



**AMENDMENT NO. 4
TO THE
BANKSIA GROVE
AGREED STRUCTURE PLAN NO. 21A**

This Amendment to the Banksia Grove Agreed Local Structure Plan 21A is prepared under the provisions of Part 4 of the *Planning and Development (Local Planning Schemes) Regulations 2015*

Title: Banksia Grove Agreed Structure Plan No. 21A
Amendment No. 4

Prepared for: LWP Property Group Pty Ltd

CLE Reference: 981Rep5 68

Date: 21 February 2019

Status: Final

Review date: 22 February 2019

Prepared by: CLE Town Planning + Design

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Part One Implementation

Record of Amendments made to the Banksia Grove Agreed Local Structure Plan 21A

CLE

Amendment No.	Description of Amendment	Finally Endorsed Council	Finally Endorsed WAPC
1	Relocates the eastern Primary School site to the west and collocates it with a new active Public Open Space Site; Consolidates the central and eastern local centres into one local centre zoned 'Commercial' and recodes the two former Local Centre areas from R60 to R30/R60; and Rezones the 'Commercial' land directly west of Glasshouse Drive from 'Commercial' to 'Mixed Use'.	26.6.12	17.10.12
2	Modifies Map 1 'Agreed Local Structure Plan' by rezoning a portion of the 'Special Residential' zone to 'Residential'; Modifies Map 2 'Zoning Plan' by rezoning a portion of the 'Special Residential' zone to 'Residential'; Modifies Map 3 'R-Code Plan' by recoding a portion the 'Special Residential (SR2)' area from 'Special Residential (SR2)' to 'R10'; and Inserts Clause 10.7 'Development Controls for R10 Coded Lots' into the Part 1 Statutory Planning Section.	15.11.17	16.11.18
3	Amending Map 1 'Agreed Local Structure Plan' to show Lot 802 Glasshouse Drive as 'Residential'; and Amending Map 2 'Zoning Plan' by rezoning Lot 802 Glasshouse Drive from 'Commercial' to Residential'.	Assessment ongoing	Assessment ongoing

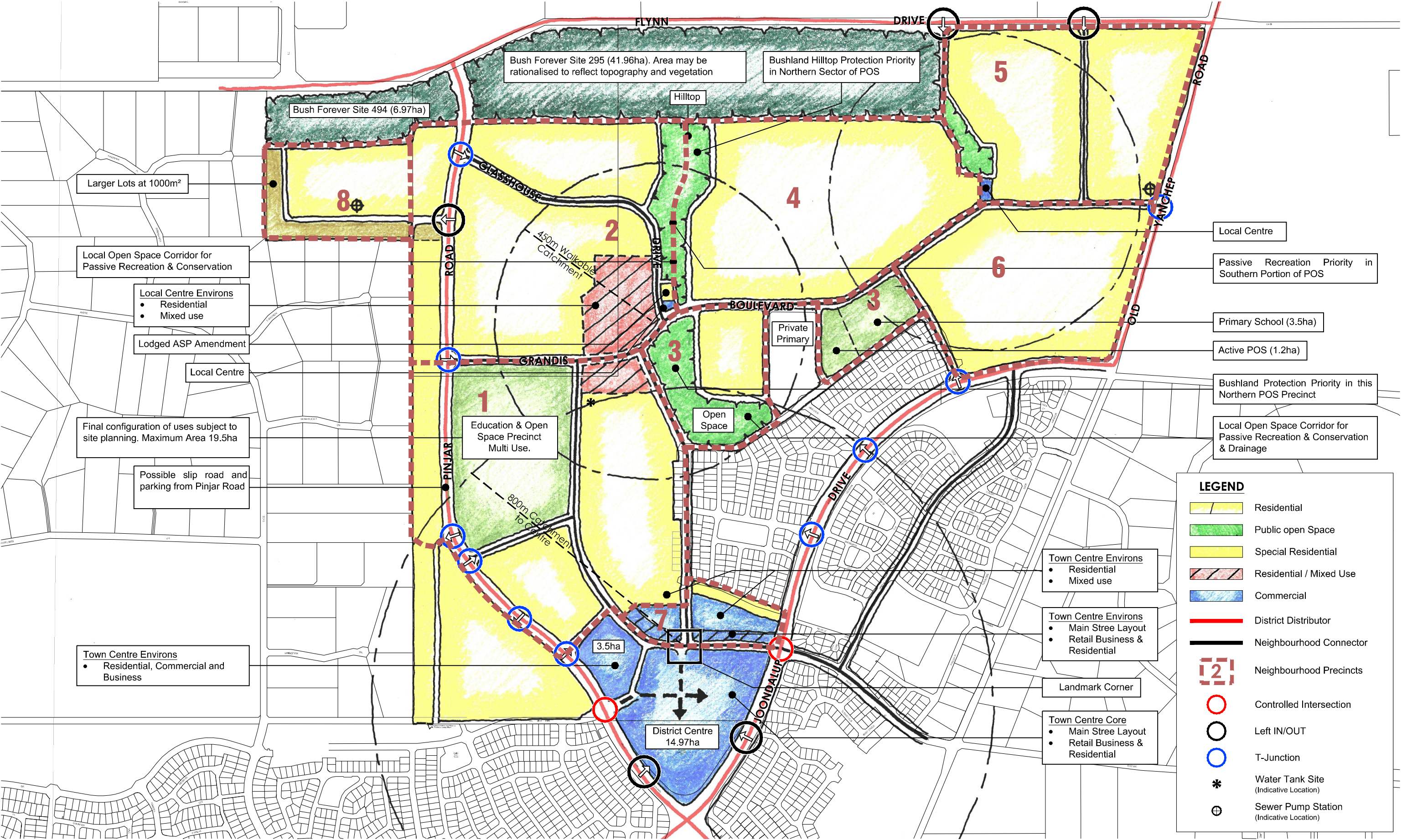
4	<p>Modifies Map 1 ‘Agreed Local Structure Plan’ by rezoning a portion of the ‘Special Residential’ zone to ‘Residential’;</p> <p>Modifies Map 2 ‘Zoning Plan’ by rezoning a portion of the ‘Special Residential’ zone to ‘Residential’;</p> <p>Modifies Map 3 ‘R-Code Plan’ by recoding a portion the ‘Special Residential (SR2)’ area from ‘Special Residential (SR2)’ to ‘R10’.</p> <p>Modifies Map 3 ‘R-Code Plan’ by creating two sub-precincts of R10 density, namely ‘R10-Precinct A’ and ‘R10-Precinct B’.</p> <p>Inserts new text under Clause 10.7 ‘Development Controls for R10 Coded Lots’ into the Part 1 Statutory Planning Section. New text distinguishes 10.7 as being specific to newly created ‘R10-Precinct A’.</p> <p>Inserts Clause 10.8 ‘Development Controls for ‘R10-Precinct B’ Coded Lots’ into the Part 1 Statutory Planning Section.</p>		
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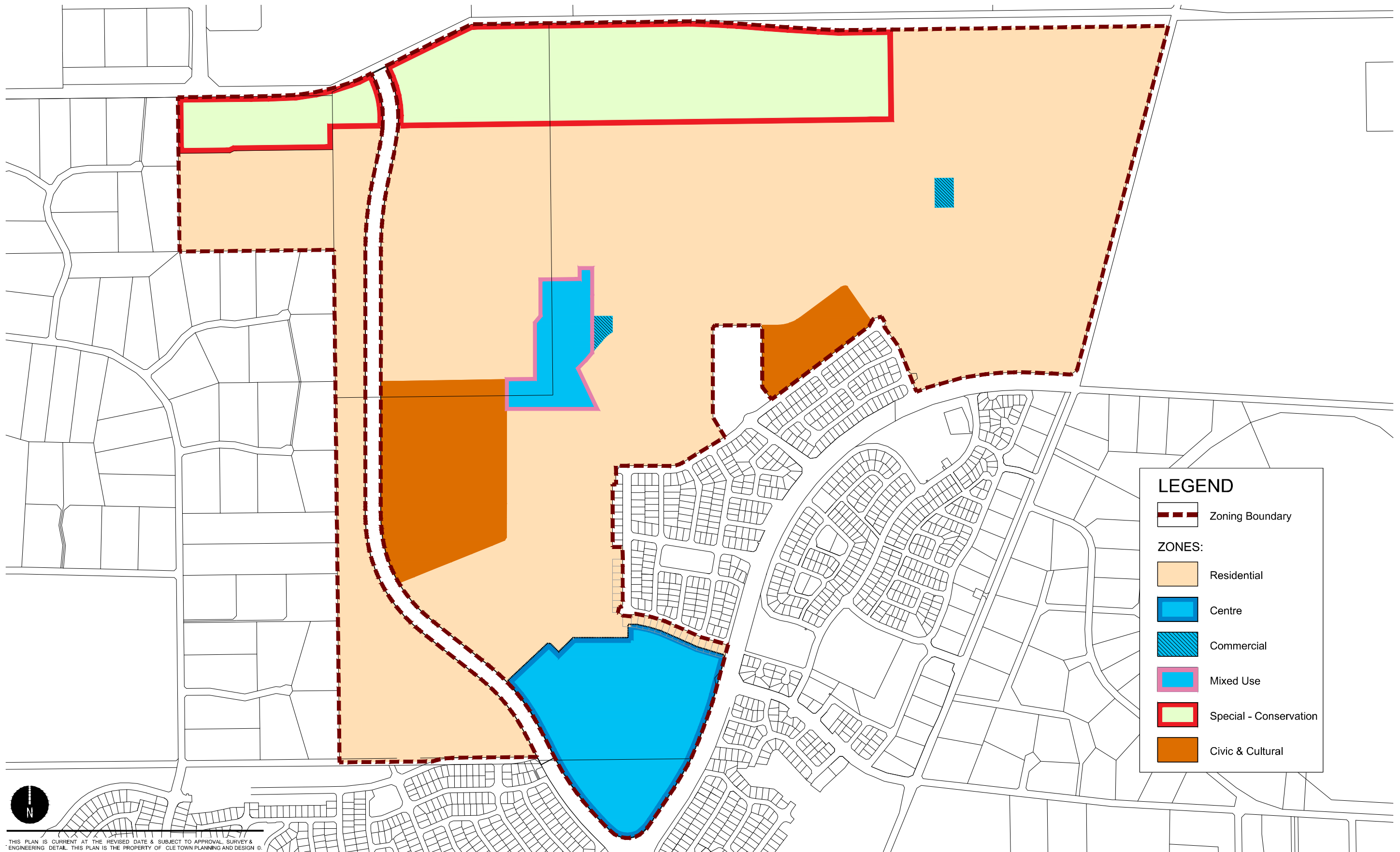


AMENDMENT NO. 4
TO
BANKSIA GROVE AGREED LOCAL STRUCTURE PLAN NO.21A

The City of Wanneroo, pursuant to Part 4 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, hereby amends the above Structure Plan by:

1. Modifying Map 1 'Agreed Local Structure Plan' by rezoning a portion of the 'Special Residential' zone to 'Residential';
2. Modifying Map 2 'Zoning Plan' by rezoning a portion of the 'Special Residential' zone to 'Residential';
3. Modifying Map 3 'R-Code Plan' by recoding a portion the 'Special Residential (SR2)' area from 'Special Residential (SR2)' to 'R10';
4. Modifying Map 3 'R-Code Plan' by creating two sub-precincts of R10 density, namely 'R10-Precinct A' and 'R10-Precinct B';
5. Inserting new text under Clause 8.7 'Development Controls for R10 Coded Lots' into the Part 1 Statutory Planning Section. New text distinguishes 8.7 as being specific to newly created 'R10-Precinct A';
6. Inserting Clause 8.8 'Development Controls for 'R10-Precinct B' Coded Lots' into the Part 1 Statutory Planning Section.





LEGEND

Zoning Boundary

ZONES:

Residential

Centre

Commercial

Mixed Use

Special - Conservation

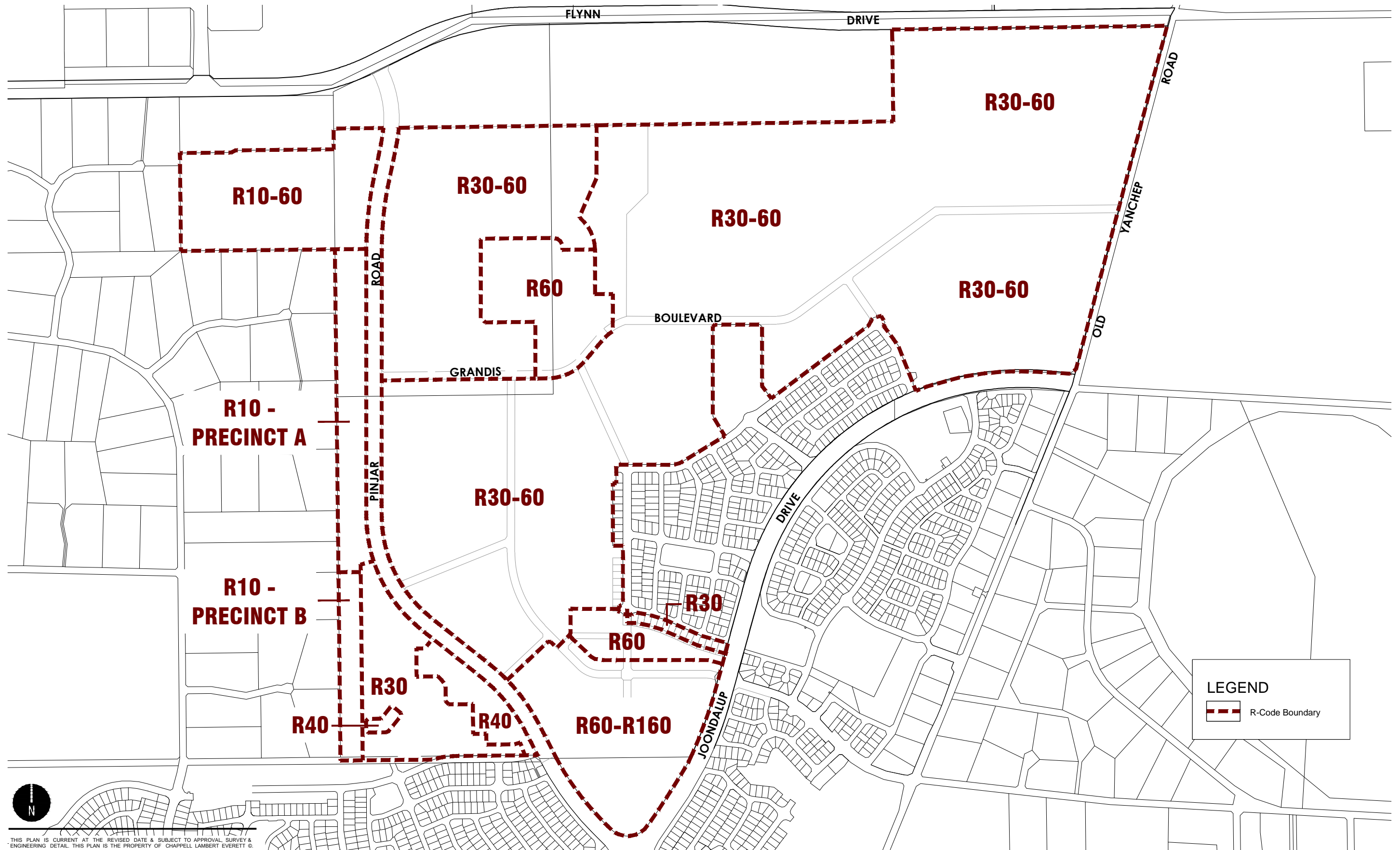
Civic & Cultural

THIS PLAN IS CURRENT AT THE REVISED DATE & SUBJECT TO APPROVAL, SURVEY & ENGINEERING DETAIL. THIS PLAN IS THE PROPERTY OF CLE TOWN PLANNING AND DESIGN ©.



