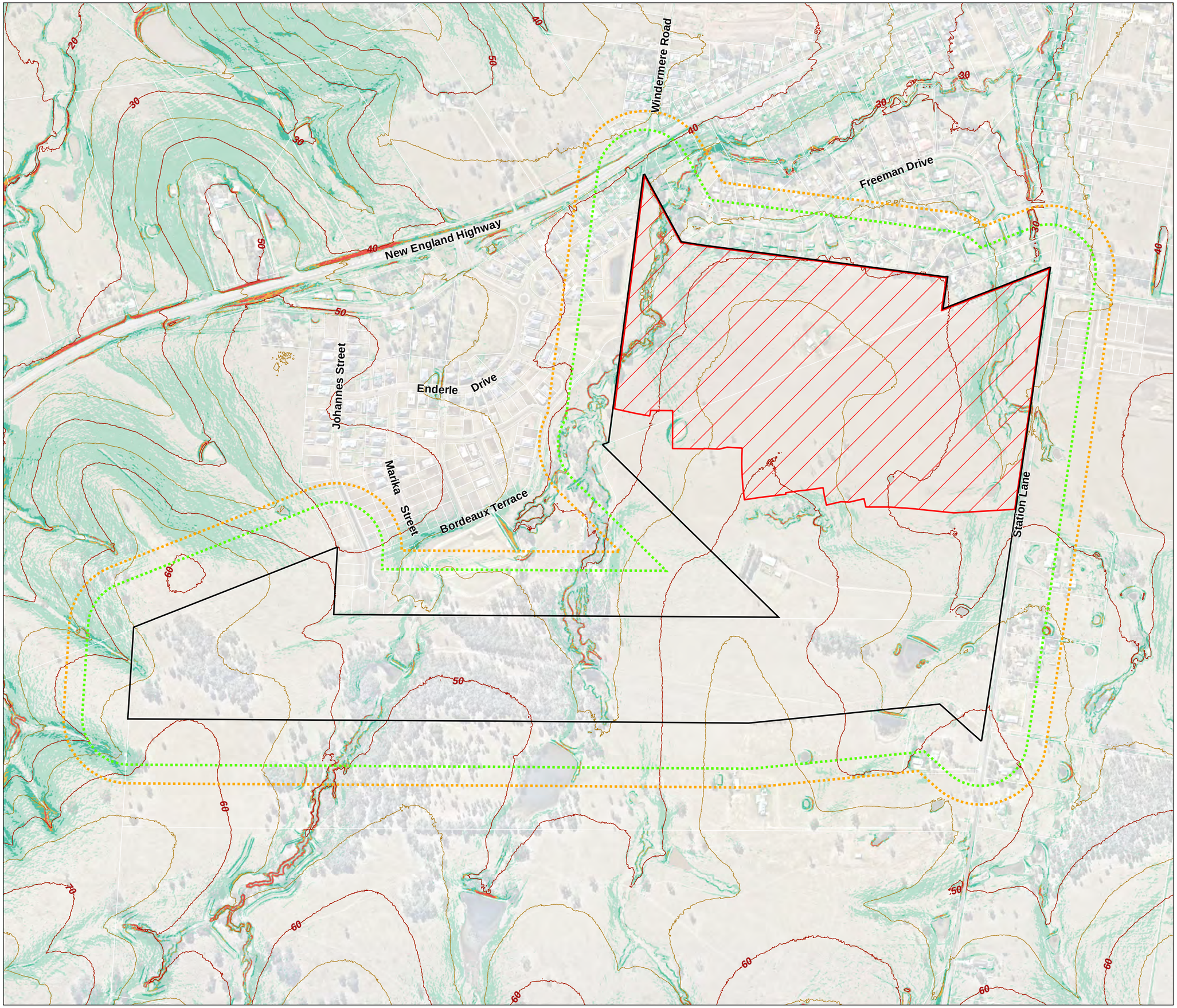
Figure 9

Slope Analysis: LiDAR



BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Development Site
- 140m Buffer
- 100m Buffer
- Contour (5m)
- Contour (1m)

Slope

- 0° - 5°
- 5° - 10°
- 10° - 15°
- 15° - 20°
- >20°

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial Photo: nearmap 06/08/2021
Surface analysis: Derived from LiDAR - CESSNOCK, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

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Meters

A3 Scale: 1:7,500

File:2190 Lochinvar-Fig7-SlopeLiDAR-220504 Date: 4/05/2022

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3.3. Results

All vegetation identified within the current Bush Fire Prone Land map was confirmed during the site inspection.

The majority of the development site has historically been actively grazed and comprises a mixture of exotic and native pasture grasses. The northern boundary is defined by a continuous row of low density residential properties. The eastern boundary is defined by Station Lane, further east is a similar rural landscape that is currently transitioning into a low density residential community.

The southern boundary is within the subject site and will be managed up to 100m as an APZ.

The only hazardous vegetation found on the site was confined to the riparian corridor within the western boundary (T14 & T15). The corridor can be described has moderately cleared with evidence of erosion and exotic weed infestation. The existing native vegetation whilst mapped as a *forested wetland* (coastal floodplain wetland) (adjoining T16 – T18), will be rehabilitated and revegetated as a *woodland*; which is the consistent vegetation formation further to south within the riparian corridor.

An area along the eastern boundary (T4 and T5) adjacent to the stormwater basin will be revegetated as a *woodland* (Coastal Valley Grassy Woodland) (**Appendix F**). Whilst the area of woodland vegetation is less than 1 hectare, the woodland adjoins a detention basin which is classified as an unmanaged *grassland*.

All detention basins (T2, T3, T6, and T16-T18); including the regional basin will be regraded and seeded with a mixture of native grasses. The basins will not be reliably maintained and therefore assessed as a *grassland* hazard.

Vegetation located outside of the development footprint up to 140m of the proposed development site was confirmed as either *low-threat* or *grassland*.

There is a gradual change in elevation across the site, primarily falling from the south down to the northeast and northwest corners. A distinct riparian corridor collects all surface water from the western portion of the site, and a series of depressions and mild gullies lead to the north-east corner. The maximum effective slope under the identified hazardous vegetation is less than 5° downslope.

The results of hazard assessment are detailed in **Table 2** and shown in **Figure 10** and **11**.

Table 2: Slope and Vegetation Assessment Results

Transect	Vegetation Description	Vegetation Classification (PBP 2019)	Slope
T1	Existing residential properties	Managed Land (Residential properties)	1.8° Downslope
T2	Regional detention basin unmanaged grassland	*Grassland*	2.9° Downslope
T3	Regional detention basin unmanaged grassland	*Grassland*	2.2° Downslope
T4	Revegetated riparian corridor from edge of road to base of watercourse being the steepest effective slope	*Woodland* (Coastal Valley Grassy Woodland)	4.9° Downslope
T5	Revegetated riparian corridor from edge of road to eastern site boundary	*Woodland* (Coastal Valley Grassy Woodland)	1.7° Downslope

Transect	Vegetation Description	Vegetation Classification (PBP 2019)	Slope
T6	Detention basin unmanaged grassland	*Grassland*	1.3° Downslope
T7	Grassland from the edge of the road to the edge of the south-eastern development site boundary	*Grassland*	1.1° Downslope
T8	The edge of the development site southern boundary to the beginning of the watercourse	*Grassland*	-1.1° Upslope
T9	The edge of the development site southern boundary to the beginning of the watercourse	*Grassland*	-2.6° Upslope
T10	Actively grazed pastures	*Grassland*	-1.4° Upslope
T11	Actively grazed pastures	*Grassland*	-0.8° Upslope
T12	Actively grazed pastures transitioning to a detention basin	*Grassland*	0.1° Downslope
T13	Development site south-western boundary to a revegetated Woodland external to the site's western boundary	*Woodland* (Coastal Valley Grassy Woodland)	0.5° Downslope
T14	Revegetated woodland from the edge of the road to the site boundary and identified as the greatest bushfire hazard	*Woodland* (Coastal Valley Grassy Woodland)	2.1° Downslope
T15	Revegetated woodland from the edge of the road beyond the site boundary and identified as the greatest bushfire hazard	*Woodland* (Coastal Valley Grassy Woodland)	0.5° Downslope
T16	Unmanaged grassland from the edge of the road to the edge of the detention basin	*Grassland*	1.1° Downslope
T17	Unmanaged grassland from the edge of the road through the detention basin to the beginning of the Woodland vegetation	*Grassland*	3.0° Downslope
T18	Unmanaged grassland from the edge of Lot 101 to the beginning of the Woodland vegetation	*Grassland*	2.0° Downslope

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Figure 10

Slope & Vegetation Assessment

BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Development Site
- 140m Buffer
- 100m Buffer
- Contour (2m)
- Contour (0.5m)
- Proposed Lots
- Future Lots
- Indicative Building Envelope (30m x 20m)
- 7.5m Buffer
- Watercourse
- Watercourse 20m Buffer
- 7.5m Buffer (including 5.5m screen planting)
- Regional Basin (grassland)
- Detention Basins (grassland)
- Active Open Space

Vegetation Community

- Forested Wetland (Coastal Floodplain Wetlands)
- Grassland
- Forest (Hunter Macleay DSF)
- Managed / urban
- Woodland (Coastal Valley Grassy Woodland)
- Woodland (revegetated)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 24/03/21
Surface analysis: Derived from LiDAR - CESSNOCK, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012
Watercourse: Geoscience Australia 2015
Vegetation: Bushfire Planning Australia 2021

N W E S

0 50 100 150 200
Meters

A3 Scale: 1:4,000

File:2190 Lochinvar-Fig8-SlopeVeg-220504 Date: 4/05/2022

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Figure 11

Lot 140 Slope & Vegetation Assessment

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- Lot 140
- Potential Building envelope (30m x 20m)
- 10m Riparian Setback
- RL
- Downslope transect
- Upslope transect
- Contour (2m)
- Contour (0.5m)
- Proposed Lots
- Future Lots
- 1.8m high radiant heat shield
- Watercourse
- Watercourse 20m Buffer
- 7.5m Buffer (including 5.5m screen planting)
- Grassland (Detention Basin)

Vegetation Community

- Forested Wetland (Coastal Floodplain Wetlands)
- Grassland
- Forest (Hunter Macleay DSF)
- Managed / urban
- Woodland (Coastal Valley Grassy Woodland)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 24/03/21
Surface analysis: Derived from LiDAR - CESSNOCK, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012
Watercourse: Geoscience Australia 2015
Vegetation: Bushfire Planning Australia 2021

N W E S

0 50
Meters

A3 Scale: 1:1,000

File:2190 Lochinvar-Fig9-Lot140-SlopeVeg-220425 Date: 25/04/2022

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GIS & mapping solutions for infrastructure, town planning & environmental management

New England Highway
Irma Place
Freeman Drive
ROAD 5
140
101
102
103
104
118
117
119
120
121
122
T1 48m -2.1°
T2 103m -2.1°
T3 99m -2.0°
T4 68m 0.9°
35.7m
33.9m
35.5m
35.6m
35.7m
39.2m
39.0m
34.6m

3.4. Significant Environmental Features

The recommended bushfire protection measures have been designed to avoid any unacceptable impacts on a significant environmental feature.

3.5. Threatened Species, populations or ecological communities

The area of the site to be affected by the proposed development has been identified to avoid impact on any threatened species, population or EEC. An independent Biodiversity Development Assessment has been completed by AER (dated May 2020) to demonstrate the site meets the requirements of the Biodiversity Assessment Method 2017 (BAM) established under Section 6.7 of the *NSW Biodiversity Conservation Act 2016*. This assessment can be provided on request.

All bushfire mitigation measures; including APZs has considered the existing and potential biodiversity values to avoid impact where possible.

3.6. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix B**) revealed there are no Aboriginal sites or places recorded near the site. All bushfire mitigation measures, such as APZs have considered this and been designed to avoid disturbing any artefacts if identified.

3.7. Bushfire Planning - Urban Release Area

The subject site is identified within a Bushfire Planning - Urban Release Area (URA) as indicated on **Figure 12** and **13**. As a subdivision of land within an URA, the assessment undertaken as part of the preparation of the BMP may exempt the proposed lots from reassessment of bushfire matters when future land owners are ready to construct a dwelling on their lot/s. For the future landowners to benefit from the available exemptions, a Post-Subdivision Bush Fire Attack Level Certificate (PSBC) must be obtained to allow for the streamlined process. To facilitate the PSBC, a Subdivision BAL Plan is required that demonstrates the location of APZs and that all new lots can suitably accommodated a dwelling envelope achieving BAL-29 or less.

