


# Bushfire Safety

C O N S U L T I N G

## Bushfire Attack Level (BAL) Assessment Report

*Prepared for: Gold Right Pty Ltd*

*Site: West Karnup Subdivision Stages 2B & 2C  
Portion of Lot 806 Mandurah Road, Karnup  
City of Rockingham  
Western Australia*

CITY OF ROCKINGHAM  
TOWN PLANNING  
APPROVED  
APPROVAL DATED: 11/2/2015  
INITIALS: 

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Version 2 – February 2015



Report Version	Revision Number	Purpose	BSC Author	Submitted to Client	
				Form	Date
Draft	Rev 0.1	Internal Review	RC		25/01/2015
Final	1.0	Client Submission	RC	email	01/02/2015

*Disclaimer:*

*This report has been prepared in good faith and is derived from sources believed to be reliable and accurate at the time of publication. Nevertheless, this publication is distributed on the terms and understanding that the author is not responsible for results of any actions taken based on information in this publication or for any error in or omission from this publication.*

*Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains. The objective of the standard (AS 3959:2009) is 'to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes' (Standards Australia, 2009). Building to the standard (AS 3959:2009) does not guarantee a building will survive a bushfire.*

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- Appendix B: Exposed Lots Requiring Notification on Title

## ATTACHMENTS

- Attachment 1: Development Staging Plan (DPS 2014)

## EXECUTIVE SUMMARY

This Report provides an assessment of the Bushfire Attack Level (BAL) in accordance with AS 3959:2009 *Construction of Buildings in Bushfire Prone Areas* for West Karnup subdivision stages 2B & 2C in the City of Rockingham.

Seventeen residential lots on the western perimeter of the development stage are exposed to a Bushfire Attack Level (BAL) rating of BAL-12.5. Twenty residential lots on the northern perimeter of the development stage are currently exposed to a Bushfire Attack Level (BAL) rating of BAL-12.5. If the vegetation north of the site is removed or modified prior to the building licence stage then a BAL re-assessment is recommended to capture the change in bushfire threat levels. The proposed dwellings on the lots exposed to BAL-12.5 are predicted to be subject to primarily ember attack and this risk can be partially mitigated by constructing the dwellings to sections 3 and 5 in the Australian Standard (AS 3959-2009 *Construction of buildings in bushfire prone areas*).

If there is a bushfire within or near the site, constructing the identified dwellings to the relevant section in AS 3959-2009 will reduce the risk of ignition to the buildings.

***The BAL depicted within this report and mapping have been determined by an assessment of the site and the surrounding 100 metres in January 2015. It should be noted that conditions may change in the future and over time and this may result in a different BAL rating.***

## 1 INTRODUCTION

Bushfire Safety Consulting Pty Ltd has been engaged by Gold Right Pty Ltd to undertake a Bushfire Attack Level (BAL) assessment within the subdivision stages 2B and 2C. This assessment has been undertaken to satisfy the developer's responsibilities for subdivision within the LSP area as outlined in the endorsed FMP for the broader West Karnup LSP Area (attached is Attachment 1). The BAL assessment identifies the level of predicted exposure for proposed lots and the subsequent recommended construction standards for future dwellings. Exposed lots will require a Section 70A Notification on titles informing purchasers of the responsibilities of the FMP and of any bushfire construction standard or re-assessment requirements.

Subdivision stages 2B and 2C are entirely a residential development. Future development stages approved by the WAPC will each be provided with a separate BAL assessment before the creation of titles to ensure an accurate representation of the bushfire threat.

Subdivision Stages 2B and 2C are hereafter referred to as the 'site'. Table 1 specifies the site details and the site plan is attached in Attachment 1.

Table 1: Site Details

<b>Locality</b>	<b>City of Rockingham</b>
<b>Address</b>	West Karnup Subdivision Stages 2B and 2C (portion of Lot 806 Mandurah Road, Karnup)
<b>Fire Management Plan</b>	Bushfire Safety Consulting (2013)
<b>Endorsed Local Structure Plan</b>	West Karnup LSP
<b>Zoning</b>	Development
<b>Forest Danger Index</b>	80
<b>Site Inspection</b>	January, 2015

This BAL report assesses the application of AS 3959-2009 *Construction of Buildings in Bushfire Prone Areas* and relevant part of Appendix 1 of *Planning for Bushfire Protection Guidelines – Edition 2* (WAPC et al., 2010).

