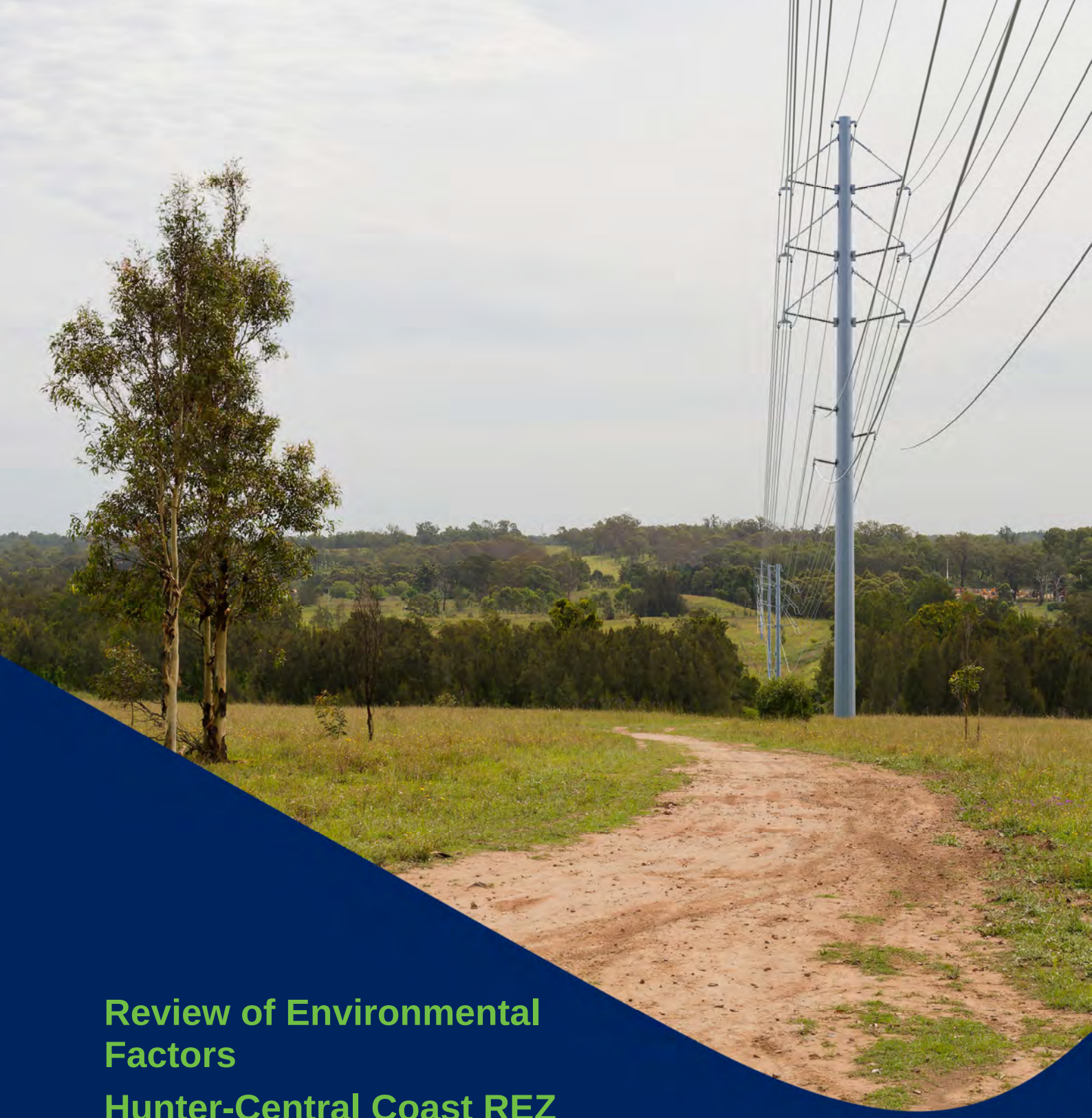

Review of Environmental Factors

Hunter-Central Coast REZ Network Infrastructure

Appendix J – Bushfire Assessment

Wired for good.™

Ausgrid

BUSH FIRE THREAT REPORT

Lot 9 in DP 250890

Hebden Road
MUSWELLBROOK

PREPARED BY
TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
September 2024

Site Inspection Date: 13th August 2024
Report Version: 1
Author: Benjamin Folbigg
BPAD Accreditation/Level: BPAD31379 Level 2
Date of Issue: 24th October 2024

Tattersall Lander Pty Limited ABN 41 003 509 215
2 Bourke Street, RAYMOND TERRACE 2324 **All mail to**: PO Box 580
Telephone: (02) 4987 1500 **Email**: reception@tatland.com.au
www.tatland.com.au

Executive Summary

This Bush Fire Risk Assessment has been prepared for a proposed development at Hebden Road Muswellbrook in the Cessnock Local Government Area – the lot being identified as Lot 9 in DP 250890.

The proposal is for the construction of a new substation. Subject to the creation of the stated APZs (within this report), the development is considered appropriate and compliant with *Planning for Bushfire Protection 2019,* as well as Section 12 pf *NS187.*

1.0 INTRODUCTION

Tattersall Lander Pty Ltd has been commissioned to undertake a Bush Fire Risk Assessment for a proposed development at Hebden Road Muswellbrook in the Muswellbrook Local Government Area (LGA). The property is identified as Lot 9 in DP 250890.

This Bush Fire Risk Assessment is based upon the guidelines as defined in the document, *Planning for Bush Fire Protection* Guidelines *2019*, which has been written by the *NSW Rural Fire Service*. This assessment outlines the risk posed from bush fire, and hence identifies the constraints with regard to bush fire, thereby providing direction to the proposed development, and ultimately assessing the acceptability or otherwise of the development.

This report has been prepared by myself (Ben Folbigg); I have a Diploma in Planning for Bush Fire Protection and am BPAD accredited (Level 2) with the FPA Australia. This report is valid for twelve months from the date of issue after which time is should be revised.

Figure 1 – Site Location

2.0 METHODOLOGY

This assessment is conducted entirely in accordance with the guidelines, as outlined in *Planning for Bush Fire Protection* (NSW Rural Fire Service) 2019 (PBP). A site investigation was undertaken by myself on Tuesday the 13th of August 2024

This assessment:

- identifies the effective slope under vegetation;
- identifies all vegetation categories within 140 metres of the site;

- determines the bush fire attack category which applies to the site;
- identifies Asset Protection Zones/Setbacks;
- identifies the bush fire Construction level required in relation to the above for the proposed development (*AS 3959-2018*)

3.0 SITE DESCRIPTION

The subject site is an existing Public Recreation lot (RE1 – Public Recreation). The site has an approximate area of approximately 8.8 hectares and is currently vacant of any structures. The vegetation is predominantly grassland with a relatively narrow band of trees (approximately 20 metres in width) which have been planted along the northern edge of the site.

The topography of the site is very gently sloping toward the south, east, and west.

Aerial photographs of the site and surrounds are included below (refer figures 2 and 3) and photographs of the site have been included; the approximate location and direction of these photographs has been included on the aerial photograph (Figure 3). It is noted that the aerial photographs (Figures 2 and 3) are not accurate in that they don't show the vegetation which has been planted along the northern edge of the site; an aerial photograph which shows this vegetation has been included as Figure 4, however, this does not show the lot boundaries.

The site is located in the Muswellbrook Local Government Area (LGA) and hence is afforded a Fire Danger Index (FDI) rating of 100.

4.0 THE PROPOSAL

The proposal is for a new substation. Plans of the substation location have been viewed and are attached as Appendix B.

NS187 *Passive Fire Mitigation Design of Major Substations*, Section 12 (Bushfire) has been addressed within this report as well as *Planning for Bushfire Protection 2019.*

With regard to Section 12 of NS187, the following points are pertinent:

- *This Network Standard does not cover the requirements for protecting the bush against fire from equipment failure.* It is stated that, as a minimum, a 12.5kW/m^2 level should be adopted at the boundary – this is essentially a BAL-12.5 requirement.
- Table 1 (below), as provided by the standard, provides the maximum exposure allowable to various elements of the substation – these exposure limits may be translated to BAL for the purpose of determining the required APZs for these exposure limits to be met.

- Buildings are to comply with *AS3959.* Smoke resistant seals are to be fitted to all external doors to ensure embers do not enter under the door(s).
- The radiant heat limits identified in Table 1 apply to critical substation structures – critical elements are those which are deemed to be essential to allow for return to service following a bushfire event.
- APZ widths may be reduced where exposed elements are able to be *locally protected* or *rapidly replaced.*
- Regular and thorough maintenance is considered critical to prevent the build-up of combustibles.

Item	Maximum allowable radiant heat flux(kW/m^2)	Comment
Cable	12.5 20	PVC cables begin to distort and ignite. Ignition of XLPE cables between 85 and 550 seconds.
Steel structure support	35	To 60% of yield strength after a maximum duration of 5 minutes. Applies where elastic deflections due to elevated temperatures are not critical.
Porcelain bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Polymeric bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Aluminium busbar	20	Based on 250oC after a maximum duration of 5 minutes. Comparable to withstand temperature uner fault conditions.
Copper busbar	25	Busbars may undergo significant distortion and impose significant stresses on rigid insulators.
Transformer tank	>35 (see note 1)	Refer to above regarding bushings and cables.
Combustibles	12.5	Piloted ignition may occur on timber

Note 1 – Transformers always have some more vulnerable components such as bushings and cables etc.

Note 2 – Detailed information on radioant heat exposure is not avaiulable. However in-service applications exposed to bushfire indicate a high radiant heat limit and a low risk of damage or failure.

It is noted that Column 3 in Table 1 (above) really has no relvance with regard to this report but it is included simply for completeness with regard to the infiormation as obtained from the standard.

Figure 2: Site and surrounds (source: https://maps.six.nsw.gov.au/)

Figure 3: Site and surrounds (source: https://maps.six.nsw.gov.au/)

Figure 4: Site and surrounds (source: nearmap)

5.0 SITE ANALYSIS

5.1 Northern Aspect

The northern aspect presents grassland with a narrow band of planted trees within the subject site – due to the trees to the north, the vegetation to the north is classified as Rainforest (the narrow width of these trees allows for this classification. Beyond the site there is Hebden Road and this is followed by more grassland. Rainforest is a slightly worse threat than grassland and therefore this is the category of vegetation utilised for this assessment.

The effective slope under the vegetation to the north is in the upslope/flat category.

5.2 Southern Aspect

The southern aspect presents grassland for more than 140 metres. The effective slope under the vegetation to the south is in the >0-5 degree category.

5.3 Eastern Aspect

The eastern aspect presents grassland for more than 140 metres. The effective slope under the vegetation to the south is in the >0-5 degree category.