A **Subdivision BAL Plan** has been prepared and contained in **Appendix E**. As part of the application for a BFSA it is requested the RFS endorse the included **Subdivision BAL Plan**.

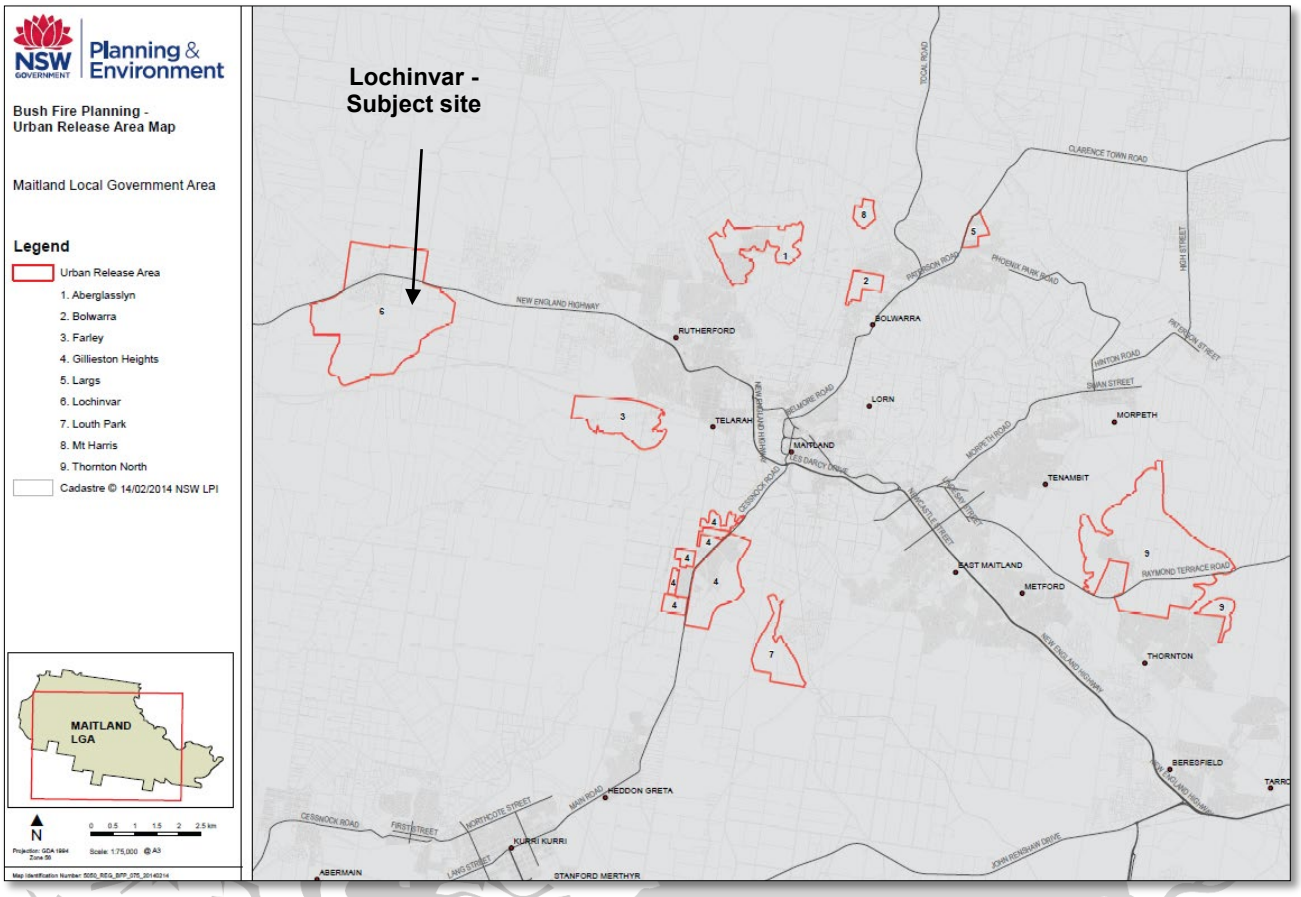


Figure 12: Bushfire Planning - Urban Release Area Map (Maitland LGA)

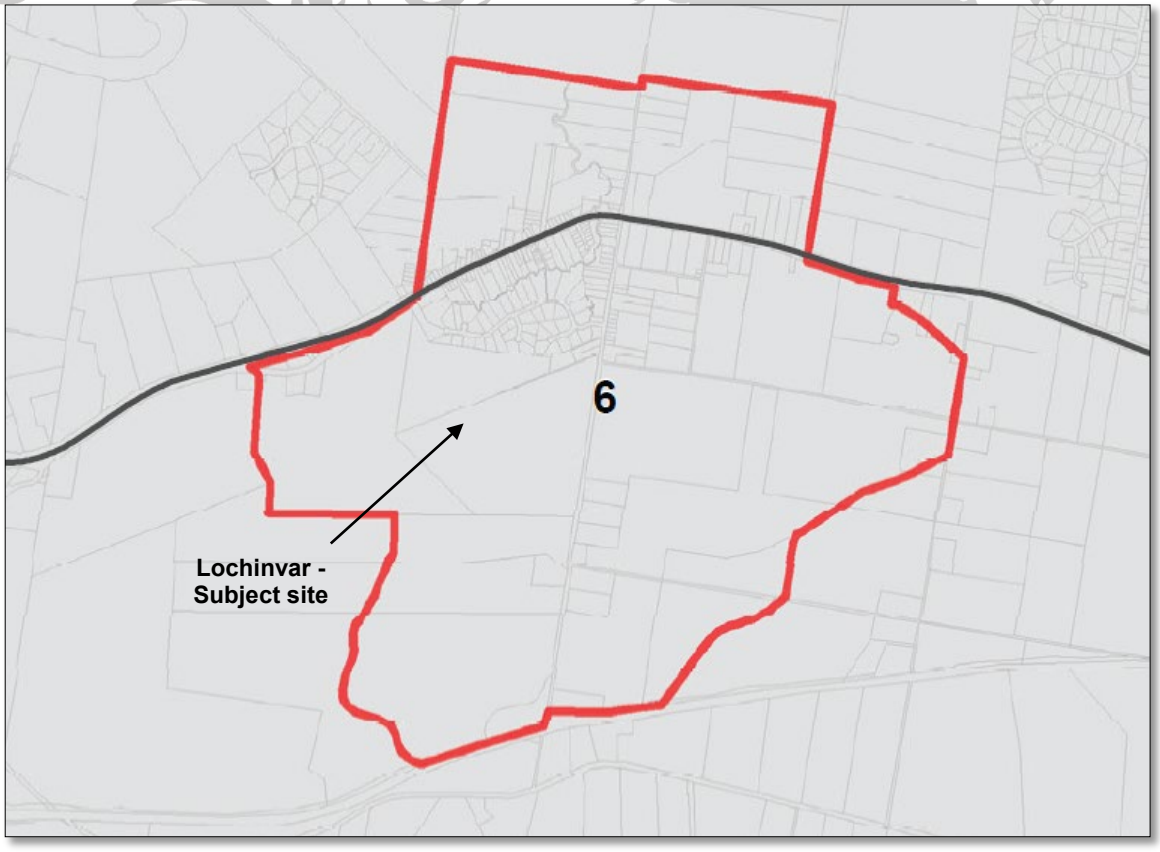


Figure 13: Bushfire Planning - Urban Release Area Map (Maitland LGA)

4. Bushfire Risk and Mitigation

4.1. Asset Protection Zones

An 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). In this instance the entire APZ and the balance of the development site shall be managed as an IPA.

4.1.1. 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-satisify 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 the Maitland City 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-T18). To ensure the APZs achieve the intent of Section 5.3.1 of PBP 2019, the APZs have been determined to ensure all lots are able to accomomodate a dwelling that will not be exposed to radiant heat levels exceeding 29kW/m^2. The NBC Bushfire Attack Assessor report detailing the inputs used is contained in **Appendix C**.

All land to the south of the development will be maintained as a temporary APZ (T8-T12) until such time the land is developed.

Whilst the proposed local and regional stormwater detention basins will be cleared, regraded and replanted, the grassland vegetation will not be guaranteed to be maintained as an APZ (grass <100mm high). Accordingly, the basins have been assessed as a grassland hazard. However, the effective slope is assessed as *flat*; as the basins will be predominantly have a level basin and surrounded by gradual sloping batters.

Two separate building envelopes have been identified on proposed Lot 140 to demonstrate there is land within the site exposed to 29kW/m^2 or less, and therefore able to accommodate a residential dwelling.

Three lots (140, 408 and 409) directly adjoing a *grassland* hazard contained within a detention basin. These lots are separated from the grassland by a 1.8m high radiant heat shield and subject to a future dwelling being constructed to BAL-29, an APZ within the lots is not considered necessary.

Refer to **Table 3** and **Figure 15** for the recommended APZs.

Table 3: Required and Recommended Asset Protection Zones

Transect	Vegetation Classification (PBP 2019)	Slope Class	PBP 2019 FDI 100 Table A1.12.2	Recommended APZ (29kW/m²) Method 2	APZ Provided
T1	Not Applicable (Managed Land)	N/A	N/A	N/A	N/A
T2, T3, T6, T16-T18	*Grassland* (detention basin)	Flat	10m	**10m**	**10m**
T4	*Woodland* (Coastal Valley Grassy Woodland)	4.9° Downslope	16m	**15m**	**15m**
T5	*Woodland* (Coastal Valley Grassy Woodland)	1.7° Downslope	16m	**13m**	**15m**
T7 & T12	*Grassland*	1.1° Downslope	12m	**11m**	**10m**
T8-T11	*Grassland* (Temporary APZ)	-0.8 to -2.6° Upslope	10m	**>100m (temp. APZ)**	**>100m**
T13	*Woodland* (Coastal Valley Grassy Woodland)	0.5° Downslope	16m	**12m**	**15m**
T14	*Woodland* (Coastal Valley Grassy Woodland)	2.1° Downslope	16m	**14m**	**15m**
T15	*Woodland* (Coastal Valley Grassy Woodland)	0.5° Downslope	16m	**12m**	**15m**

4.2. 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; and
- 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 defendable space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed.

Avoiding understorey planting and regular trimming of the lower limbs of trees also assists in reducing fire penetration into the canopy. Rainforests 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.

Specific requirements for the management of vegetation and landscaping around vulnerable developments and within the APZ the following conditions apply:

- Within 10m of a building, flammable objects such as plants, mulches and fences must not be located close to vulnerable parts of the building such as windows, decks and eaves;
- Trees must not overhang the roofline of the building, touch walls or any other elements of a building;
- Grass should be no more than 100mm in height. All leaves and vegetation debris are to be removed at regular intervals (rake leaves and twigs from grass every week during the fire season);

- Establish lawn substitutes including non-flammable ground covers such as decorative stone or gravel;
- Plants greater than 100m in height at maturity must not be placed directly in front of a window or other glass features;
- Tree canopy separation of 2 metres and overall canopy cover no more than 15% at maturity;
- Preference should be given to smooth barked and evergreen trees;
- Shrubs should not be located under trees;
- Shrubs should not form more than 10% ground cover; and
- Provide a reliable and sufficient water supply and installation of sprinkler systems to create a well-watered landscape.

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.

A Landscape Masterplan has been prepared and is contained in **Appendix F**.

4.3. 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 subdivision layout. All dwellings must have direct access to a public road. Section 5.3.2 of PBP 2019 requires a development to provide safe operational access to structures and water supply for emergency services while residents are seeking to evacuate.

Refer to **Appendix A** for the development plans indicating the proposed access arrangements. Access will be provided from Station Lane and an existing adjoining development to the west of the site via Terriere Drive, connected to the New England Highway. Terriere Drive will be the primary public road that connects the proposed development from west to east as well as to the majority of the proposed non-perimeter roads.