BANKSIA GROVE
CITY OF WANNEROO
AGREED LOCAL STRUCTURE PLAN No.21A
MAP 2: ZONING PLAN

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BANKSIA GROVE

CITY OF WANNEROO

AGREED LOCAL STRUCTURE PLAN No.21A

MAP 3: R-CODE PLAN



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phone : (08) 9382 1233 email : admin@cleplan.com.au

21 August 2018

981-261C-01

This amendment to Agreed Structure Plan No.21A amends existing text contained in Part 1 – Statutory Section, relevant to clause 8.7 as follows:

“8.7 Development Controls for Lots Coded ‘R10-Precinct A’

The following development controls are only applicable to lots designated ‘R10-Precinct A’ as per Map 3: R-Code Plan and do not apply to lots with a coding range of R10 – R60....”

8.7.1 Minimum Lot Sizes

Notwithstanding the provisions of Table 1 of the R-Codes....

This amendment to Agreed Structure Plan No.21A also inserts the following clauses into Part 1 – Statutory Section:

“8.8 Development Controls for Lots Coded ‘R10-Precinct B’

The following development controls are only applicable to lots designated ‘R10-Precinct B’ as per Map 3: R-Code Plan and do not apply to lots with a coding range of R10 – R60.

8.8.1 Minimum Lot Sizes

Notwithstanding the provisions of Table 1 of the R-Codes, the minimum lot size shall be 1,500m².

8.8.2 Local Development Plan

A Local Development Plan shall be prepared and approved on land within the R10 zone to address the following: land The Local Development Plan shall address the following:

Building envelopes.

8.8.3 Bushfire Protection

A Bushfire Management Plan shall be prepared at subdivision stage. Bushfire protection zones and construction standards shall be in accordance with the Bushfire Management Plan endorsed by the City. Compliance with the Bushfire Management Plan is to be demonstrated through the building permit process.”

IT IS CERTIFIED THAT AMENDMENT NO. 4 TO THE BANKSIA GROVE AGREED LOCAL
STRUCTURE PLAN No.21A

WAS APPROVED BY RESOLUTION OF THE
WESTERN AUSTRALIAN PLANNING COMMISSION ON:

.....Date

Signed for and on behalf of the Western Australian Planning Commission:

.....

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the
Planning and Development Act 2005 for that purpose.



Part Two

Explanatory Report

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1.0 Introduction

The Banksia Grove Agreed Local Structure Plan No. 21A was adopted by the Western Australian Planning Commission (WAPC) on 16 June 2010.

Since adoption, the Structure Plan (or 'ASP') has served as the key planning instrument guiding subdivision and development of the Banksia Grove estate. It is estimated that to date approximately 2,500 lots have either been constructed or approved under the ASP and completion of the estate is projected for 5-10 years.

Of relevance to this amendment, is that in 2018, the WAPC endorsed Amendment No. 149 to the City of Wanneroo District Planning Scheme 2 (DSP2) to rezone a portion of 'Special Residential' land at the western periphery of the Banksia Grove estate to 'Urban Development'. At this time, Amendment 2 to the Banksia Grove ASP21A was also endorsed, identifying this land as 'Residential'.

1.1 Purpose

This amendment proposes to rezone the balance of 'Special Residential' land at the western edge of the Banksia Grove estate to 'Residential'. Amending the Structure Plan as proposed will facilitate further subdivision of this land into more appropriately sized lots at approximately 1500m².

A scheme amendment request to rezone this portion of land to 'Urban Development' has also been lodged concurrently within this Banksia Grove ASP amendment, and it is intended that the two processes will occur in parallel (as was the case for Amendment 149 to DSP2 and Amendment 2 to ASP21A).

1.2 Site Description & Context

The land the subject of this Structure Plan amendment comprises a portion of Lot 9190 (located adjoining Harden Park Trail) Banksia Grove. The portion of Lot 9190 the subject of this amendment is approximately 3.6ha in size; of linear proportions; and orientated along a north-south axis. Hereafter the subject portion of Lot 9190 may also be referred to as ‘the land’.

The land is located in the south-western most extents of the Banksia Grove estate and is generally bound by the ‘Special Rural’ suburb of Carramar to the west; Harden Park Trail to the east; and ‘Special Residential’ lot of 5000m² to the south, refer Figure 1.

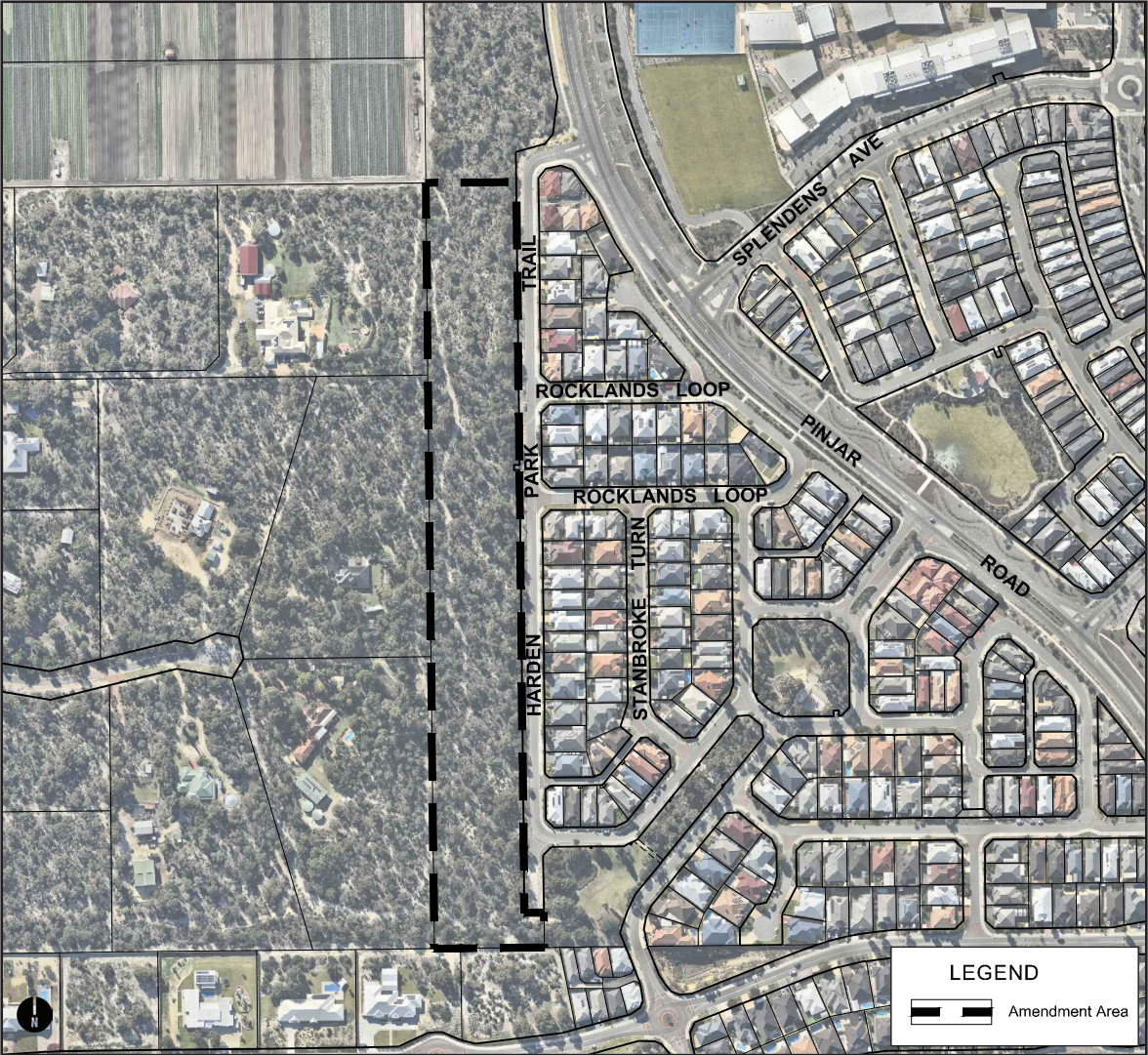


Figure 1 Site Plan

source: Nearmap

2.0 Planning Framework

2.1 Metropolitan Region Scheme

The entirety of the Banksia Grove estate, including the subject portion of Lot 9190, is zoned 'Urban' in accordance with the Metropolitan Region Scheme (MRS).

The proposed amendment to the Structure Plan is consistent with the regional zoning, refer Figure 2.

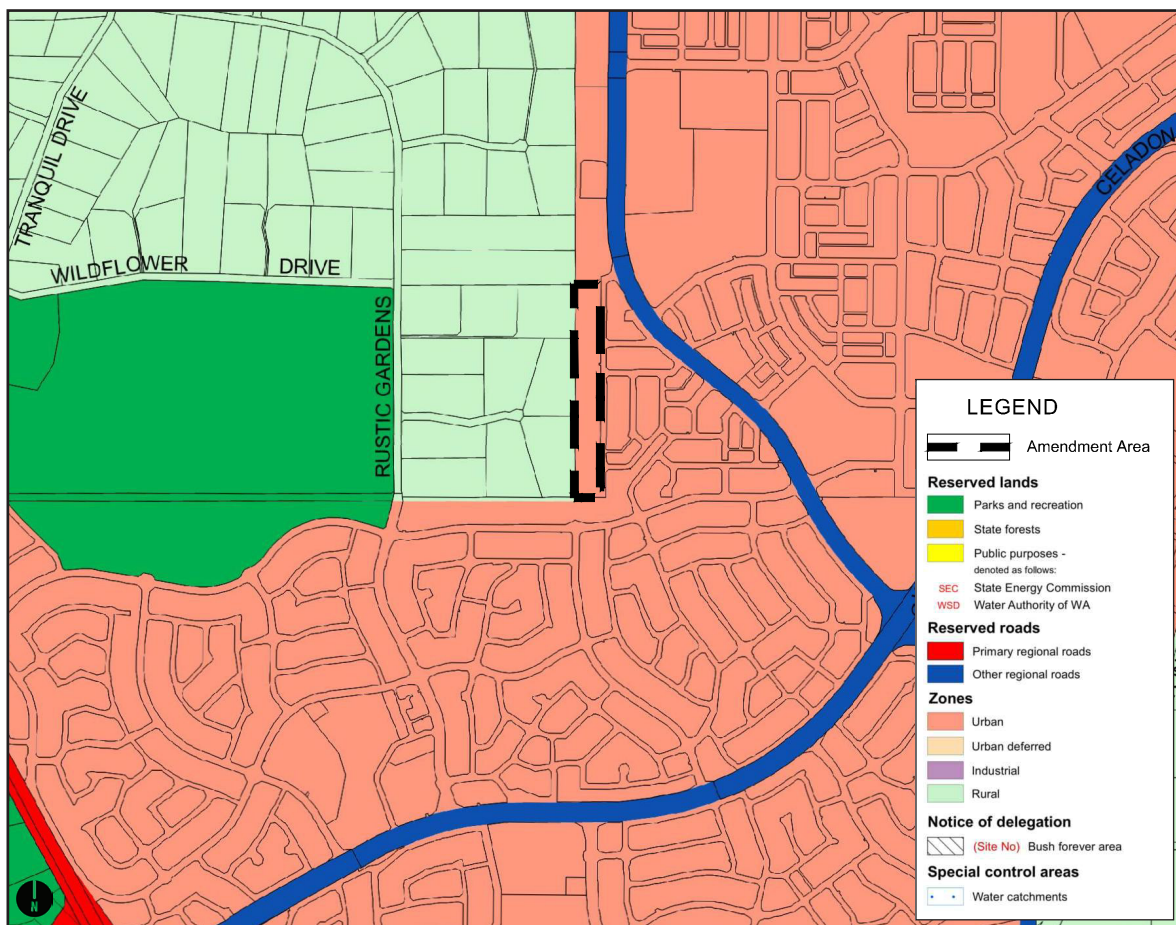


Figure 2 MRS Zoning Map

source: WAPC

2.2 City of Wanneroo District Planning Scheme No.2 (DPS2)

The local zoning for the Banksia Grove estate is set out in the City of Wanneroo District Planning Scheme No.2.

The entire estate is zoned 'Urban Development' under DPS 2, with the single exception being the land the subject of this Structure Plan amendment request. The subject land is instead zoned 'Special Residential (SR2)' in accordance with DPS2, refer Figure 3.