5.4 Western Aspect

The western aspect presents grassland for more than 140 metres. The effective slope under the vegetation to the south is in the >0-5 degree category.

6.0 SITE ANALYSIS

Table 2 – Asset Protection Zones and Construction Level Requirements as per *Planning for Bushfire Protection 2019* and *AS3959-2018*

Aspect	Vegetation Classification	Slope (degrees) Under Vegetation	Required APZ (metres) for BAL-12.5	Available land (approximate) within the site (metres) as measured from the substation
North	Rainforest	Upslope/flat	23	65
South	Grassland	>0-5	25	75 (minimum)*
East	Grassland	>0-5	25	>140
West	Grassland	>0-5	25	>140

* This is followed by the adjacent Lot 30 in DP 1193430 and then Lake Liddell which can in no way be considered a bush fire hazard for obvious reasons.

7.0 Services

7.1 Water

The site is not currently connected to the reticulated town water supply, however, satisfactory arrangements shall be made in this regard so that compliance with *PBP* as well as any and all other regulatory authorities and Standards are met. Compliance with regard to water supply shall be achieved.

7.2 Electrical

As the development is for a substation, electrical supply shall be required. Transmission lines shall be overhead and vegetation shall be maintained so that these transmission lines are not a bush fire ignition source. Compliance shall be achieved in this regard.

7.3 Gas

Not applicable.

8.0 ACCESS

8.1 Road Capacity

The site is accessed via Hebden Road which is a bitumen sealed through road capable of carrying fully laden fire fighting vehicles, including tankers.

8.2 Road Linkages to Fire Trails

There are no fire trails within the site and none are considered necessary for a site of this nature.

8.3 Emergency Access/Egress

In the event of a bush fire emergency, access and egress will be via the access road which is to be constructed and which is clearly shown on the plans; this access road is significantly less than the maximum permissible 200 metres and shall be constructed so that it is fully compliant with the requirements of *PBP 2019.*

9.0 *DISCUSSION and RECOMMENDATIONS*

The proposed development is located within the site such that 25 metre APZs (23m for the north) are readily attainable – the development may need to be shifted ever so slightly to the west to avoid transgression onto Lot 30 in DP 1193430 which abuts the development to the south, east and west – this may not be required though as the measurements within this report are to the boundary of the substation and not to the internal components and therefore this should be checked by the design team; the required APZ should be to the nearest substation component or other combustible element.

The required APZs are able to be created simply by appropriate management (mowing) of the grasslands so that they are maintained below 100mm in length. The narrow band of trees to the north will be more than 23 metres from the proposed development and hence will not require any management.

The creation and maintenance of 25 metre APZs for all directions excepting to the north which will have a required 23m APZ, shall ensure an outcome which results in full compliance with *NS187 Passive Fire Mitigation Design of Major Substations*, Section 12, *Bushfire*. Specifically, the creation of these appropriate APZs will ensure that no components of the development are exposed to a heat flux exceeding 12kW/m^2 in the event of a bush fire.

It is also noted that the development is compliant with the requirements of *PBP 2019* by meeting the aim and objectives of this document as below:

The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment. The aim is met by meeting the objectives.

The objectives of *PBP* are:

(i) afford occupants of any building adequate protection from exposure to a bush fire;

Comment – The proposal does not include a building and therefore this objective is considered not applicable.

(ii) provide for a defendable space to be located around buildings;

Comment – The determined APZ shall provide an appropriate defendable space around the development, thereby meeting this objective.

(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;

Comment – Whilst no buildings are proposed, the APZ shall provide appropriate separation between the hazard and the development, thereby meeting this objective.

(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;

Comment – The proposed internal access road is considered acceptable and shall ensure ta this objective is met.

(v) provide for ongoing management and maintenance of BPMs;

Comment – The management of the proposal will be undertaken appropriately so as to ensure that the APZ and all BPMs are maintained appropriately and this objective will be met.

(vi) ensure that utility services are adequate to meet the needs of firefighters.

Comment – The development shall include appropriate fire fighting infrastructure as is required for a development of this nature and such that this objective shall be met.

It is clear that the proposed substation and the individual elements within shall be adequately protected by the appropriate APZs and that compliance with *NS187, Section 12,* as well as *PBP 2019* is achieved.

10.0 CONCLUSION

This assessment was undertaken for a proposed development at Hebden Road Muswellbrook in the Cessnock LGA, with the property being identified as Lot 9 in DP 250890.

Subject to the proposal complying with the recommendations of this report, it is considered acceptable and compliant with *Planning for Bushfire Protection* 2019.

11.0 DISCLAIMER

All effort has been made to ensure the accuracy of this report, however, it is noted that bush fires can be unpredictable and this report in no way implies that any part of the proposed development is totally safe from fire.

Additionally it is noted that despite the site details at the time of writing this report, the situation may change; factors resulting in change to bush fire hazard include (but are not limited to) vegetation regrowth and improper maintenance of asset protection Zones.

No responsibility is accepted or implied for damage to, or loss of, life and/or property at any time resulting from bush fire or bush fire related issues (or any other factors) on this site.

Appendix A:

Photographs

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Appendix B:

Plans

BUSH FIRE THREAT REPORT

Lot 12 in DP 839233

20-24 Sandy Creek Road
MUSWELLBROOK

PREPARED BY
TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
October 2024

Site Inspection Date: 13th August 2024
Report Version: 2
Date of Issue: 9 December 2024
Author: Ben Folbigg
Accreditation: BPAD 31379

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www.tatland.com.au

Executive Summary

This Bush Fire Risk Assessment has been prepared for a proposed development at 20-24 Sandy Creek Road Muswellbrook in the Muswellbrook Local Government Area – the lot being identified as Lot 12 in DP 839233.

The proposal is for a new substation. Adequate APZs are able to be created to ensure that the development is not exposed to an energy level exceeding 12kW/m^2 and this will therefore result in compliance with Section 12 of *NS187 Passive Fire Mitigation Design of Major Substations*. It is strongly recommended that investigations be undertaken, and minimal upgrade works, for an alternate access to the south onto Coal Road.

1.0 INTRODUCTION

Tattersall Lander Pty Ltd has been commissioned to undertake a Bush Fire Risk Assessment for a proposed development at 20-24 Sandy Creek Road Muswellbrook in the Muswellbrook Local Government Area (LGA). The property is identified as Lot 12 in DP 839233.

This Bush Fire Risk Assessment is based upon the guidelines as defined in the document, *Planning for Bush Fire Protection* Guidelines *2019*, which has been written by the *NSW Rural Fire Service*. This assessment outlines the risk posed from bush fire, and hence identifies the constraints with regard to bush fire, thereby providing direction to the proposed development, and ultimately assessing the acceptability or otherwise of the development.

This report has been prepared by myself (Ben Folbigg); I have a Diploma in Planning for Bush Fire Protection and am BPAD accredited (Level 2) with the FPA Australia.

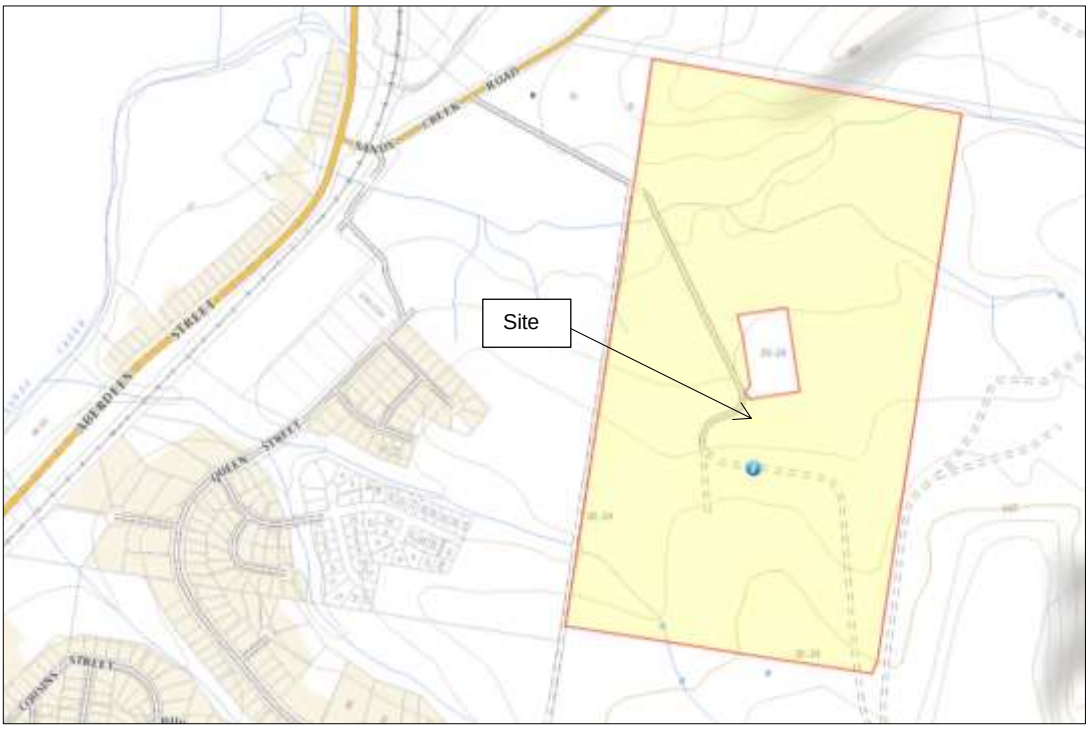


Figure 1 – Site Location

2.0 METHODOLOGY

This assessment is conducted entirely in accordance with the guidelines, as outlined in *Planning for Bush Fire Protection* (NSW Rural Fire Service) 2019 (PBP). A site investigation was undertaken by myself on Thursday the 13th of August 2024.

This assessment:

- identifies the effective slope under vegetation;
- identifies all vegetation categories within 140 metres of the site;
- determines the bush fire attack category which applies to the site;
- identifies Asset Protection Zones/Setbacks;
- identifies the bush fire Construction level required in relation to the above for the proposed development (*AS 3959-2018*)

3.0 SITE DESCRIPTION

The subject site is an existing lot which is zoned C3 – Environmental Management and SP2 - Infrastructure. The site has an approximate area of approximately 61 hectares. Vegetation consists mostly of managed grasslands with only a few trees within the south eastern corner of the site; there is also a very small patch of unmanaged vegetation in the north west corner of the site.

The topography of the site is very gently sloping toward the north and north west.

Aerial photographs of the site and surrounds are included below (refer figures 2 and 3) and photographs of the site have been included; the approximate location and direction of these photographs has been included on the aerial photograph (Figure 3).

The site is located in the Muswellbrook Local Government Area (LGA) and hence is afforded a Fire Danger Index (FDI) rating of 100.