All new perimeter roads and non-perimeter roads are designed in accordance with Maitland City Council development control plan and engineering specifications. The proposed 8m wide internal local streets (non-perimeter roads) are considered sufficiently wide enough to accommodate parking for light vehicles on both sides of road, outside of the primary vehicle carriageway. It is noted the standard for on-street parking required by Australian Standard *AS2890.5:2020 Parking facilities On-street parking* for roads with a speed limit of 50km/hr or less is to be between 2.0m and 2.3m. It is also noted that a RFS Category 1 Firefighting vehicle is 2.4m wide. Furthermore, applying the option of permitting short constrictions where the width of the access road may be reduced for sections less than 30m, an 8m wide road is considered wide enough to provide a continuous unobstructed carriageway with parking on both sides of the road. The combination of double width driveways along a typical residential local street will prevent a continuous line of parked cars on both sides of the local street.

In summary, it is considered the proposed road network provides safe, all-weather two-way through roads and safe operational access for emergency service personnel and evacuation purposes; complying with the relevant provisions contained in Section 5.3.2 of PBP.

4.4. Services - water, electricity and gas

4.4.1. Water

Fire hydrant spacing, sizing and pressure should comply with AS 2419.1 - 2005. Hydrants are not to be located within any road carriageway.

All sites within the proposed development will be connected to the internal reticulated water supply.

4.4.2. Electricity

All electricity services will be located underground.

4.4.3. Gas

Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1592-2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.

4.5. Construction Standards: Bushfire Attack Level

All buildings must satisfy the Performance Requirements of the National Construction Code: Building Code of Australia (BCA). Part 2.3 of Volume 2 of the BCA applies to dwellings located within designated bushfire areas, which are defined as:

> *Land which has been designated under a power in legislation as being subject, or likely to be subject to, bushfires.*

Accordingly, all forthcoming habitable buildings must satisfy the requirements of Part 3.7.4 of the BCA. The *Deemed-to-Satisfy* (DTS) provision of the BCA 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. 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 = *varied*;
- Vegetation classification = *Grassy Woodlands*; and
- Building location.

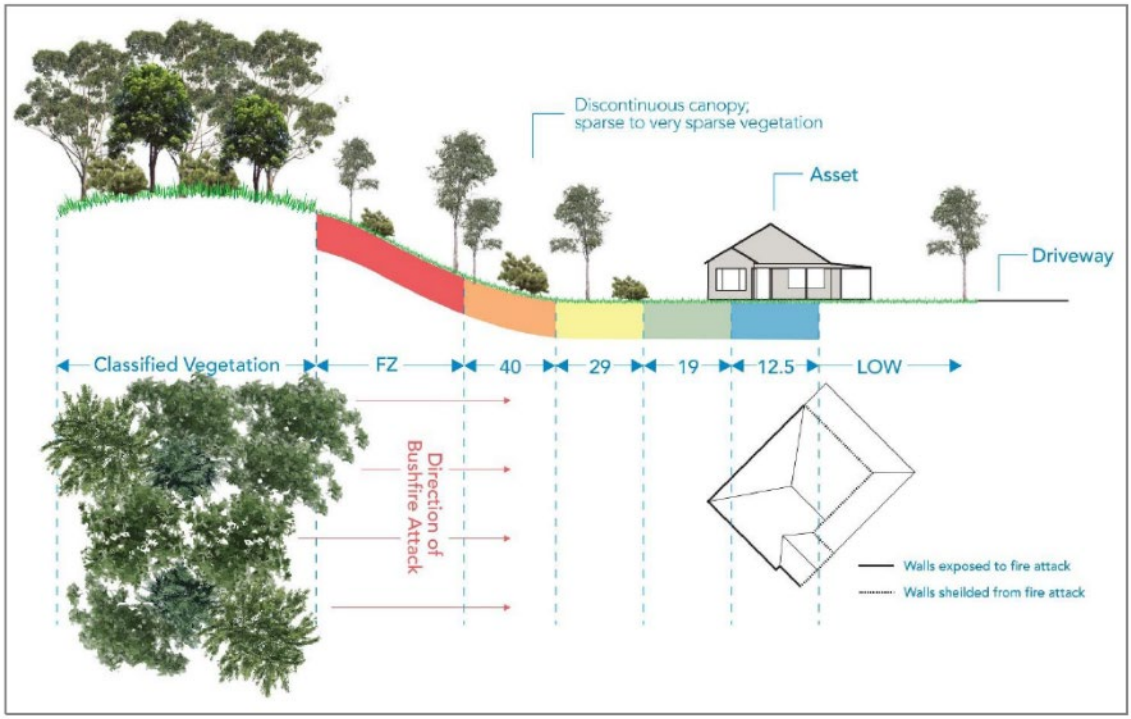


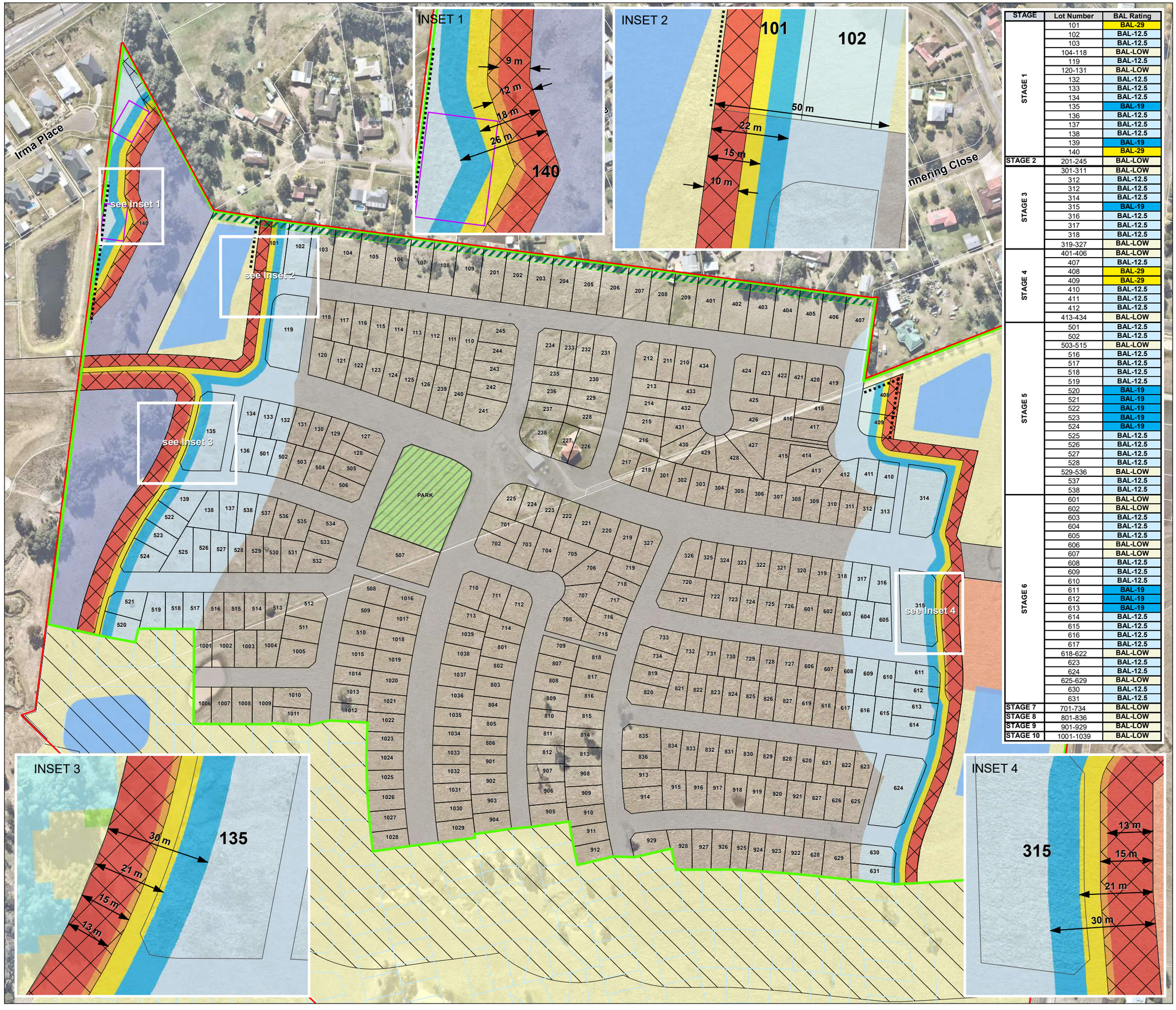
Figure 14: Bushfire Attack Level

The BALs for each transect have been calculated and provided in **Table 4**. To demonstrate the BAL ratings, **Figure 15** has been prepared in accordance with the methodology to prepare a Subdivision BAL Plan outlined in the RFS User Guide for Subdivision of Urban Release Areas on Bush Fire Prone land to represent the BALs required.

Table 4: Required BALs

Transect	Vegetation Classification (PBP 2019)	Slope	APZ Provided	Distance from Hazard	Bushfire Attack Level (BAL)
T1	Not Applicable (Managed Land)	N/A	N/A	Not Applicable	
T2, T3, T6, T16-T18	*Grassland*	Flat	**10m**	0m-<8m	BAL-FZ
				8m-<10m	BAL-40
				10m-<15m	BAL-29
				15m-<21m	BAL-19
				21m-<50m	BAL-12.5
T4	*Woodland* (Coastal Valley Grassy Woodland)	4.9° Downslope	**15m**	0m-<11m	BAL-FZ
				11m-<15m	BAL-40
				15m-<22m	BAL-29
				22m-<31m	BAL-19
				31m-<100m	BAL-12.5
T5	*Woodland* (Coastal Valley Grassy Woodland)	1.7° Downslope	**15m**	0m-<9m	BAL-FZ
				9m-<13m	BAL-40
				13m-<19m	BAL-29
				19m-<27m	BAL-19
				27m-<100m	BAL-12.5
T7 & T12	*Grassland*	1.1° Downslope	**10m**	0m-<8m	BAL-FZ
				8m-<10m	BAL-40
				10m-<15m	BAL-29
				15m-<21m	BAL-19
				21m-<50m	BAL-12.5
T8-T11	*Grassland (temporary APZ)*	-0.8 to -2.6° Upslope	**100m**	0m-<8m	BAL-FZ
				8m-<10m	BAL-40
				10m-<15m	BAL-29
				15m-<21m	BAL-19
				21m-<50m	BAL-12.5
T13	*Woodland* (Coastal Valley Grassy Woodland)	0.5° Downslope	**15m**	0m-<9m	BAL-FZ
				9m-<12m	BAL-40
				12m-<18m	BAL-29
				18m-<26m	BAL-19
				26m-<100m	BAL-12.5

Transect	Vegetation Classification (PBP 2019)	Slope	APZ Provided	Distance from Hazard	Bushfire Attack Level (BAL)
T14	*Woodland* (Coastal Valley Grassy Woodland)	2.1° Downslope	**15m**	0m-<10m	BAL-FZ
				10m-<14m	BAL-40
				14m-<20m	BAL-29
				20m-<28m	BAL-19
				28m-<100m	BAL-12.5
T15	*Woodland* (Coastal Valley Grassy Woodland)	0.5° Downslope	**15m**	0m-<9m	BAL-FZ
				9m-<12m	BAL-40
				12m-<18m	BAL-29
				18m-<26m	BAL-19
				26m-<100m	BAL-12.5



STAGE	Lot Number	BAL Rating
STAGE 1	101	BAL-29
	102	BAL-12.5
	103	BAL-12.5
	104-118	BAL-LOW
	119	BAL-12.5
	120-131	BAL-LOW
	132	BAL-12.5
	133	BAL-12.5
	134	BAL-12.5
	135	BAL-19
	136	BAL-12.5
	137	BAL-12.5
	138	BAL-12.5
	139	BAL-19
	140	BAL-29
STAGE 2	201-245	BAL-LOW
STAGE 3	301-311	BAL-LOW
	312	BAL-12.5
	312	BAL-12.5
	314	BAL-12.5
	315	BAL-19
	316	BAL-12.5
	317	BAL-12.5
	318	BAL-12.5
	319-327	BAL-LOW
STAGE 4	401-406	BAL-LOW
	407	BAL-12.5
	408	BAL-29
	409	BAL-29
	410	BAL-12.5
	411	BAL-12.5
	412	BAL-12.5
	413-434	BAL-LOW
STAGE 5	501	BAL-12.5
	502	BAL-12.5
	503-515	BAL-LOW
	516	BAL-12.5
	517	BAL-12.5
	518	BAL-12.5
	519	BAL-12.5
	520	BAL-19
	521	BAL-19
	522	BAL-19
	523	BAL-19
	524	BAL-19
	525	BAL-12.5
	526	BAL-12.5
	527	BAL-12.5
	528	BAL-12.5
	529-536	BAL-LOW
	537	BAL-12.5
	538	BAL-12.5
STAGE 6	601	BAL-LOW
	602	BAL-LOW
	603	BAL-12.5
	604	BAL-12.5
	605	BAL-12.5
	606	BAL-LOW
	607	BAL-LOW
	608	BAL-12.5
	609	BAL-12.5
	610	BAL-12.5
	611	BAL-19
	612	BAL-19
	613	BAL-19
	614	BAL-12.5
	615	BAL-12.5
	616	BAL-12.5
	617	BAL-12.5
	618-622	BAL-LOW
	623	BAL-12.5
	624	BAL-12.5
	625-629	BAL-LOW
	630	BAL-12.5
	631	BAL-12.5
STAGE 7	701-734	BAL-LOW
STAGE 8	801-836	BAL-LOW
STAGE 9	901-929	BAL-LOW
STAGE 10	1001-1039	BAL-LOW