The proposal is to create 106 residential lots in the development including a centrally located public open space area.

## 2 METHODOLOGY AND ASSUMPTIONS

The Australian Standard for assessing the BAL and providing the detailed requirements for construction includes the version titled AS 3959-2009/Amendment 3-2011 *Construction of Buildings in Bushfire Prone Areas* (Standards Australia, 2011).

In addition, the WA method for determining the BAL, found in Appendix 1 of *Planning for Bushfire Protection Guidelines – Edition 2* (WAPC et al., 2010) is consistent with the methodology in AS 3959-2009.

AS 3959-2009 has six categories of Bushfire Attack Level, namely BAL-LOW, BAL-12.5, BAL19, BAL-29, BAL-40 and BAL-FZ. These categories are based on heat flux exposure thresholds. The method for determining the BAL involves a site assessment of vegetation and local topography. The assumed Fire Danger Index (FDI) for Western Australia is 80. The BAL identifies the appropriate construction standard that applies as a minimum standard in AS 3959-2009.

It is a legal requirement of each lot owner to comply with section 33 of the *Bush Fires Act 1958*. Specific responsibilities under this legislation are outlined in the City of Rockingham Fire Control Notice which can be downloaded at:

[http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD\\_IS\\_FIRECONTROLNOTICE2014\\_2015.pdf.aspx](http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD_IS_FIRECONTROLNOTICE2014_2015.pdf.aspx)

This assessment is undertaken on the basis that each lot owner's legal responsibilities will be achieved and maintained in perpetuity.

The BAL assessment involves an assessment of the vegetation, setback distance to classified vegetation and effective slope.

## 2.1 Vegetation Assessment

Vegetation survey and mapping of the site has been undertaken as follows:

- Aerial photographic interpretation to identify broad vegetation types and boundaries
- Field assessment to confirm vegetation classes, condition, fuel structure and land-use.

## 2.2 Setback Distance to Classified Vegetation

The horizontal setback distance assessment has been undertaken as follows:

- Aerial photographic interpretation and analysis of scaled digital map
- Field assessment and setback measurement using a measuring wheel.

## 2.3 Effective Slope Assessment

The effective slope assessment has been undertaken as follows:

- Aerial photographic interpretation and analysis of digital contour maps
- Field assessment and slope measurements using a clinometer.

## 3 SITE ASSESSMENT

A site assessment of the vegetation, setback distance and slope was undertaken in accordance with *Planning for Bushfire Protection Guidelines – Edition 2* (WAPC et al., 2010) and AS 3959-2009. The assessment criteria and outcomes are summarised in Appendix A.

### 3.1 Vegetation Assessment

The site is entirely cleared of vegetation, all of the original vegetation has been removed during initial earthworks for the residential development. The site survey undertaken for this assessment identified three vegetation classes located west of Mandurah Road which qualify as classified vegetation according to AS3959-2009.

A strip of woodland trees is located west of Mandurah Road Reserve which consists of Eucalypt overstorey vegetation with elevated scrub and shrubland fuels and a grassland understorey (Figure 1). Further west and upslope from the woodland is scrub and shrubland vegetation on the dune crests and swales. The grassland vegetation within the Mandurah Road reserve is managed by Main Roads and the strip immediately adjacent to the acoustic wall of the development will be managed by Main Roads by slashing the grass and reinstating the firebreak. This has been confirmed by Main Roads.

Temporary vegetation and bushfire fuels occur north of the site on Lot 3 Mandurah Road. The vegetation consists of degraded grassland (Figure 3), scrub vegetation dominated by Acacia species (Figure 4) and areas of shrubland where heath vegetation averages 1 metre in height (Figure 5). All of the vegetation north of the site poses a threat to future development, however the entire site is identified for residential development in the approved Local Structure Plan. In this context it is likely that the vegetation will be removed in the future and exposed lots are recommended to have BAL rating re-assessed at the time of building license application if this has occurred. This will ensure the BAL rating reflects the level of threat at the time of construction.

Refer to Table 2 and Appendix A for details and summary of the vegetation assessment.





*Figure 1: Strip of Woodland vegetation west of Mandurah Road*



*Figure 2: Grassland vegetation in Mandurah Road Reserve managed by Main Roads of WA*



*Figure 3: Grassland vegetation north of the site*



*Figure 4: Scrub vegetation north of the site*



*Figure 5: Shrubland vegetation north of the site*

### 3.2 Setback Distance

The woodland vegetation west of the site is setback 78 – 100 metres from the residential lots. The grassland, scrub and shrubland vegetation north of the site is setback 41-100 metres from the site. Refer to Table 2 for summary of setback distance assessment.