4.0 THE PROPOSAL

The proposal is for a new substation which is to be located to the south of the existing substation which is located on Lot 11 in DP 839233. Plans of the proposal have been viewed and are included within this report (refer Appendix B).

There will be a requirement to remove and manage vegetation for this proposal.

NS187 *Passive Fire Mitigation Design of Major Substations*, Section 12 (Bushfire) has been addressed within this report as well as *Planning for Bushfire Protection 2019.*

With regard to Section 12 of NS187, the following points are pertinent:

- *This Network Standard does not cover the requirements for protecting the bush against fire from equipment failure.* It is stated that, as a minimum, a 12.5kW/m^2 level should be adopted at the boundary – this is essentially a BAL-12.5 requirement.
- Table 1 (below), as provided by the standard, provides the maximum exposure allowable to various elements of the substation – these exposure

limits may be translated to BAL for the purpose of determining the required APZs for these exposure limits to be met.

- Buildings are to comply with *AS3959.* Smoke resistant seals are to be fitted to all external doors to ensure embers do not enter under the door(s).
- The radiant heat limits identified in Table 1 apply to critical substation structures – critical elements are those which are deemed to be essential to allow for return to service following a bushfire event.
- APZ widths may be reduced where exposed elements are able to be *locally protected* or *rapidly replaced.*
- Regular and thorough maintenance is considered critical to prevent the build-up of combustibles.

Item	Maximum allowable radiant heat flux(kW/m^2)	Comment
Cable	12.5 20	PVC cables begin to distort and ignite. Ignition of XLPE cables between 85 and 550 seconds.
Steel structure support	35	To 60% of yield strength after a maximum duration of 5 minutes. Applies where elastic deflections due to elevated temperatures are not critical.
Porcelain bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Polymeric bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Aluminium busbar	20	Based on 250oC after a maximum duration of 5 minutes. Comparable to withstand temperature uner fault conditions.
Copper busbar	25	Busbars may undergo significant distortion and impose significant stresses on rigid insulators.
Transformer tank	>35 (see note 1)	Refer to above regarding bushings and cables.
Combustibles	12.5	Piloted ignition may occur on timber

Note 1 – Transformers always have some more vulnerable components such as bushings and cables etc.

Note 2 – Detailed information on radioant heat exposure is not avaiulable. However in-service applications exposed to bushfire indicate a high radiant heat limit and a low risk of damage or failure.

It is noted that Column 3 in Table 1 (above) really has no relvance with regard to this report but it is included simply for completeness with regard to the infiormation as obtained from the standard.

Figure 2: Site and surrounds (source: https://maps.six.nsw.gov.au/)

Figure 3: Site and surrounds (source: https://maps.six.nsw.gov.au/)

5.0 SITE ANALYSIS

5.1 Northern Aspect

The northern aspect presents grasslands with some scattered remnant trees for significantly more than 140 metres. The effective slope under the vegetation to the north is in the >0-5 degree category.

5.2 Southern Aspect

The southern aspect presents what is effectively woodland. The effective slope under the vegetation to the south is in the upslope/flat category.

5.3 Eastern Aspect

The eastern aspect presents what is effectively woodland. The effective slope under the vegetation to the east is in the >0-5 category.

5.4 Western Aspect

The western aspect presents a mixture of vegetation, there is firstly a small area of woodland with a width of approximately 40 metres as measured from the western extent of the proposal, and this is followed by grassland; as woodland is the worst case scenario, this is the vegetation category to be used for this assessment. The effective slope under the vegetation to the west is in the >0-5 degree category.

6.0 SITE ANALYSIS

Table 2 – Asset Protection Zones and Construction Level Requirements as per *Planning for Bushfire Protection 2019* and *AS3959-2018*

Aspect	Vegetation Classification	Slope (degrees) Under Vegetation	Required APZ (metres) for BAL-12.5
North	Grassland	>0-5	25
South	Woodland	Upslope/flat	26
East	Woodland	>0-5	32
West	Woodland	>0-5	32

7.0 Services

7.1 Water

Investigations with regard to water supply have not been undertaken. It is understood that as part of this development, Ausgrid shall ensure appropriate infrastructure is in place for fire fighting.

7.2 Electrical

As the development is a substation, electrical supply is relevant. Transmission lines shall be overhead and vegetation shall be maintained so that these transmission lines are not a bush fire ignition source. The development shall be compliant in this regard.

7.3 Gas

Not applicable.

8.0 ACCESS

8.1 Road Capacity

The site is accessed via a gravel access road which comes off Sandy Creek Road. This road is all-weather trafficable and has a width of approximately 4 metres. The carrying capacity of this access road has not been investigated but a visual inspection strongly suggests that it is capable of carrying fully laden fire fighting vehicles, including tankers.

8.2 Road Linkages to Fire Trails

There are no official fire trails within the site. There are many tracks and trails within the site which may be utilised for fire fighting purposes, including a track which runs to the south and through an adjacent lot and onto Coal Road. The legal use of this track has not been investigated for the purpose of this report but it is clear that it could physically be used by emergency service personnel in the event of a bush fire.

8.3 Emergency Access/Egress

In the event of a bush fire emergency, access and egress will be via the existing access road from the north west off Sandy Creek Road. This access significantly exceeds 200 metres in length; there is an alternate access to the

south onto Coal Road and the legality of the use of this track should be investigated, however, in a bush fire emergency, it is considered that emergency service personnel would be able to use this access route as an alternative. There may be some minor works to ensure this secondary access meets the minimum 4 metre width and vertical clearance requirements.

9.0 DISCUSSION and RECOMMENDATIONS

The proposal is sited such that it is physically possible to create the required APZs so that the development will not be exposed to an energy rating exceeding 12kW/m^2 – ie BAL-12.5. The required APZs shall be:

- North 25m
- South 26m
- East 32m
- West 32m

Given the vegetation to the north is grassland and hence management is not difficult, it is suggested that the APZ be 32 metres all round for simplification purposes, except to the south where is shall be 26 metres in order to minimise tree removal.

The creation of these APZs shall ensure that the elements within the substation are not exposed to radiant heat energy levels exceeding 12kW/m^2 and that therefore, the proposal will be compliant with Section 12 of NS187 *Passive Fire Mitigation Design of Major Substations.*

The only other recommendation is that the access identified to the south be investigated, and, if possible formalised and upgraded (where required) to meet the requirements of *PBP 2019.*

10.0 CONCLUSION

This assessment was undertaken for a proposed development at 20-24 Sandy Creek Road Muswellbrook in the Muswellbrook LGA, with the property being identified as Lot 12 in DP 839233.

Subject to the proposal complying with the recommendations of this report, it is considered acceptable and compliant with *NS187* Section 12 and *Planning for Bushfire Protection* 2019.

11.0 DISCLAIMER

All effort has been made to ensure the accuracy of this report, however, it is noted that bush fires can be unpredictable and this report in no way implies that any part of the proposed development is totally safe from fire.

Additionally it is noted that despite the site details at the time of writing this report, the situation may change; factors resulting in change to bush fire hazard include (but are not limited to) vegetation regrowth and improper maintenance of asset protection Zones.

No responsibility is accepted or implied for damage to, or loss of, life and/or property at any time resulting from bush fire or bush fire related issues (or any other factors) on this site.

Appendix A:

Photographs

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

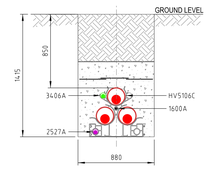
Photograph 6

Photograph 7

Photograph 8

Appendix B:

Plans



SECTION A
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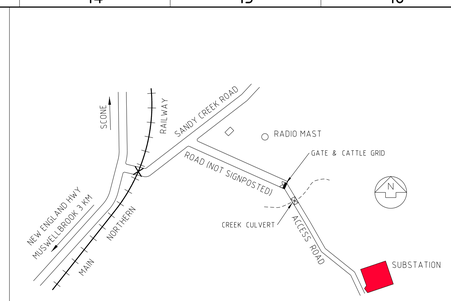
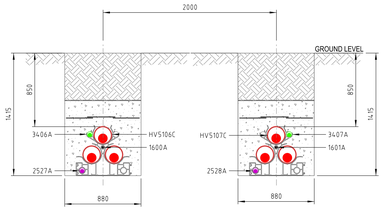
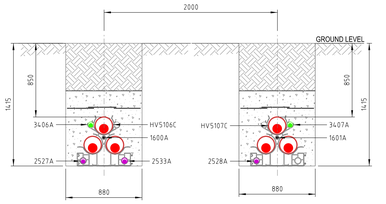


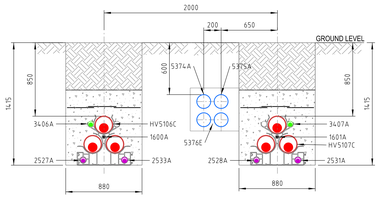
LOCALITY SKETCH



SECTION B
SCALE 1:25



SECTION C
SCALE 1:25



SECTION D
SCALE 1:25

LEGEND

- HIGH SECURITY SUBSTATION FENCE
- FARM FENCE
- 132kV OVERHEAD
- 66kV OVERHEAD
- 33kV OVERHEAD
- AUX OVERHEAD
- WATER
- WA — WATER ABANDONED
- TELECOMMUNICATION
- STORMWATER
- NEW OPTIC FIBRE CONDUITS
- ECP — EARTH COUNTERPOISE CONDUCTOR
- FIRE WATER - NEW
- POTABLE WATER - NEW
- OF — OPTIC FIBRE PIT TYPE J8 WITH LOCKABLE LID
- T — TELECOMMUNICATION PIT EXISTING
- A — DRAINAGE PIT ABANDONED
- VERTICAL LEVEL CHANGE RESTRAINT PIT
- POWER POLE
- GROUND WATER MONITORING WELL
- CATTLE GRATE
- 30m DEEP COUNTERPOISE ELECTRODE
- FH — FIRE HYDRANTS - EXISTING
- DPH — DOUBLE PILLAR FIRE HYDRAUNT - NEW
- HT — HOSE TAP

DRAWINGS AMALGAMATED INTO THIS DRAWING

TITLE	DWG No	REV
SITE PLAN	511442	3
POWER STATION SITE PLAN	566486	0
SUBSTATION SITE PLAN & TRANSMISSION LINE EASEMENTS	517719	0
MUSWELLBROOK SITE SURVEY - DATED 01-11-2012		
RMS BYPASS CONCEPT - DATE 22-5-2020		

NOTES

1. 132kV FEEDER CONDUIT INSTALLATION SHALL BE COMPLIANT WITH AUSGRID NS168.
2. OPTICAL FIBRE CONDUITS & J8 PITS SHALL BE COMPLIANT WITH AUSGRID NS204, NS234 & NS235.