Project: Station Lane, Lochinvar
Job No: 2190

Figure 15

Subdivision BAL Plan

BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Development Site
- Proposed Lots
- Future Lots
- Indicative Building Envelope (30m x20m)
- APZ (Permanent)
- APZ (Temporary)

Required Bushfire Attack Levels (PBP 2019 Table A1.12.5)

- BAL - FZ
- BAL - 40
- BAL - 29
- BAL - 19
- BAL - 12.5

- 7.5m Buffer (including 5.5m screen planting)
- Active Open Space
- Grassland (Detention Basin)

Vegetation Community

- Forested Wetland (Coastal Floodplain Wetlands)
- Grassland
- Forest (Hunter Macleay DSF)
- Managed / urban
- Woodland (Coastal Valley Grassy Woodland)
- Woodland (revegetated)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 24/03/21

N W E S

0 50 100 150
Meters

A3 Scale: 1:3,000

File:2190 Lochinvar-Fig10-BALs-220504 Date: 4/05/2022

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4.6. Emergency Services

There is a NSW Fire & Rescue Station located at 2 Mustang Drive, Rutherford, approximately 6.9km or 9 minutes drive away from the site (**Figure 15**). This station would likely be first responders with support from a second Fire & Rescue Station located at 2 Drinan Street, Branxton (13.8kms) if required (**Figure 16**).

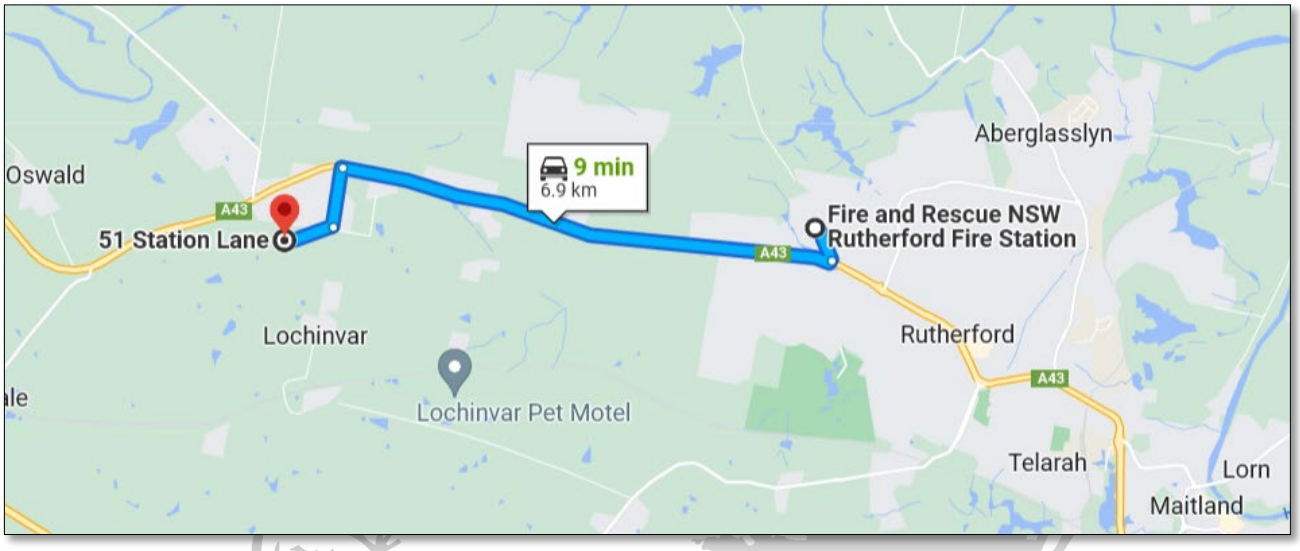


Figure 16: NSW Fire & Rescue - Rutherford

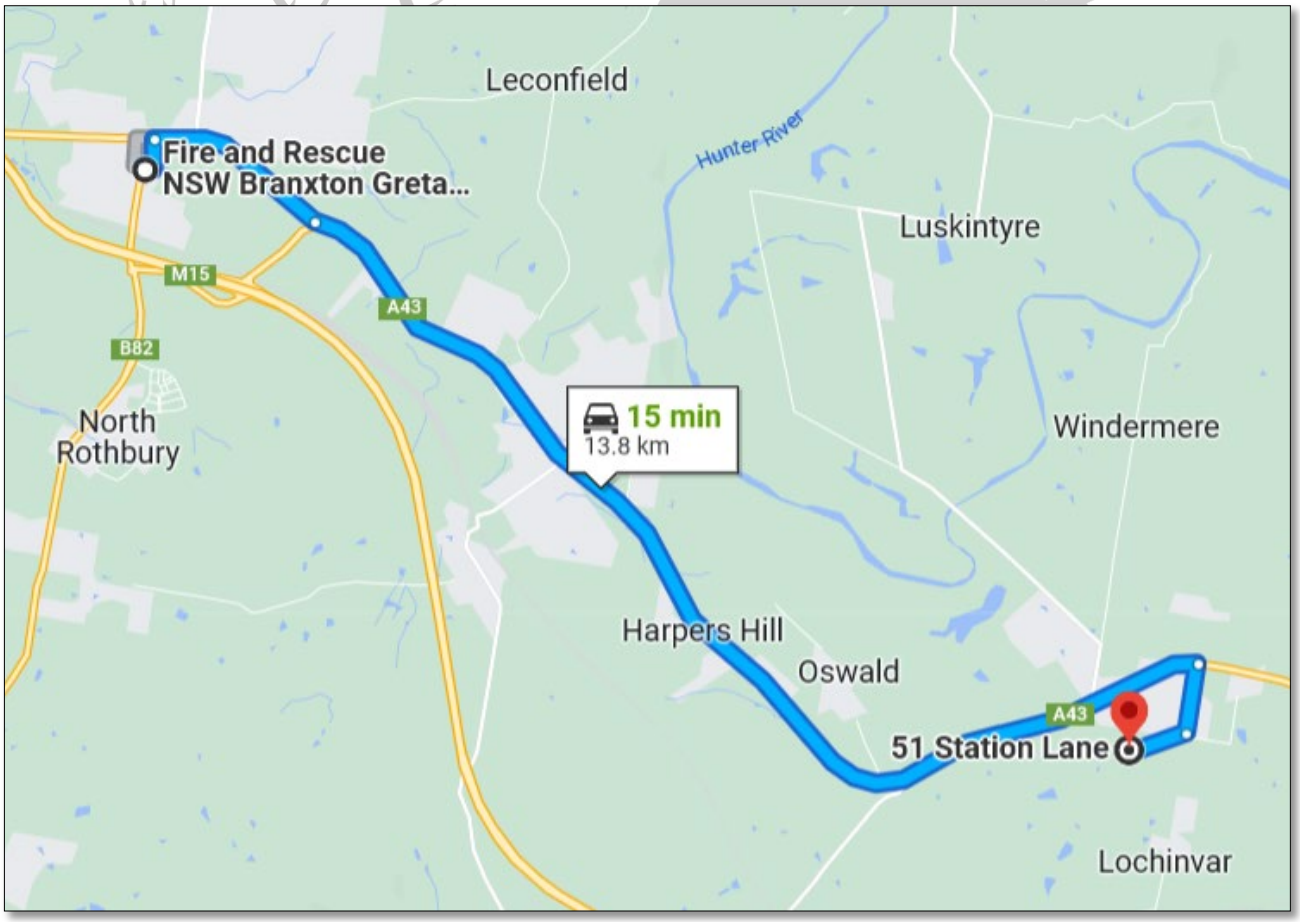


Figure 17: NSW Fire & Rescue - Branxton Greta

5. Conclusion and Recommendations

Bushfire Planning Australia has undertaken a Bushfire Assessment Report for the proposed residential subdivision located at 51, 134 and 146 Station Lane, Lochinvar.

The proposed staged subdivision will create up to 353 residential lots, 1 residue lot and 5 public lots for ancillary services including roads, pathways and basins. The subdivision will be constructed across 10 stages.

This BAR found that the site is currently exposed to a low to medium bushfire hazard contained to the existing riparian corridor straddling the western boundary of the site. The primary hazard compromises a corridor of vegetation within the riparian corridor.

Several areas within the site; including the western riparian corridor will be rehabilitated and revegetated. The vegetation formation to be established within these areas is commensurate with a Coastal Valley Grassy Woodland.

In summary, the following key recommendations have been designed to enable the proposed residential development to achieve the aims and objectives of PBP 2019:

1. All land within the site zoned R1 Residential; excluding the riparian corridors shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;
2. Asset Protection Zones shall be provided as indicated on **Figure 15** and **Appendix E**;
3. Access shall be provided in accordance with Table 5.3b of PBP 2019. This will require the provision of a minimum of two (2) separate road access points provided from the development site to the east and west to ensure safe evacuation for all residents. A temporary access road shall be provided during the staged construction of the development to Station Lane.
4. Any temporary turning heads shall be constructed in accordance Appendix A3.3 of PBP 2019;
5. Vegetation within road verges (including swales) to be consistent with a grassland vegetation classification with tree canopy less than 10% at maturity;
6. Vegetation with the stormwater basins; including associated batters shall be planted consistent with a grassland vegetation classification with tree canopy less than 10% at maturity;
7. All future dwellings to be constructed on the proposed lots shall have due regard to the specific considerations given in the National Construction Code: Building Code of Australia (BCA) which makes specific reference to Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and the NASH Standard Steel Framed Construction in Bushfire Prone Areas;
8. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 5.3.3 of PBP 2019; and
9. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site.

As the site is identified as the Lochinvar Urban Release Area in the Maitland Local Government Area Bush Fire Planning – Urban Release Area Map a Subdivision BAL Plan has been prepared in accordance with NSW Rural Fire Service (RFS) User Guide for Subdivision of Urban Release Areas on Bush Fire Prone Land. As part

As part of the application for a Bush Fire Safety Authority (BFSA) under section 100b of the Rural Fires Act 1997 (RF Act), we are also seeking endorsement of the Subdivision BAL Plan prior to the registration of the subdivision.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (May 2022) and demonstrates the development has satisfied the aims and objectives of Planning for Bushfire Protection 2019.

Finally, should the above recommendations be implemented, the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site, but they do not and cannot guarantee that the area will not be affected by bushfire at some time and that property and life damage/loss will not occur.

