

## Plan 1: Barfield Road Structure Plan

Western Australian Planning  
Commission Approval: 17/07/2014

Amendment No.6 Approval: 10/03/2025

Structure Plan Expires: 19/10/2035

(Doc Set ID. 12257866)

### LEGEND

 STRUCTURE PLAN AREA

### ZONES

 RESIDENTIAL

 LOCAL CENTRE

### RESERVES

 PARKS AND RECREATION

 PUBLIC PURPOSE - EDUCATION

### OTHER ELEMENTS THAT INFORM THE LSP

 PROPOSED BUS ROUTE

 R25 RESIDENTIAL DENSITY CODE

 PLANNING CONTROL AREA No. 156

 WESTERN POWER EASEMENT



HATCH

PART ONE: STATUTORY SECTION

# Barfield Road

## Structure Plan

AMENDMENT NO. 6

FEBRUARY 2025



Title: Barfield Road Structure Plan  
Project: Barfield Road, Whiteman  
Prepared for: Richard Noble  
Reference: RIC HAM  
Status: Final with WAPC modifications dated February 2025  
Version: V  
Date of First Release: May 2013  
Project Manager: T. Trefry  
Author: T.Trefry / K.Brooks  
Cartographer: S. Baltov  
Graphic Design: R. Franca  
Approved by: T.Trefry  
Updates Approved by: T. Trefry

## DISCLAIMER & COPYRIGHT

This document was commissioned by and prepared for the exclusive use of Richard Noble. It is subject to and issued in accordance with the agreement between Richard Noble and Roberts Day.

Roberts Day acts in all professional matters as a faithful advisor to its clients and exercises all reasonable skill and care in the provision of its professional services. The information presented herein has been compiled from a number of sources using a variety of methods. Except where expressly stated, Roberts Day does not attempt to verify the accuracy, validity or comprehensiveness of any information supplied to Roberts Day by third parties. Roberts Day makes no warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, validity or comprehensiveness of this document, or the misapplication or misinterpretation by third parties of its contents.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favouring by Roberts Day.

This document cannot be copied or reproduced in whole or part for any purpose without the prior written consent of Roberts Day.

## CITATION

This document should be cited as follows:

Barfield Road Structure Plan (2023), prepared by Roberts Day Pty Ltd.

© Roberts Day Pty Ltd

ABN 53 667 373 703, ACN 008 892 135

[www.robertsday.com.au](http://www.robertsday.com.au)

## **ENDORSEMENT PAGE**

This structure plan is prepared under the provisions of the City of Cockburn  
Town Planning Scheme No. 3.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

**17 JULY 2014**

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the *Planning and Development  
(Local Planning Schemes) Regulations 2015*.

Date of Expiry: **19 OCTOBER 2035**

## TABLE OF AMENDMENTS TO STRUCTURE PLAN

Amendment No.	Description of Amendment	Date Supported by Council	Date Endorsed by the WAPC
1	delete access street to Wattelup Rd, + BMP requirements to map	16 October 2015	n/a (not required prior to Deemed Provisions)
2	up-code area to R60 north of POS A2	9 March 2017	13 June 2017
3	Alterations to density and cul-de-sac of two east-west streets	29 June 2018	29 October 2018
4	Add Lot 15 + change to design in Lot 18	14 November 2019	17 June 2020
5	Down code area from R60 to R30 south of POS C	2 November 2021	6 May 2022
6	Amendments include Lot 16 in Structure Plan Area and to down code areas from R60 to R25-R30.	9 July 2024	10 March 2025

## Executive Summary

The Barfield Road Structure Plan covers an area of 36.597ha in the locality of Hammond Park, which is within the jurisdiction of the City of Cockburn. The Structure Plan area is generally bound by Frankland Avenue to the west, Rowley Road to the south, a powerline easement to the east and rural properties (zoned for urban development) to the north.

The Structure Plan will provide for residential development, a local centre, a portion of a high school site and associated areas of open space.