SITE SERVICES ie FIRE, 415V POWER AND CONTROL & PROTECTION CONDUITS TO BE CONFIRMED ON SITE. DEPTH UNKNOWN.

TENDER ISSUE A

CAD DRAWING SO NOT AMEND MANUALLY
AMENDMENTS
DWN amend_by
CHKD check_by
APP'D approve
DATE 27-10-2023
TENDER ISSUE A

		132kV FEEDER 95H - NEW 60F OPGW PLAN	250129
		EARTHING COUNTERPOISE LAYOUT	244759
		FIRE HYDRANT WATER SUPPLY (NEW)	255130
		OIL CONTAINMENT PLAN	249470
		EMERGENCY DRAINAGE INFORMATION PLAN	151045
STORMWATER DRAIN OUTSIDE OF YARD	249473	SWITCHYARD DRAINAGE PLAN	511445
HYDRAULIC ENCLOSURES & EXTERNAL STAIR DETAILS	249467	FENCE REFURBISHMENT	127958
HYDRAULIC SERVICES	255130-34	GENERAL ARRANGEMENT	511571
ASSOCIATED DRAWINGS		ASSOCIATED DRAWINGS	

Ausgrid
145 NEWCASTLE RD WALLSEND, NSW 2287

SCALE	1:500
DESIGNED	S.C.C.
DRAWN	P.J.S.
CHECKED	
APPROVED	J.THORNTON
DATE	14/08/18
PROJECT NUMBER	SJ-00201
PROJTRAK NUMBER	

TS 407 MUSWELLBROOK
132/33kV SUBSTATION
SITE PLAN

SIZE A0 | DRAWING No 511442 | SHEET 1 | AMD A

20110901

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BUSH FIRE THREAT REPORT

Lot 1 in DP 858171

123 Main Road
HEDDON GRETA

PREPARED BY
TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
September 2024

Site Inspection Date: 22nd August 2024
Report Version: 1
Date of Issue: 14 November 2024
Author: Ben Folbigg
Accreditation: BPAD 31379

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Executive Summary

This Bush Fire Risk Assessment has been prepared for a proposed development at 123 Main Road Heddon Greta in the Cessnock Local Government Area – the lot being identified as Lot 1 in DP 858171.

The proposal is for additions and alterations to an existing substation. Adequate APZs are able to be created to ensure that the development is not exposed to an energy level exceeding 12kW/m^2 and this will therefore result in compliance with Section 12 of *NS187 Passive Fire Mitigation Design of Major Substations*. The development is also considered compliant with *Planning for Bushfire Protection 2019* subject to the recommendations within this report.

1.0 INTRODUCTION

Tattersall Lander Pty Ltd has been commissioned to undertake a Bush Fire Risk Assessment for a proposed development at 123 Main Road Heddon Greta in the Cessnock Local Government Area (LGA). The property is identified as Lot 1 in DP 858171.

This Bush Fire Risk Assessment is based upon the guidelines as defined in the document, *Planning for Bush Fire Protection* Guidelines *2019*, which has been written by the *NSW Rural Fire Service*. This assessment outlines the risk posed from bush fire, and hence identifies the constraints with regard to bush fire, thereby providing direction to the proposed development, and ultimately assessing the acceptability or otherwise of the development.

This report has been prepared by myself (Ben Folbigg); I have a Diploma in Planning for Bush Fire Protection and am BPAD accredited (Level 2) with the FPA Australia.

Figure 1 – Site Location

2.0 METHODOLOGY

This assessment is conducted entirely in accordance with the guidelines, as outlined in *Planning for Bush Fire Protection* (NSW Rural Fire Service) 2019 (PBP). A site investigation was undertaken by myself on Thursday the 22nd of August 2024.

This assessment:

- identifies the effective slope under vegetation;
- identifies all vegetation categories within 140 metres of the site;

- determines the bush fire attack category which applies to the site;
- identifies Asset Protection Zones/Setbacks;
- identifies the bush fire Construction level required in relation to the above for the proposed development (*AS 3959-2018*)

3.0 SITE DESCRIPTION

The subject site is an existing rural lot (RU2 – Rural Landscape). The site has an approximate area of approximately 4.75 hectares. There is an existing substation within the site and vegetation consists mostly of managed lawns with only a few trees within the south eastern corner of the site; there is also a very small patch of unmanaged vegetation in the north west corner of the site.

The topography of the site is very gently sloping toward the north and north west.

Aerial photographs of the site and surrounds are included below (refer figures 2 and 3) and photographs of the site have been included; the approximate location and direction of these photographs has been included on the aerial photograph (Figure 3).

The site is located in the Cessnock Local Government Area (LGA) and hence is afforded a Fire Danger Index (FDI) rating of 100.

4.0 THE PROPOSAL

The proposal is for additions and alterations to the existing substation, specifically the proposal will result in works on the western side of the existing substation and shall result in a reduction in the existing setback from the western boundary of approximately 25 metres (as measured to the substation fence).

NS187 *Passive Fire Mitigation Design of Major Substations*, Section 12 (Bushfire) has been addressed within this report as well as *Planning for Bushfire Protection 2019.*

With regard to Section 12 of NS187, the following points are pertinent:

- *This Network Standard does not cover the requirements for protecting the bush against fire from equipment failure.* It is stated that, as a minimum, a 12.5kW/m^2 level should be adopted at the boundary – this is essentially a BAL-12.5 requirement.
- Table 1 (below), as provided by the standard, provides the maximum exposure allowable to various elements of the substation – these exposure limits may be translated to BAL for the purpose of determining the required APZs for these exposure limits to be met.
- Buildings are to comply with *AS3959.* Smoke resistant seals are to be fitted to all external doors to ensure embers do not enter under the door(s).

- The radiant heat limits identified in Table 1 apply to critical substation structures – critical elements are those which are deemed to be essential to allow for return to service following a bushfire event.
- APZ widths may be reduced where exposed elements are able to be *locally protected* or *rapidly replaced.*
- Regular and thorough maintenance is considered critical to prevent the build-up of combustibles.

Item	Maximum allowable radiant heat flux(kW/m^2)	Comment
Cable	12.5 20	PVC cables begin to distort and ignite. Ignition of XLPE cables between 85 and 550 seconds.
Steel structure support	35	To 60% of yield strength after a maximum duration of 5 minutes. Applies where elastic deflections due to elevated temperatures are not critical.
Porcelain bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Polymeric bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Aluminium busbar	20	Based on 250oC after a maximum duration of 5 minutes. Comparable to withstand temperature uner fault conditions.
Copper busbar	25	Busbars may undergo significant distortion and impose significant stresses on rigid insulators.
Transformer tank	>35 (see note 1)	Refer to above regarding bushings and cables.
Combustibles	12.5	Piloted ignition may occur on timber

Note 1 – Transformers always have some more vulnerable components such as bushings and cables etc.

Note 2 – Detailed information on radioant heat exposure is not avaiulable. However in-service applications exposed to bushfire indicate a high radiant heat limit and a low risk of damage or failure.

It is noted that Column 3 in Table 1 (above) really has no relvance with regard to this report but it is included simply for completeness with regard to the infiormation as obtained from the standard.

Figure 2: Site and surrounds (source: https://maps.six.nsw.gov.au/)

Figure 3: Site and surrounds (source: https://maps.six.nsw.gov.au/)

5.0 SITE ANALYSIS

5.1 Northern Aspect

The northern aspect presents approximately 40 metres within the subject site, from the northern most part of the substation and the northern boundary. This area is well managed, with the area only containing mown lawns. Further to the north there is significant vegetation in the form of forest and the slope under this vegetation is in the upslope/flat category.

There is a distance of approximately 75 metres between the proposed works and the nearest vegetation to the north, being the small area of vegetation in the north west corner of the site. The slope under this small are of vegetation is also in the upslope/flat category.

5.2 Southern Aspect

The southern aspect presents approximately 50 metres within the subject site, as measured from the most southern part of the substation to the southern most boundary – this area consists of managed lawn. Beyond this there is vegetation which is categorised as grassland. The effective slope under the vegetation to the south is in the upslope/flat category.

The distance to the grassland vegetation to the south from the proposed works is approximately 61 metres.

5.3 Eastern Aspect

The eastern aspect presents approximately 9 metres within the subject site, as measured from the eastern most part of the existing substation to the eastern most boundary. This area contains managed lawns. Further to the east there is an area which essentially contains grasslands but with a trail through the middle of this and the width of this grassland area is approximately 25 metres. Further to the east there is forest. The effective slope under the vegetation to the east is in the upslope/flat category.

As forest is the most significant vegetation type and the grassland provides connectivity and therefore precludes any APZ in this location outside the site, the vegetation category is identified as forest for the purpose of this assessment.

The distance between the proposed works and the eastern most boundary (hence any vegetation of significance from a bushfire threat perspective) is approximately 145 metres.

5.4 Western Aspect

The western aspect presents approximately 48 metres of managed lawns from the western most part of the existing substation to the western most boundary. Beyond this, there is significant vegetation in the form of forest and the effective slope under this forest is in the >0-5 degree category.

The proposed works will result in a reduction of 25 metres in the existing setback, and hence there will be an approximate 17 metre APZ within the subject site from the proposed works – this 17 metre APZ is due to the existing development being stepped.

6.0 SITE ANALYSIS

Table 2 – Asset Protection Zones and Construction Level Requirements as per *Planning for Bushfire Protection 2019* and *AS3959-2018*

Aspect	Vegetation Classification	Slope (degrees) Under Vegetation	Existing APZ (metres) as measured from substation overall)/From Critical Components	Existing APZ (as measured from proposed works Critical Components)	Required APZ (metres) for BAL-12.5	Required BAL construction (and APZ to obtain this rating)	Shortfall (metres) from Proposed Works for BAL-12.5 Outcome
North	Forest	Upslope/flat	55/62	75	45	BAL-12.5 (45m)	0
South	Grassland	Upslope/flat	50/57	61	22	BAL- Low (50m)	0
East	Forest	Upslope/flat	36/46	145	45	BAL- Low (100m)	0
West	Forest	>0-5	48/55	24	37*	BAL-FZ (<22m)	13

* Calculated using NBC Bushfire Attack Assessment software and using Hunter Macleay DSF Vegetation type

7.0 Services

7.1 Water

The site is connected to the reticulated town water supply and there are hydrants within the facility so that compliance with regard to water supply is achieved.

7.2 Electrical

As the development is an existing substation, electrical supply is existing. Transmission lines are overhead and vegetation is maintained so that these transmission lines are not a bush fire ignition source. Compliance is achieved in this regard.

7.3 Gas

Not applicable.

8.0 ACCESS

8.1 Road Capacity

The site is accessed via a gravel unnamed road which comes directly off Main Road. This gravel road is considered to be all-weather and capable of carrying fully laden fire fighting vehicles, including tankers.

