Local Government Use

BUSHFIRE PRONE PLANNING

Bushfire Management Plan Addendum

Produced Applying AS 3959:2018 Bushfire Attack Level Determination Methodology

Lots 624 & 625 Marshall Rd, Bennett Springs

City of Swan

Report Date: **22 July 2022**

Job Reference No: **200104**

COMPANY AND BUSHFIRE CONSULTANT DETAILS

BPP GROUP PTY LTD

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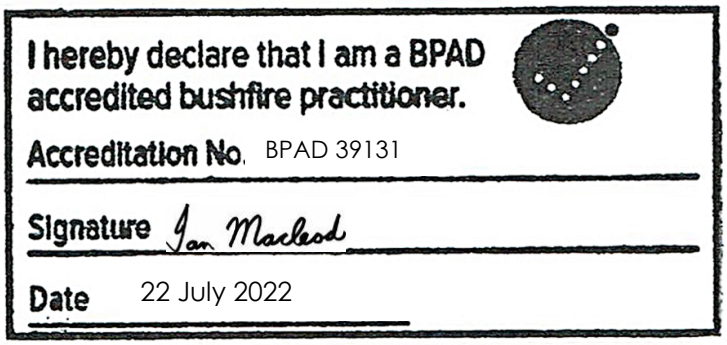

Authorised Practitioner Stamp

Author:	Ian Macleod (BPAD Level 2 No. 39131)
Reviewed:	Kathy Nastov (BPAD Level 3 No. 27794)

ASSESSMENT AND REPORT DETAILS

THIS REPORT HAS BEEN PREPARED BY AN ACCREDITED BPAD PRACTITIONER USING THE SIMPLIFIED BAL DETERMINATION PROCEDURE (METHOD 1) AS DETAILED IN SECTION 2 OF AS 3959:2018

Fire Protection Association Australia, as the accrediting body for BPAD accreditation, makes no warranties as to the accuracy of the information provided in the report. All enquiries related to the information and conclusions presented in this report must be made to the practitioner who prepared this report.

Version	Details	Site Assessment Date	Report Date
1.0	Original	18 July 2022	22 July 2022
-	-		

BAL (Master) Template v14.3

Period of Validity: *Reliance on the assessment and determination of the Bushfire Attack Level contained in this report should not extend beyond a period of 12 months from the date of issue of the report. If this report was issued more than 12 months ago, it is recommended that the validity of the determination be confirmed with the accredited practitioner and where required an updated report and/or BAL certificate issued.*

Limitations: *The protection measures that will be implemented based on information presented in this report are minimum requirements and they do not guarantee that buildings or infrastructure will not be damaged in a bushfire, persons injured, or fatalities occur either on the subject site or off the site while evacuating.*

This is substantially due to the unpredictable nature and behaviour of fire and fire weather conditions. Additionally, the correct implementation of the required protection measures (including bushfire resistant construction) and any other required or recommended measures, will depend upon, among other things, the ongoing actions of the landowners and/or operators over which Bushfire Prone Planning has no control.

All surveys, forecasts, projections and recommendations made in this report associated with the proposed development or use are made in good faith based on information available to Bushfire Prone Planning at the time. All maps included herein are indicative in nature and are not to be used for accurate calculations.

Notwithstanding anything contained therein, Bushfire Prone Planning will not, except as the law may require, be liable for any loss or other consequences whether or not due to the negligence of their consultants, their servants or agents, arising out of the services provided by their consultants.

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1 REPORT PURPOSE AND SUMMARY OUTCOME

This BMP Addendum for Lots 624 and 625 Marshall Road, Bennett Springs is to re-assess the BAL ratings for the proposed lots within the subdivision. The whole of the subject lots, with the exception of the landscaped area at the western extent of the development, has been cleared of bushfire prone vegetation. Additionally, vegetation to the south and east of the subject site has been removed during neighbouring development works.

All onsite areas of Public Open Space are currently assessed as being in a low bushfire threat state and are expected to be maintained in this condition in perpetuity, as per the requirements of the Bushfire Management Plan.

Areas assessed as having a BAL rating of BAL-40 encroachment into Lots 401 to 407. These are contained entirely within the WAPC required R-Code building setbacks, and will not affect the location of a future dwelling on the lots.