### 3.3 Effective Slope Assessment

The woodland vegetation west of the site has no effective slope. One area of scrub north of the site has an effective downslope of 0-5 degrees otherwise all areas of shrubland, grassland and remaining areas of scrub have an effective upslope of 0-5 degrees. Refer to Table 2 for summary of effective slope assessment.

*Table 2: Vegetation, effective slope and setback distance assessment*

Direction from Site	Vegetation Classification	Effective Slope	Setback Distance
North	Scrub (temporary)	Downslope 0-5 degrees	58-100 metres
North	Scrub (temporary)	Upslope 0-5 degrees	41-100 metres
North	Shrubland (temporary)	Upslope 0-5 degrees	41-100 metres
East	Grassland > 50 metres from site Development Area – Mineral Earth Low Threat Vegetation <sup>1</sup>	Upslope 0-5 degrees	>50 metres
South	Development Area – Mineral Earth Low Threat Vegetation <sup>1</sup>	N/A	N/A
West	Woodland	Flat	78-100 metres

*Note: 1. Section 2.2.3.2 of AS 3959-2009 classifies Low Threat Vegetation where the vegetation is one or a combination of the following:*

- a) Vegetation of any type that is more than 100 m from the site;*
- b) Single areas of vegetation less than 1 ha in area and now within 100m of other areas of vegetation being classified;*
- c) Multiple areas of vegetation less than 0.25 ha and not within 20 m of the site, or each other;*
- d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified;*
- e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops; and*
- f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.*

## 4 DETERMINATION OF BUSHFIRE ATTACK LEVEL ASSESSMENT

The results from this methodology were used to calculate the BAL rating for the proposed lots using Table 2.4.3 in AS 3959-2009. The results of this BAL Assessment are outlined in Table 3.



*Table 3: Bushfire Attack Level assessment for the site*

Setback Distance (m)	Classified Vegetation	Effective Slope (°)	BAL Rating
78-100 metres	Woodland	Flat	BAL-12.5
58-100 metres	Scrub	Downslope 0-5	BAL-12.5
41-100 metres	Scrub	Upslope 0-5	BAL-12.5
41-100 metres	Shrubland	Upslope 0-5	BAL-12.5
>50 metres	Grassland	Upslope 0-5	BAL-LOW

## 5 CONCLUSION, SHIELDING AND RECOMMENDATION S

Seventeen residential lots on the western perimeter of the development stage are exposed to a permanent Bushfire Attack Level (BAL) rating of BAL-12.5. Twenty residential lots on the northern perimeter of the development stage are currently exposed to a Bushfire Attack Level (BAL) rating of BAL-12.5. If the vegetation north of the site is removed or modified prior to the building licence stage then a BAL re-assessment is recommended to capture the change in bushfire threat levels. The existing BAL ratings are spatially shown in Appendix A.

The construction elements on future dwellings located on lots are expected to be exposed to ember attack and a radiant heat flux of not greater than 12.5 kW/m<sup>2</sup>. The recommended construction section in (AS 3959-2009) Construction of Buildings in Bushfire Prone Areas is Section 3 and 5 (Table 4).

The proposed dwellings are not shielded from the predicted ember attack because embers cannot be shielded by other structures, they blow on the wind unlike radiant heat which travels in straight lines.

These exposed lots (as highlighted in Appendix B) will require a section 70A Notification on title informing purchasers of the responsibilities of the FMP and the bushfire construction standards or requirement for re-assessment at building licence stage.

*Table 4: Heat flux exposure thresholds, predicted bushfire attack mechanisms and recommended construction standard*

BAL	Heat flux thresholds	Description of predicted bushfire attack and levels of exposure	Recommended Construction Section in AS 3959-2009
BAL-12.5	<12.5KW/m <sup>2</sup>	Ember attack	3 and 5

## 6 REFERENCES

Bushfire Safety Consulting (2013) Fire Management Plan Lots 3, 805 & 806 Mandurah Road, Karnup

City of Rockingham Fire Control Notice (downloadable at:  
[http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD\\_IS\\_FIRECONTROLNOTICE2014\\_2015.pdf.aspx](http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD_IS_FIRECONTROLNOTICE2014_2015.pdf.aspx))

Standards Australia. (2009). AS 3959-2009 *Construction of buildings in bushfire-prone areas*.