8.2 Road Linkages to Fire Trails

There are no fire trails within the site. The surrounding bushland has many fire trails, both official and unofficial, however, these have not been investigated as part of this assessment.

8.3 Emergency Access/Egress

In the event of a bush fire emergency, access and egress will be via the existing access road at the south eastern corner of the site and as shown in Figure 1. As this development and access is existing, it is to be considered acceptable and no further investigation is required.

9.0 *DISCUSSION and RECOMMENDATIONS*

The proposal will result in the western aspect being located within BAL-40 (using the NBC Bushfire Attack Assessment software. In order to reduce the heat exposure for critical components to 12.5kW/m^2 vegetation management will be required for 13 metres from the western boundary and to the west – this may be reduced by whatever the distance of the cabling is from the outermost critical components of the substation (ie if the cabling is 2 metres from the outermost critical components, then the vegetation management would be reduced to 11 metres). It is noted that a radiant heat barrier option has been explored and this cannot achieve the required maximum energy output.

The other option would be to utilise a BAL-19 energy level (ie 19kW/m^2) which will suit all but some cabling and this would then require a vegetation management width of only 2 metres to obtain a total APZ of 26 metres. In this instance, there will be cable shielding required.

The vegetation, whether it be 13 metres (BAL-12.5) or 2 metres (BAL-19) shall have to be cleared/managed to APZ standards and a copy of these standards is included in the appendices for reference. It is understood that there is a legal instrument permitting the management of vegetation within this area.

The creation of the required APZ to the west shall ensure that the elements within the substation are not exposed to radiant heat energy levels exceeding those as stipulated within *NS187 Section 12* (refer Table 1 above) and that therefore, the proposal will be compliant with Section 12 of NS187 *Passive Fire Mitigation Design of Major Substations* and also with the requirements of *Planning for Bushfire Protection 2019.*.

10.0 *CONCLUSION*

This assessment was undertaken for a proposed development at 123 Main Road Heddon Greta in the Cessnock LGA, with the property being identified as Lot 1 in DP 858171.

Subject to the proposal complying with the recommendations of this report, it is considered acceptable and compliant with *NS187 Passive Fire Mitigation Design of Major Substations (Section 12)* and *Planning for Bushfire Protection* 2019.

11.0 *DISCLAIMER*

All effort has been made to ensure the accuracy of this report, however, it is noted that bush fires can be unpredictable and this report in no way implies that any part of the proposed development is totally safe from fire.

Additionally it is noted that despite the site details at the time of writing this report, the situation may change; factors resulting in change to bush fire hazard include (but are not limited to) vegetation regrowth and improper maintenance of asset protection Zones.

No responsibility is accepted or implied for damage to, or loss of, life and/or property at any time resulting from bush fire or bush fire related issues (or any other factors) on this site.

Appendix A:

Photographs

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

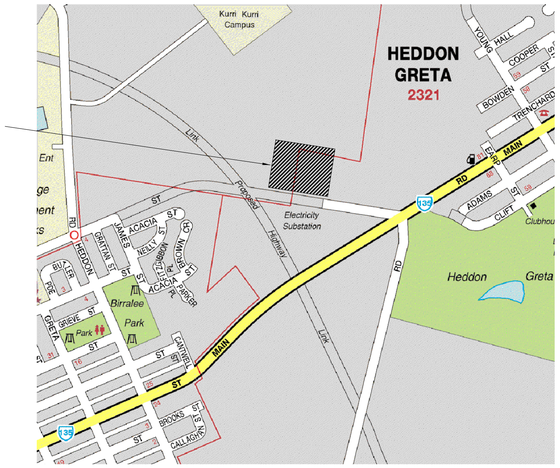
Photograph 9

Appendix B:

Plans

NORTH

SUBSTATION SITE



LOCALITY PLAN
N.T.S.

LEGEND

- EXISTING OVERHEAD
- PROPERTY BOUNDARY
- NEW SUBSTATION FENCE
- EXIST SUBSTATION FENCE
- EXIST POWER POLE

33kV SWITCHROOM SETOUT

DATUM - N/W CORNER OF Tx3 BUND - E359534.037
N6369238.319

POINT 1 - S/E CORNER OF SWITCHROOM - E359525.597
N6369251.515

POINT 2 - S/W CORNER OF SWITCHROOM - E359514.453
N6369255.177

TENDER ISSUE C

CAD DRAWING DO NOT MANUALLY AMEND			
DWN: amend_by		DWN: amend_by	DWN: amend_by
CHKD: check_by		CHKD: check_by	CHKD: check_by
APP'D: approve		APP'D: approve	APP'D: approve
DATE: 27-10-2023		DATE: 7/11/2023	DATE: 6/02/2024
TENDER ISSUE A		TENDER ISSUE B	TENDER ISSUE C
A		B	C

ASSOCIATED DRAWINGS	
EMERGENCY DRAINAGE PLAN	151037
DRAWING INDEX	203617
KURRI KURRI SUBSTATION GENERAL ARRANGEMENT	524352

Ausgrid
145 NEWCASTLE RD WALLSEND, NSW 2287

SCALE	1250
DESIGNED	DENNIS COURTNEY
DRAWN	RAY DEAL
CHECKED	DENNIS COURTNEY
APPROVED	ROSS HUGHES
DATE	17/09/09
PROJECT NUMBER	SJ-5559
PROJTRAK NUMBER	

TS 404 KURRI KURRI
132/33kV SUBSTATION
SITE PLAN

SIZE	DRAWING No	SHEET	AMD
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20110923

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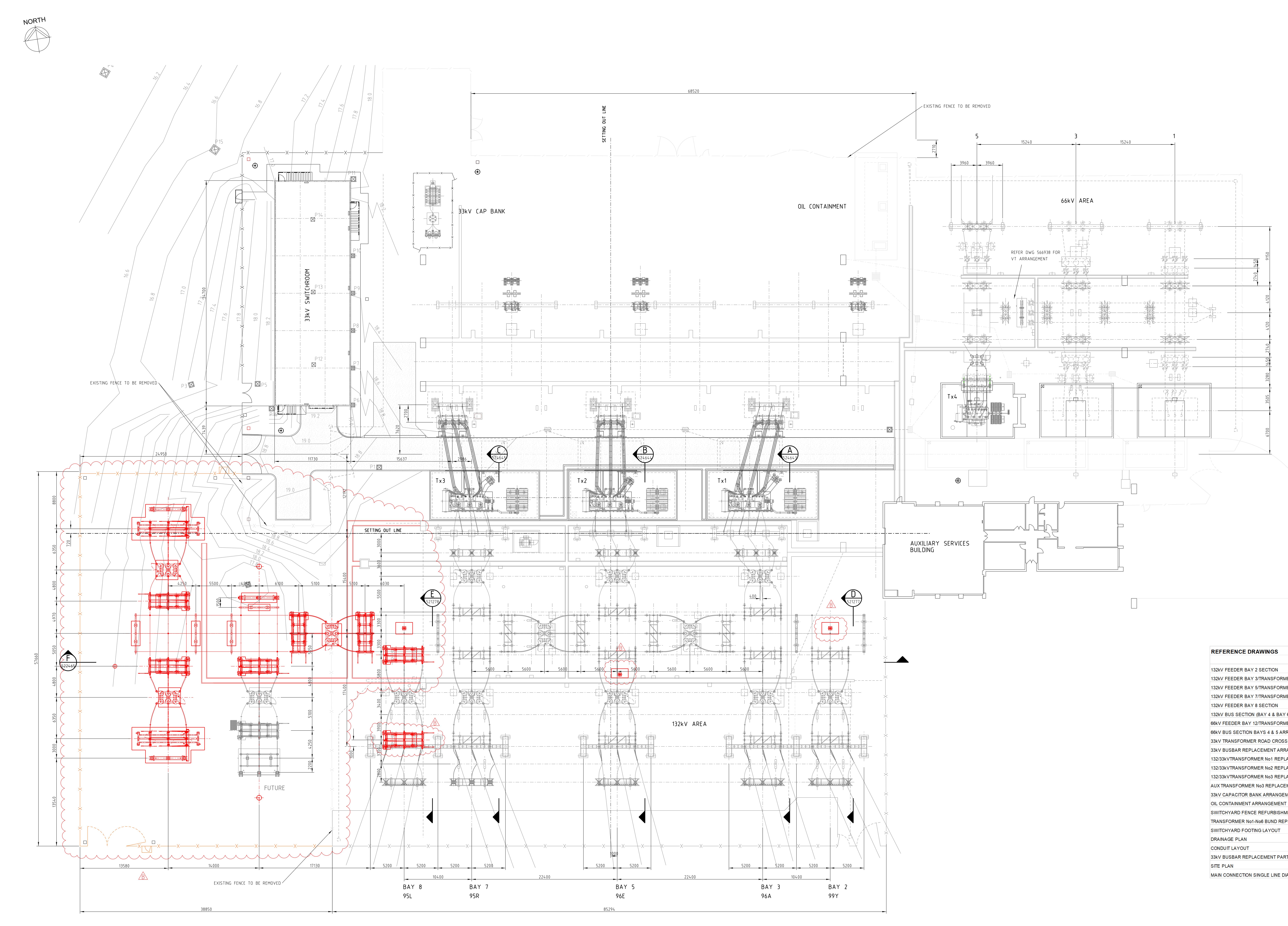

REFERENCE DRAWINGS	DWG No	REV
132kV FEEDER BAY 2 SECTION	521277	1
132kV FEEDER BAY 3/TRANSFORMER No1 SECTION	524643	4
132kV FEEDER BAY 5/TRANSFORMER No2 SECTION	524644	2
132kV FEEDER BAY 7/TRANSFORMER No3 SECTION	524645	4
132kV FEEDER BAY 8 SECTION	521278	1
132kV BUS SECTION (BAY 4 & BAY 6) SECTION	522465	1
66kV FEEDER BAY 12/TRANSFORMER No4 SECTION	521666	4
66kV BUS SECTION BAYS 4 & 5 ARRANGEMENT	566938	2
33kV TRANSFORMER ROAD CROSSING SECTION	205548	3
33kV BUSBAR REPLACEMENT ARRANGEMENT	203602	3
132/33kVTRANSFORMER No1 REPLACEMENT	167993	1
132/33kVTRANSFORMER No2 REPLACEMENT	169824	0
132/33kVTRANSFORMER No3 REPLACEMENT	175898	0
AUX TRANSFORMER No3 REPLACEMENT	174772	1
33kV CAPACITOR BANK ARRANGEMENT	161449	2
OIL CONTAINMENT ARRANGEMENT	124496	2
SWITCHYARD FENCE REFURBISHMENT	127971	7
TRANSFORMER No1-No6 BUND REPLACEMENT	204022	1
SWITCHYARD FOOTING LAYOUT	525228	7
DRAINAGE PLAN	524869	10
CONDUIT LAYOUT	203606	4
33kV BUSBAR REPLACEMENT PART SITE PLAN	243974	0
SITE PLAN	203601	0
MAIN CONNECTION SINGLE LINE DIAGRAM	524642	19

