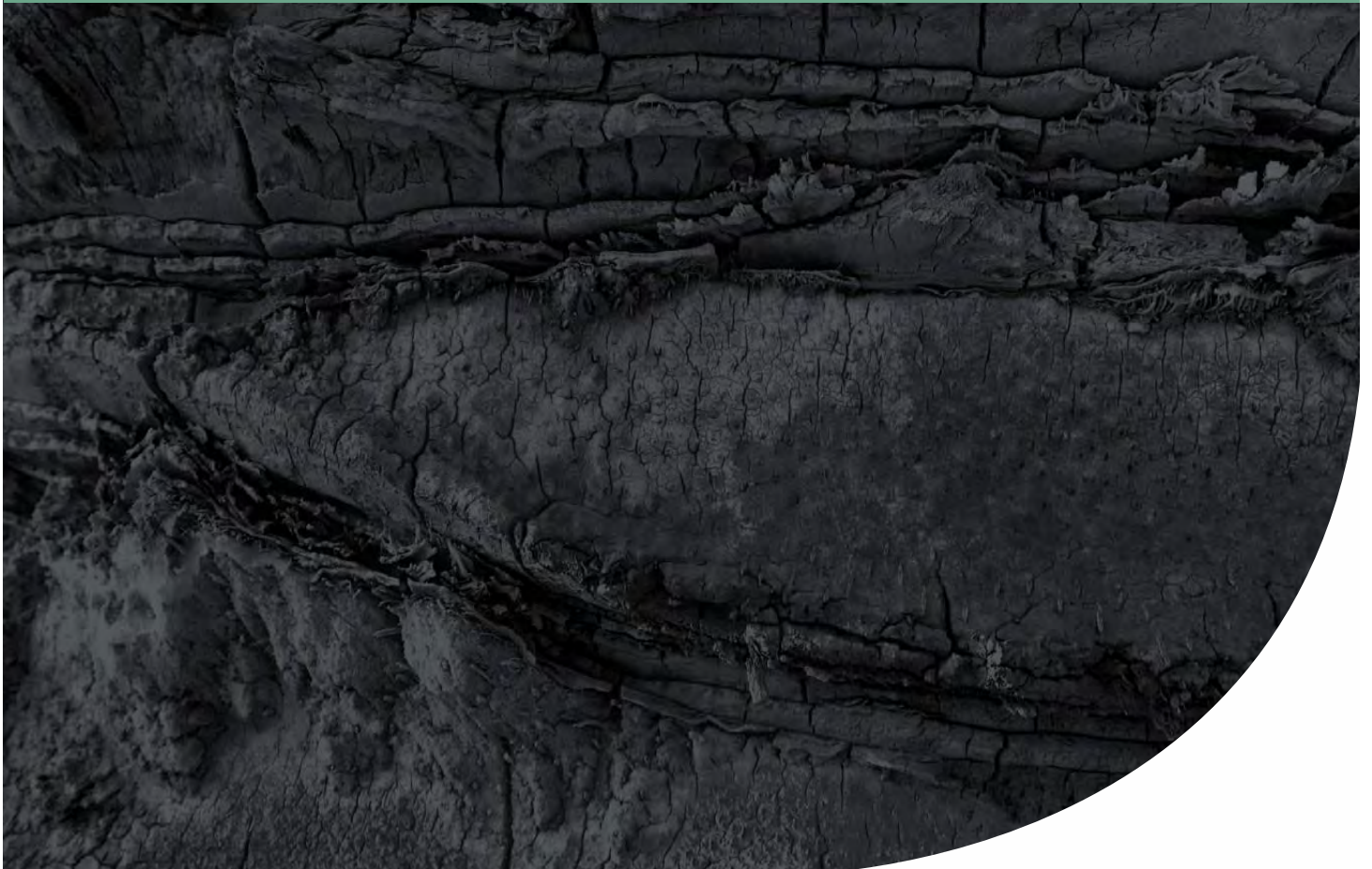


# Bushfire Management Plan

## North Harrisdale Structure Plan

Project No: EP20-127(11)

**Prepared for Yolk Property Group Pty Ltd  
August 2023**



# Bushfire Management Plan

## North Harrisdale Structure Plan



## Document Control

Doc name: Bushfire Management Plan North Harrisdale Structure Plan					
Doc no.: EP20-127(11)—010B HPB					
Version	Date	Author		Reviewer	
1	July 2021	Heidi Becker	HPB	Kirsten Knox	KK
		Dana Elphinstone	DAE		
	Report issued for client review.				
A	May 2022	Bianca Bertelli	BRB	Dana Elphinstone	DAE
	Updated in response to final structure plan layout				
B	August 2023	Daniel Bussell	DVB	Kirsten Knox	KK
				Anthony Rowe	AJR
	Updated to address Western Australian Planning Commission (WAPC) modification request and change to structure plan layout				

### Disclaimer:

This document has been prepared in good faith and is derived from information sources believed to be reliable and accurate at the time of publication. Nevertheless, it is distributed on the terms and understanding that the author is not liable for any error or omission in the information sources available or provided to us, or responsible for the outcomes of any actions taken based on the recommendations contained herein. It is also expected that our recommendations will be implemented in their entirety, and we cannot be held responsible for any consequences arising from partial or incorrect implementation of the recommendations provided.

This document has been prepared primarily to consider the layout of development and/or the appropriate building construction standards applicable to development, where relevant. The measures outlined are considered to be prudent minimum standards only based on the standards prescribed by the relevant authorities. The level of bushfire risk mitigation achieved will depend upon the actions of the landowner or occupiers of the land and is not the responsibility of the author. The relevant local government and fire authority (i.e. Department of Fire and Emergency Services or local bushfire brigade) should be approached for guidance on preparing for and responding to a bushfire.

Notwithstanding the precautions recommended in this document, it should always be remembered that bushfires burn under a wide range of conditions which can be unpredictable. An element of risk, no matter how small, will always remain. The objective of the Australian Standard AS 3959-2018 is to "prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes" (Standards Australia 2018). Building to the standards outlined in AS 3959 does not guarantee a building will survive a bushfire or that lives will not be lost.

© 2023 Emerge Associates All Rights Reserved. Copyright in the whole and every part of this document belongs to Emerge Associates and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or in or on any media to any person without the prior written consent of Emerge Associates.

# Bushfire Management Plan

## North Harrisdale Structure Plan



## Executive Summary

Yolk Property Group Pty Ltd (the proponent) are progressing the North Harrisdale Structure Plan to develop Lots 601 to 603 Balannup Road and Lots 200 to 202 Skeet Road, Harrisdale (herein referred to as the 'site') for residential and commercial purposes. The site consists of an area of approximately 20.4 ha in size and is located within the City of Armadale. It is bounded by Ranford Road to the north-east, Skeet Road to the south-east, Reilly Road to the south-west and Balannup Road to the north-west.

The site is currently identified as a 'bushfire prone area' under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2019). The identification of the site within an area declared as bushfire prone necessitates a further assessment of the determined bushfire risk affecting the site (in accordance with *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas* (AS 3959)). The assessment is required to demonstrate satisfactory compliance of the proposal with the policy measures described in *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and its associated *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

The purpose of SPP 3.7 and its policy intent is to implement effective risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure through effective risk-based land use planning. Importantly, it is a risk-based approach requiring a methodical approach to identify and evaluate the hazards and provide the treatments to ameliorate these hazards to an acceptable level. SPP3.7 requires that the determining authority consider the precautionary principle (clause 6.11 in SPP 3.7) and they must be satisfied that the potential for significant adverse impacts can be adequately reduced or managed.

This Bushfire Management Plan (BMP) examines the various responses to the identified bushfire risk (following development) that will make the ultimate use of the land suitable for its intended purpose and achieve compliance with the policy intent. The policy intent can be met by demonstrating compliance with the policy objectives, and policy measures informed by the bushfire protection criteria in the Guidelines and satisfaction of its four elements. As part of this, a bushfire attack level (BAL) assessment has been undertaken to determine the associated bushfire risk, the applicable BAL ratings (if any), and in turn the building siting and construction response that will achieve compliance with the bushfire protection criteria and satisfy the precautionary principle.

As part of assessing the long-term bushfire risk to the site, the vegetation within the site and 150 m of the site has been classified in accordance with AS 3959. The following bushfire hazards were identified in the post-development scenario:

- Forest (Class A) vegetation, largely associated with remnant vegetation within the wetland in the southern public open space (POS) and its associated buffer, as well as forest vegetation to the north east of the site which is considered a temporary hazard.
- Woodland (Class B) vegetation within landholdings north west and east of the site. Vegetation to the east is considered a temporary hazard.
- Scrub (Class D) vegetation associated with the wetland in the north-western and north-eastern POS (and associated buffers), as well as within landholdings to the north, east, south and west

## Bushfire Management Plan

### North Harrisdale Structure Plan



outside the site. This vegetation largely is associated with remnant vegetation within Balannup Lake.

- Grassland (Class G) vegetation identified within the north and south-west portions of the site, largely associated with the portions of POS that are outside the wetland and wetland buffers. The City of Armadale have not committed to managing POS to achieve low threat, and therefore all areas of POS assume classified vegetation is present.

The outcomes of this BMP demonstrate that as development progresses, it will be possible for an acceptable solution to be adopted for each of the applicable bushfire protection criteria outlined in the Guidelines. Future detailed design at subdivision stage will be required to demonstrate how the acceptable solutions of the bushfire protection criteria will be achieved. This includes:

- **Location:** future habitable buildings can be located in an area that will, on completion, be subject to a low or moderate bushfire hazard.
- **Siting and Design:** The site accommodates a suitable asset protection zone (APZ) for all proposed development cells generally through the provision of a perimeter public road network, enabling the majority of lots to achieve BAL-29 or less. Portions of the site in the north-east will have areas subject to BAL-40 or BAL-FZ (predominantly within the commercial area) as result of temporary bushfire hazards that will be removed when development in the broader area is progressed. This can be managed as part of staging of development. In the central-southern portion of the site, surrounding the POS, BAL-40 (and a small area of BAL-FZ along the western boundary) extends into the development cells as a result of retained vegetation and/or assumption around future treatment (assumed to be 'forest'). Development will be separated from classified vegetation in the POS by a public road interface, and it would be possible to achieve BAL-29 with a 6 m front lot setback for lots to the west of the POS and a 1 m front lot setback for lots to the east. This can be considered when lot layout is addressed at future subdivision stages and through use of local development plans.
- **Vehicular Access:** the proposed structure plan provides for an interconnected road network within the site that will utilise existing and future connections to the existing public road network, including connections to Balannup Road to the north and Skeet Road to the south (and the future Reilly Road to the west), providing egress opportunities in multiple directions. Interim access measures (such as temporary turn around areas or emergency access ways) may be required at subdivision stage to facilitate sufficient access at all stages of subdivision development.
- **Water:** the development will be provided with a permanent and reticulated water supply to support onsite firefighting requirements.

The management/mitigation measures to be implemented through the proposed structure planning and development of the site, as discussed in this BMP, demonstrate that the acceptable solutions and/or intent of each element can be met. Staging of development will need to consider the impacts of temporary vegetation and the associated BAL ratings on setback requirements, to ensure BAL-29 or less is able to be achieved. Having regard to clause 6.11 of SPP 3.7, the precautionary principle has been satisfied. A BMP will be prepared to support subdivision of the site and will address the specifics of detailed design, including ensuring provision for separation to achieve BAL-29 or less and vehicle access.

# Bushfire Management Plan

## North Harrisdale Structure Plan



## Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Aim of this report .....	2
1.3	Statutory policy and framework .....	2
1.4	Description of the proposed development .....	3
1.5	Description of land characteristics .....	4
<b>2</b>	<b>Environmental Considerations .....</b>	<b>5</b>
2.1	Native vegetation – modification and clearing .....	7
2.2	Revegetation and landscape plans .....	7
<b>3</b>	<b>Bushfire Assessment Results .....</b>	<b>8</b>
3.1	Bushfire attack level (BAL) assessment .....	8
3.1.1	Assessment inputs .....	8
3.1.1.1	Post development assumptions .....	11
3.1.2	Assessment outputs .....	13
<b>4</b>	<b>Identification of Bushfire Hazard Issues .....</b>	<b>15</b>
<b>5</b>	<b>Assessment Against the Bushfire Protection Criteria .....</b>	<b>16</b>
5.1	Additional management strategies .....	22
5.1.1	Future approval considerations .....	22
5.1.2	Landscape management .....	22
5.1.2.1	Within the site .....	22
5.1.2.2	Surrounding the site .....	23
5.1.3	City of Armadale Fire Break Notice .....	23
5.1.4	Vulnerable or high-risk land uses .....	23
5.1.5	Public education and preparedness .....	24
<b>6</b>	<b>Responsibilities for Implementation and Management of Bushfire Measures .....</b>	<b>25</b>
<b>7</b>	<b>Applicant Declaration .....</b>	<b>26</b>
7.1	Accreditation .....	26
7.2	Declaration .....	26
<b>8</b>	<b>References .....</b>	<b>27</b>
8.1	General references .....	27
8.2	Online references .....	27

## List of Tables

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases) .....	6
Table 2: Pre-development AS 3959 vegetation classification (refer to <b>Figure 2</b> ) .....	1
Table 3: Summary of the assumed post-development vegetation classification and associated effective slope within the site and 150 m in accordance with Table 2.5 (AS3959) .....	12
Table 4: Setback distances based on post-development vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment .....	14
Table 5: Summary of bushfire protection criteria and compliance statement .....	17
Table 6: Responsibilities for the implementation of this BMP .....	25

# Bushfire Management Plan

## North Harrisdale Structure Plan



## List of Plates

Plate 1: Areas within and surrounding the site identified as ‘bushfire prone areas’ (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).....	1
Plate 2: Metropolitan Region Scheme zones and reserves within and surrounding the site.....	3
Plate 3: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007) .....	9

## Figures

Figure 1: Site Location and Topographic Contours
Figure 2: Existing Site Conditions – AS 3959 Vegetation Classifications
Figure 3: Existing Site Conditions – Bushfire Hazard Rating
Figure 4: Post Development Conditions – AS 3959 Vegetation Classifications
Figure 5: Post Development Conditions – Effective Slope
Figure 6: Bushfire Attack Level Contours
Figure 7: Vehicle Access Plan

## Appendices

### Appendix A

Structure Plan

### Appendix B

Landscape Report

# Bushfire Management Plan

## North Harrisdale Structure Plan



## List of Abbreviations

Table A1: Abbreviations – General terms

General terms	
AHD	Australian Height Datum
AS	Australian Standard
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
CCW	Conservation category wetland
EEP	Emergency Evacuation Plan
ESL	Emergency Services Levy
FDI	Fire Danger Index
FZ	Flame Zone
POS	Public open space
REW	Resource enhancement wetland

Table A2: Abbreviations – Organisations

Organisations	
DBCA	Department of Biodiversity Conservation and Attractions
DoW	Department of Water (now known as Department of Water and Environment Regulation)
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
OBRM	Office of Bushfire Risk Management
SES	State Emergency Services
WAPC	Western Australian Planning Commission

Table A3: Abbreviations – Legislation and policies

Legislation	
Guidelines	Guidelines for Planning in Bushfire Prone Areas version 1.4 (DPLH & WAPC 2021)
SPP 3.7	State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015)

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table A4: Abbreviations – Planning and building terms

Planning and building terms	
AS 3959	<i>Australian Standard 3959-2018 Construction of buildings in bushfire prone areas</i>
MRS	Metropolitan Region Scheme
TPS	Town Planning Scheme

# Bushfire Management Plan

## North Harrisdale Structure Plan



## 1 Introduction

### 1.1 Background

Yolk Property Group Pty Ltd (the proponent) are progressing the North Harrisdale Structure Plan in order to develop Lots 601 to 603 Balannup Road and Lots 200 to 202 Skeet Road, Harrisdale (herein referred to as the 'site') for residential and commercial purposes, as shown in the attached structure plan provided in **Appendix A**. The site is shown in **Figure 1** and consists of an area of approximately 20.4 ha in size and is located within the City of Armadale. It is bounded by Ranford Road to the north-east, Skeet Road to the south-east, Reilly Road to the south-west and Balannup Road to the north-west.

