

**AUSTRALIAN STANDARD 3959:2018**  
**CONSTRUCTION OF BUILDINGS IN BUSHFIRE-PRONE**  
**AREAS**

**BUSHFIRE ATTACK LEVEL REPORT** v2

Lot 1001 SP315955

Village Green Bvd

PALMVIEW, QLD



For  
PEET  
October 2021


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## DOCUMENT CONTROL

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**Document:** Bushfire Attack Level Report  
**Client:** PEET  
**Project Number:** J000914  
**Site:** Lot 1001 on SP315955– Village Green Bvd, Palmview

**File Ref:** C:\CLIENTS\PEET – PALMVIEW AREA C\Stage 7 BAL Contour  
Map\04\_REPORTING\BUSHFIRE ATTACK LEVEL REPORT v1 – PEET –  
PALMVIEW AREA C – STAGE 7.docx

Version	Date	Distribution	Author/s	Approved
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## **1.0 INTRODUCTION**

North Coast Environmental Services have been engaged to provide a Bushfire Attack Level Report in accordance with Australian Standard 3959 (2018) *Construction of buildings in bushfire-prone areas*. The Bushfire Attack Level (BAL) assessment was requested to assess the National Construction Code (NCC) construction requirements for future Class 1 building works within Stage 7 of the Palmview Area C residential development by PEET, located on Lot 1001 on SP315955, Village Green Boulevard, Palmview (herein referred as ‘the site’).

## **2.0 LEGISLATIVE TRIGGER**

NCC 2019 Amendment 1 July 2020, *Performance Requirement P2.7.5 Buildings in bushfire prone areas* states:

*A Class 1 building or a Class 10a building or deck associated with a Class 1 building that is constructed in a designated bushfire prone area must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the —*

*(a) potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and*

*(b) intensity of the bushfire attack on the building.*

Under NCC 2019 Amendment 1 July 2020, Section 3.10.5.0 *Application* states:

*(a) Subject to (b), Performance Requirement P2.7.5 is satisfied for:*

- A Class 1 building; or*
- A Class 10a building or deck associated with a Class 1 building*

*located in a designated bushfire prone area if it is constructed in accordance with —*

- AS3959; or*
- NASH Standard – Steel Framed Construction in Bushfire Areas.*

*(b) The requirements of (a) do not apply when, in accordance with AS 3959, the classified vegetation is Group F rainforest (excluding wet sclerophyll forest types), mangrove communities and grasslands under 300 mm high.*

In accordance with the definition in the NCC, a *designated bushfire prone area* in QLD means:

- land which has been designated under a power of legislation as being subject, or likely to be subject, to bushfires.*

### **2.1 State Planning Policy Assessment Benchmark Mapping**

The Bushfire Intensity Overlay Map on the *State Planning Policy (SPP)* Interactive Mapping System identifies that the eastern portion of Stage 7 is affected by a Potential Impact Buffer (refer to Plate 1). Several build site(s) are therefore located in a *designated bushfire prone* hence the relevant Class 1 dwellings must be constructed to satisfy AS 3959.