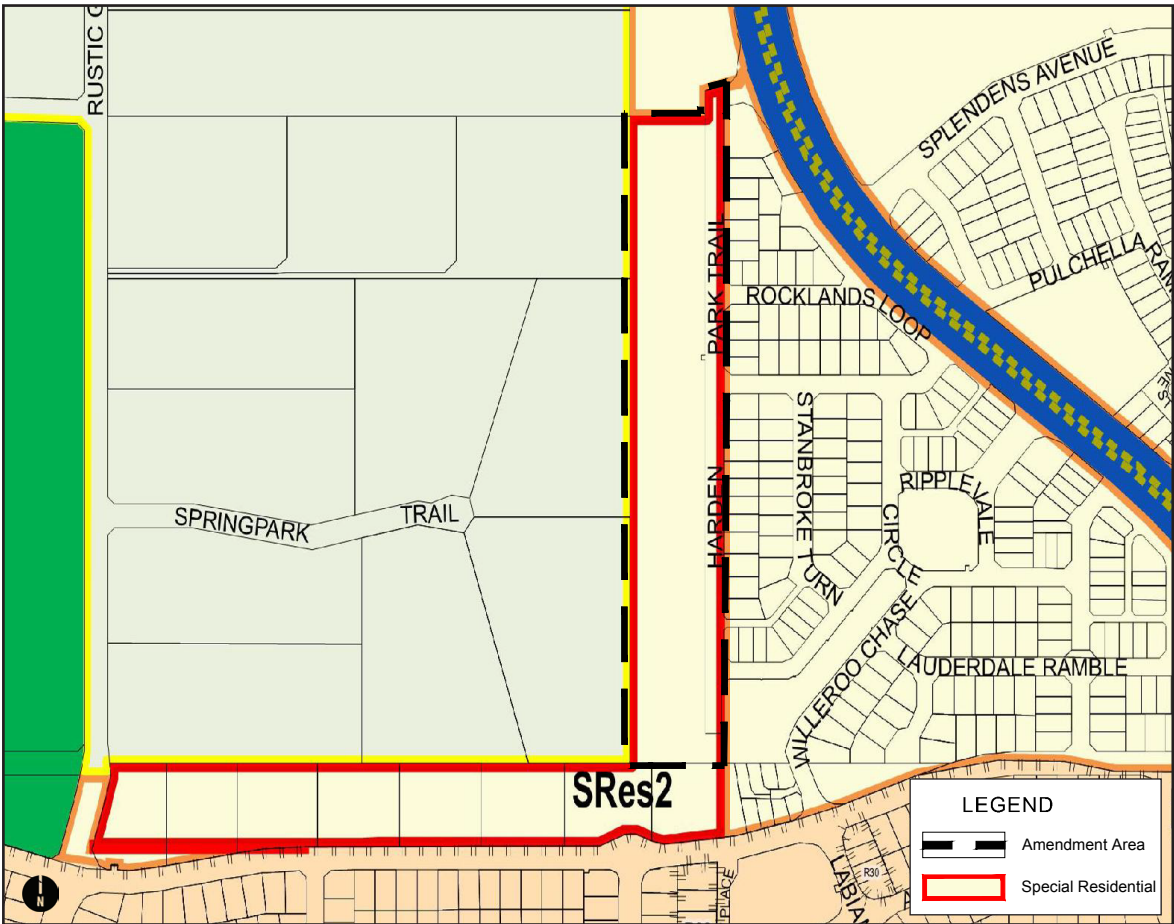


Figure 3 District Planning Scheme No.2 - Existing

source: WAPC

2.3 Proposed Amendment to DSP 2

The subdivision and development of the subject land to an R10 density is inconsistent with the current zoning of the land under DPS 2. An amendment to DSP2 is therefore submitted together with this Structure Plan amendment request. The scheme amendment proposes the rezoning of portion of Lot 9190 to 'Urban Development'.

2.3.1 Background to the Current Zoning of the Land

When the Banksia Grove ASP was first lodged, the structure plan boundary extended beyond the 'Urban Development' zone to also encompass a portion of 'Special Residential' land on the western side of the estate. The intent at the time had been to ensure the land was not alienated through the planning process. In accordance with the ASP21A the subject land would serve as transitional land

between the future Banksia Grove estate and the 'Special Rural' lots of Carramar Estate to the west.

The Banksia Grove Structure Plan report (Part 2) states:

"A strip of land to the west of the site, adjacent to the Carramar Special Rural Estate, is currently zoned 'Special Residential – SR2'. This zoning currently restricts subdivision of the land to a minimum lot size of 5,000m² in accordance with approved Development Guide Plans for the zone. A separate Scheme Amendment will be initiated to reduce the minimum lot size for the Special Residential to 2000m² and to rezone what was the Pinjar Road reservation to 'Urban Development.'"

Despite this intent, the amendment described above was not pursued until now.

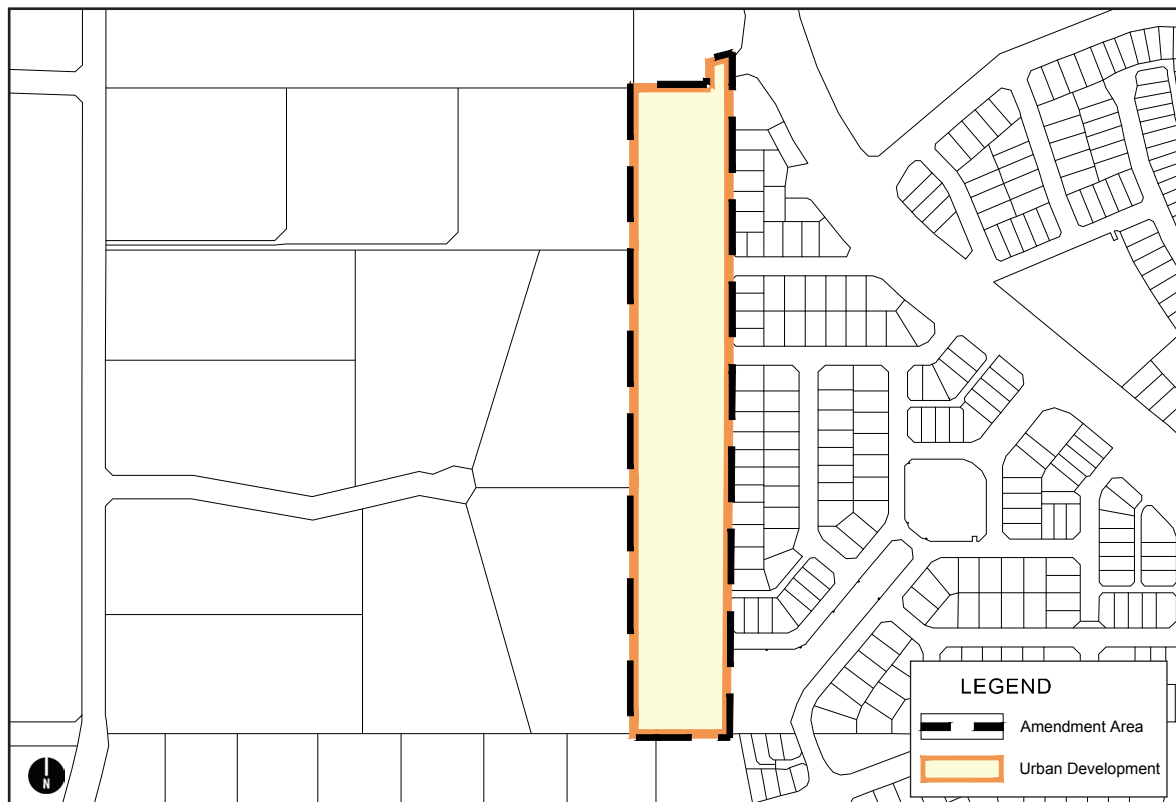


Figure 4 District Planning Scheme No.2 - Proposed

2.4 Banksia Grove Agreed Local Structure Plan No.21A (ASP 21A)

As already noted the ASP identifies the subject land for 'Special Residential' purposes on both the 'Structure Plan' (Map 1) and on the 'Zoning Plan' (Map 2). The 'R-Code Plan' (Map 3) does not identify a density code, but defaults to the provisions for the 'Special Residential SR2' zone as per DSP2.

2.5 Proposed Amendment to ASP 21A

The proposal is to subdivide and develop the land to an R10 density which will warrant the following modifications to ASP 21A:

Plan	Existing Designation	Proposed Designation
Structure Plan (Map 1)	'Special Residential'	'Residential'
Zoning Plan (Map 2)	'Special Residential'	'Residential'
R-Code Plan (Map 3)	'Special Residential (SR2)'	'R10'

Where the land is designated for the purposes of R10 development on Map 3, the Structure Plan will require further modification to ensure appropriate development controls (particularly in relation to lot size) are in place for the land. The need to provide specific development controls, rather than defer to provisions of the Residential Design Codes is explained below.

Presently, there is only one other area of R10 coded land within the Banksia Grove estate. The subdivision and development of this land is guided by clause 8.7 of the Structure Plan. The Structure Plan embodies these specific controls because the developer only intends to subdivide existing R10 land to a minimum of 1500m²; rather than the 1,000m² allowed for under the R-Codes.

The requirements of clause 8.7 are however, geographically specific and cannot also be applied to the subject land. For this reason it is necessary that the two areas of R10 land are distinguishable on the 'R-Code Plan' (Map 3), and also have distinct development controls.

To this end, this amendment also proposes that the existing R10 area be identified on the 'R-Code Plan' (Map 3) as 'R10-Precinct A'. Clause 8.7 will continue to apply to this land, but the clause heading and introductory comment will be modified such that applicability is limited to 'Precinct A'. This amendment then proposes that the subject land be identified on the 'R-Code Plan' (Map 3) as 'R10-Precinct B'.

In terms of subdivision and development within 'R10-Precinct B', the intention is to subdivide the lots to a minimum lot size of 1500m². Consequently, new provisions specific to 'R10-Precinct B' will need to be embodied under a new clause in the Structure Plan. It is proposed that the new provisions will read as follows:

"8.8 Development Controls for Lots Codes 'R10-Precinct B'

The following development controls are only applicable to lots designated 'R10-Precinct B' as per Map 3: R-Code Plan and do not apply to lots with a coding range of R10 – R60.

8.8.1 Minimum Lot Sizes

Notwithstanding the provisions of Table 1 of the R-Codes, the minimum lot size shall be 1,500m².

8.8.2 Local Development Plan

A Local Development Plan shall be prepared and approved on land within the R10 zone to address the following: land The Local Development Plan shall address the following:

Building envelopes.

8.8.3 Bushfire Protection

A Bushfire Management Plan shall be prepared at subdivision stage. Bushfire protection zones and construction standards shall be in accordance with the Bushfire Management Plan endorsed by the City. Compliance with the Bushfire Management Plan is to be demonstrated through the building permit process.”

In summary, the plan changes proposed are as follows:

For existing R10 coded land:

Plan	Existing Designation	Proposed Designation
R-Code Plan (Map 3)	'R10'	'R10 – Precinct A'

For the subject land:

Plan	Existing Designation	Proposed Designation
Structure Plan (Map 1)	'Special Residential'	'Residential'
Zoning Plan (Map 2)	'Special Residential'	'Residential'
R-Code Plan (Map 3)	'Special Residential (SR2)'	'R10 – Precinct B'

Implications of Proposed Amendment to ASP No. 21A

The proposed amendment to the Banksia Grove ASP will allow the land to be subdivided for residential purposes to a minimum lot size of 1,500m². This is in contrast to the current minimum lot size requirements of 5,000m² prescribed under DPS2.

An indicative conceptplan has been prepared to demonstrate subdivision potential, refer Figure 5.



Figure 5 Indicative Concept Plan

3.1 Planning Considerations

An R10 density coding is sought because it most closely aligns with the desired 1,500m² lot size and the physical dimensions of the land. The rationale for, and implications of the density are explored below.

Appropriateness of R10 Coding

As noted in the introductory comments of this report, it is intended that the land be subdivided to a lot product of 1,500m² minimum. This represents an ideal lot size because of its proven marketability, and because a 1500m² lot is an appropriate mid-point (and thus transition) between the 2-hectare lots to the west of the amendment area, and the 500m² lots to the east. When considered in transect from west to east, this represents a graduation from special residential to low density to medium density.

The subject land is rectangular in shape, and follows a north south alignment. The dimensions of the land parcel, particularly in respect of its width 'east-west' is a strong determinant of the residential product that can be created here. Figure 5 shows that the land is 65m wide. This fixed dimension dictates that any 1500m² lot must have a 23m frontage, which is consistent with an R10 coding. An R5 density (which is the next available code) would require a minimum frontage of 30m making the lots 2,250m² in area.

Preliminary discussions with officers at the City of Wanneroo indicate general acceptance for an R10 density coding. The WAPC endorsement and City support of Amendment 2 to the Banksia Grove ASP, also represents a strong and recent precedent.

Interface with Carramar Estate

A Preliminary Concept Plan has been prepared in support of this ASP amendment in order to demonstrate how the land may be subdivided in accordance with an R10 density. The Concept Plan, shown at Figure 5, illustrates how the lots within the 'R10 Precinct B' will continue to serve as a transitional density between the more traditional lot product of Banksia Grove, and the 'Special Rural' product at Carramar Estate.

In quantifiable terms, the subject land abuts 3 Special Residential lots to the west. Based on the location of those dwellings and the setback requirements for the amendment area (10m to rear of lots as described below), there stands to be 50 metres separating homes as a minimum. This is arguably sufficient distance to ensure visual impacts associated with new development are minimized and within an acceptable range. This is particularly the case when considering vegetation retention either side of the dividing boundary.

Front and Rear Building Setbacks

Clause 3.19.3 (e) of DPS2 prescribes a minimum front setback of 15m and a minimum rear setback of 10m for the 'Special Residential' zone. To maintain continuity and the status quo with regards to streetscapes and views from adjoining properties, it is proposed that these setbacks be embodied in the Part 1 Statutory Section of the ASP. Accordingly, new clause 8.8 of the Banksia Grove ASP stipulates a requirement for preparation of a Local Development Plan. In accordance with the BMP prepared by Bushfire West the setback will be greater than those

prescribed by the Special Residential provisions of the DPS2.

The proposed setback from rear boundaries in particular will ensure that the general rural feel is maintained and that any potential visual intrusion to Carramar Estate is minimised.

An Indicative Building Envelope Plan has been prepared to demonstrate likely building envelope locations with regard to fire management, refer Figure 6.