TENDER ISSUE B

ASSOCIATED DRAWINGS

Ausgrid
145 NEWCASTLE RD WALLSEND, NSW 2287

SCALE	1:500
DESIGNED	EC
DRAWN	EC
CHECKED	EC
APPROVED	EC
DATE	01/01/61
PROJECT NUMBER	SM 03497
PROJTRAK NUMBER	

TS 404 KURRI KURRI
132/66/33kV SUBSTATION
GENERAL ARRANGEMENT

SIZE A0 | DRAWING No 524352 | SHEET 1 | AMD B

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Appendix C:

NBC Modelling Results

NBC Bushfire Attack Assessment Report V4.0

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 14/11/2024 **Assessment Date:** 13/11/2024

Site Street Address: 123 Main Road, Heddon Greta

Assessor: Please Enter Your Name; Please Enter Company Name

Local Government Area: Cessnock **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: West

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 3 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:** Level

Elevation of Receiver(m): Default **APZ/Separation(m):** 37

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 12.5 **Peak Elevation of Receiver(m):** 7.91

Radiant Heat(kW/m2): 12 **Flame Angle (degrees):** 74

Flame Length(m): 16.45 **Maximum View Factor:** 0.199

Rate Of Spread (km/h): 2.07 **Inner Protection Area(m):** 30

Transmissivity: 0.794 **Outer Protection Area(m):** 7

Fire Intensity(kW/m): 26691

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	14	18	26	36	56	6

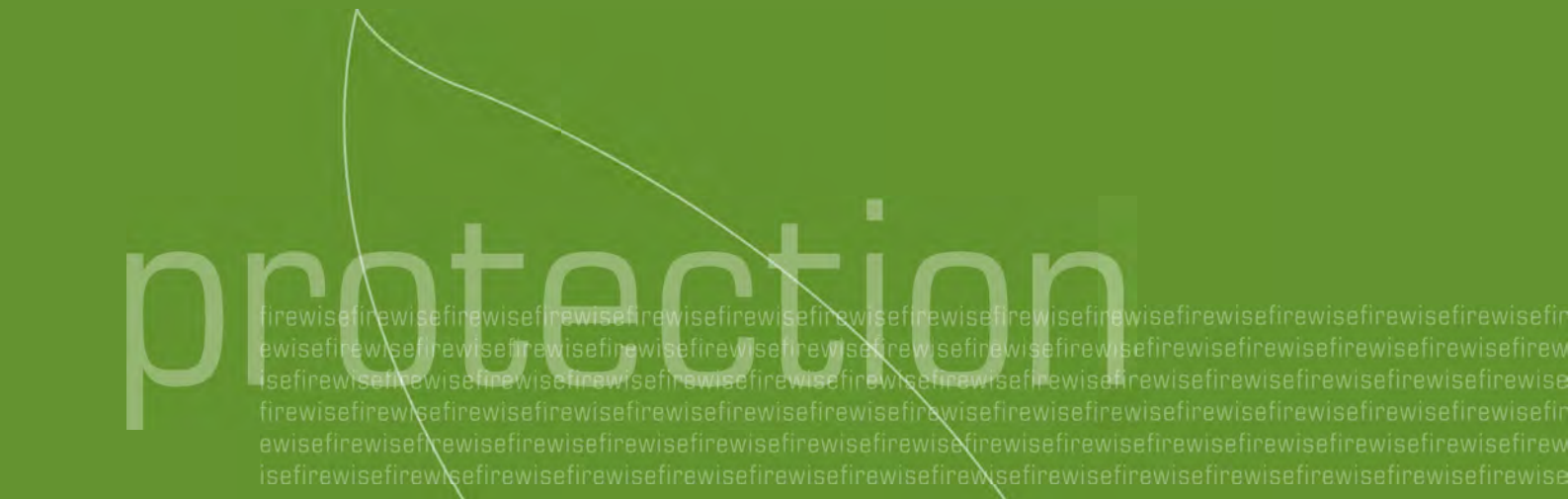
Appendix D:

Asset Protection Zone Standards

standards

for asset protection zones

protection



NSW RURAL FIRE SERVICE

STANDARDS FOR ASSET PROTECTION ZONES

INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows suppression of fire;
- an area from which backburning may be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

WHAT WILL THE APZ DO?

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset;
- damage to the built asset from intense radiant heat; and
- ember attack on the asset.

WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

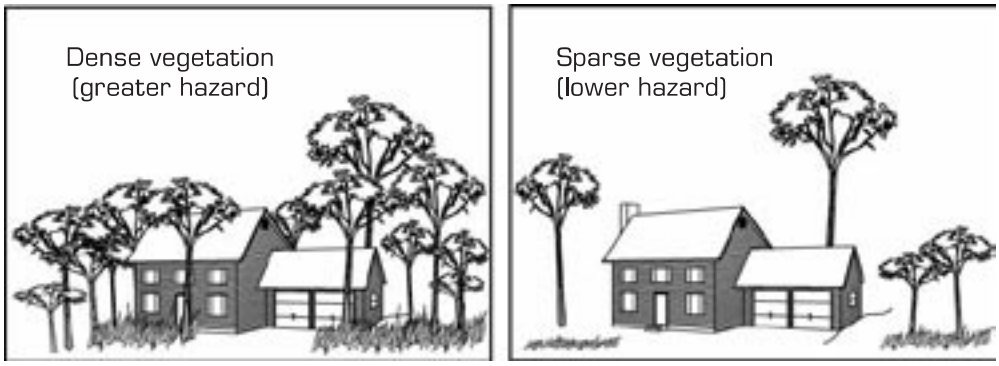
STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

Subdivided land or construction of a new dwelling
If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

Existing asset
If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

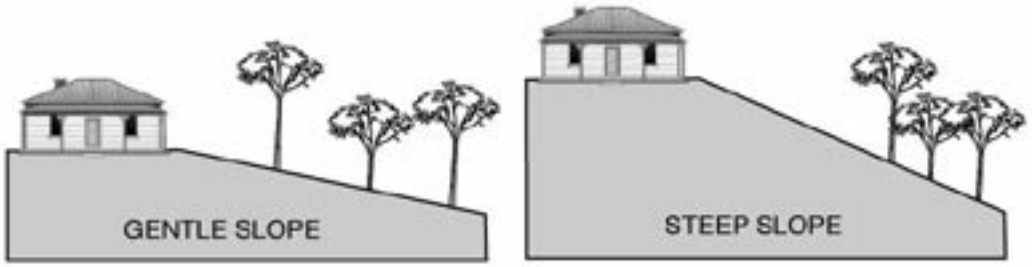
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

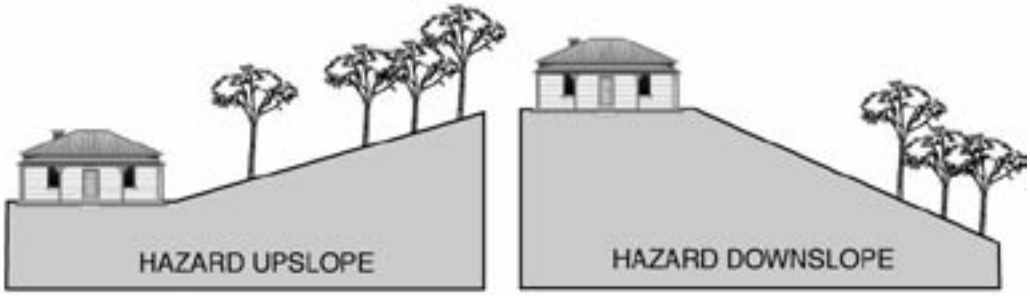
STEP 3. DETERMINE THE APZ WIDTH

The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.



Gentle slopes require a smaller APZ distance than steep slopes



A hazard downslope will require a greater APZ distance then a hazard upslope of the asset

Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

Subdivided land or construction of a new dwelling
If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

Existing asset
If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

Fuels can be controlled by:

1. raking or manual removal of fine fuels
Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

2. mowing or grazing of grass
Grass needs to be kept short and, where possible, green.

3. removal or pruning of trees, shrubs and understorey
The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

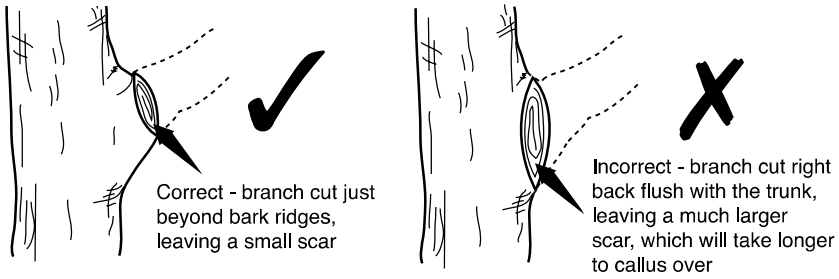
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at **www.agric.nsw.gov.au/noxweed/;**
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3 Remove or thin understorey plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in acordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

1. Crown lifting (skirting)
Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning
Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

3. Selective pruning
Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees*) for more information on tree pruning.

4. Slashing and trittering
Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

5. Ploughing and grading
Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

6. Burning (hazard reduction burning)
Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning,* or contact your local RFS for advice.