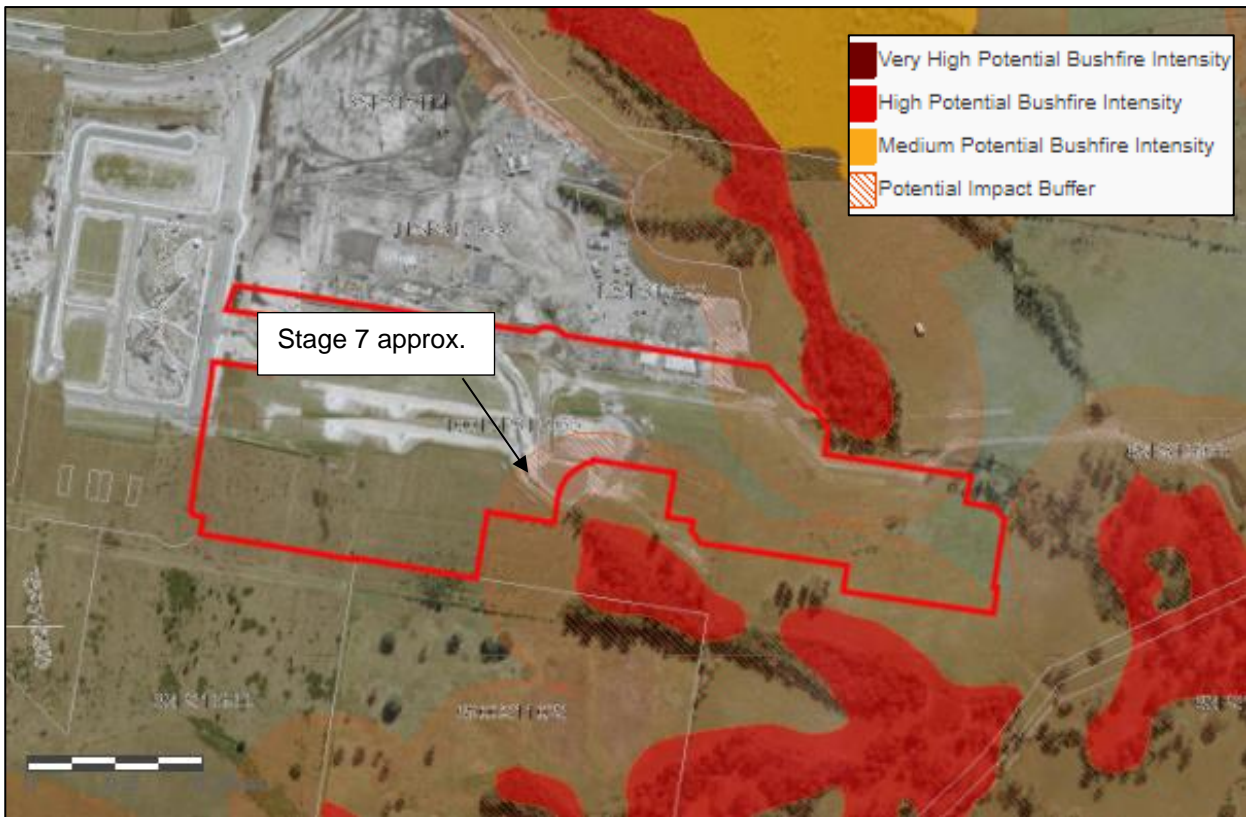


Plate 1 – Bushfire Intensity overlay (State Planning Policy Interactive Mapping System)

### 3.0 THE BUILDING APPLICATION

Future Class 1 building works are expected to be undertaken on the approved development site as per the plan of development (refer Appendix 1).

### 4.0 AS 3959:2018 BAL ASSESSMENT

AS 3959:2018 provides minimum construction requirements for assessable building works in Designated Bushfire Prone Areas. Dwellings (and renovated parts of existing dwellings) in Designated Bushfire Prone Areas must be built to the BAL construction standard relevant to the dwelling as identified by AS 3959:2018. The different BAL's prescribed by AS 3959 are pictorially represented in Plate 2.

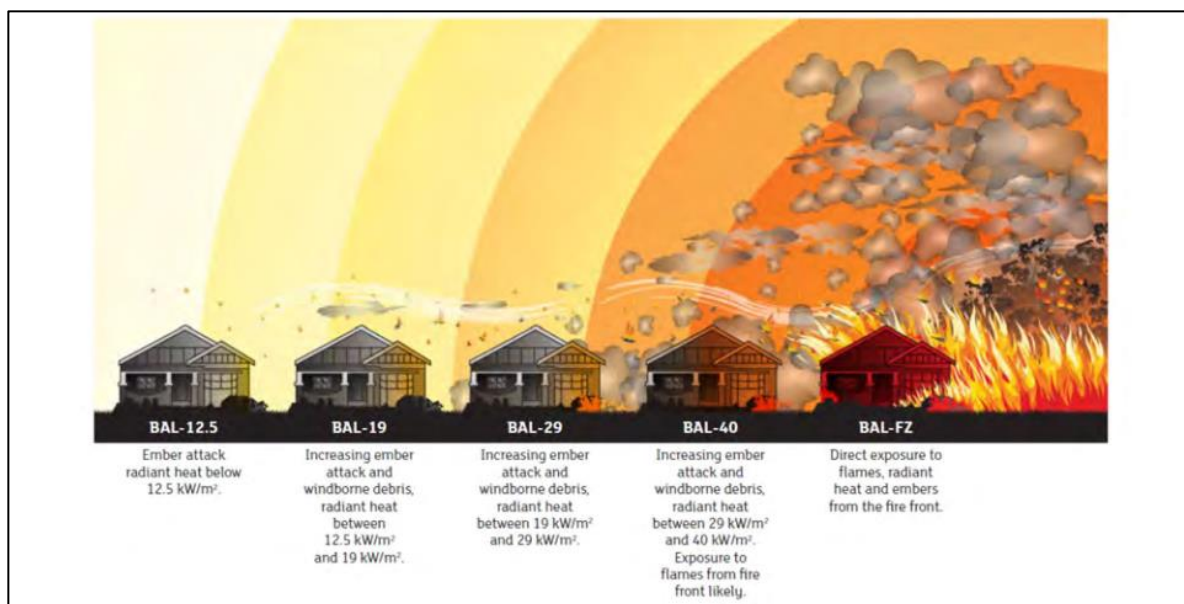


Plate 2 – BAL's and Bushfire Attack Mechanisms (Source: Victorian Country Fire Authority 2012)

## 4.1 Methodology

The BAL identified herein has been determined by using the normative procedure described in Appendix B (Method 2) of AS 3959:2018. Table 2 describes the general steps used under AS 3959:2018 to determine the BAL.

**Table 2 – Methodology**

Step	Clause	Procedure
1	2.2.2	Determine the relevant fire danger index.
2	2.2.3	Determine the classified vegetation type(s)
3	2.2.4	Determine the distance of the site from the classified vegetation type(s)
4	2.2.5	Determine the effective slope(s) under the classified vegetation type(s)
5	2.2.6	Determine the BAL from the appropriate table (Flamesol model used).
6	2.2.7	Determine the appropriate construction requirements.