The site is currently identified as a 'bushfire prone area' under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2019) and is shown in **Plate 1** below. The identification of an area within a declared bushfire prone area necessitates a further assessment of the bushfire risk and suitability of the proposed development to be undertaken in accordance with *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

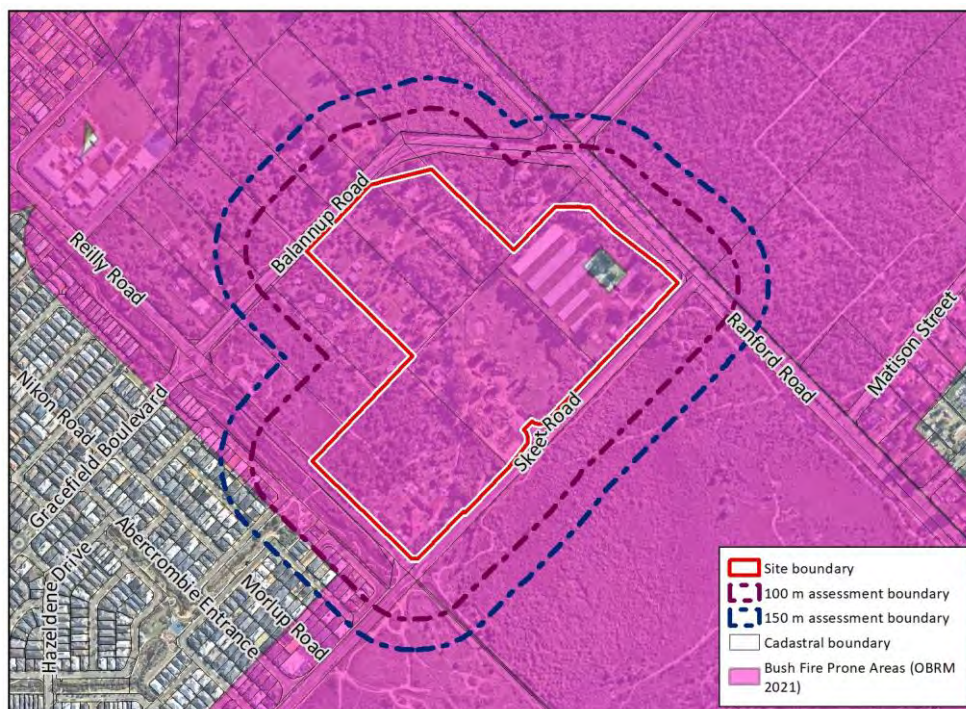


Plate 1: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 1.2 Aim of this report

The aim of this BMP is to assess bushfire hazards within the site and nearby areas and ensure that the threat posed by any identified hazards can be appropriately mitigated and managed and demonstrate satisfaction of clause 6.11 of SPP 3.7 the precautionary principle. It has been prepared to support the proposed structure plan for the site and addresses the requirements of SPP 3.7 (WAPC 2015), the Guidelines (DPLH & WAPC 2021) and *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas* (AS 3959) (Standards Australia 2018). The document provides an assessment of the general bushfire management strategies to be considered as part of the future residential development within the site and includes:

- Overview of the proposed development (see **Section 1.4**).
- An assessment of the existing classified vegetation in the vicinity of the site (within 150 m) and consideration of bushfire hazards that will exist in the post-development scenario (**Section 3**).
- Commentary on how future development can achieve the bushfire protection criteria outlined within the Guidelines (**Section 5**).
- An outline of the roles and responsibilities associated with implementing this BMP (see **Section 6**).

## 1.3 Statutory policy and framework

The following key legislation, policies and guidelines are relevant to the preparation of a bushfire management plan:

- *Fire and Emergency Services Act 1998*
- *Bush Fires Act 1954*
- *Planning and Development Act 2005* and associated regulations
- *Building Act 2011* and associated regulations
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015)
- *Guidelines for Planning in Bushfire Prone Areas*, Version 1.4 (DPLH & WAPC 2021)
- *Australian Standard AS 3959 – 2018 Construction of buildings in bushfire prone areas* (Standards Australia 2018).

A Bushfire Management Plan was previously prepared by Emerge Associates (2020) to support the Metropolitan Region Scheme (MRS) amendment of the site. The scheme amendment was to lift the 'Urban Deferred' zone in order to facilitate future residential subdivision and development of the site. As part of the lifting of the 'Urban Deferred' zone, the concurrent rezoning of the affected land under the provisions of the City of Armadale's Town Planning Scheme No. 4 to 'Development' zone was also proposed. The outcomes of the previous assessment, in particular assumptions about the future treatment of public open space have been considered as part of this assessment.

# Bushfire Management Plan

## North Harrisdale Structure Plan



### 1.4 Description of the proposed development

A structure plan has been prepared for the site and is provided in **Appendix A**. The proposed structure plan for the site will facilitate the future subdivision and development of the site to support residential and commercial land uses, and will include:

- Development cells proposed for residential purposes, with an average lot area of 350-380 m<sup>2</sup>.
- An area proposed for commercial purposes in the north-eastern portion of the site.
- Three areas of public open space (POS) aligned with supporting retention of a conservation category wetland (CCW) and two resource enhancement wetlands (REW) and their associated buffers.
- A small portion of an easement for Western Power powerlines, extending through the western portion of the site.
- An interconnected public road network.

The entire site is currently zoned 'Urban' under the Metropolitan Region Scheme (MRS) (as shown in **Plate 2**) and 'general rural' under the City of Armadale's Town Planning Scheme (TPS) No.4 (and is in the process of being rezoned to align with the MRS).

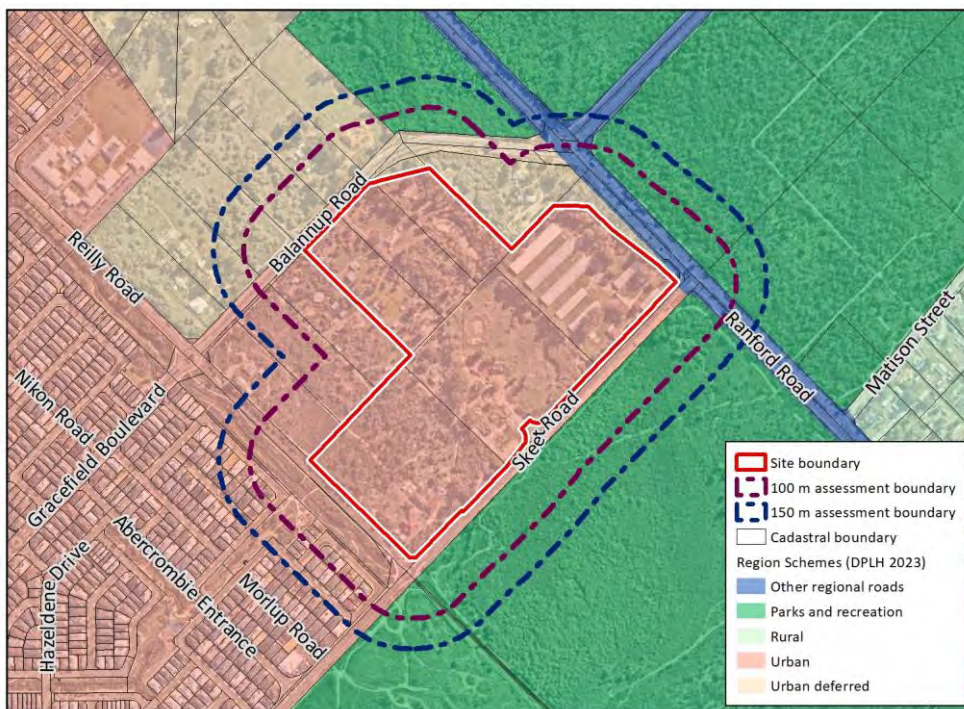


Plate 2: Metropolitan Region Scheme zones and reserves within and surrounding the site.

## Bushfire Management Plan

### North Harrisdale Structure Plan



#### 1.5 Description of land characteristics

Topography of the site is relatively flat with elevation ranging from 21 m Australian height datum (m AHD) to 23 m AHD across the site (DoW 2008). It is noted that there are several elevated areas with an elevation up to 24 m AHD just outside the site boundary, perpendicular to Skeet Road on the western boundary and along Ranford Road to the east as shown on **Figure 1**.

Much of the site has been subject to considerable historical disturbance and comprises cleared land and planted non-native vegetation, particularly in the eastern portion. The western half of the site tends to comprise more intact native vegetation. The eastern portion is slightly lower lying than the western portion and some areas showed evidence of periods of inundation.

The general locality surrounding the site is characterised by residential land uses associated with the suburb of Harrisdale. The land uses surrounding the site include:

- Bush Forever Site No. 413 (Balannup Lake and adjacent bushland, Southern River/Forrestdale), reserved 'Parks and Recreation' under the MRS, and Ranford Road to the north.
- Bush Forever Site No. 342 (Anstey/Keane Dampland and adjacent bushland, Forrestdale) located to the south and east.
- Large rural residential lots to the immediate west, with existing residential development zoned 'Urban' under the MRS further to the west.
- Large rural residential lots and Balannup Road to the north-west.

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 2 Environmental Considerations

In accordance with the *Bushfire Management Plan – BAL Contour* template prepared by Department of Planning, Lands and Heritage (DPLH) (2018), this BMP has considered whether there are any environmental values that may require specific consideration through either protection, retention or revegetation. To support this, a review of publicly available databases, as well as site specific information (where available) has been undertaken, with particular reference to the Shared Location Information Platform (SLIP) databases.

A number of site-specific environmental investigations and surveys were undertaken to support the proposed development of the site, these investigations include:

- *Basic Fauna and Targeted Black Cockatoo Assessment – Lots 600-606 Balannup Road and 200-202 Skeet Road, Harrisdale (Emerge Associates 2021a)*
- *Environmental Assessment and Management Strategy – North Harrisdale Structure Plan (Emerge Associates 2022)*
- *Spring Flora and Vegetation Assessment – Lots 600 – 606 Balannup Road and 200 – 202 Skeet Road, Harrisdale (Emerge Associates 2021b)*

A review of historical aerial images available from 1953 onwards shows the site supported undisturbed remnant native vegetation until 1965, after which an easement was constructed transecting Lots 604-606. Between 1974 and 1987, the majority of Lots 200 to 202 and Lots 600 and 601 were cleared and a large body of water was constructed within the center of the site. A number of buildings were constructed circa 1978, including the chicken farm within Lot 202. Since 2008, most of the site has been subject to limited clearing, and areas of regrowth of native vegetation are visible, particularly in Lots 200, 600 and 604-606.

A review of the site-specific environmental investigations and the publicly available datasets identified a number of environmental values within or nearby to the site and have been summarised in **Table 1**.

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases)

Key environmental feature (information in brackets refers to data source)	Yes / no / potentially occurring	If yes / potentially, describe the value that may be impacted
Conservation category wetlands and buffer (Geomorphic wetlands, Swan Coastal Plain (DBCA-019))	Yes	<p>A review of the <i>Geomorphic Wetlands of the Swan Coastal Plain</i> dataset (DBCA 2022a) indicated that the majority of the site is mapped as a multiple use wetland (MUW) (unique feature identifier (UFI) #16168). Two resource enhancement wetlands (REW) (UFI #16165 and UFI #15946) interface with the northern portion of the site, while a conservation category wetland (CCW) (UFI #14880) is located in the south-western portion of the site.</p> <p>CCW's are considered priority wetland areas that support a high level of ecological attributes and function, whilst REW's are considered to support a lower level of ecological attributes and functions. A 50 m buffer is proposed to be provided to the CCWs and will be accommodated with POS, while a 30 m wide buffer to the REW adjacent to the north-eastern boundary of the site will be provided. The buffer for the REW will extend into the site and be accommodated within POS or road reserve. It is assumed that the associated wetlands will be retained.</p>
RAMSAR wetlands (DBCA-010)	No	Not applicable. No RAMSAR sites are located within or nearby to the site.
Waterways (DWER-031)	No	Not applicable. No waterways are present within the site.
Threatened and priority flora (Emerge Associates 2021c)	Yes	No threatened flora species were recorded within the site; however, three priority flora species were recorded: <i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026) (P1), <i>Jacksonia gracillima</i> (P3) and <i>Verticordia lindleyi</i> subsp. <i>lindleyi</i> (P4). The majority of the priority flora species identified within the site will be retained and protected within POS.
Threatened and priority fauna (Emerge Associates 2021a).	Yes	The site supports vegetation which has the potential to provide habitat for threatened fauna, including black cockatoos. The native vegetation in the site, particularly that in the southern portion, is contiguous with extensive areas of intact native vegetation outside of the site and would contribute to ecological linkages.
Threatened ecological communities (TEC)	Yes	One TEC listed as endangered under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) ('banksia woodlands of the Swan Coastal Plain TEC') has been identified within the site. Correspondingly, the description, area, and condition thresholds of this TEC also apply to a state-listed priority ecological community (PEC) ('banksia woodlands of the Swan Coastal Plain PEC'). Approximately 7.64 ha of this TEC/PEC occurs within the site, within Lot 603 and Lot 200 (Emerge Associates 2021b). Portions of the banksia woodlands of the Swan Coastal Plain TEC are proposed to be retained in POS.
DBCA controlled lands or waters (DBCA-011)	No	Not applicable. No DBCA controlled lands or water exist within or in close proximity to the site.
Clearing regulations – Environmentally Sensitive Areas (DWER-046)	Yes	One environmentally sensitive area (ESA) is present over the entirety of the site. The mapped ESA within the site is likely related to the presence of the CCW and TEC and nearby Bush Forever sites.
Aboriginal heritage places (DPLH-001)	No	Not applicable. No Aboriginal heritage places are identified within or adjacent to the site.
Heritage Council WA – State Register (DPLH-006)	No	Not applicable. No state-listed heritage places are identified within or adjacent to the site.

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 2.1 Native vegetation – modification and clearing

The vegetation associated with the REWs and CCWs will be retained within three separate POS areas. In addition, a large area of remnant vegetation within the south-western portion of the site will also be retained within POS. The location of the POS areas is shown within the structure plan provided in **Appendix A**.

The remainder of vegetation within the site will most likely be removed as part of the proposed development or where possible retained within road reserves (but modified to low threat). The entire site is mapped as an ESA and is likely to be associated with the CCW and Banksia Woodland TEC identified within the site and in the broader area.

Clearing of native vegetation needs to be undertaken in accordance with a clearing permit or valid exemption pursuant to the *Environmental Protection Act 1986*. Clearing undertaken in accordance with addressing conditions associated with a subdivision approval, pursuant to the *Planning and Development Act 2005*, are exempt from requiring a clearing permit pursuant to Schedule 6 of the *Environmental Protection Act 1986* (where approved by a responsible authority).