An overview of the Structure Plan area and its key components is provided in the table below. Note that the “Total Area covered by the Structure Plan” stated in the table excludes Planning Control Area no.156 (0.9329 ha).

Item	
Total area covered by the structure plan	36.597 ha
Area of specified land use	Residential: 22.09 ha POS: 3.9 ha Road Reserve: 9.597 ha Local Centre: 0.15 ha High School Site: 0.86 ha
Estimated Lot Yield	545
Estimated number of dwellings	545
Estimated population	1400 people
Number of high schools (portion)	1
Number of primary schools	0
Estimated retail floor space	0
Estimated employment provided (no. of jobs)	5
Number and area of public open space	
: District parks	0
: Neighbourhood parks	3.9 ha

# Contents

## Part One: Implementation Section

- 1.0 Structure Plan Area
- 2.0 Structure Plan Content
- 3.0 Interpretations and Use Class Permissibility
- 4.0 Operation Date
- 5.0 Residential Density
- 6.0 General Subdivision and Development Requirements
  - 6.1 Notifications on Title
  - 6.2 Local Development Plans
  - 6.3 Other provisions / standards / requirements

## Part Two: Explanatory Section

### 1.0 Planning Background

- 1.1 Introduction and Purpose
- 1.2 Land Description
  - 1.2.1 Location
  - 1.2.2 Area and Land Use
  - 1.2.3 Legal Description and Ownership
- 1.3 Planning Framework
  - 1.3.1 Zoning and Reservations
  - 1.3.2 District Structure Plan
  - 1.3.3 State Policies
  - 1.3.4 Local Policies and Strategies

### 2.0 Site Conditions and Environment

- 2.1 Environmental Assets and constraints
- 2.2 Landform and Soils

- 2.3 Groundwater and Surface Water
- 2.4 Bushfire Hazard
- 2.5 Context and Constraints Analysis

### 3.0 Structure Plan

- 3.1 General
- 3.2 Land Use
- 3.3 Residential
- 3.4 Movement Networks
- 3.5 Open Space
- 3.6 Water Management
- 3.7 Bush Fire Management
- 3.8 Education Facilities
- 3.9 Infrastructure Coordination, Servicing and Staging
- 3.10 Developer Contribution Arrangements

### 4.0 Implementation

- 4.1 Staging

### 5.0 Amendments

- 5.1 Background
- 5.2 Amendment 6
  - 5.2.1 Proposal Context
  - 5.2.2 Modifications
  - 5.2.3 Public Open Space
  - 5.2.4 Overall Dwelling Yield
- 5.3 Servicing

## Appendices

- Appendix 1 – Environmental Assessment Report
- Appendix 2 – Local Water Management Strategy Addendum
- Appendix 3A – Bushfire Management Plan
- Appendix 3B – Stage 9 and 10 Bushfire Management Plan
- Appendix 3C – Lot 16 Bushfire Management Plan
- Appendix 4 – Transport Impact Assessment
- Appendix 5 – Noise Management Report
- Appendix 6 – Engineering Servicing Plan
- Appendix 7 – Landscape Plan
- Appendix 8 – Earthworks Plan

## List of Figures

- Figure 1: Location Plan
- Figure 2: Context Plan
- Figure 3: Aerial Photograph
- Figure 4: MRS Zoning
- Figure 5 TPS Zoning
- Figure 6: Vegetation Condition
- Figure 7: Contour Plan
- Figure 8: Context and Constraints Plan
- Figure 9: Structure Plan
- Figure 10: Residential Density Plan
- Figure 11: Movement Network Plan
- Figure 12: Rowley Road Interface
- Figure 13: Cycle/Footpath and Public Transport Plan
- Figure 14: Public Open Space Plan

# Part One: Implementation Section

## 1.0 Structure Plan Area

This Part applies to the Barfield Road Structure Plan, being all land contained within the inner edge of the black line shown on the Structure Plan map (Plan 1).