## 4.2 Site Description

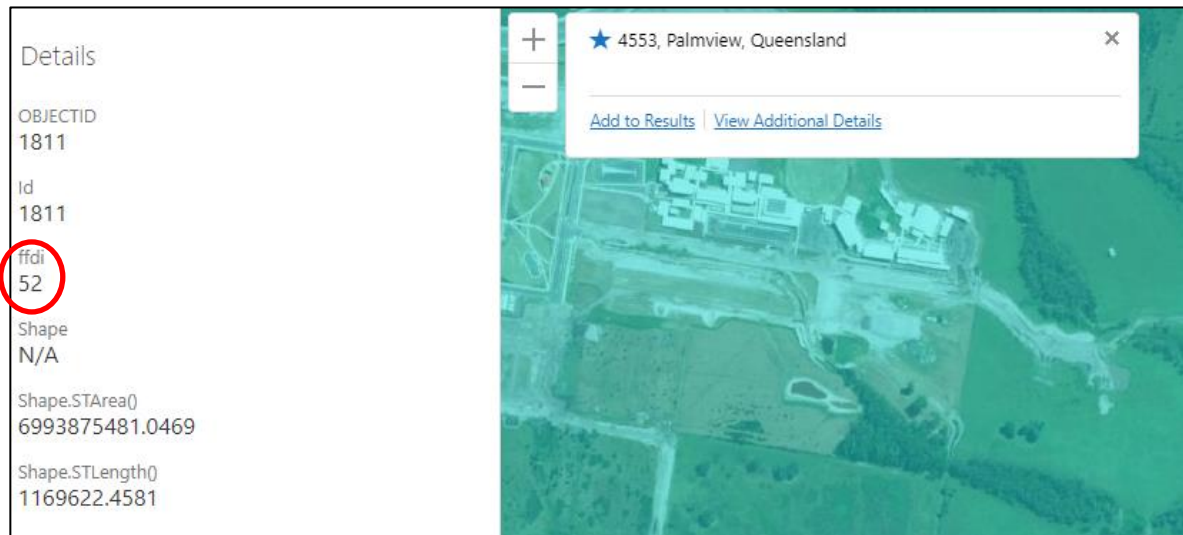
Lot & Plan: 1001SP315955

Street Address: Village Green Bvd PALMVIEW QLD 4553

Site Area: 18.9ha

Dominant site slope: 1° southeast

QFES Forest Fire Danger Index (FFDI): 52 (refer to Plate 3)



**Plate 3 – Redi Map North (QFES FFDI 2019)**

### 4.3 Existing Vegetation Types and slope

The only current assessable vegetation within 100m of the site comprises a small stand of VHC 8.1 Wet eucalypt forest located approximately 50m to the south-east of the Stage 7A south-east boundary corner. A narrow strip of regrowth paperbark open forest; VHC 22.1, flanks a drainage line which extends beyond the main stand of VHC 8.1 to within approximately 20m of the south-east corner of Stage 7a (refer Plate 4). Non-assessable VHC 40.4 Continuous low grass cover (i.e., grazing land) currently borders the majority of the Stage 7 boundaries.

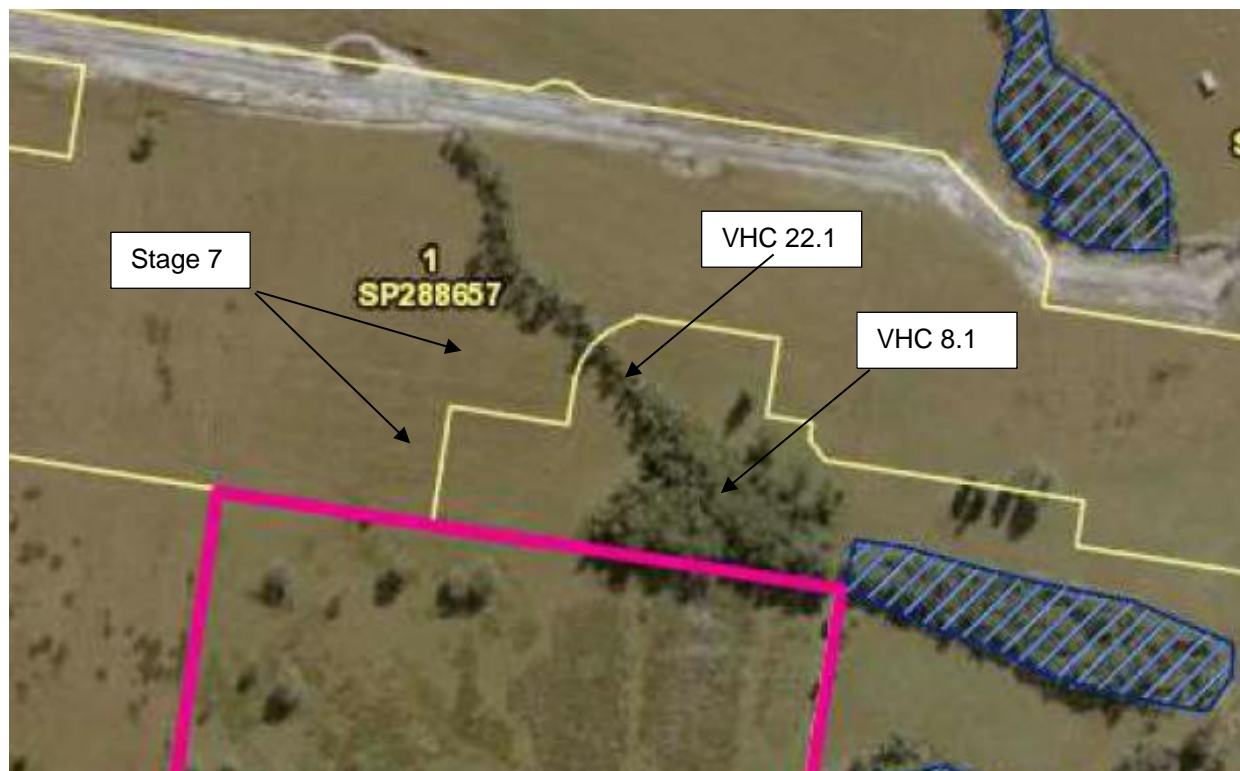


Plate 4 – Type A Forest to south-east of Stage 7 (Source – Approved Concept Rehabilitation Strategy by Saunders Havill Group)