Standards Australia. (2011). AS 3959-2009/Amendment 3-2011 *Construction of buildings in bushfire-prone areas*.

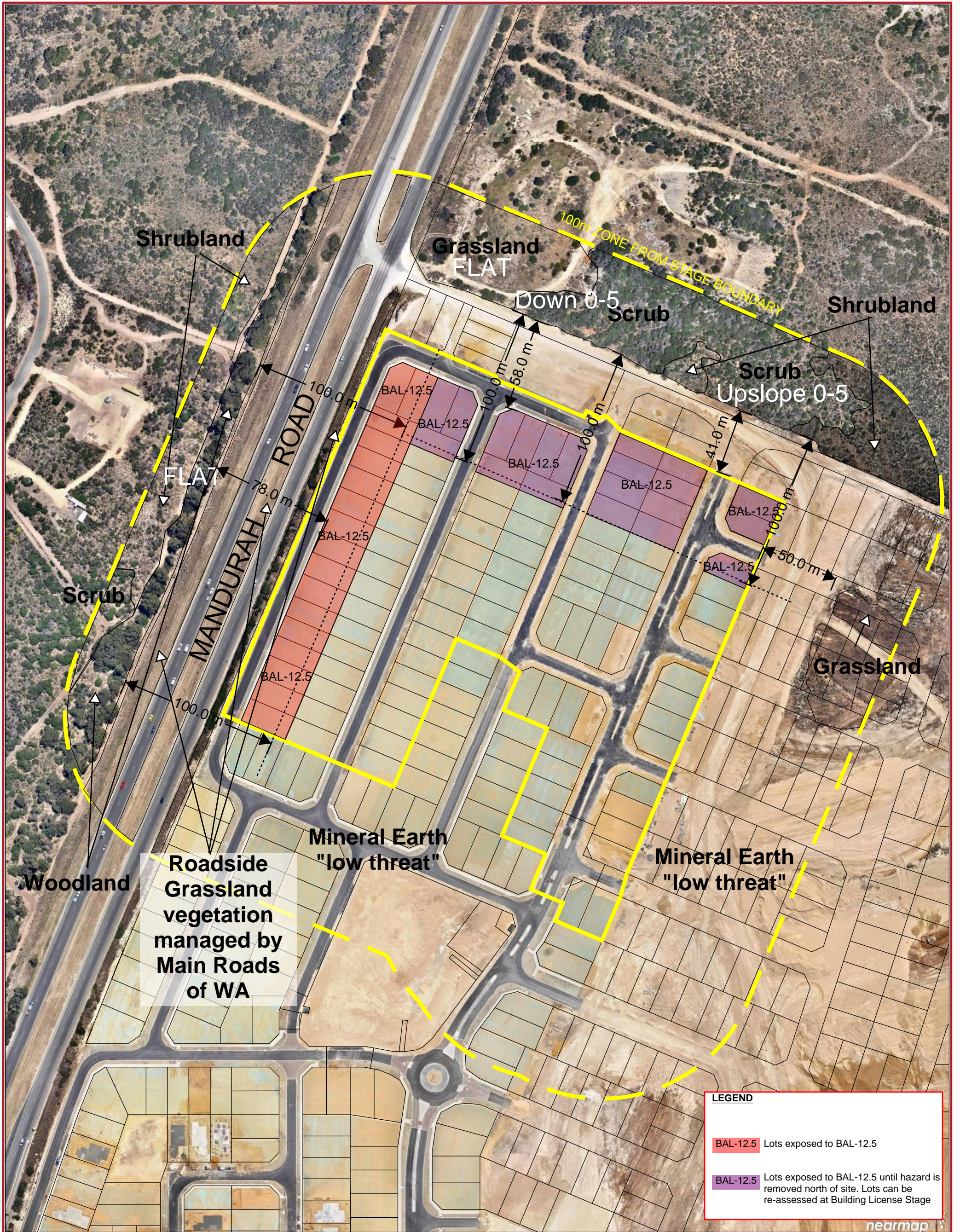
Western Australian Planning Commission (WAPC), FESA and Department of Planning and Infrastructure. (2010). *Planning for Bush Fire Protection Guidelines - Edition 2*. Western Australian Planning Commission, Perth.