6. References

- 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: Plan of Proposed Residential Subdivision

LEGEND

- PROPOSED RESIDENTIAL DEVELOPMENT AREA
- OVERALL DEVELOPMENT AREA
- PROPOSED LOT BOUNDARIES
- STAGE BOUNDARY
- 4 STAGE NUMBER
- PROPOSED RESIDENTIAL
- PROPOSED ROADS
- PROPOSED COUNCIL DEDICATED RESERVE
- STORMWATER BASIN
- PROPOSED REGIONAL BASIN
- FUTURE RESIDENTIAL DEVELOPMENT APPLICATION (STCA)

LOT SCHEDULE

STAGE	RESIDENTIAL LOTS	PUBLIC LOTS
1	40	BASIN
2	45	PARK
3	27	0
4	34	BASIN
5	38	0
6	31	BASIN
7	34	0
8	36	0
9	29	0
10	39	0
TOTAL LOTS	353	5
RESIDUE LOTS	1	-

DIAL BEFORE YOU DIG www.1100.com.au

FOR INFORMATION

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
H	ISSUED FOR APPROVAL	11.04.22	JER	GPC
G	ISSUED FOR APPROVAL	08.04.22	JER	GPC
F	ISSUED FOR APPROVAL	31.03.22	JER	GPC
E	ISSUED FOR CLIENT REVIEW	24.03.22	JER	GPC

North

Client
McCLOY PROJECT MANAGEMENT PTY LTD
PO BOX 2214
DANGAR, NSW 2309
PHONE : 02 4945 7500 FAX : 02 4929 6472

McCLOYGROUP

ACOR CONSULTANTS

ACOR Consultants Pty Ltd
Level 1, 54 Union Street
Cooks Hill, Newcastle NSW 2300
T +61 2 4926 4811

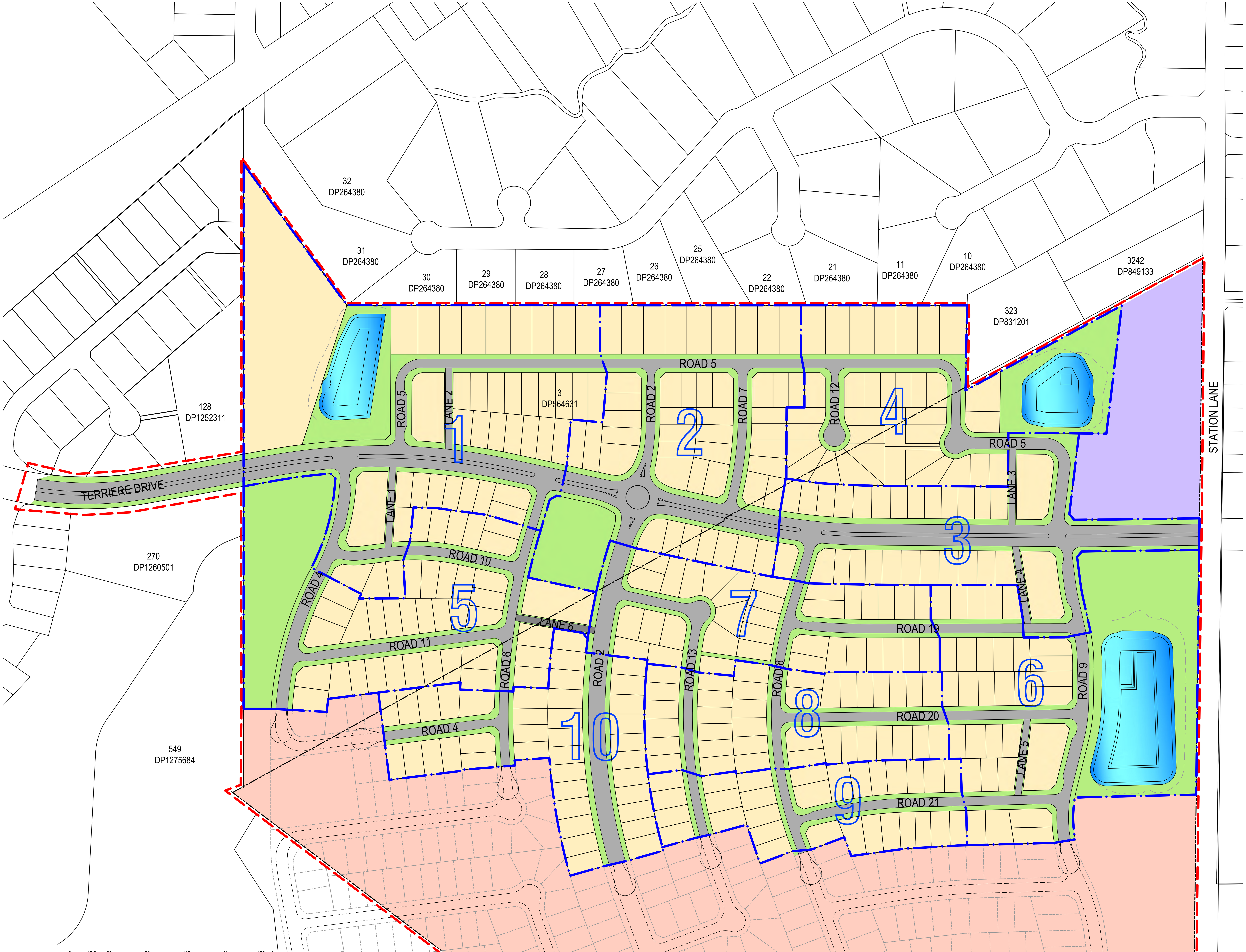
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project
KALUDAH SUBDIVISION LOCHINVAR
LOT 3 IN DP564631, LOT 4 IN DP634523
STATION LANE LOCHINVAR, NSW 2321

Kaludah LOCHINVAR

Drawing Title
OVERALL MASTER PLAN

Drawn	Date	Scale A1	Q.A. Check	Date
JER	MAR 2022	1:2500	GPC	11.03.22
Designed	Project No.		Dwg. No.	Issue
BG	NSW212012		DA101-005	H



SCALE 1:1750 @ A1
SCALE 1:3500 @ A3
0 17.5 35 70 105 140 175 metres

LEGEND

- PROPOSED RESIDENTIAL DEVELOPMENT AREA
- OVERALL DEVELOPMENT AREA
- PROPOSED LOT BOUNDARIES
- STAGE BOUNDARY
- 4 .... STAGE NUMBER
- PROPOSED RESIDENTIAL
- PROPOSED ROADS
- PROPOSED COUNCIL DEDICATED RESERVE
- STORMWATER BASIN
- PROPOSED REGIONAL BASIN
- FUTURE RESIDENTIAL DEVELOPMENT APPLICATION (STCA)

LOT SCHEDULE

STAGE	RESIDENTIAL LOTS	PUBLIC LOTS
1	40	BASIN
2	45	PARK
3	27	0
4	34	BASIN
5	38	0
6	31	BASIN
7	34	0
8	36	0
9	29	0
10	39	0
TOTAL LOTS	353	5
RESIDUE LOTS	1	-

DIAL BEFORE YOU DIG www.1100.com.au

FOR INFORMATION

This drawing has been assigned an electronic code that signifies the drawing has been checked and approved by:

Issue	Description	Date	Drawn	Approved
H	ISSUED FOR APPROVAL	11.04.22	JER	GPC
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F	ISSUED FOR APPROVAL	31.03.22	JER	GPC
E	ISSUED FOR CLIENT REVIEW	24.03.22	JER	GPC

1cm at full size 10cm 20cm

North

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Project
KALUDAH SUBDIVISION
LOCHINVAR
LOT 3 IN DP564631, LOT 4 IN DP634523
STATION LANE LOCHINVAR, NSW 2321

Kaludah LOCHINVAR

Drawing Title
OVERALL DA MASTER PLAN

Drawn	Date	Scale A1	Q.A. Check	Date
JER	MAR 2022	1:1750	GPC	11.03.22
Designed	Project No.		Dwg. No.	Issue
BG	NSW212012		DA101-006	H

\\192.168.2.11\Synergy\Projects\NSW21\NSW212012\Drawings... Apr 11, 2022 - 4:21pm

Appendix B: AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2190 Lochinvar McCloy

Client Service ID : 667453

Katrina Greville

21 Costata Crescent
Adamstown New South Wales 2289

Attention: Katrina Greville

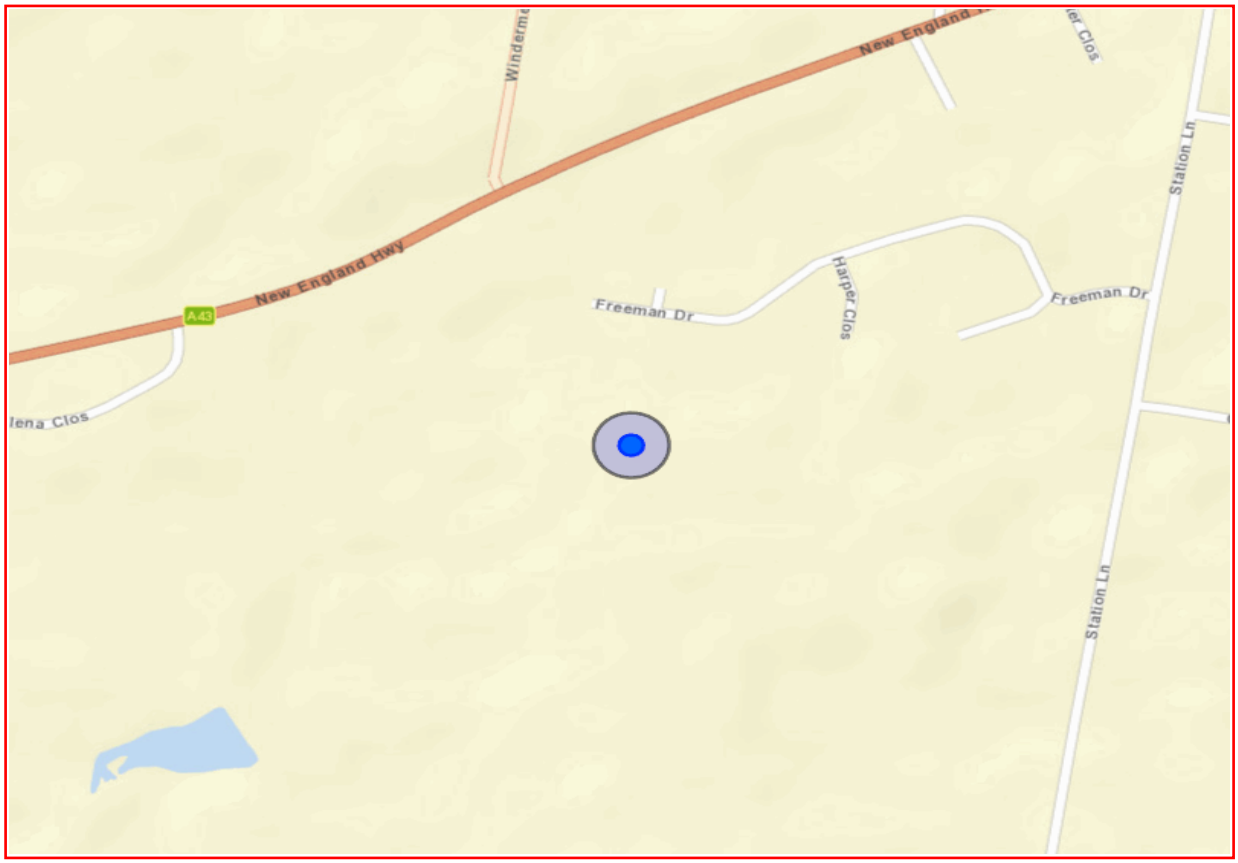
Email: klmukevski@bigpond.com

Date: 15 March 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 51 STATION LANE LOCHINVAR 2321 with a Buffer of 50 meters, conducted by Katrina Greville on 15 March 2022.