7. Burning (pile burning)
In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning.*

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

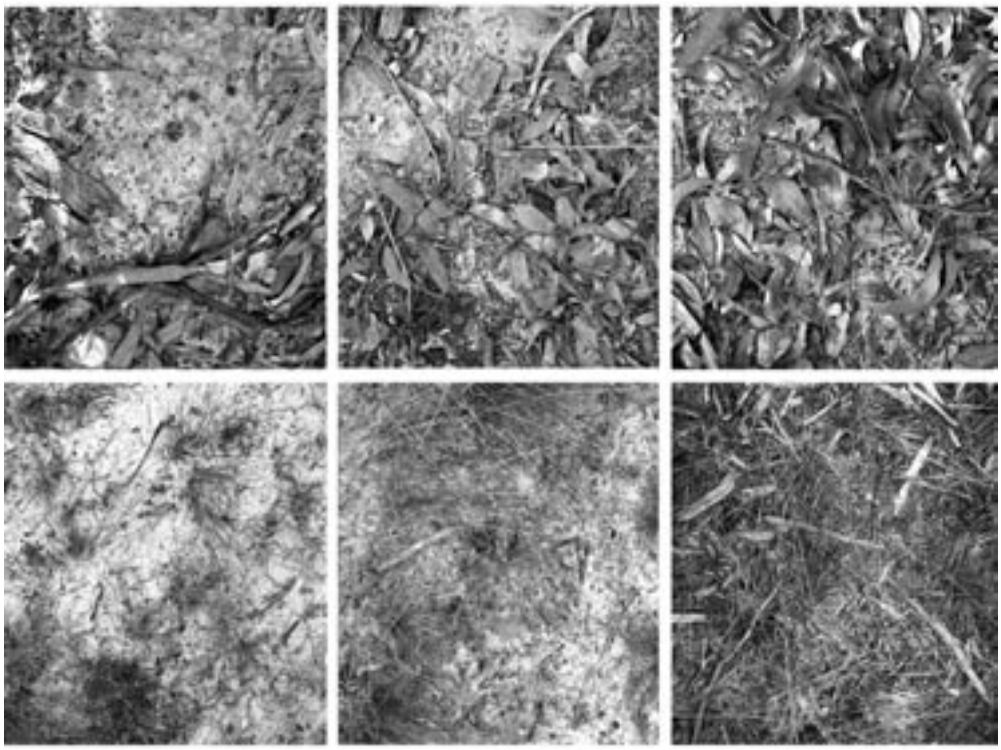
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

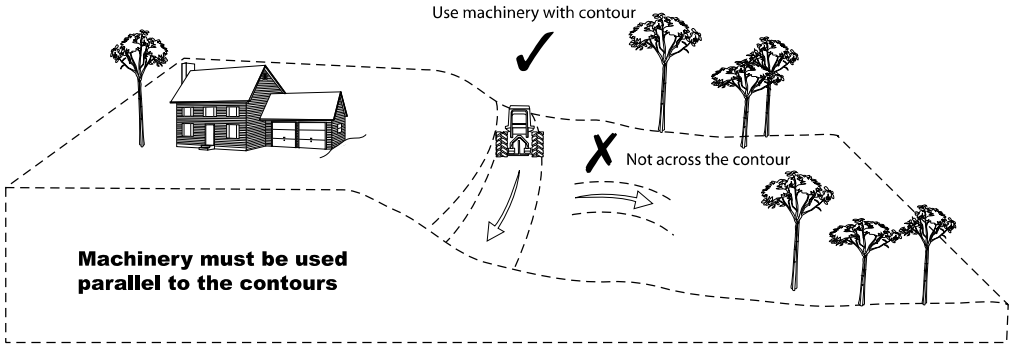
When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



50% **75%** **100%**

Ground Cover

To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.

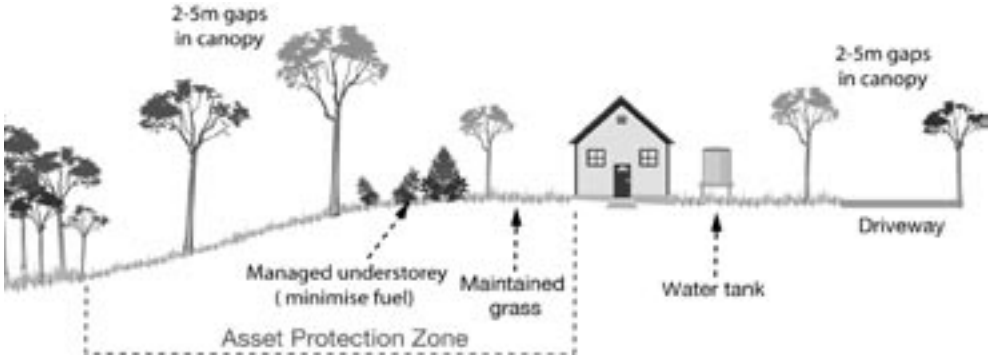


STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

Layout of gardens in an APZ
When creating and maintaining a garden that is part of an APZ you should:

- ensure that vegetation does not provide a continuous path to the house;
- remove all noxious and environmental weeds;
- plant or clear vegetation into clumps rather than continuous rows;
- prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
- locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
- ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable ground cover such as pebbles and crush tile; and
- avoid erecting brush type fencing and planting "pencil pine" type trees next to buildings, as these are highly flammable.



Removal of other materials
Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features
You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

Plants that are less flammable, have the following features:

- high moisture content
- high levels of salt
- low volatile oil content of leaves
- smooth barks without "ribbons" hanging from branches or trunks; and
- dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees.*

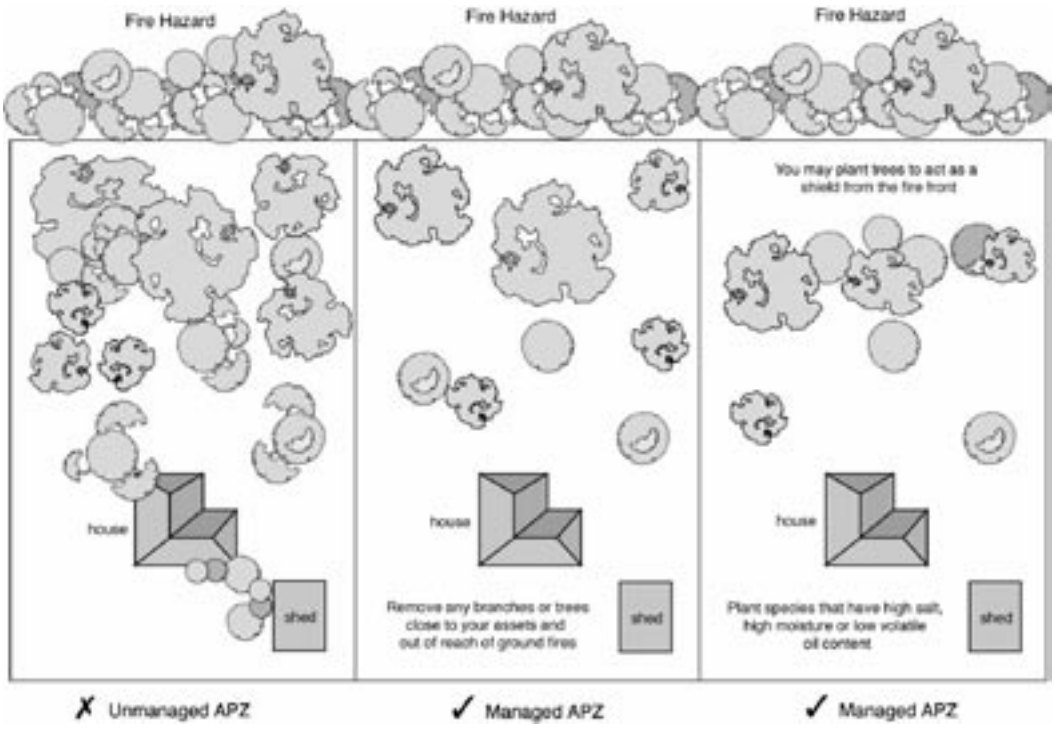
WIND BREAKS

Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.



HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at **www.rfs.nsw.gov.au.**

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre. Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737 (Monday to Friday, 9am to 5pm), or
- the NSW RFS website at **www.rfs.nsw.gov.au.**

Produced by the NSW Rural Fire Service, Locked Mail Bag 17, GRANVILLE, NSW 2142. Ph. 1800 679 737
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BUSH FIRE THREAT REPORT

Lot 4 in DP 598847

1309 Wine Country Drive
ROTHBURY

PREPARED BY
TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
October 2024

Site Inspection Date: 22nd August 2024
Report Version: 1
Author: Benjamin Folbigg
BPAD Accreditation/Level: 31379/2
Date of Issue: 31 October 2024

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Executive Summary

This Bush Fire Risk Assessment has been prepared for a proposed development at 1309 Wine Country Drive Rothbury in the Cessnock Local Government Area – the lot being identified as Lot 4 in DP 598847.

The proposal is for additions and alterations to an existing substation. The proposal is compliant with *Planning for Bushfire Protection 2019,* as well as Section 12 of *NS187* and only very minor vegetation management shall be required so that the overall development is compliant.

1.0 INTRODUCTION

Tattersall Lander Pty Ltd has been commissioned to undertake a Bush Fire Risk Assessment for a proposed development at 1309 Wine Country Drive Rothbury in the Cessnock Local Government Area (LGA). The property is identified as Lot 4 in DP 598847.

This Bush Fire Risk Assessment is based upon the guidelines as defined in the document, *Planning for Bush Fire Protection* Guidelines *2019*, which has been written by the *NSW Rural Fire Service*. This assessment outlines the risk posed from bush fire, and hence identifies the constraints with regard to bush fire, thereby providing direction to the proposed development, and ultimately assessing the acceptability or otherwise of the development.

This report has been prepared by myself (Ben Folbigg); I have a Diploma in Planning for Bush Fire Protection and am BPAD accredited (Level 2) with the FPA Australia.

Figure 1 – Site Location

2.0 METHODOLOGY

This assessment is conducted entirely in accordance with the guidelines, as outlined in *Planning for Bush Fire Protection* (NSW Rural Fire Service) 2019 (PBP). A site investigation was undertaken by myself on Thursday the 22nd of August 2024.

This assessment:

- identifies the effective slope under vegetation;
- identifies all vegetation categories within 140 metres of the site;
- determines the bush fire attack category which applies to the site;

- identifies Asset Protection Zones/Setbacks;
- identifies the bush fire Construction level required in relation to the above for the proposed development (*AS 3959-2018*)

3.0 SITE DESCRIPTION

The subject site is an existing rural lot (RU2 – Rural Landscape) with an approximate area of approximately 11.7 hectares. There is an existing substation within the site and vegetation consists mostly of managed lawns with only several clumps/rows of trees; there is also a riparian zone at the far west of the site, however, this is significantly distant from the development such that it has not been examined for this assessment.

The topography of the site is almost flat with only the very gentlest of slopes toward the west and only on parts of the site.

Aerial photographs of the site and surrounds are included below (refer figures 2 and 3) and photographs of the site have been included; the approximate location and direction of these photographs has been included on the aerial photograph (Figure 3).

The site is located in the Cessnock Local Government Area (LGA) and hence is afforded a Fire Danger Index (FDI) rating of 100.

4.0 THE PROPOSAL

The proposal is for substation upgrade works, specifically the proposal will result in an extension of 23.5 metres to the southern side of the substation.

NS187 *Passive Fire Mitigation Design of Major Substations*, Section 12 (Bushfire) has been addressed within this report as well as *Planning for Bushfire Protection 2019.*

With regard to Section 12 of NS187, the following points are pertinent:

- *This Network Standard does not cover the requirements for protecting the bush against fire from equipment failure.* It is stated that, as a minimum, a 12.5kW/m^2 level should be adopted at the boundary – this is essentially a BAL-12.5 requirement.
- Table 1 (below), as provided by the standard, provides the maximum exposure allowable to various elements of the substation – these exposure limits may be translated to BAL for the purpose of determining the required APZs for these exposure limits to be met.
- Buildings are to comply with *AS3959.* Smoke resistant seals are to be fitted to all external doors to ensure embers do not enter under the door(s).