## 2.2 Revegetation and landscape plans

A Landscape Report has been prepared by Emerge Associates (refer to **Appendix B**) to detail the landscaping treatments across the structure plan area. The Landscape Report identifies the areas of public open space (POS) proposed for the structure plan. The POS areas integrate the various wetlands and wetland buffers, based on a recent review of the vegetation condition and extents of the wetlands, as well as areas of retained banksia woodlands of the Swan Coastal Plain TEC. The wetland areas will be surrounded by retained vegetation, bio retention areas and flood storage areas. Where native vegetation is to be retained and/or rehabilitated, this vegetation has been classified in **Section 3** below.

Road reserves and the portions of POS areas not containing retained or rehabilitated vegetation (i.e. within wetlands and their buffer areas, or areas of retained TEC) are proposed to be landscaped as part of future development. These areas will be designed to achieve low threat vegetation in accordance with Section 2.2.3.2(f) of AS 3959. . Future verges and areas of turf and low shrub planting will be maintained and irrigated (where required). The management of the POS and road reserves will be the responsibility of the proponent initially prior to handover to the City of Armadale (where agreed). For the purposes of this BMP, and following feedback from the City of Armadale, all POS areas are assumed to contain classified vegetation and be a bushfire hazard.

Where low threat vegetation is agreed to, ongoing management is expected to align with the typical maintenance requirements for POS and road reserves, and is likely to include activities such as:

- Regular mowing/slashing of grass/turf to less than 100 mm in height (where present).
- Irrigation of grass and garden beds (where required).
- Regular removal of weeds and built up dead material (such as fallen branches, leaf litter etc.).
- Low pruning of trees (branches below 2 m in height removed where appropriate).
- Application/replacement of ground/surface covers such as mulch or non-flammable materials as required.

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 3 Bushfire Assessment Results

Bushfire risk for the site has been appropriately considered in the specific context of the Guidelines (DPLH & WAPC 2021) (using AS 3959) out to 150 m from the development site, but for determining the likely bushfire impacts upon a building, a distance of 100 m is used. The objective of AS 3959 is to reduce the risk of ignition and loss of a building to bushfire. It provides a consistent method for determining a radiant heat level (radiant heat flux) as a primary consideration of bushfire attack on a building or object. It also prescribes simple national construction responses that can resist the determined radiant heat level at a given distance from the fire and are based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

The building construction requirements outlined within AS 3959 only apply to new Class 1, 2, 3 and associated 10a buildings. Any construction requirements detailed within AS 3959 that may be indicated as part of the BAL assessment will only apply to the new habitable buildings to be constructed as part of the proposed development of the site and that are designated bushfire prone within the state-wide *Map of Bush Fire Prone Areas* (as updated).

Two separate methods (Method 1 and Method 2) are outlined in AS 3959 for determining the impact of bushfire on dwellings. Method 1 (used in this BMP), outlined in Section 2 and Appendix A of AS 3959, provides a basic assessment of radiant heat flux levels at various distances from classified vegetation (up to 100 m). This method assumes standard fuel loads for classified vegetation as outlined in AS 3959 and considers the effective slope beneath vegetation. This method can be used to determine appropriate setbacks to dwellings to achieve different levels of radiant heat exposure (i.e. BAL-12.5 to BAL-FZ).

### 3.1 Bushfire attack level (BAL) assessment

In accordance with Appendix Five of the Guidelines, a method 1 BAL assessment has been undertaken to support the structure plan for the site, in order to determine the BAL ratings potentially applicable to the habitable buildings based on the vegetation classification and effective slope. The BAL ratings are illustrated across the site in the BAL contour plan (discussed further below in **Section 3.1.2**).

#### 3.1.1 Assessment inputs

Assessing bushfire hazards takes into account the classes of vegetation within the site and surrounding area for a minimum of 100 m, in accordance with AS 3959. The assignment of vegetation classifications is based on an assessment of vegetation structure, which includes consideration of the various fuel layers of different vegetation types. For example, fuel layers in a typical forest environment can be broken down into five segments as illustrated in **Plate 3** below. These defined fuel layers are considered when determining the classification of vegetation and associated bushfire hazard levels.

# Bushfire Management Plan

## North Harrisdale Structure Plan



Plate 3: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)

Not all vegetation is a classified bushfire risk. Vegetation and ground surfaces that are exempt from classification as a potential hazard is identified as a low threat under Section 2.2.3.2 of AS 3959. Low threat vegetation includes the following:

- a) Any vegetation that is more than 100 m from the site.
- b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.
- c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other, or of other areas of vegetation being classified.
- 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, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- f) Vegetation regarded as a low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

An assessment of existing vegetation and effective slope within the site and surrounding 150 m was undertaken on the 21<sup>st</sup> of January 2021, following the method in accordance with AS 3959 and the Guidelines. It has also been considered as part of subsequent site visits, the most recent being August 2022. A description of the pre-development vegetation classifications and supporting photographs are provided in **Table 2**.

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**)



Photo ID:	1	Plot:	1	
Vegetation Classification or Exclusion Clause				
Class A - Forest				
Description / Justification for Classification				
Areas of forest vegetation have been identified within the southern portion of the site. The vegetation has a multi-tiered fuel structure and is associated with an overstorey of Eucalyptus trees up to at least 15 m in height and foliage cover greater than 30%. The understorey consists of mixed small trees, shrubs, grass and herbs. This vegetation is associated with the CCW proposed to be retained.				
Photo ID:	2	Plot:	2	
Vegetation Classification or Exclusion Clause				
Class A - Forest				
Description / Justification for Classification				
Areas of forest vegetation have been identified within the northern portion of the site. The vegetation has a multi-tiered fuel structure and is associated with an overstorey of Eucalyptus trees approximately 10-20 m in height and foliage cover greater than 30%. The understorey consists of mixed small trees, shrubs, grass and a ground cover of accumulated leaf litter and debris. This vegetation is to be removed/modified as part of future development.				
Photo ID:	3	Plot:	2	
Vegetation Classification or Exclusion Clause				
Class A - Forest				
Description / Justification for Classification				
Areas of forest vegetation have been identified within the northern portion of the site. The vegetation has a multi-tiered fuel structure and is associated with an overstorey of Eucalyptus trees approximately 10-20 m in height and foliage cover greater than 30%. The understorey consists of mixed small trees, shrubs, grass and a ground cover of accumulated leaf litter and debris. This vegetation is to be removed/modified as part of future development.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to Figure 2) (continued)

Photo ID:	4	Plot:	3	
Vegetation Classification or Exclusion Clause				
Class A – Forest				
Description / Justification for Classification				
Areas of forest vegetation have been identified within and external to the east of the site. The vegetation has a multi-tiered fuel structure and is associated with an overstorey of Eucalyptus trees approximately 10 m in height and foliage cover greater than 30%. The understorey consists of mixed small trees, shrubs, grass and a ground cover of accumulated leaf litter and debris. This vegetation is likely to be removed/modified as part of future development but timing is uncertain, so is identified as a temporary hazard.				
Photo ID:	5	Plot:	4	
Vegetation Classification or Exclusion Clause				
Class A - Forest				
Description / Justification for Classification				
Areas of forest vegetation have been identified external to the north of the site (background of photo). Whilst some management may occur, this does not appear to be consistent. The vegetation contains a multi-tiered fuel structure associated with the overstorey of Eucalyptus trees approximately 10 m-15 m in height over small trees, grasses, and debris. Foliage cover is greater than 30%, and increases further into the plot.				
Photo ID:	6	Plot:	4	
Vegetation Classification or Exclusion Clause				
Class A - Forest				
Description / Justification for Classification				
Areas of forest vegetation have been identified external to the northeast of the site, associated with Bush Forever site 413 Balannup Lake and adjacent bushland. The vegetation has a multi-tiered fuel structure and is associated with an overstorey of Eucalyptus trees up to 20 m in height and foliage cover greater than 30%. The understorey consists of mixed small trees, shrubs, grass and a ground cover of accumulated leaf litter and debris.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**)

Photo ID:	7	Plot:	5
Vegetation Classification or Exclusion Clause			
Class B - Woodland			
Description / Justification for Classification			
Woodland vegetation has been identified within and external to the eastern portion of the site. The vegetation is characterised by an overstorey of predominantly planted Eucalyptus trees up to a height of approximately 20 m. Separation in tree canopy (and trunks) was apparent over the area (and represented a foliage cover of less than 30%). This vegetation is likely to be removed/modified as part of future development, but timing is uncertain, so is identified as a temporary hazard.			
Photo ID:	8	Plot:	5
Vegetation Classification or Exclusion Clause			
Class B - Woodland			
Description / Justification for Classification			
Woodland vegetation has been identified within and external to the eastern portion of the site. The vegetation is characterised by an overstorey of predominantly planted Eucalyptus trees up to a height of approximately 20 m. Separation in tree canopy (and trunks) was apparent over the area and represented a foliage cover of less than 30%. This vegetation is likely to be removed/modified as part of future development, but timing is uncertain, so is identified as a temporary hazard.			



# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**) (continued)

Photo ID:	9	Plot:	6	
Vegetation Classification or Exclusion Clause				
Class B - Woodland				
Description / Justification for Classification				
Woodland vegetation has been identified external to the northwest of the site. The vegetation is characterised by an overstorey of Eucalyptus trees up to a height of approximately 15 m over grasses. Separation in tree canopy (and tree trunk) was apparent over the area with a foliage cover of less than 30%.				
Photo ID:	10	Plot:	6	
Vegetation Classification or Exclusion Clause				
Class B - Woodland				
Description / Justification for Classification				
Woodland vegetation has been identified external to the northwest of the site. The vegetation is characterised by an overstorey of Eucalyptus trees up to a height of approximately 15 m over grasses. Separation in tree canopy (and tree trunk) was apparent over the area with a foliage cover of less than 30%.				
Photo ID:	11	Plot:	7	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation has been identified external to the northwest of the site. The area consists of predominantly of <i>Melaleuca spp</i> , scattered <i>Kunzea glabrecens</i> and grasses averaging approximately 2-3 m in height. Occasional <i>Banksia spp</i> up to 4 m in height are scattered throughout the area.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**)


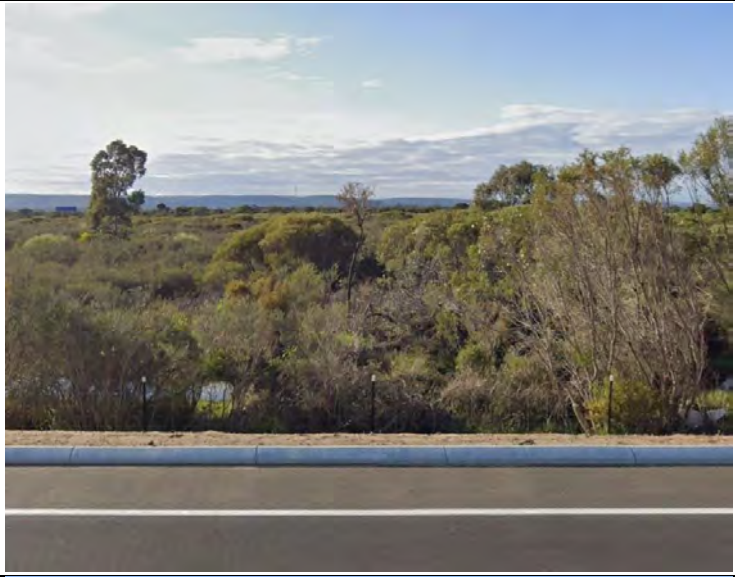

Photo ID:	12	Plot:	7	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation has been identified external to the west of the site. The area consists of predominantly of <i>Melaleuca spp</i> , scattered <i>Kunzea glabrecens</i> and grasses averaging approximately 2-3 m in height. Occasional <i>Banksia spp</i> up to 4 m in height are scattered throughout the area.				
Photo ID:	13	Plot:	7	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation has been identified external to the west of the site. The area consists of predominantly of <i>Melaleuca spp</i> , scattered <i>Kunzea glabrecens</i> and grasses averaging approximately 2-3 m in height. Occasional <i>Banksia spp</i> up to 4 m in height are scattered throughout the area.				
Photo ID:	14	Plot:	8	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation associated with a low lying drainage feature has been identified to the west and north-west of the site. This vegetation is associated with POS/drainage areas in adjacent residential development. Vegetation consists of predominantly <i>Melaleuca spp</i> and <i>Kunzea spp</i> up to 2-4 m in height. Areas of revegetated native sedges and small shrubs are also present within the drain. Some management is evident (use of mulch, weed control), however is assumed to be a bushfire hazard.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**)


Photo ID:	15	Plot:	9	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation has been identified within the southeastern portion of the site, consisting of <i>Banksia spp</i> approximately 4 m in height over weeds and grasses. This vegetation is to be removed/modified as part of future development.				
Photo ID:	16	Plot:	10	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation associated with a low lying wetland features have been identified external to the south of the site and Skeet Road. Vegetation consists of predominantly <i>Melaleuca spp</i> approximately 2-4 m in height. This vegetation is associated with Bush Forever site 342 Anstey/Keane Dampland and adjacent bushland, and is proposed to remain in the long-term.				
Photo ID:	17	Plot:	10	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation associated with low lying wetland features have been identified external to the south of the site and Skeet Road. Vegetation consists of predominantly <i>Melaleuca spp</i> approximately 2-4 m in height. This vegetation is associated with Bush Forever site 342 Anstey/Keane Dampland and adjacent bushland, and is proposed to remain in the long-term.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to Figure 2) (continued)

Photo ID:	18	Plot:	10	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation associated with low lying wetland features have been identified within the southern portion of the site. Vegetation consists of predominantly <i>Melaleuca spp</i> approximately 2-4 m in height. This is associated with the CCW feature and is proposed to remain in the long-term, however has been assumed to achieve 'forest' in the long term (aligning with adjacent vegetation that is also being retained).				
Photo ID:	19	Plot:	12	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation associated with low lying wetland features have been identified to the north of the site. Vegetation consists of predominantly <i>Melaleuca spp</i> approximately 2-4 m in height. This vegetation is predominantly associated with a REW feature, and is proposed to remain in the long-term.				
Photo ID:	21	Plot:	11	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation has been identified external to the east of the site, consisting of <i>Melaleuca spp</i> and <i>Banksia spp</i> approximately 2-4 m in height. This vegetation is associated with Bush Forever site 413 Balannup Lake and adjacent bushland, and is proposed to remain in the long-term.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to Figure 2) (continued)




Photo ID:	20	Plot:	12	
Vegetation Classification or Exclusion Clause				
Class D - Scrub				
Description / Justification for Classification				
Scrub vegetation has been identified external to the north-west of the site, consisting of predominantly <i>Melaleuca spp</i> approximately 2-4 m in height over non-native grasses and weeds.				
Photo ID:	23	Plot:	13	
Vegetation Classification or Exclusion Clause				
Class G – Grassland				
Description / Justification for Classification				
Areas of grassland vegetation has been identified within the north-west portion of the site and are associated with areas that have historically been cleared to support agricultural/rural-residential land uses. These areas are characterised by non-native grass species, which while appear to be subject to some management, are currently unmanaged, growing to a height of between 15 cm – 1 m. This vegetation is to be removed/modified as part of future development.				
Photo ID:	24	Plot:	13	
Vegetation Classification or Exclusion Clause				
Class G – Grassland				
Description / Justification for Classification				
Areas of grassland vegetation has been identified throughout portions of the site and are associated with areas that have historically been cleared to support agricultural/rural-residential land uses. These areas are characterised by non-native grass species, which are currently unmanaged, growing to a height of between 15 cm – 1 m. This vegetation is to be removed/modified as part of future development.				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**)

Photo ID:	22	Plot:	14	
Vegetation Classification or Exclusion Clause				
Class G – Grassland				
Description / Justification for Classification				
Areas of grassland vegetation has been identified external to the south of the site and are associated with areas that have historically been cleared to support agricultural/rural-residential land uses. These areas are characterised by non-native grass species, which are currently unmanaged, growing to a height of between 15 cm – 1 m.				
Photo ID:	25	Plot:	15	
Vegetation Classification or Exclusion Clause				
Exclusion 2.2.3.2(e)				
Description / Justification for Classification				
The photo shows the intersection of Skeet Road and Ranford Road consisting of paved surface and areas of mineral earth and roads have been excluded in accordance with Clause 2.2.3.2(e) of AS 3959. These areas may contain portions of managed vegetation however predominantly comprise non-vegetated areas.				
Photo ID:	26	Plot:	15	
Vegetation Classification or Exclusion Clause				
Exclusion 2.2.3.2(e)				
Description / Justification for Classification				
Areas surrounding the site to the west are associated with residential development currently under construction consisting of roads, built structures (dwellings) and bare mineral earth and therefore has been excluded in accordance with Clause 2.2.3.2(e) of AS 3959. These areas may contain managed vegetation (gardens), however for ease of reference have been identified as non-vegetated areas				

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 2: Pre-development AS 3959 vegetation classification (refer to **Figure 2**)

Photo ID:	27	Plot:	16
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2(f)			
Description / Justification for Classification			
Areas surrounding the site to the north/north-west associated with private landholdings contain managed lawns and gardens maintained to a low threat condition and have been excluded in accordance with Clause 2.2.3.2(f) of AS 3959.			