The remainder of the proposed residential lots are subject to BAL ratings of BAL-29 or lower.

Figure 1

Proposed Subdivision Lot Layout Plan

Lots 624 & 625 on Plan 3698
158 & 194 Marshall Road
BENNETT SPRINGS
CITY OF SWAN

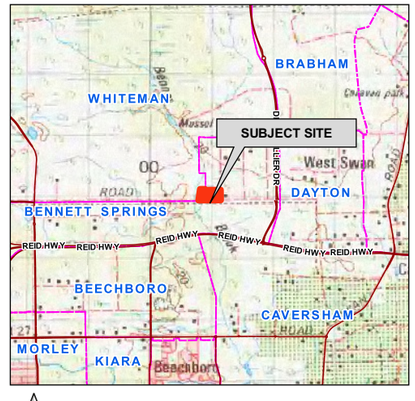
------ LEGEND ------

- Residential Lots
- Public Open Space
- Proposed Roads
- Road Widening
- Existing Road Reserve
- Subject Site
- Localities_Suburb
- Cadastre

0 20 40 60 80

Metres

------ LOCALITY ------



AERIAL IMAGERY: Landgate/SLIP

BUSHFIRE PRONE PLANNING

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Merctaor Units: Metre
Map by: Ian Macleod 19-07-2022
SCALE (A3): 1 : 1400

2 INFORMATION FOR LOCAL GOVERNMENT BUILDING SERVICES (& THE LANDOWNER)

BUSHFIRE ATTACK LEVELS (BAL) - UNDERSTANDING THE RESULTS

The transfer (flux/flow) of radiant heat from the bushfire to a receiving object is measured in kW/m^2. The AS 3959:2018 BAL determination methodology establishes the ranges of radiant heat flux that correspond to each bushfire attack level. These are identified as BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

The bushfire performance requirements for certain classes of buildings are established by the Building Code of Australia (Vol. 1 & 2 of the NCC). The BAL will establish the bushfire resistant construction requirements that are to apply in accordance with AS 3959:2018 - Construction *of buildings in bushfire prone areas* and the NASH Standard – *Steel framed construction in bushfire areas (NS 300 2021),* whose solutions are deemed to satisfy the NCC bushfire performance requirements.

DETERMINED BAL RATINGS

A BAL Certificate can be issued for a determined BAL. A BAL can only be classed as 'determined' for an existing or future building/structure when:

1. It's final design and position on the lot are known and the stated separation distance from classified bushfire prone vegetation exists and can justifiably be expected to remain in perpetuity; or

2. It will always remain subject to the same BAL regardless of its design or position on the lot after accounting for any regulatory or enforceable building setbacks from lot boundaries as relevant and necessary (e.g., R-codes, restrictive covenants, defined building envelopes) or the retention of any existing classified vegetation either onsite or offsite.

If the BMP derives determined BAL(s), the BAL Certificate(s) required for submission with building applications can be provided, using the BMP as the assessment evidence.

INDICATIVE BAL RATINGS

A BAL Certificate cannot be issued for an indicative BAL. A BAL will be classed as 'indicative' for an existing or future building/structure when the required conditions to derive a determined BAL are not met.

This class of BAL rating indicates what BAL(s) could be achieved and the conditions that need to be met are stated.

Converting the indicative BAL into a determined BAL is conditional upon the currently unconfirmed variable(s) being confirmed by a subsequent assessment and evidential documentation. These variables will include the future building(s) location(s) being established (or changed) and/or classified vegetation being modified or removed to establish the necessary vegetation separation distance. This may also be dependent on receiving approval from the relevant authority for that modification/removal.

BAL RATING APPLICATION – PLANNING APPROVAL VERSUS BUILDING APPROVAL

1. **Planning Approval**: SPP.3.7 establishes that where BAL- LOW to BAL-29 will apply to relevant future construction (or existing structures for proposed uses), the proposed development may be considered for approval (dependent on the other requirements of the relevant policy measures being met). That is, BAL40 or BAL-FZ are not acceptable on planning grounds (except for certain limited exceptions).