Typical canopy species in the VHC 8.1 include *Eucalyptus pilularis* (blackbutt), *Syncarpia glomulifera* (turpentine), *E. racemosa* (scribbly gum) and *E. tindaliae* (Tindale's stringybark). *Corymbia intermedia* (pink bloodwood) and *C. gummifera* (red bloodwood) are present as sub-dominant canopy species. The average canopy height within VHC 8.1 is 30m. The midstorey is sparse to mid-dense and dominated by *Acacia* species, *Baeckea frutescens* (weeping Baeckea) and juvenile canopy trees. The understorey is dominated by a dense association of native shrub species including *Acacia complanata* (flat-stemmed wattle), *Banksia spinulosa* (golden candles), *Leptospermum spp.* and sedges such as *Caustis blakei* (fox tail sedge).

### 4.3 Post Development Vegetation Types

The approved Concept Rehabilitation Strategy by Saunders Havill Group will result in the extensive revegetation of the grazing land flanking the eastern perimeter of the Stage 7 boundary. In accordance with AS3959, revegetation works associated with a site must be considered when determining the BAL acting on a site.

According to the approved Concept Rehabilitation Strategy, the grazing land will be rehabilitated to be consistent with the pre-clearing regional ecosystem listed for the area, being RE 12.3.5 which is described as *Melaleuca quinquenervia* open forest on coastal alluvium. RE 12.3.5 accords with VHC 22.1 *Melaleuca quinquenervia* open forest on seasonally inundated lowlands and coastal swamps.

This future revegetation work will affect the extent of assessable vegetation impacting Stage 7 hence has been considered in determining the resultant BAL's acting on future building works in Stage 7. For the purposes of this assessment it has been assumed that the revegetation works will be completed to within no closer than 3m of the Stage 7 boundary as per the approved Rehabilitation Plan Layout P:Lan presented within the approved Local Ecological And Landscape

Protection And Rehabilitation Plans Area C - Design And Specification For A Work Contribution - Landscape Unit 7 (Area 1), prepared by Saunders Havill Group (Refer Appendix 2). It is therefore expected that the dominant VHC impacting Stage 7 will be VHC 22.1. The VHC 8.1 vegetation to the east of the VHC 22.1 revegetation works becomes of insignificance in the assessment process by virtue of its separation to the Stage 7 boundary and the impeding presence of the VHC 22.1.

It is noted that the above assumptions should be reviewed at the time of building certification to ensure as-constructed conditions in the adjacent bushland actually reflect those presented in the approved plans.

### 4.3 Slope

The identified assessable vegetation is positioned across slope from the site for assessment purposes (i.e., 1° slope). Plate 5 depicts topographic conditions within and adjacent to the site.

