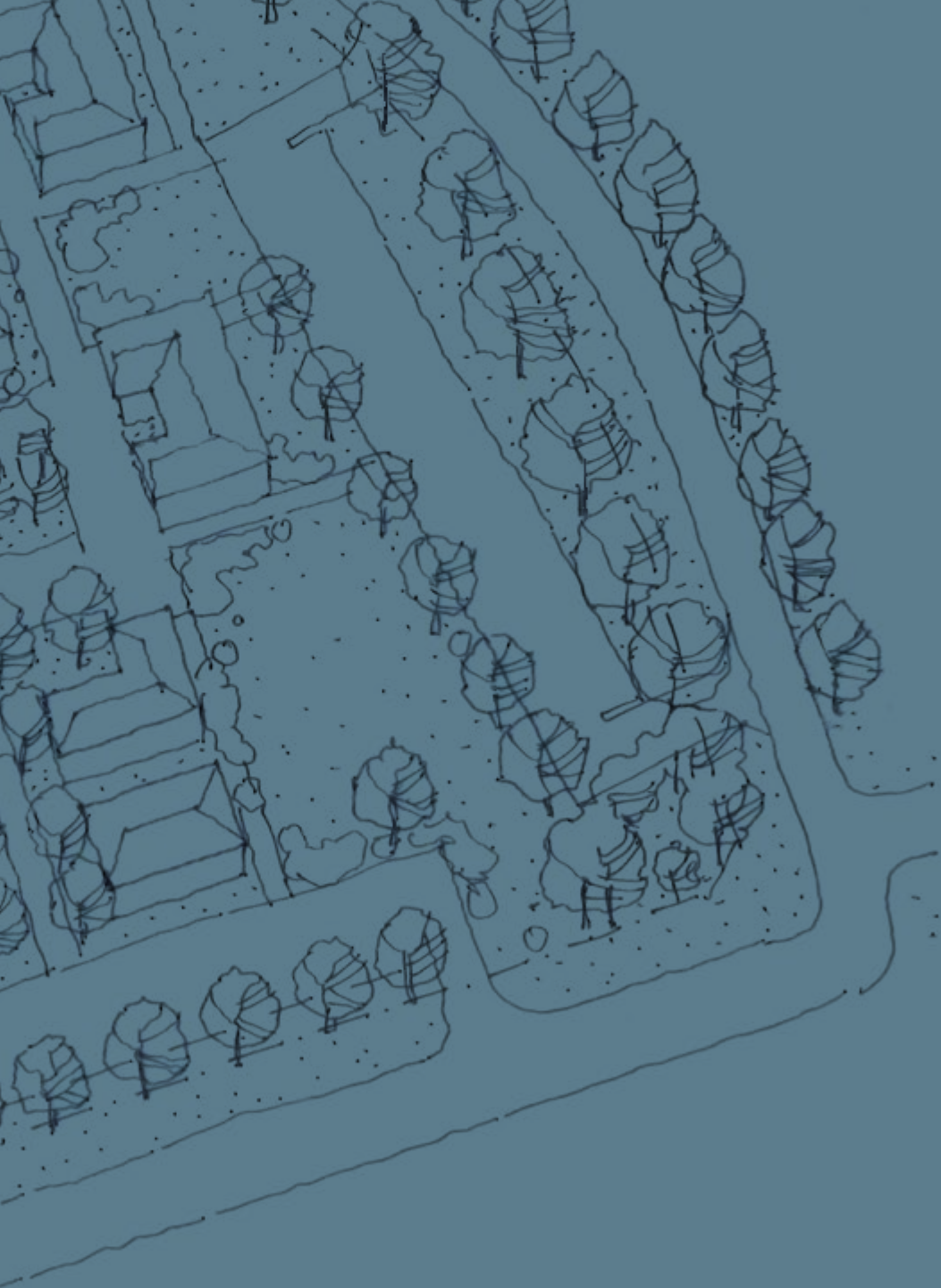


APPENDIX 7

BUSHFIRE MANAGEMENT PLAN



Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: North Stoneville Structure Plan 34 Amendment 1, Lot 48 Roland Road

Suburb: Stoneville

State: WA

P/code: 6081

Local government area: Shire of Mundaring

Description of the planning proposal: Structure Plan application

BMP Plan / Reference Number: 56850

Version: R03 Rev 7

Date of Issue: 11/06/2024

Client / Business Name: Satterley Property Group

Reason for referral to DFES	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)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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 BPC elements)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Strategic planning proposal (including rezoning applications)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Minor development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
High risk land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vulnerable land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

Structure Plan application

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name Louisa Robertson	Accreditation Level Level 3	Accreditation No. BPAD 36748	Accreditation Expiry 28/02/2025
Company JBS&G		Contact No. 08 9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner

LM Robertson

Date 11/06/2024



North Stoneville Structure Plan 34 Amendment 1

Satterley Property Group

Bushfire Management Plan (Structure Plan Application)

JBS&G 56850 | 123,646

11 June 2024





We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

Table of Contents

Abbreviations iv

Executive Summary.....	1
1. Proposal details.....	3
1.1 Background	3
1.1.1 Current Structure Plan proposal.....	3
1.2 Site description	4
1.2.1 Existing land uses.....	4
1.2.2 Existing vehicular access.....	4
1.2.3 Existing water supply	4
1.3 Bushfire prone designation.....	5
1.4 Purpose	5
1.5 Other plans/reports	5
1.5.1 Previous versions of this BMP	5
1.5.2 Land use planning, bushfire risk, and traffic and evacuation analysis	6
1.5.3 Other reports	7
1.6 Purpose of this report	7
2. Environmental considerations.....	10
2.1 Environmental values.....	10
2.2 Native vegetation – modification and clearing.....	12
2.3 Revegetation / Landscape Plans	13
3. Bushfire assessment results	14
3.1 Bushfire Hazard Level Assessment.....	14
3.2 Assessment inputs	14
3.2.1 Vegetation classification.....	14
3.2.2 Effective slope.....	15
3.2.3 Pre-development inputs.....	15
3.2.4 Post-development inputs	16
3.3 Assessment outputs.....	20
3.3.1 Bushfire Hazard Level assessment results	20
4. Identification of bushfire hazard issues	23
4.1 Bushfire context.....	23
4.1.1 Potential bushfire impact to the proposed development.....	23
4.1.2 Potential bushfire impact to evacuation routes.....	24
4.2 Bushfire hazard issues and proposed mitigation measures	25

5.	Assessment against the bushfire protection criteria.....	32
5.1	Compliance with Elements 1 – 4.....	32
5.2	Compliance with Element 5	37
6.	Responsibilities for implementation and management of the bushfire measures	40
6.1	Future responsibilities.....	40
7.	References	42
Appendix A	Vegetation plots – Photographs and description.....	43
Appendix B	Transect Design Guide	1
Appendix C	Asset Protection Zone standards and explanatory notes.....	2
Appendix D	Shire of Mundaring Firebreak and Fuel Load Notice.....	10
Appendix E	Vehicular access – Explanatory notes from the Guidelines	11
Appendix F	Bushfire firefighting water supply standards and explanatory notes	22
Appendix G	Limitations	26

List of Tables

Table 1: Summary of environmental values.....	10
Table 2: Bushfire hazard levels and characteristics.....	14
Table 3: Pre-development vegetation classifications/exclusions and effective slope	15
Table 4: Post-development vegetation classifications/exclusions and effective slope	16
Table 5: Asset Protection Zone requirements from post-development classified vegetation	17
Table 6: Bushfire hazard issues and bushfire management measures	25
Table 7: Compliance of the LSP area with the bushfire protection criteria of the Guidelines (Elements 1 – 4).....	32

List of Figures

Figure 1: Structure Plan (Hatch 2024)	8
Figure 2: Site overview	9
Figure 3: Pre-development vegetation classification and effective slope	18
Figure 4: Post-development vegetation classification and effective slope.....	19
Figure 5: Pre-development BHL assessment.....	21
Figure 6: Post-development BHL assessment	22
Figure 7: Proposed bushfire mitigation strategies – Asset Protection Zones and vegetation management... ..	38
Figure 8: Proposed bushfire mitigation strategies – Vehicular access and fire water	39

List of Plates

Plate 1: Map of Bush Fire Prone Areas (DFES 2021).....	5
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Appendices

Appendix A	Vegetation plots – Photographs and description
Appendix B	Transect Design Guide
Appendix C	Asset Protection Zone standards and explanatory notes
Appendix D	Shire of Mundaring Firebreak and Fuel Load Notice
Appendix E	Vehicular access – Explanatory notes from the Guidelines
Appendix F	Bushfire firefighting water supply standards and explanatory notes
Appendix G	Limitations

Abbreviations

Term	Definition
AHD	Australian Height Datum
AS	Acceptable Solution
AS 3959	<i>Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas (SA 2018)</i>
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BHL	Bushfire Hazard Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DA	Development Application
DBCA	Department of Biodiversity Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DFES	Department of Fire and Emergency Services
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
EAW	Emergency Access Way
EP Act	<i>Environmental Protection Act 1986</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally Sensitive Area
F/US	Flat/upslope
FBI	Fire Behaviour Index
FDI	Fire Danger Index
FFDI	Forest Fire Danger Index
FSAR	Fire Services Access Route
Guidelines	<i>Guidelines for Planning in Bushfire Prone Areas Version 1.4 (WAPC 2021)</i>
LDP	Local Development Plan
LMP	Landscape Management Plan
LNA	Local Natural Area
NCC	National Construction Code
POS	Public Open Space
R-Code	Residential Design Code
SA	Standards Australia
Shire	Shire of Mundaring
SPC	Statutory Planning Committee
SPP 3.7	<i>State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015)</i>
SAT	State Administrative Tribunal
TEC	Threatened Ecological Community
WAPC	Western Australian Planning Commission

Term	Definition
WC Act	<i>Wildlife Conservation Act 1950</i>

Executive Summary

Satterley Property Group has prepared and submitted a Structure Plan application for proposed residential development within Lot 48 Stoneville Road, Stoneville (the project area), in the municipality of the Shire of Mundaring. The planning application is referred to as North Stoneville Structure Plan 34 Amendment 1.

This Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measures 6.2 and 6.3 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas Version 1.4* (the Guidelines; WAPC 2021) and in accordance with *AS 3959-2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018).

This report provides an assessment of the proposed development, bushfire risk context, and required bushfire mitigation measures and includes:

- a review of existing and post-development vegetation class and slope within the project area and surrounds,
- the results of a Bushfire Hazard Level (BHL) assessment to determine the applicable BHLs across the project area and adjoining land,
- details of any bushfire hazard issues relevant to the site and proposed development, and
- a compliance assessment to demonstrate the proposed development can comply with the bushfire protection criteria of the Guidelines at subsequent planning stages.

The Structure Plan identifies three separate villages, residential land uses with lots averaging 1,200 m² to 1ha in area, local centre, two education sites, recycled wastewater infrastructure, internal road network, and public open space. North Stoneville Structure Plan 34 is expected to be developed over an approximately 15-year period, with staggered release of subdivision stages.

The site comprises approximately 555 ha and is currently vegetated with areas of grazed pastureland along with patches of remnant native forest vegetation. While much of the project area is proposed to be cleared/managed to facilitate the proposed residential land uses, large areas have been identified as Conservation POS and existing forest and scrub vegetation will remain within these areas. The wider landscape supports a combination of remnant forest vegetation, rural farmland, and rural-residential properties, many of which contain unmanaged forest and grassland vegetation.

A Bushfire Hazard Level (BHL) assessment has been undertaken in accordance with Appendix 2 of the Guidelines. The assessment methodology categorises land as having a as Low, Moderate, or Extreme BHL based on the AS 3959 vegetation classification and effective slope. Bushfire Hazard Levels provide an indication of the potential intensity of a bushfire event associated with vegetation within and adjacent to the project area.

The results of the BHL assessment indicate that existing BHLs across the site are Moderate and Extreme. However, all land proposed for development of lots will be within areas of Low or Moderate BHL post-development as a result of proposed vegetation modification and strategic siting of lots. This achieves compliance with the acceptable solutions of the bushfire protection criteria of the Guidelines.

Potential bushfire hazard issues have been identified for the proposed development, along with a suite of mitigation measures to be implemented at future planning stages to mitigate the identified risks. Some of the key issues include:

- The project area is vulnerable to landscape scale bushfire risk which requires serious consideration at all stages of the planning process.
- Vegetation is proposed to be retained on-site within POS. An appropriate APZ and BAL response is to be implemented at these interfaces to manage the risk.
- Perimeter roads are to be incorporated into subdivision design to provide hazard separation and a defensible space for fire suppression operations.
- Maintaining existing fragmentation between vegetated Conservation POS areas will reduce the potential for a bushfire to spread through the project area and requires consideration during landscaping design.
- The BMP documents overarching landscaping design principles which will need to be further developed within a site-wide Landscape Management Plan, which will also provide an enforcement mechanism for the ongoing management of low threat vegetation throughout the site.
- School sites (and potentially community purposes sites) represent vulnerable land uses and will require additional consideration of bushfire risk at subdivision and DA stage, including compliance with the NCC where applicable.
- Given the potential bushfire risk to the site, appropriate vehicular access is required for both egress by residents and visitors and firefighter access to and around the project area.
- Impacts of staged subdivision on bushfire risk, BALs and vehicular access will need to be considered at future planning stages.
- Given the location of the proposed development, and the higher risk of bushfire impact relative to developments on the Swan Coastal Plain, resident bushfire awareness and preparation will be critical to ensuring appropriate response in a bushfire emergency.
- The proposed development will result in expansion of the existing population which may put pressure on the existing public road network during a bushfire emergency. Upgrades to existing roads will occur as a result of implementation of the Structure Plan, along with any planned road upgrades by Main Roads WA, and construction of the future State Government East Link project.
- The project area is not currently within a reticulated area and this will need to be provided to secure a permanent firefighting supply given the density of development proposed.
- There are currently no significantly large areas of low threat land within the local area where the community would be able to seek refuge (as a last resort measure) if evacuation out of the area cannot safely occur. Construction of the proposed project will provide a place of refuge to the residents and wider community.

The BMP goes into detail as to how these issues will be addressed.

A compliance audit has been undertaken to assess the capacity of the proposed development to comply with the acceptable solutions of the Guidelines at future planning stages. The assessment demonstrates that the project is able to satisfy all four elements of the bushfire protection criteria, being Element 1 (Location), Element 2 (Siting and design), Element 3 (Vehicular access) and Element 4 (Water). Compliance with the acceptable solutions will be demonstrated at each subsequent stage of subdivision, and any further development applications, as noted in Section 6.1 of the BMP.

1. Proposal details

1.1 Background

Satterley Property Group (Satterley) has prepared and submitted a Structure Plan application for proposed residential development within Lot 48 Stoneville Road, Stoneville (the project area), in the municipality of the Shire of Mundaring (the Shire). The planning application is referred as North Stoneville Structure Plan 34 Amendment 1.

The North Stoneville Structure Plan 34 Amendment 1 was considered previously in 2020 by the Statutory Planning Committee (SPC) of the Western Australian Planning Commission (WAPC) and has recently been reconsidered following prior refusal through the State Administrative Tribunal (SAT) mediation process.

The Structure Plan has been revised since the 2020 review by WAPC and includes the following modifications:

- the density of proposed residential development has been significantly reduced, by approximately 25%.
- areas of Natural Living lots along the southern boundary have been removed and replaced with areas of public open space. This removes building envelopes (and therefore habitable development) from high bushfire risk areas and enhances retention of remnant native vegetation.
- Lot 1 (along the southwest boundary) has been removed from the Structure Plan design. As above, this avoids siting of building envelopes in high bushfire risk areas and promotes retention of remnant native vegetation.
- Natural Living lots will be managed entirely to low threat/asset protection zone (APZ) standards, as opposed to unmanaged vegetation being retained within the lots, which reduces bushfire risk to the lots and project area as a whole.
- additional fire service access routes have been included in the development design to enhance access for emergency vehicles at the interface between bushfire prone vegetation and habitable development.

1.1.1 Current Structure Plan proposal

The revised Structure Plan (Figure 1; Hatch 2024 [Rev I]) identifies the future proposed land uses within the project area as including:

- three separate villages
- residential land uses comprising:
 - 42 Natural Living lots (average 1 ha)
 - 647 Suburban lots (average 1,700 m²)
 - 312 Village Urban lots (average 1,200 m²).
- Local Centre
- two educational sites
- two Special Use sites
- recycled wastewater treatment plant
- waterinfrastructure

- internal road network
- 22 areas of Public Open Space (POS), including Local Scheme Reserve – Recreation (Recreation POS) and Local Scheme Reserve – Conservation (Conservation POS),
- creek corridors and drainage basins
- multiple connections to the surrounding existing public road network.

North Stoneville Structure Plan 34 is expected to be developed over an approximately 15-year time period, with staggered release of subdivision stages. Construction is anticipated to commence within Village 2 and initial access from Roland Road. Existing public roads will be upgraded to provide for a road network that can support the planned population growth in both normal and emergency conditions. This is discussed further in Section 1.5.2.

1.2 Site description

1.2.1 Existing land uses

The site comprises approximately 555 ha and is currently vegetated with areas of grazed pasture land along with patches of remnant native forest vegetation. While much of the project area is proposed to be cleared/managed to facilitate the proposed residential land uses, large areas have been identified as Conservation POS and existing forest and scrub vegetation will remain within these areas.

The wider landscape supports a combination of remnant forest vegetation, rural farmland and rural-residential properties, many of which contain unmanaged forest and grassland vegetation.

Land uses immediately adjoining the project area include (see Figure 2):

- Hawkstone Street and Rural Residential zoned landholdings to the north
- Rural zoned landholdings to the south
- Rural zoned landholdings and undeveloped Department of Education land to the east
- Roland Road and Rural zoned landholdings to the west.

1.2.2 Existing vehicular access

The project area is directly accessible from Roland Road (which abuts the western cadastral boundary) in the west and Hawkstone Street (which adjoins the northern lot boundary) in the north. The southern boundary of the site intersects with two existing no-through roads – Brindle Road and Sundowner Grove, although site access is currently not available from these roads. Woodlands Road, another legacy no-through road, terminates at the eastern project area boundary and also does not provide site access. The proposed development will result in extension of these roads to enhance access options within the local area, as discussed in Section 1.5.2.

1.2.3 Existing water supply

The project area is not currently provided with an existing reticulated water supply, but existing Water Corporation hydrants are located to the south and will be extended into the project area. The project area has several dams that would provide a potential water supply for use during a bushfire.

1.3 Bushfire prone designation

A large proportion of the project area is designated as bushfire prone on the WA *Map of Bush Fire Prone Areas* (DFES 2021; see Plate 1).

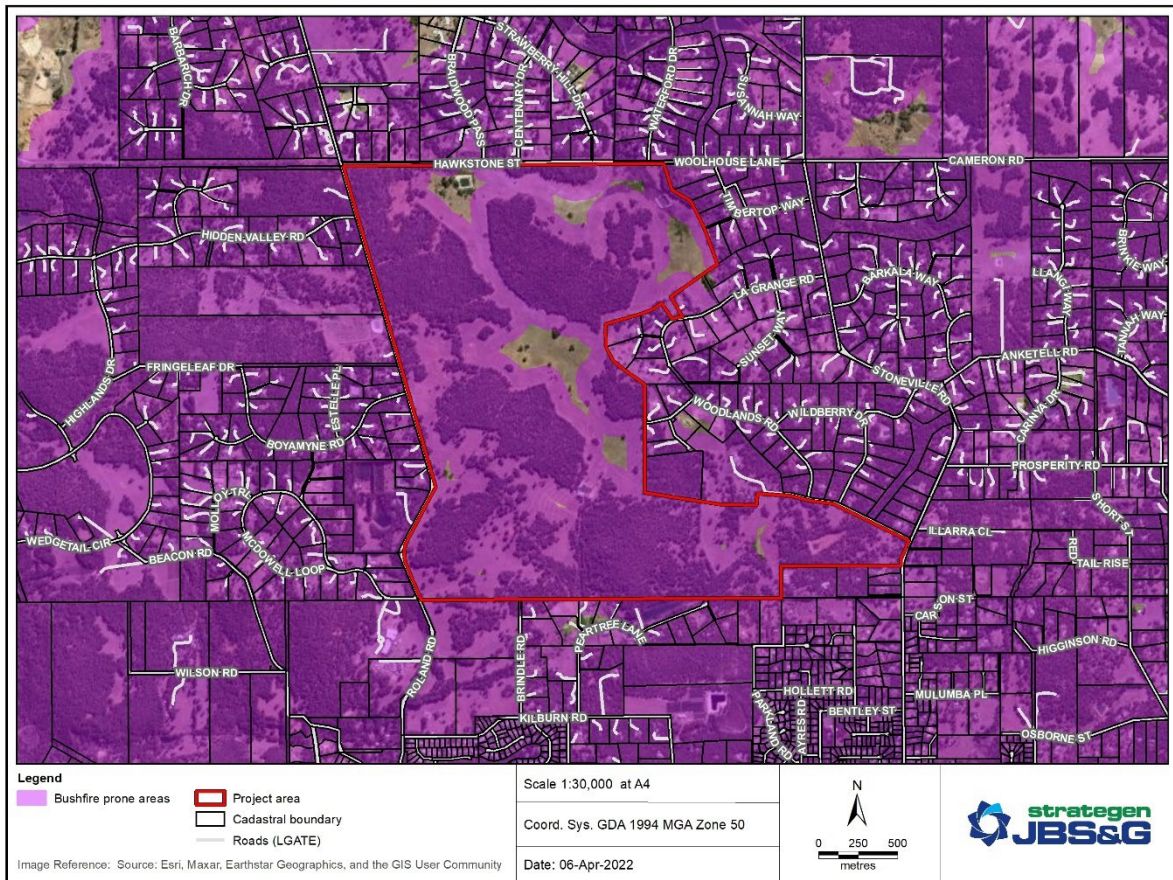


Plate 1: Map of Bush Fire Prone Areas (DFES 2021)

1.4 Purpose

This BMP has been prepared to address requirements under Policy Measures 6.2 and 6.3 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas Version 1.4* (the Guidelines; WAPC 2021).

1.5 Other plans/reports

1.5.1 Previous versions of this BMP

This BMP was originally prepared in November 2018 (Rev 0) and has undergone several reviews in response to DFES referral comments, in preparation for consideration by WAPC in 2020.

The BMP was updated in May 2022 as Rev 3, in response to a modified Structure Plan design. The BMP was also subject to revision in response to Version 1.4 of the Guidelines which was fully adopted in March 2022 and demonstrates that the proposal presents an outcome which is compliant with current provisions of SPP 3.7 and the Guidelines.

The BMP was further updated in February 2023 as Rev 6 to incorporate minor amendments to the development design and was submitted for consideration under SAT mediation. Of significance to bushfire management was the increase in width of all emergency access ways and fire service access routes from 6 m to 12 m.

This version of the BMP (Rev 7) was updated following completion of the SAT mediation process and receipt of the WAPC planning officers report, as well as referral comments on the amended Structure Plan from DFES.

1.5.2 Land use planning, bushfire risk, and traffic and evacuation analysis

Detailed bushfire risk, and traffic and evacuation analysis has been carried out in response to previous refusal of North Stoneville Structure Plan 34 Amendment 1. A brief overview of the reports containing these studies is outlined below. The reports are to be referred to by the reader in the first instance to ensure accuracy of information.

1.5.2.1 North Stoneville Structure Plan 34 Amendment 1, Bushfire Simulation Modelling Report (JBS&G 2024)

Bushfire simulation modelling using SPARK (developed by Commonwealth Scientific and Industrial Research Organisation [CSIRO]) was carried out to determine the time it would take for various design bushfires to impact the local public road network and the project area.

The modelling assessed four design bushfires, approaching the project area from the southwest, northwest, northeast and southeast under various Forest Fire Danger Index (FFDI) scenarios, including a projection for climate change.

Several trial simulations were conducted, informed by reconstruction of two local historical bushfires (Parkerville 2014 and Wooroloo 2021), to validate accuracy of the models.

The results of the simulations for each design bushfire scenario produced a range of simulated times to impact the project area, at each FFDI across all ignition locations. Time to impact various key impact points under each scenario is detailed in the report, including time to impact key evacuation routes such as Great Eastern Highway, Toodyay Road and Roland Road.

The simulation results have been used to inform the traffic evacuation analysis, as detailed below.

The report was recently updated in May 2024 (Rev 4) in response to some of the comments raised by DFES on review of the previous version (Rev 3).

North Stoneville Structure Plan (DR 189/2020), Microsimulation Evacuation Modelling Report (Transcore 2024)

Evacuation modelling and analysis has been undertaken for the four bushfire scenarios assessed in the bushfire simulation modelling analysis. The objectives of the simulation were to:

- assess whether the current and proposed road network is capable of facilitating the evacuation of the study area (as defined) and structure plan area, in a timely and safe manner under the bushfire scenarios;
- assess whether, in the context of evacuation time, the proposed structure plan affects the level of bushfire risk in the modelling study area; and
- identify what mitigation measures, if any, are necessary to enable the population of the modelling study area, including the structure plan area, to safely evacuate the study area during the model duration.

The results of traffic modelling indicate that safe evacuation can be achieved in a bushfire emergency based on projected staged development of the project area, and upgrades to the surrounding public road network.

The report was recently updated in May 2024 (Rev 4) in response to some of the comments raised in the DPLH Officer's Report (WAPC 2023) on review of the previous version (Rev 3).

1.5.3 Other reports

Structure Plan stage

- Environmental Assessment Report Addendum (JBS&G 2023)
- Environmental Assessment Report (Strategen [now JBS&G] 2018)

Scheme Amendment stage

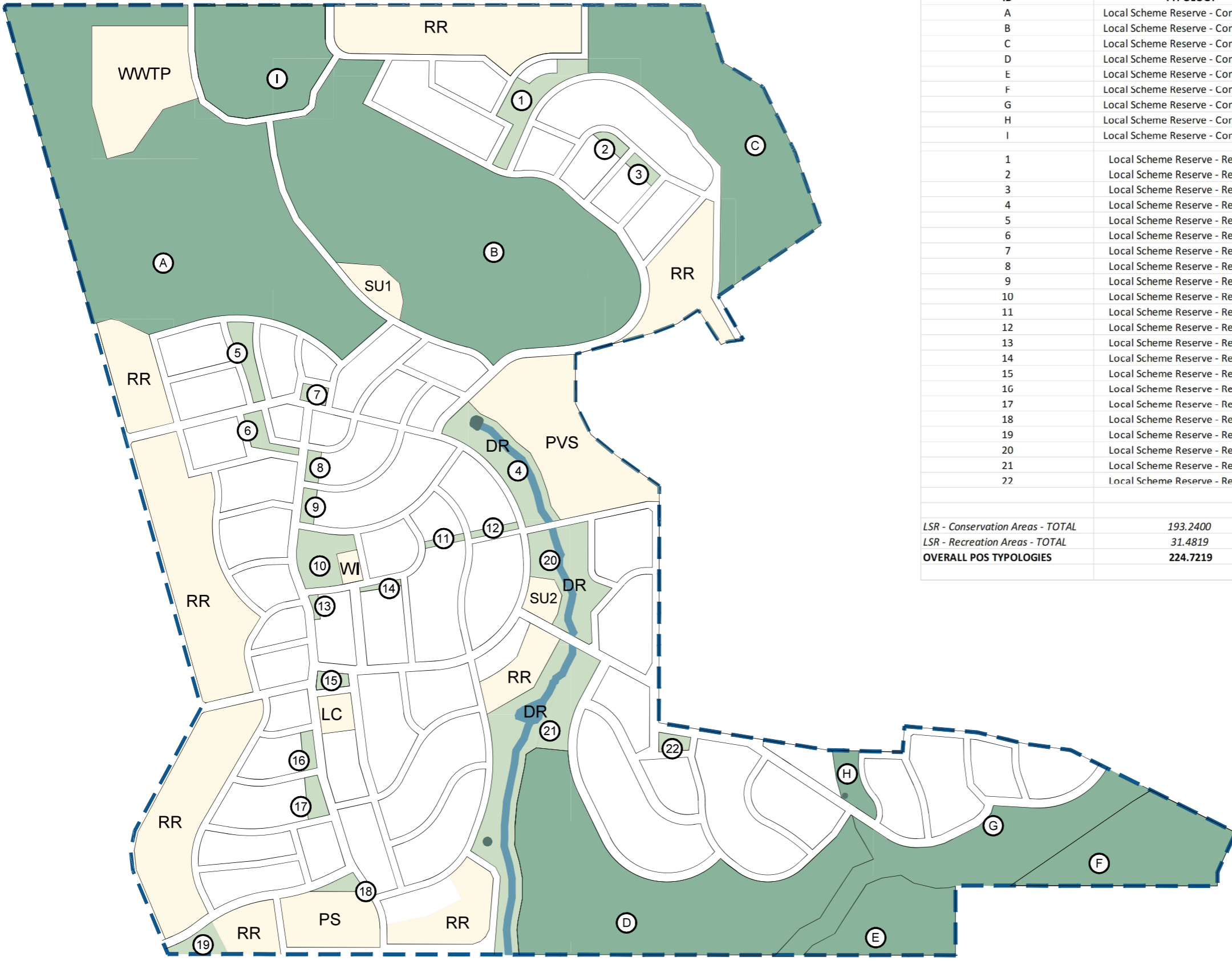
- Bushfire Management Plan (Strategen [now JBS&G] 2016).

1.6 Purpose of this report

This Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measures 6.2 and 6.3 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas Version 1.4* (the Guidelines; WAPC 2021) and in accordance with *AS 3959-2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018).

This report provides an assessment of the proposed development, bushfire risk context, and required bushfire mitigation measures and includes:

- a review of existing and post-development vegetation class and slope within the project area and surrounds,
- the results of a Bushfire Hazard Level (BHL) assessment to determine the applicable BHLs across the project area and adjoining land,
- details of any bushfire hazard issues relevant to the site and proposed development, and
- a compliance assessment to demonstrate the proposed development can comply with the bushfire protection criteria of the Guidelines at subsequent planning stages.



ENTIRE SUBJECT LAND PUBLIC OPEN SPACE TYPOLOGIES

ID	TYOLOGY	AREA	UNRESTRICTED	RESTRICTED
A	Local Scheme Reserve - Conservation	50.4674		
B	Local Scheme Reserve - Conservation	47.8578		
C	Local Scheme Reserve - Conservation	22.6446		
D	Local Scheme Reserve - Conservation	28.9183		
E	Local Scheme Reserve - Conservation	7.0054		
F	Local Scheme Reserve - Conservation	10.5012		
G	Local Scheme Reserve - Conservation	13.3902		
H	Local Scheme Reserve - Conservation	1.3084		
I	Local Scheme Reserve - Conservation	11.1467		
1	Local Scheme Reserve - Recreation	2.4170	2.4170	
2	Local Scheme Reserve - Recreation	0.3597	0.3597	
3	Local Scheme Reserve - Recreation	0.4000	0.4000	
4	Local Scheme Reserve - Recreation	4.2012	2.6521	1.5491
5	Local Scheme Reserve - Recreation	1.1104	1.1104	
6	Local Scheme Reserve - Recreation	0.7528	0.7528	
7	Local Scheme Reserve - Recreation	0.3808	0.3808	
8	Local Scheme Reserve - Recreation	0.3607	0.3607	
9	Local Scheme Reserve - Recreation	0.4007	0.4007	
10	Local Scheme Reserve - Recreation	2.1143	2.1143	
11	Local Scheme Reserve - Recreation	0.2321	0.2321	
12	Local Scheme Reserve - Recreation	0.2777	0.2777	
13	Local Scheme Reserve - Recreation	0.1495	0.1495	
14	Local Scheme Reserve - Recreation	0.1867	0.1867	
15	Local Scheme Reserve - Recreation	0.4180	0.4180	
16	Local Scheme Reserve - Recreation	0.4114	0.4114	
17	Local Scheme Reserve - Recreation	0.6067	0.6067	
18	Local Scheme Reserve - Recreation	0.4285	0.4285	
19	Local Scheme Reserve - Recreation	0.8947	0.8947	
20	Local Scheme Reserve - Recreation	4.4248	3.1086	1.3162
21	Local Scheme Reserve - Recreation	10.5277	6.3887	4.1390
22	Local Scheme Reserve - Recreation	0.4265	0.4265	
		224.7219	24.4776	7.0043
LSR - Conservation Areas - TOTAL		193.2400		
LSR - Recreation Areas - TOTAL		31.4819		
OVERALL POS TYPOLOGIES		224.7219		

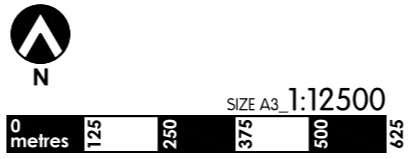
LEGEND

- Subject Site
- Local Scheme Reserve - Conservation
- Local Scheme Reserve - Recreation
- Deductions
- PS - Primary School 4.3092 ha
- PVS - Private School 11.9498 ha
- LC - Local Centre 1.0416 ha
- WI - Water Infrastructure 0.5400 ha
- WWTP - Waste Water Treatment Plant 8.6786 ha
- DR - Drainage 3.9227ha
- RR - Rural Residential 62.2519ha
- SU1 - Special Use Site 1 1.6622ha
- SU2 - Special Use Site 2 1.0820ha

POS SCHEDULE - NORTH STONEVILLE
REDESIGN OF PROPOSED STRUCTURE PLAN (SP34)

CADASTRAL INFORMATION
SOURCE: LANDGATE SLIP SERVICE
YYMMDD: VARIES
DWG REF: VARIES
PROJECTION: HUG94

AERIAL PHOTOGRAPHY
SOURCE: NEARMAPS
YYMMDD: 201010



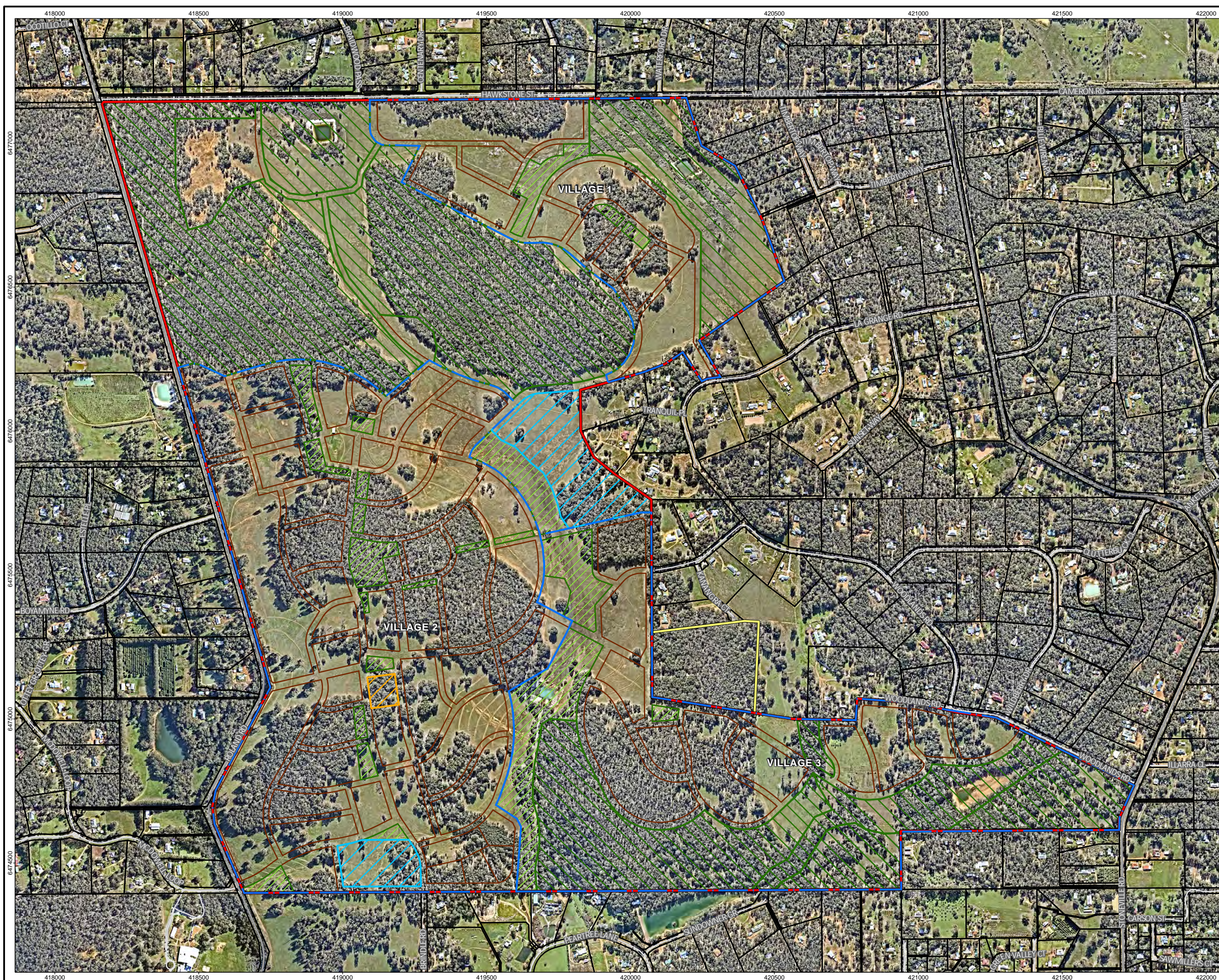
DR 189 of 2020 - Satterley Property Group Pty Ltd v WAPC (confidential and subject to legal professional privilege)

I	RE-INCLUSION OF SPECIAL USE SITES (SU)	240509	TG	PC
H	UPDATING TABLE AND ANNOTATIONS	240420	TG	PC
G	UPDATING TABLE AND INCL ANNOTATIONS	240417	TG	PC
F	INCLUSION OF ADDITIONAL CONSERVATION AREA	230111	IF	PC
E	INCLUSION OF CONSERVATION AREA	221104	TG	PC
D	FIRE SERVICE CONNECTIONS, POS TABLE	220510	SJ	PC
C	CONSERVATION AND AREAS UPDATED	220330	SJ	PC
REV	DESCRIPTION	YYMMDD	DRAWN	APPRD

North Stoneville
Shire of Mundaring

JOB CODE DRAW NO. REV.
SAT STO RD1 407 I

DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

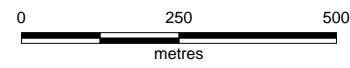


- Legend**
- Project area
 - Cadastral boundary
 - Village boundary
 - Local centre
 - Education site
 - Proposed Recreation POS
 - Proposed Conservation POS
 - Proposed development
 - Department of Education site
 - Major road
 - Minor road



Job No: 56850
 Client: Satterley Property Group
 Version: 7 Date: 20-Sep-2023
 Drawn By: jcrute Checked By: LR

Scale 1:12,000 at A3



Coord. Sys. GDA2020 MGA Zone 50

North Stoneville Residential Development
Stoneville, WA

SITE OVERVIEW

FIGURE 2

2. Environmental considerations

2.1 Environmental values

Table 1 provides a summary of the environmental attributes potentially occurring within the project area, based on a search of publicly available environmental data and recent environmental surveys. Given the high-level planning stage of the proposal, it is anticipated that any impacts to ecological values will be determined and quantified at future planning stages where detailed development design is known.