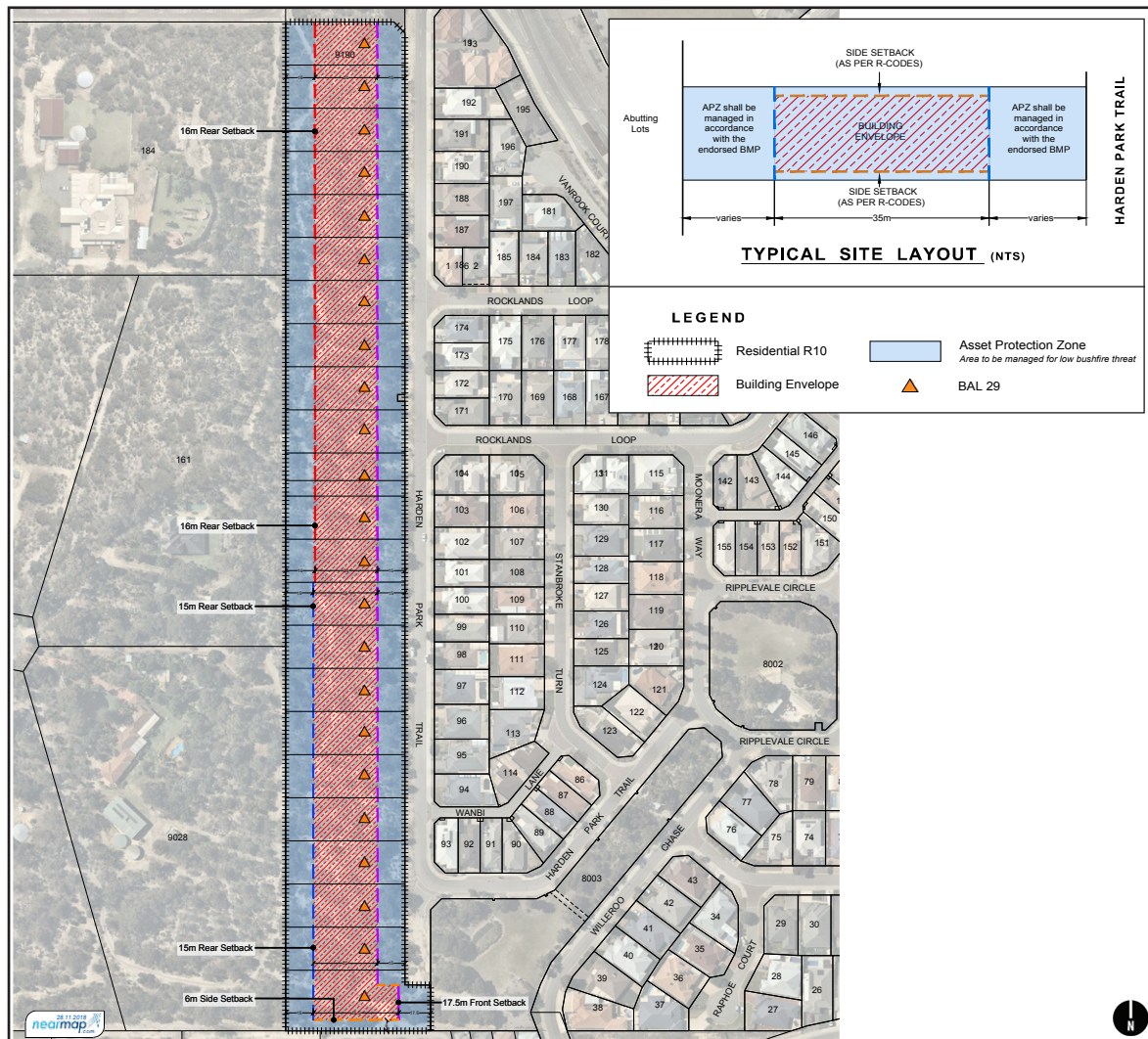


Figure 6 Indicative Building Envelope Plan

3.2 Environmental Approvals

As part of the determination of Amendment 149 to DPS2 and Amendment 2 to ASP21A, extensive liaison was undertaken with the City of Wanneroo and environmental agencies regarding the existing environmental approvals relevant to the amendment area and the overall ASP21A.

The land is covered by Ministerial Statement No. 280, which makes the project exempt from requiring a clearing permit under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. As part of the proposal for the rezoning of land to the north, the Environmental Protection Authority (EPA) confirmed that land being subject to the Ministerial Statement 280 does not require any further State environmental approvals.

Vegetation retention shall take place where possible, subject to compliance with fire requirements and with regard to site works.

3.3 Bushfire Protection

The subject land is located within a Bushfire Prone Area. Accordingly, any future subdivision or development of the land must comply with an approved Fire Management Plan (FMP).

An (FMP) was recently prepared by BushfireWest in support this proposed Amendment to ASP 21A. The FMP is attached at Appendix 1. The FMP is premised on the development scenario illustrated in CLE's Indicative Concept Plan attached as Figure 5.

The FMP finds that through the implementation of prescribed building protection zones, as well as other fire safety measures, bushfire risk can be managed sufficiently to enable residential development to occur in accordance with the WAPC's 'State Planning Policy 3.7 – Planning in Bushfire Prone Areas', together with the associated Guidelines..

While further work in the area of bushfire risk management may be necessary in time subject to final subdivision design, the work undertaken by Bushfire West to date demonstrates that the issue will not prohibit the enjoyment of the land for residential purposes at an R10 density.

3.4 Servicing and Earthworks

A requirement to connect to essential service infrastructure is expected to be imposed as a condition of any future subdivision approval.

The subject land will likely be serviced by extending the existing infrastructure from within the Banksia Grove estate, either from north-east, or due east across Harden Park Trail.

It is the developer's intent to earthwork the proposed lots once subdivision approval has been obtained and prior to the sale of any lots.

4.0 Conclusion

The proposal involves the 'rezoning' of approximately 3.6ha of land from 'Special Residential' to 'Residential' under the ASP. This will facilitate the future subdivision of the land broadly in accordance with an R10 density.

This amendment asserts that the current lot size minimum (of 5,000m²) is excessive and inefficient in this location; particularly when considered in the context of the mandate for consolidation and more efficient utilisation of existing land supply. This amendment to ASP 21A is a logical step forward in the planning framework that will allow for the land to be developed at a more appropriate density, making subdivision of the land viable for the project.

The proposed amendment is consistent with Amendment 2 to ASP 21A, which was supported by the City and endorsed by the WAPC in 2018.

The formal support of the City and the Western Australian Planning Commission is now sought for Amendment 4 to ASP21A. It is requested that the amendment is processed under clause 29 of Schedule 2, Part 4 of the Planning and Development (Local Planning Schemes Regulations 2015) at the earliest possible convenience.

Appendix 1

Fire Management Plan

Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address:

Lot 9190 Banksia Grove

Site visit:

Yes

☒

No

☐

Date of site visit (if applicable):

Day

31st

Month

November

Year

2018

Report author or reviewer:

Jeremy Durston

WA BPAD accreditation level (please circle):

Not accredited

☐

Level 1 BAL assessor

☐

Level 2 practitioner

☒

Level 3 practitioner

☐

If accredited please provide the following.

BPAD accreditation number:

36525

Accreditation expiry: Month

April

Year

2019

Bushfire management plan version number:

1.1

Bushfire management plan date: Day

19th

Month

February

Year

2019

Client/business name:

Banksia Grove Development Nominees

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	X	
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the bushfire protection criteria elements)?	X	

Is the proposal any of the following (see [SPP 3.7 for definitions](#))?

	Yes	No
Unavoidable development (in BAL-40 or BAL-FZ)		X
Strategic planning proposal (including rezoning applications)	X	
High risk land-use		X
Vulnerable land-use		X

None of the above

☐

Note: Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

Why has it been given one of the above listed classifications (E.g. Considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

Strategic Planning proposal including re-zoning and sub-division.

The information provided within this bushfire management plan to the best of my knowledge is true and correct:

Signature of report author
or reviewer



Date

19th February 2019

BUSHFIRE MANAGEMENT PLAN

Subdivision Application

Lot 9190 Banksia Grove



Bushfire West Pty Ltd
12 Davidson Road, Attadale WA 6156
0403 328 835



Ref: 181009
Version: 1.1
Feb 2019

Project Number: 181009
Project Name: Lot 9190 Banksia Grove
Author: Jeremy Durston, BPAD36525
Version: 1.1
Date of issue: 19th February 2019



Author: Jeremy Durston



This report supersedes all previous Bushfire Management Plans for the site.

DISCLAIMER AND LIMITATION

This report is prepared solely for **Banksia Grove Development Nominees** (the 'proponent') and any future landowners of the subject lot(s) and is not for the benefit of any other person and may not be relied upon by any other person.

The mitigation strategies contained in this Bushfire Management Plan are considered to be prudent minimum standards only, based on the writer's experience as well as standards prescribed by relevant authorities. It is expressly stated that Bushfire West Pty Ltd and the writer do not guarantee that if such standards are complied with or if a property owner exercises prudence, that a building or property will not be damaged or that lives will not be lost in a bush fire.

Fire is an extremely unpredictable force of nature. Changing climatic factors (whether predictable or otherwise) either before or at the time of a fire can also significantly affect the nature of a fire and in a bushfire prone area it is not possible to completely guard against bushfire.

Further, the growth, planting or removal of vegetation; poor maintenance of any fire prevention measures; addition of structures not included in this report; or other activity can and will change the bushfire threat to all properties detailed in the report. Further, the achievement of the level of implementation of fire precautions will depend on the actions of the landowner or occupiers of the land, over which Bushfire West Pty Ltd has no control. If the proponent becomes concerned about changing factors then a new Bushfire Management Plan should be requested.

To the maximum extent permitted by the law, Bushfire West Pty Ltd and the writer excludes all liability whatsoever for:

1. claim, damage, loss or injury to any property and any person caused by fire or as a result of fire or indeed howsoever caused;
2. errors or omissions in this report except where grossly negligent; and

the proponent expressly acknowledges that they have been made aware of this exclusion and that such exclusion of liability is reasonable in all the circumstances.

If despite the provisions of the above disclaimer Bushfire West Pty Ltd and/or the writer is found liable then liability is limited to the lesser of the maximum extent permitted by the law and the proceeds paid out by Bushfire West Pty Ltd's professional or public liability insurance following the making of a successful claim against such insurer.

Bushfire West Pty Ltd and/or the writer accept no liability or responsibility whatsoever for or in respect of any use or reliance upon this report and its supporting material by any third party.

This report is valid for a period of three years only from the date of its issue.

Jeremy Durston

Bushfire West Pty Ltd

ABN: 37 625 893 450

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1.0 Summary

This Bushfire Management Plan (the Plan) has been prepared to accompany the subdivision application (23 proposed Special Residential lots) for Lot 9190 Banksia Grove located in the City of Wanneroo (the Proposal).

The subdivision site of 3.6071 ha is within a designated bushfire prone area and the Proposal requires the application of *State Planning Policy No. 3.7: Planning in Bushfire Prone Areas* (SPP 3.7).

The aim of this Plan is to reduce the threat to people, property and infrastructure in the event of a bushfire. The Plan includes:

- How the identified bushfire threat will be reduced and managed for the life of the subdivision.
- How the Bushfire Protection Criteria in the Guidelines have been addressed.

This report determines the following compliance of the Proposal with the objectives of State Planning Policy 3.7:

1. It avoids any increase in the threat of bushfire to people, property and infrastructure.

The proposed subdivision avoids unacceptable bushfire hazard. The design provides for the management of the bushfire threat to people, property and infrastructure to an acceptable level.

2. It reduces vulnerability to bushfire through the identification and consideration of bushfire risks in the design of the development and the decision-making process.

The bushfire risks have been identified, assessed and considered in the subdivision design including proposed building envelopes, as described within this report.

3. The design of the subdivision takes into account bushfire protection requirements and includes specific bushfire protection measures.

Compliance with the Bushfire Protection Criteria of the Guidelines is as follows:

- The proposed lots will each incorporate building envelopes subject to an acceptable rating of no greater than BAL-29.
- The entirety of each proposed Lot is required to be managed for low bushfire threat according to the specifications required of an Asset Protection Zone.
- Multiple access and egress routes will be available to the proposed lots. Harden Park Trail will terminate in a cul-de-sac with an acceptable length of 50m, however, the width of the existing road reserve is insufficient to install a compliant vehicle turning area at the cul-de-sac head.
- A reticulated water supply including existing hydrants is available to the proposed lots.

3. Achieves an appropriate balance between bushfire risk management measures and biodiversity, conservation values, and environmental protection.

The subdivision will avoid impact to any vegetation having significant conservation value. Any significant habitat trees or other significant vegetation is to be identified for retention in consultation with the City of Wanneroo.

2.0 Proposal Details

2.1 Subject Site

The subject site of this report is Lot 9190 (No.17) Banksia Grove located in the City of Wanneroo. Figure 2A illustrates the subject site and immediate surrounds.

The site is identified as being Bushfire Prone on the Map of Bush Fire Prone Areas 2018 (OBRM, 2018), as illustrated in Figure 2B.

The site is 3.6071 ha in area and is currently vegetated and undeveloped. Figure 2C illustrates the subdivision concept plan for the subject site.

2.2 Subdivision Description

The proposal involves the subdivision of the site into 23 Special Residential lots as follows:

Proposed Lot *	Area (m ²)
1	1509
2	1527
3	1527
4	1527
5	1527
6	1527
7	1527
8	1527
9	1513
10	1527
11	1527
12	1527
13	1527
14	1527
15	1527
16	1527
17	1527
18	1527
19	1527
20	1527
21	1527
22	1527
23	2501

* the lot numbers have been adopted only for identification purposes for this Plan.

2.3 Previous Bushfire Assessments

A previous bushfire assessment for the subject site, by Bushfire West Pty Ltd dated 26/01/2019, incorporated a 22 Lot subdivision concept. The assessment is amended within this document to incorporate the proposed 23 Lot subdivision design.