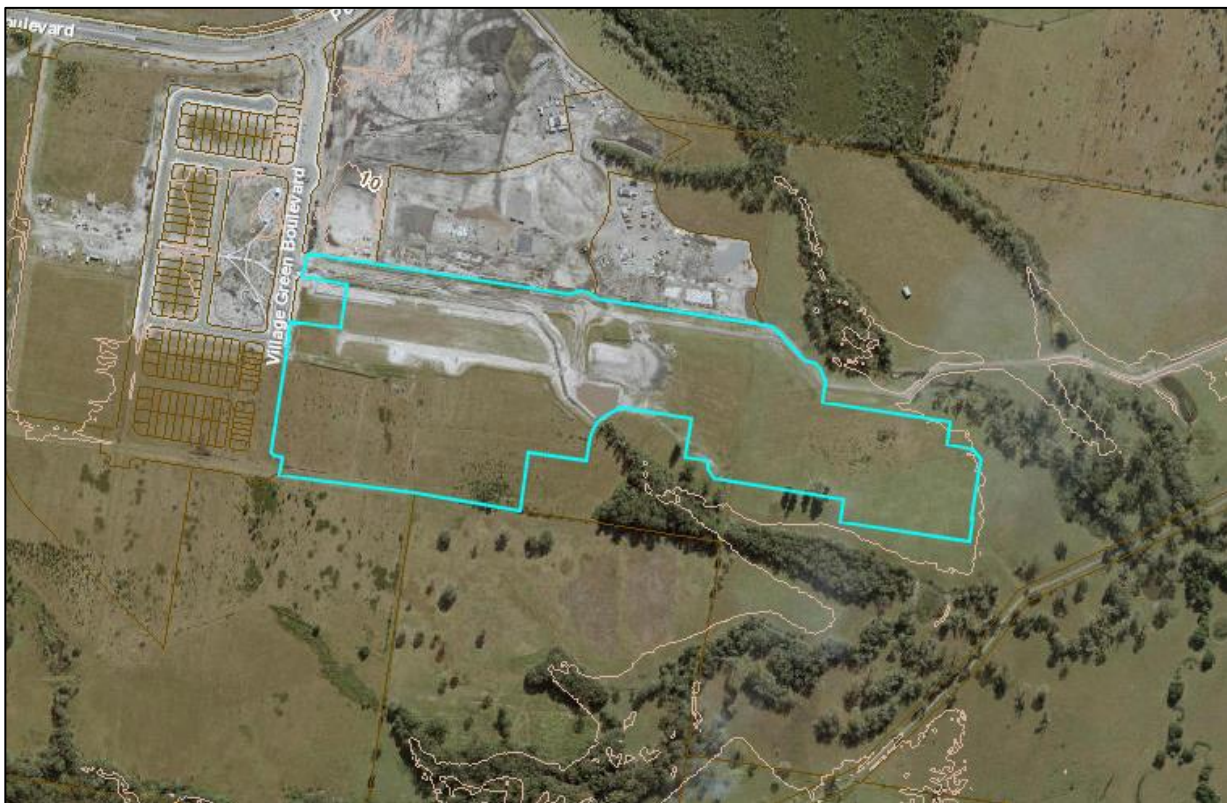


Plate 5 – Topography (Source: SCC MyMaps)

### 4.4 Flamesol Input Data

Quantitative modelling of the potential bushfire conditions that may be experienced within the Type A Forest VHC 22.1 vegetation approved to be reconstructed next to the Stage 7 eastern perimeter boundary has been undertaken to identify the BAL/s acting on each proposed allotment (refer Appendix 3). The distribution of the identified BAL dimensions has been spatially represented in Appendix 4 – BAL Contour Map. The FLAMESOL Minimum Distance calculator has been used to ascertain the BAL dimensions and comprises an AS 3959:2018 Method 2 (Appendix B) based calculator.

The following input data was used to determine the BAL acting on the building works based on the conditions observed during the site inspection in August 2021 (refer to Table 3).

Table 3 – Input Data

Input Parameter	Input Data
Fire Danger Index (QFES 2019)	52
AS 3959 Vegetation Type	Type A – Forest



Input Parameter	Input Data
QFES Vegetation Hazard Classes and Fuel Loads	22.1 <i>Melaleuca quinquenervia</i> open forest on seasonally inundated lowlands and coastal swamps. (23.4 t/ha combined surface and 28 t/ha total fuels)
Effective slope(s) under the classified vegetation type	North – N/A South – N/A East – 1 degree across slope West – N/A
Flame Width	North – N/A South – N/A East – 100m West – N/A

## **5.0 AS 3959:2018 BAL ASSESSMENT RESULTS**

The BAL contours emitted from the future adjacent forest, as determined from the results of the AS3959 Method 2 Flamesol modelling presented herein (Refer Appendix 3 Flamesol outputs), have been populated on the BAL Contour Map presented in Appendix 4. The plan of development has been overlaid onto the BAL Contour Map to identify the extent of different BAL intrusions into the respective allotments. The population of the BAL's relies on several inherent assumptions related to post development conditions in the bushland reserve to the east of the site. Any deviation in the composition and extent of revegetation works approved to be undertaken in the adjacent bushland as detailed in the approved LELPRP by Saunders Havill Group may influence the BAL's identified herein. The prescribed BAL's should therefore be reviewed upon completion of the rehabilitation works or least the point of on-maintenance for the works.

In accordance with AS3959 2018, the most severe BAL acting on a building is applied to the whole dwelling with all new building works to be constructed to that BAL, precluding any parts of the building which are shielded from the direction of attack (refer Plate 6). Elevations shielded from the direction of attack can be built to the next lowest BAL but no lower than BAL 12.5.

Building designers and prospective purchasers can use the BAL Contour Map to understand the BAL likely to be triggered by proposed works on any one lot.

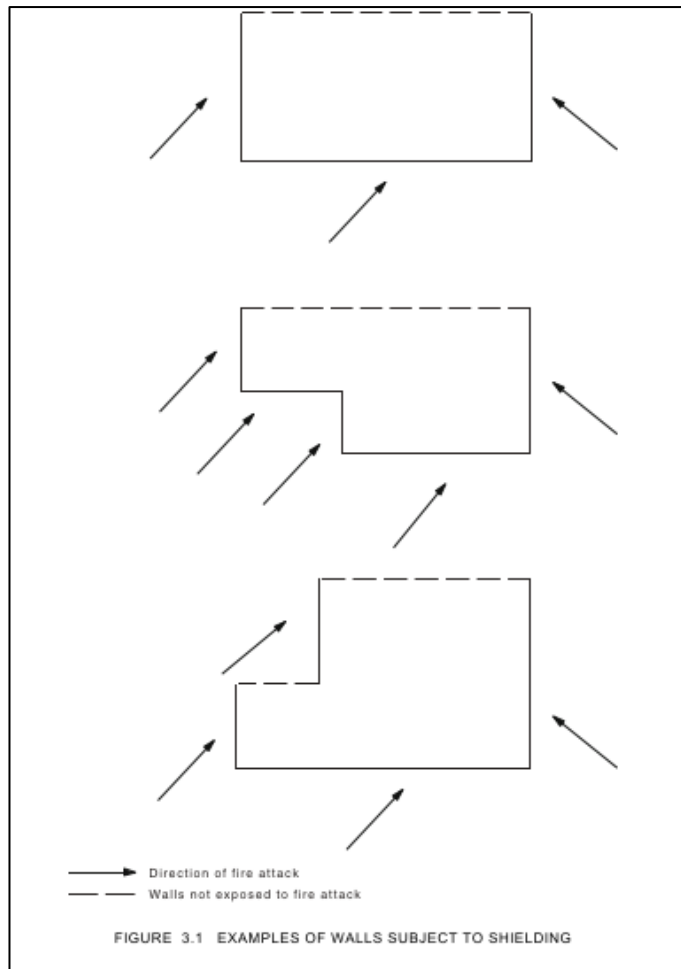


Plate 6 – Shielding (Source AS3959 2018)