- The radiant heat limits identified in Table 1 apply to critical substation structures – critical elements are those which are deemed to be essential to allow for return to service following a bushfire event.
- APZ widths may be reduced where exposed elements are able to be *locally protected* or *rapidly replaced.*
- Regular and thorough maintenance is considered critical to prevent the build-up of combustibles.

Item	Maximum allowable radiant heat flux(kW/m^2)	Comment
Cable	12.5 20	PVC cables begin to distort and ignite. Ignition of XLPE cables between 85 and 550 seconds.
Steel structure support	35	To 60% of yield strength after a maximum duration of 5 minutes. Applies where elastic deflections due to elevated temperatures are not critical.
Porcelain bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Polymeric bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See note 2.
Aluminium busbar	20	Based on 250oC after a maximum duration of 5 minutes. Comparable to withstand temperature uner fault conditions.
Copper busbar	25	Busbars may undergo significant distortion and impose significant stresses on rigid insulators.
Transformer tank	>35 (see note 1)	Refer to above regarding bushings and cables.
Combustibles	12.5	Piloted ignition may occur on timber

Note 1 – Transformers always have some more vulnerable components such as bushings and cables etc.
Note 2 – Detailed information on radioant heat exposure is not avaiulable. However in-service applications exposed to bushfire indicate a high radiant heat limit and a low risk of damage or failure.

It is noted that Column 3 in Table 1 (above) really has no relvance with regard to this report but it is included simply for completeness with regard to the infiormation as obtained from the standard.

Figure 2: Site and surrounds (source: https://maps.six.nsw.gov.au/)

Figure 3: Site and surrounds (source: https://maps.six.nsw.gov.au/)

5.0 SITE ANALYSIS

5.1 Northern Aspect

The northern aspect presents approximately 46 metres within the subject site, from the northern most part of the substation to the northern boundary (at the closest point); this area contains mown lawns and a small patch of vegetation which is categorised as rainforest due to its minimal size (being approximately 5000 square metres) and its minimal fire run (being approximately 25 metres at

its widest point). This vegetation is located approximately 27 metres from the substation and the effective slope under this vegetation is in the upslope/flat category. Further to the north, beyond the northern boundary of the site, there is further well managed grasslands and this situation exists for more than 140 metres form the substation.

The proposed development will not result in any reduction in setback to the northern boundary or vegetation in this location.

5.2 Southern Aspect

The southern aspect presents approximately 47 metres within the subject site, as measured from the most southern part of the substation to the southern most boundary – this area consists of managed lawn and also a narrow and small clump of vegetation which is able to be categorised as rainforest due to its minimal size (being approximately 2700 square metres) and its minimal fire run (being approximately 14 metres at its widest point). This vegetation is located approximately 39 metres from the substation and the effective slope under this vegetation is in the upslope/flat category. Beyond this there is Old North Road with a width of approximately 20 metres and this is followed by more rural properties with well managed grasslands.

The proposed development will result in a reduction in the setback from the southern boundary and the relevant vegetation by 23.5 metres and hence the setback from the relevant vegetation shall be approximately 15.5 metres.

5.3 Eastern Aspect

The eastern aspect presents approximately 57 metres within the subject site, from the eastern most part of the substation to the eastern boundary (at the closest point); this area contains mown lawns and a small patch of vegetation which is categorised as rainforest due to its minimal size (being approximately 2700 square metres) and its minimal fire run (being approximately 20 metres at its widest point). This vegetation is located approximately 29 metres from the substation and the effective slope under this vegetation is in the upslope/flat category. Further to the east, beyond the eastern boundary of the site, there is Wine Country Drive with a width of approximately 30 metres and this is followed by vegetation which is categorised as forest; the effective slope under this forest vegetation is in the upslope/flat category.

The proposed development will not result in any reduction in setback to the eastern boundary or vegetation in this location.

5.4 Western Aspect

The western aspect presents over 140 metres within the subject site from the western most part of the substation; this area contains mown lawns and a small patch of vegetation which is categorised as rainforest due to its minimal size (being approximately 1300 square metres) and its minimal fire run (being approximately 15 metres at its widest point). This vegetation is located approximately 20 metres from the existing substation and the effective slope under this vegetation is in the upslope/flat category. Further to the west there is managed grassland.

The proposed development will not result in any reduction in setback to the western boundary or vegetation in this location – it is noted that the setback from the rainforest vegetation to the west for the proposed additions to the subdivision is approximately 32 metres.

6.0 SITE ANALYSIS

Table 2 – Asset Protection Zones and Construction Level Requirements as per *Planning for Bushfire Protection 2019* and *AS3959-2018*

Aspect	Vegetation Classification	Slope (degrees) Under Vegetation	Existing APZ (metres) as measured from Existing Substation)	Existing APZ (as measured from the Substation post works)	Required APZ (metres) for BAL-12.5	BAL Rating as per Current Proposal	Shortfall (metres) to Obtain BAL-12.5
North	Rainforest	Upslope/flat	27	27	23	BAL-12.5	N/A
South	Rainforest	Upslope/flat	39	15.5	23	BAL-29	7.5
East	Rainforest	Upslope/flat	29	29	23	BAL-12.5	N/A
	Forest	Upslope/flat	81*	81*	45	BAL-29	16**
West	Rainforest	Upslope/flat	20	20	23	BAL-19	3
				32***	23	BAL-12.5	N/A

* This is disregarding the Rainforest vegetation between the forest and the substation

** This is calculated using all vegetation present to this aspect

*** This is for the new part of the substation

7.0 Services

7.1 Water

The site is connected to the reticulated town water supply and there are hydrants within the facility so that compliance with regard to water supply is achieved.

7.2 Electrical

As the development is an existing substation, electrical supply is existing. Transmission lines are overhead and vegetation is maintained so that these transmission lines are not a bush fire ignition source. Compliance is achieved in this regard.

7.3 Gas

Not applicable.

8.0 ACCESS

8.1 Road Capacity

The site is accessed via both Wine Country Drive and also Old North Road; both of these roads are two way bitumen sealed roads capable of carrying fully laden fire fighting vehicles, including tankers.

8.2 Road Linkages to Fire Trails

There are no fire trails within the site and none are required.

8.3 Emergency Access/Egress

In the event of a bush fire emergency, access and egress will be via the existing access roads off Wine Country Drive and/or Old North Road and both of these accesses are considered acceptable and compliant with *PBP 2019.*

9.0 *DISCUSSION and RECOMMENDATIONS*

The existing substation is already located so that it is theoretically too close to nearby vegetation (to the east and west, by 16 metres and 3 metres respectively) to achieve a BAL-12.5 rating – the rating for the east being BAL-29 and the rating for the west being BAL-19. Having stated this, the measurements in Table 1 (above) are to the substation fence and the actual setback to critical components for the existing substation is approximately 43 metres for the eastern aspect and 30 metres for the western aspect, meaning that the western aspect actually complies with the setback/APZ to achieve a BAL-12.5 rating and the eastern setback/APZ is short by only 2 metres and achieves a BAL-19 rating.

The proposed new part of the substation will be approximately 18 metres further away from the vegetation to the east and as such this will achieve a BAL-12.5 rating for the eastern aspect; it shall also achieve a BAL-12.5 rating for the northern and western aspects.

Whilst Table 1 shows a 7.5 metre shortfall in the required APZ to the south from the proposal, this is as measured from the substation fencing and there is actually a further 10 metre setback from the fencing to the critical components for the substation, therefore, the substation will achieve a BAL-12.5 rating for the southern aspect.

In summary, the development, both existing and proposed, is compliant with a BAL-12.5 rating except for the eastern aspect which has a shortfall of approximately 2 metres for the existing development only, but no shortfall for the proposed components. It is recommended that vegetation to the east be cleared for an additional 2 metres, or that as required to obtain an effective APZ of 45 metres from the critical components of the substation to the nearest vegetation of significance.

The creation and maintenance of the 45 metre APZ to the east and the maintenance of a 23 metre APZ to all other aspects shall ensure an outcome which results in full compliance with *NS187 Passive Fire Mitigation Design of Major Substations*, Section 12, *Bushfire*. Specifically, these APZs will ensure that no critical components of the development are exposed to a heat flux exceeding 12kW/m^2 in the event of a bush fire.

It is also noted that the development is compliant with the requirements of *PBP 2019* by meeting the aim and objectives of this document as below:

The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment. The aim is met by meeting the objectives.

The objectives of *PBP* are:

(i) afford occupants of any building adequate protection from exposure to a bush fire;

Comment – The proposal does not include a building and therefore this objective is considered not applicable.

(ii) provide for a defendable space to be located around buildings;

Comment – The determined APZ shall provide an appropriate defendable space around the development, thereby meeting this objective.

(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;

Comment – Whilst no buildings are proposed, the APZ shall provide appropriate separation between the hazard and the development, thereby meeting this objective.

(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;

Comment – The existing internal access roads are considered acceptable and shall ensure that this objective is met.

(v) provide for ongoing management and maintenance of BPMs;

Comment – The management of the substation and surrounding lands shall be undertaken appropriately so as to ensure that the APZ and all BPMs are maintained appropriately and this objective will be met.

(vi) ensure that utility services are adequate to meet the needs of firefighters.

Comment – The development shall include appropriate fire fighting infrastructure as is required for a development of this nature and such that this objective shall be met.

It is clear that the proposed additions and alterations, including the individual elements within, shall be adequately protected by the appropriate APZs and that compliance with *NS187, Section 12,* as well as *PBP 2019* is achieved.

10.0 CONCLUSION

This assessment was undertaken for a proposed development at 1309 Wine Country Drive Rothbury in the Cessnock LGA, with the property being identified as Lot 4 in DP 598847.

Subject to the proposal complying with the recommendations of this report, it is considered acceptable and compliant with *NS187 Passive Fire Mitigation Design of Major Substations, Section 12* and also with *Planning for Bushfire Protection* 2019.

11.0 DISCLAIMER

All effort has been made to ensure the accuracy of this report, however, it is noted that bush fires can be unpredictable and this report in no way implies that any part of the proposed development is totally safe from fire.

Additionally it is noted that despite the site details at the time of writing this report, the situation may change; factors resulting in change to bush fire hazard include (but are not limited to) vegetation regrowth and improper maintenance of asset protection Zones.

No responsibility is accepted or implied for damage to, or loss of, life and/or property at any time resulting from bush fire or bush fire related issues (or any other factors) on this site.

Appendix A:

Photographs

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 14

Photograph 15

Appendix B:

Plans