Photo ID:	28	Plot:	16
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2(f)			
Description / Justification for Classification			
Portions of the site are under management containing well-managed grass/garden areas (in mid-ground) as part of existing operating businesses and have been excluded in accordance with Clause 2.2.3.2 (f) of AS 3959. It is noted these areas also contain non-vegetated areas however primarily consist of managed vegetation. This vegetation is to be removed/modified as part of future development			

## Bushfire Management Plan

### North Harrisdale Structure Plan



#### 3.1.1.1 Post development assumptions

The BAL assessment for the site has been undertaken in accordance with Method 1 of AS 3959 to determine the maximum heat flux to which future dwellings within the site are likely to be exposed.

- The vegetation classification and effective slope applicable to vegetation within or nearby to the site in the post-development scenario have been summarised in **Table 3**. Overall, the assumed BAL assessment criteria includes: **Designated FDI: 80**
- **Flame temperature:** 1090 K
- **Vegetation classification:** forest (Class A), woodland (Class B), scrub (Class D) and grassland (Class G) vegetation as identified within the post-development scenario, as outlined in **Figure 4** and summarised in **Table 3**
- **Effective slope beneath classified vegetation:** flat/upslope (see **Figure 5**)
- **Setback distances:** as per Table 2.5 in AS 3959 with the relevant distances used to inform the BAL contour plan summarised in **Table 4**, with the BAL contour provided in **Figure 6**.

In addition to the above, the following key assumptions have informed this assessment:

- Retained vegetation will keep its current predominant structure (including wetlands and wetland buffers and areas of the banksia woodlands of the Swan Coastal Plain TEC) and have been classified accordingly. Where revegetation is assumed, this has been included as part of the indicated classification (and generally aligns with the predominant vegetation of the wetland).
- POS areas as per the request of the City of Armadale, have been assumed to be a bushfire hazard. It is possible that the areas outside retained environmental values will be subject to future management and considered low threat.
- Areas of low threat vegetation outside of the site (and not under the proponent's control) will continue to be managed and/or considered to achieve low threat (in accordance with Section 2.2.3.2 of AS 3959) based on the existing maintenance regimes, and/or as per the City of Armadale's fire control notice.
- Classified vegetation that has been identified outside of the proponent's landholdings has been assumed to remain in its current state (unless stated otherwise), and will, therefore, remain a bushfire hazard to development within the site.
- Vegetation located between the site boundary and Ranford Road is expected to be removed and developed in the future. As the timing of this is not known, the vegetation has been classified based on its current state but identified as a temporary hazard. The BALs are based on the existing vegetation structure in this area.

# Bushfire Management Plan

## North Harrisdale Structure Plan



*Table 3: Summary of the assumed post-development vegetation classification and associated effective slope within the site and 150 m in accordance with Table 2.5 (AS3959)*

Pre-development (Figure 2)		Post-development vegetation classification (Figure 4)	Effective slope
Plot no.	Vegetation classification		
Plot 1	Class A – Forest	Class A – Forest (Plot 1): areas associated with the CCW and areas of TEC within POS.	Flat/upslope
Plot 2	Class A – Forest	Exclusion 2.2.3.2 (e) (Plot 15): will be modified for future roads and lot areas.	Not applicable
Plot 3	Class A – Forest	Class A – Forest (Plot 3): however is a temporary hazard.	Flat/upslope
Plot 4	Class A – Forest	Class A – Forest (Plot 4)	Flat/upslope
Plot 5	Class B – Woodland	Class B – Woodland (Plot 5): however is a temporary hazard	Flat/upslope
Plot 6	Class B – Woodland	Class B – Woodland (Plot 6)	Flat/upslope
Plot 7	Class D – Scrub	Class D – Scrub (Plot 7): where outside the site  Exclusion 2.2.3.2 (e) (Plot 15): will be modified within the site for future roads and lot areas.	Flat/upslope (Plot 7)  Not applicable (Plot 15)
Plot 8	Class D – Scrub	Class D – Scrub (Plot 8)	Flat/upslope
Plot 9	Class D – Scrub	Exclusion 2.2.3.2 (e) (Plot 15): will be modified for future roads and lot areas.	Not applicable
Plot 10	Class D – Scrub	Class D – Scrub (Plot 10): associated with Bush Forever site 342	Flat/upslope
Plot 11	Class D – Scrub	Class D – Scrub (Plot 11): associated with Bush Forever site 413	Flat/upslope
Plot 12	Class D – Scrub	Class D – Scrub (Plot 12): associated with Bush Forever site 413.  Class D – Scrub (Plot 17): Areas associated the portion of the REW buffer that extends into the site. It will be revegetated with native shrub species (known to support heights less than 6 m) where within POS.	Flat/upslope (Plot 12)  Flat/upslope (Plot 17)
Plot 13	Class G – Grassland	Class D – Scrub (Plot 17): Areas associated with the portion of the REW buffer that extends into the site (to the west) will be revegetated with native shrub species (known to support heights less than 6 m) where within POS..  Exclusion 2.2.3.2 (e) (Plot 15): will be modified within the site for future roads and lot areas	Flat/upslope (Plot 17)  Not applicable (Plot 15)
Plot 14	Class G – Grassland	Class G – Grassland (Plot 14).	Flat/upslope
Plot 15	Exclusion 2.2.3.2 (e)	Exclusion 2.2.3.2 (e) (Plot 15): will remain under existing management regimes, associated with roads, bare ground and residential development.  Class G – Grassland (Plot 18): Associated with areas of POS outside wetland buffers and retained vegetation, which is assumed to be unmanaged for the purposes of this BMP.	Not applicable (Plot 15)  Flat/upslope (Plot 18)

# Bushfire Management Plan

## North Harrisdale Structure Plan



*Table 3: Summary of the assumed post-development vegetation classification and associated effective slope within the site and 150 m in accordance with Table 2.5 (AS3959) (continued)*

Pre-development (Figure 2)		Post-development vegetation classification (Figure 4)	Effective slope
Plot no.	Vegetation classification		
Plot 16	Exclusion 2.2.3.2 (f)	<p>Class D – Scrub (Plot 17): Areas associated with the portion of the REW buffer that extends into the site (to the north) will be revegetated with native shrub species (known to support heights less than 6 m) where within POS..</p> <p>Exclusion 2.2.3.2 (e) (Plot 15) – will be modified within the site for future roads and lot areas.</p> <p>Exclusion 2.2.3.2 (f) (Plot 16) – applicable to existing managed areas external to the site.</p>	<p>Flat/upslope (Plot 17)</p> <p>Not applicable (Plot 15)</p> <p>Not applicable (Plot 16)</p>

### 3.1.2 Assessment outputs

Based on the outcomes of the BAL assessment (see **Figure 6**), the majority of the site is likely to be subject to a BAL rating of BAL-29 or less, with the bulk subject to BAL-12.5 or less. Portions of the site in the north-east will have areas subject to BAL-40 or BAL-FZ (predominantly within the commercial area) as result of temporary bushfire hazards that will be removed when development in the broader area is progressed. This can be managed as part of staging of development.

In the central-southern portion of the site, surrounding the POS, BAL-40 (and a small area of BAL-FZ along the western boundary) extends into the development cells as a result of retained vegetation and/or assumption around future treatment (assumed to be 'forest'). Development will be separated from classified vegetation in the POS by a public road interface, and it would be possible to achieve BAL-29 with a 6 m front lot setback for lots to the west of the POS and a 1 m front lot setback for lots to the east. This can be considered when lot layout is addressed at future subdivision stages and through use of local development plans

**Table 4** provides a summary of the setback distances necessary from classified vegetation to achieve the indicated BAL ratings, with the BAL Contour Plan (provided in **Figure 6**) being a visual representation of these distances. The setback distances are based on the post-development classified vegetation (**Figure 4**), effective slope (**Figure 5**) and are taken from Table 2.5 of AS 3959.

# Bushfire Management Plan

## North Harrisdale Structure Plan



*Table 4: Setback distances based on post-development vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment*

Post development plot number (see Figure 4)	Vegetation classification (see Figure 4)	Effective slope (see Figure 5)	Distance to vegetation (from Table 2.5 of AS 3959)	BAL rating (see Figure 6)
Plot 1, Plot 3, and Plot 4	Forest (Class A)	Flat/upslope	< 16 m	BAL-FZ
			16 - < 21 m	BAL-40
			21 - < 31 m	BAL-29
			31 - < 42 m	BAL-19
			42 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 5 and Plot 6	Woodland (Class B)	Flat/upslope	< 10 m	BAL-FZ
			10 - < 14 m	BAL-40
			14 - < 20 m	BAL-29
			20 - < 29 m	BAL-19
			29 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 7, Plot 8, Plot 11, Plot 12, and Plot 17	Scrub (Class D)	Flat/upslope	< 10 m	BAL-FZ
			10 - < 13 m	BAL-40
			13 - < 19 m	BAL-29
			19 - < 27 m	BAL-19
			27 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 13, Plot 14, and Plot 18	Grassland (Class G)	Flat/upslope	< 6 m	BAL-FZ
			6 - < 8 m	BAL-40
			8 - < 12 m	BAL-29
			12 - < 17 m	BAL-19
			17 - < 50 m	BAL-12.5
			> 50 m	BAL-LOW

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 4 Identification of Bushfire Hazard Issues

From a bushfire hazard management perspective, the key issues that are likely to require management and/or consideration as part of future development within the site include:

- Provision of appropriate separation distances from permanent bushfire hazards within the site (i.e. classified vegetation associated with the POS areas, wetland and buffers) and surrounding the site to ensure a BAL rating of BAL-29 or less can be achieved at future habitable buildings. This includes the consideration of the long-term classification of vegetation based on potential revegetation and/or development.
- Provision of appropriate vehicular access to ensure that when development within the site is fully constructed, egress to at least two different destinations will be available to future residents and emergency personnel. This may include the use of temporary emergency access ways or turning heads as part of internal staging of subdivision, until the full road network associated with the structure plan is constructed.
- Provision of appropriate water supply and associated infrastructure (e.g. reticulated water and associated hydrant network).

These issues are considered further in **Section 5**.

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 5 Assessment Against the Bushfire Protection Criteria

This BMP provides an outline of the mitigation strategies that will ensure that as development progresses within the site, an acceptable solution and/or performance-based system of control can be adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines (DPLH & WAPC 2021). The bushfire protection criteria identified in the Guidelines and addressed as part of this BMP are:

- Element 1: Location of the development
- Element 2: Siting and design of the development
- Element 3: Vehicular access
- Element 4: Water supply.

For future development, the intent of the bushfire protection criteria can be satisfied through an acceptable solution. A summary of how this can be achieved and an associated compliance statement for each has been provided in **Table 5**.

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 5: Summary of bushfire protection criteria and compliance statement

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.	A1.1 Development location Yes.	N/A	<p>The BAL contour plan indicates that the majority of the site will be able to achieve a BAL rating of BAL-29 or less. Based on the retained wetland values, associated buffers and proposed revegetation, minor portions of the site are likely to be subject to a BAL rating exceeding BAL-29. As part of future subdivision and detailed design, development can be designed to ensure habitable buildings achieve BAL-29 or less through the use of in-lot setbacks or the location of public roads. Temporary bushfire hazards will be a consideration for staged development and need to be factored in as part of proposed subdivision.</p> <p>Further planning at the subdivision application and/or development application stage will inform the proposed lot layout for the site, with an updated BMP (and associated BAL assessment) to be prepared to ensure that future habitable buildings are able to achieve a BAL rating of BAL-29 or less.</p>	The proposed structure plan provides developable land <sup>1</sup> that will, on completion be subject to BAL-29 or below compliant with A1.1.
Element 2: Siting and design of development	To ensure that the siting and design of development minimises the level of bushfire impact.	A2.1 Asset Protection Zone Yes	N/A	<p>Asset protection zones (APZ) around buildings are an important bushfire protection measure influencing the safety of people and property. The APZ is a low fuel area immediately surrounding a building and can include non-flammable features such as irrigated landscapes, gardens, driveways, public roads and managed public open space.</p> <p>The bushfire hazards in the post-development scenario that are relevant to the site are shown in <b>Figure 4</b>. These include retained forest and scrub vegetation within the site, associated with the wetland features, and their buffers, as well as POS areas. External bushfire hazards are predominantly associated with areas of forest and scrub vegetation to the north, east, south and west of the site.</p> <p>(continued below)</p>	Continued below

<sup>1</sup> Position Statement: Planning in bushfire prone areas - Demonstrating Elements 1: Location and Element 2: Siting and design Department of Planning, Lands and Heritage (DPLH) 2019, Position Statement: Planning in bushfire prone areas - Demonstrating Element 1: Location and Element 2: Siting and design, Western Australian Planning Commission. has outlined that 'developable land' is "land that can accommodate a habitable dwelling and would not generally include areas of BAL-40 and/or BAL-FZ, areas within the local government setback and areas subject to environmental constraints".