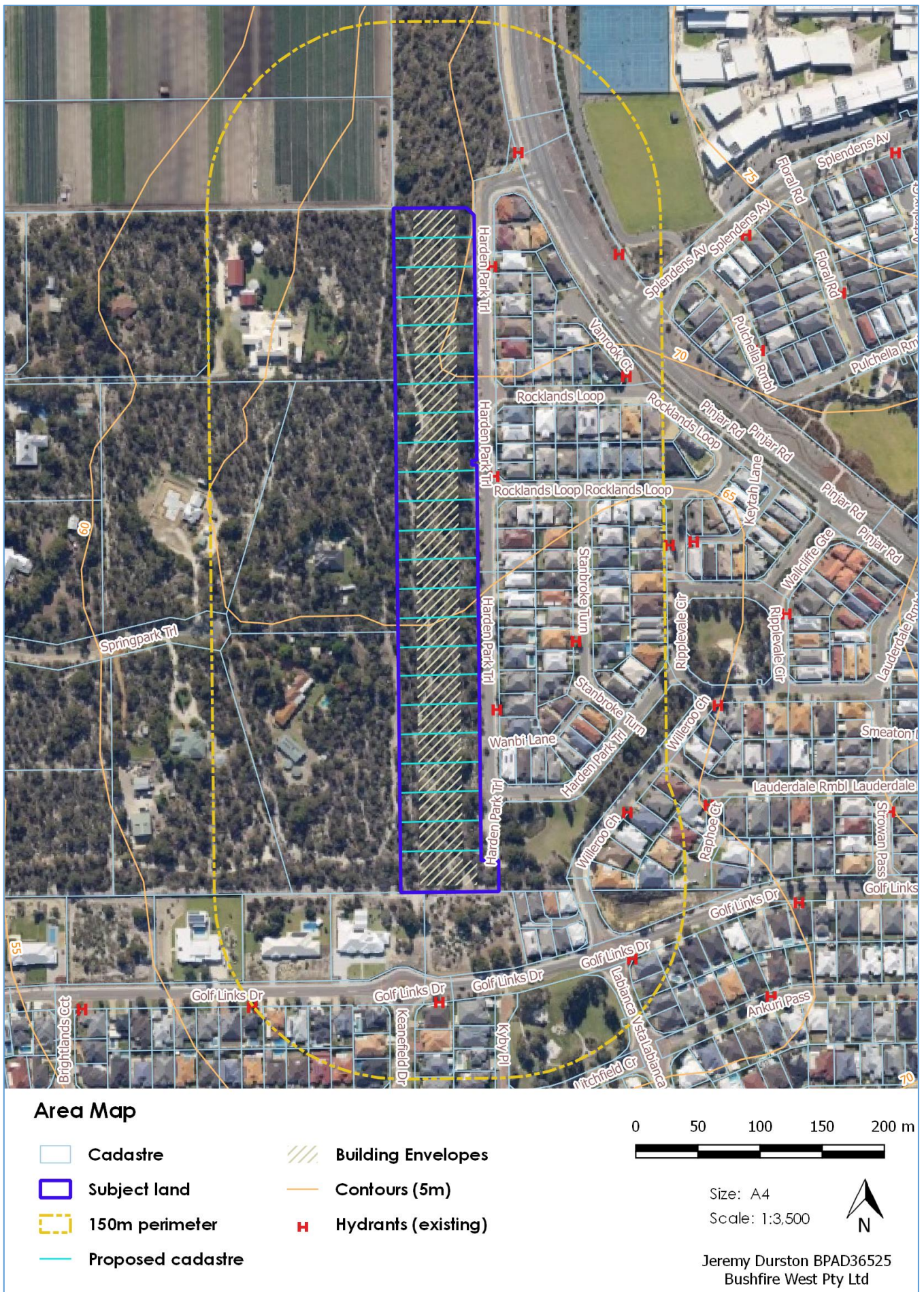


Figure 2A: Area Map



Figure 2B: Designated Bushfire Prone Area Map



3.0 Environmental Considerations

The following environmental considerations have been addressed with the aid of the WALGA Environmental Planning Tool.

Figure 3A illustrates the identified environmental considerations for the subdivision. The proponent has not identified any additional environmental considerations located within the site or potentially affected by the subdivision.

3.1 Native Vegetation

Local Natural Area (LNA) category vegetation is identified within the site, and also to the west and north of the site. Consultation with the City of Wanneroo regarding the potential impact of the Proposal on native vegetation is therefore required.

3.2 Environmentally Sensitive Areas

The site is not located within a designated Environmentally Sensitive Area.

3.3 Re-vegetation & Landscaping

All proposed lots will require landscaping to manage the potential bushfire threat from onsite vegetation. The required landscaping will include the removal and/or management of understorey vegetation in addition to the removal of sufficient trees to achieve a low bushfire threat, which generally requires canopy cover to be no greater than 15%.

Prior to the removal or modification of any native vegetation, any significant habitat trees or other significant vegetation should firstly be identified for retention in consultation with the City of Wanneroo. Such vegetation identified for retention should be illustrated on any future applicable Local Development Plan.

The removal of any native vegetation will be subject to the prior approval from the relevant authorities. Should approval not be forthcoming to remove the necessary onsite vegetation required to manage the site for low bushfire threat, the assessed BAL ratings will need to be updated and this Bushfire Management Plan will need to be revised accordingly.

No known requirement exists for any re-vegetation that will impact the assessed bushfire threat.

Environmental Considerations Map

Legend

Site

Boundary

Context area

150m

new subdiv

Proposed cadastre

Building

Envelopes

Administrative Planning Categories

- Bush Forever (BF)
- Bush Forever, DPaW Conservation (BFDPWCON)
- Bush Forever, DPaW Conservation, Reg Park (BFDPWCONREG)
- Bush Forever, DPaW State Forest (BFDPWFSF)
- Bush Forever, DPaW Other (BFDPWOTH)
- Bush Forever, DPaW Other, Reg Park (BFDPWOTHREG)
- Bush Forever, Reg Park (BFREG)
- DPaW Conservation (DPWCON)
- DPaW Conservation, Reg Park (DPWCONREG)
- DPaW State Forest (DPWSF)
- DPaW State Forest, Reg Park (DPWSFREG)
- DPaW Other (DPWOTH)
- DPaW Other, Reg Park (DPWOTHREG)
- Regional Park (REG)
- Local Natural Area (LNA)



Map Printed from WALGA Environmental Planning Tool on Tue Feb 19 12:33:26 WST 2019

Figure 3A: Environmental Considerations Map

4.0 Bushfire Assessment Inputs

4.1 Effective Slope



Effective slope under each vegetation area was assessed in accordance with the methodology detailed in AS 3959-2018 *Construction of buildings in bushfire prone areas* (AS 3959) (Standards Australia, 2009). Slope data was measured on site and cross referenced with Landgate elevation data.




The assessment area was found to exhibit a minor slope generally from the west upwards towards the east. The effective slope of each vegetation area is listed in the tables provided in Section 4.2 below.

4.2 Bushfire Fuels

The location and extent of classified vegetation structures, including low-threat exclusions, within 150 metres of the site are mapped in Figure 4A and illustrated in the photos below. All bushfire structures and fuel loads are assessed in their mature states unless otherwise identified. The areas of classified vegetation are summarised in Table 4A

Where relevant, the requirements of the City of Wanneroo Annual Firebreak and Fuel Hazard Reduction Notice have been referenced to support the classification and/or Exclusion of vegetation as a bushfire threat, including the requirement to “install and maintain a twenty (20) metre building protection zone surrounding all buildings”. A copy of the 2018/19 Firebreak and Fuel Hazard Reduction Notice is included in Appendix 2.

Area 1	
AS3959-2018 Classification	Class B Woodland
Effective Slope	Downslope 3 degrees
<p><i>Plot 1 comprises the wooded area to the north of the site. Vegetation consists of predominately Banksia and Sheoak trees below 6m in height. Isolated Eucalypts represent less than 10% canopy coverage. The understorey is shrubs, grasstrees and grass. The vegetation lacks the extent of Eucalypts that would characterise Forest classification.</i></p>	
 <p>8... Banksia Grove 31/10/18, 12:10:38 pm</p> <p>Photo ID: 1a</p>	 <p>8... Banksia Grove 31/10/18, 12:19:01 pm</p> <p>Photo ID: 1b</p>

Area 2	
AS3959-2018 Classification	Class B Woodland
Effective Slope	Downlope 3.0 degrees
Area 2 comprises a wooded area to the west of the site, defined by the slope of up to 3.0 degrees downslope. Vegetation consists of predominately Banksia and Sheoak trees below 6m in height. Isolated Eucalypts represent less than 10% canopy coverage. The understorey is shrubs, grasstrees and grass. The vegetation lacks the extent of Eucalypts that would characterise Forest classification.	
 <p>DIRECTION 266 deg(T) -31.70268° ACCURACY 5 m +115.79314° DATUM WGS84</p> <p>3 Harden Park Trail Banksia Grove 31/10/18, 12:01:01 pm</p> <p>Photo ID: 2a</p>	 <p>DIRECTION 262 deg(T) -31.70177° ACCURACY 5 m +115.79320° DATUM WGS84</p> <p>3 Harden Park Trail Banksia Grove 31/10/18, 12:03:10 pm</p> <p>Photo ID: 2b</p>
 <p>DIRECTION 228 deg(T) -31.70034° ACCURACY 5 m +115.79315° DATUM WGS84</p> <p>5... Banksia Grove 31/10/18, 12:06:20 pm</p> <p>Photo ID: 2c</p>	

Area 3	
AS3959-2018 Classification	Class B Woodland
Effective Slope	Downslope 1.5 degrees
Area 3 comprises a wooded area to the west of the site, defined by the slope of up to 1.5 degrees downslope. Vegetation consists of predominately Banksia and Sheoak trees below 6m in height. Isolated Eucalypts represent less than 10% canopy coverage. The understorey is shrubs, grasses and grass. The vegetation lacks the extent of Eucalypts that would characterise Forest classification.	
<div> <div> <div> DIRECTION 266 deg(T) </div> <div> -31.70503° +115.79307° </div> <div> ACCURACY 5 m DATUM WGS84 </div> </div>  <div> 1 Harden Park Trail </div> <div> Banksia Grove </div> <div> 31/10/18, 11:52:27 am </div> </div> <div>Photo ID: 3a</div>	
<div> <div> <div> DIRECTION 286 deg(T) </div> <div> -31.70463° +115.79307° </div> <div> ACCURACY 5 m DATUM WGS84 </div> </div>  <div> 1 Harden Park Trail </div> <div> Banksia Grove </div> <div> 31/10/18, 11:53:17 am </div> </div> <div>Photo ID: 3b</div>	
<div> <div> <div> DIRECTION 266 deg(T) </div> <div> -31.70268° +115.79314° </div> <div> ACCURACY 5 m DATUM WGS84 </div> </div>  <div> 3 Harden Park Trail </div> <div> Banksia Grove </div> <div> 31/10/18, 12:01:01 pm </div> </div> <div>Photo ID: 3c</div>	

Area 4

AS3959-2018 Classification	Class B Woodland
Effective Slope	Upslope
<p>Area 4 comprises a wooded strip of public open space to the east of the site. Vegetation consists of predominately Banksia and Sheoak trees below 6m in height. Isolated Eucalypts represent less than 10% canopy coverage. The understorey is shrubs, grasstrees and grass. The vegetation lacks the extent of Eucalypts that would characterise Forest classification.</p>	



Photo ID: 4a



Photo ID: 4b

Area 5

AS3959-2018 Classification	Class B Woodland
Effective Slope	Upslope
<p>Area 5 comprises a wooded pocket of public open space to the east of the site. Vegetation consists of predominately Banksia and Sheoak trees below 6m in height. Isolated Eucalypts represent less than 10% canopy coverage. The understorey is shrubs, grasstrees and grass. The vegetation lacks the extent of Eucalypts that would characterise Forest classification.</p>	



Photo ID: 5a



Photo ID: 5b

Area 6

AS3959-2018 Classification

Class B Woodland

Effective Slope

Upslope

Area 6 comprises the wooded area of the undeveloped land to the south of the site. Vegetation consists of dispersed eucalypts with Banksia and Sheoak trees, and canopy cover below 30%. The understorey is shrubs, grasses and grass. The vegetation structure is classified Woodland. The vegetation lacks the extent of Eucalypts that would characterise Forest classification.



Photo ID: 6a



Photo ID: 6b

Area 7

AS3959-2018 Classification

Class C Shrubland

Effective Slope

Upslope

Area 7 comprises the non-wooded area of the undeveloped land to the south of the site. Vegetation consists of shrubs and grasses below 2m in height with grass. The vegetation structure is classified Shrubland.



Photo ID: 7a



Photo ID: 7b (to the right of firebreak)

Area 8	
AS3959-2018 Classification	Exclusion 2.2.3.2(f)
Effective Slope	n/a
Area 8 comprises the area of maintained public open space to the east of the site, with lawn, shade trees and landscaped gardens managed for low bushfire threat.	
<div> <div> DIRECTION 200 deg(T) -31.70460° +115.79438° ACCURACY 5 m DATUM WGS84 </div>  <div> 15 Harden Park Trail Banksia Grove 31/10/18, 11:25:26 am </div> </div> <div> DIRECTION 210 deg(T) -31.70454° +115.79458° ACCURACY 5 m DATUM WGS84 </div>  <div> 15 Harden Park Trail Banksia Grove 31/10/18, 11:25:09 am </div>	
Photo ID: 8a Photo ID: 8b	

Area 9	
AS3959-2018 Classification	Exclusion 2.2.3.2(f)
Effective Slope	n/a
Area 9 comprises the maintained area of public open space to the south of the site, with lawn, shade trees and landscaped gardens managed for low bushfire threat.	
<div> DIRECTION 159 deg(T) -31.70586° +115.79411° ACCURACY 5 m DATUM WGS84 </div>  <div> 22 Harden Park Trail Banksia Grove 31/10/18, 11:35:45 am </div>	
Photo ID: 9a	

Area 10

AS3959-2018 Classification	Exclusion 2.2.3.2(c)
Effective Slope	n/a

Area 10 comprises the unmanaged vegetation in the drainage basin to the south east of the site. Vegetation consists of grass and isolated shrubs. This area is less than 0.25 ha, not within 20m of other such vegetation, and not within 20m of the site. This area is excluded as a bushfire threat under clause 2.2.3.2(c).



Photo ID: 10a

Area 11

AS3959-2018 Classification	Exclusions 2.2.3.2(e) and (f)
Effective Slope	n/a

Area 11 comprises the developed residential area to the south west of the site and north of Golf Links Drive. Vegetation consists of lawns, landscaped gardens and road verges managed for low threat. Residential Lot owners/occupants are required by the Firebreak and Fuel Hazard Reduction Notice to install and maintain a building protection zone surrounding all buildings.



Photo ID: 11a



Photo ID: 11b

Area 12

AS3959-2018 Classification	Exclusions 2.2.3.2(e) and (f)
Effective Slope	n/a

Area 12 comprises the balance of developed residential areas to the south of the site. Vegetation consists of lawns, gardens and road verges managed for low threat. Residential Lot owners/occupants are required by the Firebreak and Fuel Hazard Reduction Notice to install and maintain a building protection zone surrounding all buildings.



Photo ID: 12a



Photo ID: 12b

Area 13

AS3959-2018 Classification	Exclusions 2.2.3.2(e) and (f)
Effective Slope	n/a

Area 13 comprises the developed residential area to the east of the site. Vegetation consists of lawns, gardens and road verges managed for low threat. Residential Lot owners/occupants are required by the Firebreak and Fuel Hazard Reduction Notice to install and maintain a building protection zone surrounding all buildings.



Photo ID: 13a



Photo ID: 13b

Area 13



Photo ID: 13c



Photo ID: 13d



Photo ID: 13e

Area 14

AS3959-2018 Classification

Exclusions 2.2.3.2(e) and (f)


Effective Slope

n/a

Area 14 comprises the market garden located to the north west of the site. Vegetation consists of non-curing crops maintained for low threat.