Clearing of vegetation as a result of implementation of the Structure Plan is considered a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Accordingly, an application has been submitted to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) to gain approval based on the concept layout, which includes significant areas to be secured for conservation purposes. All associated offsets have been identified and agreed by the DCCEEW. The offset package includes direct acquisition of an external site in the Shire of Williams and formal protection and ongoing management of conservation areas on site. Both offsets will be protected in perpetuity via the application of a restrictive covenant.

Table 1: Summary of environmental values

Environmental value	Present within or adjacent to site	Description
Environmentally Sensitive Area	No	N/A.
Wetlands	No	There are no mapped geomorphic wetlands within the site. Several man-made dams occur throughout the site which are not of conservation significance.
Waterways	Yes	<p>The Local Water Management Strategy (Emerge 2018) states that runoff from surrounding catchments is concentrated into four main streamlines within the project area. The central streamline discharges into Clutterbuck Creek which flows through the southern eastern portion of the site. Clutterbuck Creek is a tributary of Jane Brook and those catchments which discharge northwards eventually discharge to Susannah Brook.</p> <p>In addition to the streamline, several surface water capture dams exist onsite.</p> <p>It is proposed that these existing streamlines will largely be retained within portions of the site. Some vegetation clearing in these areas may be required for bushfire management purposes.</p>
Potential Threatened Ecological Communities (TECs) listed under the EPBC Act	No	Based on publicly available data, there are no known TECs within the site. The flora and vegetation assessments conducted for the site did not identify any TECs.
Potential for Threatened and Priority flora to occur	Unconfirmed	<p>According to a search of <i>NatureMap</i> (DBCA 2018) a total of two Threatened and seven Priority flora species have been recorded within 5 km of the site.</p> <p>No conservation significant flora species were recorded during the site assessments (Strategen 2017), however</p>

Environmental value	Present within or adjacent to site	Description
		<p>based on habitat requirements, there may be potential for several Threatened and Priority species of to occur in the patches of vegetation across the site.</p> <p>Any clearing of native vegetation within the site will be subject to assessment through the planning process (which provides an exemption from the requirement of a State clearing permit) and under the EPBC Act.</p>
Potential habitat for threatened fauna species	Yes	<p>Fauna assessments (Strategen 2017) conducted across the site identified foraging evidence of both Forest Red-tailed Black Cockatoos and Baudin’s Black Cockatoos which are Threatened species protected under the Wildlife Conservation Act 1950 (WC Act) and the EPBC Act. The survey also identified a significant amount of significant black cockatoo trees, some with hollows.</p> <p>The site also contains habitat suitable for the Chuditch (<i>Dasyurus geoffroii</i>) and Brush-tailed Phascogale (<i>Phascogale tapoatafa</i>) which is a Threatened species under the WC Act and the EPBC Act.</p> <p>Any clearing of native vegetation within the site will be subject to assessment through the planning process (which provides an exemption from the requirement of a State clearing permit) and under the EPBC Act.</p>
Bush Forever sites	No	N/A.
Swan Bioplan Regionally Significant Areas	No	N/A.
Local Natural Areas	Yes	<p>The proposal will involve clearing of vegetation mapped by the Shire of Mundaring as Local Natural Areas (LNAs). Two large pockets of vegetation are proposed to be retained in Conservation POS in the northern portion of the site, which are identified as Priority 1 and 2 LNAs.</p>
DBCA legislated lands and waters (includes National Park, Conservation Park, Nature Reserve, marine reserves, State forest and timber reserve)	No	N/A.
DBCA land of interest (includes some areas of UCL, freehold purchased by State and some unvested Crown reserves)	No	N/A.
Vegetation associations or complexes with <30% of Pre-European extent remaining outside of constrained areas	No	<p>Hedde Complex:</p> <p>Dwellingup D2 (82% remaining)</p> <p>Yarragil 1 (81% remaining)</p> <p>Beard Association: West Darling 3 (86% remaining).</p>
Heritage	Yes	<p>Several Aboriginal Heritage Sites are located within the project area and will be conserved within the north-eastern Conservation POS.</p>

2.2 Native vegetation – modification and clearing

Vegetation within the survey area predominantly comprises the following two vegetation types:

- Jarrah-Marri forest comprising Jarrah (*Eucalyptus marginata*) and Marri *Corymbia calophylla* trees over an understorey varying from species rich to completely absent. Blackbutt (*Eucalyptus patens*) present in wetter areas.
- Pasture areas comprising exotic grasses and herbs with scattered Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) trees with Blackbutt (*Eucalyptus patens*) present in wetter areas.

As outlined in Table 1, the project area contains habitat for Threatened species protected under the EPBC Act. The environmental impacts resulting from implementation of the proposal are being addressed in accordance with standard State and Commonwealth legislative requirements through the State planning and development processes, as well as the Commonwealth EPBC Act.

In response to identification of the abovementioned environmental values, future development within the project area will aim to (where possible) avoid clearing of native vegetation through:

- the strategic location of lot boundaries and building envelopes, and APZs to achieve BAL-29 and BAL-19 on future dwelling to minimise clearing impacts from Asset Protection Zones (APZs) that would be associated with a rating of BAL-12.5.
- the retention of vegetation or selective planting within POS areas, where the vegetation does not result in an unacceptable risk to future habitable buildings.
- vegetation retention/rehabilitation within creek lines to achieve a low threat state under AS 3959 Clause 2.2.3.2 which allows for unmanaged treed vegetation (e.g. Clause [c] enables unmanaged vegetation less than 0.25 ha in area and not within 20 m of habitable development or classified vegetation, and Clause [d] enables retention of 20 m wide strips of unmanaged vegetation where separated from habitable development and classified vegetation by at least 20 m.
- retention of mature trees as part of low threat landscaping, as well as within APZs.

Modification and clearing of native vegetation within various areas of the project area is discussed below.

Development areas and Recreation POS

Areas proposed for future urban development within the project area will be predominantly cleared. Trees and vegetation will be retained within managed portions of Recreation POS as well as road verges as part of low threat landscaping in accordance with Clause 2.2.3.2 (f) of AS 3959 or configured in a way that another vegetation exclusion under Clause 2.2.3.2 applies.

Natural Living lots

Vegetation within lots proposed for Natural Living is expected to be modified to a low threat state to meet exclusions under Clause 2.2.3.2 prior to clearance of subdivision. This will not necessarily result in full clearing of vegetation as trees can be retained within APZs as per Guidelines standards and unmanaged vegetation can also be retained to meet Clause 2.2.3.2 (e.g. strips of vegetation up to 20 m can be retained at the front of lots as per exclusion [d]). Retention of vegetation in a low threat manner will help maintain rural character for these lots.

School sites and Special Sites

School sites and Special Sites No. 2 and 3 will be subject to future planning and design through a Development Application process. It is expected that these sites will be cleared, managed to a low

threat standard, or will retain vegetation in accordance with a relevant exclusion under AS 3959 Clause 2.2.3.2. These sites are expected to be co-developed by the proponent and a third party, thus ensuring that they will not pose an unacceptable bushfire risk to the proposed development or to adjacent lots. Special Site No. 1 is nominated as Conservation POS.

2.3 Revegetation / Landscape Plans

The development proposes the retention of vegetation and/or trees in areas of POS consistent with a low threat vegetation exclusion under AS 3959, most likely in accordance with Clauses 2.2.3.2 (c), (d), (e) and (f).

The proponent is currently considering selective planting and/or revegetation within Recreation and Conservation POS areas and creek lines, with planting in the Conservation POS to be determined in consultation with the DCCEE and the Shire.

Careful consideration will be given to any revegetation and landscaping to ensure that these works do not result in an unacceptable risk to future habitable buildings.

It is recommended that an overarching Landscape Concept Plan is prepared during the first stage of subdivision to set out broad landscaping concepts across the entire project area. Each stage of subdivision will then prepare a detailed landscaping design based on these high-level principles. Preparation of the Landscape Concept Plan should form part of preparation of a wider Landscape Management Plan, prepared to:

- document the high-level landscaping concepts for the entire Structure Plan area,
- guide detailed design for each subsequent stage of subdivision to achieve a cohesive and consolidated approach to site landscaping and bushfire protection, and
- clearly detail the responsibilities and provide an appropriate means of enforcement for the ongoing management of vegetation across the site, especially APZs and low threat vegetation on private land and POS.

3. Bushfire assessment results

3.1 Bushfire Hazard Level Assessment

A Bushfire Hazard Level (BHL) assessment has been undertaken in accordance with Appendix 2 of the Guidelines. The assessment methodology categorises land as having a as Low, Moderate, or Extreme BHL based on the AS 3959 vegetation classification and effective slope. Bushfire Hazard Levels provide an indication of the potential intensity of a bushfire event associated with vegetation within and adjacent to the project area.

Table 2 lists the three BHLs and their associated characteristics. Bushfire Hazard Levels have been applied to land within the project area and adjoining 150 m (the assessment area) to assess current (pre-development) bushfire hazard conditions, as well as the anticipated post-development bushfire hazard conditions.

Table 2: Bushfire hazard levels and characteristics

Bushfire hazard level	Characteristics*
Extreme	Class A Forest Class B Woodland (05) Class D Scrub Any classified vegetation with a greater than 10° slope.
Moderate	Class B Low woodland (07) Class C Shrubland Class E Mallee/Mulga Class G Grassland, including sown pasture and crops Class G Grassland: Open woodland (06), Low open woodland (08), Open shrubland (09) Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.
Low	Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetre Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.

*Vegetation classifications from AS 3959-2018 Table 2.3.

3.2 Assessment inputs

3.2.1 Vegetation classification

JBS&G assessed classified vegetation and exclusions within the project area and adjoining 150 m (the assessment area) through on-ground verification on 10 July 2018 in accordance with AS 3959 and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016).

Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix A.

Pre-development vegetation was assessed based on the current extent of vegetation and slope within the assessment area.

Post-development vegetation takes into consideration clearing and modification of vegetation to a low threat state which will occur during subdivision works.

3.2.2 Effective slope

JBS&G assessed effective slope under classified vegetation within the assessment area through on-ground verification on 10 July 2018 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m and Landgate 5 m contour data and are depicted in Figure 3.

The assessment area has a varied hilly terrain typical of the Perth Hills area. Slope within the project area varies from flat (0°) up to 10° under forest and grassland vegetation. Effective slope has been assigned to vegetation plots within the project area based on a worst-case scenario given the effective slope relevant to each future lot will differ depending on the elevation of the vegetation it is exposed to. Where applicable, predominant slope has been taken into consideration rather than minor localised variation across the wider landscape which is appropriate and in accordance with AS 3959 methodology.

Land adjoining the project area is similarly undulating with effective slope ranging from flat/upslope (0°) to downslope 10°.

Detailed slope analysis will be carried out at each subsequent stage of subdivision to confirm site specific effective slope and relevant APZ widths.

3.2.3 Pre-development inputs

A summary of the pre-development classified vegetation, exclusions and effective slope within the assessment area are listed in Table 3 and illustrated in Figure 3.

Table 3: Pre-development vegetation classifications/exclusions and effective slope

Vegetation Plot	Vegetation classification/exclusion	Effective slope under the classified vegetation (degrees)	Comments
1	Class A Forest	Flat/upslope (0°)	Primarily forest vegetation external to the project area as there is potential for on-site forest to be down-slope of future development (as well as up-slope).
2	Class A Forest	Downslope >0–5°	The majority of forest vegetation within and surrounding the project area has a gentle slope.
3	Class A Forest	Downslope >5–10°	Steeper areas vegetated within forest vegetation are primarily present within the south and south-west of the project area.
4	Class D Scrub	Downslope >0–5°	Scrub vegetation is present within lower lying damp areas in the northeast of the project area.
5	Class G Grassland	Flat/upslope (0°)	Slope under grassland is generally gently sloping within the project area and surroundings. Plot 5 is primarily limited to external vegetation where an up-slope is present.
6	Class G Grassland	Downslope >0–5°	The majority of grassland within the project area and surrounding is gently sloping.
7	Class G Grassland	Downslope >5–10°	Plot 7 is present along hillsides within the project area.
8	Excluded – Non-vegetated and Low threat	N/A	Existing roads, dams, buildings and landscaped gardens within assessment area.

Vegetation Plot	Vegetation classification/exclusion	Effective slope under the classified vegetation (degrees)	Comments
	(Clause 2.2.3.2 [e] and [f])		

3.2.4 Post-development inputs

A summary of the anticipated post-development classified vegetation, exclusions and effective slope within the assessment area are listed in Table 4 and illustrated in Figure 3. Assumptions made to inform the post-development assessment are outlined below.

Table 4: Post-development vegetation classifications/exclusions and effective slope

Vegetation Plot	Vegetation classification/exclusion	Effective slope under the classified vegetation	Comments
1	Class A Forest	Flat/upslope (0°)	As per pre-development conditions (aside from vegetation modified to a low threat state)
2	Class A Forest	Downslope >0–5°	As per pre-development conditions (aside from vegetation modified to a low threat state)
3	Class A Forest	Downslope >5–10°	As per pre-development conditions (aside from vegetation modified to a low threat state)
4	Class D Scrub	Downslope >0–5°	As per pre-development conditions (aside from vegetation modified to a low threat state)
5	Class G Grassland	Flat/upslope (0°)	As per pre-development conditions (aside from vegetation modified to a low threat state)
6	Class G Grassland	Downslope >0–5°	As per pre-development conditions (aside from vegetation modified to a low threat state)
7	Class G Grassland	Downslope >5–10°	As per pre-development conditions (aside from vegetation modified to a low threat state)
8	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	As per pre-development conditions
9	Modified to a low threat state (Clause 2.2.3.2)	N/A	Areas of the project area proposed to be modified to a low threat state, including proposed roads, lots, Special Sites, central fuel break, Low threat POS and APZs.

Assumptions relating to clearing, modification and low threat management of vegetation

The post-development classifications/exclusions are based on clearing/modification and ongoing management of vegetation as follows:

- removal/management of vegetation to facilitate construction of internal roads, lots, urban areas, school sites and the Special Sites and ongoing management of these areas as well as any associated APZs.
- removal/management of vegetation for creation of APZs adjoining on-site POS and ongoing management.

- creation and ongoing management of low threat POS areas, including management of the central creek spine in the low threat condition.
- maintenance of a central grassed fuel break within the northern Conservation POS in a low threat state.
- creation and management of the fire service access routes and emergency access way.

Assumptions relating to potential revegetation

Broad assumptions have also been made around potential revegetation within the project area as a precautionary measure in the absence of landscaping detail at this strategic planning stage, as detailed below:

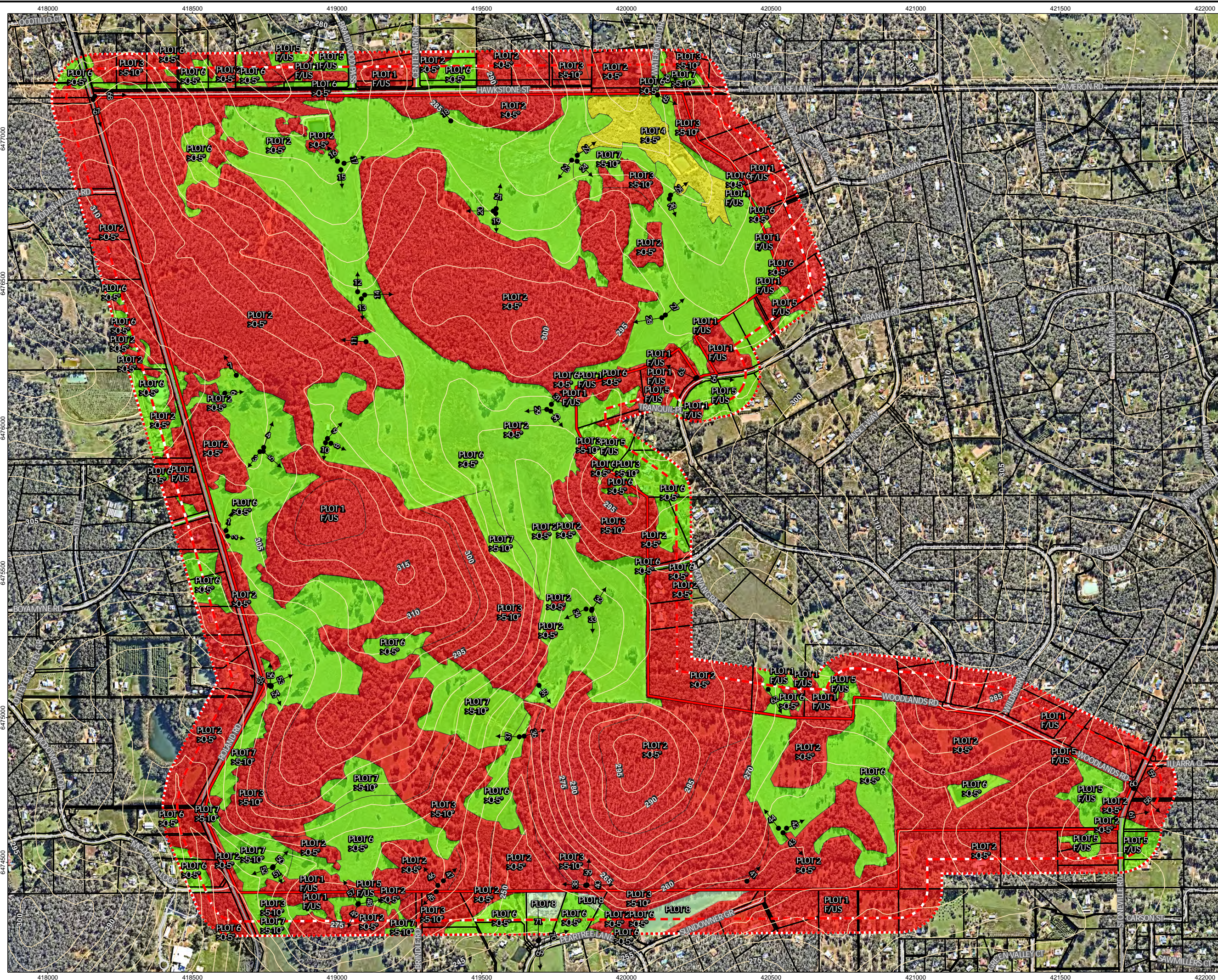
- existing grassland areas within Conservation POS in the southern portion of the project area are assumed to be revegetated to Class A Forest, in consistency with the surrounding vegetation.
- small pockets of grassland within the northeast Conservation POS are assumed to be revegetated to Class A Forest. Larger areas of grassland within this area, and grassland vegetation adjoining the proposed low threat fuel break are assumed to remain as Class G Grassland.

Asset Protection Zones

Table 5 summarises the APZ widths required between future habitable development and post-development classified vegetation to achieve BAL-29 (maximum permitted under SPP 3.7) and BAL-19 (proposed enhanced APZ adjacent to Conservation POS) as calculated under AS 3959 Method 1.

Table 5: Asset Protection Zone requirements from post-development classified vegetation

Vegetation Plot	Vegetation classification/exclusion	Effective slope under the classified vegetation	APZ to achieve BAL-29	APZ to achieve BAL-19 (adjacent to Conservation POS)
1	Class A Forest	Flat/upslope (0°)	21 m	31 m
2	Class A Forest	Downslope >0–5°	27 m	37 m
3	Class A Forest	Downslope >5–10°	33 m	46 m
4	Class D Scrub	Downslope >0–5°	15 m	22 m
5	Class G Grassland	Flat/upslope (0°)	8 m	N/A
6	Class G Grassland	Downslope >0–5°	9 m	N/A
7	Class G Grassland	Downslope >5–10°	10 m	N/A



- Legend**
- Project area
 - 100m assessment area
 - 150m assessment area
 - Cadastral boundary
- Vegetation classification
- Class A Forest
 - Class D Scrub
 - Class G Grassland
 - Clause 2.2.3.2
- Topographic contours (mAHD)
 - Photo point directions
 - Major road
 - Minor road



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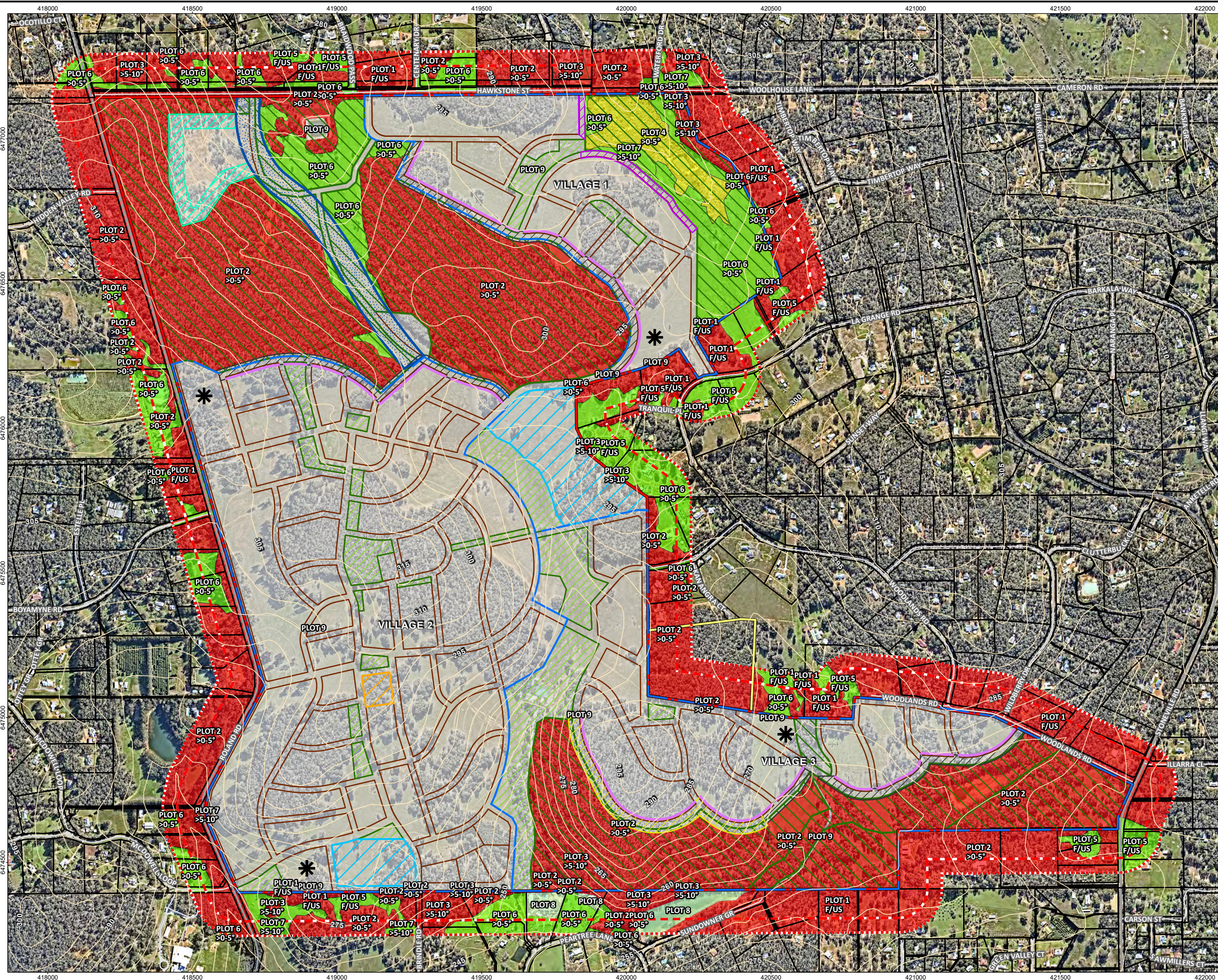
Scale 1:12,000 at A3

Coord. Sys. GDA2020 MGA Zone 50

**North Stoneville
 Residential Development
 Stoneville, WA**

**PRE-DEVELOPMENT
 VEGETATION CLASSIFICATION
 AND EFFECTIVE SLOPE**

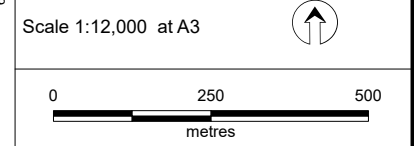
FIGURE 3



- Legend**
- Project area
 - 100m assessment area
 - 150m assessment area
 - Cadastral boundary
 - Village boundary
 - Local centre
 - Education site
 - Proposed Active POS
 - Proposed Conservation POS
 - Central vegetation break (managed as low threat vegetation)
 - 22m wide APZ
 - 37m wide APZ
 - 46m wide APZ
 - 50m wide APZ
- Vegetation classification**
- Class A Forest
 - Class D Scrub
 - Class G Grassland
 - Clause 2.2.3.2
 - Area to be modified to non-vegetated and low threat state
 - Proposed development
 - 7m R-Code setback
 - Department of Education site
 - Topographic contours (mAHD)
 - Major road
 - Minor road
 - * Setback required for future habitable development



Job No: 56850
 Client: Satterley Property Group
 Version: 7 Date: 10-Jun-2024
 Drawn By: droberts Checked By: LR



Coord. Sys. GDA2020 MGA Zone 50

North Stoneville Residential Development Stoneville, WA

POST-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE 4

3.3 Assessment outputs

3.3.1 Bushfire Hazard Level assessment results

3.3.1.1 Pre-development results

The pre-development bushfire hazard levels have been mapped within the assessment area on the basis of the pre-development vegetation discussed in Section 3.2.3 and depicted in Figure 3.

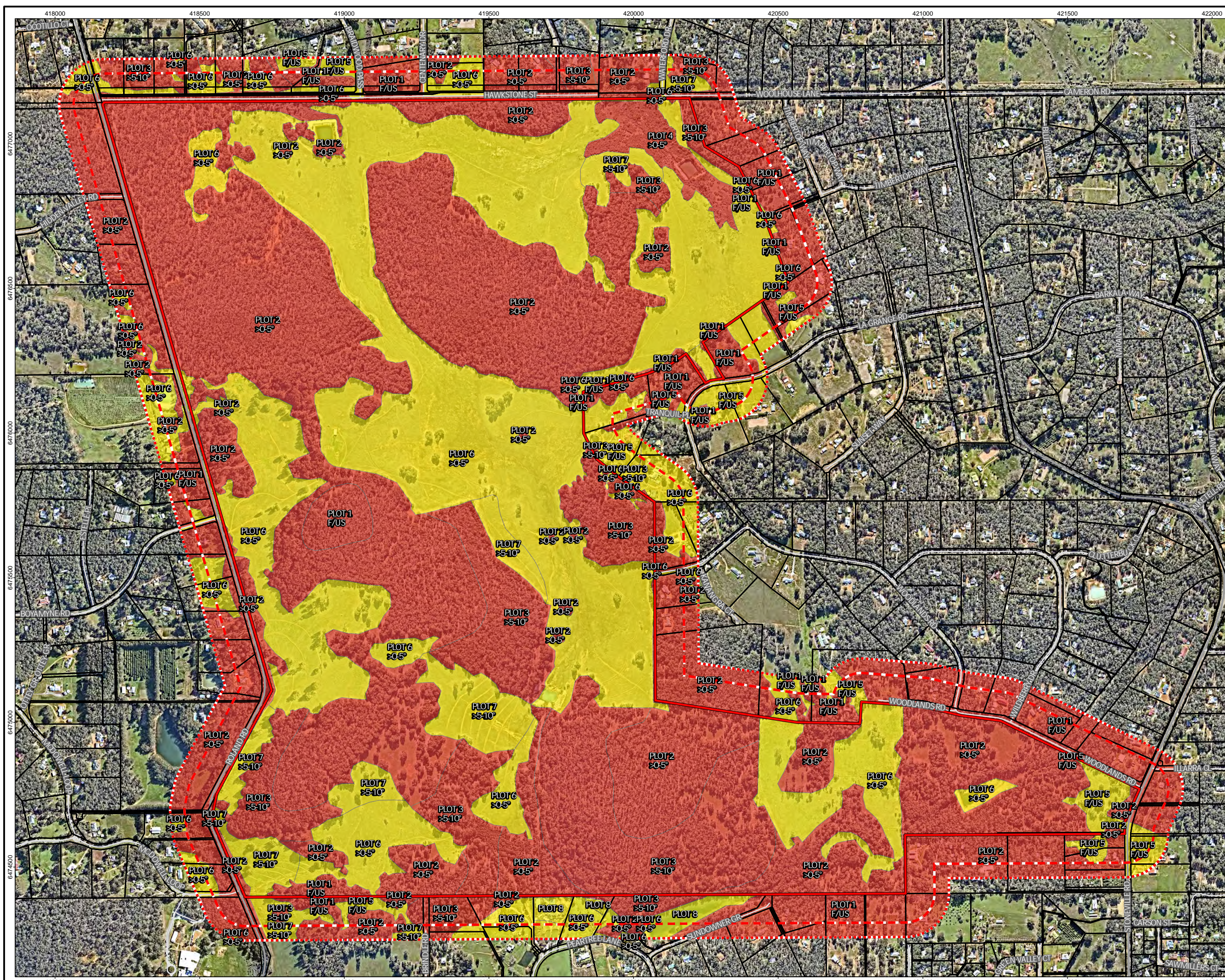
The pre-development BHL assessment map (Figure 3) demonstrates that existing land within the assessment area comprises **Moderate** and **Extreme** bushfire hazard levels.

Land with an Extreme BHL is not suitable for development and the Structure Plan provides a design response to the bushfire hazards to ensure no development occurs within these areas, as outlined below.

3.3.1.2 Post-development results

The post-development bushfire hazard levels have been mapped within the assessment area on the basis of the anticipated post-development vegetation discussed in Section 3.2.4 and depicted in Figure 4.

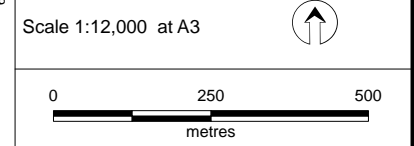
The post-development BHL assessment map (Figure 4) demonstrates that all proposed development areas will be located on land with either a **Low** or **Moderate** bushfire hazard level. This achieves compliance with Element 1 of the bushfire protection criteria of the Guidelines, as discussed in Section 3.2.4.



- Legend**
- Project area
 - 100m assessment area
 - 150m assessment area
 - Cadastral boundary
- Bushfire hazard level**
- Extreme
 - Moderate
- Major road
 - Minor road



Job No: 56850
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 Version: 7 Date: 20-Sep-2023
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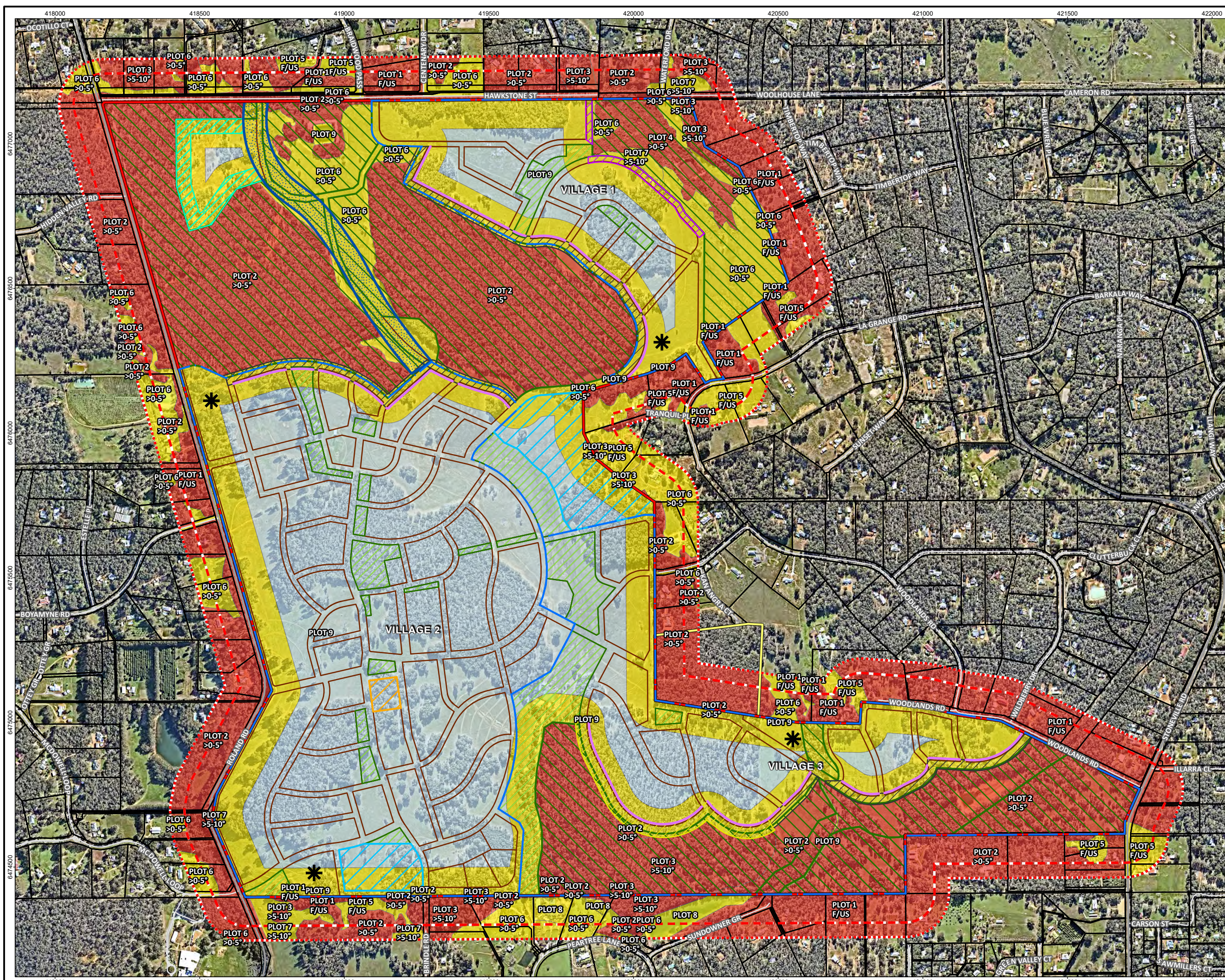


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**North Stoneville
 Residential Development
 Stoneville, WA**

**PRE-DEVELOPMENT
 BUSHFIRE HAZARD LEVEL**

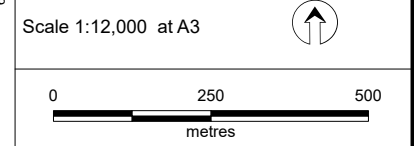
FIGURE 5



- Legend**
- Project area
 - 100m assessment area
 - 150m assessment area
 - Cadastral boundary
 - Village boundary
 - Local centre
 - Education site
 - Proposed Active POS
 - Proposed Conservation POS
 - Central vegetation break (managed as low threat vegetation)
 - 22m wide APZ
 - 37m wide APZ
 - 46m wide APZ
 - 50m wide APZ
- Bushfire hazard level**
- Extreme
 - Moderate
 - Low
- Proposed development
 - 7m R-Code setback
 - Department of Education site
 - Major road
 - Minor road
 - * Setback required for future habitable development



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North Stoneville Residential Development
 Stoneville, WA

POST-DEVELOPMENT BUSHFIRE HAZARD LEVEL

FIGURE 6

4. Identification of bushfire hazard issues

4.1 Bushfire context

Recent bushfires in the local area include Perth Hills 2011, Stoneville/Parkerville 2013, Sawyers Valley 2018, and most recently Wooroloo 2021, and highlight the need for serious consideration of bushfire planning in future developments within the Shire.