   Because planning is looking forward at what can be achieved, as well as looking at what may currently exist, both determined and indicative BAL ratings are acceptable assessment outcomes on which planning decisions can be made (including conditional approvals).

2. **Building Approval:** The Building Code of Australia (Vol. 1 & 2 of the NCC) establishes that relevant buildings in bushfire prone areas must be constructed to the bushfire resistant requirements corresponding to the BAL rating that is to apply to that building. Consequently, a determined BAL rating and the BAL Certificate is required for a building permit to be issued - an indicative BAL rating is not acceptable.

2.1 BAL Assessment Summary

2.1.1 The BAL Determination Method(s) Applied and the Location of Data and Results

Procedure Method (AS 3959:2018)	Applied to the BAL Assessment	Location of the Site Assessment Data			Location of the Results
		Classified Vegetation and Topography Map(s)	Calculation Input Variables		Assessed Bushfire Attack Levels
			Summary Data	Detailed Data with Explanatory and Supporting Information	
Method 1 (Simplified)	Yes	Figure 2	Table 2.1	Appendix A1	BAL Contour Map Table 2.3
Method 2 (Detailed)	No	N/A	N/A	N/A	N/A

Figure 2

Proposed Subdivision Classified Vegetation Map

Lots 624 & 625 on Plan 3698
158 & 194 Marshall Road
BENNETT SPRINGS
CITY OF SWAN

AREA 1 Class (A) Forest Effective Slope 0°
AREA 2 Class (B) Woodland Effective Slope 0°
AREA 3 Class (G) Grassland Effective Slope 0°
AREA 4 Class (Ex) Exempt Effective Slope 0°

Vegetation Area	Vegetation Class	Vegetation Type	Effective Slope
1	A	Forest	0
2	B	Woodland	0
3	G	Grassland	0
4	Ex	Exempt	0

------ LEGEND ------

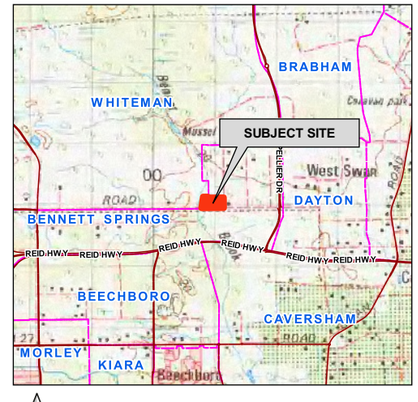
- Photos
- Proposed Lots
- Subject Site
- 150m Assessment Area
- Cadastre
- Vegetation Outline

Classified Vegetation

- Class A - Forest
- Class B - Woodland
- Class G - Grassland
- Exclusion 2.2.3.2

0 20 40 60 80 100 120
Metres

------ LOCALITY ------



AERIAL IMAGERY: Landgate/SLIP

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Merctaor Units: Metre
Map by: Ian Macleod 20-07-2022
SCALE (A3): 1 : 2200

BUSHFIRE PRONE PLANNING

CONSTRUCTION OF THE BAL CONTOUR MAP(S) – RELEVANT CLASSIFIED VEGETATION	
Identification of Classified Vegetation that is Relevant to the Production of the BAL Contour Map(s)	Relevant Map
All identified areas of classified vegetation that exist at the time of the site assessment – both within the subject site (onsite) and external to the subject site (offsite) will be the relevant vegetation.	Figure 2
All identified areas of classified vegetation that exist at the time of the site assessment – both within the subject site (onsite) and external to the subject site (offsite) will be the relevant vegetation for the BAL contour map.	Figure 3
Supporting Assessment Details: Not required.	

2.1.3 Summary Site Data Applied to Construction of the BAL Contour Map

Table 2.1: Summary of applied calculation input variables applied to determining the site specific separation distances corresponding to each bushfire attack level.