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. ***

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2190 134 StationLochinvar

Client Service ID : 667479

Katrina Greville

21 Costata Crescent
Adamstown New South Wales 2289

Attention: Katrina Greville

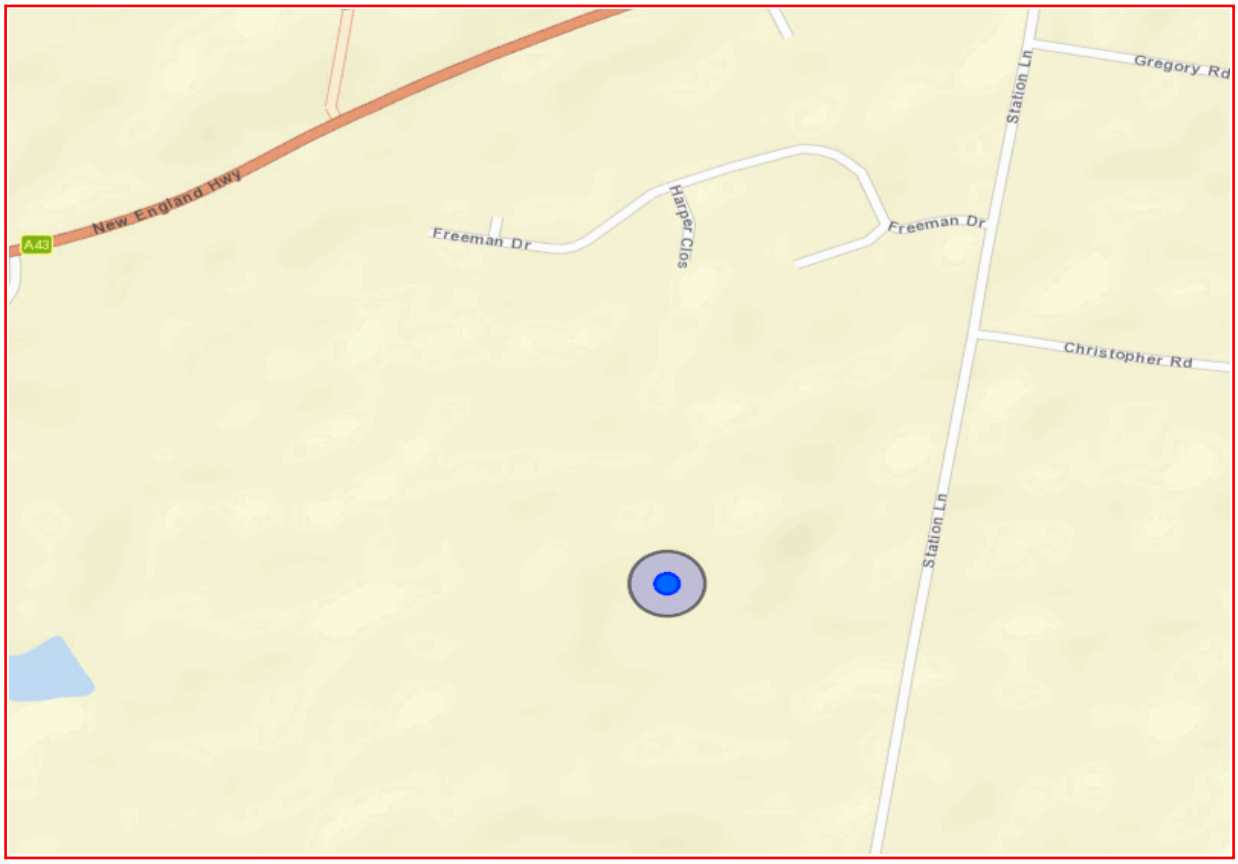
Email: klmukevski@bigpond.com

Date: 15 March 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 134 STATION LANE LOCHINVAR 2321 with a Buffer of 50 meters, conducted by Katrina Greville on 15 March 2022.

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. ***

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) 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 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.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix C: NBC Bushfire Attack Assessor V4.1 Report

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 4/05/2022 **Assessment Date:** 8/04/2022

Site Street Address: 2190 Station Lane, Lochinvar

Assessor: Stuart Greville; Bushfire Planning Australia

Local Government Area: Maitland **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: Grassland basins

Vegetation Information

Vegetation Type: Grassland
Vegetation Group: Grassland
Vegetation Slope: 0 Degrees **Vegetation Slope Type:** Level
Surface Fuel Load(t/ha): 6 **Overall Fuel Load(t/ha):** 6
Vegetation Height(m): 0 Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): 2.6 **APZ/Separation(m):** 10

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:** 130

Program Outputs

Level of Construction: BAL 29 **Peak Elevation of Receiver(m):** 3.88
Radiant Heat(kW/m2): 23.11 **Flame Angle (degrees):** 61
Flame Length(m): 8.63 **Maximum View Factor:** 0.349
Rate Of Spread (km/h): 16.9 **Inner Protection Area(m):** 10
Transmissivity: 0.872 **Outer Protection Area(m):** 0
Fire Intensity(kW/m): 52390

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	8	10	15	21	36	2.6

Run Description:	Lot 140 riparian corridor		

Vegetation Information

Vegetation Type:	Coastal Valley Grassy Woodland		
Vegetation Group:	Woodlands		
Vegetation Slope:	1 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	10	**Overall Fuel Load(t/ha):**	18.07
Vegetation Height(m):	0.9	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope:	3 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	12

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):**	4.22
Radiant Heat(kW/m2):	28.16	**Flame Angle (degrees):**	67
Flame Length(m):	10.53	**Maximum View Factor:**	0.429
Rate Of Spread (km/h):	1.29	**Inner Protection Area(m):**	12
Transmissivity:	0.864	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	12004		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	9	12	18	25	41	6

Run Description: T13 & T15 - western riparian corridor to be reveg

Vegetation Information

Vegetation Type: Coastal Valley Grassy Woodland

Vegetation Group: Woodlands

Vegetation Slope: 1 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 10

Overall Fuel Load(t/ha): 18.07

Vegetation Height(m): 0.9

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): 12

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): 4.73

Radiant Heat(kW/m2): 28.75

Flame Angle (degrees): 64

Flame Length(m): 10.53

Maximum View Factor: 0.437

Rate Of Spread (km/h): 1.29

Inner Protection Area(m): 12

Transmissivity: 0.865

Outer Protection Area(m): 0

Fire Intensity(kW/m): 12004

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	9	12	18	26	40	6

Run Description: T14 - steepest slope - revegetated woodland

Vegetation Information

Vegetation Type: Coastal Valley Grassy Woodland

Vegetation Group: Woodlands

Vegetation Slope: 3 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 10

Overall Fuel Load(t/ha): 18.07

Vegetation Height(m): 0.9

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): 14

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): 5.33

Radiant Heat(kW/m2): 27.27

Flame Angle (degrees): 65

Flame Length(m): 11.76

Maximum View Factor: 0.418

Rate Of Spread (km/h): 1.48

Inner Protection Area(m): 14

Transmissivity: 0.858

Outer Protection Area(m): 0

Fire Intensity(kW/m): 13780

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	10	14	20	28	45	6

Run Description: T4 - revegetated woodland to base of watercourse

Vegetation Information

Vegetation Type: Coastal Valley Grassy Woodland

Vegetation Group: Woodlands

Vegetation Slope: 5 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 10

Overall Fuel Load(t/ha): 18.07

Vegetation Height(m): 0.9

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): 15

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): 5.87

Radiant Heat(kW/m2): 28.45

Flame Angle (degrees): 63

Flame Length(m): 13.18

Maximum View Factor: 0.437

Rate Of Spread (km/h): 1.69

Inner Protection Area(m): 15

Transmissivity: 0.857

Outer Protection Area(m): 0

Fire Intensity(kW/m): 15819

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	11	15	22	31	49	6

Run Description: T5 - revegetated woodland across riparian

Vegetation Information

Vegetation Type: Coastal Valley Grassy Woodland

Vegetation Group: Woodlands

Vegetation Slope: 2 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 10

Overall Fuel Load(t/ha): 18.07

Vegetation Height(m): 0.9

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): 13

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): 5

Radiant Heat(kW/m2): 27.92

Flame Angle (degrees): 64

Flame Length(m): 11.12

Maximum View Factor: 0.426

Rate Of Spread (km/h): 1.38

Inner Protection Area(m): 13

Transmissivity: 0.862

Outer Protection Area(m): 0

Fire Intensity(kW/m): 12861

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	9	13	19	27	43	6

Run Description: T7 & T12

Vegetation Information

Vegetation Type: Grassland

Vegetation Group: Grassland

Vegetation Slope: 2 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 6

Overall Fuel Load(t/ha): 6

Vegetation Height(m): 0

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): 11

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: 130

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 4.19

Radiant Heat(kW/m2): 27.64

Flame Angle (degrees): 65

Flame Length(m): 9.24

Maximum View Factor: 0.419

Rate Of Spread (km/h): 19.4

Inner Protection Area(m): 11

Transmissivity: 0.867

Outer Protection Area(m): 0

Fire Intensity(kW/m): 60142

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	0	0	0	0	0	0

Run Description:	West - HM DSF		
Vegetation Information			
Vegetation Type:	Hunter Macleay DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrub/Grass)		
Vegetation Slope:	2 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	14	**Overall Fuel Load(t/ha):**	24.6
Vegetation Height(m):	0.9	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):**	25
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 19	**Peak Elevation of Receiver(m):**	7.28
Radiant Heat(kW/m2):	18.79	**Flame Angle (degrees):**	70
Flame Length(m):	15.49	**Maximum View Factor:**	0.3
Rate Of Spread (km/h):	1.93	**Inner Protection Area(m):**	20
Transmissivity:	0.824	**Outer Protection Area(m):**	5
Fire Intensity(kW/m):	24512		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	13	18	25	35	54	6

Appendix D: Planning for Bushfire Protection 2019 Compliance Table

Table 1: Aims and Objectives of Planning for Bushfire Protection 2019

Objectives	Satisfied	Comment
➢ Afford buildings and their occupants protection from exposure to a bush fire	✓	All lots within the proposed development are provided with sufficient separation from the nearest bushfire hazard by public roads.
➢ Provide for a defendable space to be located around buildings	✓	Defendable space by way of an APZ is provided between all new lots and the bushfire hazard to ensure radiant heat levels are below critical limits (29kW/m^2).
➢ Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings	✓	Appropriate APZs are provided between the proposed lots and the hazard, which in addition to other mitigation measures such as suitable construction, will provide an acceptable level of protection to the buildings, and prevent the spread of fire to the buildings and onto adjoining buildings.
➢ Ensure that safe operational access and egress for emergency service personnel and residents is available	✓	Public road access will be provided from Station Lane to the east and Terriere Drive to the west through an existing adjoining development.
➢ Provide for ongoing management and maintenance of BPMs	✓	All owners will be responsible for the management and maintenance of the private property.
➢ Ensure that utility services are adequate to meet the needs of firefighters	✓	The development includes all essential utility services to meet the needs of firefighters; including a reliable water supply.

Table 2: Performance Criteria and Acceptable Solutions for residential subdivisions (Chapter 5 PBP 2019)

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
5.3.1 ASSET PROTECTION ZONES Table 5.3a To provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building.	Potential building footprints must not be exposed to radiant heat levels exceeding 29kW/m^2 on each proposed lot.	APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	✓/AS	All proposed lots may be exposed to a maximum potential radiant heat level no greater than 29kW/m^2. A maximum APZ of 15m was calculated using methodology outlined in Appendix B of AS3959-2018 (Method 2 modelling).
	APZs are managed and maintained to prevent the spread of a fire towards the building.	The APZ is managed in accordance with the requirements of Appendix 4	✓	All new landowners will be required to manage their respective lot as an IPA.
	The APZ is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	✓	There are no exceptional circumstances that would require an APZ to be located external to the development site.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	The APZ is not located on lands with a slope exceeding 18°	✓	The maximum slope of the site is 5° or less.
LANDSCAPING	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with APZ standards (see Appendix 4). Fencing is constructed in accordance with section 7.6.	✓	All new landscaping has considered the requirements of APZs per Appendix 4. All new fencing will be colorbond or similar non-combustible material.
5.3.2 ACCESS (General Requirements) **Table 5.3b** To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area.	Fire fighters are provided with safe all weather access to structures	Property access roads are two-wheel drive, all-weather roads	✓	Public road access will be provided from Station Lane to the east and Terriere Drive to the west. All new roads will be constructed in accordance with MCC DCP and engineering specifications and satisfy the Acceptable Solutions in Table 5.3b.
		Perimeter roads are provided for residential subdivisions of three or more allotments	✓	
		Subdivisions of three or more allotments have more than one access in and out of the development		
		Traffic management devices are constructed to not prohibit access by	✓	