4.1.1 Potential bushfire impact to the proposed development

The project area is predominantly surrounded by existing agricultural and rural residential development in the form of large tracts of grazed land and remnant native vegetation, in particular forest vegetation, interspersed with roads, buildings and localised low threat managed landscaping.

John Forrest National Park (located approximately 3 km to the west), Beelu National Park (located approximately 7.5 km to the south) and Leschenaultia Conservation Park (located approximately 5 km to the east), represent nearby landscape scale bushfire risks that could potentially impact the project area.

JBS&G considers a bushfire approaching the site from the west, to be the worst-case bushfire scenario in terms of impact to the project area. This is due to the potential for landscape bushfire behaviour that could develop in the long fire runs through forest vegetation within John Forrest National Park, and the ability for bushfire to spread from the National Park to the site, through relatively continuous forest vegetation within adjacent rural residential development, in particular to the north-west of the project area. Under typical afternoon weather conditions in summer, the likely prevailing winds from the west may be capable of directing a bushfire towards the project area and the resulting fire behaviour is likely to escalate over this time and contribute to significantly elevated levels of radiant heat and ember attack on the proposed development.

A bushfire approaching from the north-west will be able to enter the project area through the forest vegetation to be retained for conservation purposes. There is some fragmentation of the forest vegetation to the west of Roland Road by existing rural residential development, however the level of connectivity of forest vegetation does pose a significant risk to proposed habitable development, especially if left unmanaged. Bushfire approaching from the south-west of the site also poses a significant risk, however there is greater fragmentation of the forest fuels by existing development, in particular Mundaring Christian College and existing rural residential development within the 300 m directly east of Roland Road. Roland Road provides sufficient north-south vehicular access along this interface for both resident and visitor egress and bushfire fighting access. It is noted that in the case of bushfire approaching from the north-west, Roland Road is unlikely to be a sufficient barrier to bushfire spread through the predominately forest fuels.

Both Beelu National Park and Leschenaultia Conservation Park are located over 4 km from the project area, with land between these parks and site consisting mainly of rural residential land uses with small urban areas. Bushfire approaching the project area from within these large parks to the south or east, will spread through fragmented forest fuels and grazed grassland vegetation associated with existing rural residential development. Although the likelihood of landscape scale bushfire is lesser from these directions, there are pockets of forest vegetation to the north-east, east and south of the project area (as well as the on-site southern Conservation POS) that could facilitate significant bushfire behaviour that may impact proposed development. In each of these cases, there is some level of fuel fragmentation due to roads, buildings and firebreaks, which may hinder bushfire growth and also permit a level of access for bushfire fighting activities.

Land within the project area mainly consists of remnant forest vegetation and grazed grassland. Much of the site will be cleared for future development with the significant areas of retained unmanaged vegetation being restricted to the northern, northeastern and southern Conservation POS areas. The

intensification of development within the project area will result in a lower overall bushfire hazard level than currently exists, due to the clearing and modification of bushfire prone vegetation associated with the proposed development.

4.1.2 Potential bushfire impact to evacuation routes

As detailed previously in Section 1.5.2, separate bushfire and traffic evacuation modelling has identified four design bushfire scenarios that could result in closure of one or more of the major evacuation corridors (Great Eastern Highway in the south, or Toodyay Road in the north). These bushfire scenarios are from the southwest, northwest, northeast and southeast and are considered to be 'worst-case scenarios' based on the capacity to inhibit evacuation from, and access to, the project area. The modelling has demonstrated that with public road upgrades and staggered development, future occupants of the project area will have sufficient time to evacuate the area before a bushfire impacts the major transport routes.

4.2 Bushfire hazard issues and proposed mitigation measures

Examination of strategic development design in accordance with the Structure Plan, bushfire context and pre-development and post-development bushfire hazard levels has identified bushfire hazard issues to be considered at future planning stages. These bushfire hazard issues, and proposed mitigation measures are detailed in Table 6 and are also considered in the compliance assessment in Table 7 (Section 5.1).

JBS&G considers the bushfire hazards within and adjacent to project area and the associated bushfire risks are manageable through the development of these mitigation measures and will result in suitable levels of defendable space, compliant APZs (oversized at higher risk interfaces), suitable access provisions, appropriate firefighting water supply and increased building construction standards. These measures should be reviewed at all stages of the planning process to ensure a suitable, compliant, and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.

Table 6: Bushfire hazard issues and bushfire management measures

No.	Bushfire hazard issue	Proposed mitigation measures
1	The project area is vulnerable to landscape scale bushfire risk which warrants serious consideration through the development design at Structure Plan and all subsequent planning stages.	<ul style="list-style-type: none"> Bushfire mitigation measures proposed within this strategic level BMP take into consideration the local bushfire risk context and aim to minimise these risks by providing for appropriate siting of habitable development, large areas of low threat/BAL-Low internal spaces, multiple vehicular access options, including perimeter access to adjoining hazards, and improvements to the existing public road network, as well as an on-site fire-fighting water supply, as discussed below.
2	The retention of on-site vegetation within Conservation POS will result in interfaces between vegetation hazards and habitable development. An appropriate APZ and BAL response is to be implemented at these interfaces in consideration of the landscape scale bushfire risk to the project area.	<ul style="list-style-type: none"> These higher risk interfaces with Conservation POS will be provided with APZs sufficient to achieve BAL-19, as opposed to the maximum permitted BAL-29. This will reduce bushfire impacts to a risk of ember attack and a likelihood of radiant heat impact no greater than 19 kW/m² (noting BAL-29 is associated with an increased risk of ember attack and likelihood of exposure to increased levels of radiant heat [≤ 29 kW/m²]). The enhanced APZs, in tandem with substantial perimeter roads will act to moderate bushfire behaviour at the highest risk interfaces while providing for enhanced defendable space for attending emergency services. The APZs will be 46 m in width where effective slope under forest vegetation is $>5-10^\circ$ and 37 m where the effective slope is $>0-5^\circ$. A 22 m APZ will be provided adjacent to Class D Scrub $>0-5^\circ$. These interfaces will all be provided with substantial perimeter roads of 20-30 m and the remaining separation will be provided via habitable building setbacks (e.g. R-Code setbacks), or APZs extending into future low threat areas of POS, or a combination of both (as depicted on Figure 7) or as nominated during preparation of a Local Development Plan (LDP).
3	Due to the extent of on-site and adjoining vegetation hazards, perimeter roads are required to provide a defendable space for emergency services personnel as well as hazard separation between bushfire prone vegetation and habitable development. Where	<ul style="list-style-type: none"> The vast majority of proposed lots will be provided with public road perimeter access (20-30 m width) to provide the required hazard separation and defendable space. There are four direct interfaces between proposed lots and adjoining vegetation hazards where FSARs are proposed instead of public perimeter roads due to site constraints (refer to the Concept Plan [Figure 1] and

No.	Bushfire hazard issue	Proposed mitigation measures
	<p>perimeter roads are not provided, FSARs will need to provide the necessary access.</p>	<p>Figure 8). These FSARs will be 12 m wide, which is significantly wider than the minimum 6 m required for public roads under the Guidelines.</p> <ul style="list-style-type: none"> • An additional FSAR is proposed adjacent to POS within Village 1 (northeast corner of the project area) which will improve access for firefighters in a bushfire emergency, whilst also providing separation between the managed Recreation POS and unmanaged Conservation POS to the east. • Provision of perimeter access at all vegetated interfaces will provide for a fire suppression response immediately between on-site and external bushfire hazards and habitable development throughout the development site. • Temporary FSARs may also be employed during staged subdivision to provide vehicular access to temporary vegetation hazards that will be cleared during future development stages. • The Transect Design Guide (Appendix B) demonstrates that external perimeter roads will have a minimum 12 m clear width, with reduced street trees providing for trafficable/mountable street verges and intersection kerbs, and there will be no median strips. These design concepts will assist emergency vehicles operating at the development interface in the event of a bushfire emergency by allowing an appliance to operate and vehicles to pass to prevent that section becoming blocked or forming a bottleneck.
4	<p>Any interface where perimeter roads/FSARs are not sufficient to provide the full separation required to achieve BAL-29 will require lot boundary setbacks to ensure all habitable development is located in BAL-29 or below.</p>	<ul style="list-style-type: none"> • Where perimeter roads and/or FSARs are not sufficient for proposed lot boundaries to achieve BAL-29, APZ setbacks will be implemented at the vegetation interface to achieve the necessary separation. • These setbacks are expected to be easily accommodated within these larger lots. • APZ setbacks will be nominated at subdivision stage through preparation of a BAL contour map and will be enforced through mandatory Residential Design Code (R-Code) setbacks, where the setbacks are sufficient to cater for the required BAL-29 APZ, restrictive covenant on title, and/or preparation of a LDP as a condition of subdivision approval.
5	<p>Revegetation is expected to occur within area of open space which requires consideration in the context of post-development bushfire hazard levels.</p>	<ul style="list-style-type: none"> • Although landscaping detail is currently not available at this strategic stage of planning, the post-development BHL assessment makes assumptions around revegetation within Conservation POS and some currently vegetated areas of Recreation POS to provide for worst-case vegetation conditions. These on-site hazards will be mitigated through the provision of perimeter roads and APZs at the interfaces adjoining open space and will be sufficient for adjoining habitable development to achieve the intended BAL of 19 or 29. In this regard, areas where future revegetation is proposed are considered suitable in the context of the proposed development. APZs adjacent to Conservation POS are depicted in Figure 7. • In addition, landscaping within Recreation POS is largely expected to comprise low threat vegetation and will be designed to ensure that these areas do not pose a bushfire risk to the adjoining residential development, as discussed in Section 2.2 and 2.3.

No.	Bushfire hazard issue	Proposed mitigation measures
6	Maintaining existing fragmentation between vegetated Conservation POS areas will reduce the potential for a bushfire to spread through the project area and requires consideration during landscaping design.	<ul style="list-style-type: none"> • BAL contour assessments carried out at subdivision stage will consider detailed landscaping design to further investigate the impacts of revegetation on habitable development and ensure that revegetation does not result in unacceptable impacts on future development. • A central fuel break is proposed within the northern Conservation POS where grassland currently separates the eastern and western areas of forest vegetation that are proposed to be retained post-development (see Figure 7). The fuel break will be maintained on an ongoing basis to provide a passive break to disrupt fuel continuity and fire behaviour and enable vehicular access through the vegetated POS. The break may also provide a defence line for fire firefighting operations. • In addition to the above, the central north-south creek line is anticipated to be largely established and maintained as excluded vegetation under Clause 2.2.3.2 of AS 3959 (especially at habitable development interfaces), either based on low threat landscaping, or through size restrictions and relative separation from classified vegetation. This will inhibit fire spread from northern/southern vegetated areas to within the central development areas. The BHL assessment demonstrates that the creek lines and associated Recreation POS will present a Low bushfire hazard level, thereby demonstrating that the fire potential and fire spread through the central spine will be negligible. • Landscaping of creek lines requires careful consideration given revegetation is likely to occur within the identified drainage basins to create a healthy stream ecosystem. Setback distances to any classified vegetation remaining within central Recreation POS will be determined at subdivision stage through the development of a Landscaping Plan and detailed BMP, including a BAL contour map assessment.
7	Existing forest vegetation is likely be retained within the larger Natural Living lots where possible, to maintain rural amenity and protect any potential fauna habitat trees. Consideration is to be made in regard to achieving a co-ordinated approach to vegetation management within these lots to ensure there is no residual vegetation on adjoining properties that would result in unacceptable BALs for future habitable development.	<ul style="list-style-type: none"> • The full extent of vegetation within Natural Living lots will be modified to a low threat state as per AS 3959 Clause 2.2.3 to create a low threat outcome across the adjoining lots. Reducing bushfire fuels to a low threat state will not necessarily require full clearing of vegetation and significant trees are anticipated to be retained where possible. • Creating a low threat landscape within these lots, which are primarily sited at the perimeter of the project area, will act to prevent bushfire penetration from external and on-site vegetation hazards into the interior portions of the site, thus reducing bushfire threat to the project area as a whole • The low threat standard will need to be established for all lots prior to clearance of subdivision to ensure the risk of unmanaged vegetation is mitigated prior to building construction. • Landscaping and ongoing management commitments should be documented within a Landscape Management Plan (as discussed under 8 below_.
8	This BMP documents overarching landscaping design principles which will need to be further developed within a site-wide Landscape Management Plan, which will also provide an enforcement mechanism	<ul style="list-style-type: none"> • Justification for the low threat post-development classifications applied within this BMP (i.e. Plot 9) will need to be demonstrated through the preparation of detailed landscaping design, which is most appropriately prepared at subdivision stage. An overarching Concept Landscape Plan is recommended to be prepared as part of the initial subdivision stage, as part of a wider Landscape Management Plan (LMP) which would:

No.	Bushfire hazard issue	Proposed mitigation measures
	<p>for the ongoing management of low threat vegetation within POS as well as private landholdings.</p>	<ul style="list-style-type: none"> ○ document the high-level landscaping concepts for the entire Structure Plan area, ○ guide detailed design for each subsequent stage of subdivision to achieve a cohesive and consolidated approach to site landscaping and bushfire protection, and ○ clearly detail the responsibilities and provide an appropriate means of enforcement for the ongoing management of vegetation across the site, especially APZs and low threat vegetation on private land and POS. ● The LMP could be prepared following the Structure Plan endorsement and accompany each subsequent subdivision application. The plan could become a ‘living document’ with an addendum being prepared for each stage of subdivision to ensure the plan incorporates final subdivision and landscaping design.
9	<p>The school sites represent vulnerable land uses and will require additional consideration of bushfire risk at subdivision and DA stage.</p> <p>Special Sites also have potential to be used for community purposes that could present a vulnerable land use.</p>	<ul style="list-style-type: none"> ● The proposed school sites and Special Sites are relatively large and future development is expected to be able to meet compliance with the bushfire protection criteria within the lot boundaries, as required. Special Site No. 1 will be reserved as Conservation POS and is unlikely to be developed for habitable purposes. ● School sites and Special Sites will be subject to future planning and design through a development application process. It is expected that these sites will be cleared, managed to a low threat standard, or will retain vegetation in accordance with a relevant exclusion under AS 3959 Clause 2.2.3.2. These sites are expected to be co-developed by the proponent and a third party, thus ensuring that they will not pose an unacceptable bushfire risk to the proposed development or to adjacent lots. ● Requirements under the National Construction Code (NCC) also apply to school buildings, as discussed below. ● Future BMPs prepared at subdivision and DA stage will consider bushfire compliance for future vulnerable land uses as well as site-specific bushfire mitigation measures, including preparation of an emergency evacuation plan at DA stage. ● As mentioned above, compliance is considered to be readily achievable for these sites and future land uses and this will be demonstrated at future stages. ● Evacuation modelling (Transcore 2024) has also demonstrated that the future road upgrades associated with construction of various stages of the Structure Plan will provide for a safe evacuation of the site.
10	<p>Specification 43 of the NCC sets out bushfire protection measures for certain Class 9 buildings, including Class 9a healthcare buildings, Class 9b early childhood centres and schools, Class 9c residential care buildings, and associated Class 10a structures. These requirements will need to be considered at future planning and building stages.</p>	<ul style="list-style-type: none"> ● The NCC requirements for certain Class 9 buildings will need to be considered at subdivision stage when determining an appropriate location for the proposed school sites. It should be demonstrated at this stage of planning that there is capacity to achieve sufficient separation between buildings and classified vegetation as prescribed in the NCC. ● NCC requirements will need to be further investigated at DA during the specific siting of buildings in relation to vegetation hazards, allotment boundaries and carparking areas, and other buildings. Other considerations at DA and building permit stage include access, firefighting water supply, signage, provision of an outdoor refuge site, internal tenability, construction to AS 3959, and emergency power supply.

No.	Bushfire hazard issue	Proposed mitigation measures
		<ul style="list-style-type: none"> It is noted that Specification 43 of the NCC sets out the deemed-to-satisfy pathway and that alternative solutions may also be considered. It is recommended that appropriate siting of buildings is considered early in the planning process, to ensure these types of land uses are located in the lowest possible bushfire risk area with the appropriate bushfire mitigation measures in place.
11	The Structure Plan includes several Special Use sites. Future land uses will need to consider the bushfire risk to these sites at the appropriate planning stage.	<ul style="list-style-type: none"> This Structure Plan BMP assumes that the Special Sites No. 2 and 3 will comprise low threat vegetation. This outcome is expected to be achieved via one or a combination of meeting Clauses 2.2.3.2 [c], [d], [e] and [f]. Site specific bushfire mitigation measures will be developed at DA stage, with consideration of suitable APZ distances and setbacks also being made at subdivision stage. As mentioned above, compliance for future land uses within the Special Sites is considered to be readily achievable given the size of the sites. Special Site No. 1 will be reserved as Conservation POS and is not expected to be developed for habitable purposes.
12	A recycled water plant is proposed in the northwest of the project area and will be surrounded by forested Conservation POS. A substantial APZ will be required to protect this critical infrastructure.	<ul style="list-style-type: none"> Due to the presence of critical infrastructure, it is recommended that the entire development cell is modified to a low threat state as per AS 3959 Clause 2.2.3.2 and as a minimum, APZs are provided to achieve BAL-12.5. This will reduce the level of bushfire related risk increase the likelihood of ongoing operation of critical infrastructure during and immediately after a bushfire event. An indicative 50 m APZ to achieve BAL-12.5 from the fringing forest vegetation (downslope >0-5°) is depicted in Figure 4 and Figure 7.
13	Impacts of staged subdivision on bushfire risk, BALs and vehicular access will need to be considered at future planning stages.	<p>On-site staging buffers to mitigate temporary bushfire risk and BALs</p> <ul style="list-style-type: none"> If future development (and therefore clearing) is to occur on a staged basis, clearing in advance of adjacent areas will need to occur to ensure building construction is not inhibited by any temporary vegetation extents located within adjacent development stages yet to be cleared. This can be achieved by ensuring that each approved stage subject to construction is surrounded by a 100 m wide (or other distance confirmed by an accredited bushfire practitioner), on-site cleared or low threat buffer prior to development (not including vegetation proposed to be retained). Once the buffers are created, they will need to be maintained on a regular and ongoing basis to achieve a low threat minimal fuel condition all year round until such time that the buffer area is developed as part of the next development stage. This will assist in managing the on-site temporary vegetation hazards. <p>Vehicle access staging</p> <ul style="list-style-type: none"> Vehicle access arrangements will need to ensure that all occupiers and visitors are provided with at least two vehicular access routes to two different destinations at all stages. This may be achieved via construction of access in advance of stages or through provision of temporary emergency access ways until two formal access roads are available.

No.	Bushfire hazard issue	Proposed mitigation measures
14	Given the potential bushfire risk to the site, appropriate vehicular access is required for both egress by residents and visitors and firefighter access to and around the project area.	<ul style="list-style-type: none"> • The proposed internal vehicular access network will comply with the requirements of the Guidelines, with a focus on preventing entrapment of the public or firefighters in a bushfire scenario. This will be achieved through a continuous road network and all roads being through roads. • Roland Road (to the west) and Hawkstone Street (to the north) provide public road interfaces along the project area boundary, while the existing public road network to the south and east of the site ensure good access for firefighting operations for bushfires approaching from these directions. • Several legacy access non-compliances will be resolved by connecting the proposed road network to legacy dead-ends, as discussed below. • 12m wide FSARs will be provided at the five interfaces where public perimeter road access is not suitable, to facilitate simultaneous evacuation and movements by emergency service vehicles.
15	There are several existing no-through roads adjoining the project area and opportunity has been recognised for the Structure Plan design to resolve these roads through extension of the public road network and construction of EAWs.	<ul style="list-style-type: none"> • The Structure Plan design will result in extension of several legacy non-compliant no-through roads within the surrounding public road network which will improve access options within the local area and remove the existing single point-of-failure roads. • Extension of the roads into the project area (either via public road or EAW) will also provide residents with a potential place of temporary relative safety away from bushfire impacts occurring within the largely bushfire prone landscape. • These road extensions are further discussed in Table 7 (A3.2b)
16	The project area is not currently within a reticulated area and this will need to be provided to secure a permanent firefighting supply given the density of development proposed.	<ul style="list-style-type: none"> • Fire water is anticipated to be provided via extension of reticulated water supply and hydrants to service the entirety of the development site. • In the event that this is not possible, strategic or individual lot water tanks will be considered in consultation with the Shire. • There are also several dams within the project area that will be retained and may be available to provide a supplementary water supply for ground and aerial crews.
17	Given the location of the proposed development, and the higher risk of bushfire impact relative to developments on the Swan Coastal Plain, resident bushfire awareness and preparation will be critical to ensuring appropriate response in a bushfire emergency, thereby reducing the burden on fire and emergency services.	<ul style="list-style-type: none"> • A section on bushfire is to be included in the resident information package issued to all landowners upon purchase of their lot. This will include information on bushfire behaviour, building construction and APZ specifications, vehicular access, firebreak requirements and ongoing maintenance and housekeeping requirements for buildings and APZs. • Additionally, information will also be provided on developing a bushfire survival plan for the residence including evacuation planning, and where to access information on bushfire status.
18	The proposed development will result in expansion of the existing population which may put pressure on the existing public road network during a bushfire emergency.	<ul style="list-style-type: none"> • To ensure there is no impact to the existing population from a traffic management point of view, upgrades to existing roads will occur as a result of implementation of the Structure Plan, along with any planned road upgrades by Main Roads WA, and construction of the future State Government East Link project. The Transcore traffic modelling has determined that certain road upgrades will be sufficient to cater for evacuation

No.	Bushfire hazard issue	Proposed mitigation measures
19	Existing rural-residential development surrounding the project area is vulnerable to landscape-scale bushfire which places the existing community at risk based on current conditions. There are currently no significantly large areas of low threat land within the local area where the community would be able to seek refuge (as a last resort measure) if evacuation out of the area cannot safely occur.	<p>of the existing and future population. Based on the modelling, development of the project area will be restricted to 400 lots until East Link is completed. This will ensure that the existing and future population will be appropriately provided for in terms of the public road network under both normal and emergency conditions.</p> <ul style="list-style-type: none"> • An appropriate mechanism of enforcement is to be provided to ensure that the required offsite road and infrastructure upgrades are implemented at the relevant subdivision stages to support further land use intensification. <hr/> <ul style="list-style-type: none"> • Build out of the Structure Plan area will result in creation of significant areas of Low BHL/BAL-Low land, particularly within Village 2, as depicted in Figure 6. • While evacuation from the incident area should always be the primary option during a bushfire emergency, implementation of the Structure Plan will provide a potential contingency on-site sheltering option to be considered by emergency services that could be used by residents, the local community, and firefighters, especially given the project area will have multiple connections to the adjoining public road network in all directions. • On-site shelter in place is more likely to be considered under lower FDI/FBI conditions and would result in reduced pressure on the road network and reduced potential for evacuation issues. Adoption of this fall-back strategy should not be ruled out during the preparation of future subdivision stage BMPs, where modelling would need to be carried out to determine areas capable of achieving $\leq 10\text{kW/m}^2$ for buildings and $\leq 2\text{kW/m}^2$ for open space and constructed in accordance with current guidance for on-site refuge buildings/open space areas. Certain Class 9 buildings may have different requirements for open space refuge under the NCC. • The potential for the Structure Plan to provide places of relative safety for the existing and future population is considered to have significant potential benefit to the local community in the event that evacuation from the local area is not possible or desirable.

5. Assessment against the bushfire protection criteria

5.1 Compliance with Elements 1 – 4

Compliance of the LSP area with Elements 1 – 4 of the bushfire protection criteria of the Guidelines (Version 1.4) is demonstrated by meeting the acceptable solutions, as detailed in Table 7.

Table 7: Compliance of the LSP area with the bushfire protection criteria of the Guidelines (Elements 1 – 4)

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance can be achieved at future planning stages
Element 1: Location	P1 – The strategic planning proposal, subdivision and development application is located in an area where the bushfire hazard assessment is or will, on completion, be moderate or low, or a BAL-29 or below, and the risk can be managed. For unavoidable development in areas where BAL-40 or BAL-FZ applies, demonstrating that the risk can be managed to the satisfaction of the decision-maker.	A1.1 Development location The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL-29 or below.	The post-development BHL assessment (Figure 6) identifies that on completion of development, all developable land within the Structure Plan area will comprise either a Low or Moderate bushfire hazard level. All land with an Extreme BHL will be restricted to Conservation POS which will not be developed for habitable purposes. This satisfies A1.1. Future habitable buildings will be located within areas deemed suitable for development as per acceptable solutions of the Guidelines through the following means: <ol style="list-style-type: none"> 1. Creation of APZs to achieve a suitable BAL. 2. Provision of perimeter roads and FSARs at vegetation interfaces. 3. Establishment and maintenance of low threat landscaping with lots and POS. In addition, lots at higher risk interfaces with intact Conservation POS vegetation hazards will be provided with an APZ to achieve BAL-19, as opposed to BAL-29 (refer to Figure 7), which is the maximum permitted under A1.1. This will reduce bushfire impact on future dwellings and enhance defensible space for attending emergency services.	✓
Element 2: Siting and design	P2 – The siting and design of the strategic planning proposal, subdivision or development application, including roads, paths and landscaping, is appropriate to the level of bushfire threat that applies to the site. The proposal incorporates a defensible space and significantly reduces the heat intensities at the building surface thereby minimising the bushfire risk to people, property and infrastructure, including compliance with AS 3959 if appropriate.	A2.1 Asset Protection Zone Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements: <ul style="list-style-type: none"> • Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29) in all circumstances. • Location: the APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity (see explanatory notes). • Management: the APZ is managed in accordance with the requirements of 'Standards for Asset Protection Zones' (see Schedule 1). 	It is envisaged that the entirety of the project area (aside from areas of Conservation POS) will be modified to a low threat state as per provisions of AS 3959 Clause 2.2.3.2. In this regard, the low fuel standard will be created for proposed residential lots prior to subdivision clearance. Asset Protection Zones will be required for the following areas of the Structure Plan: <ol style="list-style-type: none"> 1. Adjoining residential lots at the interface with on-site retained Conservation POS vegetation, sufficient to achieve BAL-19, as shown in Figure 7. These APZs range from 22 m to 46 m wide and will be contained within a combination of the interfacing 20 m – 30 m wide perimeter roads, POS (as a low threat buffer) and/or APZ setbacks into the lots (enforced via preparation of a LDP). Future detailed design at subdivision stage will determine the most appropriate outcome at these interfaces. 2. Within the recycled water infrastructure lot to provide protection for critical infrastructure. 3. Around habitable development within the Special Sites (if the sites are not fully managed in a low threat state). 4. Around habitable buildings within the two school sites (if the sites are not fully managed in a low threat state). 5. Around habitable buildings within the fringing Natural Living lots (although it is proposed that these lots will be fully managed in a low threat state). 6. Lots where there is a direct interface with external vegetation hazards requiring an APZ setback from the property boundary, or where the perimeter road/FSAR is insufficient to absorb the entire APZ requirements. The remainder of proposed lots will be provided with perimeter roads that will be sufficient for the interfacing lots to achieve BAL-29, as per requirements of A1.1. The BHL assessment makes a broad assumption that the entirety of the waste facility site, Special Sites (No. 2 and 3) and education sites will be modified to and maintained in a low threat state. If unmanaged vegetation is to be retained, then APZs sufficient to achieve BAL-29 will be required around habitable buildings. For the waste facility site, it is recommended that as a minimum, APZs are provided around critical infrastructure to achieve BAL-12.5. The school sites are subject to provisions of Specification 43 of the NCC, including siting of buildings within an appropriate BAL rated area. As mentioned above, the APZ standard is anticipated to be established within the residential lots, including the larger Natural Living lots, prior to subdivision clearance, which will ensure unmanaged vegetation hazards with potential to inhibit the neighbouring lots from achieving BAL-29 are not present. In addition, maintenance of APZ/low threat standards on lots at the development perimeter will act to prevent the spread of a bushfire into the site interior.	✓

			<p>The required APZs are to be identified at future planning stages based on future subdivision/development design and following a BAL contour map assessment. Likely APZ distances for BAL-19 and BAL-29 are detailed in Table 5.</p> <p>Any APZ setbacks will be enforced through mandatory R-Code setbacks, where the setbacks are sufficient to cater for the required BAL-29 APZ, restrictive covenant on title, and/or preparation of a LDP as a condition of subdivision approval. Natural Living Lots are understood to require a 7 m front R-Code setback, in this regard, the APZ extending from these lots has been measured from the R-Code setback line, rather than the external lot boundary.</p> <p>APZs are to be implemented and maintained in accordance with Schedule 1 of the Guidelines (Appendix C Appendix B) and the Shire’s Firebreak and Fuel Hazard Reduction Notice (see Appendix D). It is anticipated that where possible, on-site significant trees will be retained as part of low threat landscaping within the APZs.</p>	
Element 3: Vehicular access	P3i – The design and capacity of vehicular access and egress is to provide for the community to evacuate to a suitable destination before a bushfire arrives at the site, allowing emergency services personnel to attend the site and/or hazard vegetation.	A3.1 Public roads <i>The minimum requirements under this acceptable solution are applicable to all proposed and existing public roads.</i> Public roads are to meet the minimum technical requirements in Table 6, Column 1. The trafficable (carriageway/pavement) width is to be in accordance with the relevant class of road in the Local Government Guidelines for Subdivisional Development (IPWEA Subdivision Guidelines), Liveable Neighbourhoods, Austroad standards and/or any applicable standards for the local government area.	Provisions for the construction of future public roads to relevant technical requirements under the Guidelines (refer to A3.1 and Appendix E) are to be made at the subdivision stage of planning. All proposed public roads have been designed to meet the relevant Guidelines and Standards to satisfy Shire requirements. The substantial road reserve widths (20 – 30 m) will provide for a direct firefighting response with simultaneous evacuation of residents, enhanced defensible space and reduced bushfire impacts at the critical interfaces. The existing surrounding public road network onto which internal roads are proposed to connect to consist predominantly of 6 m wide paved surfaces with gravel shoulders. These are understood to meet minimum requirements for the class of road in the local rural area and will facilitate two-way vehicular access to and egress from the project area to places of relative safety. Separate traffic evacuation modelling by Transcore (2024) has identified that some roads upgrades will be required to facilitate safe evacuation of the area by both the existing and future population. These road upgrades are to be attended to as required prior to implementation of the relevant stage of development.	✓
		A3.2a Multiple access routes Public road access is to be provided in two different directions to at least two different suitable destinations with an all-weather surface (two-way access). If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the road access is to be a maximum of 200 metres from the subject lot(s) boundary to an intersection where two-way access is provided. The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints and the following requirements are met: <ul style="list-style-type: none"> • the no-through road travels towards a suitable destination; and • the balance of the no-through road, that is greater than 200 metres from the subject site, is wholly within BAL-LOW, or is within a residential built-out area – Figure 23. 	On completion of future subdivision within the Structure Plan area, the existing public road network and proposed public internal roads will provide all occupants with the option of travelling to least two different suitable destinations via multiple access routes, as detailed below. Given the extent of bushfire prone vegetation within the local area, the most suitable destinations are likely to be away from the Perth Hills, either west towards the outer Perth suburbs on the Swan Coastal Plain or east toward Northam or York. The location of suitable destinations will be largely dictated by bushfire behaviour and emergency services will advise the most appropriate evacuation routes and destinations. The following access routes to the identified suitable destinations will be provided for the project area: <ol style="list-style-type: none"> 1. Three public road connections and one fire service access route connection will be provided to Roland Road in the west. Roland Road then provides access to Toodyay Road in the north and Great Eastern Highway in the south, thus providing access options in all directions. 2. Three public road connections will be provided to Hawkstone Street in the north. Hawkstone Street provides access west to Roland Road, as well as north to Toodyay Road via Strawberry Hills Road and Braidwood Pass. 3. Three public road connections will be provided to Woodlands Road in the east. The northern connection with Woodlands Road will resolve two existing non-compliant no-through roads – Woodlands Road and Kanangra Court, which both currently exceed 200 m from a road providing access in two directions. Woodlands Road is connected via an existing 250 m long EAW to La Grange Road which forms a continuous loop road to connect back to Stoneville Road. Stoneville Road then provides access north to Toodyay Road and south to Great Eastern Highway. 4. A public road connection will be provided to La Grange Road along the eastern project area boundary which will enable access east to Stoneville Road or south to Woodlands Road via an EAW (as mentioned above) and then east out to Stoneville Road. 5. A public road connection will be provided to Brindle Road in the south, which will resolve the existing no-through road and provide access in multiple directions including Roland Road in the west (via Kilburn Road) and Stoneville Road in the east (via Richardson Road). The proposed road connections and emergency access routes are depicted on Figure 8, which also provides an overview of the immediately surrounding public road network, including the location of existing EAWs. In the event that future development is staged, each stage of subdivision is to be provided with multiple access/egress routes to two different suitable destinations. This will be achieved via construction of public roads in advance of later stages and/or provision of temporary compliant EAWs to the satisfaction of the Shire and DFES. Compliance	✓

		with these provisions will be driven through the subdivision clearance process for each state of subdivision through preparation of a Bushfire Management Plan compliance report.	
	<p>A3.2b Emergency access way <i>Where it is demonstrated that A3.2a cannot be achieved due to site constraints, or where an alternative design option does not exist, an emergency access way can be considered as an acceptable solution.</i></p> <p>An emergency access way is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 2; provides a through connection to a public road; be no more than 500 metres in length; and must be signposted and if gated, gates must open the whole trafficable width and remain unlocked. 	<p>The Structure Plan design has avoided creation of no-through roads, with all proposed roads within the project area providing through access. In this regard, no EAWs are required in response to the proposed public road network. Temporary EAWs may be required during staged development to ensure provisions of A3.2a (i.e. through-connections between public multiple access routes) are met and will meet all technical provision of A3.2b (refer to Appendix A).</p> <p>Opportunity has been identified through the Structure Plan design process to improve access outcomes within the existing surrounding public road network. This includes provision of a 12m wide EAW to connect the existing dead-end of Sundowner Grove (which intersects the southern project area boundary) with the proposed internal public road network (see Figure 8). Sundowner Grove is a legacy non-compliant no-through road being approximately 465 m from the intersection with Peartree Lane (which provides access northwest and then south to Kilburn Road or east via an existing EAW to Hollett Road). The EAW proposed as part of this Structure Plan will provide occupants of both Sundowner Grove and Peartree Lane with alternative emergency access/egress to the north and will meet all construction requirements set out under A3.2b, including a maximum length of 500 m. This permanent EAW is to be provided as a right of way or public easement in gross and will be maintained by the Developer initially and the Shire thereafter. The significant width of the EAW (12 m) will assist in simultaneous access/egress of both the community and emergency service vehicles.</p>	✓
	<p>A3.3 Through-roads All public roads should be through-roads. No-through roads should be avoided and should only be considered as an acceptable solution where:</p> <ul style="list-style-type: none"> it is demonstrated that no alternative road layout exists due to site constraints; and the no-through road is a maximum length of 200 metres to an intersection providing two-way access, unless it satisfies the exemption provisions in A3.2a of this table. <p>A no-through road is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements of a public road (Table 6, Column 1); and turn-around area as shown in Figure 24. 	<p>As mentioned previously, the Structure Plan design will not result in creation of any no-through roads. On this basis, all proposed public roads will provide for continuous vehicular access throughout the project area.</p> <p>In addition, Structure Plan design provides for through construction of legacy non-compliant no-through roads within the surrounding public road network to improve access outcomes as follows (refer to Figure 8):</p> <ol style="list-style-type: none"> Two public road connections with Hawkstone Street in the north (although EAW access is also provided north to Strawberry Hills Drive) Extension of Woodlands Road to the east Extension of Brindle Road to the south. <p>In addition, a 12m wide EAW will be constructed to connect the no-through portion of Sundowner Grove to public roads within the southeast of the project area (as discussed under A3.2b).</p> <p>Temporary no-through roads may be required during staged subdivision due to site/staging constraints, however, the aim should be to provide a continuous road network at all stages. Any temporary no-through roads are to meet technical provisions set out under A3.3 (refer to Appendix E).</p>	✓
<p>P3ii – The design of vehicular access and egress provides:</p> <ul style="list-style-type: none"> access and egress for emergency service vehicles while allowing the community to evacuate; a defensible space for emergency services personnel on the interface between classified vegetation and development site; and hazard separation between classified vegetation and the subject site to reduce the potential radiant heat that may impact a lot(s). 	<p>A3.4a Perimeter roads A perimeter road is a public road and should be provided for greenfield or infill development where 10 or more lots are being proposed (including as part of a staged subdivision) with the aim of:</p> <ul style="list-style-type: none"> separating areas of classified vegetation under AS3959, which adjoin the subject site, from the proposed lot(s); and removing the need for battle-axe lots that back onto areas of classified vegetation. <p>A perimeter road is to meet the requirements contained in Table 6, Column 1.</p> <ul style="list-style-type: none"> A perimeter road may not be required where: the adjoining classified vegetation is Class G Grassland; lots are zoned for rural living or equivalent; 	<p>The vast majority of proposed residential lots will be provided with public perimeter roads with reserves ranging in width from 20 m to 30 m. These roads will provide for defensible space at vegetation interfaces, enable simultaneous emergency services response and community evacuation and will act to provide low threat separation between vegetation hazards and habitable development.</p> <p>Where proposed lots are adjoining by the existing public road network (e.g. Natural Living lots at the Roland Road and Hawkstone Street interfaces), the existing public roads will provide the necessary perimeter access.</p> <p>Four development interfaces will be provided with a 12 m wide FSAR in lieu of a public perimeter road, as discussed below (refer to Figure 1 and Figure 8):</p> <ol style="list-style-type: none"> <u>Southwest corner of project area, within Natural Living lots</u> Public perimeter roads have not been proposed at this interface as a public road will be provided along the northern boundary and would result in dual frontage for the proposed lots. A compliant FSAR will be provided along the southern boundary of the lots and eastern boundary of adjacent POS to connect back to the internal road network. <u>Northern boundary of southeast portion of project area, within Suburban lots</u> A perimeter road has not been proposed at this interface to avoid multiple public road crossings over the creek line. Given the unacceptable environmental impacts of a perimeter road at this interface, provision of an FSAR is considered to be suitable and in accordance with A3.4a. <u>West of project area, connecting to Roland Road, within Natural Living lots</u> 	✓