## 6.0 VEGETATION MANAGEMENT

Vegetation conditions within the setbacks attributable to each BAL must comprise *low threat vegetation* as per the definition prescribed in the Standard in order for the BAL construction standards to be effective as intended. Clause 2.2.3.2 (f) of the Standard defines Low threat vegetation as:

- (f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

### NOTES:

- 1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).
- 2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

## **7.0 CONCLUSION**

A Bushfire Attack Level (BAL) assessment has been prepared to assess the National Construction Code construction requirements for future building works within proposed Stage 7 of Palmview Area C, located at Village Green Bvd, Palmview (herein referred as 'the site').

The assessed BAL's applicable to each Lot within the development are depicted on the BAL Contour Map presented as Appendix 4. The most severe BAL which intercepts a building footprint is applied to the entire dwelling precluding any components deemed to be shielded from the direction of attack.

**All queries regarding building materials should be discussed with the architect and/or building designer and confirmed to be compliant with the requirements of the AS 3959:2018 by a registered building certifier.**

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## **8.0 REFERENCES**

Standards Australia Committee FP-020, 2018. AS 3959:2018 Construction of buildings in bushfire-prone areas. Standards Australia, Sydney NSW.

Leonard, J., Newnham, G., Opie, K., and Bianchi, R. (2014). A new methodology for state-wide mapping of bushfire prone areas in Queensland. CSIRO, Australia.

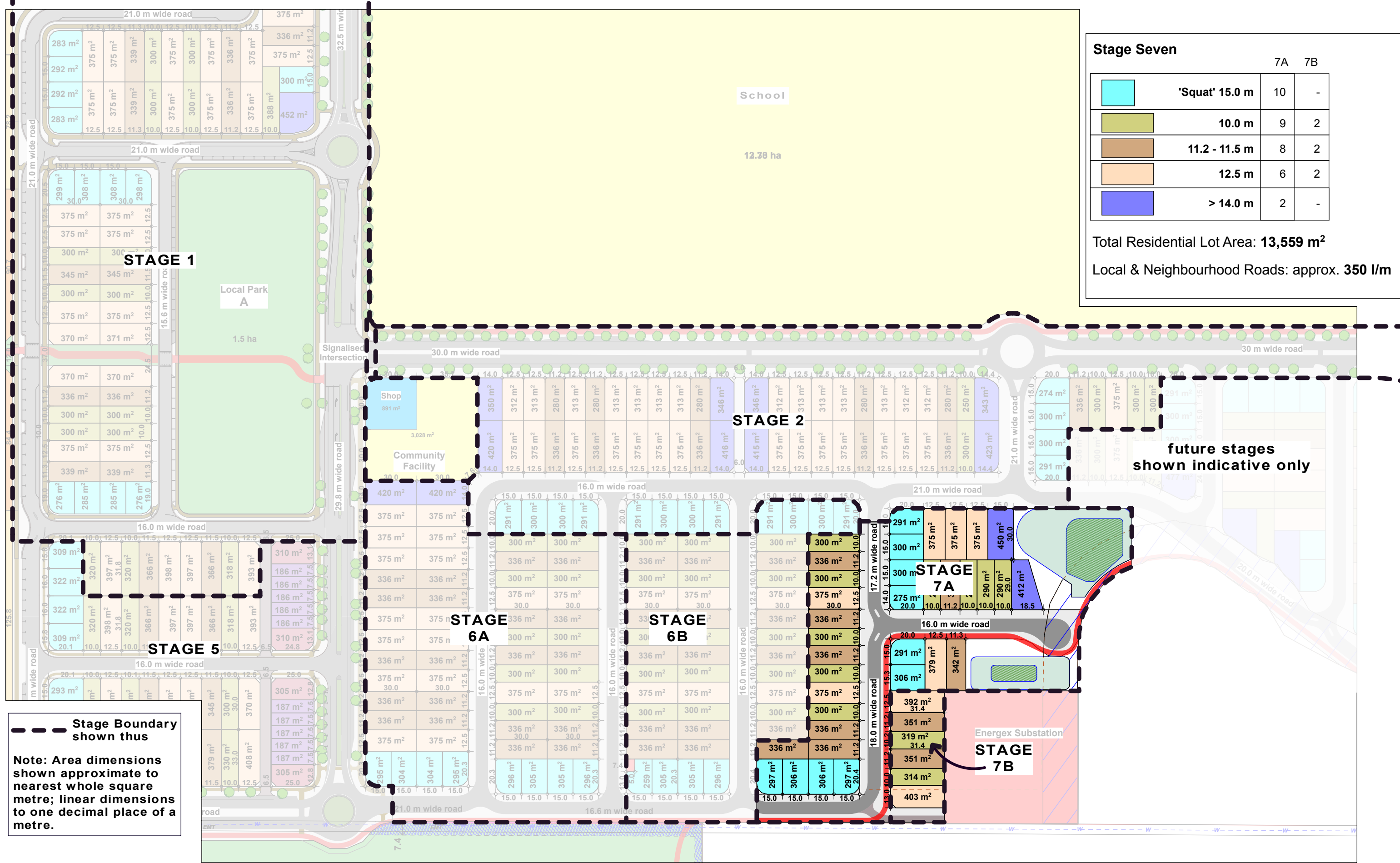
Leonard, J., Opie, K. (2017). Estimating the Potential Bushfire Hazard of Vegetation Patches and Corridors. CSIRO, Australia.