# APPENDICES

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LEGEND	
<span style="background-color: red; color: white; padding: 2px;">BAL-12.5</span>	Lots exposed to BAL-12.5
<span style="background-color: purple; color: white; padding: 2px;">BAL-12.5</span>	Lots exposed to BAL-12.5 until hazard is removed north of site. Lots can be re-assessed at Building License Stage

## Appendix A BAL Assessment Criteria & Outcome

LOTS 805 & 806 MANDURAH ROAD  
KARNUP (STAGES 2B & 2C)  
City of Rockingham

### LEGEND

SUBJECT LAND.....

SOURCE:  
PHOTOGRAPHY FROM NEARMAP

PREPARED FOR:  
GOLD RIGHT PTY LTD



NORTH



NOT TO SCALE @ A3  
DATE: JANUARY 2015  
Base mapping supplied by  
Development Planning Strategies

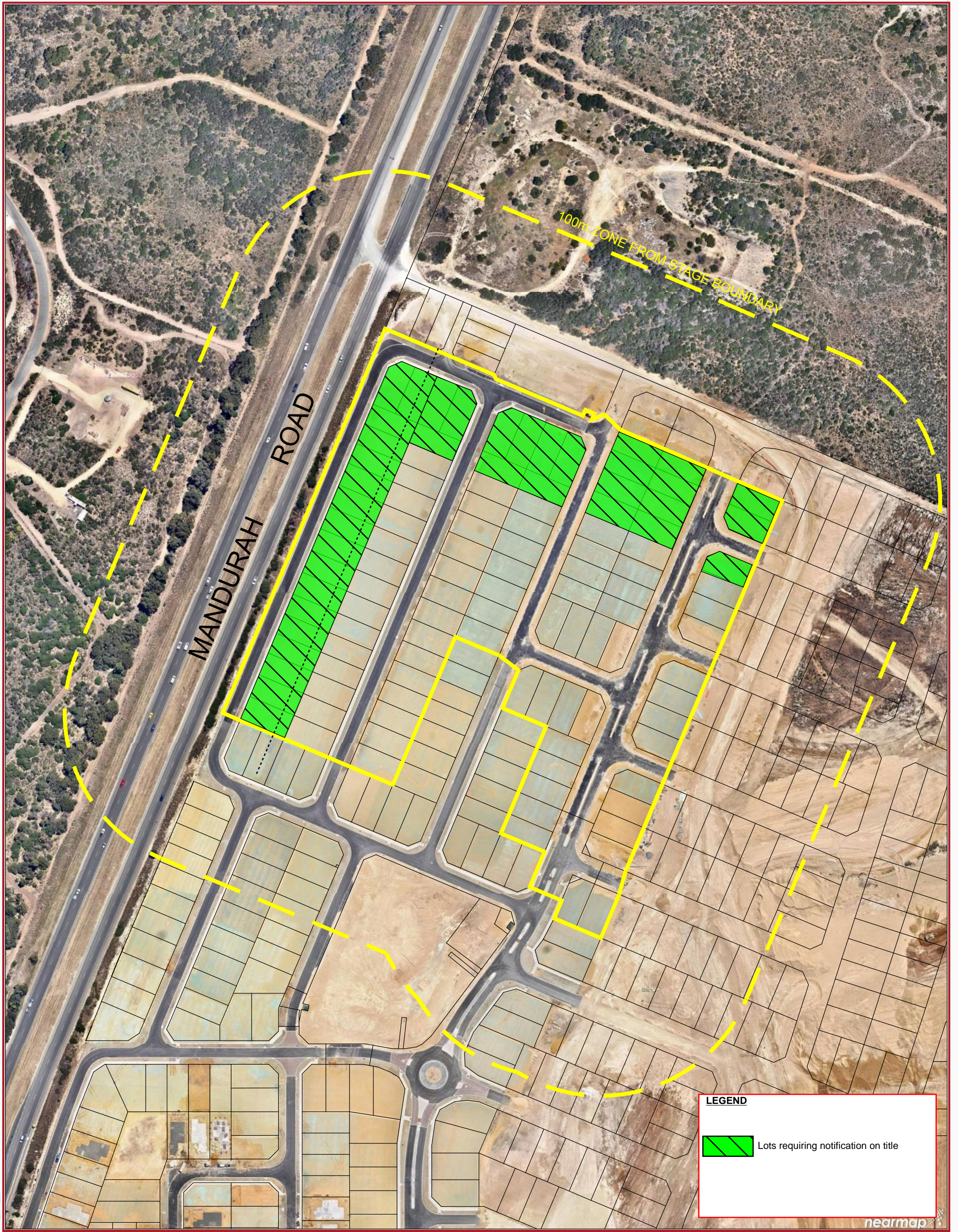
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CONSULTING