SUMMARY OF CALCULATION INPUT VARIABLES (INCLUDING SITE DATA) APPLIED TO THE DETERMINATION OF SEPARATION DISTANCES CORRESPONDING TO BUSHFIRE ATTACK LEVELS [1]												
Applied BAL Determination Method		METHOD 1 - SIMPLIFIED PROCEDURE (AS 3959:2018 CLAUSE 2.2)										
Calculation Variables Corresponding to BAL Determination Method												
Methods 1 and 2		Method 1	Method 2									
Vegetation Classification		FDI	Effective Slope		Site Slope	FFDI or GFDI	Flame Temp.	Elevation of Receiver	Flame Width	Fireline Intensity	Flame Length	Modified View Factor
			Applied Range	Measured								
Area	Class		degree range	degrees	degrees		K	metres	metres	kW/m	metres	% Reduction
1	(A) Forest	80	Upslope or flat 0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	(B) Woodland	80	Upslope or flat 0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	(G) Grassland	80	Upslope or flat 0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Excluded cl 2.2.3.2(e & f)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1] All data and information supporting the determination of the classifications and values stated in this table and any associated justification, is presented in Appendix A.

Where the values are stated as 'default' these are either the values stated in AS 3959:2018, Table B1 or the values calculated as intermediate or final outputs through application of the equations of the AS 3959:2018 BAL determination methodology. They are not values derived by the assessor.

Table 2.2: Vegetation separation distances corresponding to bushfire attack levels and illustrated as BAL contours in Figure 3.

THE CALCULATED VEGETATION SEPARATION DISTANCES CORRESPONDING TO THE STATED LEVEL OF RADIANT HEAT [1]							
Vegetation Classification		Separation Distances Corresponding to Stated Level of Radiant Heat (metres)					
		Bushfire Attack Level					
Area	Class	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL12.5	BAL-LOW
1	(A) Forest	<16	16-<21	21-<31	31-<42	42-<100	>100
2	(B) Woodland	<10	10-<14	14-<20	20-<29	29-<100	>100
3	(G) Grassland	<6	6-<8	8-<12	12-<17	17-<50	>50
4	Excluded cl 2.2.3.2(e & f)	N/A	N/A	N/A	N/A	N/A	N/A
[1] All calculation input variables are presented in Table 2.1.							

Figure 3

Proposed Subdivision BAL Contour Map

Lots 624 & 625 on Plan 3698
158 & 194 Marshall Road
BENNETT SPRINGS
CITY OF SWAN

AREA 1
AREA 2
AREA 3
AREA 4
DULWICH ST
MARSHALL RD
CHAMAELEON RD
LUMINOUS BVD
AQUARIUS LOOP
VELA LANE
Bennett Brook

401 424 425 402 423 403 422 404 421 405 420 406 419 407 418 408 409 410 411 412 413
426 427 447 448 449 428 446 429 445 430 444 431 443 432 442 433 441 434 440 435 439 436 438 437
475 474 473 472 471 476 477 478 479 480 481 482 483 484 485 495 494 493 492 491 490 489 488 487 486
470 469 450 451 452 468 467 453 454 465 466 457 456 455 464 463 458 459 460 461 462

------ LEGEND ------

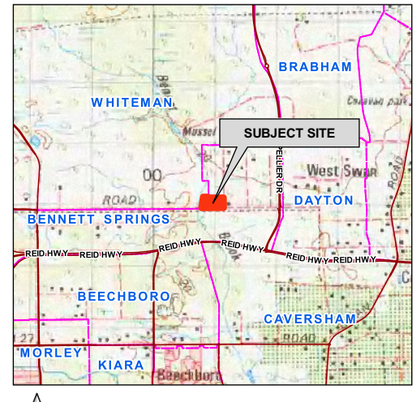
- Proposed Lots
- Subject Site
- 100m BAL Buffer
- Cadastre
- Vegetation Outline

Bushfire Attack Levels

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

0 20 40 60 80 100 120
Metres

------ LOCALITY ------



Vegetation Area	Vegetation Class	Vegetation Type	Effective Slope
1	A	Forest	0
2	B	Woodland	0
3	G	Grassland	0
4	Ex	Exempt	0

AERIAL IMAGERY: Landgate/SLIP

BUSHFIRE PRONE PLANNING

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Merctaor Units: Metre
Map by: Ian Macleod 20-07-2022
SCALE (A3): 1 : 2000

2.1.5 BAL Ratings Derived from the Contour Map

Table 2.3: Determined BAL(s) for the proposed lots.