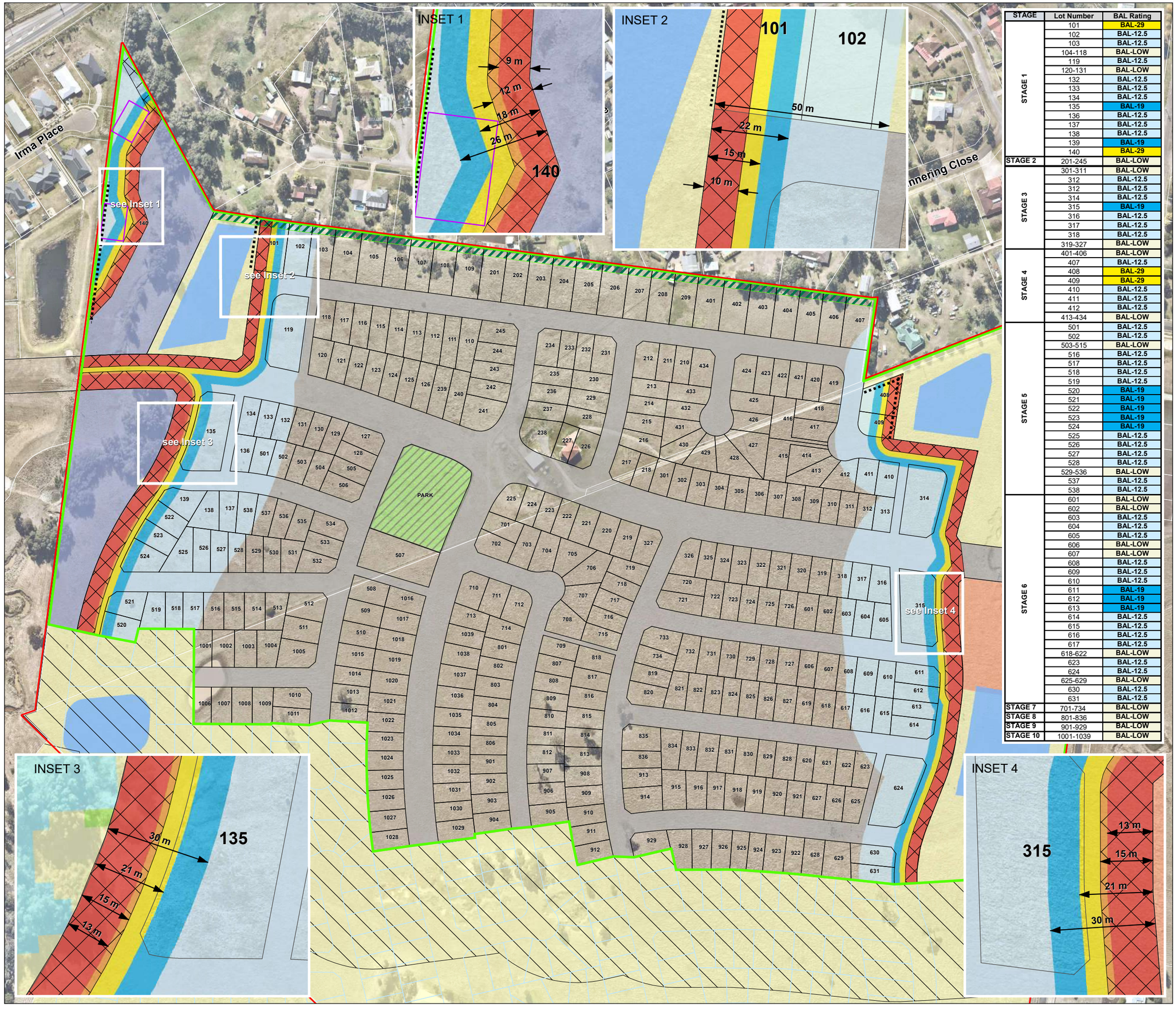
Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		emergency services vehicles.		
		Access roads must provide suitable turning areas in accordance with Appendix 3.	✓	
ACCESS ROAD CAPACITY	The capacity of access roads is adequate for firefighting vehicles.	The capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.	✓	
ACCESS TO WATER	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	✓	All proposed lots are able to be connected to a reticulated water supply.
		Hydrants are provided in accordance with AS2419.1:2005	✓	
		There is suitable access for Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	✓	
PERIMETER ROADS	Perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	There are two-way sealed roads.	✓	A 10m wide paved carriageway will be provided allowing for an 8m wide unobstructed path of travel and on-street parking outside the carriageway.
		8m carriageway width kerb to kerb.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating.	Minimum 5.5m width kerb to kerb.	✓	The proposed road network is required to connect with the approved subdivision layout. A 8m wide paved carriageway will be provided allowing for an 5.5m wide unobstructed path of travel and on-street parking outside the carriageway. All roads; including non-perimeter roads will be constructed in accordance with PBP 2019.
		Parking is provided outside of the carriageway.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
5.3.3 SERVICES Table 5.3c To provide adequate services for water for the protection of buildings during and after the passage of a bushfire, and not to locate gas and electricity so as not to contribute to the risk of fire to a building. **WATER**	Adequate water supplies is provided for firefighting purposes	Reticulated water is to be provided to the development, where available	✓	A reticulated water supply is provided.
		A static water supply is provided where no reticulated water is available	**N/A**	
		Static water supplies shall comply with Table 5.3d	**N/A**	
	Water supplies are located at regular intervals	Fire hydrant spacing, design and sizing comply with AS2419.1:2005;	✓	A reticulated water supply is provided.
		Hydrants are not located within any road carriageway;	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
	The water supply is accessible and reliable for firefighting operations	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	✓	A reticulated water supply is provided.
	Flows and pressures are appropriate	Fire hydrant flows and pressures comply with AS2419.1:2005.	✓	
	The integrity of the water supply is maintained	All above ground water service pipes are metal, including and up to any taps.	**Able to comply**	
ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	✓	The proposed new lots will be connected to the existing underground electricity service.
		Where overhead electrical transmission lines are proposed as follows: → lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and → no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines	**N/A**	
GAS	Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS 1596:2014 and the requirements of relevant authorities, metal piping is to be used.	✓	Any new gas connections will be underground and will be unlikely to create an additional hazard risk to surrounding bushland.
		All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side;		

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		Connections to and from gas cylinders are metal:		
		Polymer-sheathed flexible gas supply lines are not used; and		
		Above-ground gas service pipes are metal, including and up to any outlets.		

Appendix E: Subdivision BAL Plan



STAGE	Lot Number	BAL Rating
STAGE 1	101	BAL-29
	102	BAL-12.5
	103	BAL-12.5
	104-118	BAL-LOW
	119	BAL-12.5
	120-131	BAL-LOW
	132	BAL-12.5
	133	BAL-12.5
	134	BAL-12.5
	135	BAL-19
	136	BAL-12.5
	137	BAL-12.5
	138	BAL-12.5
	139	BAL-19
	140	BAL-29
STAGE 2	201-245	BAL-LOW
STAGE 3	301-311	BAL-LOW
	312	BAL-12.5
	312	BAL-12.5
	314	BAL-12.5
	315	BAL-19
	316	BAL-12.5
	317	BAL-12.5
	318	BAL-12.5
	319-327	BAL-LOW
STAGE 4	401-406	BAL-LOW
	407	BAL-12.5
	408	BAL-29
	409	BAL-29
	410	BAL-12.5
	411	BAL-12.5
	412	BAL-12.5
	413-434	BAL-LOW
STAGE 5	501	BAL-12.5
	502	BAL-12.5
	503-515	BAL-LOW
	516	BAL-12.5
	517	BAL-12.5
	518	BAL-12.5
	519	BAL-12.5
	520	BAL-19
	521	BAL-19
	522	BAL-19
	523	BAL-19
	524	BAL-19
	525	BAL-12.5
	526	BAL-12.5
	527	BAL-12.5
	528	BAL-12.5
	529-536	BAL-LOW
	537	BAL-12.5
	538	BAL-12.5
STAGE 6	601	BAL-LOW
	602	BAL-LOW
	603	BAL-12.5
	604	BAL-12.5
	605	BAL-12.5
	606	BAL-LOW
	607	BAL-LOW
	608	BAL-12.5
	609	BAL-12.5
	610	BAL-12.5
	611	BAL-19
	612	BAL-19
	613	BAL-19
	614	BAL-12.5
	615	BAL-12.5
	616	BAL-12.5
	617	BAL-12.5
	618-622	BAL-LOW
	623	BAL-12.5
	624	BAL-12.5
	625-629	BAL-LOW
	630	BAL-12.5
	631	BAL-12.5
STAGE 7	701-734	BAL-LOW
STAGE 8	801-836	BAL-LOW
STAGE 9	901-929	BAL-LOW
STAGE 10	1001-1039	BAL-LOW

Project: Station Lane, Lochinvar
Job No: 2190

Subdivision BAL Plan

BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Development Site
- Proposed Lots
- Future Lots
- Indicative Building Envelope (30m x20m)
- APZ (Permanent)
- APZ (Temporary)

Required Bushfire Attack Levels (PBP 2019 Table A1.12.5)

- BAL - FZ
- BAL - 40
- BAL - 29
- BAL - 19
- BAL - 12.5

- 7.5m Buffer (including 5.5m screen planting)
- Active Open Space
- Grassland (Detention Basin)

Vegetation Community

- Forested Wetland (Coastal Floodplain Wetlands)
- Grassland
- Forest (Hunter Macleay DSF)
- Managed / urban
- Woodland (Coastal Valley Grassy Woodland)
- Woodland (revegetated)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Aerial photo: NearMap 24/03/21

N W E S

0 50 100 150
Meters

A3 Scale: 1:3,000

File:2190 Lochinvar-Fig10-BALs-220504 Date: 4/05/2022

GEOVIEW
GIS & mapping solutions for infrastructure, town planning & environmental management

Appendix F: Landscape Masterplan

51 and 134 Station Lane, LOCHINVAR

Lot 3 / DP 564631 and Lot 4 / DP 634523

LANDSCAPE MASTERPLAN

SHEET INDEX		ISSUE	DESCRIPTION	DATE
L01	SITE PLAN	B	FOR SUBMISSION	22/04/2022
L02	STREET TREE MASTER PLAN	B	FOR SUBMISSION	22/04/2022
L03	PARK CONCEPT	B	FOR SUBMISSION	22/04/2022
L04	PLANT SCHEDULE	B	FOR SUBMISSION	22/04/2022
L05	LANDSCAPE BUFFER	B	FOR SUBMISSION	22/04/2022

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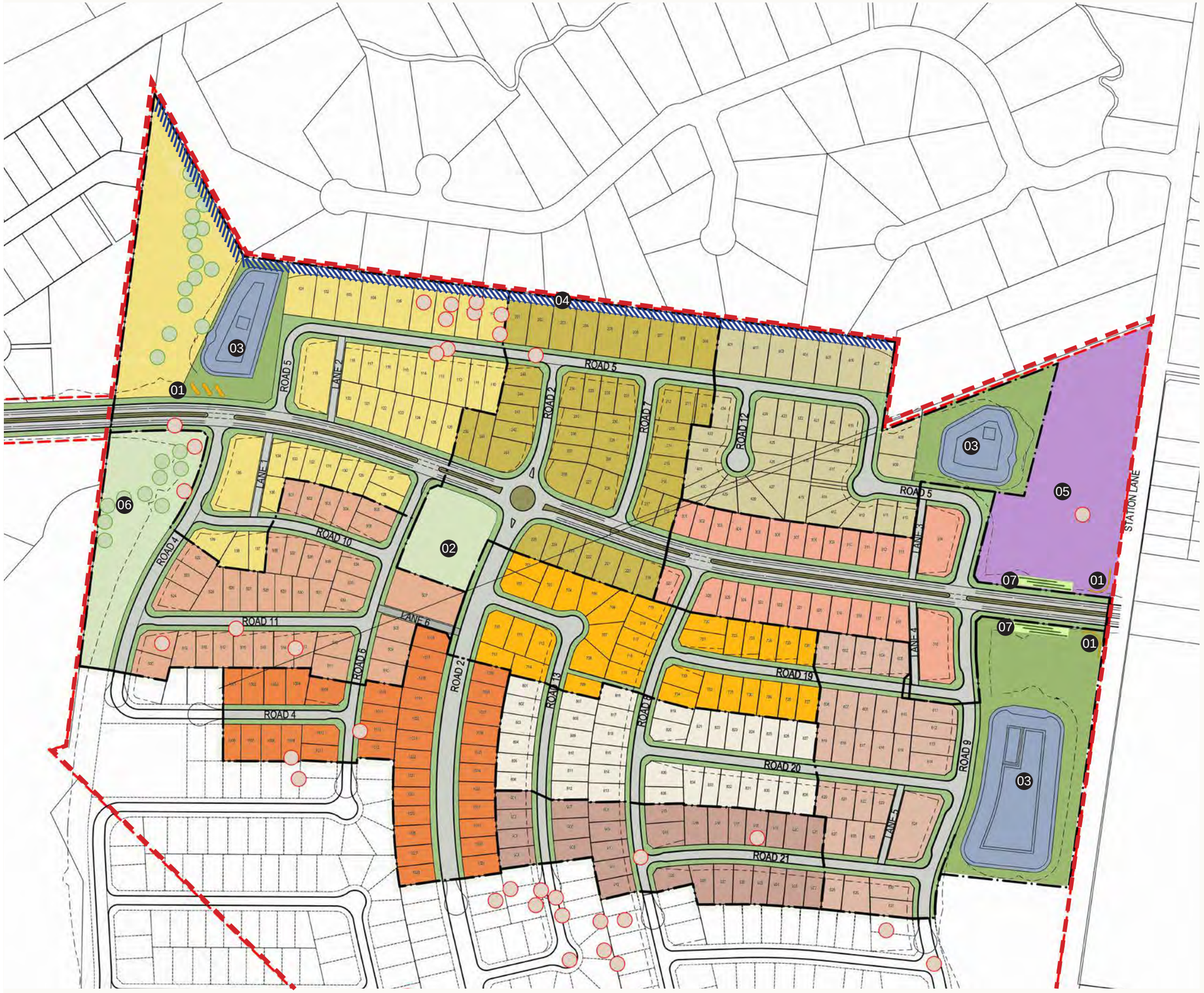