Queensland Fire and Emergency Services. (2019). *Bushfire Resilient Communities - Technical Reference Guide for the State Planning Policy - State Interest Guideline - Natural Hazards, Risk and Resilience 2- Bushfire.*

Southeast Queensland Fire and Biodiversity Consortium – *Operational Manual.*

The State of Queensland, Department of State Development, Manufacturing, Infrastructure and Planning (2019). Natural hazards, risk and resilience - Bushfire State Planning Policy – state interest guidance material.

## **APPENDIX 1 – PLAN OF DEVELOPMENT**

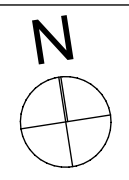


Stage Seven		7A	7B
	'Squat' 15.0 m	10	-
	10.0 m	9	2
	11.2 - 11.5 m	8	2
	12.5 m	6	2
	> 14.0 m	2	-

Total Residential Lot Area: **13,559 m<sup>2</sup>**  
 Local & Neighbourhood Roads: approx. **350 l/m**

**--- Stage Boundary shown thus**

**Note: Area dimensions shown approximate to nearest whole square metre; linear dimensions to one decimal place of a metre.**



## **APPENDIX 2 – LELPRP REHABILITATION PLAN**

# PALMVIEW ESTATE, PALMVIEW REHABILITATION PLAN - AREA I

SUNSHINE COAST REGIONAL COUNCIL

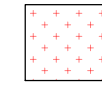
**APPROVED**

RN20/0117

13 Nov 2020



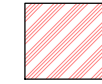
## MANAGEMENT ZONE



**Management Zone 1 - Existing Vegetation (Assisted Natural Regeneration)**

Existing native trees, shrubs and groundcovers to be protected and retained. Weed management to entire zone to encourage natural regeneration by reducing competition. Appropriate (sensitive) weed management methodology within this zone to minimize any native vegetation damage / losses.

Refer to Rehabilitation Notes for additional details, plant species and densities.

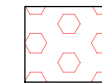


**Management Zone 2 - General Rehabilitation (Reconstruction)**

Weed management to entire zone to encourage natural regeneration by reducing competition. Any existing/ occurring regrowth of native trees, shrubs and groundcovers to be protected and retained.

All bare / denuded areas to be appropriately cultivated, topsoiled and blanket mulched (100mm depth) or jutenetting (1:3 batters and locations prone to erosion) as required. All jutenetting to be installed to manufacturer's recommendations. Reconstruction of natural environment to be undertaken via tubestock installation including a diversity of tree, shrub and groundcover species to match regional ecosystem mapping for site.

Refer to Rehabilitation Notes for additional details, plant species and densities.



**Management Zone 3 - Rectified Waterway (Reconstruction)**

Jutenetting to swale batters (both 1:4 and 1:3) and areas of direct overland flow. Areas to be appropriately cultivated, topsoiled and planted at high densities as required. All jutenetting to be installed to manufacturer's recommendations. Reconstruction of natural environment to be undertaken via tubestock installation including a diversity of groundcover species to match regional ecosystem mapping for site.

Refer to Rehabilitation Notes for additional details, plant species and densities.



**Rehabilitation Photo-Monitoring Location:**  
Confirm final locations on site and mark on site (with coloured star picket) prior to on maintenance.

## NON-URBAN OPEN SPACE INFRASTRUCTURE



**Environmental Protection Area**



**Environmental Enhancement Area - Type A**



**Environmental Transition Area**

Issue	Date	Description	Checked
A	21/10/2019	CLIENT ISSUE	JG
B	24/10/2019	AMENDMENTS ISSUE	JG
C	06/12/2019	AMENDMENTS ISSUE	JG
D	18/12/2019	AMENDMENTS ISSUE	JG
E	01/05/2020	AMENDMENTS ISSUE	JG
F	27/08/2020	AMENDMENTS ISSUE	JG
G	22/09/2020	AMENDMENTS ISSUE	JG

CLIENT: PEET NO. 127 PTY LTD
PROJECT: PALMVIEW ESTATE LAXTON ROAD, PALMVIEW
SCALE: 1:1500@A1 1:3000@A3

landscape architecture	
DRAWING: REHABILITATION PLAN LAYOUT PLAN	
DATE: October 2019	CHECKED: JG
CLIENT REF.: 8206	DRAWN: FW
DRAWING No.: 8206 L RP 502 G	



## APPENDIX 3 – FLAMESOL OUTPUT



Calculated August 10, 2021, 4:11 pm (MDC v.4.9)