Photo ID: 14a

Area 15	
Pre-development AS3959-2018 Classification	Class B Woodland
Post-development AS3959-2018 Classification	Exclusions 2.2.3.2 (e) and (f)
Effective Slope	n/a
<p>Area 15 comprises the Wooded area adjacent to the north of the site. This area is identified as a section of Moort Rise road reserve on the Banksia Grove Local Development Plan No.13. Pre-development vegetation consists of predominately Banksia and Sheoak trees below 6m in height, with isolated Eucalypts representing less than 10% coverage. The understorey is shrubs, grasstrees and grass. The pre-development vegetation classification is Woodland.</p> <p>This section of road reserve is required to be maintained in low threat condition to provide an asset protection zone, to the minimum extent of 17m, between the site and the unmanaged vegetation to the north. Ultimately, this area is to include a sealed road with verge.</p>	
<div> <div> DIRECTION 41 deg(T) -31.70029° +115.79317° ACCURACY 5 m DATUM WGS84 </div>  <div> 8... Banksia Grove 31/10/18, 12:07:20 pm </div> </div> <p>Photo ID: 15a</p>	





Area 16	
Pre-development AS3959-2018 Classification	Class B Woodland
Post-development AS3959-2018 Classification	Exclusions 2.2.3.2 (e) and(f)
Effective Slope	n/a
<p>Area 16 comprises the area of the subject site. Pre-development vegetation consists of predominately Banksia and Sheoak trees below 6m in height, with isolated Eucalypts representing less than 10% coverage. The understorey is shrubs, grasstrees and grass. The pre-development vegetation classification is Woodland.</p> <p>The entire area of the site is required to be managed in low threat condition in future to the specifications required of an asset protection zone.</p>	
 <p>Photo ID: 16a</p>	 <p>Photo ID: 16b</p>
 <p>Photo ID: 16c</p>	 <p>Photo ID: 16d</p>

Table 4A Areas of classified vegetation and exclusions, post-development:

Vegetation Area	Vegetation Classification	Effective Slope
Area 1	Class B Woodland	Downslope 3.0°
Area 2	Class B Woodland	Downslope 3.0°
Area 3	Class B Woodland	Downslope 1.5°
Area 4	Class B Woodland	Upslope
Area 5	Class B Woodland	Upslope
Area 6	Class B Woodland	Upslope
Area 7	Class C Shrubland	Upslope
Area 8	Exclusion 2.2.3.2 (f)	n/a
Area 9	Exclusion 2.2.3.2 (f)	n/a
Area 10	Exclusion 2.2.3.2 (c)	n/a
Area 11	Exclusions 2.2.3.2 (e) & (f)	n/a
Area 12	Exclusions 2.2.3.2 (e) & (f)	n/a
Area 13	Exclusions 2.2.3.2 (e) & (f)	n/a
Area 14	Exclusions 2.2.3.2 (e) & (f)	n/a
Area 15	Exclusions 2.2.3.2 (e) & (f)	n/a
Area 16	Exclusions 2.2.3.2 (e) & (f)	n/a

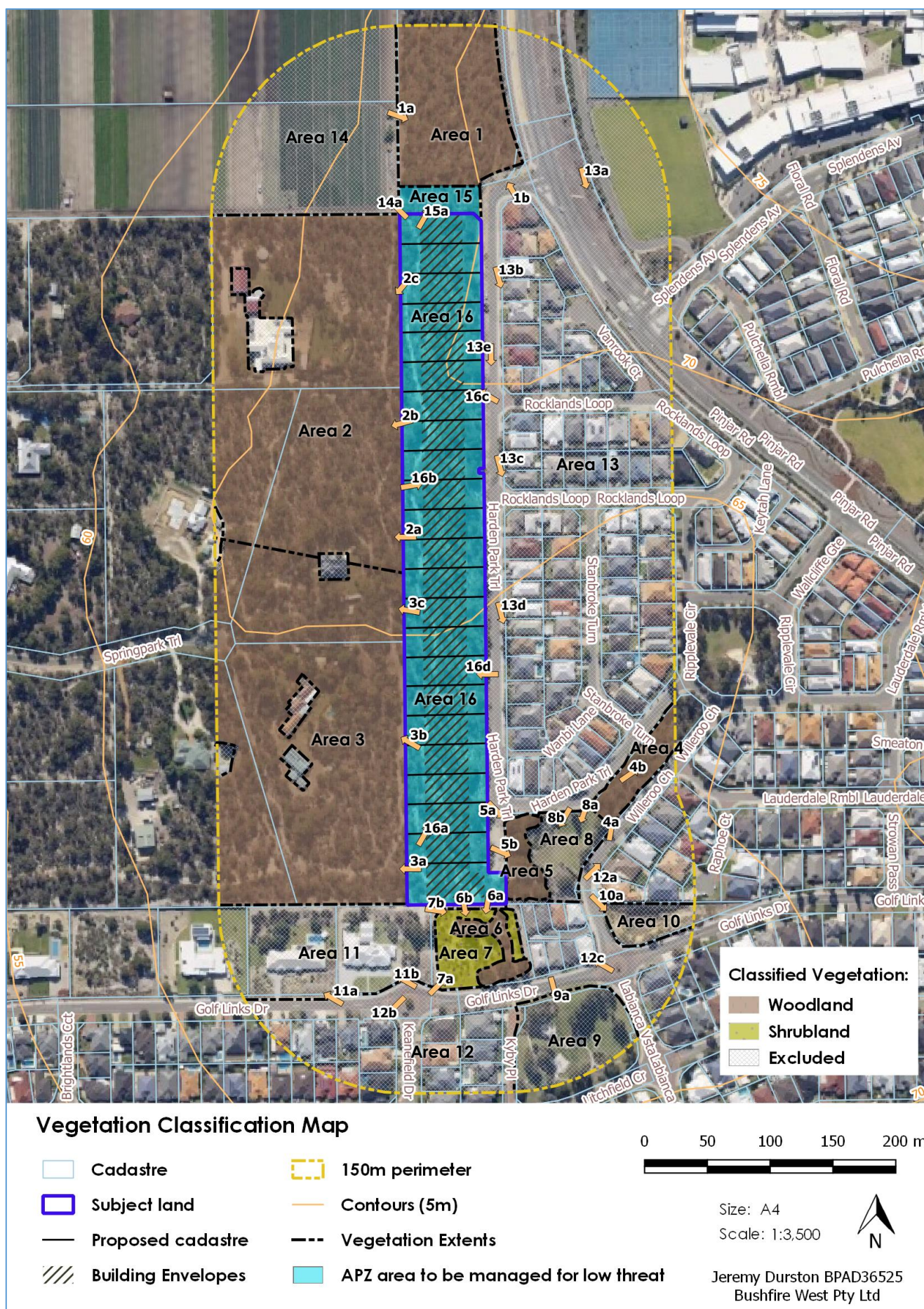


Figure 4A: Vegetation Classifications

5.0 Bushfire Assessment Outputs

5.1 Potential Bushfire Impact

Potential bushfire impact analysis was undertaken in accordance with SPP3.7 Guidelines and AS3959 to determine the potential radiant heat impacts to habitable buildings within the proposed building envelopes on each of the lots in the subdivision.

The potential impacts from identified vegetation Area 2 and Area 3 have been determined using AS 3959 Method 2 calculations, with modified input values as follows:

1. The **Area 2** variables for Effective Slope and Site Slope are both determined at up to **3.0 degrees downslope**, rather than applying the Method 1 slope bracket of >0 up to 5.0 degrees downslope.
2. The **Area 3** variables for Effective Slope and Site Slope are both determined at **1.5 degrees downslope**, rather than applying the Method 1 slope bracket of >0 up to 5.0 degrees downslope.

If the Method 1 slope bracket of up to 5.0 degrees downslope were applied, the potential slope effect would be over-estimated for Area 2 and Area 3. Using the Method 2 methodology provides a more accurate assessment of the Bushfire Attack Levels that apply to the proposed building envelopes from the primary bushfire hazard located to the west of the site, based on the assessed vegetation and topography.

The determined slope variables for Area 2 and Area 3 are the maximum assessed slopes that apply to these areas. No other input variables have been modified from those used for AS3959 Method 1.

The outputs from the Method 2 Bushfire Attack Level assessments are as follows:

Area	Vegetation Classification	Slope		Minimum distances to achieve BAL Ratings					
		Effective	Site	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5	BAL-LOW
2	Class B Woodland	3.0° down	3.0° down	<11.8m	11.8m	15.9m	23.1m	32.6m	100m
3	Class B Woodland	1.5° down	1.5° down	<11.0m	11.0m	14.8m	21.7m	30.7m	100m

Details of the Method 2 calculations for vegetation Area 2 and Area 3 are presented in Appendix 3.

The potential impacts from all other identified vegetation areas, aside from Area 2 and Area 3, have been determined using AS 3959 Method 1 calculations.

In accordance with SPP 3.7, BAL Contour Maps have been prepared to illustrate the potential radiant heat impacts and associated BAL ratings for the assessment area after the subdivision is completed (see Figures 5A to 5D). The resulting **maximum** BAL ratings that will apply to the subdivision site from each identified vegetation area are presented in the following table (Table 5A).

Table 5A: Maximum post-development BAL ratings for the site from each vegetation area:

Vegetation Area	Vegetation Classification	AS3959 Method	Effective Slope	Site Slope	Vegetation Separation	Maximum BAL
1	Class B Woodland	1	3.0°	n/a	17m	BAL-29
2	Class B Woodland	2	3.0°	3.0°	0m	BAL-FZ
3	Class B Woodland	2	1.5°	1.5°	0m	BAL-FZ
4	Class B Woodland	1	Upslope	n/a	80m	BAL-12.5
5	Class B Woodland	1	Upslope	n/a	0m	BAL-FZ
6	Class B Woodland	1	Upslope	n/a	4m	BAL-FZ
7	Class C Shrubland	1	Upslope	n/a	3m	BAL-FZ
8	Exclusion 2.2.3.2 (f)	1	n/a	n/a	n/a	BAL-LOW
9	Exclusion 2.2.3.2 (f)	1	n/a	n/a	n/a	BAL-LOW
10	Exclusion 2.2.3.2 (c)	1	n/a	n/a	n/a	BAL-LOW
11	Exclusions 2.2.3.2 (e)&(f)	1	n/a	n/a	n/a	BAL-LOW
12	Exclusions 2.2.3.2 (e)&(f)	1	n/a	n/a	n/a	BAL-LOW
13	Exclusions 2.2.3.2 (e)&(f)	1	n/a	n/a	n/a	BAL-LOW
14	Exclusions 2.2.3.2 (e)& f)	1	n/a	n/a	n/a	BAL-LOW
15	Exclusions 2.2.3.2 (e)&(f)	1	n/a	n/a	n/a	BAL-LOW
16	Exclusions 2.2.3.2 (e)&(f)	1	n/a	n/a	n/a	BAL-LOW

The separation between classified vegetation and future habitable buildings required to achieve indicative ratings of no higher than BAL-29 will be established by the proposed building envelopes, as detailed below.

The following table (Table 5B) illustrates the indicative ratings that are achievable for any future dwellings within the proposed **building envelope** on each Lot.

Table 5B: Indicative BAL ratings for the proposed **building envelopes**

Lot	Vegetation Classification	AS3959 Method	Effective Slope	Site Slope	Vegetation Separation	Maximum BAL
1	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
2	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
3	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
4	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
5	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
6	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
7	Class C Shrubland	2	3.0°	3.0°	16m	BAL-29
8	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
9	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
10	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
11	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
12	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
13	Class B Woodland	2	3.0°	3.0°	16m	BAL-29
14	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
15	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
16	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
17	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
18	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
19	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
20	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
21	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
22	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
23	Class B Woodland	2	1.5°	1.5°	15m	BAL-29
Note						
i	The selected vegetation area is that with the highest indicative BAL rating.					
ii	The separation distance is measured to the nearest point on the building envelope.					

As indicated above, future habitable buildings within all proposed building envelopes will achieve ratings no greater than BAL-29, as required by SPP3.7.

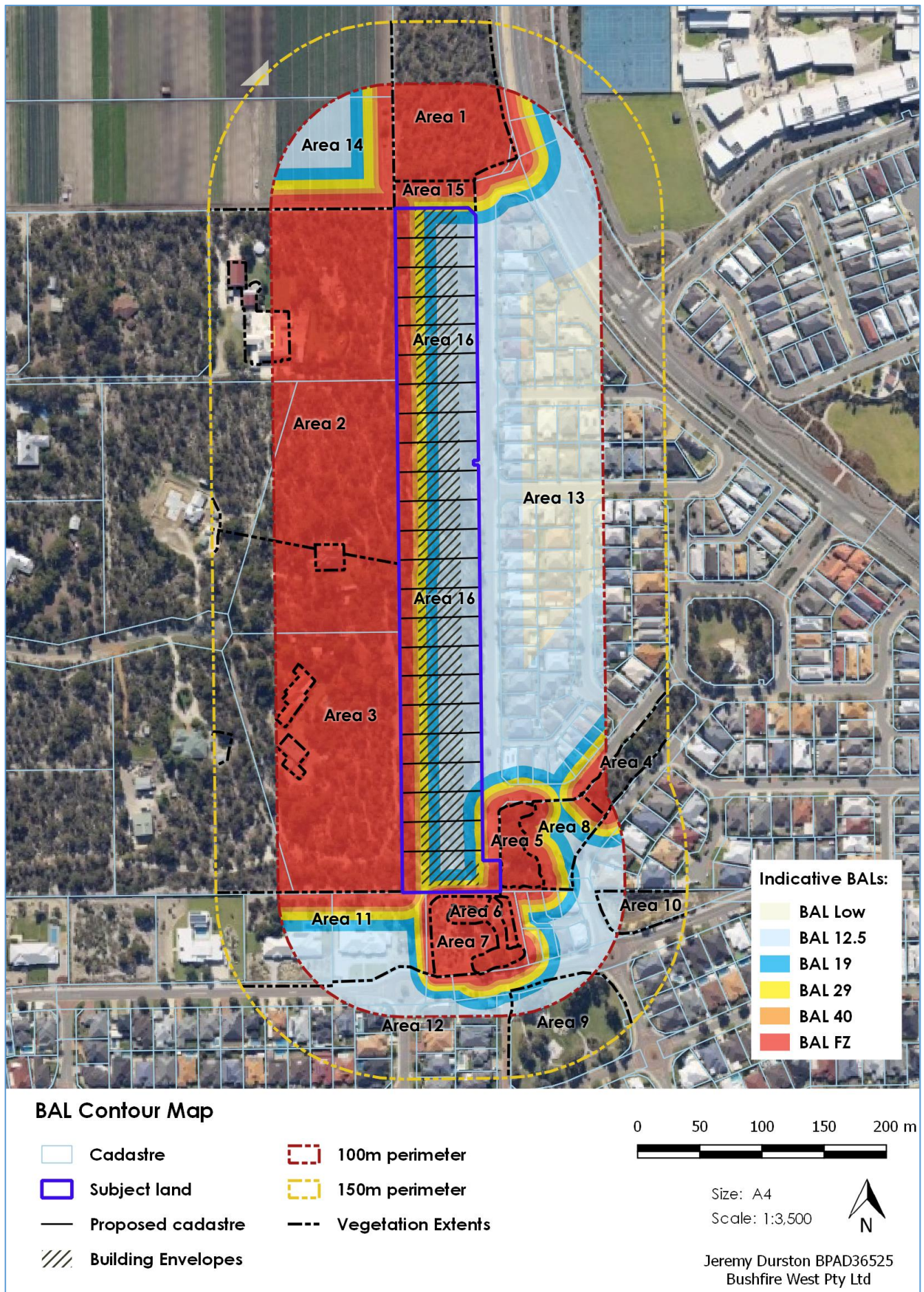


Figure 5A: BAL Contour Map (overview)