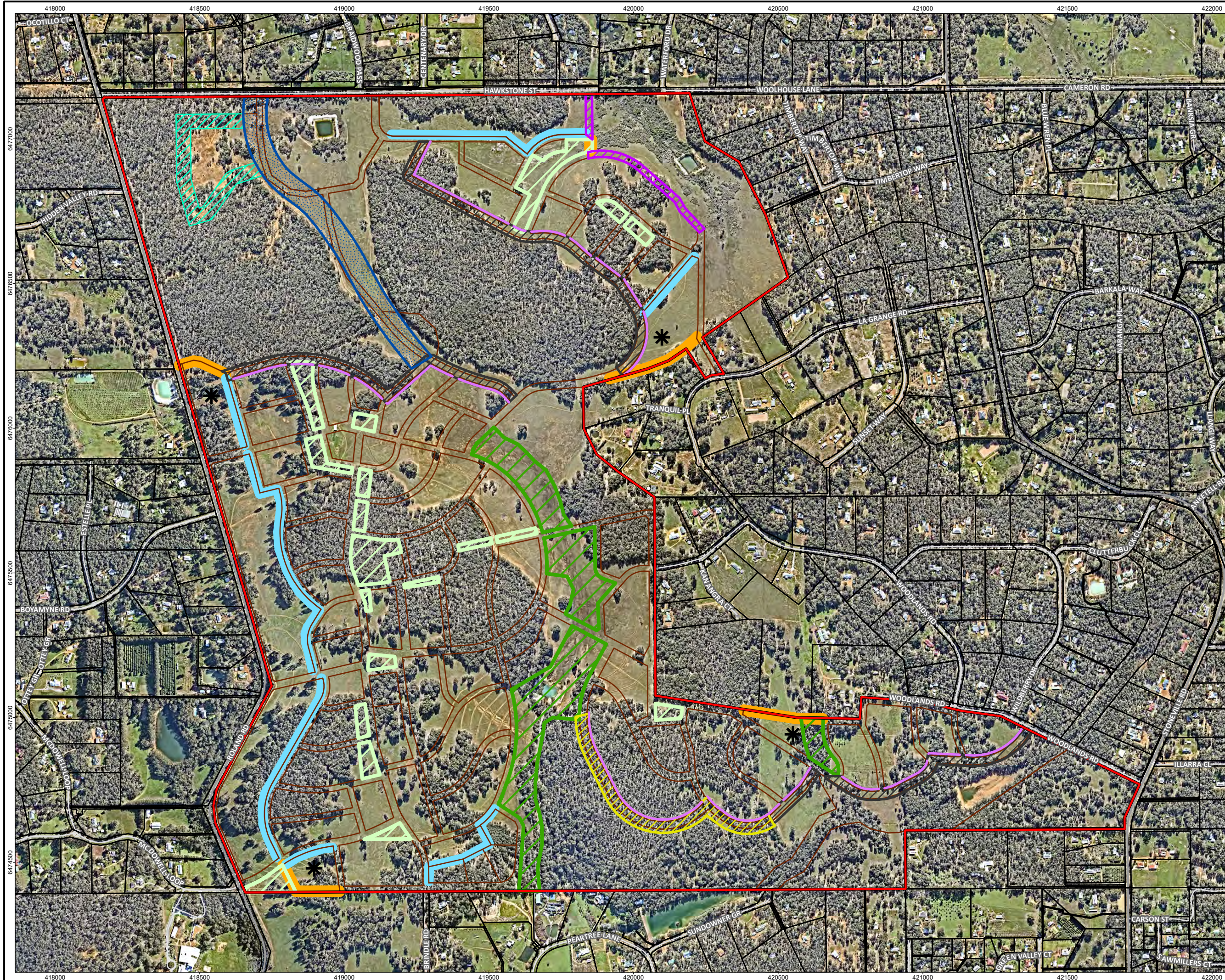
		<ul style="list-style-type: none"> it is demonstrated that it cannot be provided due to site constraints; or all lots have frontage to an existing public road. 	<p>A FSAR is proposed in lieu of a perimeter road as this would result in an unacceptable number of public road connections to Roland Road.</p> <p>4. <u>Within Natural Living lots adjacent to the public road connection to La Grange Road in the east of the project area</u></p> <p>A FSAR is proposed in lieu of a perimeter road based on appropriate road/subdivision design. The alignment for this FSAR is conceptual and requires further investigation.</p> <p>A fifth minor FSAR will be constructed at the interface between Conservation POS and on-site POS in the northeast corner of the project area. This will act to prevent fire spread into the site and facilitate continuous fire service vehicle access to the perimeter of the unmanaged vegetation areas.</p> <p>The merits of providing perimeter roads/FSARs will be further investigated during detailed design at subdivision stage.</p>
	<p>P3iii – Vehicular access is provided which allows:</p> <ul style="list-style-type: none"> access and egress for emergency service vehicles; defendable space for emergency services personnel on the interface between classified vegetation and development; and hazard separation between classified vegetation and the site to reduce the potential radiant heat that may impact a lot(s). 	<p>A3.4b Fire service access route</p> <p><i>Where proposed lots adjoin classified vegetation under AS3959 (excluding Class G Grassland), and a perimeter road is not required in accordance with A3.4a, a fire service access route can be considered as an acceptable solution to provide firefighter access, where access is not available, to the classified vegetation.</i></p> <p>A fire service access route is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 3; be through-routes with no dead-ends; linked to the internal road system at regular intervals, every 500 metres; must be signposted; no further than 500 metres from a public road; if gated, gates must open the required horizontal clearance and can be locked by the local government and/or emergency services, if keys are provided for each gate; and turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 metres. 	<p>As discussed above under A3.4b, public perimeter roads will be provided around the majority of proposed lots, however, there are five interfaces where provision of an FSAR is deemed to be more suitable due to site constraints. The FSARs proposed at these interfaces (shown indicatively on Figure 8) are to meet technical provisions set out under A3.4b (also refer to Appendix E).</p> <p>Technical standards set out in Acceptable Solution A3.4b provide for a FSAR width of 6 m, however, all proposed FSARs will be provided as 12 m wide as a result of feedback from DFES. The enhanced width of the FSARs will facilitate simultaneous community evacuation and emergency services movements.</p>
	<p>P3iv – Vehicular access is provided which allows emergency service vehicles to directly access all habitable buildings and water supplies and exit the lot without entrapment.</p>	<p>A3.5 Battle-axe access legs</p> <p><i>Where it is demonstrated that a battle-axe cannot be avoided due to site constraints, it can be considered as an acceptable solution.</i></p> <p>There are no battle-axe technical requirements where the point the battle-axe access leg joins the effective area of the lot, is less than 50 metres from a public road in a reticulated area.</p> <p>In circumstances where the above condition is not met, or the battle-axe is in a non-reticulated water area, the battle-axe is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 4; and passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined 	<p>Creation of battle-axe lots is to be avoided wherever possible. Where unavoidable, provisions for battle-axe legs in accordance with relevant technical requirements under the Guidelines (refer to A3.5 and Appendix E) are to be made at the subdivision stage of planning</p>

		<p>trafficable width of the passing bay and constructed private driveway to be a minimum six metres).</p> <p>A3.6 Private driveways There are no private driveway technical requirements where the private driveway is:</p> <ul style="list-style-type: none"> • within a lot serviced by reticulated water; • no greater than 70 metres in length between the most distant external part of the development site and the public road measured as a hose lay; and • accessed by a public road where the road speed limit is not greater than 70 km/h. <p>In circumstances where all of the above conditions are not met, or the private driveway is in a non-reticulated water area, the private driveway is to meet all the following requirements:</p> <ul style="list-style-type: none"> • requirements in Table 6, Column 4; • passing bays every 200 metres with a minimum length of 20 metres and a minimum • additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres); and • turn-around area as shown in Figure 28 and within 30 metres of the habitable building. 	<p>Private driveways constructed at development application stage will need to meet relevant technical requirements of the Guidelines, where applicable (refer to A3.6 and Appendix E). ✓</p>
Element 4: Water	No performance principle applies	<p>A4.1 Identification of future water supply Evidence that a reticulated or sufficient non-reticulated water supply for bushfire fighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements of Schedule 2. Where the provision of a strategic water tank(s) is required a suitable area within a road reserve or a dedicated lot the location should be identified, should be identified on the structure plan, to the satisfaction of the local government.</p>	<p>The LSP area will be provided with a reticulated firefighting hydrants in accordance with specifications of Water Corporation or Schedule 2 of the Guidelines (refer to Appendix F). In addition, existing dams will be retained across the site and may be used as a supplementary water supply in the event of a bushfire emergency. Figure 8 depicts existing hydrants within the local area and the location of existing on-site dams, as well as the proposed extent of hydrants coverage to future habitable development. Although a reticulated water supply is proposed, if this not achievable then firefighting water tanks will need to be provided in accordance with Guidelines standards set out in Schedule 2 and as per Shire requirements. Firefighting water will need be provided via strategic (community) firefighting tanks at a ratio of 50,000 L per 25 lots or part thereof. Consideration may also be given to provision of a 10,000 L dedicated water tank within individual lots. ✓</p>
	<p>P4 – Provide a permanent water supply that is:</p> <ul style="list-style-type: none"> • sufficient and available for firefighting purposes; • constructed from non-combustible materials (e.g. steel), or able to maintain its integrity throughout a bushfire; and • accessible, with legal access for maintenance and re-filling by 	<p>A4.2 Provision of water for firefighting purposes Where a reticulated water supply is existing or proposed, hydrant connection(s) should be provided in accordance with the specifications of the relevant water supply authority. Where these specifications cannot be met, then the following applies:</p> <ul style="list-style-type: none"> • The provision of a water tank(s), in accordance with the requirements of Schedule 2; and <ul style="list-style-type: none"> ○ Where the provision of a strategic water tank(s) is applicable, then the following requirements apply: 	<p>Provisions for reticulated water supply will be addressed at the subdivision and DA stages of planning, as discussed above. ✓</p>

	<p>tankers and emergency service vehicles.</p>	<ul style="list-style-type: none"> ○ land to be ceded free of cost to the local government for the placement of the tank(s); ○ the lot or road reserve where the tank is to be located is identified on the plan of subdivision; ○ tank capacity, construction, and fittings, provided in accordance with the requirements of Schedule 2; and ○ a strategic water tank is to be located no more than 10 minutes from the subject site (at legal road speeds). <p>Where a subdivision includes an existing habitable building(s) that is to be retained, a water supply should be provided to this existing habitable building(s), in accordance with the requirements listed above.</p>	
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5.2 Compliance with Element 5

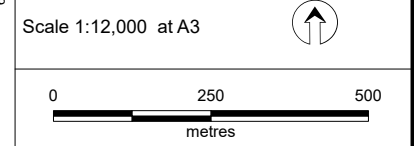
Element 5 relates specifically to vulnerable tourism land uses and is therefore not applicable to the current Structure Plan application.



- Legend**
- Project area
 - Cadastral boundary
 - Low threat vegetation:
combination of rehabilitated drainage lines and managed POS
 - Low threat vegetation: landscaped POS
 - Central vegetation break
(managed as low threat vegetation)
 - 22m wide APZ
 - 37m wide APZ
 - 46m wide APZ
 - 50m wide APZ
 - Proposed development
 - 7m R-Code setback
 - Siting of Natural Living lots will moderate bushfire behaviour at rural urban interface
 - 12m wide FSAR
 - Major road
 - Minor road
 - * Setback required for future habitable development



Job No: 56850
 Client: Satterley Property Group
 Version: 7 Date: 10-Jun-2024
 Drawn By: droberts Checked By: LR

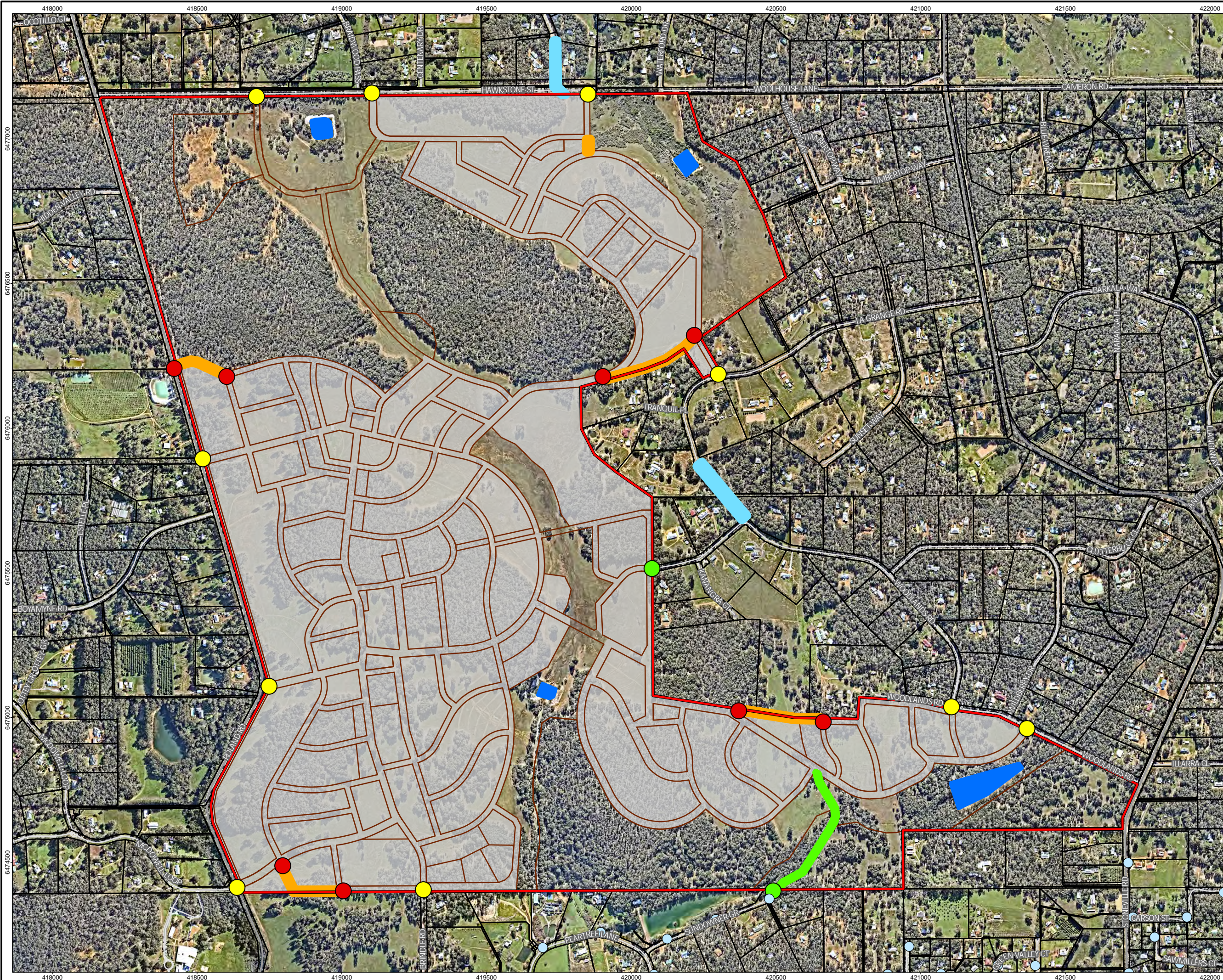


Coord. Sys. GDA2020 MGA Zone 50

**North Stoneville Residential Development
 Stoneville, WA**

PROPOSED BUSHFIRE MITIGATION STRATEGIES: ASSET PROTECTION ZONES AND VEGETATION MANAGEMENT

FIGURE 7



- Legend**
- Project area
 - Cadastral boundary
 - 12m wide EAW
 - 12m wide FSAR
 - Existing EAW
 - Existing Dam = potential fire water supply
 - Anticipated extent of fire hydrant coverage to future habitable buildings
 - Proposed development
 - Major road
 - Minor road
 - Vehicular access points - fire brigade only
 - Vehicular access points - public
 - Vehicular access points - public (addressing legacy non-compliances)
 - Water hydrant



Job No: 56850
 Client: Satterley Property Group
 Version: 7 Date: 22-Sep-2023
 Drawn By: jcrute Checked By: LR

Scale 1:12,000 at A3 ↑

 metres

Coord. Sys. GDA2020 MGA Zone 50

**North Stoneville Residential Development
 Stoneville, WA**

PROPOSED BUSHFIRE MITIGATION STRATEGIES: VEHICULAR ACCESS AND FIRE WATER

FIGURE 8

File Name: C:\Users\jcrute\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Satterley Property Group\Stoneville\56850_Stoneville_BMP\GIS\02_MapProjects\56850_Stoneville_BMP_R03_Rev7\56850_Stoneville_BMP_R03_Rev7.aprx
 Image Reference: www.nearmap.com © - Imagery Date: 31. August 2023.

6. Responsibilities for implementation and management of the bushfire measures

6.1 Future responsibilities

This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs to accompany future subdivision and/or development applications where appropriate, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs prepared for subsequent subdivision and/or development applications are to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 6.4 or 6.5 where applicable) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions or meet the performance requirements of the Guidelines. Future BMPs are to include the following detailed information:

- proposed lot layout, including public open space (POS), drainage and conservation areas
- detailed landscaping design/plans in regard to POS and drainage areas, including preparation of an overarching Landscape Management Plan and Landscape Concept Plan for the site as a whole during Stage 1 subdivision
- post development classified vegetation extent and effective slope
- BAL contour map demonstrating that proposed development areas will achieve BAL–29 or lower
- width and alignment of compliant APZs, including any APZ setback requirements into lots
- confirmation of how bushfire management will be addressed regarding temporary bushfire hazards on adjacent future development stages, including low threat staging buffers or temporary quarantining of lots where required
- proposed approach to fuel management or AS 3959 application in response to on-site POS and drainage
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of development
- water supply provisions with regards to reticulated or non-reticulated water supply
- future requirements for any future vulnerable land uses, such as provision of a Bushfire Emergency Evacuation Plan (if relevant)
- future requirements for any future high-risk land uses, such as provision of a Bushfire Risk Management Plan (if relevant)
- provisions for notification on Title for any future lots with a rating of BAL–12.5 or greater as a condition of subdivision
- compliance requirements with the Shire’s annual firebreak notice
- construction of Class 1, 2, 3 or associated 10a buildings in accordance with AS 3959 to the assessed BAL rating
- compliance with performance principles of the bushfire protection criteria (where required)
- provision of bushfire information in the resident information package issued to all landowners upon purchase of their lot

- proposed implementation and audit program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

On the basis of the information contained in this BMP, JBS&G considers the bushfire hazards within and adjacent to the site and the associated bushfire risks are manageable through application of acceptable solutions outlined in the Guidelines as well as the proposed additional measures, which will be implemented as required throughout future planning stages. JBS&G considers that on implementation of the proposed management measures, the site will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines.

7. References

- Department of Biodiversity, Conservation and Attractions 2018, *Naturemap* database, Department of Biodiversity, Conservation and Attractions, Kensington.
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- Hatch 2024, *Revised Design of Proposed Structure Plan (SP34), POS Schedule – North Stoneville, Rev I (9 May 2024)*, Hatch, Perth.
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- JBS&G 2023, *Modified North Stoneville Local Structure Plan – Environmental Assessment Report Addendum*, unpublished report prepared for Satterley Property Group.
- Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.
- Strategen [now JBS&G] 2018, *Lot 48 Stoneville Road Stoneville: Environmental Assessment Report*, unpublished report prepared for Satterley Property Group.
- Strategen [now JBS&G] 2016, *Lot 48 Stoneville Road Stoneville: Bushfire Management Plan (Scheme amendment)*, unpublished report prepared for Satterley Property Group.
- Transcore 2024, *North Stoneville Structure Plan (DR 189/2020), Microsimulation Evacuation Modelling Report (R01g, May 2024)*, Transcore, Perth.
- Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas, Version 1.4 December 2021*, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2023, *Section 31 (SAT Act) Reconsideration of refusal of North Stoneville, DPLH Officer's Report dated 7 December 2023*, WAPC, Perth.
- Structure Plan No. 34 *Guidelines for Planning in Bushfire Prone Areas, Version 1.4 December 2021*, Western Australian Planning Commission, Perth.

Appendix A Vegetation plots – Photographs and description



Photo ID: 1

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 2

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 3

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 4

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 5

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 6

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 7

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 8

Description: Class G Grassland (foreground, Plot 6), Class A Forest (on right, Plot 1)



Photo ID: 9

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 10

Description: Class G Grassland (foreground, Plot 2), Class A Forest (background, Plot 6)



Photo ID: 11

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 12

Description: Class G Grassland (foreground, Plot 6), Class A Forest (on left, Plot 2), location of central vegetation break.



Photo ID: 13

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 14

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)

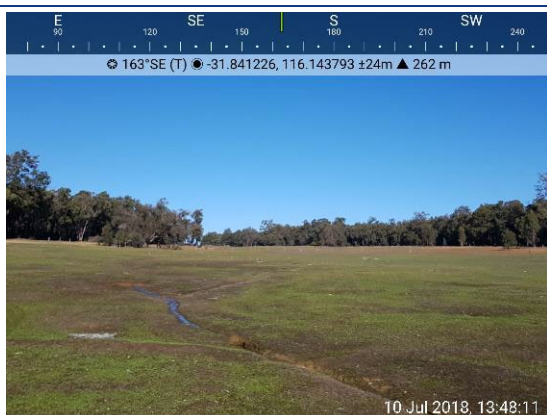


Photo ID: 15

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 16

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 17

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)

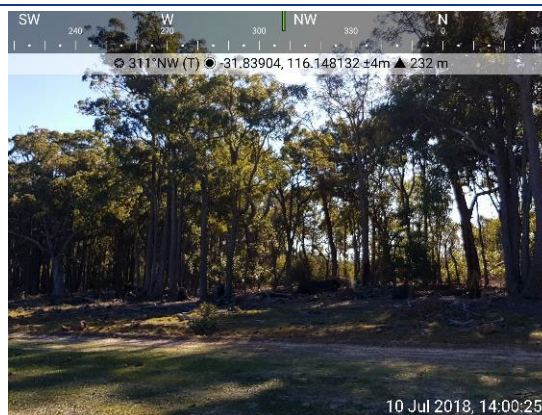


Photo ID: 18

Description: Class A Forest (Plot 2)



Photo ID: 19

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 20

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 21

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 22

Description: Class G Grassland (foreground, Plot 6), Class D Scrub (on right, Plot 4), Class A Forest external to project area (background, Plot 1)



Photo ID: 23

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 24

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 3)



Photo ID: 25

Description: Class G Grassland (foreground, Plot 6), Class D Scrub (centre, Plot 4) Class A Forest (background, Plot 1)



Photo ID: 26

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 27

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 1)



Photo ID: 28

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 29

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 30

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background/ right, Plot 3)



Photo ID: 31

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)



Photo ID: 32

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 3)



Photo ID: 33

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 3)



Photo ID: 34

Description: Class G Grassland (foreground, Plot 6), Class A Forest (on right, Plot 2)



Photo ID: 35

Description: Constructed dam on right (Exclusion [e], Plot 8), Class A Forest (background, Plot 3)

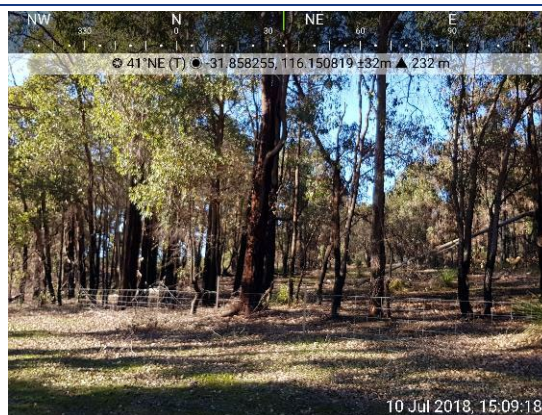


Photo ID: 36

Description: Class A Forest (Plot 3)



Photo ID: 37

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 3)



Photo ID: 38

Description: Class A Forest (foreground, Plot 3); Excluded Clauses 2.2.3.2 (e) and (f) in background (Plot 8)



Photo ID: 39

Description: Class A Forest (Plot 3)



Photo ID: 40

Description: Class A Forest (Plot 3)

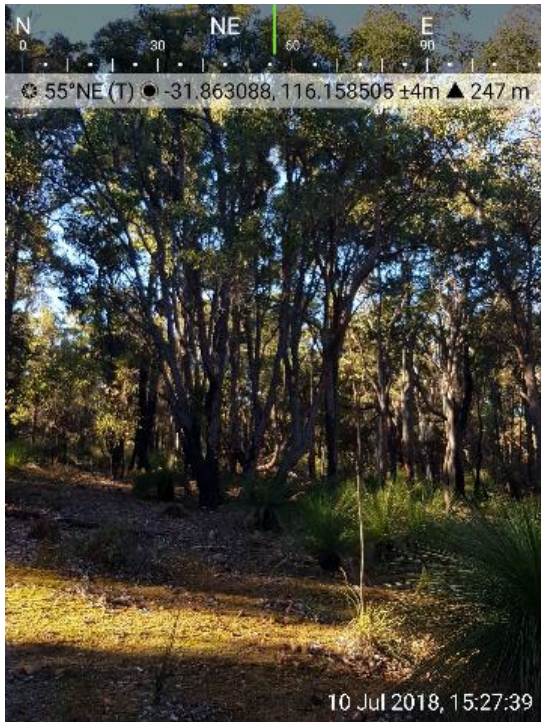


Photo ID: 41

Description: Class A Forest (Plot 3)



Photo ID: 42

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)

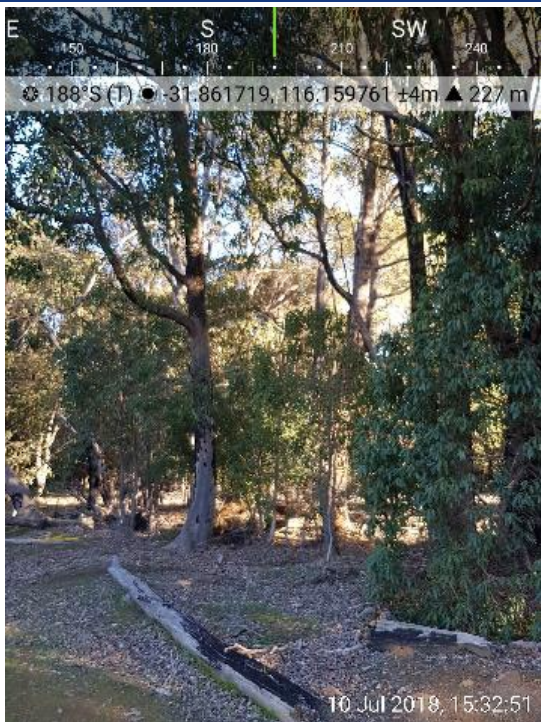


Photo ID: 43

Description: Class A Forest (Plot 2)

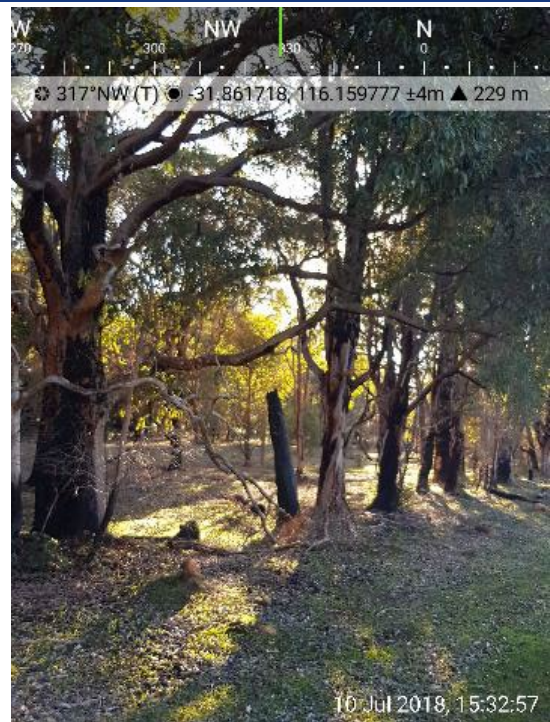


Photo ID: 44

Description: Class A Forest (background, Plot 2)

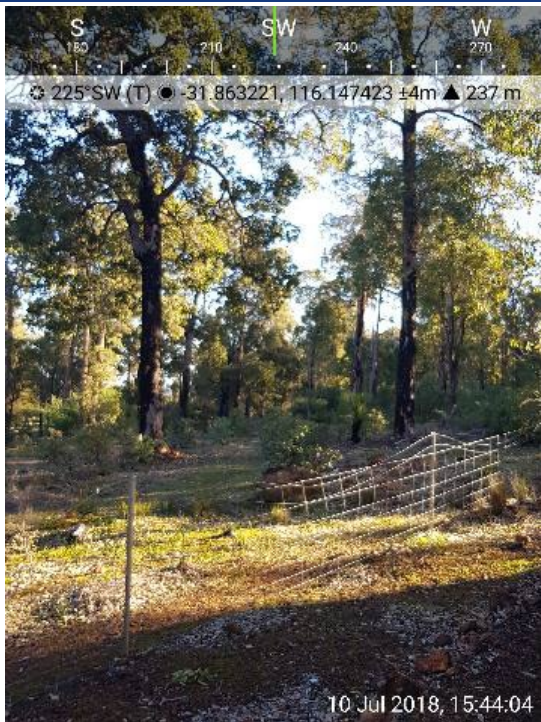


Photo ID: 45

Description: Class A Forest (Plot 3)

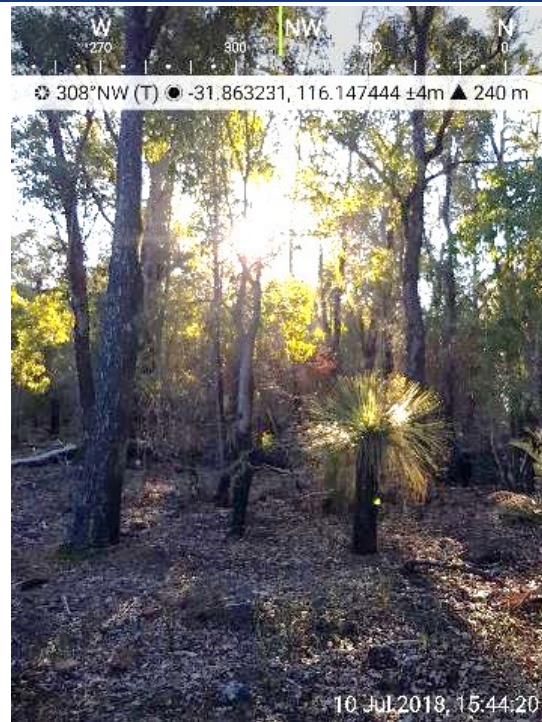


Photo ID: 46

Description: Class A Forest (Plot 2)



Photo ID: 47

Description: Class A Forest (Plot 2)