BUSHFIRE ATTACK LEVEL FOR STATED LOT [1]	
Lot No.	**Determined BAL [2]**
Lots 401 to 407	**BAL-40 (See Table 2.4 below)**
Lot 408	**BAL-29**
Lot 409	**BAL-19**
Lots 410 to 413	**BAL-12.5**
Lots 418 to 422	**BAL-12.5**
Lots 423 to 427	**BAL-19**
Lot 428 and 429	**BAL-12.5**
Lots 430 to 434	**BAL-LOW**
Lots 435 and 436	**BAL-12.5**
Lots 437 to 445	**BAL-LOW**
Lot 446	**BAL-12.5**
Lots 447 to 449	**BAL-19**
Lots 450 to 461	**BAL-LOW**
Lot 462	**BAL-12.5**
Lot 463 to 472	**BAL-LOW**
Lot 473 and 474	**BAL-12.5**
Lots 475 to 485	**BAL-19**
Lots 486 to 495	**BAL-12.5**

[1] The assessment data used to derive the BAL ratings is sourced from Table 3.1 and Figure 3.2.

[2] Refer to the start of Section 3 for an explanation of indicative versus determined BAL ratings.

Table 2.4: Building setback distances required to achieve target BAL.

TARGET BUSHFIRE ATTACK LEVELS FOR FUTURE BUILDINGS AND CORRESPONDING BUILDING SETBACK REQUIRED [1]							
Lot No./ID	Relevant Vegetation Area/s [2]	Relevant Lot Boundary [3]	Highest BAL Contour Impacting the Lot	Target BAL	BAL-40 Encroachment and Required Minimum Building Setback		
					BAL-40 Encroachment	Required R-Code Setback	Additional Building Setback Required to Achieve BAL-29
					metres	metres	metres
401	Area 1	Western	BAL-40	BAL-29	0.8	1.5	0
402	Area 1	Western	BAL-40	BAL-29	0.4	1.5	0
403	Area 1	Western	BAL-40	BAL-29	0.6	1.5	0
404	Area 1	Western	BAL-40	BAL-29	0.6	1.5	0
405	Area 1	Western	BAL-40	BAL-29	0.5	1.5	0
406	Area 1	Western	BAL-40	BAL-29	0.6	1.5	0
407	Area 1	Western	BAL-40	BAL-29	0.9	1.5	0

[1] The assessment data used to derive the information is sourced from Table 3.1 and Figure 3.

[2] The vegetation area(s) that generate the highest BAL impacting the lot.

[3] This is the boundary adjacent to the relevant vegetation area for which the required building setback distance from the boundary) is being stated.

The BAL-40 encroachment for Lots 401 to 407 is contained entirely within the WAPC required R-Code building setbacks and will not affect the location of a future dwelling on the lots.

APPENDIX A: BAL ASSESSMENT DATA (DETAILED) AND SUPPORTING INFORMATION

A1: Assessed Site Inputs Common to the Method 1 and Method 2 Procedures

A1.1: FIRE DANGER INDICES (FDI/ FDI/GFDI)

When using Method 1 the relevant FDI value required to be applied for each state and region is established by AS 3959:2018, Table 2.1. Each FDI value applied in Tables 2.4 – 2.7 represents both the Forest Fire Danger Index (FFDI) and a deemed equivalent for the Grassland Fire Danger Index (GFDI), as per Table B2 in Appendix B. When using Method 2, the relevant FFDI and GFDI are applied.

The values may be able to be refined within a jurisdiction, where sufficient climatological data is available and in consultation with the relevant authority.

Relevant Jurisdiction:	WA	Region:	Whole State	Method 1	Applied FDI:	80
				Method 2	Applied FFDI:	N/A
					Applied GFDI:	N/A

A1.2: VEGETATION ASSESSMENT AND CLASSIFICATION

Vegetation Types and Classification

In accordance with AS 3959:2018 clauses 2.2.3 and C2.2.3.1, all vegetation types within 100 metres of the 'site' (defined as "the part of the allotment of land on which a building stands or is to be erected"), are identified and classified. Any vegetation more than 100 metres from the site that has influenced the classification of vegetation within 100 metres of the site, is identified and noted. The maximum excess distance is established by AS 3959: 2018 cl 2.2.3.2 and is an additional 100 metres.