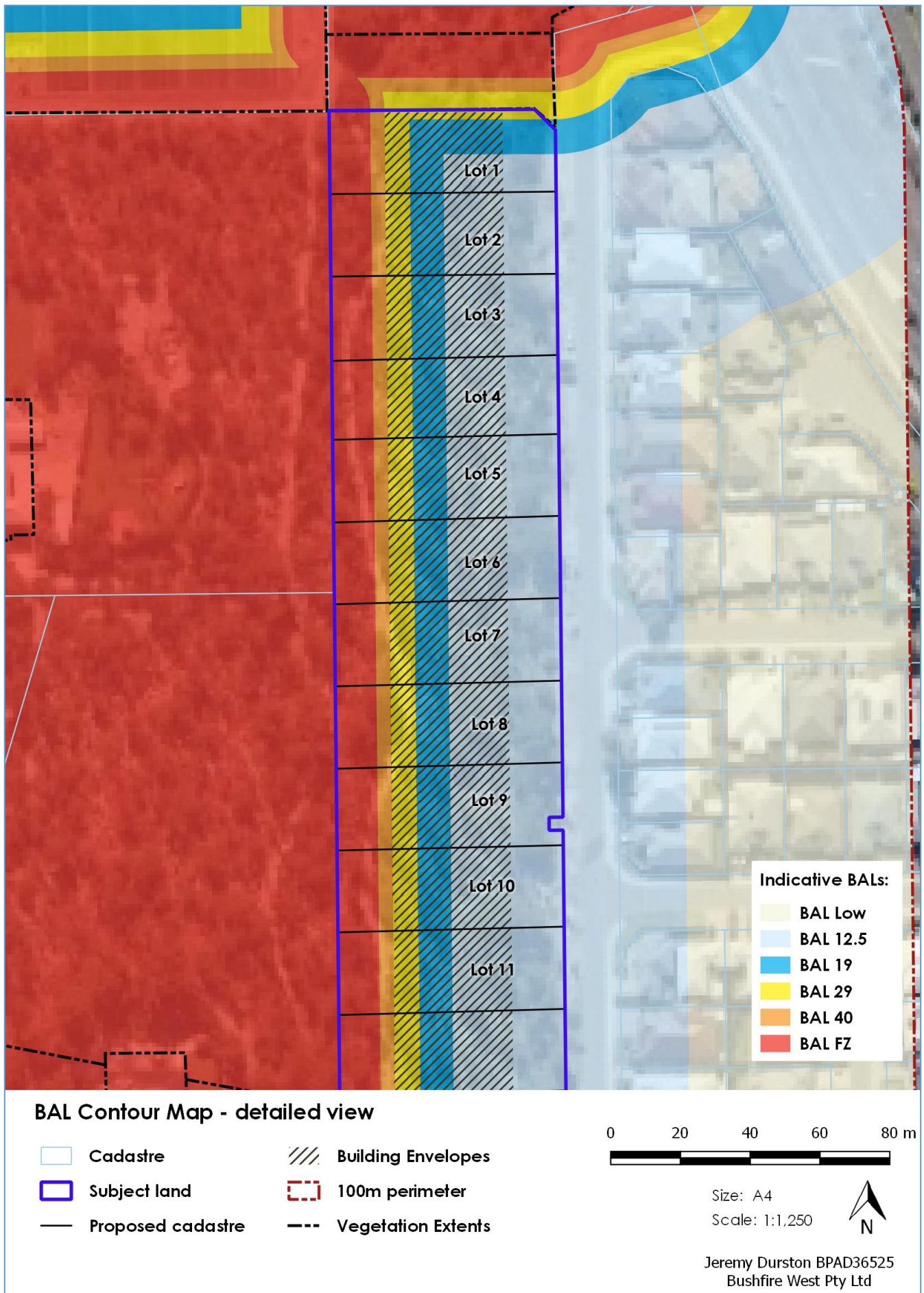


Figure 5B: BAL Contour Map (detail – northern section)

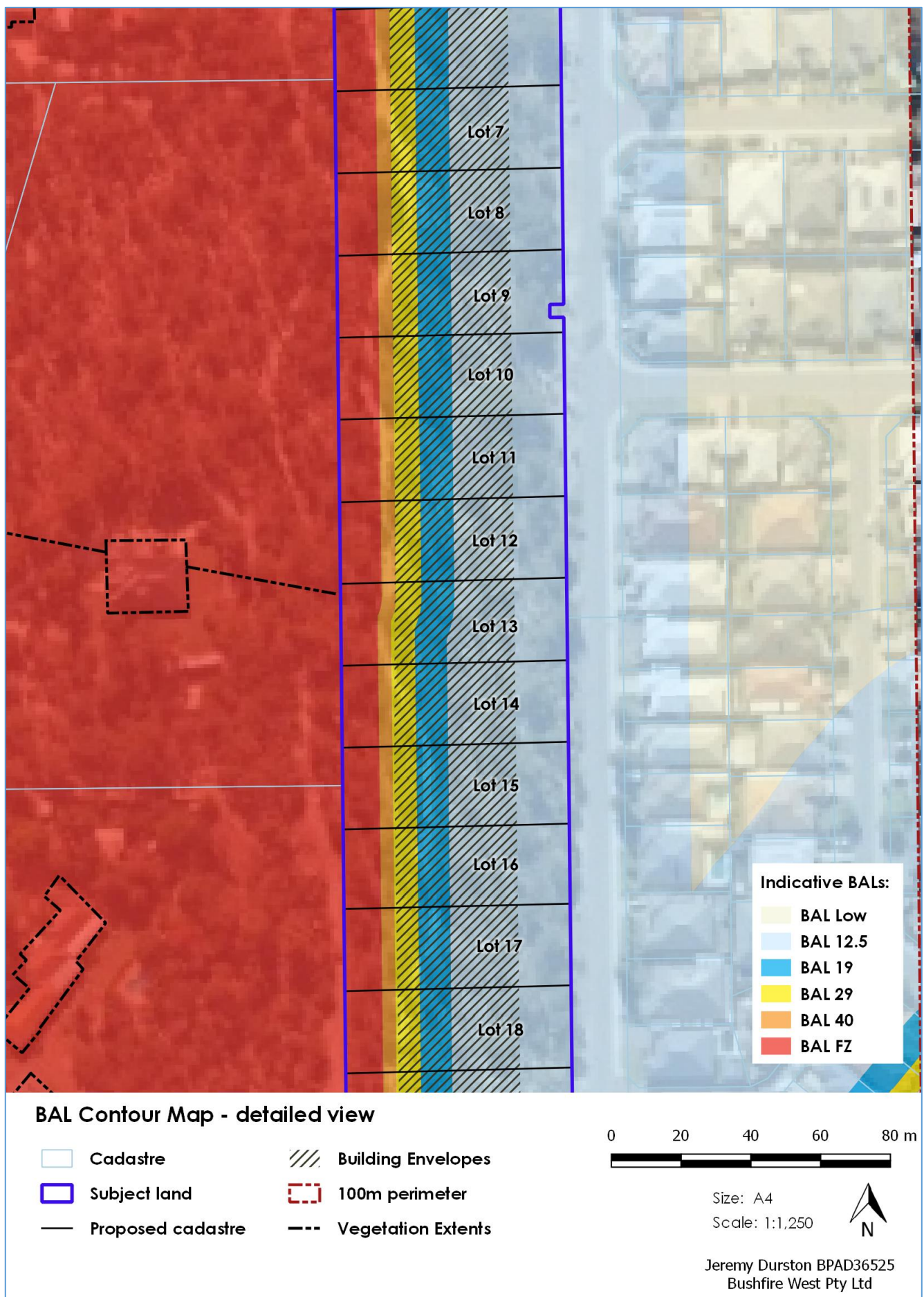


Figure 5C: BAL Contour Map (detail – central section)

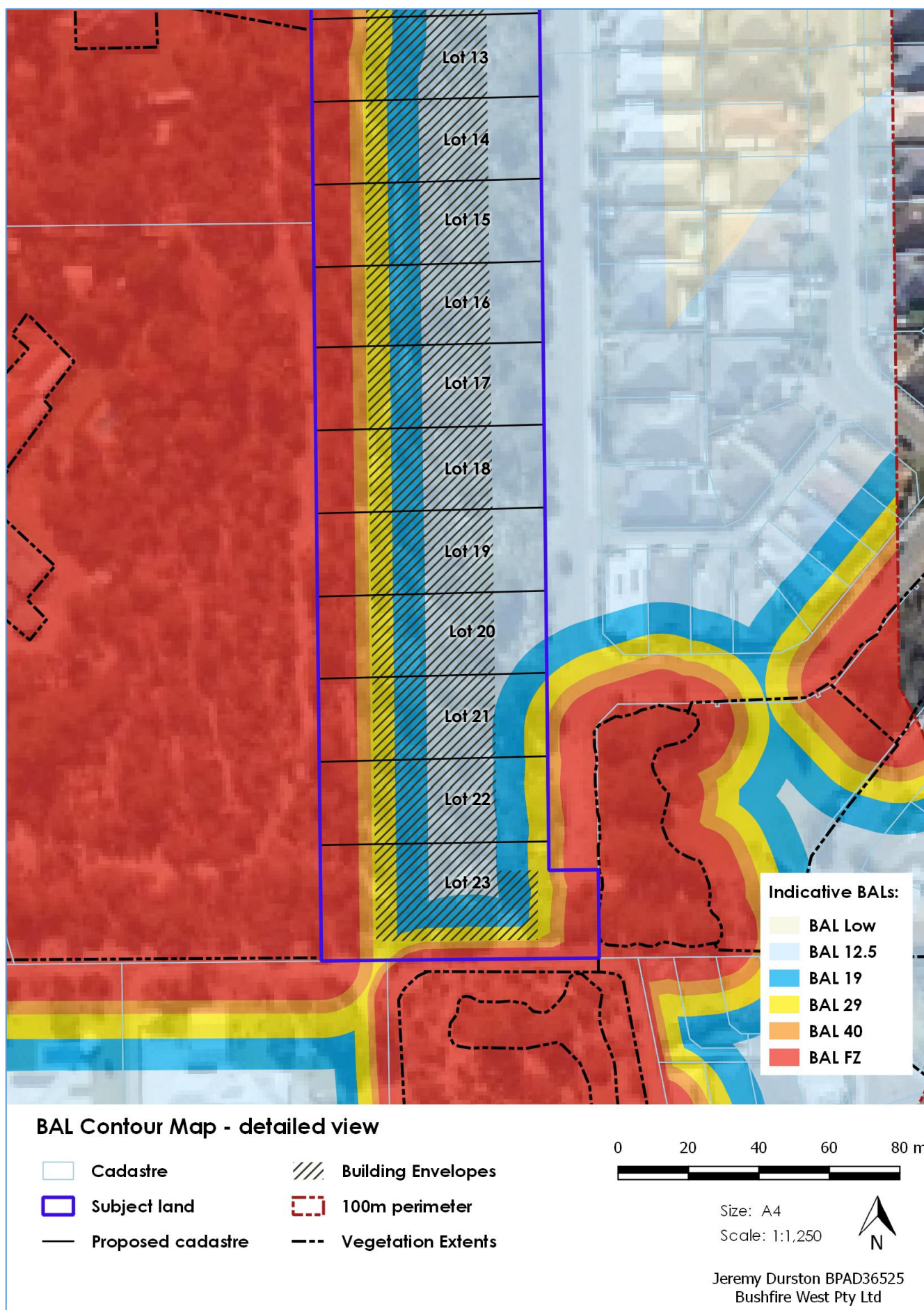


Figure 5D: BAL Contour Map (detail – southern section)

5.2 Bushfire Hazard Issues

The most significant identified bushfire hazards are:

- The vegetation within the site itself, which is required to be managed;
- The large areas of vegetation adjacent to the west and north of the site; and
- The pockets of vegetation in proximity to the southern sections of the site.

From the BAL assessments and mapping, the following bushfire hazard issues have been identified:

- The site will have ratings of up to BAL-FZ when assessed at the site boundaries, which necessitates appropriate building envelopes.
- The onsite vegetation is required to be managed for low threat, to the standards required of an Asset Protection Zone, to ensure the BAL ratings are not impacted by any onsite vegetation. This is addressed in Section 6 of this report.
- All proposed lots will include building envelopes that will be subject to ratings no higher than BAL-29.
- Future residential buildings and any associated Class 10a buildings are to be constructed to the applicable construction standard of AS 3959.
- Due to the proposed subdivision being subject to a rating above BAL-LOW the relevant bushfire protection criteria apply and are addressed in Section 6 of this report.
- The BAL ratings provided in the BAL Contour Maps and associated tables are indicative only and are for the purposes of demonstrating compliance with the bushfire protection criteria of SPP 3.7. Individual BAL assessments are required to determine the final BAL ratings for applicable buildings prior to the issuance of building permits.

6.0 Bushfire Protection Criteria

6.1 Guidelines for Planning in Bushfire Prone Areas Version 1.3 (the Guidelines)

The Guidelines apply to subdivision applications located within designated bushfire prone areas. The Guidelines provide supporting information for implementation of SPP 3.7. Specifically, they provide the Bushfire Protection Criteria to be addressed for all applications.

6.2 Proposal Assessment

Table 6A provides an assessment against the bushfire protection criteria detailed in Appendix 4 of the Guidelines, including the applicable Acceptable Solutions for each element.