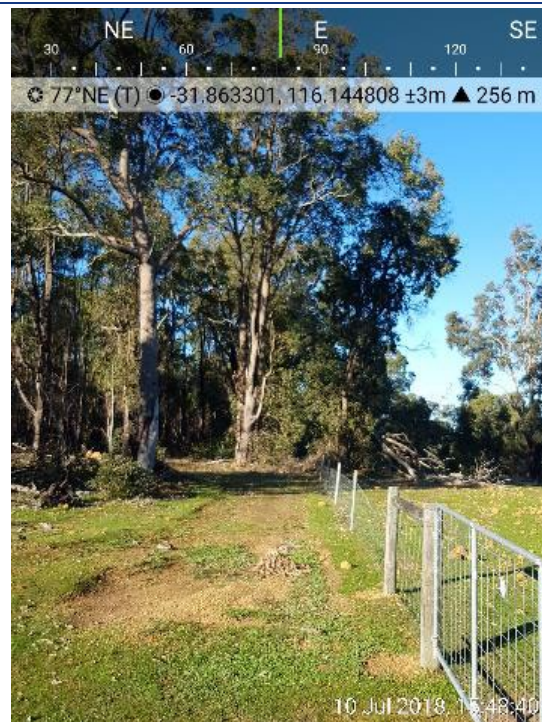


Photo ID: 48

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 2)



Photo ID: 49

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 2)

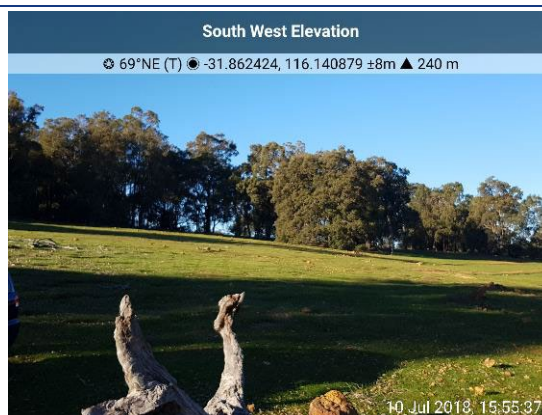


Photo ID: 50

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 2)



Photo ID: 51

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 1)



Photo ID: 52

Description: Class G Grassland (foreground, Plot 7), Class A Forest (background, Plot 1)



Photo ID: 53

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)

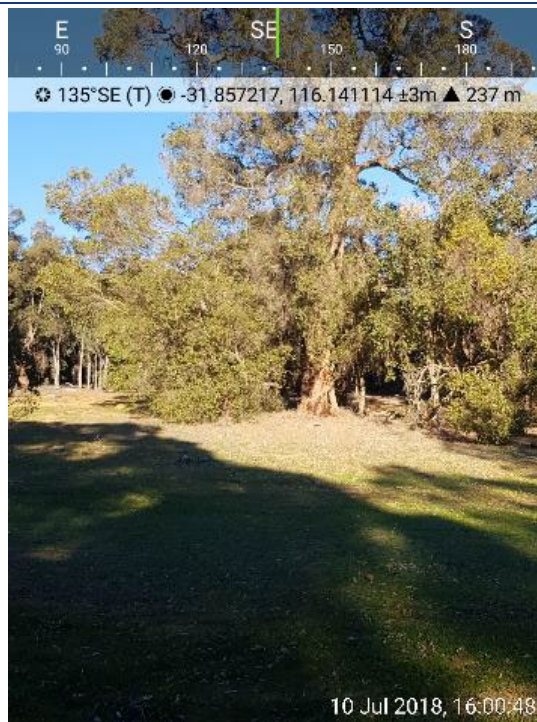


Photo ID: 54

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 2)

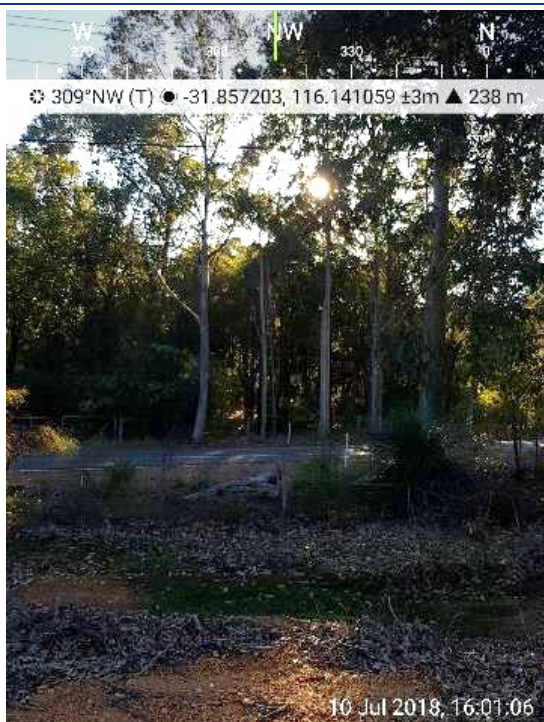


Photo ID: 55

Description: Class A Forest in Roland Road reserve (Plot 2)



Photo ID: 56

Description: Class G Grassland (right, Plot 6), Class A Forest (on left, Plot 2)



Photo ID: 57

Description: Class G Grassland (foreground, Plot 5), Class A Forest (background, Plot 1)

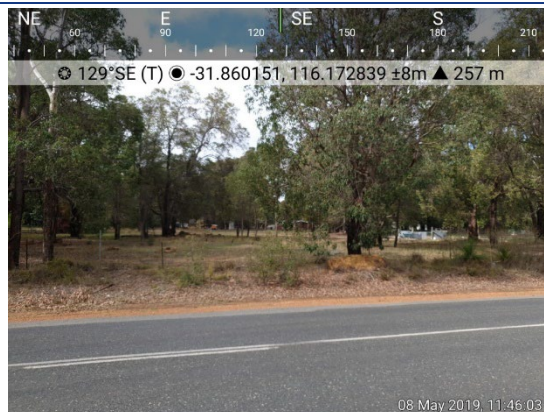


Photo ID: 58

Description: Class A Forest on eastern side of Stoneville Road (Plot 1)



Photo ID: 59

Description: Class A Forest on eastern side of Stoneville Road (Plot 1)



Photo ID: 60

Description: Class A Forest on northern side of Woodlands Road (Plot 1)



Photo ID: 61

Description: Class A Forest (left, Plot 5) and Class G Grassland (right, Plot 1) on eastern side of Stoneville Road



Photo ID: 62

Description: Class G Grassland (foreground, Plot 5), Class A Forest (background, Plot 1)



Photo ID: 63

Description: Class A Forest to the north-west of Tranquil Place (Plot 1)



Photo ID: 64

Description: Class G Grassland to the east of Tranquil Place (Plot 5)



Photo ID: 65

Description: Class G Grassland (foreground, Plot 6), Class A Forest (background, Plot 1)



Photo ID: 66

Description: Class G Grassland north of Hawkstone Street (Plot 7)



Photo ID: 67

Description: Class A Forest to south-west of Roland Road/Hawkstone Street intersection (Plot 2)



Photo ID: 68

Description: Class A Forest to south of Hawkstone Street (Plot 2)



Photo ID: 69

Description: Class G Grassland to south of Peartree Lane (Plot 6)



Photo ID: 70

Description: Class G Grassland to north of Peartree Lane (Plot 6)



Photo ID: 71

Description: Class G Grassland and non-vegetated/managed land to north of Peartree Lane (Plot 8)

Appendix B Transect Design Guide

NORTH STONEVILLE

TRANSECT DESIGN GUIDE

JUNE 2024



T1



T2



T3

HATCH

 **SATTERLEY**

DOCUMENT CONTROL

TITLE	North Stoneville Transect Design Guide
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APPROVED	Duane Cole
REFERENCE	SAT STO
STATUS	Issued for Client use
VERSION	F
DATE OF RELEASE	June 2024

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CONFIRMATION OF SUPPORT		
	DATE	SIGNED
SHIRE OF MUNDARING		
DEPARTMENT OF PLANNING, LANDS & HERITAGE		

CONTENTS

1

OVERVIEW

OF THE URBAN-RURAL TRANSECT

2

STREETS

TRANSECT DESIGN GUIDE

3

PRIVATE LAND

TRANSECT DESIGN GUIDE

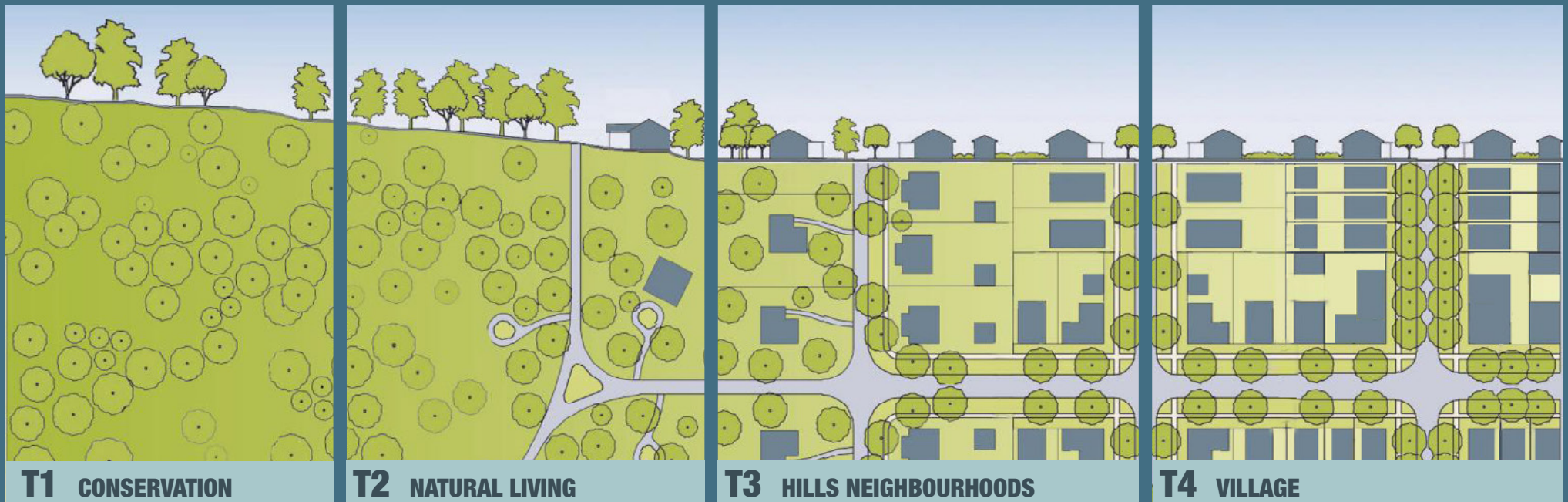
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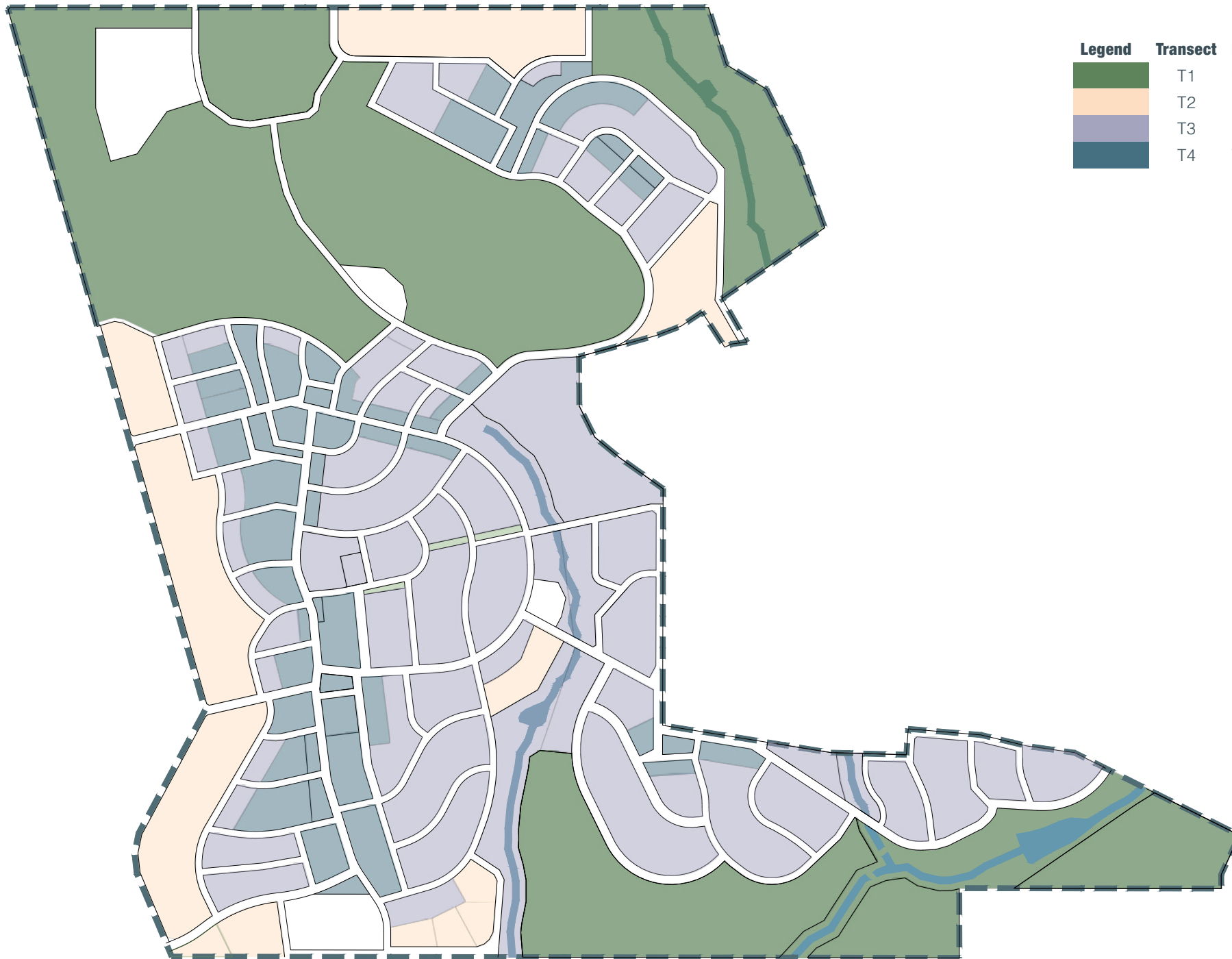
OPEN SPACE

TRANSECT DESIGN GUIDE

OVERVIEW 1

OF THE URBAN-RURAL TRANSECT





Legend	Transect	Description
	T1	Conservation
	T2	Natural Living
	T3	Hills Neighbourhoods
	T4	Village



Plan produced by Hatch 2024

FIGURE 1: MASTERPLAN

INTRODUCTION

The North Stoneville Transect Design Guide is an initiative being progressed by Satterley to guide the delivery of thoroughfares, open space, and private land, with design guidance that is calibrated to urban context and the site's unique features.

The pages overleaf provide a summary of the rural-urban transect principles, and individual design elements that will alter in response to neighbourhood intensity.

This Guide supplements the WAPC's Liveable Neighbourhoods Operational Policy, the Local Government Guidelines for Subdivisional Development and the relevant Austroads Guidelines.

The Transect Design Guide is appended to the North Stoneville Structure Plan and forms part of the Approved documentation. The Guide represents a collaborative effort between the Department of Planning, Lands & Heritage, the Shire of Mundaring, and the North Stoneville Project Team commissioned by Satterley to deliver a shared vision for a new community over 534 hectares of land in the Perth hills.

The North Stoneville Urban-Rural Transect comprises the following transect areas, as depicted on the concept masterplan (Figure 1):

- T1 - Conservation
- T2 - Natural Living
- T3 - Hills Neighbourhoods
- T4 - Village

PURPOSE

The primary purpose for adopting a transect approach toward the delivery of the North Stoneville new community is to establish an overarching organising framework, that provides a guide to all disciplines for individual design elements.

The general intent is to define and create distinctively different character areas based on individual transects, that will assist in providing a memorable set of experiences and a variety of different environments to appeal to a broad range of demographics.

The major departure from conventional practice is to place context at the forefront of all design decisions, rather than apply the same standard without consideration to its setting and intended character.

The T4 Village transect represents a small proportion of the new community but will have a neighbourhood character. A T4 area will therefore have a much more formal setting and create an arrival experience in which the built environment favours the pedestrian.

In contrast the T2 Natural living transect will contain very large lots and will be entirely organic in its character - the trees will be native, the roads will wind and respect landform, kerbing may be flush or non-existent, drainage will be open swales, and the built environment may favour the vehicle.

The T3 transect area will provide everything inbetween.

The transect has been used in the formulation of the concept masterplan, with T4 transect typically concentrated on areas with fair grades and little environmental constraints. As an extension of that logic, T2 and T3 transects containing larger lots are typically placed in areas with undulating terrain.

RELATIONSHIP WITH LIVEABLE NEIGHBOURHOODS

The Transect Design Guide supplements the WAPC's Liveable Neighbourhoods' Policy objectives and design requirements.

Liveable Neighbourhoods (LN) is an operational policy for the design and assessment of structure plans and subdivision. It is a performance-based code, with the objectives and majority of requirements capable of being satisfied in a number of ways. The introductory guide of Liveable Neighbourhoods states that "...the WAPC encourages creativity in response to the environment and in creating a thoughtful sense of place."

The North Stoneville Transect Design Guide represents a collaborative and creative effort by the project team and contributors (including the Shire of Mundaring and Government Agencies) to establish a set of guiding principles and design information that is calibrated to the site's unique landform and natural features.

The Transect Design Guide provides design information on streets, private land and parks, corresponding with Elements 2, 3 and 4 of LN respectively.

By way of example, Element 2 of LN addresses the Movement Network and generally provides for "...narrower pavement and lane widths that concurrently promote reduced vehicle speeds, reduced kerb radii and increased requirements for footpaths and large street trees, to support pedestrians, together with other details to support a more balanced movement system.." plus "...increased use of four-way intersections..." and "...to minimise the need for roundabouts." Much of the detail related to Streets in this guide seeks to achieve exactly those requirements.

The Transect Design Guide, with its information that augments LN, is necessary in the Hills context to ensure that competing policy or standards are not given priority to the detriment of the LN design objectives.

THE TRANSECT EXPLAINED

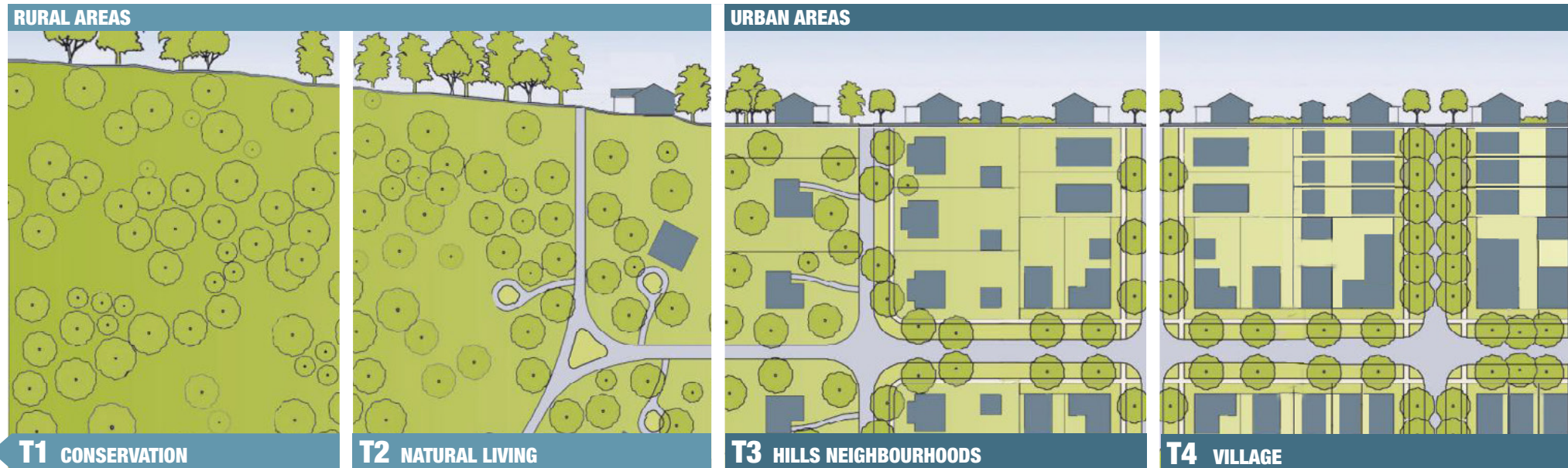
"A transect is a cut or path through part of the environment showing a range of different habitats. Biologists and ecologists use transects to study the many symbiotic elements that contribute to habitats where certain plants and animals thrive.

Human beings also thrive in different habitats. Some people prefer urban centres and would suffer in a rural place, while others thrive in the rural or sub-urban zones. Before the automobile... development patterns were walkable, and transects within towns and city neighborhoods revealed areas that were less urban and more urban in character. This urbanism could be analyzed as natural transects are analyzed...

...Transect Zones instead provide the basis for real neighborhood structure... The T-zones vary by the ratio and level of intensity of their natural, built, and social components. They may be coordinated to all scales of planning, from the region through the community scale down to the individual lot and building...

...The T-zones are intended to be balanced within a neighborhood structure based on pedestrian sheds (walksheds), so that even T-3 residents may walk to different habitats, such as a main street, civic space, or agrarian land."

Source: Centre for Applied Transect Studies
<https://transect.org/transect.html>



T1 CONSERVATION **T2 NATURAL LIVING** **T3 HILLS NEIGHBOURHOODS** **T4 VILLAGE**

NATURAL	PROTECTED HABITAT RIPARIAN CORRIDORS CONSERVATION AREA NATURAL DRAINAGE AREAS ESSENTIAL INFRASTRUCTURE NATURE WALKS & TRAILS	SEMI-RURAL SIZED LOTS RURAL RESIDENTIAL NATURALISTIC LANDSCAPING DETACHED BUILDINGS, DETACHED OUTBUILDINGS ROTATED FRONTAGES LIVESTOCK/HORSES	URBAN	LARGER BLOCKS PRIMARILY RESIDENTIAL MORE GREENSCAPE DETACHED BUILDINGS ROTATED FRONTAGES DOMESTIC ANIMALS	LARGE BLOCKS PRIMARY RESIDENTIAL MIXED HARDSCAPE & GREENERY DETACHED BUILDINGS ALIGNED FRONTAGES DOMESTIC ANIMALS	PRIVATE
	OPEN DRAINAGE STEEP SLOPES BUSHFIRE PRONE AREAS NATURAL OPEN SPACES ORCHARDS & MARKETS LEGACY FARMLAND LEGACY WOODLANDS LIMITED SERVICES DRY, ROLLING LAND	DEEP SETBACKS ROADS & CONNECTORS NARROW PATHS OPPORTUNISTIC PARKING LARGER KERB RADII OPEN SWALES MIXED TREE CLUSTERS		MODEST SETBACKS STREETS WIDE SIDEWALKS DEDICATED PARKING SMALLER KERB RADII PIT & PIPE DRAINAGE ALIGNED STREET TREES	THOROUGHFARES	
	BUSHFIRE BUFFERS NATURE PARKS & SPORTS OVALS INFORMAL GATHERING PLACES	NATIVE & EXOTIC TREES CIVIC SQUARES & VILLAGE CORE FORMAL PARKS, HALLS, CENTRES		PARKS		

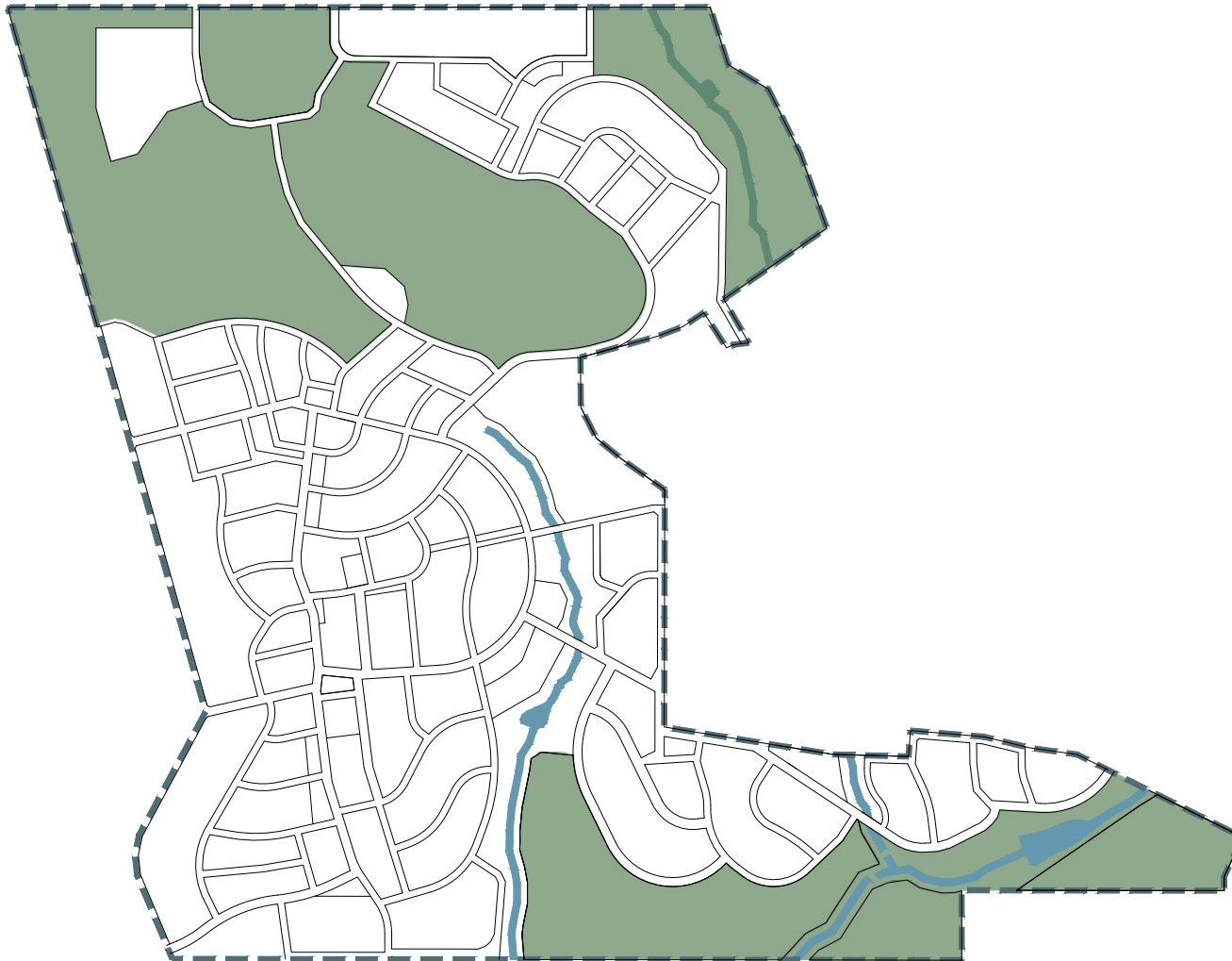
T1 CONSERVATION



T1 CONSERVATION

GUIDING PRINCIPLES

The T1 transect applies to lands approximating or reverting to a wilderness condition.



GENERAL CHARACTER Natural landscape, retained high quality vegetation and living streams

BUILDING PLACEMENT Generally not applicable, unless ancillary to T1 function.

FRONTAGE TYPE Not applicable

TYPICAL BUILDING HEIGHT Use and site specific for community structures

EMPLOYMENT /RETAIL Potential tourism or entertainment uses within Special Sites identified on Structure Plan map.

TYPE OF PARKS /CIVIC SPACE Conservation areas; Bike & hike trails; Reconstructed living streams; Parkland cleared bushfire buffers; kick-about spaces and discrete grassed areas

LOT SIZES (RANGE) Not applicable



FIGURE 4: T1 CONSERVATION / RECREATION



T2 NATURAL LIVING

TRANSECT DESCRIPTION:

Sparsely settled lands in open or cultivated states, with dry rolling land. These include existing cleared agricultural land, grassland, and drainage areas. Typical buildings are farmhouse style with large verandahs, and family homes with large outbuildings & sheds. Provided on periphery of Village as a transition to established larger lots surrounding.

GENERAL CHARACTER Primarily larger lifestyle blocks, with retained vegetation and scattered buildings; vehicles are given priority

BUILDING PLACEMENT Variable, large setbacks

FRONTAGE TYPE No standard

TYPICAL BUILDING HEIGHT 1 to 2 Storey

EMPLOYMENT /RETAIL Tradespersons / Home Businesses

TYPE OF PARKS /CIVIC SPACE Bike & hike trails; Nature play; Parkland cleared bushfire buffers

LOT SIZES (RANGE) 1-2 hectares

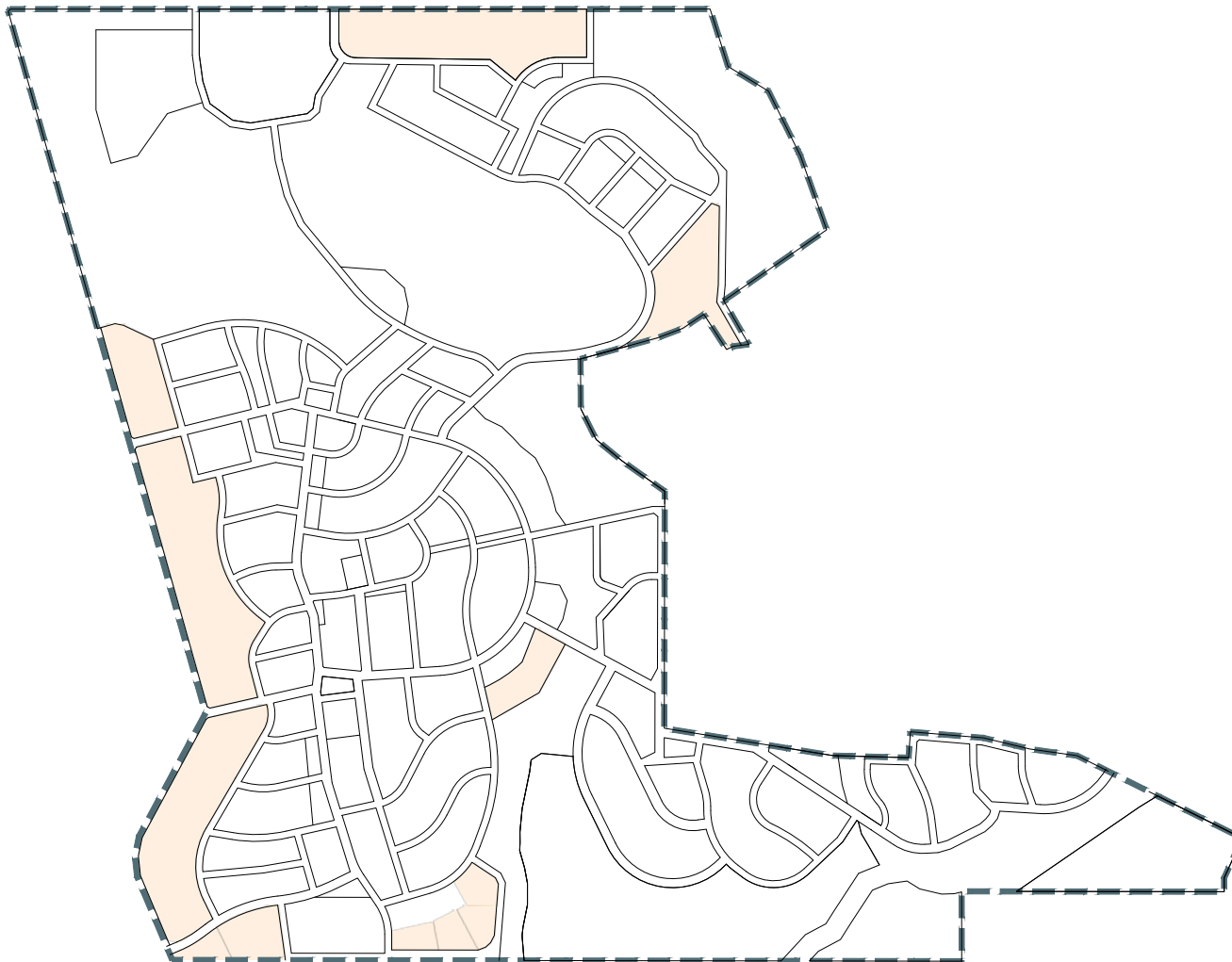


FIGURE 5: T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS

TRANSECT DESCRIPTION

consists of low density residential areas, within walking distance of village. Home businesses and outbuildings are allowed. Planting is naturalistic and setbacks are relatively deep. Blocks may be large and the roads site-responsive to accommodate natural conditions.