Classification is also guided by the Visual Guide for Bushfire Risk Assessment in WA (WA Department of Planning February 2016) and any relevant FPA Australia practice notes.

Modified Vegetation

The vegetation types have been assessed as they will be in their natural mature states, rather than what might be observed on the day. Vegetation destroyed or damaged by a bushfire or other natural disaster has been assessed on its expected re-generated mature state. Modified areas of vegetation can be excluded from classification if maintained in a permanently low threat, minimal fuel condition, satisfying AS 3959:2018 s2.2.3.2(f), and there is sufficient justification to reasonable expect that this modified state will exist in perpetuity.

The Influence of Ground Slope

Where significant variation in effective slope exists under a consistent vegetation type, these will be delineated as separate vegetation areas to account for the difference in potential bushfire behaviour, in accordance with AS 3959:2018 clauses 2.2.5 and C2.2.5.

THE INFLUENCE OF VEGETATION GREATER THAN 100 METRES FROM THE SUBJECT SITE	
Vegetation area(s) within 100m of the site whose classification has been influenced by the existence of bushfire prone vegetation from 100m – 200m from the site:	None
Assessment Statement:	N/A

<table>
<tr><th colspan="8">VEGETATION AREA 1</th></tr>
<tr><td>Classification</td><td colspan="7">A. FOREST</td></tr>
<tr><td>Types Identified</td><td colspan="7">Low open forest A-04</td></tr>
<tr><td>Exclusion Clause</td><td colspan="7">N/A</td></tr>
<tr><td>Effective Slope</td><td>Measured</td><td colspan="2">flat 0 degrees</td><td colspan="2">Applied Range (Method 1)</td><td colspan="2">Upslope or flat 0 degrees</td></tr>
<tr><td>Foliage Cover (all layers)</td><td>>30%</td><td>Shrub/Heath Height</td><td>N/A</td><td>Tree Height</td><td colspan="3">Up to 12m</td></tr>
<tr><td>Dominant & Sub-Dominant Layers (species as relevant)</td><td colspan="7">Brook line dominated with melaleucas up to 12m in height with a canopy cover up to 90%, some flooded gums.</td></tr>
<tr><td>Understorey:</td><td colspan="7">Understorey of sedges and grasses in some areas and occasional shrubs including acacia and jacksonia.</td></tr>
<tr><td>Additional Justification:</td><td colspan="7">Not Required.</td></tr>
<tr><td>Post Development Assumptions:</td><td colspan="7">Nil</td></tr>
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<tr><td colspan="4">PHOTO ID: 1c</td><td colspan="4">PHOTO ID: 1d</td></tr>
</table>

VEGETATION AREA 2						
Classification	**B. WOODLAND**					
Types Identified	Woodland B-05					
Exclusion Clause	N/A					
Effective Slope	Measured	flat 0 degrees	Applied Range (Method 1)	Upslope or flat 0 degrees		
Foliage Cover (all layers)	Select.	Shrub/Heath Height	Select.	Tree Height	Select.	
Dominant & Sub-Dominant Layers (species as relevant)	Trees on average 15m in height. Canopy cover less than 30%.					
Understorey:	Grass					
Additional Justification:	Not Required.					
Post Development Assumptions:	Nil					

PHOTO ID: 2a

PHOTO ID: 2b

VEGETATION AREA 3						
Classification	**G. GRASSLAND**					
Types Identified	Sown pasture G-26			Tussock grassland G-22		
Exclusion Clause	N/A					
Effective Slope	Measured	flat 0 degrees		Applied Range (Method 1)	Upslope or flat 0 degrees	
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A		Tree Height	N/A
Dominant & Sub-Dominant Layers (species as relevant)	Occasional tree or shrub, <10% foliage cover.					
Understorey:	Open paddocks.					
Additional Justification:	Not Required.					
Post Development Assumptions:	Nil					