### Stage 7 VHC 22.1 East

Minimum Distance Calculator – AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	52	Rate of spread	1.56 km/h
Vegetation classification	Forest	Flame length	13.57 m
Understorey fuel load	23.4 t/ha	Flame angle	54 °, 64 °, 72 °, 76 °, 78 ° & 84 °
Total fuel load	28.4 t/ha	Elevation of receiver	5.29 m, 5.83 m, 6.07 m, 6.04 m, 5.99 m & 5.18 m
Vegetation height	n/a	Fire intensity	22,955 kW/m
Effective slope	1 °	Transmissivity	0.874, 0.856, 0.831, 0.806, 0.792 & 0.729
Site slope	1 °	Viewfactor	0.6001, 0.4436, 0.2997, 0.2039, 0.1655 & 0.045
Flame width	100 m	Minimum distance to < 40 kW/m <sup>2</sup>	11.1 m
Windspeed	n/a	Minimum distance to < 29 kW/m <sup>2</sup>	15 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m <sup>2</sup>	22 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m <sup>2</sup>	31.1 m

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

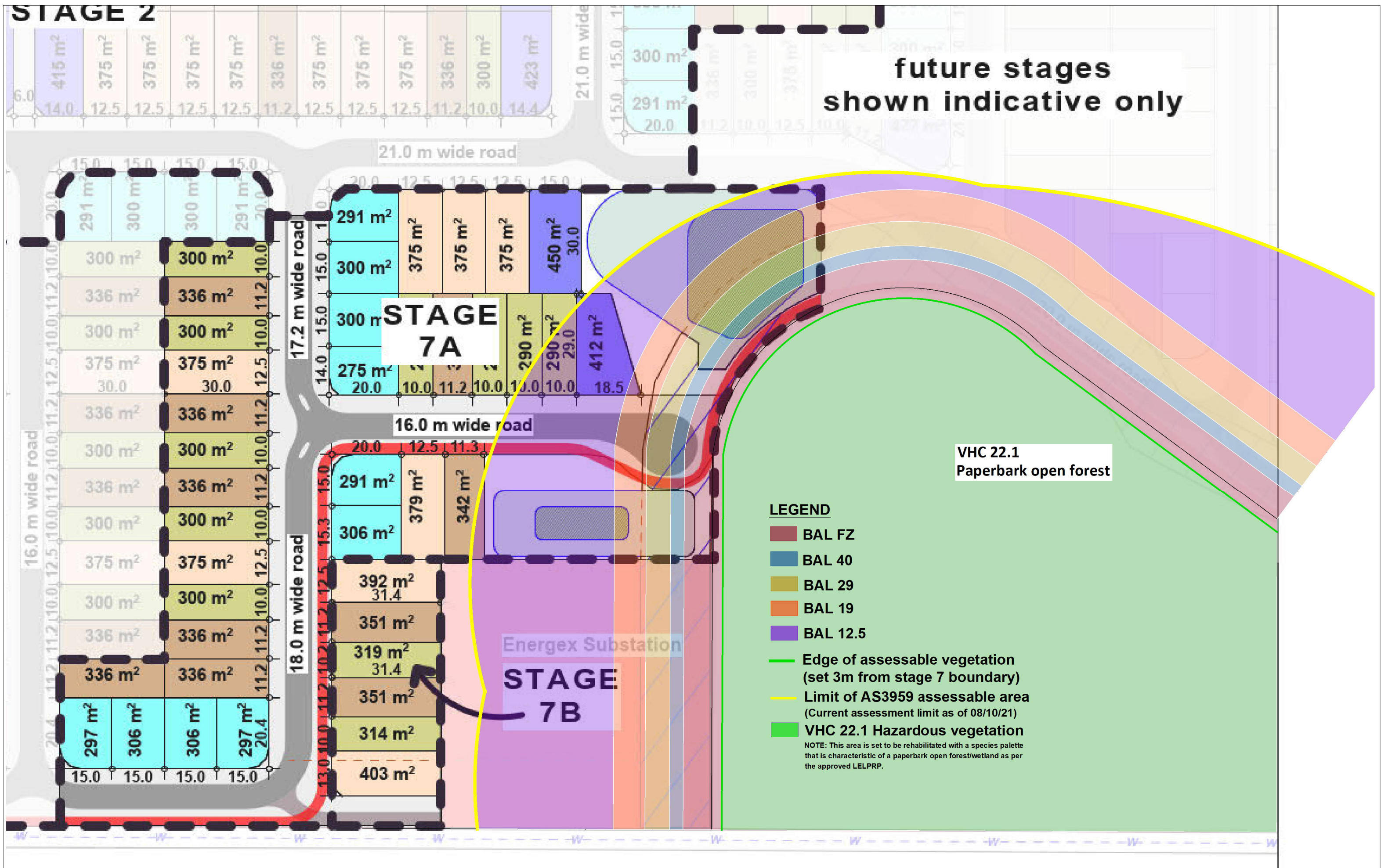
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

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**APPENDIX 4 – BAL CONTOUR MAP**

# STAGE 2

future stages shown indicative only



VHC 22.1  
Paperbark open forest

### LEGEND

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- Edge of assessable vegetation (set 3m from stage 7 boundary)
- Limit of AS3959 assessable area (Current assessment limit as of 08/10/21)
- VHC 22.1 Hazardous vegetation

NOTE: This area is set to be rehabilitated with a species palette that is characteristic of a paperbark open forest/wetland as per the approved LELPRP.