GENERAL CHARACTER	Landscaped yards surrounding detached single-family houses, pedestrians occasionally
BUILDING PLACEMENT	Modest to large setbacks, slight angles, placed to suit landform and slope as primary consideration. Driveways to respond to trees, slope and ground conditions.
FRONTAGE TYPE	fences, some connection with street
TYPICAL BUILDING HEIGHT	1- to 2-Storey
EMPLOYMENT /RETAIL	Low impact home businesses compatible with residential, generally near Connectors
TYPE OF PARKS /CIVIC SPACE	Bike & hike trails; Nature play; Parkland cleared bushfire buffers
LOT SIZES (RANGE)	1,428sqm - 2,000sqm

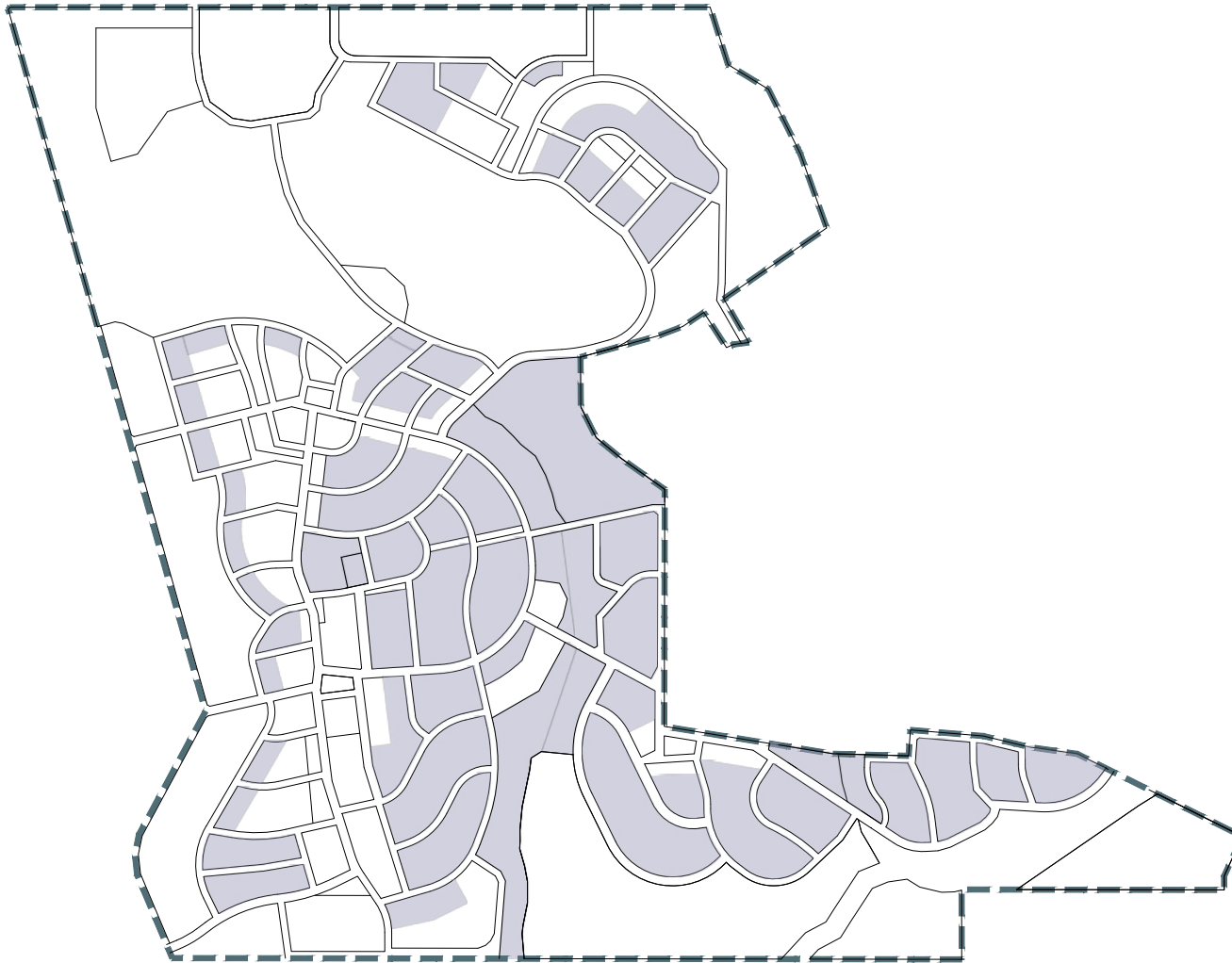


FIGURE 6: T3 SUB URBAN



T4 VILLAGE

TRANSECT DESCRIPTION:

Primarily residential traditional neighbourhood grid structure, with a local centre a village core. Setbacks and landscaping are modest, encouraging public-private interaction at street level. Streets with kerbs and sidewalks define large-residential blocks

GENERAL CHARACTER	Mix of housing types, balance between landscape & buildings, pedestrians given priority
BUILDING PLACEMENT	Median setbacks
FRONTAGE TYPE	Verandahs, fences, strong connection with street
TYPICAL BUILDING HEIGHT	1- to 2-Storey
EMPLOYMENT /RETAIL	Minimum impact smaller home businesses, mixed use at core
TYPE OF PARKS /CIVIC SPACE	Formal gathering spaces, gazebos & structures with civic presence, playgrounds, ovals
LOT SIZES (RANGE)	1,012sqm - 1,428sqm

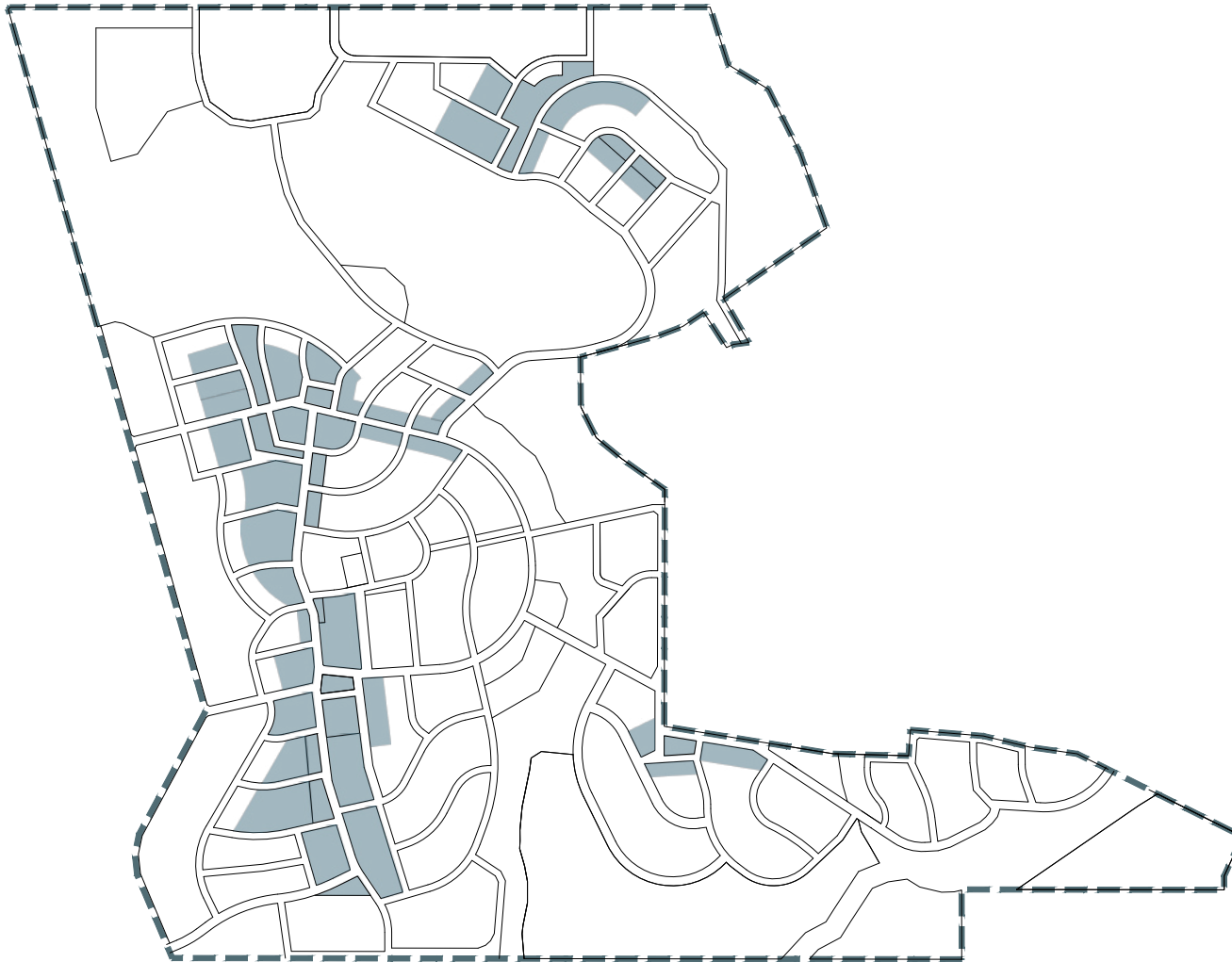
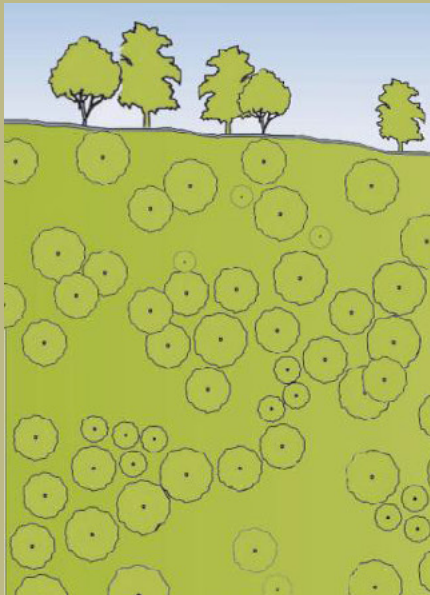


FIGURE 7: T4 VILLAGE URBAN

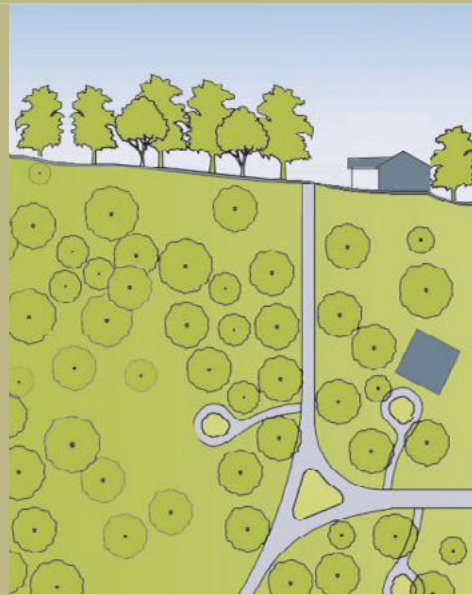
STREETS

TRANSECT DESIGN GUIDE

2



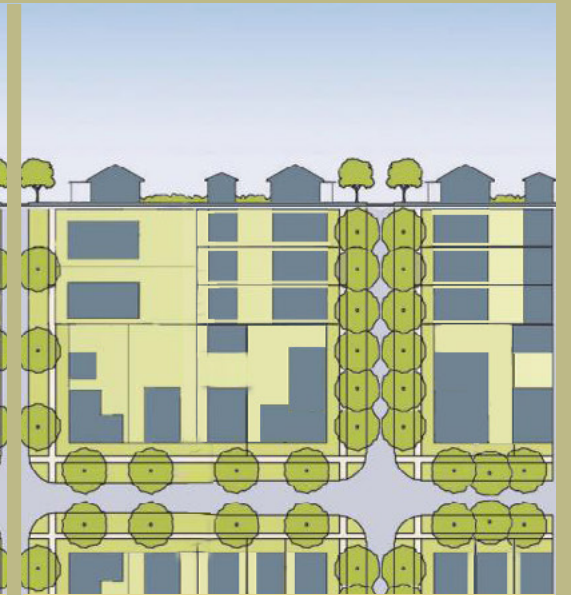
T1 CONSERVATION



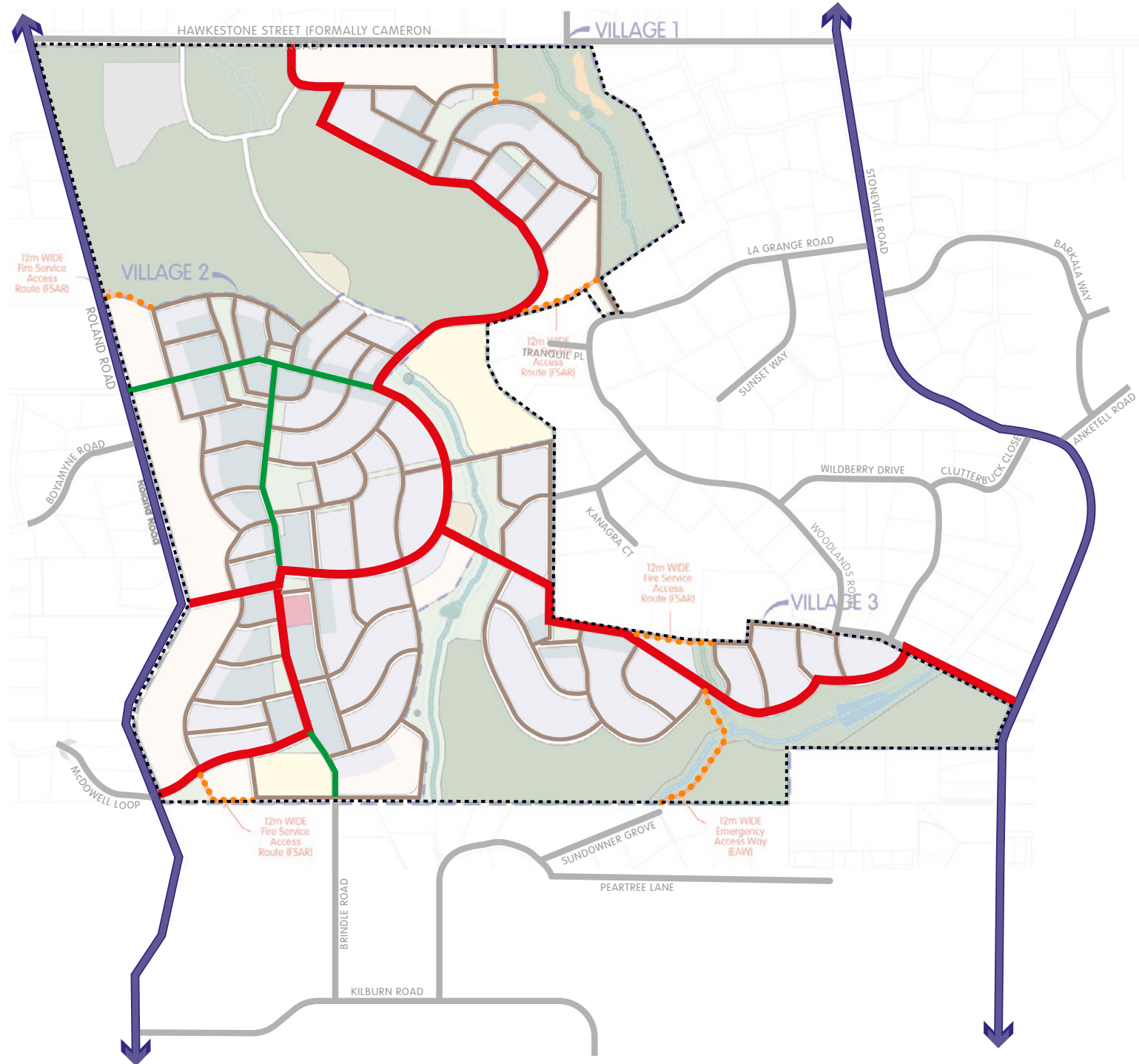
T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE



Explanatory Note:

Neighbourhood Connector B and Access Street A serve a similar function, and are collectively referred to as Connectors in explanatory text.

LEGEND	TYPE
	Important Local Roads
	Neighbourhood Connector B
	Access Street A
	Access Street
	12m wide Fire Service Access Route (FSAR)

Refer to Structure Plan for Active Transport Network map and Public Transport map.

FIGURE 9: STREET TYPES PLAN

2.1 DESIGN PRINCIPLES

STREET TYPES

The North Stoneville Townsite contains three main street types, including Neighbourhood Connector B, Access Street A and Access Street D. Important Local Roads do not traverse the site.

Neighbourhood Connector B and Access Street A serve a similar function, and are collectively referred to as Connectors in explanatory text.

The pages following provide a summary of the key design elements and function of each of the three street types, and detail the character changes that occur within each transect.

Detailed design shall have regard to the Thoroughfare Design Principles on this page.

The importance of maintaining pedestrian desire lines.

Pedestrians are especially sensitive to minor shifts in geometry and detours.

Larger kerb radii and footpaths that contain detours are preferred in areas where pedestrians are not a priority - ie. T1 and T2 transect areas, or where the needs of emergency service vehicles, or emergency evacuation must prevail.

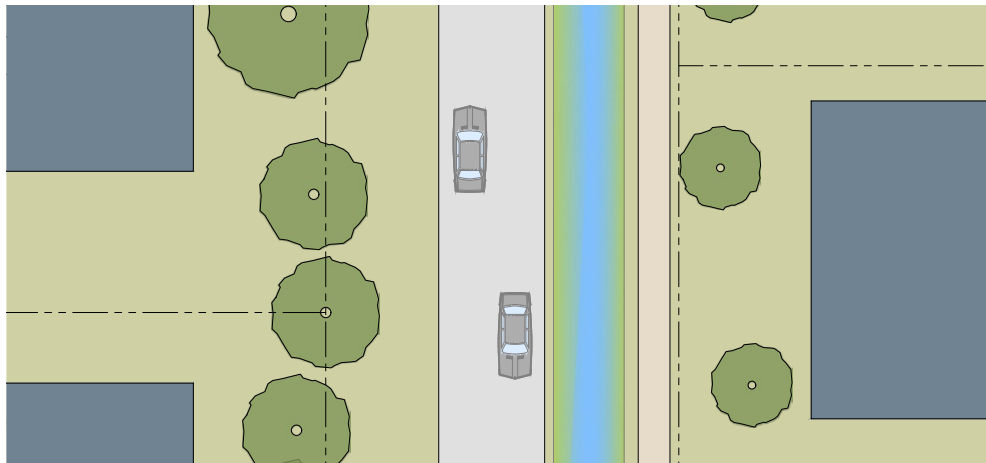
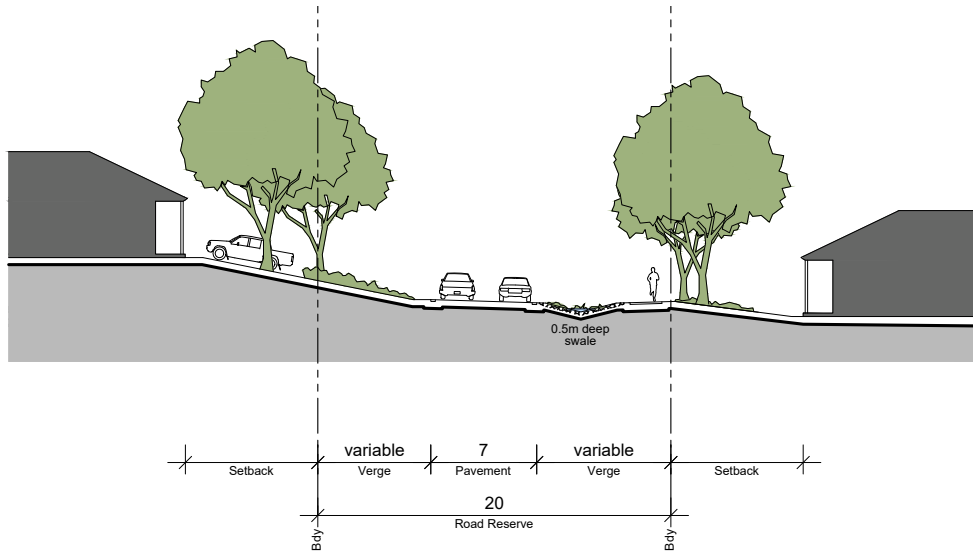
STREET DESIGN PRINCIPLES

- 1** Streets will be designed in context with the urban form and the desired design speed, relative to the Transect area through which they pass.
- 2** Streets will be designed to reduce overall vehicle speeds to provide a safe and attractive environment for pedestrians and cyclists.
- 3** The detailed design of thoroughfares will draw inspiration from the elements found in older neighbourhoods including the provision of limited lot truncations, appropriate kerb radii, and reduced pavement widths - particularly for T3 and T4 transects. Rubbish trucks may cross the centreline of the road pavement for all Access Streets in the interest of accommodating appropriate kerb radii and straight footpaths.
- 4** The street network shall be highly connected for cyclists and pedestrians. Cyclists will be accommodated with shared paths or shared low speed traffic environments.
- 5** Streets will be designed to create shady, pedestrian friendly streets and paths, and will retain existing trees in lower transects where possible.
- 6** On-street parking shall generally only be necessary closest to Village Core or selected parks, either in designated bays or as yield parking, depending on the thoroughfare and its position in the transect. As well as contributing to the total parking supply and allowing reduced-on-site requirements for retail and civic uses, on-street parking will be used to calm traffic movements.
- 7** One-way 'pinch points' and narrower pavement widths may feature in higher transect areas and be designed with the following benefits in mind: slower traffic speeds, safer pedestrian crossings, lowered street maintenance/resurfacing costs; tree canopy cover; and less heat radiation. 'Pinch points' should be trafficable or mountable by emergency vehicles.
- 8** Street reserve widths may be reduced adjacent to Public Open Space, where a verge is not required to service adjoining lots.

2 STREETS

2.2 STREET TYPES - ACCESS STREET A AND NEIGHBORHOOD CONNECTOR B (CONNECTORS)

CROSS SECTION A NOT TO SCALE



*Median not required for traffic purposes;
only necessary where dealing with drainage or topographic level differences-

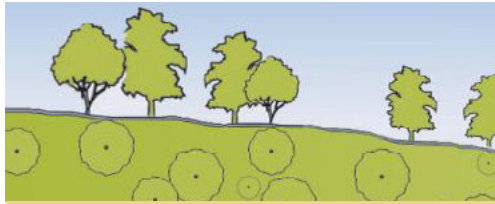
DESIGN GUIDANCE

THOROUGHFARE TYPE	Access Street A & Neighbourhood Connector B
MOVEMENT	Free flowing
DESIGN SPEED	Typically 50km/h (60km/h by warrant)
ROAD RESERVE	20m-30m dependent on need for drainage and on-street parking
PAVEMENT WIDTH	3.5m each lane
TRAFFIC FLOW	Two way
PARKING WIDTH / TYPE	T4 - both sides parallel within verge where required
KERB TYPE	T4/T3 - semi-mountable T2/T1 - flush / no kerb as appropriate to accommodate drainage swales
MEDIAN	n/a
TREE TYPE / SPACING	T4 - Formal planting for good shade T3 - Semi-formal planting for shade T2 - Naturalistic clusters / existing groups T1 - Completely natural
CYCLIST PROVISION	Typically a dual use path and on-street cycle lanes, consider separated cycle paths for key routes;
FOOTPATH TYPE / WIDTH	2.4m shared path one side; + 1.5m path one side in T4 only

*Street section shown is through T3 Transect

CONNECTOR STREET DETAILS

2.2 STREET TYPES - CONNECTOR



T1 CONSERVATION



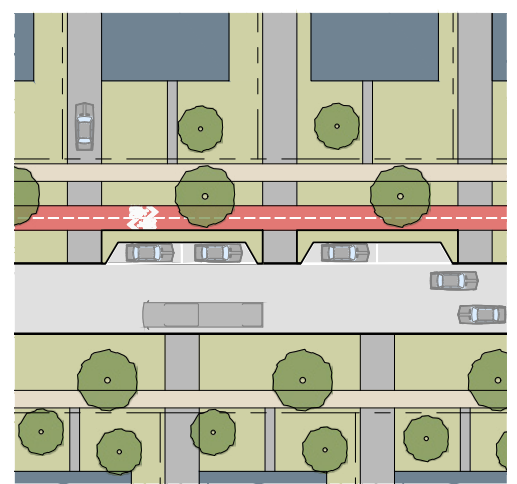
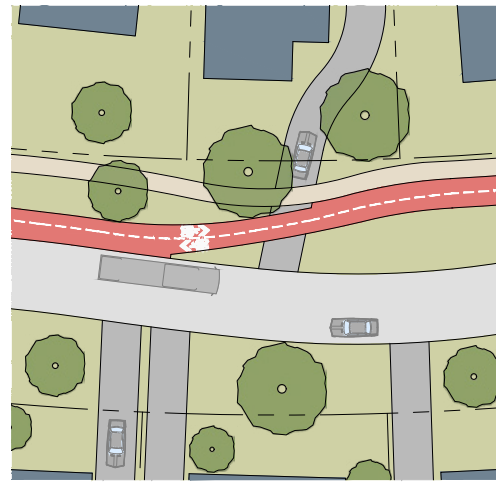
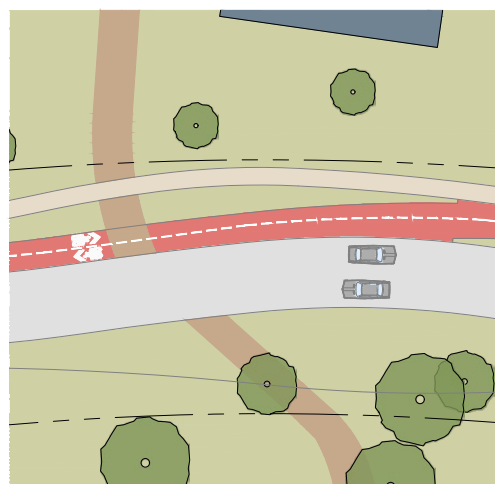
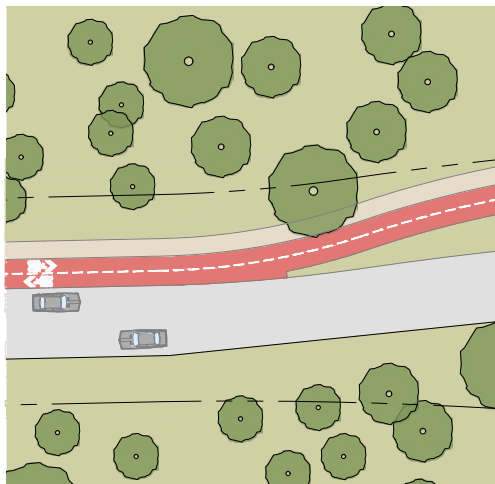
T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE



RURAL



TRANSECT

URBAN

*dedicated cycle lanes only warranted in circumstances agreed by the Shire of Mundaring

2 STREETS

2.2 STREET TYPES - ACCESS STREET A AND NEIGHBORHOOD CONNECTOR B (CONNECTORS)

EXPLANATORY NOTES

Both Access Street A and Neighbourhood Connector B (referred to as Connectors) are strategic links that direct the majority of traffic through the village and to areas of interest within the townsite, and hold the highest level of movement functionality. Connectors do not contain high enough volumes to be correctly classified as 'Neighbourhood Connectors' (more than 3,000 vehicles per day), but shall be designed to accommodate bus services, in addition to dedicated cycling infrastructure.

Connectors will provide an arrival experience for residents and visitors of North Stoneville, with their physical makeup including tree species and kerb type to be informed by the corresponding transect it traverses.

For most circumstances, Connectors can utilise a standard two-way 7.2m carriageway where no future bus route is anticipated. (Note that Connector Street sections identify a carriageway width of 7.0m. This dimension aligns with LN, but may be implemented at 7.2m to align with engineering practice.)

On-street parking shall only be necessary in the T4 Village" transect with the core area, such as the vicinity of the Local Centre, the school and possible oval, and shall be used to slow vehicle movements for safety.

Connectors shall generally provide for free movement of vehicles at moderate speed, and can be designed to traverse natural features and existing trees with sweeping curves. The sign posted speed limit is 60km/h, except village core areas (30km/h).

The base reserve width is generally 20 metres to accommodate carriageway, footpaths, and cycleway. However, variances should be adopted to suit landform and tree retention efforts in certain locations.

**SIGN POSTED
SPEED LIMIT**



**TYPICAL CONNECTOR
TRAFFIC VOLUMES**

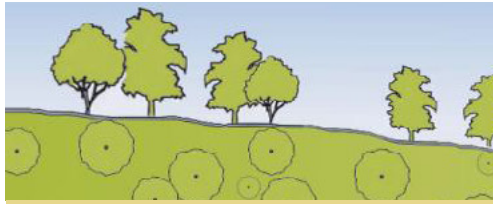
Up to 3,000 vehicles per day

ACCOMMODATES BUS

Yes

INTERSECTION DETAILS

2.2 STREET TYPES - CONNECTOR



T1 CONSERVATION



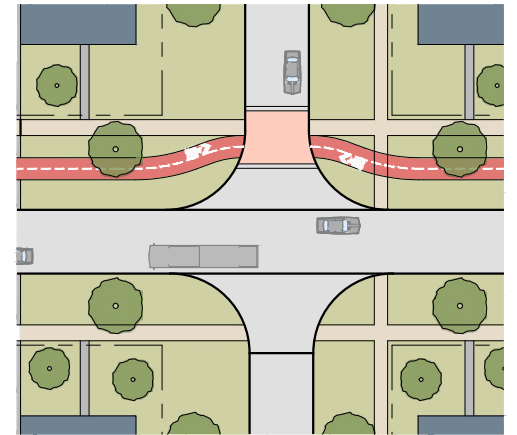
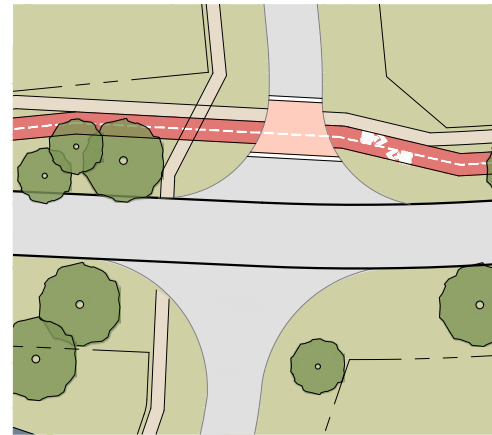
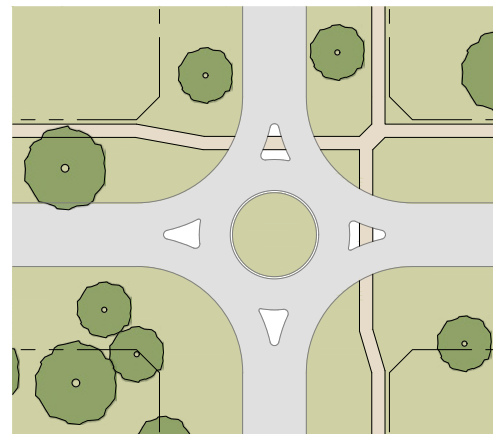
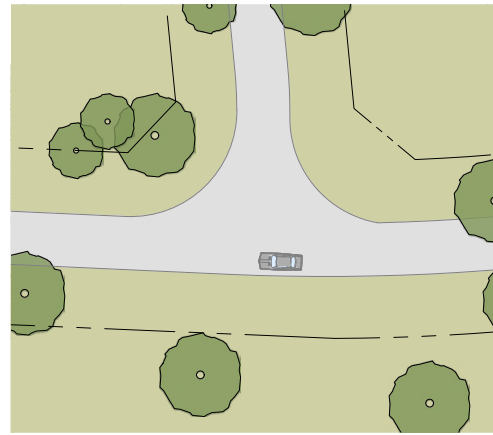
T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE



KERB RADII	12m
KERB TREATMENT	no kerb
4-WAY INTERSECTION	not encouraged
USER PRIORITY	Motorist (vehicles)

KERB RADII	12m
KERB TREATMENT	semi-mountable
4-WAY INTERSECTION	roundabout
USER PRIORITY	Motorist (vehicles)

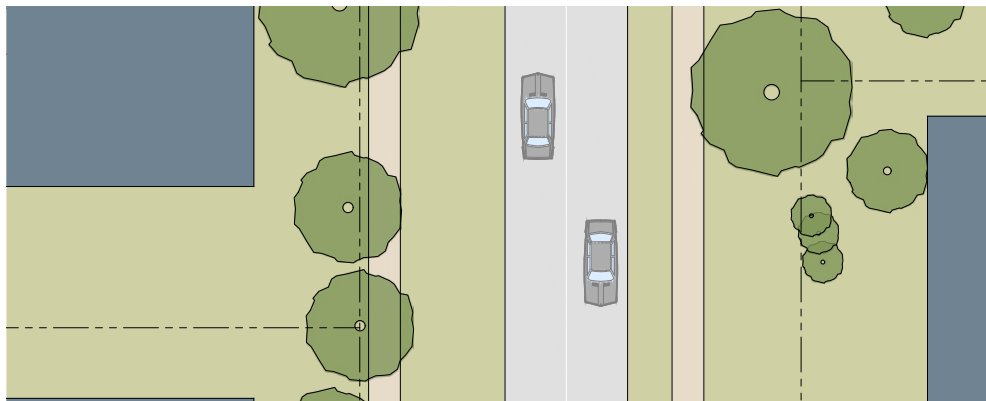
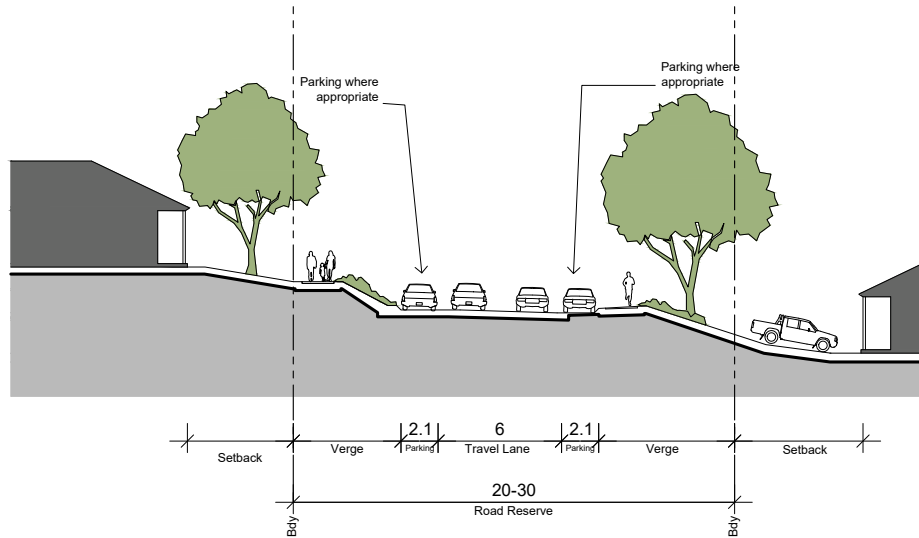
KERB RADII	12m
KERB TREATMENT	semi-mountable
4-WAY INTERSECTION	restricted
USER PRIORITY	balanced

KERB RADII	9m
KERB TREATMENT	semi-mountable
4-WAY INTERSECTION	threshold treatment
USER PRIORITY	balanced/active

2 STREETS

2.2 STREET TYPES - ACCESS STREET

CROSS SECTION B NOT TO SCALE



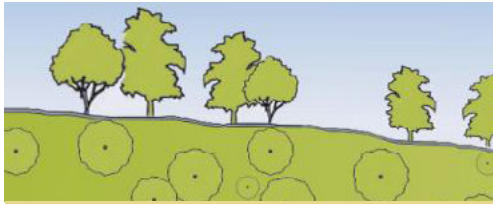
DESIGN GUIDANCE

THOROUGHFARE TYPE	Access Street
MOVEMENT	Yield
DESIGN SPEED	50km/h
ROAD RESERVE	Generally 20m; may be increased to retain vegetation
PAVEMENT WIDTH	6.0m
TRAFFIC FLOW	Two way yield
PARKING WIDTH / TYPE	Staggered parallel within pavement
KERB TYPE	T4 - semi-mountable T3/T2/T1 - flush / no kerb as appropriate to accommodate drainage swales
MEDIAN	n/a
TREE TYPE / SPACING	T4 - Semi-formal planting for shade T3/T2 - Naturalistic clusters / existing groups T1 - Completely natural
CYCLIST PROVISION	n/a
FOOTPATH TYPE / WIDTH	Typically 1.5m

*Street section shown is through T3 Transect

ACCESS STREET DETAILS

2.2 STREET TYPES - ACCESS STREET



T1 CONSERVATION



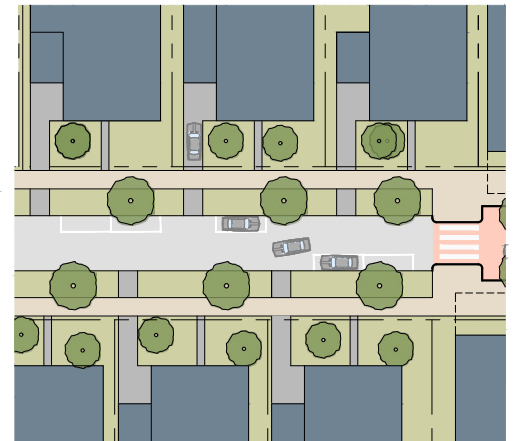
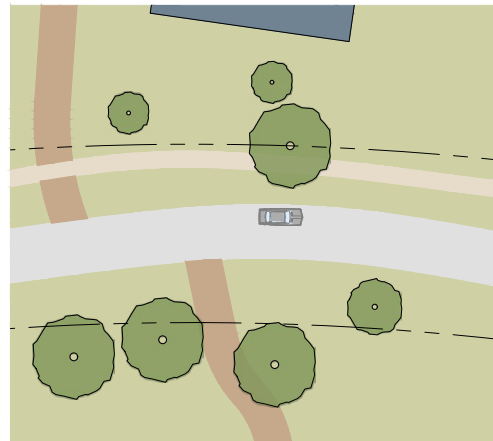
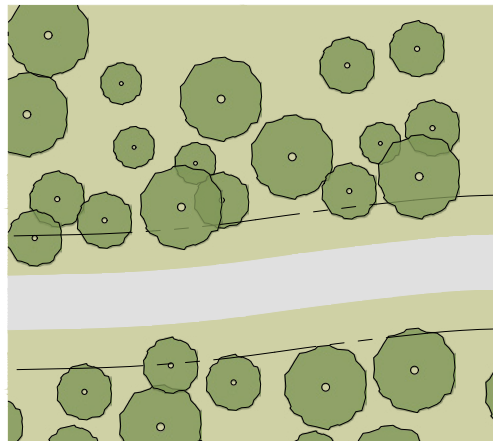
T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE



RURAL



TRANSECT

URBAN

2 STREETS

2.2 STREET TYPES - ACCESS STREET

EXPLANATORY NOTES

Access Streets are the most common street type in North Stoneville, and shall support a relatively high level of pedestrian activity, with low to moderate traffic volumes. Access Streets are not designed to deal with public buses or to encourage high volumes of through traffic, with their primary function to facilitate pedestrian and cycling movements and the 'last few hundred metres' of private vehicle travel to individual homes.

Given that Access Streets will comprise a large majority of public space within North Stoneville, they will serve as a catalyst for neighbourhood identity and, while they shall vary in character and tree species selection dependent on their positioning within the transect, will generally create, shaded residential streetscapes.