PHOTO ID: 3a

PHOTO ID: 3b

PHOTO ID: 3c

PHOTO ID: 3d

VEGETATION AREA 3						
Classification	**G. GRASSLAND**					
Types Identified	Sown pasture G-26			Tussock grassland G-22		
Exclusion Clause	N/A					
Effective Slope	Measured	flat 0 degrees	Applied Range (Method 1)	Upslope or flat 0 degrees		
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A	Tree Height	N/A	
Dominant & Sub-Dominant Layers (species as relevant)	Occasional tree or shrub, <10% foliage cover.					
Understorey:	Open paddocks.					
Additional Justification:	Not Required.					
Post Development Assumptions:	Nil					

PHOTO ID: 3e

PHOTO ID: 3f

PHOTO ID: 3g

PHOTO ID: 3h

VEGETATION AREA 3						
Classification	**G. GRASSLAND**					
Types Identified	Sown pasture G-26			Tussock grassland G-22		
Exclusion Clause	N/A					
Effective Slope	Measured	flat 0 degrees	Applied Range (Method 1)		Upslope or flat 0 degrees	
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A	Tree Height	N/A	
Dominant & Sub-Dominant Layers (species as relevant)	Occasional tree or shrub, <10% foliage cover.					
Understorey:	Open paddocks.					
Additional Justification:	Not Required.					
Post Development Assumptions:	Nil					

PHOTO ID: 3i

PHOTO ID: 3j

VEGETATION AREA 4						
Classification	**N/A**					
Types Identified	N/A			N/A		
Exclusion Clause	2.2.3.2 (e) Non-vegetated areas and (f) Low threat vegetation - minimal fuel condition.					
Effective Slope	Measured	N/A		Applied Range (Method 1)	N/A	
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A		Tree Height	N/A
Dominant & Sub-Dominant Layers (species as relevant)	N/A					
Understorey:	N/A					
Additional Justification:	Areas cleared for construction, managed gardens.					
Post Development Assumptions:	N/A					

PHOTO ID: 4a

PHOTO ID: 4b

PHOTO ID: 4c

PHOTO ID: 4d

VEGETATION AREA 4						
Classification	**N/A**					
Types Identified	N/A			N/A		
Exclusion Clause	2.2.3.2 (e) Non-vegetated areas and (f) Low threat vegetation - minimal fuel condition.					
Effective Slope	Measured	N/A		Applied Range (Method 1)	N/A	
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A		Tree Height	N/A
Dominant & Sub-Dominant Layers (species as relevant)	N/A					
Understorey:	N/A					
Additional Justification:	Managed grassland areas, developed lots.					
Post Development Assumptions:	N/A					

PHOTO ID: 4e

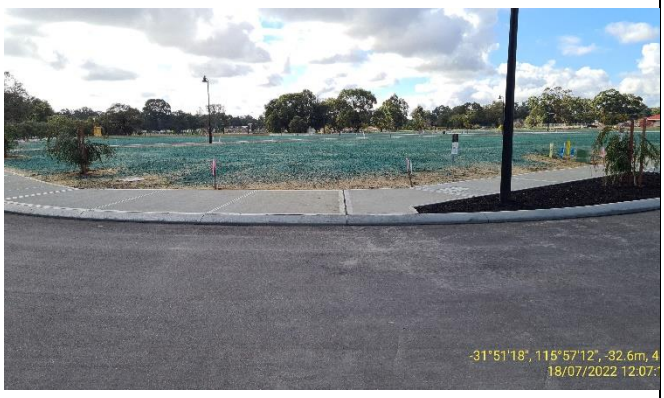
PHOTO ID: 4f

PHOTO ID: 4g

PHOTO ID: 4h

VEGETATION AREA 4						
Classification	**N/A**					
Types Identified	N/A			N/A		
Exclusion Clause	2.2.3.2 (e) Non-vegetated areas and (f) Low threat vegetation - minimal fuel condition.					
Effective Slope	Measured	N/A		Applied Range (Method 1)	N/A	
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A		Tree Height	N/A
Dominant & Sub-Dominant Layers (species as relevant)	N/A					
Understorey:	N/A					
Additional Justification:	Developed lots prepared for sale.					
Post Development Assumptions:	N/A					

PHOTO ID: 4i



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VEGETATION AREA 4						
Classification	**N/A**					
Types Identified	N/A			N/A		
Exclusion Clause	2.2.3.2 (e) Non-vegetated areas and (f) Low threat vegetation - minimal fuel condition.					
Effective Slope	Measured	N/A	Applied Range (Method 1)	N/A		
Foliage Cover (all layers)	N/A	Shrub/Heath Height	N/A	Tree Height	N/A	
Dominant & Sub-Dominant Layers (species as relevant)	N/A					
Understorey:	N/A					
Additional Justification:	Land under development.					
Post Development Assumptions:	N/A					

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A1.3: EFFECTIVE SLOPE

Measuring

Effective slope refers to the slope "under the classified vegetation which most significantly influences bushfire behaviour (AS 3959:2018, clause B4, CB4). It is not the average slope.