LEGEND

- SITE BOUNDARY
- EXISTING TREES TO BE RETAINED
  Refer Arborist Report for Details
- EXISTING TREES TO BE REMOVED
  Refer Arborist Report for Details
- 01 PROPOSED ENTRY FEATURE
- 02 PROPOSED PARK
  Refer L03 for details
- PROPOSED MEDIAN MASS PLANTING
  Refer L04 Planting Schedule
- 03 DETENTION BASINS
  Refer L04 for Basin Planting Details
  Surrounding planting subject to separate VMP
  Refer Engineer's Plans for details
- PROPOSED VERGE
- PROPOSED ROAD
  Refer to Engineer's drawings for details
- 04 PROPOSED NORTHERN BUFFER PLANTING
  Refer L05
- 05 PROPOSED REGIONAL BASIN
- 06 AREA SUBJECT TO SEPARATE VMP
- 07 PROPOSED ORNAMENTAL VINEYARD

LEGEND

- STAGE 1 (40 LOTS)
- STAGE 2 (45 LOTS)
- STAGE 3 (27 LOTS)
- STAGE 4 (34 LOTS)
- STAGE 5 (38 LOTS)
- STAGE 6 (31 LOTS)
- STAGE 7 (34 LOTS)
- STAGE 8 (36 LOTS)
- STAGE 9 (29 LOTS)
- STAGE 10 (39 LOTS)

SCALE 1:3500 @ A3

L01 Site Plan

51 and 134 STATION LANE, LOCHINVAR, NSW

DATE: APRIL 2022

CLIENT: McCLOY PROJECT MANAGEMENT

PROJECT NO. GSP210301

SUBMISSION: B - FOR SUBMISSION

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GSP

LEGEND

- SITE BOUNDARY
- EXISTING TREES TO BE RETAINED
  Refer Arborist Report for Details
- EXISTING TREES TO BE REMOVED
  Refer Arborist Report for Details
- 01 PROPOSED ENTRY FEATURE
- 02 PROPOSED PARK
  Refer L03 for details
- PROPOSED MEDIAN MASS PLANTING
  Refer L04 Planting Schedule
- 03 DETENTION BASINS
  Refer L04 for Basin Planting Details
  Surrounding planting subject to separate VMP
  Refer Engineer's Plans for details
- PROPOSED VERGE
- PROPOSED ROAD
  Refer to Engineer's drawings for details
- 04 PROPOSED NORTHERN BUFFER PLANTING
  Refer L05
- 05 PROPOSED REGIONAL BASIN
- 06 AREA SUBJECT TO SEPARATE VMP
- 07 PROPOSED ORNAMENTAL VINEYARD

STREET TREE LEGEND

AVENUE TREES

ZELKOVA SERRATA 'GREEN VASE'

TRISTANIOPSIS LAURINA 'LUSCIOUS'

EVERGREEN TREES

BUCKINGHAMIA CELSISSIMA
CUPANIOPSIS ANARCARDIODES
HARPULLIA PENDULA
LOPHOSTEMON CONFERTUS
WATERHOUSEA FLORIBUNDA 'GREEN AVENUE'

DECIDUOUS TREES

ACER NEGUNDO
FRAXINUS PENNSYLVANICA 'CIMMZAM CIMMARON'
PISTACHIO CHINENSIS
PRUNUS CERASIFERA 'NIGRA'
SAPIUM SEBIFERUM

LANDSCAPE NOTES

1. STREET TREE SPECIES CHOSEN FOR BEING SUITABLY HARDY, PROVEN PERFORMERS.
2. PROPOSED PLANTING DOWN CENTRAL MEDIAN OF STRIKING FEATURE TREE (ZELKOVA SP.) WITH MASS PLANTING BENEATH. EVERGREEN 'LUSCIOUS' TREES TO CREATE A VERDANT AVENUE EFFECT.
3. A SINGLE STREET TREE SPECIES IS INTENDED TO LINE EACH STREET IN ORDER TO CREATE A SENSE OF PLACE AND CHARACTER FOR EACH STREET.
4. DECIDUOUS TREE SPECIES HAVE BEEN CHOSEN TO LINE EAST-WEST ORIENTATED STREETS FOR SEASONAL VARIATION AND TO PERMIT SOLAR ACCESS TO RESIDENCES.
5. MIXED EVERGREEN SPECIES TO LINE NORTH-SOUTH ORIENTATED STREETS.

L02 Street Tree Masterplan

51 and 134 STATION LANE, LOCHINVAR, NSW

DATE: APRIL 2022

CLIENT: McCLOY PROJECT MANAGEMENT

PROJECT NO. GSP210301

SUBMISSION: B - FOR SUBMISSION

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KEY

01 PARK ENTRY FEATURE
02 PUBLIC ART LOCATION
03 MINI VINEYARD AND COMMUNITY GARDEN OPPORTUNITY
04 CHILDRENS' PLAYGROUND
05 LOOP PATH FOR TRIKE TRACK
06 PICNIC SHELTERS
07 GYM STATION EQUIPMENT
08 HALF BASKETBALL COURT
09 CENTRAL PATHWAY
10 OPEN GRASS PASSIVE RECREATION SPACE
11 FEATURE PLANTING IN ACCORDANCE WITH CPTED PRINCIPLES - REFER PLANT SCHEDULE FOR SPECIES SELECTION RECOMMENDATIONS.

CHARACTER IMAGES


01


02


04


05


07


08

L03 Indicative Park Concept

51 and 134 STATION LANE, LOCHINVAR, NSW

DATE: APRIL 2022

CLIENT: McCLOY PROJECT MANAGEMENT

PROJECT NO. GSP210301

SUBMISSION: B - FOR SUBMISSION

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SUGGESTED PLANT SCHEDULE

Key	Botanical Name	Common Name	Pot Size	Mature Height	Mature Spread
STREET TREES					
01	*Acer negundo ‘Sensation’*	Box Elder	75L	10m	8m
02	*Buckinghamia celsissima*	Ivory Curl Tree	75L	10m	4m
03	*Cupaniopsis anarcardiodes*	Tuckeroo	75L	8m	5m
04	*Fraxinus pennsylvanica ‘Cimmzan’*	Cimmaron Ash	75L	13m	8m
05	*Harpullia pendula*	Tulipwood	75L	6m	4m
06	*Lophostemon confertus*	Brush Box	75L	5m	4m
07	*Pistacia chinensis*	Chinese Pistachio	75L	10m	6m
08	*Prunus cerasifera ‘Oakvale Crimson Spire’*	Purple-leaf Cherry Plum	75L	8m	4m
09	*Sapium sebiferum*	Chinese Tallow Tree	75L	7m	5m
10	*Tristaniopsis laurina ‘Luscious’*	Water Gum	75L	8m	4m
11	*Waterhousea floribunda ‘Green Avenue’*	Weeping LillyPilly	75L	15m	9m
12	Zelkova serrata ‘Green Vase’	Green Vase	75L	14m	10m
MASS PLANTED MEDIAN / ROUNDABOUT					
Feature Shrubs					
13	*Dietes grandiflora*	Wild Iris	140mm	1.2m	1.2m
14	*Nandina domestica alba 'lemon lime'*	Coastal Rosemary	140mm	1m	1m
Groundcovers					
15	*Myoporum parvifolium ‘Yareena’*	Boobialla	140mm	0.1m	2m
PARK PLANTING					
Trees					
-	*Backhousia citriodora*	Lemon Myrtle	75L	8m	4m
-	*Elaecarpus reticulatus*	Blueberry Ash	75L	8m	5m
-	*Eucalyptus sideroxylon ‘Rosea’*	Red Flowering Ironbark	75L	15m	6m
Low Shrubs					
16	*Liriope muscari ‘Just Right’*	Liriope	140mm	0.5m	0.5m
17	*Lomandra ‘Lime Tuff’*	Lime Tuff	140mm		
18	*Pennisteum ‘Cream Lea’*	Fountain Grass	140mm	1m	1m
19	*Westringia ‘Zena’*	Coastal Rosemary	140mm	1m	1m
Groundcovers					
20	Carpobrotus glaucescens	Pigface	140mm	0.2m	2.0m
-	*Hardenbergia ‘Meema’*	Meema	140mm	0.4m	2m
DETENTION BASIN					
-	*Austrodanthonia fulva*	Wallaby Grass	Tubestock		
-	*Dichelachne micranthe*	Plum Grass	Tubestock		
-	*Echinopogon caespitosus*	Hedgehog Grass	Tubestock		
-	*Poa labillardieri*	Tussock Grass	Tubestock		
-	*Themeda australis*	Kangaroo Grass	Tubestock		

L04 Plant Schedule

51 and 134 STATION LANE, LOCHINVAR, NSW

DATE: APRIL 2022

CLIENT: McCLOY PROJECT MANAGEMENT

PROJECT NO. GSP210301

SUBMISSION: B - FOR SUBMISSION

GREEN SPACE PLANNING Co.
3/19 BOLTON STREET NEWCASTLE NSW 2300
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KEY PLAN

PLANT SCHEDULE

Key	Botanical Name	Common Name	Mature Height	Mature Spread
Canopy Trees				
	Angophoa costata	Smoothbarked Apple Myrtle	20m	12m
	Tristaniopsis laurina	Kanooka Gum	15m	6m
Medium Trees				
	Acacia dealbata	Hickory Wattle	12m	8m
	Acacia implexa	Hickory Wattle	8m	7m
	Elaeocarpus reticulatus	Blueberry Ash	9m	4m
Groundcovers and Grasses				
	Aristida ramosa	Purple Wiregrass	0.9m	0.5m
	Austrostipa aristiglumis	Speargrass	2m	1.2m
	Carpobrotus glaucescens	Pigface	0.3m	2.0m
	Correa alba	White Correa	1.5m	1.5m
	Cyperus gracilis	Slender Flat-sedge	0.3m	0.3m
	Dianella revoluta	Flax Lily	1m	0.8m
	Geranium solanderi	Native Geranium	0.5m	0.5m
	Lomandra filiformis	Mat Rush	0.4m	0.4m
	Themeda triandra	Kangaroo Grass	1.5m	0.5m
	Wahlenbergia communis	Bluebell	0.7m	0.5m

TIERED VEGETATION TO PROVIDE VISUAL SCREEN

COLOURBOND FENCE TO PROPERTY BOUNDARY LINE

INDICATIVE ELEVATION

GROUNDCOVERS WITHIN SEWER EASEMENT.

SMALL SHRUBS, GRASSES AND GROUNDCOVERS. STAGGERED PLANT IN A STAGGERED PATTERN ALONG THE EXTERNAL EDGES OF THE BUFFER IN SPECIES GROUPS OF 3-5.

TALL TREES. PLANT THROUGH THE CENTRE OF THE CORRIDOR. ALLOW 2 TREES PER 10M SECTION WITH APPROX. 5M SPACING BETWEEN EACH TREE.

MEDIUM TREES. PLANT BETWEEN THE LOWEST LAYER AND THE TREES. PLANT IN A STAGGERED PATTERN IN ALTERNATIVE SPECIES GROUPS OF 3-5.

INDICATIVE PLANTING PLAN

L05 **Northern Boundary Buffer Planting**

51 and 134 STATION LANE,
LOCHINVAR, NSW

DATE:
APRIL 2022

CLIENT:
McCLOY
PROJECT MANAGEMENT

PROJECT NO.
GSP210301

SUBMISSION:
B - FOR SUBMISSION

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