# Bushfire Management Plan

North Harrisdale Structure Plan



Table 5: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Element 2: Siting and design	To ensure that the siting and design of development minimises the level of bushfire impact.	A2.1 Asset Protection Zone  (Continued from above)		<p>(Continued from above)</p> <p>The BAL assessment completed for the site indicates that a BAL rating of BAL-29 or less can be achieved at the majority of residential cells supporting future habitable buildings based on the indicated spatial layout for the development, as shown in <b>Figure 6</b>, with the majority of the future development areas likely to be subject to a BAL rating of BAL-12.5 or less. Separation from bushfire hazards can be accommodated through the public road network and/or in-lot setbacks.</p> <p>The BAL assessment has also identified a number of development cells (including the local centre) that will be subject to areas exceeding BAL-29 as a result of retained vegetation within POS or adjacent temporary hazards. Future residential lots located within the development cells adjacent to the immediate west and east of the southern POS, associated with wetland, wetland buffers and retained vegetation are located partially within BAL-40 (with a minor portion of the western cell, less than 1 m, in BAL0FZ) . For the development cell to the east, the area is separated by a proposed 20 m wide road reserve, and therefore only a 1 m in-lot setback is likely to be required for future habitable buildings to achieve BAL-29. For the development cell to the west of the POS, it is separated from the area of bushfire hazard by a proposed 15 m-wide road reserve, and an approximate 6 m-wide front lot setback would enable future habitable buildings to achieve BAL-29. Based on the R-codes of the development cells, future lots, would typically require a minimum front lot setback of 4-6 m.</p> <p>Portions of the site in the north-east (near Ranford Road) will have areas subject to BAL-40 or BAL-FZ (predominantly within the local centre area) as result of temporary bushfire hazards that will be removed when development in the broader area is progressed. This can be managed as part of staging of development.</p> <p>The acceptable solution can be satisfied for all existing and future habitable buildings. Where proposed to be constructed and within a designated bushfire prone area, new Class 1, 2, 3 and associated 10a buildings, in an area subject to a BAL rating of BAL-12.5 or higher will need to satisfy higher construction standards in accordance with AS 3959.</p>	<p>Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 2: Siting and design.</p> <p>Subject to satisfying required setbacks through subdivision design and considering temporary bushfire hazards, future habitable buildings can achieve a BAL rating of BAL-29 or less, compliant with A2.1</p>

# Bushfire Management Plan

## North Harrisdale Structure Plan



Table 5: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement																																										
		Acceptable solution	Performance principle																																												
Element 3: Vehicular access	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event	A3.1 Public road		<p>Existing roads surrounding the site, in addition to the proposed new public roads within the site, can and will comply with the minimum standards outlined in Appendix Four of the Guidelines (DPLH &amp; WAPC 2021) and includes a minimum 6 m-wide trafficable surface. An excerpt of the requirements (from Table 6 of the Guidelines) has been provided below.</p> <p>Excerpt of Table 6 from The Guidelines (DPLH &amp; WAPC 2021)</p> <table><tr><th>TECHNICAL REQUIREMENTS</th><th>1 Public roads</th><th>2 Emergency access way<sup>1</sup></th><th>3 Fire service access route<sup>1</sup></th><th>4 Battle-axe and private driveways<sup>2</sup></th></tr><tr><td>Minimum trafficable surface (metres)</td><td>In accordance with A3.1</td><td>6</td><td>6</td><td>4</td></tr><tr><td>Minimum horizontal clearance (metres)</td><td>N/A</td><td>6</td><td>6</td><td>6</td></tr><tr><td>Minimum vertical clearance (metres)</td><td colspan="4">4.5</td></tr><tr><td>Minimum weight capacity (tonnes)</td><td colspan="4">15</td></tr><tr><td>Maximum grade unsealed road<sup>3</sup></td><td rowspan="4">As outlined in the IPWEA Subdivision Guidelines</td><td colspan="3">1:10 (10%)</td></tr><tr><td>Maximum grade sealed road<sup>3</sup></td><td colspan="3">1:7 (14.3%)</td></tr><tr><td>Maximum average grade sealed road</td><td colspan="3">1:10 (10%)</td></tr><tr><td>Minimum inner radius of road curves (metres)</td><td colspan="3">8.5</td></tr></table>	TECHNICAL REQUIREMENTS	1 Public roads	2 Emergency access way <sup>1</sup>	3 Fire service access route <sup>1</sup>	4 Battle-axe and private driveways <sup>2</sup>	Minimum trafficable surface (metres)	In accordance with A3.1	6	6	4	Minimum horizontal clearance (metres)	N/A	6	6	6	Minimum vertical clearance (metres)	4.5				Minimum weight capacity (tonnes)	15				Maximum grade unsealed road <sup>3</sup>	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)			Maximum grade sealed road <sup>3</sup>	1:7 (14.3%)			Maximum average grade sealed road	1:10 (10%)			Minimum inner radius of road curves (metres)	8.5			<p>Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 3: Vehicular access.</p> <p>In particular, access to at least two different destinations can be facilitated through the future development of the site.</p>
		TECHNICAL REQUIREMENTS	1 Public roads		2 Emergency access way <sup>1</sup>	3 Fire service access route <sup>1</sup>	4 Battle-axe and private driveways <sup>2</sup>																																								
		Minimum trafficable surface (metres)	In accordance with A3.1		6	6	4																																								
Minimum horizontal clearance (metres)	N/A	6	6	6																																											
Minimum vertical clearance (metres)	4.5																																														
Minimum weight capacity (tonnes)	15																																														
Maximum grade unsealed road <sup>3</sup>	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)																																													
Maximum grade sealed road <sup>3</sup>		1:7 (14.3%)																																													
Maximum average grade sealed road		1:10 (10%)																																													
Minimum inner radius of road curves (metres)		8.5																																													
A3.2a Multiple access routes		<p>The public road access within the structure plan has provided egress in two different directions to at least two different suitable destinations with an all-weather surface (two-way access). The proposed structure plan provides for an interconnected road network within the site that will utilise the existing and future connections to the existing public road network. This includes connections to Balannup Road to the north, Skeet Road to the south, and Reilly Road to the immediate west (under construction), providing egress opportunities to the north, east, south and west. Interim access measures may be required at subdivision stage to facilitate sufficient access at all stages of subdivision development where through roads remain under development.</p>																																													
Yes	N/A																																														

# Bushfire Management Plan

North Harrisdale Structure Plan



Table 5: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement	
		Acceptable solution	Performance principle			
Element 3: Vehicular access	To ensure that the vehicular access serving a subdivision/ development is available and safe during a bushfire event	A3.2b Emergency access way		No permanent emergency access ways will be required given the structure plan provides for egress to at least two different destinations. It is possible that as part of staged development, emergency access ways may be required to ensure future development has access to at least two different destinations, until the full public road network is constructed. This should be considered as part of each stage of development. Where required, these should be implemented in accordance with the requirements of the Guidelines, unless agreed otherwise with the City of Armadale.	Continued from above	
		N/A	N/A			
		A3.3 Through roads		Three permanent no-through roads are proposed as part of the structure plan layout (see in <b>Figure 7</b> ) however two of the no-through roads are less than 30 m in length. Being less than 30 m in length means fire appliances can safely operate from the road junction without having to travel down the no-through roads and turn around (similar to the considerations for private driveways less than 70 m in length, where no additional access considerations are required), or if a fire appliance does need to travel down the no-through road it could easily navigate reversing this section of road. The third no-through road in the south-east of the site is approximately 35 m in length and provides lot access for several lots. It is noted that the road terminates with the local centre and in the long-term is not expected to function as a no-through road but rather an entrance to these areas. Until the progression of the local centre proceeds the road can be provided with a temporary turning head as per Appendix Four of the Guidelines.  As part of the staging of development additional temporary no-through roads may be required. These no-through roads will be provided with turn-around areas that are able to comply with Appendix Four of the Guidelines.  Indicative turning head locations have been shown in <b>Figure 7</b> to demonstrate the ability to meet the no through road technical requirements.		
		Yes	N/A			
		A3.4a Perimeter roads				A perimeter road is a public road where 10 or more lots are being proposed (including as part of a staged subdivision) with the aim of separating areas of vegetation classified under AS 3959, from the proposed lot(s). All future development cells and the local centre either have frontage to an existing public road or will be provided with a public road interface.
		Yes	N/A			

# Bushfire Management Plan

North Harrisdale Structure Plan



Table 5: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Element 3: Vehicular access	Continued from above	A3.4b Fire service access route		Not required. All development is separated from areas of bushfire hazards by public roads.	Continued from above
Continued from above	To ensure that the vehicular access serving a subdivision/ development is available and safe during a bushfire event.	N/A	N/A		
		A3.5 Battle-axe access legs		Not applicable. The structure plan has not yet been designed to the lot level. Battle-axe lots should be avoided unless site constraints dictate these are necessary.	
		N/A	N/A		
		A3.6 Private driveways		Not applicable. No private driveways longer than 70 m are proposed and/or are likely based on the type and density of the proposed development. It is possible the local centre may have a driveway longer than 70 m, if this is the case, the requirements of the Guidelines will need to be considered but would be addressed at development application stage of the process.	
N/A	N/A				
Element 4: Water	To ensure water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	A4.1 Identification of future water supply		Bushfire events in this area are responded to by a network of metropolitan career Fire and Rescue Service stations and the State Emergency Services (SES) as required. Fire response services require ready access to and adequate water supply during bushfire emergencies.  The site will connect with the reticulated water supply network.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 4: Water given it will connect with the reticulated water supply network.
		Yes	N/A		
		A4.2 Provision of water for firefighting purposes		Fire hydrants installed by the developer will meet the specifications of Water Corporation (Design Standard DS 63) and the Department of Fire and Emergency Services (DFES). Fire hydrants on land zoned for residential purposes are generally required to be sited at or within 200 m of dwellings (Class 1a). Commercial development (local centre) will be subject to onsite hydrant requirements as specified by the National Construction Code.	
		Yes	N/A		

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 5.1 Additional management strategies

### 5.1.1 Future approval considerations

The BAL assessment within this document is considered to be a conservative assessment of potential bushfire risk posed to future residential and commercial development within the site based on the assumptions outlined in **Section 3**.

The measures to be implemented through this structure plan and associated future subdivision process have been outlined as part of this BMP and can be used to support future planning and development approval processes. A revised BMP is likely to be required to support any future subdivision applications, particularly if the development layout is different to that outlined within this document and will need to respond to the subdivision design (and/or stage of development).

### 5.1.2 Landscape management

#### 5.1.2.1 Within the site

##### **Within POS areas**

In accordance with the request of the City of Armadale, proposed as part of development within the site have been identified as classified vegetation and a bushfire hazard (forest, scrub or grassland depending upon the pre-development scenario and expected use/purpose). The existing CCW and REW wetland areas will be retained, and the associated wetland buffers are assumed to be revegetated to the same vegetation classification as the wetland. This is shown in **Figure 4**. No ongoing management has been assumed in the POS areas for bushfire purposes, although it is noted from an amenity, public use and community expectation perspective management is likely to occur.

The design and construction of POS areas is generally a condition of subdivision approval, and the detailed design will be determined in collaboration with the City of Armadale as part of the standard development process (and based on typical maintenance requirements for urban/residential areas). A Landscape Report has been prepared and is provided in **Appendix B** showing intended uses/approach.

##### **Within public road reserves**

The proposed road reserves will be designed and maintained to achieve a low threat in accordance with Section 2.2.3.2 (e) and (f) of AS 3959 and will be the responsibility of the proponent initially until handover to the City of Armadale.

##### **Future lots**

All lots will be managed to a low threat standard by the proponent initially, and once sold, will be managed by the applicable landowners in accordance with the City of Armadale fire control notice (as published).

## Bushfire Management Plan

### North Harrisdale Structure Plan



#### 5.1.2.2 Surrounding the site

Where indicated as a low threat in **Figure 4**, it is assumed that the landholdings surrounding the site will be managed by the applicable landowners in accordance with the City of Armadale's fire break notice (as published) and/or in accordance with existing maintenance regimes. It is noted that the site does not rely on management within these areas given the road interface between lots and areas of classified or excluded vegetation.

Where indicated as classified vegetation in **Figure 4**, the landholdings surrounding the site have been assumed to remain a bushfire hazard in the long-term.

The forest and woodland vegetation along Ranford Road adjoining the site boundary is expected to be removed and developed in the future. However, the timing of this is not known and the current vegetation classifications have been applied to provide a conservative approach to the BAL ratings for the structure plan area and support future design/staging as part of the subdivision process.

#### 5.1.3 City of Armadale Fire Break Notice

The City of Armadale releases a fire break notice annually (or as required) to provide a framework for bushfire management within the City. The City of Armadale is able to enforce this order in accordance with Section 33(1) of the *Bush Fires Act 1954* and landowners will need to ensure compliance with the fire break notice, as published, or any directions provided by the City of Armadale.

Following development for residential purposes, it is likely that landholdings will be required to have all long grass, weeds, etc., slashed, mowed or trimmed down by other means to a height no greater than 5 cm across the entire property. The firebreak notice (as updated) should be referred to for further detail.

#### 5.1.4 Vulnerable or high-risk land uses

No vulnerable or high-risk land uses, as defined under SPP 3.7, are proposed within the site as part of the future development of the site. The requirements of policy measure 6.6 within SPP 3.7 are not applicable at this stage.

If any high-risk or vulnerable land uses are proposed in the future, the requirements of policy measure 6.6 of SPP 3.7 will need to be addressed, including the assessment of bushfire risk and/or the preparation of an emergency evacuation plan (for vulnerable land uses) or risk management plan (for high-risk land uses).

Currently, it is possible for all future lots to be located in an area with appropriate vehicle access to support emergency evacuation and for BAL-29 or less to be achieved at habitable buildings, enabling the requirements of SPP 3.7 to be satisfied.

## Bushfire Management Plan

### North Harrisdale Structure Plan



#### 5.1.5 Public education and preparedness

Community bushfire safety is a shared responsibility between individuals, the community, government and fire agencies. DFES has an extensive Community Bushfire Education Program including a range of publications, a website and Bushfire Ready Groups. The DFES website (<https://www.dfes.wa.gov.au/bushfire/prepare/>) provides a range of materials to help the community prepare for and survive the bushfire season.

The City of Armadale provides bushfire safety advice to residents available from their website <https://www.armadale.wa.gov.au/firebreaks-and-burning-permits>. Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in high-risk areas in addition that that provided in this BMP.

In the case of a bushfire in the area, advice would be provided to residents and businesses by DFES, the Department of Biodiversity Conservation and Attractions (DBCA) and/or the City of Armadale on any specific recommendations with regard to responding to the bushfire, including evacuation if required. It is highly recommended that residents make themselves aware of their responsibilities with regard to preparing for and responding to a potential bushfire that may impact upon them, their property and their visitors at the time, regardless of the BAL rating the building is subject to.

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 6 Responsibilities for Implementation and Management of Bushfire Measures

**Table 6** outlines the future responsibilities of the proponent (developer) and the City of Armadale associated with implementing this BMP. These responsibilities will need to be considered as part of the subsequent development and implementation process.

*Table 6: Responsibilities for the implementation of this BMP*

Management action	Timing
<b>Developer</b>	
Provide a copy of this BMP to the relevant decision makers to support approval of the proposed structure plan.	To support the structure plan approval process.
If required, prepare a new/revised BMP in accordance with SPP 3.7, the Guidelines and AS 3959 to support future subdivision applications, based on the proposed subdivision layout and in consideration of existing bushfire hazards or those that will be present following development. This will need to consider staging of development, and how temporary vehicle access and/or BAL ratings setbacks will be managed. If the assumptions regarding the treatment of the POS and public road reserves change as part of future detailed design stages, a revised BMP will be required.	To support each future subdivision application.
Where required, and based on the outcomes this BMP or subsequent BMP/s, make spatial provision within the subdivision layout/design to accommodate: <ul style="list-style-type: none"> <li>A suitable road network that provides access to at least two different destinations. The trafficable surface of the public roads should meet the minimum requirements of Appendix Four in the Guidelines (or as agreed with the City of Armadale). The proposed structure plan currently supports this requirement.</li> <li>The proposed no through roads should meet the minimum requirements of Appendix Four in the Guidelines (or as agreed with the City of Armadale), including provision of a suitable turning head.</li> <li>If any temporary no through roads or emergency access ways are required (based on staging of development), ensure these meet the requirements outlined in Appendix Four of the Guidelines (if applying an acceptable solution), or as agreed with the City of Armadale.</li> <li>Ensure future habitable buildings are able to be located so that BAL-29 or less can be achieved. Separation distances should be in accordance with the minimum distances outlined in <b>Table 4</b> of this BMP for the corresponding vegetation plot/classification, or as determined in subsequent BMPs/BAL assessments. This may include the provision of public roads and/or managed public open space between built form and bushfire hazards, or by ensuring lots are an adequate depth or width to accommodate in-lot setbacks to ensure BAL-29 is not exceeded at future built form.</li> </ul>	To support each future subdivision application.
Comply with the City of Armadale fire break notice/s as published and/or in accordance with directions given by the local government.	Ongoing.