Table 6A: Assessment against the bushfire protection criteria of the Guidelines

Element	Acceptable Solution (A)	Compliance		Notes
1. Location	A1.1 Development location	Yes	When developed	The development location is assessed as capable of achieving BAL-29 or lower for future dwellings within the proposed building envelopes, subject to management of onsite vegetation.
2. Siting of Development	A2.1 Asset Protection Zone	Yes	When developed	The entire area of the proposed lots is to be managed for low bushfire threat in accordance with the APZ specifications detailed in Appendix 1. The required APZ is to extend to the north of the site for a minimum width of 17m (i.e. to include a section of the designated Moort Rise road reserve).
3. Vehicular Access	A3.1 Two access routes	Yes	Existing Site	All lots will be accessible from Harden Park Trail, which connects with Pinjar Road to the north, and with Golf Links Drive to the south via Ripplevale Circle and Willeroo Chase. These routes connect to the wider area public road network providing access in multiple directions.
	A3.2 Public road	Yes	When developed	The southern, undeveloped section of Harden Park Trail is to be constructed with minimum 6m trafficable surface and to the relevant standards specified in the Local Government Guidelines for Subdivisional Development, which meet the requirements for bushfire access.

Element	Acceptable Solution (A)	Compliance		Notes
	A3.3 Cul-de-sac	No		The existing southern end of the Harden Park Trail road reserve will create a cul-de-sac of approximately 50m in length. The length of the cul-de-sac is acceptable. The width of the road reserve is not sufficient to allow a compliant vehicle turning area. There is no proposed modification to the road reserve.
	A3.4 Battle-axe	N/A		No battle-axe lots are proposed.
	A3.5 Private driveways longer than 50m	N/A		All driveways will be less than 50m in length.
	A3.6 Emergency access way	N/A		No emergency access ways are required.
	A3.7 Fire service access routes	N/A		No fire service access routes are required.
	A3.8 Firebreak widths	N/A		All residential lots are less than 0.5 ha in area and are not required by the Guidelines to have firebreaks. Any created balance Lot over 0.5 ha is required to have a 3m wide boundary firebreak.
4. Water	A4.1 Reticulated areas	Yes	Current	The site is located within an existing reticulated area with hydrants installed along Harden Park Trail and also Golf Links Drive. The furthest point on any building envelope from an existing hydrant is no greater than 120m.
	A4.2 Non-reticulated areas	N/A		Reticulated area.
	A4.3 Individual lots within non-reticulated areas	N/A		Reticulated area.

6.3 Bushfire Management Strategies

The proposed risk management measures, as detailed in Table 6A, are illustrated in the following Bushfire Management Strategies Map (Figure 6A).

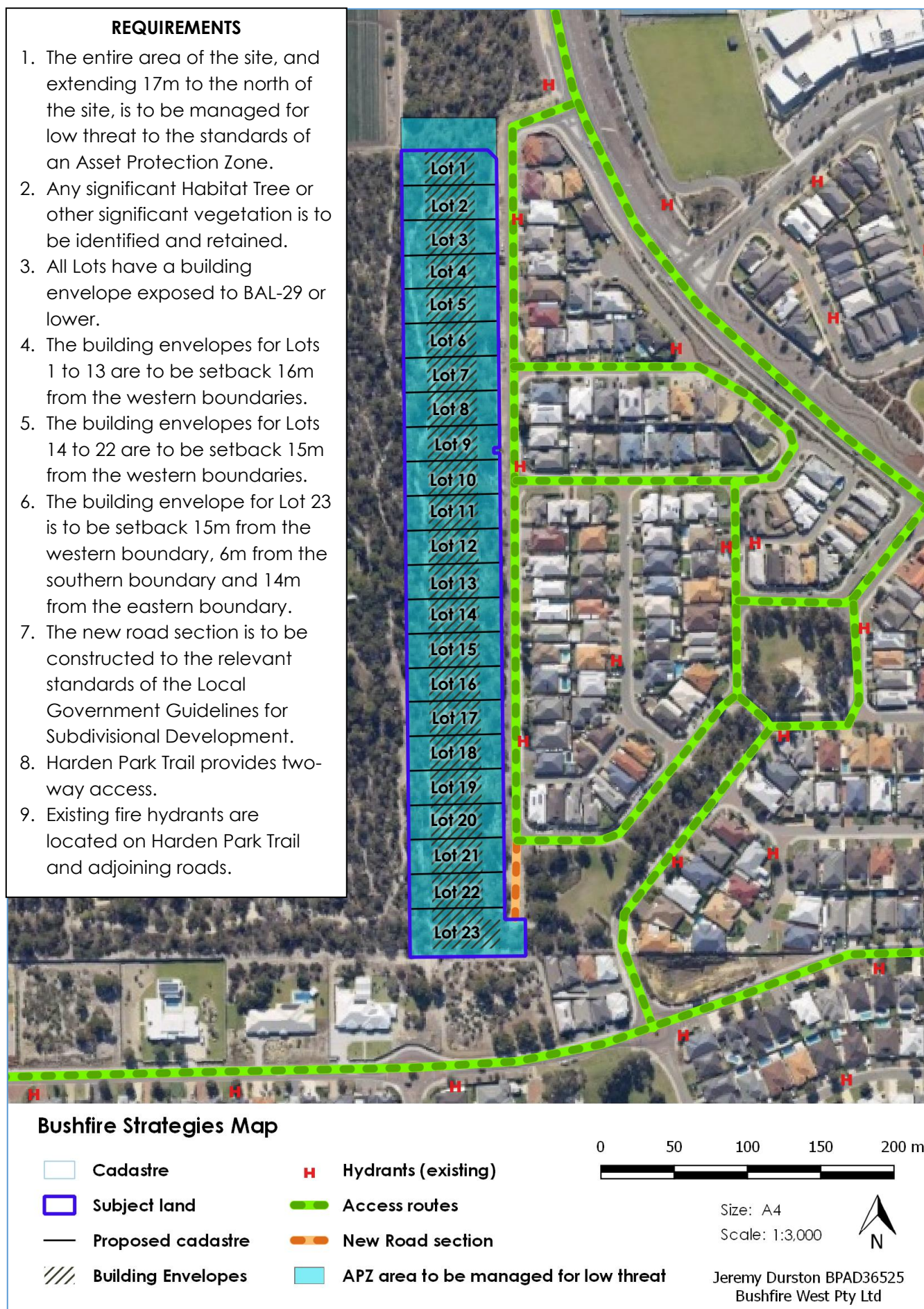


Figure 6A: Bushfire Management Strategies Map

7.0 Implementation and Management

Table 7A: Implementation Schedule

No.	Management Action	Timing
1.0 Developer Prior to Issue of Titles		
1.1	Construction of the southern section of Harden Park Trail to the relevant standards of the Local Government Guidelines for Subdivisional Development to ensure safe access and egress.	Subdivision
1.2	Consult with the City of Wanneroo to identify any significant vegetation to be retained.	Subdivision
1.3	Installation of the low threat Asset Protection Zone as detailed within this Bushfire Management Plan, retaining any identified significant vegetation.	Subdivision
1.4	Prepare a notification to be included on the certificate of titles advising the relevant Bushfire Attack Level and the land being subject to a Bushfire Management Plan.	Subdivision
2.0 Developer Prior to Sale		
2.1	Providing prospective residents with a summary of this Bushfire Management Plan.	Sale of Lots

No.	Management Action	Timing
3.0 Landowners Prior to Occupancy		
3.1	Ensuring that any application for a building permit for a dwelling is to include a Bushfire Attack Level assessment.	Development
4.0 Landowners Ongoing		
4.1	Undertaking regular property maintenance in preparation for the annual fire season.	Ongoing
4.2	Comply with all required fire mitigation measures prescribed in Council's annual Firebreak and Fuel Hazard Reduction Notice.	Ongoing

Table 7A: Implementation Schedule (continued)

No.	Management Action	Timing
5.0 Local Government Prior to Issue of Titles		
5.1	Identify any significant vegetation to be retained.	Subdivision
6.0 Local Government Ongoing Management		
6.1	Ensuring Building Permit Applications and Development Applications are compliant with the building and land use planning provisions.	Ongoing
6.2	Maintenance of vegetation in low threat condition within the designated areas of Public Open Space and road reserves.	Ongoing
6.3	Enforce compliance with its annual Firebreak and Fuel Hazard Reduction Notice.	Ongoing

8.0 References

City of Wanneroo. (2018). Annual Firebreak and Fuel Hazard Reduction Notice 2018/19.

Department of Planning Lands and Heritage. (2017). Local Government Guidelines for Subdivisional Development.

OBRM. (2018). Map of Bush Fire Prone Areas 2018. Office of Bushfire Risk Management.

Standards Australia. (2018). AS 3959-2018 Construction of buildings in bushfire prone areas.

WAPC. (2015). State Planning Policy 3.7 Planning in Bushfire Prone Areas.

WAPC. (2016). Planning Bulletin 111/2016 Planning in Bushfire Prone Areas.

WAPC. (2017a). Guidelines for Planning in Bushfire Prone Areas Version 1.3.

WAPC. (2017b). Guidelines for Planning in Bushfire Prone Areas Appendices Version 1.3.

Appendix 1 – Asset Protection Zone Specifications

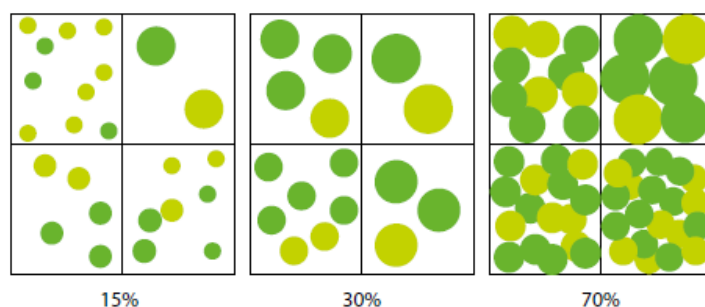
Source: *Guidelines for Planning in Bushfire Prone Areas (DoP/DFES v1.3 2017)*

Fences: within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.

Objects: within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.

Fine Fuel Load: combustible dead vegetation matter less than 6 mm in thickness reduced to and maintained at an average of two tonnes per hectare.

Trees (> 5 metres in height): trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy. Diagram below represents tree canopy cover at maturity.



Shrubs (0.5 metres to 5 metres in height): should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m² in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.

Ground covers (<0.5 metres in height): can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 mm in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.

Grass: should be managed to maintain a height of 100 mm or less.

FIRE BREAKS / FUEL HAZARD REDUCTION / FIRE BREAK EXAMPLES



Under the Bushfires Act (1954), all owners and occupiers of land in Western Australia must establish and maintain fire breaks.

Fire breaks and protection measures are vital in assisting the prevention of fires spreading and to allow safer access for bushfire fighters and vehicles.

Land with an area of less than 4,000m²

- A fire break, not less than three (3) metres wide must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Land with an area of 4,000m² or more

- A fire break, not less than three (3) metres wide, must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Buildings

- Install and maintain a twenty (20) metre building protection zone surrounding all buildings, large hay stacks and fuel storage areas. A building protection zone includes undertaking measures such as pruning all lower tree branches to prevent fire entering the trees, ensuring three (3) metre spacing between tree canopies to prevent treetop fires spreading between trees, keeping all grasses to a height of not more than fifty (50) millimetres and storing all firewood piles more than twenty (20) metres away from the buildings.

APPLICATION TO VARY THE ABOVE REQUIREMENTS

If it is considered impracticable for any reason to implement any of the requirements of this Notice, application may be made not later than the 18th of October annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the requirements of this Notice must be complied with.

ADDITIONAL WORKS

In addition to the requirements of this Notice, you may be required to carry out further works which are considered necessary by an Authorised Officer and specified by way of a separate written notice forwarded to the address of the owner/s as shown on the City of Wanneroo rates record for the relevant land.



Minimum clearances 3.5m above ground level dependent upon land area.



Non-compliant: no fire break installed inside boundary fence



Compliant: grass slashed to ground level



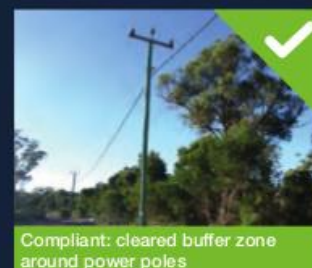
Non-compliant: mineral earth fire break showing grass/weed regrowth



Compliant: mineral earth fire break



Non-compliant: thick scrub creates a fire hazard around power poles



Compliant: cleared buffer zone around power poles

Appendix 3 – AS 3959 Method 2 Bushfire Attack Level calculations



Calculated November 21, 2018, 12:28 pm (MDC v.4.8)

Area 2: Woodland, Downslope to 3 degrees

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	80	Rate of spread	1.77 km/h
Vegetation classification	Woodland	Flame length	14.51 m
Surface fuel load	15 t/ha	Flame angle	55 °, 65 °, 73 °, 78 °, 80 ° & 85 °
Overall fuel load	25 t/ha	Elevation of receiver	5.32 m, 5.74 m, 5.72 m, 5.38 m, 5.11 m & 2.34 m
Vegetation height	n/a	Fire intensity	22,877 kW/m
Effective slope	3 °	Transmissivity	0.872, 0.853, 0.828, 0.802, 0.789 & 0.727
Site slope	3 °	Viewfactor	0.5987, 0.4438, 0.3011, 0.2047, 0.1662 & 0.0451
Flame width	100 m	Minimum distance to < 40 kW/m ²	11.8 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	15.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	23.1 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	32.6 m
		Minimum distance to < 10 kW/m ²	38.7 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

Calculated November 21, 2018, 12:16 pm (MDC v.4.8)

Area 3: Woodland, Downslope to 1.5 degrees

Minimum Distance Calculator - AS3959-2009 (Method 2)

Inputs		Outputs	
Fire Danger Index	80	Rate of spread	1.59 km/h
Vegetation classification	Woodland	Flame length	13.38 m
Surface fuel load	15 t/ha	Flame angle	53.5 °, 64.5 °, 72.5 °, 76.5 °, 78.5 ° & 84.5 °
Overall fuel load	25 t/ha	Elevation of receiver	5.09 m, 5.65 m, 5.81 m, 5.7 m, 5.6 m & 4.32 m
Vegetation height	n/a	Fire intensity	20,628 kW/m
Effective slope	1.5 °	Transmissivity	0.875, 0.857, 0.831, 0.806, 0.793 & 0.73
Site slope	1.5 °	Viewfactor	0.5997, 0.4447, 0.299, 0.2035, 0.1655 & 0.045
Flame width	100 m	Minimum distance to < 40 kW/m ²	11 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	14.8 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	21.7 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	30.7 m
		Minimum distance to < 10 kW/m ²	36.5 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