It is described as upslope, flat or downslope when viewed from the exposed element (e.g., building) looking towards the vegetation – and measured in degrees. Ground slope has a direct and significant influence on a bushfire's rate of spread and intensity, which increases when travelling up a slope.

The slope under the vegetation in closest proximity to the exposed element(s), over the distance that will most likely carry the entire depth of the flaming front, will be a significant consideration in the determination of the effective slope. This distance is determined as a function of the potential quasi-steady rate of spread and expected residence time (i.e., the flaming combustion period at a single point on the ground), of a bushfire in the specific vegetation type/landscape scenario.

Slope Variation Within Areas of Vegetation

Where a significant variation in effective slope exists under a consistent vegetation type, these will be delineated as separate vegetation areas to account for the difference in potential bushfire behaviour, in accordance with AS 3959:2018 clauses 2.2.5 and C2.2.5.

Slope Variation Due to Multiple Development Sites

When the effective slope, under a given area of bushfire prone vegetation, will vary significantly relative to multiple proposed development sites (exposed elements), then the effective slopes corresponding to each of the different locations, are separately identified.

The relevant (worst case) effective slope is determined in the direction corresponding to the potential directions of fire spread towards the subject building(s).

Differences in Application of Effective Slope - AS 3959:2018 Method 1 versus Method 2 Procedures

The Method 1 procedure provides five different slope ranges from flat (including all upslopes) to 20 degrees downslope to define the effective slope and bushfire behaviour model calculations apply the highest value in each range (i.e., 0^0, 5^0, 10^0, 15^0 or 20^0).

The Method 2 procedure requires an actual slope (up or down in degrees) to be determined. AS 3959:2018, clause B1 limits the effective slope that can be applied to 30 degrees downslope and 15 degrees upslope. Where any upslope is greater than 15 degrees, then 15 degrees is to be used.

SITE ASSESSMENT DETAILS - EXPLANATION & JUSTIFICATION

The effective slopes determined from the site assessment are recorded in Table 2.1 of this Bushfire Management Plan Addendum.

A1.4: SEPARATION DISTANCE

Measuring

The separation distance is the distance in the horizontal plane between the receiver (building/structure or area of land being considered) and the edge of the classified vegetation (AS 3959:2018, clause 2.2.4)

The relevant parts of a building/structure from which the measurement is taken is the nearest part of an external wall or where a wall does not exist, the supporting posts or columns. Certain parts of buildings are excluded including eaves and roof overhangs.

The edge of the vegetation, for forests and woodlands, will be determined by the unmanaged understorey rather than either the canopy (drip line) or the trunk (AS 3959:2018, clause C2.2.5).

Measured Separation Distance as a Calculation Input

If a separation distance can be measured because the location of the building/structure relative to the edge of the relevant classified vegetation is known, this figure can be entered into the BAL calculation. The result is a determined BAL rating.

Assumed Separation Distance as a Calculation Input

When the building/structure location within the lot is not known, an assumed building location may be applied that would establish the closest positioning of the building/structure relative to the relevant area of vegetation.

The assumed location would be based on a factor that puts a restriction on a building location such as:

- An established setback from the boundary of a lot, such as a residential design code setback or a restrictive covenant; or
- Within an established building envelope.

The resultant BAL rating would be indicative and require later confirmation (via a Compliance Report) of the building/structure actual location relative to the vegetation to establish the determined BAL rating.

SITE ASSESSMENT DETAILS - EXPLANATION & JUSTIFICATION

When separation distances corresponding to BAL's are being derived from calculations, they are an output and not and input and consequently are not presented in this section of the Bushfire Management Plan.