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 7 Applicant Declaration

### 7.1 Accreditation

This BMP has been prepared by Emerge Associates who have been providing bushfire risk management advice for more than ten years, undertaking detailed bushfire assessments (and associated approvals) to support the land use development industry.

Anthony Rowe is a Fire Protection Association of Australia (FPAA) Level 3 Bushfire Planning and Design (BPAD) accredited practitioner (BPAD No. 36690) in accordance with clause 6.12 of the Guidelines.

### 7.2 Declaration

I declare that the information provided is true and correct to the best of my knowledge.

Signature:

A handwritten signature in black ink, appearing to read 'Anthony Rowe', written over a light grey dotted line.

**Name:** Anthony Rowe

**Company:** Emerge Associates/Envision Bushfire Protection

**Date:** 29 August 2023

**BPAD Accreditation:** Level 3 BPAD no. 36690

## Bushfire Management Plan

### North Harrisdale Structure Plan



## 8 References

### 8.1 General references

Department of Water (DoW) 2008, LiDAR Elevation Dataset, Swan Coastal Plain, Perth.

Department of Planning, Lands and Heritage (DPLH) 2019, Position Statement: Planning in bushfire prone areas - Demonstrating Element 1: Location and Element 2: Siting and design, Western Australian Planning Commission.

Department of Planning, Lands and Heritage, and Western Australian Planning Commission, (DPLH & WAPC) 2021, Guidelines for Planning in Bushfire Prone Areas Version 1.4, Perth, Western Australia.

Emerge Associates 2020, Bushfire Management Plan -Lots 600-606 Balannup Road and 200-202 Skeet Road, Harrisdale, EP20-127(11)--010 HPB.

Emerge Associates 2021a, Basic Fauna and Targeted Black Cockatoo Assessment - Lots 600-606 Balannup Road and 200-202 Skeet Road, Harrisdale EP20-127(03)--006 SCM, Version 1.

Emerge Associates 2021b, Spring Flora and Vegetation Assessment - Lots 600 - 606 Balannup Road and 200 - 202 Skeet Road, Harrisdale, EP20-127(02)--003, 1.

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

Western Australian Planning Commission (WAPC) 2015, State Planning Policy 3.7 Planning in Bushfire Prone Areas, Perth.

### 8.2 Online references

Landgate 2019, Locate V5, viewed March 2021, <<https://maps.slip.wa.gov.au/landgate/locate/>>

Office of Bushfire Risk Management (OBRM) 2021, Map of Bush Fire Prone Areas, viewed March 2022, <https://maps.slip.wa.gov.au/landgate/bushfireprone/>

# Figures



*Figure 1: Site Location and Topographic Contours*

*Figure 2: Existing Site Conditions – AS 3959 Vegetation Classifications*

*Figure 3: Existing Site Conditions – Bushfire Hazard Rating*

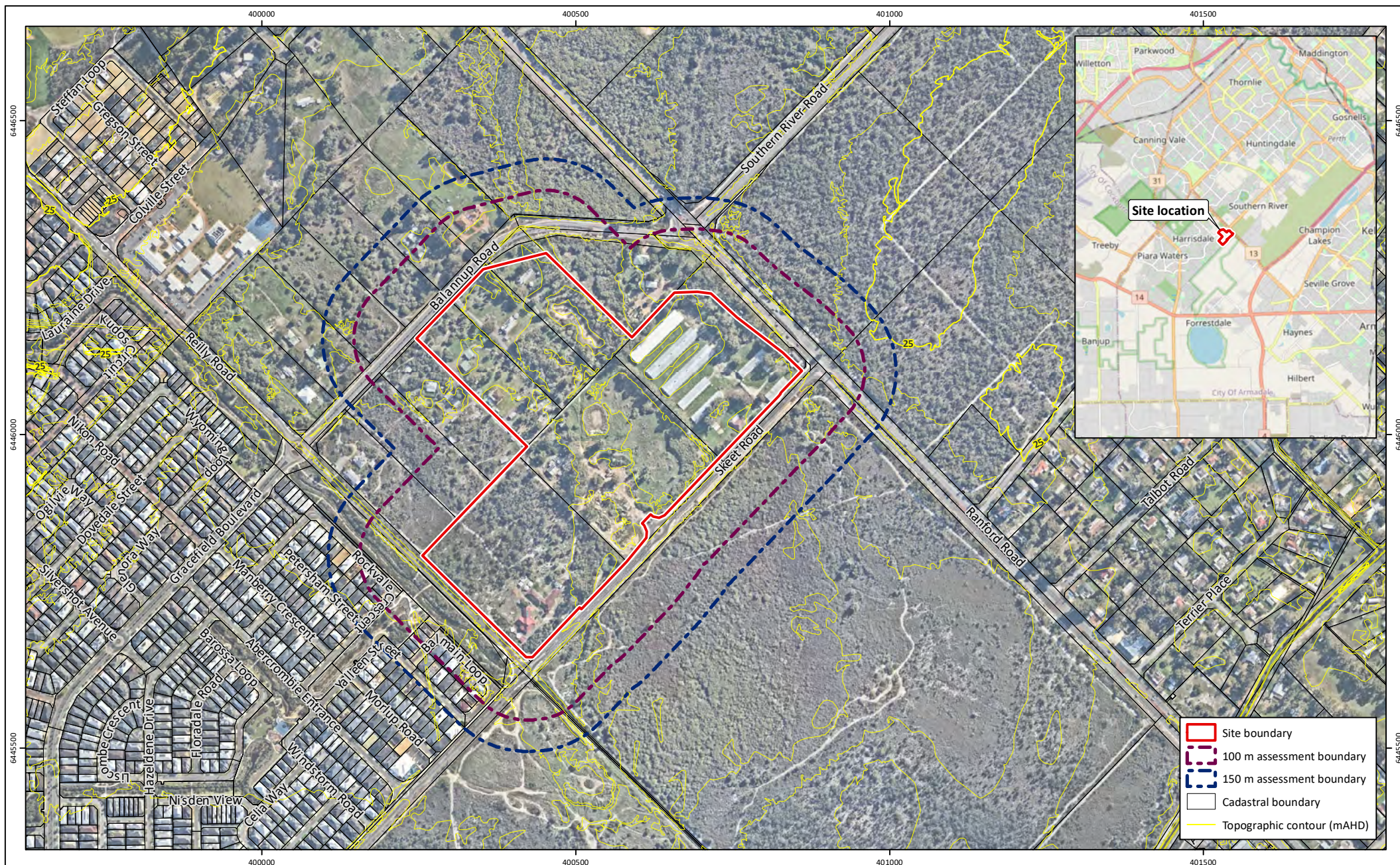
*Figure 4: Post Development Conditions – AS 3959 Vegetation Classifications*

*Figure 5: Post Development Conditions – Effective Slope*

*Figure 6: Bushfire Attack Level Contours*

*Figure 7: Vehicle Access Plan*





**Figure 1: Site Location and Topographic Contours**

**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan  
**Client:** Volk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)--F107  
**Drawn:** WJC  
**Date:** 28/08/2023  
**Checked:** DVB  
**Approved:** KK  
**Date:** 29/08/2023



0 100 200 300  
Metres  
Scale: 1:8,000@A4  
GDA 1994 MGA Zone 50

**emerge**  
ASSOCIATES



**Figure 2: Existing Site Conditions - AS 3959 Vegetation Classifications**

**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan

**Client:** Yolk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)-F108

**Drawn:** WJC

**Date:** 28/08/2023

**Checked:** DVB

**Approved:** KK

**Date:** 29/08/2023



0 100 200  
Metres

**Scale: 1:6,500@A4**

GDA 1994 MGA Zone 50

**emerge**  
ASSOCIATES



**Figure 3: Existing Site Conditions - Bushfire Hazard Rating**

**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan

**Client:** Volk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)--F109

**Drawn:** WJC

**Date:** 28/08/2023

**Checked:** DVB

**Approved:** KK

**Date:** 29/08/2023

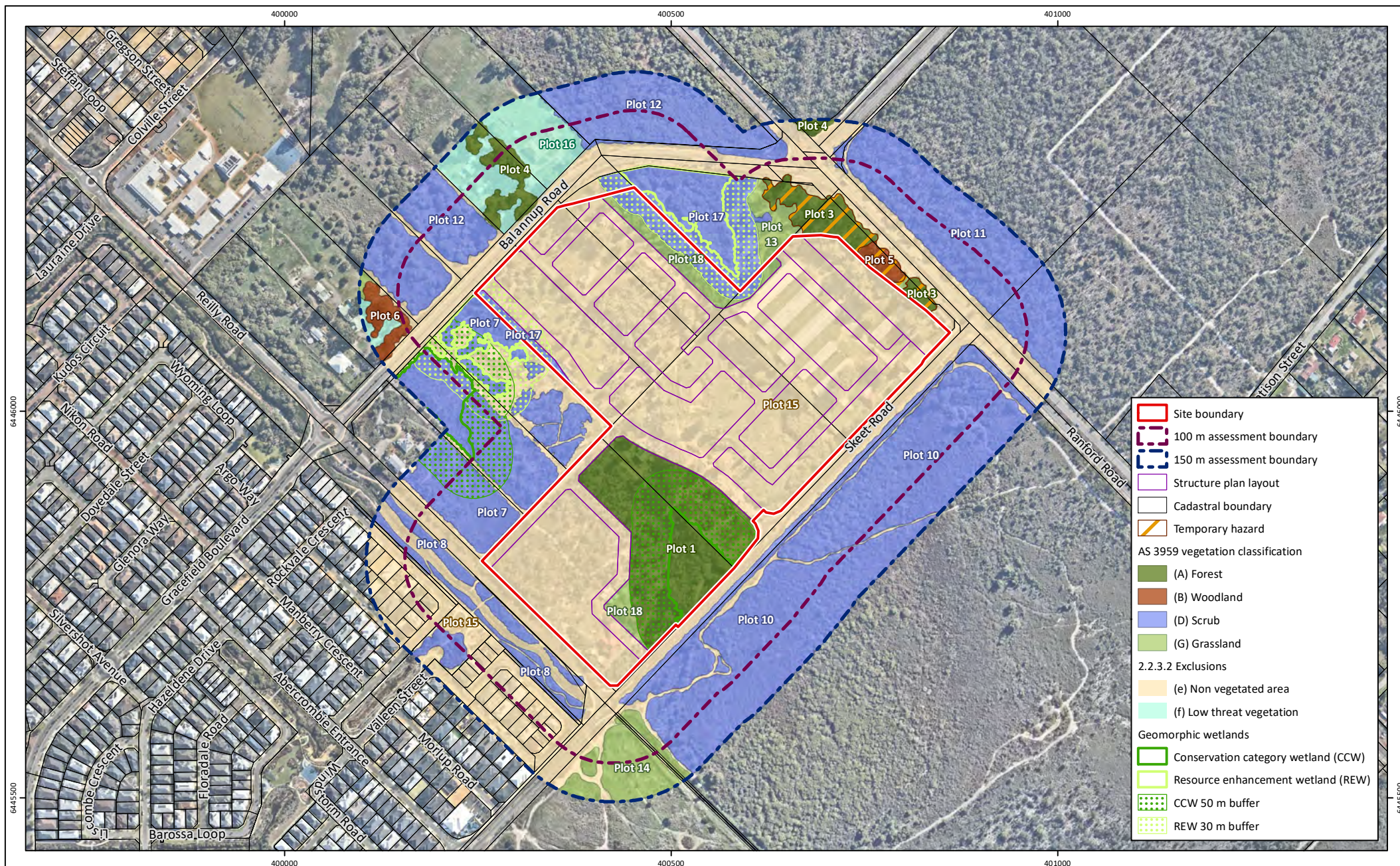


0 100 200  
Metres

**Scale: 1:6,500@A4**

GDA 1994 MGA Zone 50

**emerge**  
ASSOCIATES



**Figure 4: Post Development Conditions - AS 3959 Vegetation Classifications**

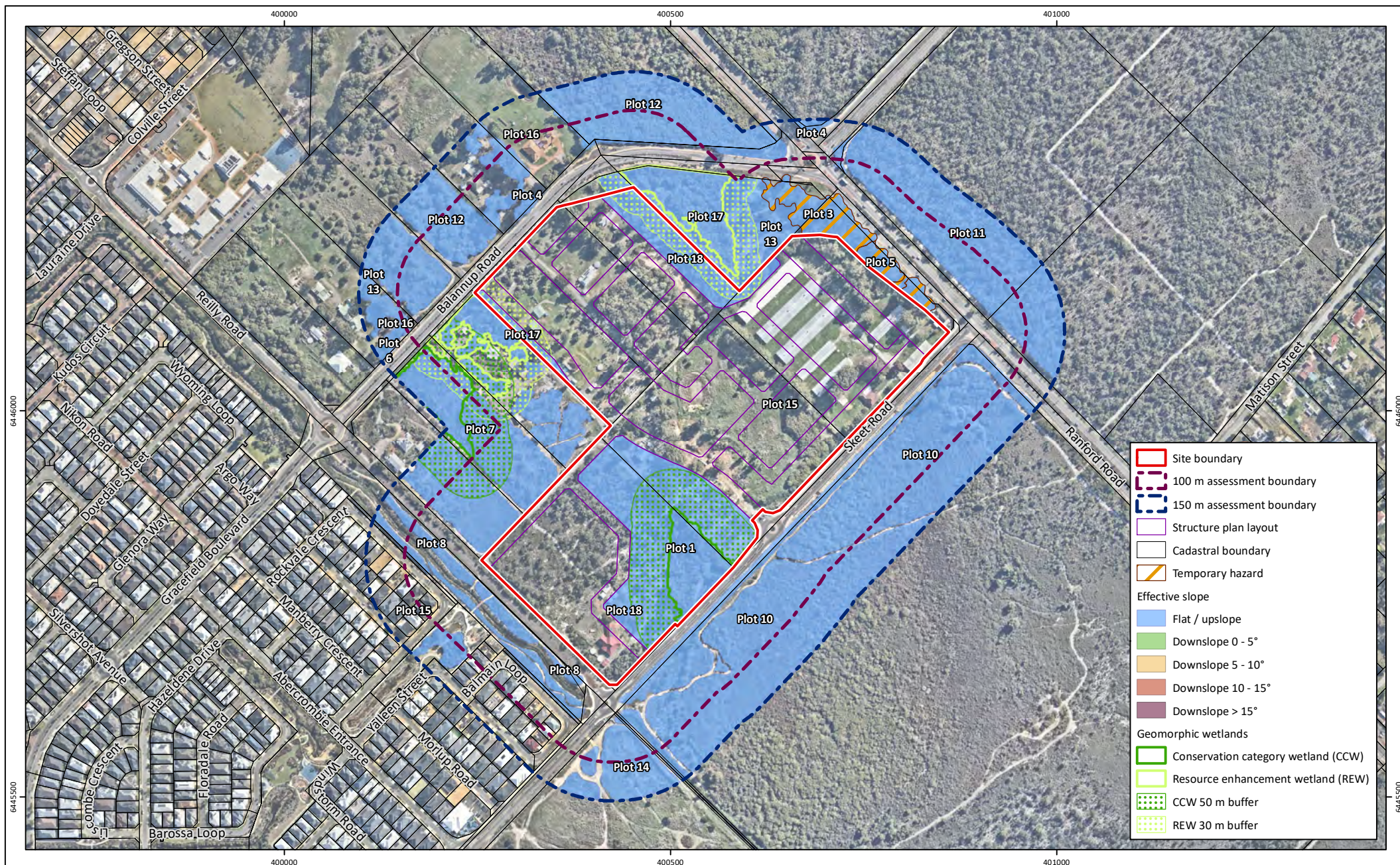
**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan  
**Client:** Volk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)-F110  
**Drawn:** WJC  
**Date:** 28/08/2023  
**Checked:** DVB  
**Approved:** KK  
**Date:** 29/08/2023