On-street parking nearest the Village Core transect shall be used to slow vehicle movements, but shall generally not be required in the majority of streets with larger lots.

In higher transect areas, particularly the T4 Village Urban area, Access Streets shall follow a straight alignment, lined with medium single species trees in reasonably formal layout. In T3 Sub Urban and T2 Natural Living transect areas, Access Streets shall bend and follow the natural grade of landform, where possible.

Although the base reserve width is generally 20 metres, variances should be adopted to suit landform and tree retention efforts in certain locations. Streets running perpendicular to steeper downward slopes, in excess of 8% gradient, should consider using tighter reserve widths to minimise the amount of battering and earthworks required to accommodate flat verges.

**SIGN POSTED
SPEED LIMIT**



**TYPICAL CONNECTOR
TRAFFIC VOLUMES**

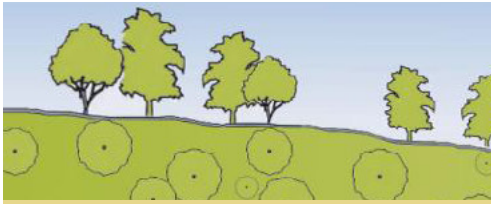
750 to 1,500 vehicles per day

ACCOMMODATES BUS

n/a

INTERSECTION DETAILS

2.2 STREET TYPES - ACCESS STREET



T1 CONSERVATION



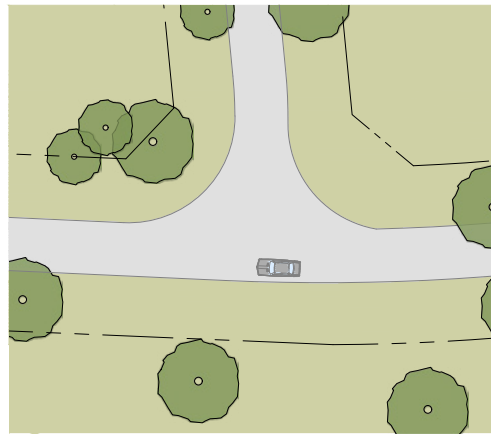
T2 NATURAL LIVING



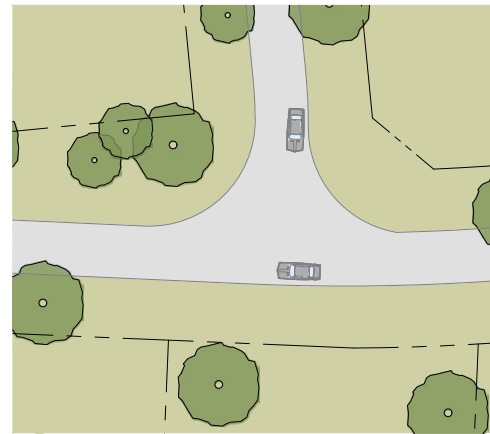
T3 HILLS NEIGHBOURHOODS



T4 VILLAGE



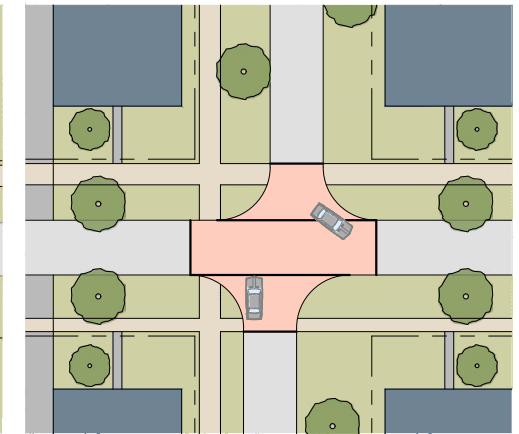
KERB RADII	12m
KERB TREATMENT	no kerb
4-WAY INTERSECTION	not encouraged
USER PRIORITY	Motorist (vehicles)



KERB RADII	12m
KERB TREATMENT	no kerb / flush
4-WAY INTERSECTION	not encouraged
USER PRIORITY	Motorist (vehicles)



KERB RADII	9m
KERB TREATMENT	semi-mountable
4-WAY INTERSECTION	staggered
USER PRIORITY	balanced



KERB RADII	6m
KERB TREATMENT	semi-mountable
4-WAY INTERSECTION	minor R-L stagger
USER PRIORITY	Pedestrian

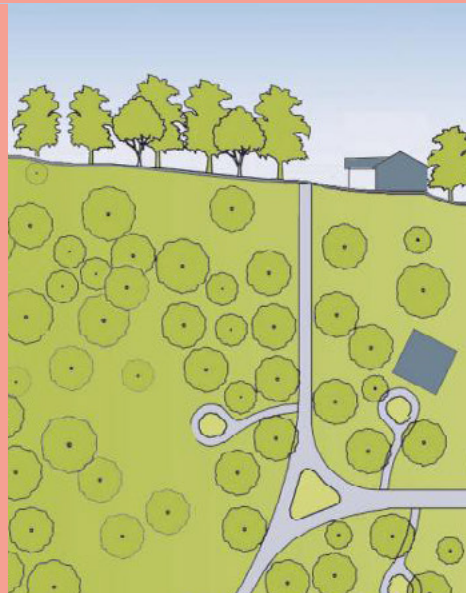
PRIVATE LAND

TRANSECT DESIGN GUIDE

3



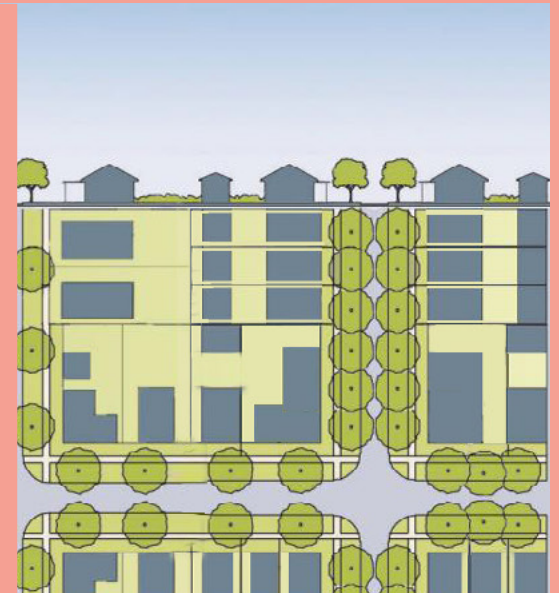
T1 CONSERVATION



T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE

3 PRIVATE LAND

FRONTAGE FENCING GUIDE



T1 CONSERVATION



T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE

NOT APPLICABLE

(exception below)



FENCING any fencing required for conservation purposes

FENCING post and rail

FENCING picket, post and rail, some masonry elements closer to T4

FENCING picket, permeable, masonry

BUILDING DISPOSITION



T1 CONSERVATION



T2 NATURAL LIVING

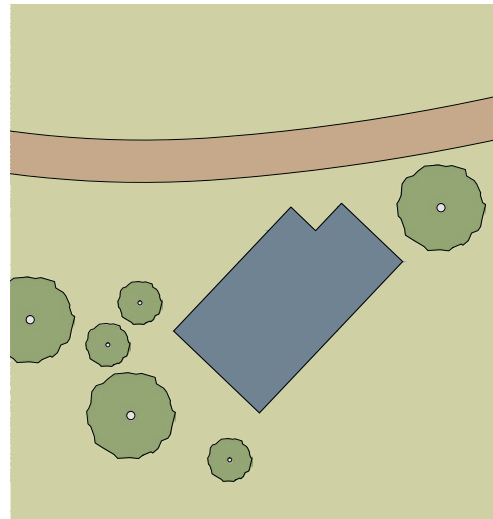


T3 HILLS NEIGHBOURHOODS

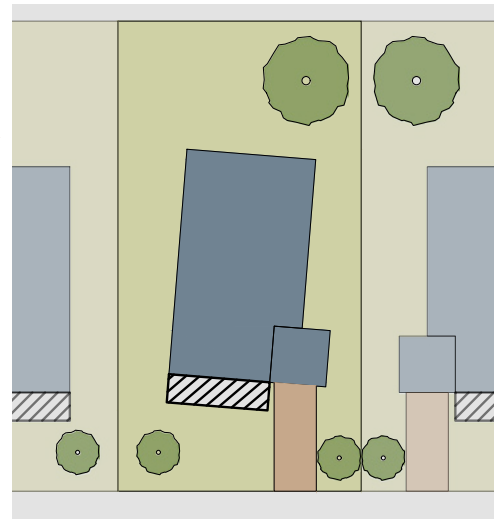


T4 VILLAGE

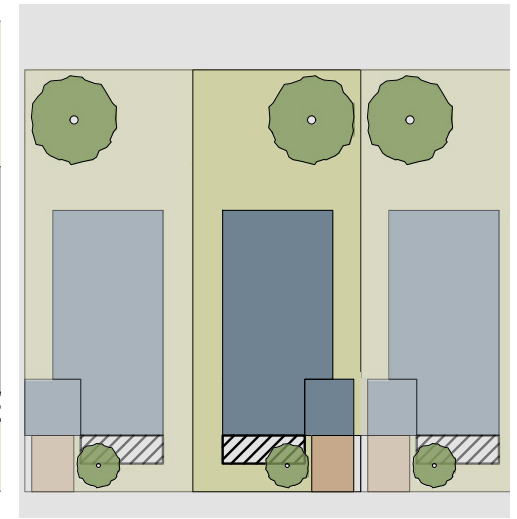
NOT APPLICABLE



SETBACK	15m +, generally
STREET RELATIONSHIP	less important, focus on responding to slope
GENERAL	generous yards on all sides of dwelling



SETBACK	7.5m - 15m
STREET RELATIONSHIP	slight angles, verandah encouraged
GENERAL	yards on all sides of dwelling, priority is to respond to slope



SETBACK	7m, generally
STREET RELATIONSHIP	right angles with street, verandah with outlook to street
GENERAL	large rear yard, priority to frame streetscape

RURAL



TRANSECT

URBAN

OPEN SPACE

TRANSECT DESIGN GUIDE

4



4 OPEN SPACE

4.1 PARK TYPES

Consistent with the transect design philosophy, parks should also respond to the context in which they sit.

A user should expect to experience a much more natural setting with minimal intervention and less modified landscaped elements adjacent T1 Conservation / Recreation and T2 Natural Living transects.

Meanwhile, spaces within the T4 area are intended to be formal in their landscape response, but flexible in their design commensurate with its village setting. Activities such as community markets, outdoor performance, and everyday gathering spaces are intended for the village squares.

T3 and T4 sub urban parks can provide kick-about spaces and traditional playgrounds, but they should still draw heavily on the hills' design references.

Nature play can be adapted to most transect areas, but should not take up large areas of T4 parks.

Nature corridors and linear parks that retain natural vegetation may connect and traverse transects, and provide opportunities for bike & hike trails.

While shade from trees is always an important consideration, tree planting efforts in parks should be concentrated within inner T4 transects, to further emphasise a higher status of amenity and attract everyday users to create vibrant activity within the village cores.

OPEN SPACE DETAILS



T1 CONSERVATION



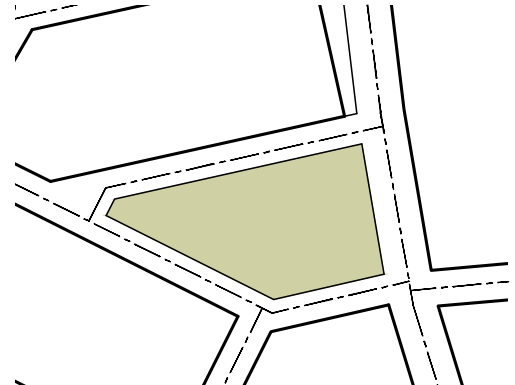
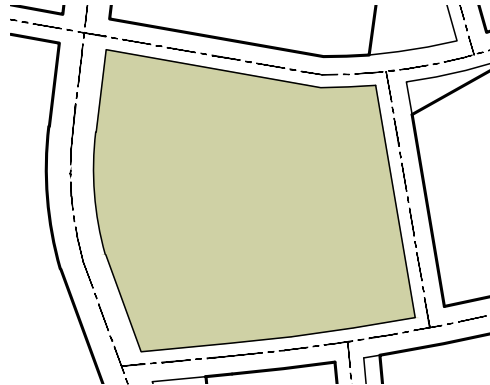
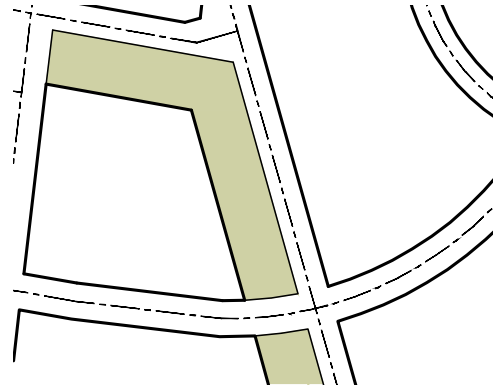
T2 NATURAL LIVING



T3 HILLS NEIGHBOURHOODS



T4 VILLAGE



TREE FORM	Large Shade
TREE SPECIES	Indigenous evergreen
VEGETATION UNDERSTOREY	Bushes, Understorey
PATH MATERIAL	Stabilised gravel
STRUCTURES	None
FACILITIES	Walking and cycling trails, bushfire access, high conservation function, with compatible recreation uses

TREE FORM	Large Shade
TREE SPECIES	Indigenous evergreen
VEGETATION UNDERSTOREY	Groundcover, reduced bushfire threat
PATH MATERIAL	Stabilised gravel, red asphalt
STRUCTURES	Shade shelter
FACILITIES	Seating, walking trails, exercise equipment, preserve high quality trees

TREE FORM	Large Shade
TREE SPECIES	Indigenous evergreen, food (orchard)
VEGETATION UNDERSTOREY	Groundcover, grassland cleared
PATH MATERIAL	Stabilised gravel, brick paving, red asphalt
STRUCTURES	Shade shelter, community hall
FACILITIES	Seating, tables, bbqs, playgrounds, kick-about

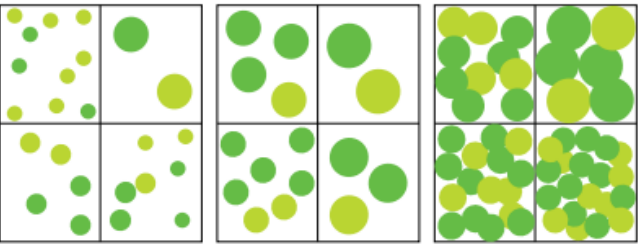
TREE FORM	Large Shade, small shade
TREE SPECIES	Indigenous / exotic / deciduous / evergreen
VEGETATION UNDERSTOREY	Groundcover, grassland cleared, paving
PATH MATERIAL	Brick paving, concrete
STRUCTURES	Shade shelter, kiosk
FACILITIES	Seating, tables, bbqs, playgrounds, public art



HATCH

Appendix C Asset Protection Zone standards and explanatory notes

Schedule 1: Standards for Asset Protection Zones

Object	Requirement
Fences within the APZ	Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness)	Should be managed and removed on a regular basis to maintain a low threat state. Should be maintained at <2 tonnes per hectare (on average). Mulches should be non-combustible such as stone, gravel or crushed mineral earth or wood mulch >6 millimetres in thickness.
Trees* (>6 metres in height)	Trunks at maturity should be a minimum distance of six metres from all elevations of the building. Branches at maturity should not touch or overhang a building or powerline. Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation. Canopy cover within the APZ should be <15 per cent of the total APZ area. Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.
<p>Figure 19: Tree canopy cover – ranging from 15 to 70 per cent at maturity</p> 	
Shrub* and scrub* (0.5 metres to six metres in height). Shrub and scrub >6 metres in height are to be treated as trees.	Should not be located under trees or within three metres of buildings. Should not be planted in clumps >5 square metres in area. Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground covers* (<0.5 metres in height. Ground covers >0.5 metres in height are to be treated as shrubs)	Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above. Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
Grass	Grass should be maintained at a height of 100 millimetres or less, at all times.

Schedule 1: Standards for Asset Protection Zones	
Object	Requirement
	Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
Defendable space	Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
LP Gas Cylinders	<p>Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building.</p> <p>The pressure relief valve should point away from the house.</p> <p>No flammable material within six metres from the front of the valve.</p> <p>Must sit on a firm, level and non-combustible base and be secured to a solid structure.</p>

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Element 2 Explanatory Notes

E2 Landscaping and design of an Asset Protection Zone

Landscaping, design, and maintenance of an APZ in a bushfire prone area can significantly improve the bushfire resilience of a building. An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that gives holistic consideration to how existing or proposed vegetation or non-combustible features interact with, or affect the building’s bushfire resilience.

A well designed APZ provides a greater level of vegetation management within the first few metres of a building with, for example, less vegetation or inclusion of non-combustible materials. The vegetation within the remainder of an APZ can increase further away from the building with carefully considered plant selection and landscaping techniques.

Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation (refer to E2 Plant Flammability) to create horizontal and vertical separations between the retained vegetation. The accumulation of fine fuel load from different plants is an important consideration for ongoing maintenance in accordance with Schedule 1. For example, when planting ground covers under deciduous trees within an APZ, the total fine fuel load prescribed in Schedule 1 will include any dead plant material from ground covers and leaf litter from the trees.

Plant density and final structure and form of mature vegetation should be considered in the initial landscaping stages. For example, clumps of sapling shrubs planted at a density without consideration of future growth, may increase the bushfire risk as a clump will quickly grow to exceed 5m². It should be noted that in some cases, a single shrub in a mature state may be so dense as to fill a 5m² clump alone.

The location of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material, will break up fuel continuity and reduce the likelihood of a bushfire running through an APZ and subjecting a dwelling to radiant heat or direct flame contact. It is important to note, where mature trees are separated from a building by six metres, but the canopy has grown to extend or overhang a building, maintenance and pruning to remove the overhanging branches should be undertaken without the entirety of the tree being removed.

Element 2 Explanatory Notes

Mulches used within the APZ should be non-combustible. The use of stone, gravel, rock and crushed mineral earth is encouraged. Wood mulch >6mm in thickness may be used, however it is recommended that it is used in garden beds or areas where the moisture level is higher by regular irrigation. These materials could be sourced from non-toxic construction and demolition waste giving the added benefit of reducing the environmental impact of any 'hard landscaping' actions.

Combustible objects, plants, garden supplies such as mulches, fences made from combustible material, should be avoided within 10 metres of a building. Vines or climbing plants on pergolas, posts or beams, should be located away from vulnerable parts of the building, such as windows and doors. Non-flammable features can be used to provide hazard separation from classified vegetation, such as tennis courts, pools, lawns and driveways or paths that use inorganic mulches (gravel or crushed rock). Consider locating firewood stacks away from trees and habitable buildings.

Incorporation of landscaping features, such as masonry feature walls can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection within areas of 29kW/m² (BAL-29) or below, or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged.

In addition to regular maintenance of an APZ, further bushfire protection can be provided at any time by:

- ensuring gutters are free from vegetation;
- installing gutter guards or plugs;
- regular cleaning of underfloor spaces, or enclosing them to prevent gaps;
- trimming and removing dead plants or leaf litter;
- pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors;
- removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank; and/or
- following the requirements of the relevant local government section 33 fire break notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.

Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. As embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building, best practice recommends that objects within the APZ are moved away from the building prior to any bushfire event. Objects may include, but are not limited to:

- door mats;
 - outdoor furniture;
 - potted plants;
 - shade sails or umbrellas;
 - plastic garbage bins;
 - firewood stacks;
 - flammable sculptures; and/or
 - playground equipment and children's toys.
-

Element 2 Explanatory Notes

E2 Plant flammability

There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event, but may be more resistant to burning and some may regenerate faster post-bushfire.

There are many terms for plant flammability that should not be confused, including:

- Fire resistant – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly
- flammable and inappropriate for a garden in areas of high bushfire risk.
- Fire retardant – plants that may not burn readily or may slow the passage of a bushfire.
- Fire wise – plants that have been identified and selected based on their flammability properties and linked to maintenance advice and planting location within a garden.

Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire retardant plant species that suit the environmental characteristics of an area. When developing a recommended plant species list, local governments should consult with ecologists, land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat.

When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics:

- grow in a predicted structure, shape and height;
- are open and loose branching with leaves that are thinly spread;
- have a coarse texture and low surface-area-to-volume ratio;
- will not drop large amounts of leaves or limbs, that require regular maintenance;
- have wide, flat, and thick or succulent leaves;
- trees that have bark attached tightly to their trunk or have smooth bark;
- have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed);
- do not produce or hold large amounts of fine dead material in their crowns; and/or
- will not become a weed in the area.

Refer to the WAPC Bushfire and Vegetation Fact Sheet for further information on clearing and vegetation management and APZ landscaping, design and plant selection reference material.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Element 2 Explanatory Notes

E2 Managing an Asset Protection Zone (APZ) to a low threat state

An APZ is a low fuel area maintained around a habitable building to increase the likelihood that it will survive a bushfire, by providing a defensible space and reducing the potential for direct flame contact, radiant heat exposure and ember attack.

Vegetation management within an APZ should provide defensible space and be maintained to a low threat state, in perpetuity, in accordance with the requirements outlined in Schedule 1.

The width of an APZ varies with slope and vegetation type, however it should only be as wide as needed to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29), or 10kW/m² where a building is identified for use as an on-site shelter. An APZ is generally not required where a building or development site achieves 29kW/m² (BAL-29) or lower in its pre-development state (prior to any vegetation clearing or modification).

An APZ should include an area of defensible space immediately adjoining a building, that is kept free from combustible items and obstructions, within which firefighting operations can be undertaken to defend the structure. Where a lot contains a building envelope, it may not be necessary for the entire building envelope to achieve 29kW/m² (BAL-29) as this may result in significant unnecessary clearing. It is recommended that the BMP identifies that a sufficient APZ can be accommodated within the building envelope, with the development site and associated APZ to be determined at the development approval stage.

An APZ should be contained within the boundaries of the lot on which the building is situated, except in instances where it is demonstrated that the vegetation on the adjoining land is managed in a low threat state, as per cl. 2.2.3.2 of AS 3959, such as a road, managed park, rocky outcrop or a water body.

The siting of a habitable building and associated APZ should aim to minimise the clearing of vegetation. The BMP should demonstrate that the proposed APZ has minimised the unnecessary loss of vegetation or potential for conflict with landscape or environmental objectives; and complies with environmental approvals/exemptions (where necessary). A re-design or reduction in lot yield may be necessary to minimise the removal and modification of remnant vegetation.

It is recommended that development be located on flat areas or slopes less than 20 degrees (especially where classified vegetation is located downslope to a building) and away from ridge tops, crests or narrow gullies, as bushfire can spread rapidly in these areas. Circumstances where these locations may be suitable for development to occur include where the land is already cleared, and 29kW/m² (BAL-29) or lower can be achieved for the whole development site without the use of an APZ. To ensure soil stability within an APZ, vegetation removal on slopes exceeding 18 degrees is discouraged.

Fine fuel load should be maintained to less than two tonnes per hectare, however this is often a subjective assessment. Reducing fuel load levels does not necessarily require the removal of existing vegetation. A combination of methods can be utilised to reduce fuel load such as raking, weed removal, pruning, mulching and/or the removal of plant material.

A simple method to estimate fuel load is to roughly equate one tonne of fuel load per hectare as 100 grams per square metre. For example, two tonnes per hectare of leaf litter is roughly 200 grams of leaf litter per square metre and eight tonnes per hectare is roughly 800 grams. Eucalyptus leaf litter is approximately 100 grams per handful, so two handfuls of litter per square metre will roughly equate to two tonnes per hectare. Different types of fine fuel, like mulch or pine needles may be more or less than a handful, however the 100 grams per square metre rule of thumb can still be used.

The landowner or proponent is responsible for maintaining an APZ in accordance with Schedule 1 - Standards for Asset Protection Zones. Ongoing maintenance of an APZ is usually enforced through the local government firebreak notice issued under section 33 of the Bushfires Act 1954, and/or through a condition of a development approval, which requires the implementation of measures identified within a BMP.

A copy of the firebreak notice and Schedule 1 should be included in a BMP specifically as a how-to guide for the landowner, and to demonstrate to decision-makers that the measures outlined in the BMP to achieve the appropriate BAL rating through provision and ongoing management of an APZ, can be implemented.

E2 Landscaping and design of an Asset Protection Zone

Landscaping, design, and maintenance of an APZ in a bushfire prone area can significantly improve the bushfire resilience of a building. An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically

designed space that gives holistic consideration to how existing or proposed vegetation or non-combustible features interact with, or affect the building's bushfire resilience.

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Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation (refer to E2 Plant Flammability) to create horizontal and vertical separations between the retained vegetation. The accumulation of fine fuel load from different plants is an important consideration for ongoing maintenance in accordance with Schedule 1. For example, when planting ground covers under deciduous trees within an APZ, the total fine fuel load prescribed in Schedule 1 will include any dead plant material from ground covers and leaf litter from the trees.

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Mulches used within the APZ should be non-combustible. The use of stone, gravel, rock and crushed mineral earth is encouraged. Wood mulch >6mm in thickness may be used, however it is recommended that it is used in garden beds or areas where the moisture level is higher by regular irrigation. These materials could be sourced from non-toxic construction and demolition waste giving the added benefit of reducing the environmental impact of any 'hard landscaping' actions.

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In addition to regular maintenance of an APZ, further bushfire protection can be provided at any time by:

- ensuring gutters are free from vegetation;
- installing gutter guards or plugs;
- regular cleaning of underfloor spaces, or enclosing them to prevent gaps;
- trimming and removing dead plants or leaf litter;
- pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors;
- removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank; and/or
- following the requirements of the relevant local government section 33 fire break notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.
- Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. As embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building, best practice recommends that objects within the APZ are moved away from the building prior to any bushfire event. Objects may include, but are not limited to:

-
- door mats;
 - outdoor furniture;
 - potted plants;
 - shade sails or umbrellas;
 - plastic garbage bins;
 - firewood stacks;
 - flammable sculptures; and/or
 - playground equipment and children's toys.

E2 Plant flammability

There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event, but may be more resistant to burning and some may regenerate faster post-bushfire.

There are many terms for plant flammability that should not be confused, including:

Fire resistant – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly flammable and inappropriate for a garden in areas of high bushfire risk.

Fire retardant – plants that may not burn readily or may slow the passage of a bushfire.

Fire wise – plants that have been identified and selected based on their flammability properties and linked to maintenance advice and planting location within a garden.

Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire retardant plant species that suit the environmental characteristics of an area. When developing a recommended plant species list, local governments should consult with ecologists, land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat.

When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics:

- grow in a predicted structure, shape and height;
- are open and loose branching with leaves that are thinly spread;
- have a coarse texture and low surface-area-to-volume ratio;
- will not drop large amounts of leaves or limbs, that require regular maintenance;
- have wide, flat, and thick or succulent leaves;
- trees that have bark attached tightly to their trunk or have smooth bark;
- have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed);
- do not produce or hold large amounts of fine dead material in their crowns; and/or
- will not become a weed in the area.

Refer to the WAPC Bushfire and Vegetation Fact Sheet for further information on clearing and vegetation management and APZ landscaping, design and plant selection reference material.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Appendix D Shire of Mundaring Firebreak and Fuel Load Notice

FIREBREAK AND FUEL LOAD NOTICE



Bush Fires Act 1954

Section 33

Notice to all owners and occupiers of land situated within the Shire of Mundaring

Pursuant to *section 33(1)* of the *Bush Fires Act 1954*, the Shire of Mundaring (the Shire) gives notice that the owners and/or occupiers of land district are required to undertake the following works on land owned or occupied by them. This must be done by 1 November each year and maintained until 31 March the year following.

DEFINITIONS WITHIN THIS NOTICE

Authorised Officer - means an employee of the Shire appointed as a Bush Fire Control Officer pursuant to the powers conferred in *section 38 of the Bush Fires Act 1954*.

Trafficable - means to be able to travel from one point to another in an emergency services vehicle on a clear surface, unhindered, without any obstruction that may endanger such vehicles. It must not terminate, lead to a dead end, or have any pinch points without provision for egress to a safe place or a cleared turnaround area of not less than an 18-metre diameter.

Inflammable Material - means any substance which will catch fire easily without contact with flames or with a low ignition point, such as but not limited to petrol or liquefied petroleum gas.

Fuel Depot / Fuel Storage Area - means an area of land, a building or a structure where fuel, i.e. (petrol, diesel, kerosene, liquid gas or any other fossil fuel) is kept in any container or vessel.

Flammable Material - means any fine fuels, plant, tree, grass, substance, object, thing or material that may or is likely to catch fire and burn or any other thing deemed by an Authorised Officer to be capable of combustion.

Vertical Clearance - means a continuous, uninterrupted vertical line at a right angle to the horizontal baseline of the firebreak to a minimum height of 4 metres from the ground.

Firebreak - means a strip or area of ground, with a minimum width of 3 metres and a vertical clearance of 4 metres, immediately inside all external boundaries of any lot and constructed to a trafficable surface that is kept and maintained totally clear of all flammable material and includes the pruning and removal of any living or dead trees, scrub or any other material encroaching onto it or into the vertical clearance of the firebreak area. Firebreaks may be constructed by one or more of the following methods: Ploughing, Cultivating, Scarifying, Raking, Burning, Chemical Spraying, Blowing or other methods as approved by an Authorised Officer

Fuel Loads

Fine Fuel Loads - means the leaf litter on the ground, including leaves, twigs (up to 6mm in diameter) and bark. A fine fuel load depth of 5mm from the top of the layer to the mineral earth beneath indicates approximately 2 tonnes per hectare. A fine fuel load depth of 15mm from the top of the layer to the mineral earth beneath indicates approximately 8 tonnes per hectare.

Coarse Fuel Loads - means branches, logs etc.

Maintaining Fuel Loads - relates to managing fuel loads described in this Notice. Reducing fuel load levels does not necessarily require the removal of existing natural vegetation. A combination of methods can be utilised, including planned burning, raking, weed removal, pruning and/or removing dead plant material.

Managed Vegetation - includes vegetation that is pruned away from buildings, under pruned to minimise contact with ground fuels, and that is kept free of dead suspended matter such as twigs, leaves and bark.

Notice to all owners and occupiers of land situated within the Shire of Mundaring

Habitable Buildings - means any building or other dwelling suitable for human residency, occupation, or use. This includes attached or adjacent structures such as garages, carports, verandas, or similar roofed structures that are attached to, or within 6 metres, of the dwelling or primary building.

Asset Protection Zone (APZ) - is an area of very low fuel levels surrounding a habitable building extending to a minimum of 20 metres out from any external walls of the building, attached structures, or adjacent structures within 6 metres of that building. On sloping ground, it shall increase at 1 metre for every degree in slope on the sides of the habitable building that are exposed to downslope natural vegetation.

1. The Land owner (or occupier) is required to do the following

1.1 All land with an area of 5000sqm up to 50,000sqm (5 Hectares) with a building on it must

- a) Maintain all grass on the land to a height no greater than 5cm
- b) Install a firebreak around all structures outside of your APZ and immediately inside all external boundaries of the land
- c) Maintain fuel loads in natural bush areas at less than 8 tonnes per hectare across the land.
- d) Maintain an APZ in line with the requirements of section 1.5 of this Notice

1.2 All land with an area of 50,000sqm or greater, with a building on it must

- a) Maintain all grass to a height no greater than 5cm for a distance of 10m from any firebreak.
- b) All other grasses within the area must be managed by slashing or effective grazing by livestock or as directed by an Authorised Officer.
- c) Install a firebreak around all structures outside of your APZ and immediately inside all external boundaries of the land.
- d) Maintain fuel loads in natural bush areas at less than 8 tonnes per hectare across the land.
- e) Maintain an APZ in line with the requirements of section 1.5 of this Notice

1.3 All land with an area of 5,000sqm or less, with a building on it must

- a) Maintain all grass on the land to a height no greater than 5cm
- b) Maintain fuel loads in natural bush areas at less than 8 tonnes per hectare across the land.
- c) Maintain an APZ in line with the requirements of section 1.5 of this Notice

1.4 All vacant land with an area less than 2000sqm

Must ensure all grass be maintained on the land to a height no greater than 5cm and that fuel loads in natural bush areas are maintained to less than 8 tonnes per hectare across the land.

All vacant land with an area more than 2000sqm must

- a) Install a firebreak immediately inside all external boundaries of the land All land with an area of less than 50,000sqm (5 Hectares), all grass must be maintained on the land to a height no greater than 5cm
- b) All land with an area of 50,000sqm (5 Hectares) or greater, the grass must be maintained on the land to a height no greater than 5cm for a distance of 10 metres from any firebreak, and all other grasses managed by slashing or effective grazing by livestock or as directed by an Authorised Officer
- c) Maintain fuel loads in natural bush areas to less than 8 tonnes per hectare across the land.

1.5 Asset Protection Zone Specification

- a) Maintain all grass on the land to a height no greater than 5cm.
- b) Fuel loads maintained at 2 tonnes per hectare or lower.

- c) Clear separation between adjoining or nearby tree crowns
- d) Small group/s of trees within close proximity to one another may be treated as one crown provided the combined crowns do not exceed the area of a large or mature crown size for that species.
- e) No trees/shrubs over 2 metres high are to be within 2 metres of a habitable building.
- f) Trees and shrubs must be under-pruned to a minimum height of 2 metres from the ground.
- g) Shrubs over 2 metres high must not be planted in groups close to habitable buildings, ensuring there is a gap of at least three times the height (at maturity) of the shrub away from habitable buildings.
- h) Ensure no part of a tree overhangs any buildings.
- i) Roofs, gutters, and walls of all buildings on the land are free of fine fuel loads and other flammable material.
- j) Ensure paths and non-flammable features immediately adjacent to habitable buildings are installed.
- k) Wood piles and flammable materials are stored a safe distance from habitable buildings.
- l) Ensure roofs, gutters, and walls of all buildings on the land are free of flammable matter, for example, the accumulation of leaves in gutters, wood piles against building walls and flammable/inflammable materials against that building or stored under pole-framed houses.

1.6 Fuel Depot /Storage Area, Haystacks / Stockpiled Flammable Material

- a) Remove all flammable material within 10 metres of where it is stored.
- b) Install a firebreak immediately adjacent to any haystacks or stockpiled flammable material

1.7 Application to vary the above Requirements/Arrangements

An application to vary any of the above requirements can be made to the Shire to implement measures in the case of geographical or environmental obstructions. This will be assessed by an Authorised Officer, and will be granted for a time period as decided by the Authorised Officer assessing your application. If approved you must still comply with the other sections of this notice. If not approved, your property must still comply with this notice. Bushfire Management Plans, Bushfire Management Statements, or Fuel Load Management Plans, approved by the Shire to reduce and mitigate fire hazards within a particular subdivision, lot or other area of land anywhere in the district, are also included.

1.8 Additional Works

- a) All driveways must be clear of flammable material and accessible to allow for the safe access and egress of emergency services vehicles as deemed by the Authorised Officer.
- b) In addition to the requirements of this Notice, you may be required to carry out further works that 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 Shire rates record for the relevant land.

The Shire advises that its officers, servants, workmen, contractors, vehicles, machinery, and appliances (as the officers deem fit) may carry out the requisitions of this notice that are not complied with by the date specified above, and any costs and expenses incurred may be recovered from you as the owner and/or occupier of the land.

The penalty for failing or neglecting to comply with this Notice is a fine not exceeding \$5000, and a person in default is also liable, whether prosecuted or not, to pay the costs of performing the work directed by this Notice if it is not carried out by the owner and/or occupier by the date required by this Notice.



Supplementary requirements to this notice *section 24F and 24G (Restricted Burning) Burning of Garden Refuse*

- a) 1sqm piles of garden refuse may be burnt without a permit between 6 pm and 11 pm.
- b) No more than one pile of garden refuse is to be burnt at any one time.
- c) A permit to burn before 6 pm is required, and all permit conditions must be followed.
- d) One able-bodied adult person must be in attendance at all times or as specified on your permit.