**BUSHFIRE SAFETY CONSULTING**

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**LEGEND**

 Lots requiring notification on title

**Appendix B**  
**Lots Requiring Notification on Title**


LOTS 805 & 806 MANDURAH ROAD  
 KARNUP (STAGES 2B & 2C)  
 City of Rockingham

**LEGEND**

SUBJECT LAND..... 

SOURCE:  
 PHOTOGRAPHY FROM NEARMAP

PREPARED FOR:  
 GOLD RIGHT PTY LTD

  
 NORTH

0 20 40 60 80 100m

NOT TO SCALE @ A3  
 DATE: JANUARY 2015  
 Base mapping supplied by  
 Development Planning Strategies

**Bushfire Safety**  
 CONSULTING

**BUSHFIRE SAFETY CONSULTING**

PO BOX 84 STONEVILLE WA 6081  
 Mbl: 0429 949 262  
 www.bushfiresafety.net





# ATTACHMENTS

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**LEGEND:**

Staging Boundary

**RESIDENTIAL LOT SUMMARY:**

STAGE 1	
8.5m	-
10m	9
13m	49
15m	80
17m	13
18m	-
<b>GH</b>	2
<b>Dwellings</b>	9
<b>TOTAL LOTS</b>	<b>153</b>
<b>TOTAL DWELLINGS</b>	<b>160</b>

STAGE 2	
8.5m	-
10m	24
13m	56
15m	78
17m	3
18m	-
<b>GH</b>	1
<b>Dwellings</b>	2
<b>TOTAL LOTS</b>	<b>161</b>
<b>TOTAL DWELLINGS</b>	<b>162</b>

STAGE 3	
8.5m	-
10m	6
13m	49
15m	73
17m	36
18m	-
<b>GH</b>	1
<b>Dwellings</b>	4
<b>TOTAL LOTS</b>	<b>165</b>
<b>TOTAL DWELLINGS</b>	<b>168</b>

STAGE 4	
8.5m	-
10m	-
13m	75
15m	64
17m	28
18m	2
<b>GH</b>	-
<b>Dwellings</b>	-
<b>TOTAL LOTS</b>	<b>169</b>
<b>TOTAL DWELLINGS</b>	<b>169</b>

STAGE 5	
8.5m	4
10m	2
13m	43
15m	59
17m	22
18m	-
<b>GH</b>	-
<b>Dwellings</b>	-
<b>TOTAL LOTS</b>	<b>130</b>
<b>TOTAL DWELLINGS</b>	<b>130</b>

STAGE 6	
8.5m	-
10m	60
13m	62
15m	60
17m	35
18m	11
<b>GH</b>	-
<b>Dwellings</b>	-
<b>TOTAL LOTS</b>	<b>228</b>
<b>TOTAL DWELLINGS</b>	<b>228</b>

STAGE 7	
8.5m	-
10m	51
13m	-
15m	-
17m	-
18m	-
<b>GH</b>	2
<b>Dwellings</b>	43
<b>TOTAL LOTS</b>	<b>53</b>
<b>TOTAL DWELLINGS</b>	<b>94</b>

OVERALL	
8.5m	4
10m	152
13m	334
15m	413
17m	137
18m	13
<b>GH</b>	6
<b>Dwellings</b>	58
<b>LOT 3 TOTAL LOTS</b>	<b>111</b>
<b>TOTAL LOTS</b>	<b>1170</b>
<b>TOTAL DWELLINGS</b>	<b>1222</b>

**LOT SUMMARY**

Lots 805 & 806 Mandurah Road, KARNUP

for: Gold Right Pty Ltd.

**NORTH**

Scale 1: 6000 @ A3

COMPILED: DPS, MAPS, JDSI	DRAWN BY: NM
DATE: 08/02/2013	REVISED: 19/02/2014
GRID: PCG 94	DATUM: AHD
DRAWING NUMBER: GOGKA-1-008d	JOB CODE: GOGKAST1
FILE ID: M:\GOGKA\BASE\FEASIBILITY & CONCEPT PLANNING\GOGKA-1-008d.dgn	



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