0 100 200  
Metres  
Scale: 1:6,500@A4  
GDA 1994 MGA Zone 50

**emerge**  
ASSOCIATES



**Figure 5: Post Development Conditions - Effective Slope**

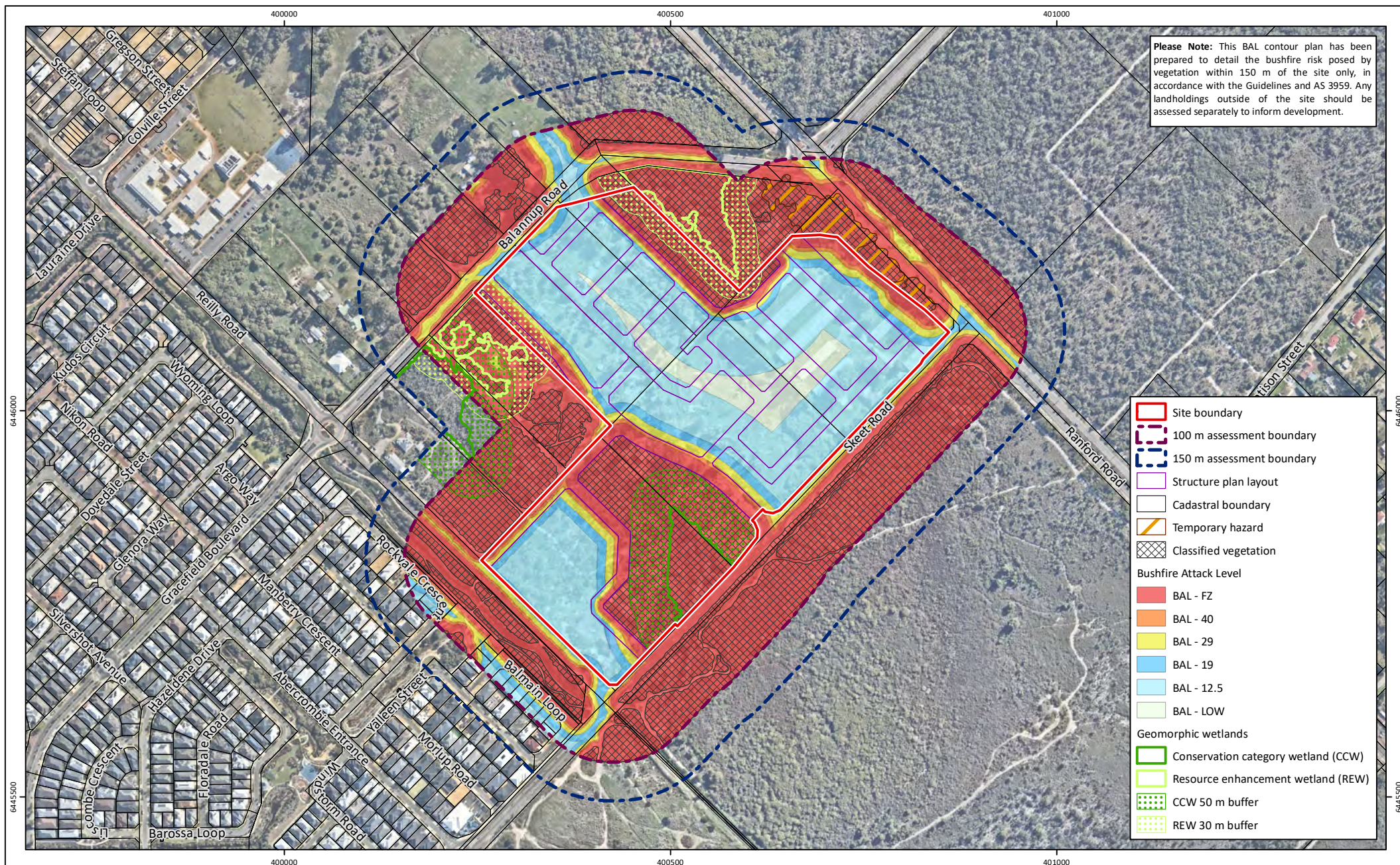
**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan  
**Client:** Volk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)-F111  
**Drawn:** WJC  
**Date:** 28/08/2023  
**Checked:** DVB  
**Approved:** KK  
**Date:** 29/08/2023



0 100 200  
Metres  
Scale: 1:6,500@A4  
GDA 1994 MGA Zone 50

**emerge**  
ASSOCIATES



**Figure 6: Bushfire Attack Level Contours**

**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan

**Client:** Yolk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)-F112

**Drawn:** WJC

**Date:** 28/08/2023

**Checked:** DVB

**Approved:** KK

**Date:** 29/08/2023



0 100 200  
Metres

**Scale: 1:6,500@A4**

GDA 1994 MGA Zone 50





**Figure 7: Vehicle Access Plan**

**Project:** Bushfire Management Plan  
North Harrisdale Structure Plan  
**Client:** Yolk Property Group Pty Ltd

**Plan Number:**  
EP20-127(11)--F113  
**Drawn:** WJC  
**Date:** 28/08/2023  
**Checked:** DVB  
**Approved:** KK  
**Date:** 29/08/2023



0 100 200  
Metres  
Scale: 1:5,000@A4  
GDA 1994 MGA Zone 50

**emerge**  
ASSOCIATES



# Appendix A

Structure Plan







# **HARRISDALE NORTH STRUCTURE PLAN** Harrisdale. Armadale, WA

Project YOLHA 22001001B | Scale 1:2500 @ A3 | Date: June 2023



Hex Design and Planning  
ABN 34 627 142 299  
29 A Bartlett Crescent  
Karrinyup WA 6018  
T +61 8 9204 1518  
M +61 438 000 235  
E shekton@hexdesignplanning.com.au

© COPYRIGHT PROTECTS THIS PLAN  
Unauthorised reproduction or amendment  
not permitted. Please contact the author.



# Appendix B

Landscape Report





# NORTH HARRISDALE STRUCTURE PLAN

LANDSCAPE REPORT

AUGUST 2023





# CONTENTS

1.0 SITE CONTEXT.....	3
2.0 LANDSCAPE MASTER PLAN.....	5
3.0 LANDSCAPE STRATEGY .....	6
4.0 LANDSCAPE STRATEGY POS CENTRAL.....	7
5.0 LANDSCAPE STRATEGY POS WEST .....	8
6.0 LANDSCAPE STRATEGY POS EAST .....	9
7.0 STORM WATER MANAGEMENT STRATEGY .....	10
8.0 DRAINAGE CROSS SECTIONS .....	11
9.0 STREESTSCAPE PLAN .....	13
10.0 IRRIGATION STRATEGY.....	14
11.0 MAINTENANCE STRATEGY .....	15

# 1.0 SITE CONTEXT

Lots 600 - 606 Balannup Road and Lots 200 - 202 Skeet Road, Harrisdale (referred to herein as ‘the site’) are located approximately 20 kilometres (km) south of the Perth Central Business District within the City of Armadale.

The site is approximately 29.29 hectares (ha) in size and is bound by Ranford Road to the north east, Skeet Road to the south east, Balannup Road to the north west and vacant land associated with the easement for the future continuation of Reilly Road to the south west.

The local structure plan (LSP) allows for the creation of residential lots, three areas of public open space (POS) with integration of various wetlands and wetland buffers (based on recent review of condition and extents), a commercial area, and an existing Western Power easement (which cuts through the south-western corner of the site).

The LSP provides for a well connected open space network which will provide the local community with safe parklands, supporting various open space functions whilst facilitating significant environmental outcomes through the retention and protection of existing conservation category wetlands (CCW). The landscape master plan for the proposal includes retention of existing vegetation and the revegetation of buffers for the CCW as well as the resource enhancement wetland (REW) to the north of the site.





## 2.0 LANDSCAPE MASTER PLAN



## 3.0 LANDSCAPE STRATEGY

The Landscape Strategy is intended to be an overall guide to the proposed functions, amenities and landscape treatment within North Harrisdale LSP.

The parklands will be characterised with native planting reflecting the historical flora of the area.

The public open space (POS) areas have been located to retain and protect the CCW and REW areas as well as integrate a variety of local amenity and storm water management functions.

LEGEND	
SUBJECT SITE	---
PARENT LOT	---
REW	---
CCW	---
30M BUFFER TO REW	---
50M BUFFER TO CCW	---
PROPOSED CELL BOUNDARY	---
EASMENT (30M WIDTH)	---
RESIDENTIAL	---
PUBLIC OPEN SPACE (POS)	---
COMMERCIAL	---



LEGEND	
---	SHELTER & BBQ FACILITIES
---	SEATING
---	NATURAL PLAY OPPORTUNITIES
---	BIORETENTION DRAINAGE AREA
---	FLOOD STORAGE AREA
---	WALKING TRAIL
---	REHABILITATION AREA

## 4.0 LANDSCAPE STRATEGY POS CENTRAL

This POS is located centrally within the proposed development providing a concentrated suite of amenity and POS function accessible to the wider community. It incorporates the CCW to the south adjacent Skeet Road.

- Informal active recreation uses on open grassed areas
- Gathering nodes with picnic and shelter facilities
- Opportunity for informal walking trails through controlled access points through the POS. Location and alignment of trails to avoid disturbance of areas of significant vegetation.
- Stormwater retention and conveyance through a vegetated and stabilized swale
- Retention and protection of CCW and revegetation of associated buffer
- Retention of existing Banksia Woodland areas
- Opportunity for nature play nodes to existing areas of clearing
- Path network which links into the greater development
- Manicured landscape areas fully irrigated outside buffer and retained vegetation areas
- All areas outside of wetland, vegetated wetland buffer area and bioretention areas to be “low threat vegetation” in accordance with AS3959:2018.



## 5.0 LANDSCAPE STRATEGY POS WEST

This POS is located within the western corner of the proposed LSP along the central entry road off Balannup Road . It includes the REW buffer to the west of the site.

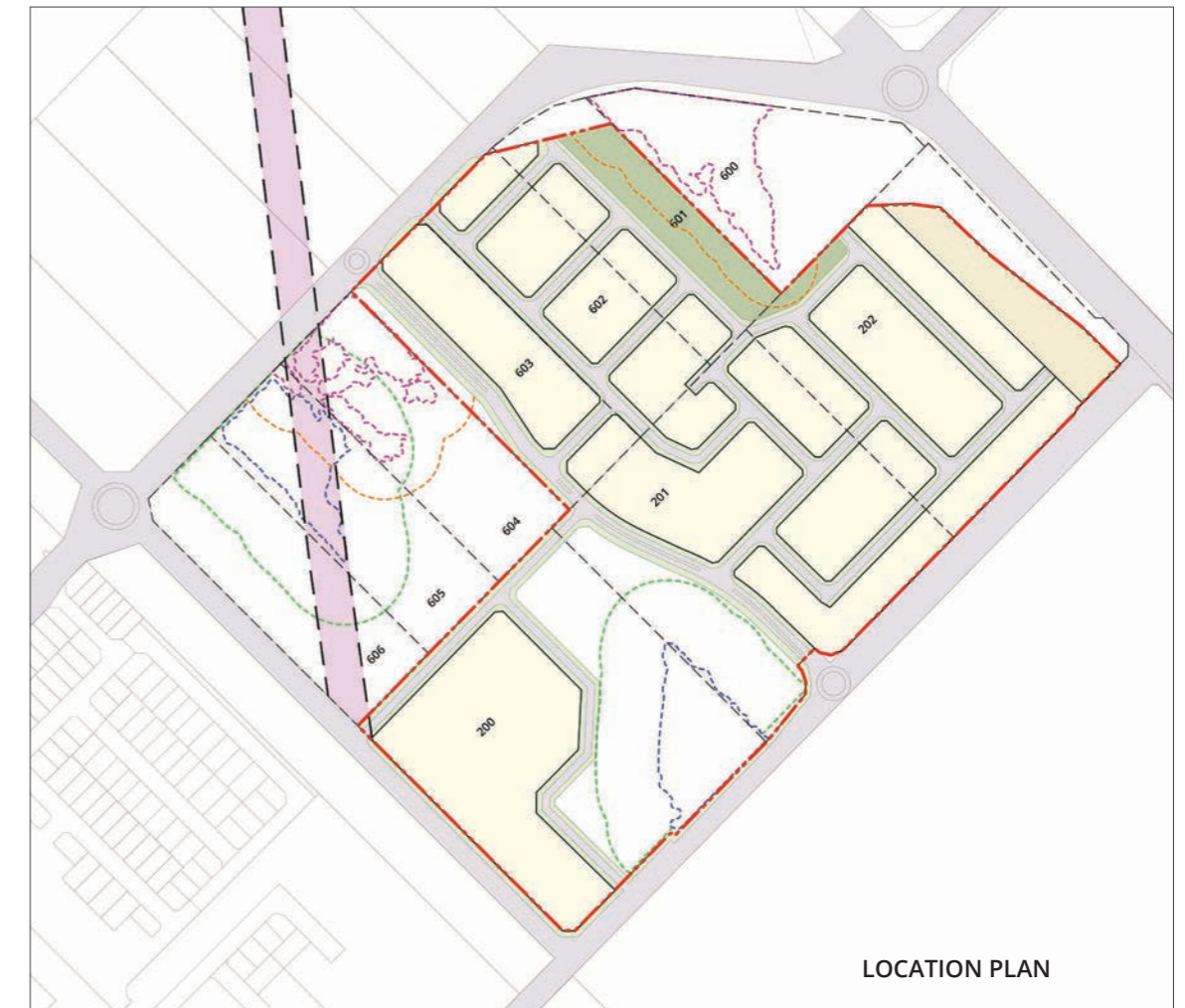
- Vegetation retention and revegetation of associated buffer to REW
- Opportunity for informal walking trails through controlled access points through the POS. Location and alignment of trails to avoid disturbance of areas of significant vegetation
- Path network which links into the greater development Retention of existing significant trees and vegetation where possible
- Opportunity for education of the site and its environmental assets through signage or other means along walking trails
- Majority of this POS will be classified vegetation and therefore a bushfire hazard in accordance with AS3959:2018



## 6.0 LANDSCAPE STRATEGY POS EAST

This POS is located in the north east corner of the site. It provides for a revegetated buffer to the REW to the north of the site. It is linear in shape and will provide a north-south greenspace connection through the development.