The following requirements must be carried out by the responsible person in attendance

- Piles to be fully extinguished by midnight. Fully extinguished means no heat, smoke or steam, or white ash is to be present where the fire was situated.
- The persons responsible for the lighting of piles are required to check the Fire Danger Rating and weather conditions to ensure burning is allowed at that time.

If the requirements of this Notice are carried out by burning, such burning must be in accordance with the relevant provisions of the *Bush Fires Act 1954*.

By order of the Council.



Jonathan Throssell
CHIEF EXECUTIVE OFFICER

Appendix E Vehicular access – Explanatory notes from the Guidelines

Acceptable Solution A3.1 – Public Roads

Explanatory Note E3.1

These Guidelines do not prescribe values for the trafficable (carriageway/pavement) width of public roads as they should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area.

The IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards do not prescribe a horizontal clearance. However, it is recommended that a traversable verge is provided to allow for emergency services vehicles to stop and operate on the side of the public road, specifically where the public road may traverse large areas of classified vegetation.

Where local government roads are proposed to be widened by the proponent, they must obtain approval from the local government.

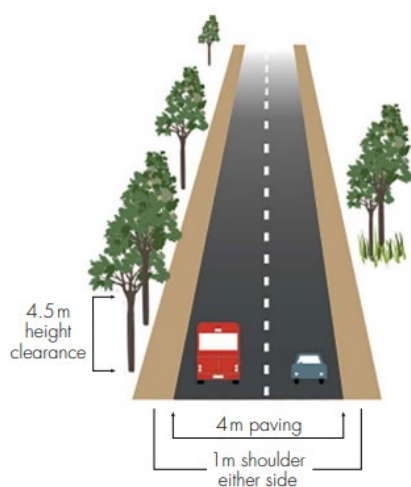


Figure 20: Example of a public road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.2a – Multiple access routes

Explanatory Note E3.2a

Two-way public road access is public road access from a lot in at least two different directions to two suitable destinations, and provides residents and the community, as well as emergency services, with access and egress from

both the subdivision and individual habitable buildings/development in the event of a bushfire emergency. A single road provides no alternative route if the access becomes congested or is unable to be traversed due to smoke and/or fallen trees during a bushfire.

Two-way public road access applies to access/egress routes leading into a subdivision, as well as those within a subdivision. A road that loops back onto itself does not constitute the option of two different directions.

Two-way public road access should always be the first option. Where the site is not able to achieve two-way access within 200 metres of the lot boundary, due to demonstrated site or environmental constraints, the proponent should identify options for an emergency access way from the subject site to a suitable destination. Where an emergency

access way cannot be provided, the proponent should demonstrate compliance with the performance principle.

Subject sites or proposed lots greater than 200 metres from an intersection, which provides two-way access, do not satisfy the requirement for two-way access unless they meet the provisions which allow for no-through roads greater than 200 metres in A3.2a.

To demonstrate compliance with the performance principle for two-way access, the bushfire planning practitioner may have regard to:

- the extent of the bushfire hazard, location and vegetation classification, the likelihood, potential severity and impact of bushfire to the subject site and the road network;
- time between fire detection and the onset of conditions in comparison to travel time for the community to evacuate to a suitable destination;
- available access route(s) travelling towards a suitable destination; and
- turn-around area for a fire appliance for no-through roads.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

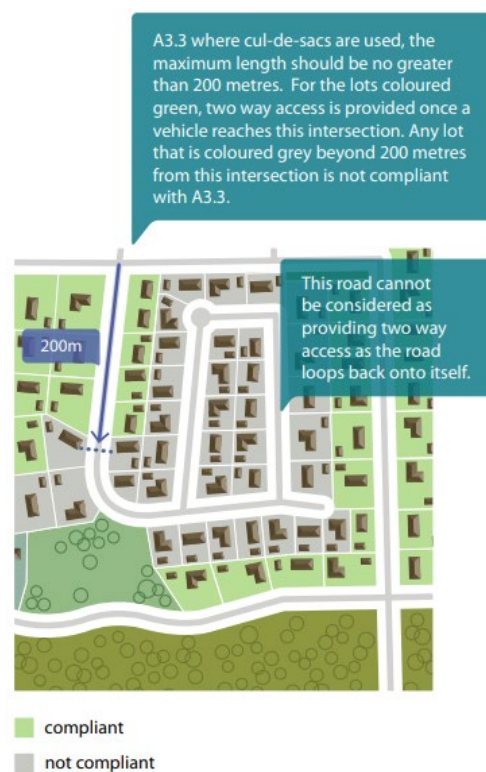


Figure 21: Example of compliant and non-compliant two-way

Acceptable Solution A3.2b – Emergency access way

Explanatory Note E3.2a

An emergency access way is not a preferred alternative to through public road access and should only be considered acceptable where it has been demonstrated that it will provide the safety and performance needs of emergency services and the community, including consideration for future needs, and that public road access to satisfy A3.2a cannot be achieved due to site constraints, such as an established road network with no opportunity to provide a public road for secondary access. Acceptance of an emergency access way should also consider the ability to accommodate reasonable worst-case vehicle volumes.

The principle function of the emergency access way is to provide a contingency (second) community evacuation route and simultaneously provide access for emergency services, in the event of a bushfire emergency. Where an emergency access way traverses classified vegetation, which has the potential to create a bushfire hazard, an emergency access way performs the secondary function of providing access by emergency services to this vegetation.

Emergency access ways should connect to a public road to allow alternative two-way through access. An emergency access way should not exceed 500 metres in length as they may not be as safe for road-use due to not being designed or constructed to the full requirements of a public road and may present uncertainties to emergency service personnel and the public as they are not part of the daily road network and not identified on Maps.

Permanent public emergency access way

An emergency access way can be provided as either a public easement in gross or a right-of-way. In both approaches, the management of the emergency access way is by the local government as the grantee of the easement or management body of the right-of-way. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the easement or right-of-way; this must be provided to the decision-maker prior to granting planning approval. The approach taken is at the discretion of the decision-maker and/ or the local government and is also dependent on whether the land is to remain in private ownership or be ceded to the Crown. Consultation with Land Use Management at the Department of Planning, Lands and Heritage should also be considered if the land is to be ceded to the Crown or if the local government is uncertain of which approach to take.

If the emergency access way is provided as an easement, it should be provided as a public easement in gross under sections 195 and 196 of the Land Administration Act 1997 in favour of the local government and/or public authority, to ensure accessibility for emergency services and the public at all times. To be provided as a right-of-way the emergency access way should be vested in the Crown under section 152 of the Planning and Development Act 2005 as a right-of-way and such land to be ceded free of cost and without any payment or compensation by the Crown. If gates are used to control traffic flow during non-emergency periods, these will be managed by the local government and must not be locked. Gates should be double gates wide enough to access the full pavement width and accommodate Type 3.4 fire appliances with the design and construction to be approved by the relevant local government.

Temporary public emergency access way

A temporary emergency access way may be proposed to facilitate the staging arrangements of a subdivision. The provision of two public roads may not be possible in the first stage of the subdivision and an emergency access way can be provided as an interim access route until the second public road is developed and gazetted in a subsequent stage of the subdivision (see figure 22). The emergency access way should be provided in the same manner as a permanent emergency access way, but it should be removed from the certificate of title once the public road is developed and gazetted. Where an emergency access way is proposed as an alternative to a public road, the Bushfire Management Plan should provide thorough justification for its use.

Restricted public emergency access way

There may be some instances where a restricted emergency access way is proposed as a performance principle based solution where access is only available to the public in the event of a bushfire emergency. This option can only be considered where the local government or Main Roads WA have advised that vehicular access on the emergency access way is not allowed during non-emergency periods, as it provides an additional thoroughfare and entry point on a local or State road. In this scenario, the emergency access way can be provided as an easement under section 195 of the Land Administration Act 1997, as public access in the event of a bushfire emergency or vested in the Crown as a reserve under section 152 of the Planning and Development Act 2005. Such land is to be ceded free of cost without any payment or compensation by the Crown. The proponent must obtain written consent from the local

Acceptable Solution A3.2b – Emergency access way

government that the local government will accept care, control and management of the proposed reserve and agree to the terms of the Management Order Conditions (if applicable); this must be provided to the decision-maker prior to granting planning approval.

The purpose of the reserve should be for a public purpose specified in the condition related to the subdivision, for example for emergency access only, or for emergency access and recreation. A reserve for emergency access and recreation can optimise the land-use as a dual purpose where it provides vehicular access in the event of a bushfire emergency, but can be accessed by the public (on foot) on a day-to-day basis as a recreation link. Appropriate signage can ensure the general public is aware of the purpose of the reserve. The approach taken is at the discretion of the decision-maker and/or local government.

Right-of-carriageway emergency access way

There may be some instances where a right-of-carriageway easement is proposed as a performance principle-based solution. This may be where particular landowner(s) and emergency services, but not the public, require access over a neighbouring lot(s). A right-of-carriageway easement should be provided under section 195 of the Land Administration Act 1997. The easement is to provide alternative access for the particular landowner(s) in the event of a bushfire emergency and not for use by the public. In this scenario, support will be necessary from the adjoining lot owner(s). The easement is to be granted to the local government and it is to agree with the landowner on the arrangements of the management of the easement area by deed. These management arrangements will be at the discretion of the local government. If gated, the easement area can be locked to restrict day-to-day vehicular access.



Figure 22: Example of an emergency access way

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.3 – Through roads

Explanatory Note E3.3

In bushfire prone areas, a proposed structure plan or subdivision that incorporates no-through roads should be avoided because they do not provide a connected and legible design that allows for easy access and egress by the community, residents and emergency services in the event of a bushfire. No-through roads also reduce the options available for access and egress in the event of a bushfire emergency.

There will however be situations where a subject site is accessed via an existing or proposed no-through road and alternative access cannot be provided. In these situations, the proponent should demonstrate to the decision-maker, that all efforts have been made with the local government and/or adjoining landowners to secure alternative public road access or an emergency access way and that a redesign has been explored. The bushfire planning practitioner may need to develop a performance principle-based solution or address the non-compliance and demonstrate to the decisionmaker why discretion should be exercised in accordance with section 2.6 of these Guidelines.

No-through roads will only be considered an acceptable solution where it is demonstrated by the proponent, to the satisfaction of the decision maker, that a no through-road cannot be avoided due to site constraints. For example, the internal road design of a structure plan or subdivision where site constraints, such as a water body or Bush Forever, prevent the ability to create a through-road and a nothrough road may be a more appropriate road layout. No-through roads should be a maximum of 200 metres from the lot(s) boundary to an intersection where two-way access is provided and may only exceed 200 metres if it meets the provisions which allow for no-through roads greater than 200 metres in A3.2a.

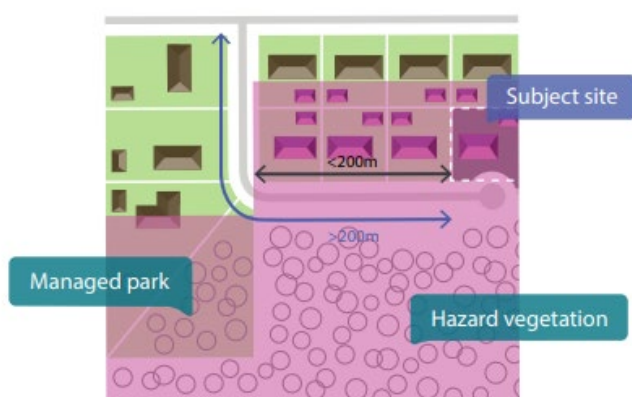


Figure 23: Example of a site on a no-through road greater than 200 metres from the intersection, but within 200 metres of BAL-LOW

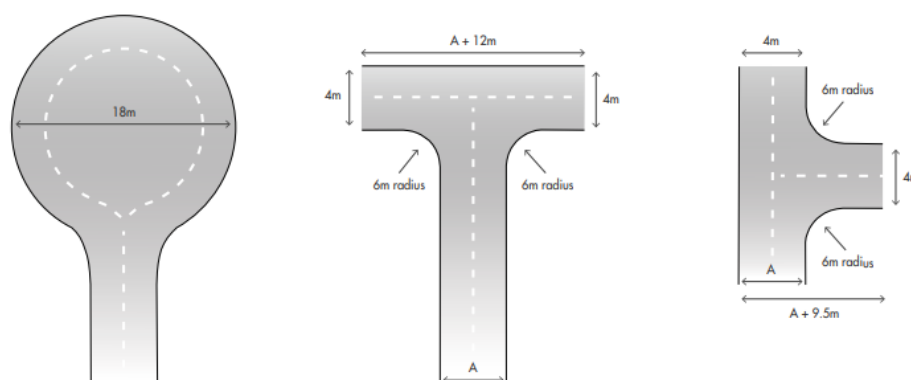


Figure 24: Turn-around area dimensions for a no-through road

Source: Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)

Acceptable Solution A3.4a – Perimeter roads

Explanatory Note E3.4a

Where a planning proposal includes the creation of 10 or more lots adjacent to each other, which adjoin classified vegetation under AS 3959 with the exception of Class G Grassland, as part of a greenfield development or large urban infill site, hazard separation and defensible space should be provided in the form of a perimeter road. Greenfield is 'undeveloped or minimally developed areas that have been identified for urban development'; and urban infill is 'the redevelopment of existing urban areas at a higher density than currently exists'. The creation of 10 or more lots includes cumulative subdivision applications where the subdivision application may be part of a staged subdivision.

A perimeter road should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area as per the requirements of a public road in Table 6, Column 1.

As the road is likely to function as a key neighbourhood distributor, or similar, consideration should be given to the provision of additional width to allow for emergency services vehicles to stop and operate on the side of the perimeter road, whilst simultaneously providing for the evacuation of the community (Figure 20).

When designing a strategic planning proposal and/or subdivision, creating a large setback between classified vegetation and proposed lots with a perimeter road, and orientating habitable buildings to front onto (rather than back onto) areas of vegetation has many benefits, including:

- passive surveillance;
- defensible space for firefighting and emergency management purposes;
- reducing the potential radiant heat that may impact a habitable building in a bushfire event;
- reducing the need for battle-axe lots; and
- unconstrained public access/egress for the community in the event of a bushfire.

In developments where no perimeter road exists, property defence in a bushfire event is difficult and can be impossible. Where proposed lots have frontage to an existing public road and abut the hazard at the rear or side, it may be an undesirable planning outcome to create lots which front the existing public road and back onto a perimeter road. In this instance, consideration should be given to a fire service access route. Refer to E3.4b below.

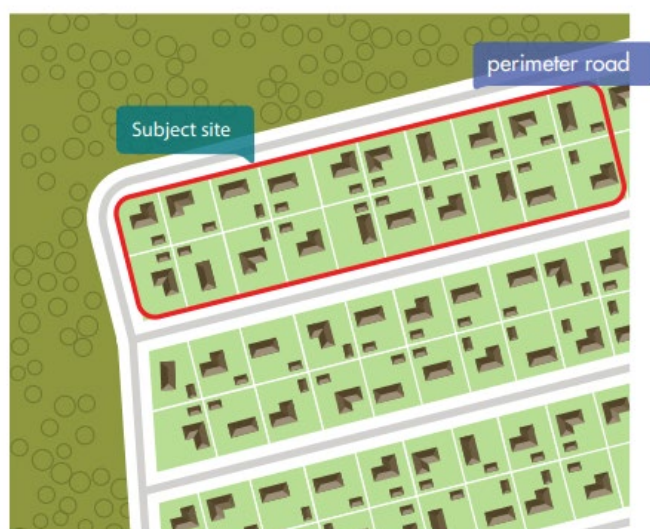


Figure 25: Example of a perimeter road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.4b – Fire service access route

Explanatory Note E3.4b

Where a subdivision adjoins classified vegetation and where A3.2a has been satisfied, hazard separation and defensible space across multiple lots may be required in the form of a fire service access route.

A fire service access route is not intended to provide residents and the general public with emergency egress and therefore is not a suitable second access or substitute for a public road. A fire service access route is to provide access for emergency services to classified vegetation for firefighting and fire management purposes.

A fire service access route can be provided as either an easement in gross over private or Crown land, or ceded to the Crown as a reserve. In both approaches, the management of the fire service access route is by the local government as the grantee of the easement or management body of the reserve. Determining which approach to take is dependent on what the intended tenure of the fire service access route is, which is explained further below. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the easement or reserve and agree to the terms of the Management Order Conditions (if applicable); this must be provided to the decision-maker prior to granting planning approval. The approach taken is at the discretion of the decision-maker and/or the local government. Consultation with Land Use Management at the Department of Planning, Lands and Heritage should also be considered if the land is to be ceded to the Crown or if the local government is uncertain of which approach to take.

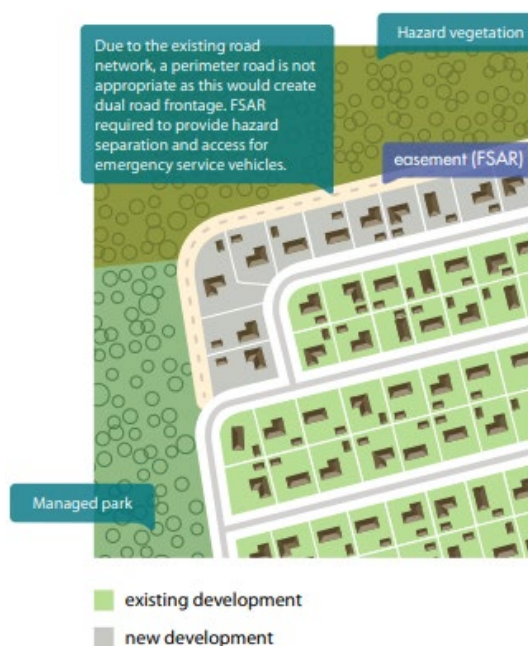


Figure 26: Example of a fire service access route

Where gates are used, these should be double gates wide enough to access the full required horizontal clearance and accommodate type 3.4 fire appliances with the design and construction to be approved by the relevant local government. Gates on fire service access routes may be locked to restrict access, provided a common key system is used, and such keys are made available for emergency services and designated fire officers within the local government area and/or surrounding district. Gates should be installed where fences cross fire service access routes. If an easement in gross is proposed, such arrangements for gates should be included in the deed of easement and be agreed to by the local government.

Fire service access route to remain in private ownership of multiple landowners

Where a fire service access route is proposed to traverse multiple private lots and they are intended to remain in the private ownership of the multiple landowners, it should be provided as an easement in gross under section 196 of the Land Administration Act 1997, to ensure accessibility for fire emergency services and not for use by the public. The easement is to be granted to the local government and/or public authority for firefighting and emergency management purposes.

Fire service access route to be created under State ownership

Where a fire service access route is proposed to traverse multiple private lots, but the decision-maker and/or local government prefer for the fire service access route to remain in one ownership under the State for management purposes, the fire service access route can be vested in the Crown under section 152 of the Planning and Development Act 2005 as a reserve, such land to be ceded free of cost without any payment or

compensation by the Crown. The purpose of the reserve should be for a public purpose specified in the condition related to the subdivision, for example for vehicular access for emergency services and the local government only, or for vehicular access for emergency services and the local government and recreation. A reserve for emergency services access and recreation can optimise the land-use as a dual purpose, where it provides vehicular access for emergency services, but can be accessed by the public (on foot) on a day-to-day basis as a recreation link. Appropriate signage will ensure the general public is aware of the purpose of the reserve. The approach taken is at the discretion of the decision-maker and/or local government.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.5 – Battle-axe access legs

Explanatory Note E3.5

In bushfire prone areas, lots with battle-axe access legs should be avoided because they: do not enable the habitable building to be located close to a public road where it is visible to emergency services; result in longer than necessary access routes for evacuation and the response of emergency services; may be blocked by falling trees or debris; and may not provide certainty for emergency services regarding the width, length and ability to turn emergency services vehicle around.

In some instances, it may be appropriate for battle-axe access legs to be used to overcome specific site or design constraints created by the existing road networks or lot layout. The Bushfire Management Plan should provide justification for proposed battle-axe access leg(s), including exploration of a redesign of the proposal, and the decision-maker should determine whether the justification is valid.

The measurement of the battle-axe access leg should be from the edge of the public road to where the access leg joins the effective area of the lot. Effective lot area means that part of the battle-axe lot that is capable of development and excludes the access leg and associated truncations for vehicle manoeuvrability. Where a proposed battle-axe lot has an existing habitable building that will be retained, the private driveway requirements and/or the battle-axe requirements (as appropriate) should be satisfied.

Battle-axe access should be 6 metres in width where the battle-axe is more than 50m in length or for lots serviced by a water source within the property, such as a water tank. It is acceptable for a single battle-axe to have a trafficable width of 4 metres with a traversable edge of 1 metre on either side of the carriageway.

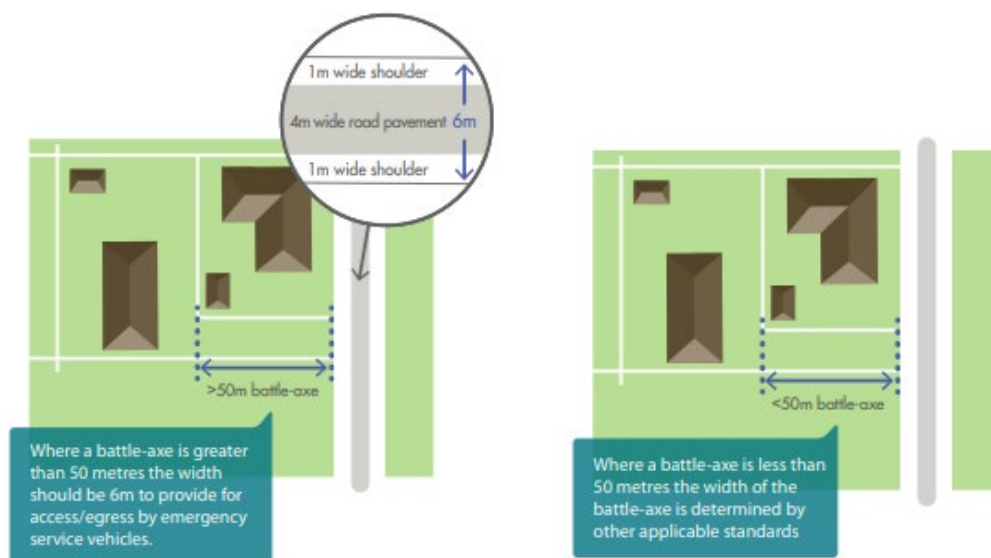


Figure 27: Battle-axe design requirements where required under A3.5

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.6 – Private driveways

Explanatory Note E3.6

In areas serviced by reticulated water, where the road speed limit is not greater than 70 km/h, and where the distance from the public road to the further part of the habitable building is no greater than 70 metres, emergency service vehicles typically operate from the street frontage.

In the event the habitable building cannot be reached by hose reel from the public road, then emergency service vehicles will need to gain access within the property. Emergency service vehicles will also need to gain access within the property, where access to reticulated water (fire hydrants) is not possible. In these situations, the driveway and battle-axe (if applicable) will need to be wide enough for access for an emergency service vehicle and a vehicle to evacuate.

Turnaround areas should be available for both conventional two-wheel drive vehicles of residents and Type 3.4 fire appliances. Turn-around areas should be located within 30 metres of habitable buildings. Circular and loop driveway design may also be considered. Note that the design requirements for a turn-around area for a private driveway or battle-axe differ to a cul-de-sac.

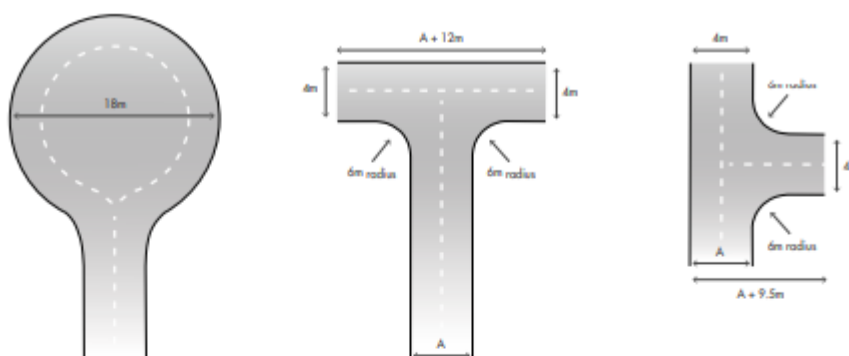


Figure 28: Design requirements for a turn-around area for a private driveway or battle-axe

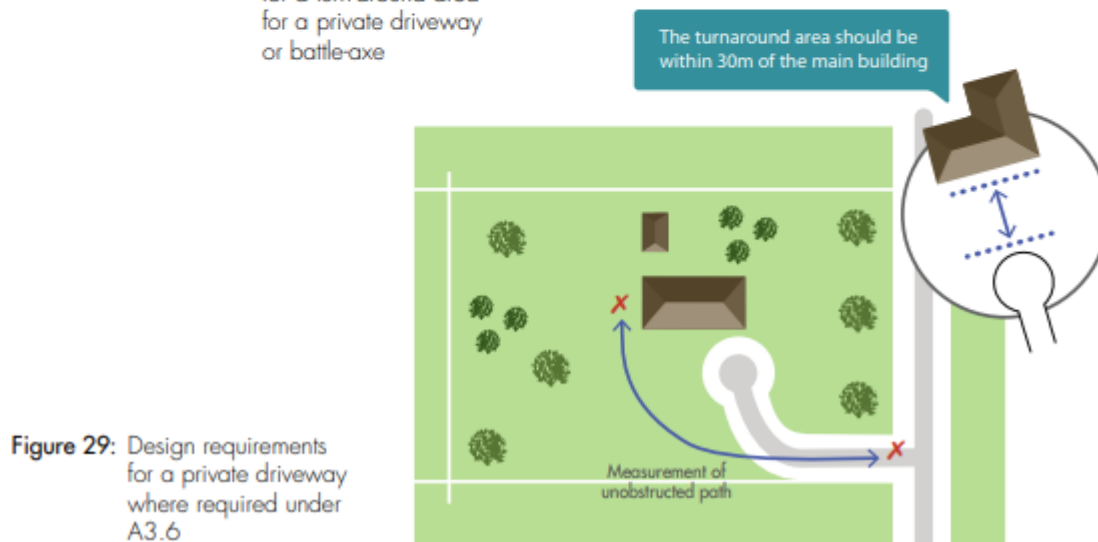


Figure 29: Design requirements for a private driveway where required under A3.6

Source: Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)

Technical requirement	1 Public road	2 Emergency access way ¹	3 Fire service access route ¹	4 Battle-axe and private driveways ²
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (m)	N/A	6	6	6
Minimum vertical clearance (m)	4.5	4.5	4.5	4.5
Minimum weight capacity (t)	15	15	15	15
Maximum grade unsealed road ³	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Maximum grade sealed road ³		1:7 (14.3%, 8°)	1:7 (14.3%, 8°)	1:7 (14.3%, 8°)
Maximum average grade sealed road		1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Minimum inner radius of road curves (m)		8.5	8.5	8.5

¹ To have crossfalls between 3 and 6%

² Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision

³ Dips must have no more than a 1 in 8 (12.5% - 7.1 degree) entry and exit angle.

Appendix F Bushfire firefighting water supply standards and explanatory notes

Schedule 2: Water supply dedicated for bushfire firefighting purposes (Guidelines V1.4)

2.1 Water supply requirements

Water dedicated for firefighting should be provided in accordance with the table below and be in addition to water required for drinking purposes.

Planning Application	Non-Reticulated Areas
Development application	10,000L per habitable building
Structure Plan / Subdivision: Creation of 1 additional lot	10,000L per lot
Structure Plan / Subdivision: Creation of 3 to 24 lots	10,000L tank per lot or 50,000L strategic water tank
Structure Plan / Subdivision: Creation of 25 lots or more	50,000L per 25 lots or part thereof Provided as a strategic water tank(s) or 10,000L tank/lot

2.1 Water supply requirements

2.2.1 Construction and design		<p>An above-ground tank and associated stand should be constructed of non-combustible material. The tank may need to comply with AS/NZS 3500.1:2018.</p> <p>Below ground tanks should have a 200mm diameter access hole to allow tankers or emergency service vehicles to refill direct from the tank, with the outlet location clearly marked at the surface. The tank may need to comply with AS/NZS 3500.1:2018. An inspection opening may double as the access hole provided that the inspection opening meets the requirements of AS/NZS 3500.1:2018. If the tank is required under the BCA as part of fire hydrant installation, then the tank will also need to comply with AS 2419.</p> <p>Where an outlet for an emergency service vehicle is provided, then an unobstructed, hardened ground surface is to be supplied within four metres of any water supply.</p>
2.2.2 Pipes and fittings	2.2.2.1 Fittings for above-ground water tanks	<p>All above-ground, exposed water supply pipes and fittings should be metal. Fittings should be located away from the source of bushfire attack and be in accordance with the applicable section below, unless otherwise specified by the local government.</p>
	2.2.2.2 Remote outlets	<ul style="list-style-type: none"> Commercial land uses: 125mm Storz fitting; or Strategic water tanks: 50mm or 100mm (where applicable and adapters are available) male camlock coupling with full flow valve; or Standalone water tanks: 50mm male camlock coupling with full flow valve; or Combined water tanks: 50mm male camlock coupling with full flow valve or a domestic fitting, being a standard household tap that enables an occupant to access the water supply with domestic hoses or buckets for extinguishing minor fires.

Element 4 Explanatory Notes

E4 Use of water supply

Water supply for firefighting in the event of a bushfire can be provided on a lot for use by emergency services or for use by the landowner, if their Bushfire Survival Plan is to stay and defend their property. Water supply in the form of a dedicated standalone tank may be provided solely for use by emergency services, and/or a water supply may be provided for use by the landowner in the form of non-drinking water (garden or grey water for firefighting) or drinking water. It is important to note, that a combined tank of drinking water and water for firefighting purposes is not recommended. It is required to be separated in accordance with section 4.2.3 of AS/NZS 3500.1:2018. This requirement is necessary, as stagnant water may alter the quality of the drinking water and the emergency services, by law, may not be able to take water from the water supply to suppress a bushfire.

E4 Independent water and power supply

Bushfires can directly impact a water service provider's equipment or pipes. As such, a reticulated water supply may not be reliable due to a reduction in water pressure or loss of supply. Where development is in a bushfire prone area (even if there is access to reticulated water), it is recommended that the landowner consider providing an additional water supply for use by emergency services.

Where a landowner intends on staying to defend their property during a bushfire event, as identified in their Bushfire Survival Plan, it is recommended that pumping equipment separate to the electricity network be provided. The pumping equipment could be a diesel or petrol powered pump, or an electric pump if there is an onsite generator or backup power supply independent from electricity network grid.

It is recommended that combustion pumps should be a minimum 5hp or 3kW diesel or petrol powered pump and should be shielded against bushfire attack. Where an electric pump is used, a backup power supply independent from electricity network grid should be provided. A 3.7kw/12kw-h sized battery (14.8kw-h reserved solely for bushfire will power a 3.7kw system for 4 hours) with blackout protection or a generator should be provided.

E4 Strategic water supplies

Many local governments have a well-developed network of strategic water tanks for firefighting within their local government area. Given this, it is at the discretion of the local government to determine if the water supply within a locality, is sufficient to cater for an increasing population when a subdivision is proposed. Local governments are encouraged to work with their local emergency services to ensure the water needs for firefighting is understood.

Where a structure plan or subdivision proposes to create more than three but less than 24 lots, it is optional as to whether each lot is provided with a 10,000 litre tank or a strategic water tank is provided for the entire development. If 25 or more lots are proposed, then it is recommended that a 50,000 litre strategic water tank (for every 25 lots) is provided.

For every lot additional to the 25, it is at the discretion of the local government whether they require an additional strategic water tank or for each lot to be provided with a 10,000 litre tank. For example, 37 proposed lots require two strategic water tanks, or a 10,000 litre tank on each lot, or a combination of both with a strategic water tank and 12 proposed lots with a 10,000 litre tank on each lot. Where the local government, following consultation with the local emergency services, is of the opinion that a strategic water tank is unnecessary, a 10,000 litre standalone tank per lot can be provided.

A strategic water tank should be located no more than 10 minutes from the subject site (20-minute turnaround time). The turnaround time is the time it takes from a lot, to the water supply and return back to the lot, at legal road speeds. Where a strategic water tank has been provided at the subdivision stage and a development application is located within the 20-minute turnaround time of that (or another) strategic water source, then the decision-maker could remove the requirement for the provision of an additional water supply at the development application stage. Local government will need to consider whether the strategic water tank has the capacity to serve the lot identified in the development application i.e. what lots were identified at subdivision stage to be serviced by the strategic water tank. A landowner should enquire with their local government to determine whether a water supply on their lot will be required.

When there is fragmented ownership of a structure plan area, or when staging of a subdivision is to occur and the local government has determined that a strategic water tank is required, then the first stage should include arrangements for the installation of a water tank and the identification of land to be ceded to the local government authority (if applicable).

Element 4 Explanatory Notes

Where local planning scheme provisions provide for developer contributions for public infrastructure and the local government is supportive, then a cash-in lieu arrangement may be established for the provision of a strategic water tank.

Grouped dwellings may provide dedicated firefighting water supply in one standalone tank per lot or may provide one shared standalone tank with the accumulative amount of water needed, for the number of lots it will serve. For example, a development proposing three lots may either have three tanks of 10,000L (one per lot) or one tank with 30,000L (shared between three lots)

E4 Alternative water sources

A dam, river or other source may be considered a firefighting water source if it complies with DFES guidelines and it can be demonstrated that the water level will be maintained above the top of the highest fire brigade suction point in perpetuity, if it is expected that the water supply will be used by emergency services. Approval for the use of these types of water supplies are on a case by case basis and at the discretion of the decision maker, in consultation with emergency services and local government.

E4 Location of water tanks

A water tank should be located with consideration to surrounding vegetation and should avoid locations where the tank will be situated underneath existing vegetation or where vegetation will grow against or overhang the tank, as shown in Figure 30 below. Where a tank is located on the bushfire hazard side of a building, sufficient shielding for the protection of firefighters should be provided. In addition to the tank location, the fitting should be positioned and/or shielded from the bushfire hazard to allow access by emergency services. It is recommended that the fitting face away from the bushfire hazard and be within four metres of a hardstand area.



Figure 30: A good and bad example of landscaping around a water tank

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Appendix G Limitations

Scope of services

This report (“the report”) has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

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Environmental conclusions

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Document Status

Report version	Rev No.	Purpose	Author	Internal review	
				Name	Date
Draft Report	Rev A	For client review	C Turner	Linden Wears (BPAD 19809, Level 3)	28 November 2018
Final Report	Rev 0	For approval	C Turner	Linden Wears (BPAD 19809, Level 3)	30 November 2018
Final Report	Rev 1	For approval - updated in consideration of DFES feedback	C Turner	Linden Wears (BPAD 19809, Level 3)	2 August 2019
Final Report	Rev 2	For approval - updated in consideration of DFES comments	C Turner	Linden Wears (BPAD 19809, Level 3)	31 March 2020
Draft Report	Rev B	For client review - updated in consideration of revised Concept Plan and Guidelines Version 1.4	Louisa Robertson (BPAD 36748, Level 3)	Louisa Robertson (BPAD 36748, Level 3)	12 April 2022
Final Report	Rev 3	Revised final	Louisa Robertson (BPAD 36748, Level 3)	Linden Wears (BPAD 19809, Level 3)	19 May 2022
Final Report	Rev 4	Revised final	Louisa Robertson (BPAD 36748, Level 3)	Louisa Robertson (BPAD 36748, Level 3)	9 December 2022
Final Report	Rev 5	Minor revisions prior to lodgement	Louisa Robertson (BPAD 36748, Level 3)	Louisa Robertson (BPAD 36748, Level 3)	24 January 2023
Final Report	Rev 6	Minor revisions post lodgement	Louisa Robertson (BPAD 36748, Level 3)	Louisa Robertson (BPAD 36748, Level 3)	16 February 2023
Final Report	Rev 7	Revisions post SAT mediation/DFES referral	Louisa Robertson (BPAD 36748, Level 3)	Louisa Robertson (BPAD 36748, Level 3)	11 June 2024



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