- Gathering nodes with seating along footpath network
- Stormwater retention and conveyance through a vegetated and stabilised swale
- Vegetation retention and revegetation of associated buffer to REW
- Retention of existing significant trees and vegetation where possible
- Path network which links into the greater development
- Manicured landscape areas fully irrigated outside buffer areas
- All areas outside of the wetland, vegetated wetland buffer and bio retention areas to be “low threat vegetation” in accordance with AS3959:2018

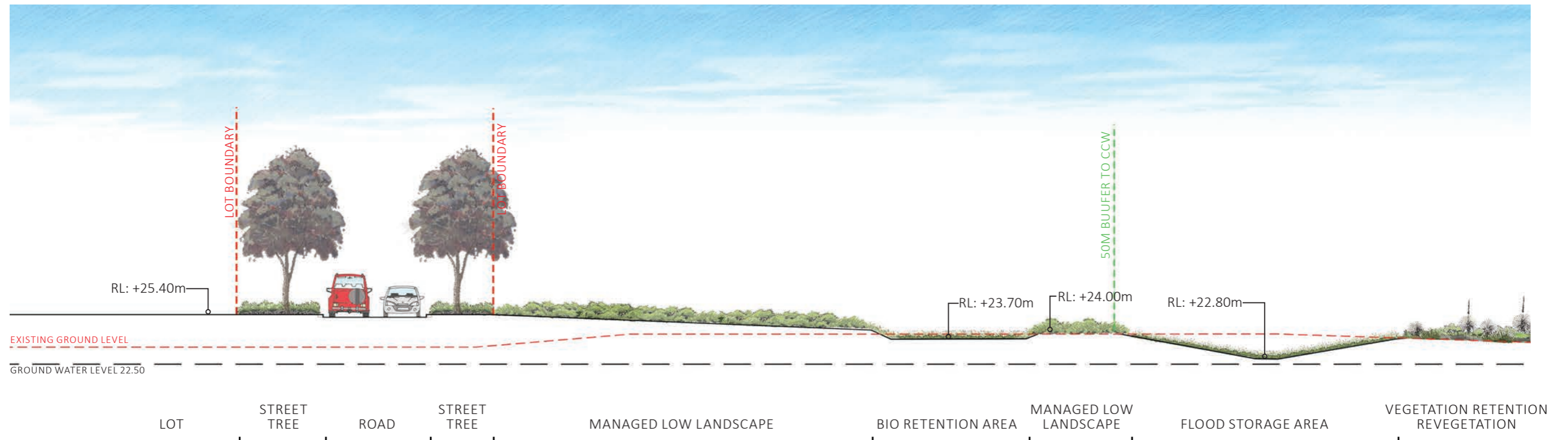


## 7.0 STORM WATER MANAGEMENT STRATEGY

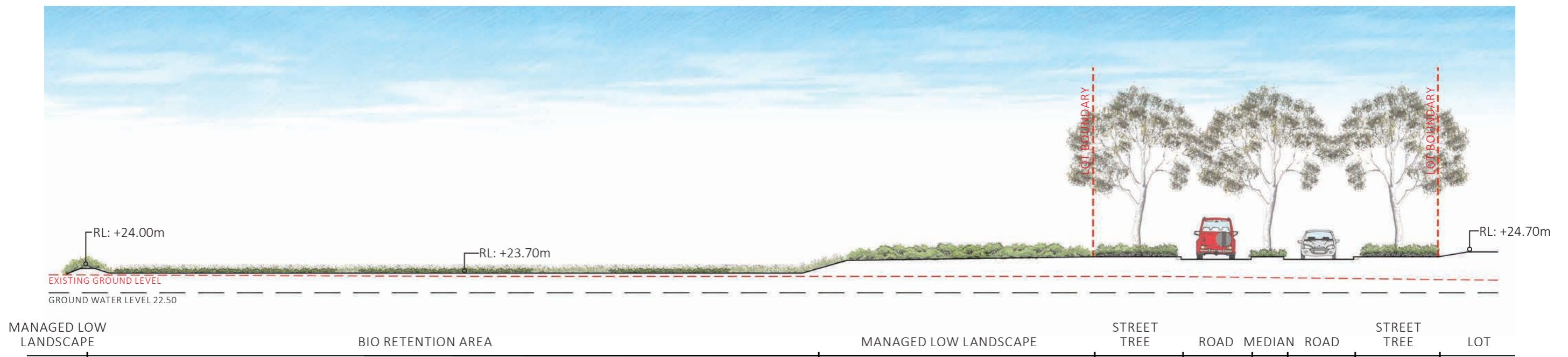
All stormwater from the development will be directed into bio-retention treatment areas constructed along the edges of the POS. These will be sized to treat the flows from the small rainfall event in accordance with the principles of water sensitive urban design. Storm events in excess of these will be directed into flood storage areas typically located within CCW and REW buffer areas. Flood storage areas will be revegetated with native species. Bio-retention areas will be located outside of CCW buffer areas.



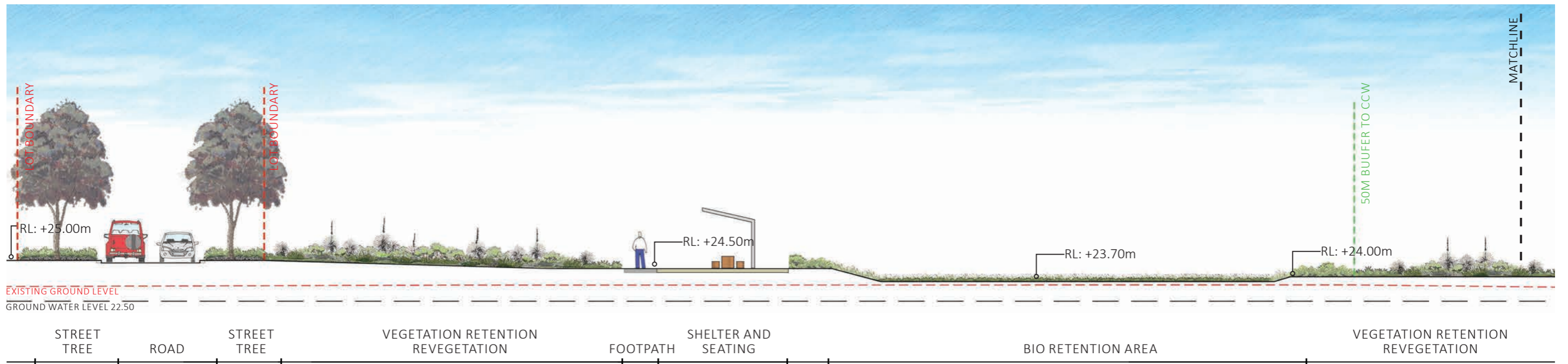
## 8.0 DRAINAGE CROSS SECTIONS



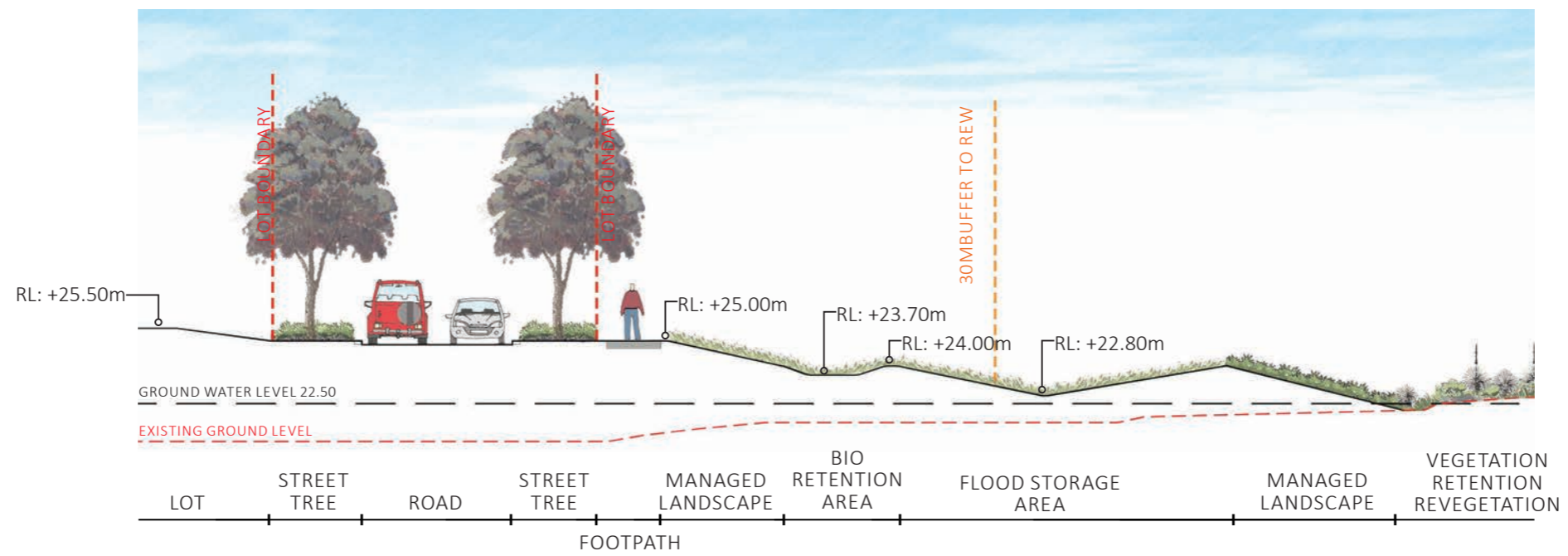
**SECTION A-A**



**SECTION B-B**



SECTION C-C



SECTION D-D

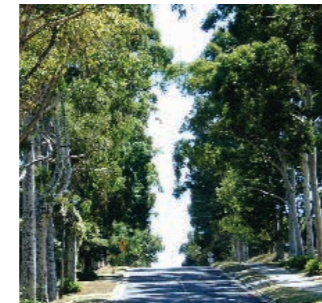
## 9.0 STREESTSCAPE PLAN

The streetscape planting strategy design will be translated through different palettes of street trees providing legibility through the development.

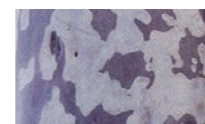
Tree species selected are waterwise, fast growing, reliable and readily available whilst providing shade and amenity to each street. The proposed species below offer consistencies in appearance with differences in size and scale. Larger, taller trees are shown around POS areas and along north-south roads as the major connector roads through the development. Smaller trees are shown on east-west roads as minor local roads.



CORYMBIA FICIFOLIA



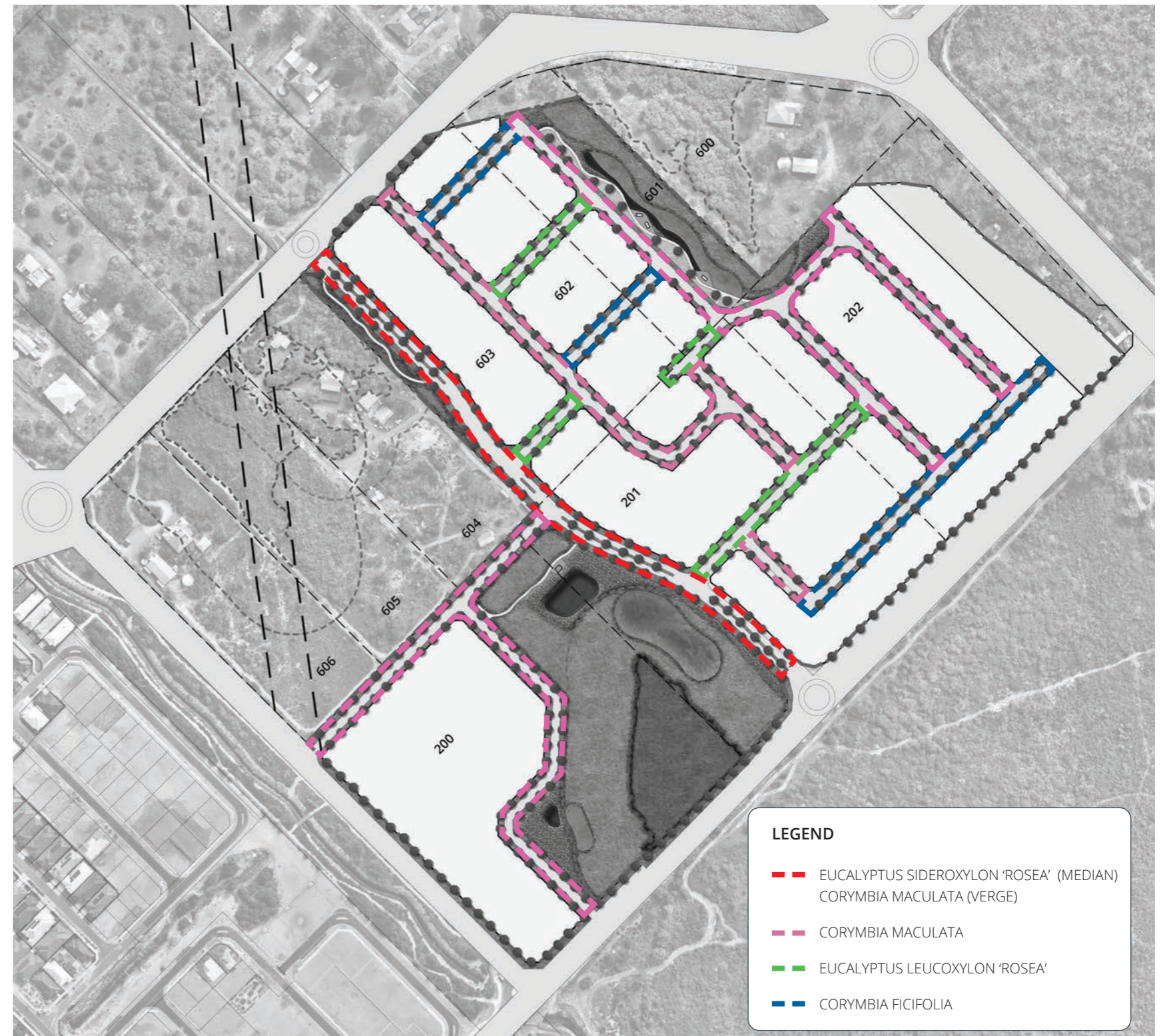
CORYMBIA MACULATA



EUCALYPTUS SIDEROXYLON



EUCALYPTUS LEUCOXYLON 'ROSEA'



## 10.0 IRRIGATION STRATEGY

The planting design of all streetscape and public open space areas will consist of predominantly native species. Planting design is proposed to include a water sensitive design approach and will also seek to reduce irrigation rates over the long term to planting areas to promote a longer term water saving strategy for the development.

Hydrozoning will also provide a supplementary design principle whereby groups of plants with similar irrigation demand needs will be grouped together. This will facilitate irrigation efficiencies that can be made across the scheme.

Areas within the stormwater swales, bio retention basins and revegetation areas are proposed to be in the main non-irrigated. Swales and basins will be planted with native sedges and rushes to facilitate the stormwater treatment requirements for the site. The water table in these areas will be close to the surface particularly in winter months possibly limiting the need for irrigation within swale. Revegetation areas will be planted with endemic native species.



## 11.0 MAINTENANCE STRATEGY

In all cases, a maintenance regime will be in place inclusive of general maintenance minimisation through design practices and will aim to use sustainable maintenance practices. This includes, but is not limited to, defined edges and borders, minimal and preferably alternate approaches to pesticides, controlled and minimized fertilizer use.

Maintenance will be undertaken via general access to all public accessible areas. Light maintenance vehicles can access all public areas and can adjoin all private areas within the development. This will occur initially via the road system and then by careful access over landscaped grass areas and select areas of the pedestrian path system. Use of removable bollards will limit and control unauthorized access to link areas between roads.

Maintenance will be managed by the development for the first 2 years minimum. The 2 year maintenance timeframe may be extended in certain locations at the developer's discretion in liaison with the City.

The routine and general maintenance of areas outside of the wetland, revegetation, vegetation retention areas, and bioretention areas would be sufficient to satisfy the requirements to be considered "low treat vegetation" in accordance with AS3959:2018. Specially these areas would be irrigated to avoid seasonal die off, and any overgrown and for dead vegetative material would be routinely removed including weeds.