## 2.0 Structure Plan Content

This Structure Plan comprises the:

- Implementation section (Part 1)
- Explanatory section (Part 2)
- Technical appendices (Part 3)

## 3.0 Interpretations and Use Class Permissibility

Land use permissibility within the Structure Plan area shall be in accordance with the Structure Plan Map and corresponding Zones and Reserves under the Scheme.

## 4.0 Operation Date

This Structure Plan is operative until 19 October 2035.

## 5.0 Residential Density

Plan 1 defines the residential density, in accordance with the Residential Design Codes, that applies to specific areas within the Structure Plan area.

## 6.0 General Subdivision and Development Requirements

### 6.1 Notifications on Title

In respect of applications for the subdivision of land the City of Cockburn may recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate(s) of Title(s) to advise of the following:

1. Lots deemed to be affected by a Bush Fire Hazard as identified in the Barfield Road Structure Plan Bushfire Management Plan prepared by Strategen at Appendix 3.
2. Building setbacks and construction standards required to achieve a Bushfire Attack Level -29 or lower in accordance with Australian Standards (AS3959-2009): Construction of buildings in bushfire prone areas.
3. Lots deemed to be affected by an identified noise impact as identified in the Noise Management Plan for Barfield Road Structure Plan prepared by Lloyd George Acoustics at Appendix 5.
4. Construction standards to achieve quiet housing design in accordance with State Planning Policy 5.4 Road and Rail Noise.
5. The road network connectivity in this area linking Barfield Road will be permanently closed in the future.



## 6.2 Local Development Plans

1. Local Development Plans (LDPs) are required for lots comprising one or more of the following site attributes:
  - i. Lots with rear-loaded vehicle access;
  - ii. Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space;
  - iii. Lots deemed to be affected by noise from Rowley Road and Kwinana Freeway, as identified spatially in the Noise Management Plan prepared by Lloyd George Acoustics at Appendix 5. This includes a requirement for noise modelling for ground floor and two-storey development as applicable.
2. LDPs are required to be prepared for all land zoned 'Local Centre' on the Structure Plan map (Plan 1).

## 6.3 Other provisions / standards / requirements

- i. This Structure Plan is supported by a Bushfire Hazard Level Assessment (BFHA) and a Fire Management Plan (FMP). Any land falling within 100 metres of a bushfire hazard identified in the BFHA/ FMP is designated as a Bushfire Prone Area for the purpose of the Building Code of Australia.
- ii. Proportional contributions being made towards DCA 9 (Hammond Park) and DCA 13 (Community Infrastructure) in accordance with clause 6.3 of the City of Cockburn Town Planning Scheme No. 3
- iii. The Noise Management Plan for Barfield Road Structure Plan being updated / finalised at the subdivision stage (if updated or once final levels and road designs are known) to inform subdivision applications, and any mitigation measures being implemented via appropriate subdivision conditions.
- iv. Rural fencing treatment to be provided along the boundary of road reserves and freehold lots within the Special Use 23 zoned area.
- v. Preparation of a Wildfire Management Plan is required to address the management and relocation of fauna prior to clearing native vegetation.

## Plan 1: Barfield Road Structure Plan



### LEGEND

 STRUCTURE PLAN AREA





### ZONES

 RESIDENTIAL  
 LOCAL CENTRE

### RESERVES

 PARKS AND RECREATION  
 PUBLIC PURPOSE - EDUCATION

### OTHER ELEMENTS THAT INFORM THE LSP

 PROPOSED BUS ROUTE  
 R25 RESIDENTIAL DENSITY CODE  
 PLANNING CONTROL AREA No. 156  
 WESTERN POWER EASEMENT



## Part Two: Explanatory Section

Figure 15: Staging Plan

### 1.0 Planning Background

#### 1.1 Introduction and purpose

This report has been prepared on behalf of Gold Estates Holdings Pty Ltd, in association with the Department of Housing in support of a Structure Plan (Structure Plan) for Lots 13, 14, 15, 16 and 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park (Structure Plan area). The Structure Plan will provide for residential development, a local centre, a portion of the high school site and associated areas of open space.

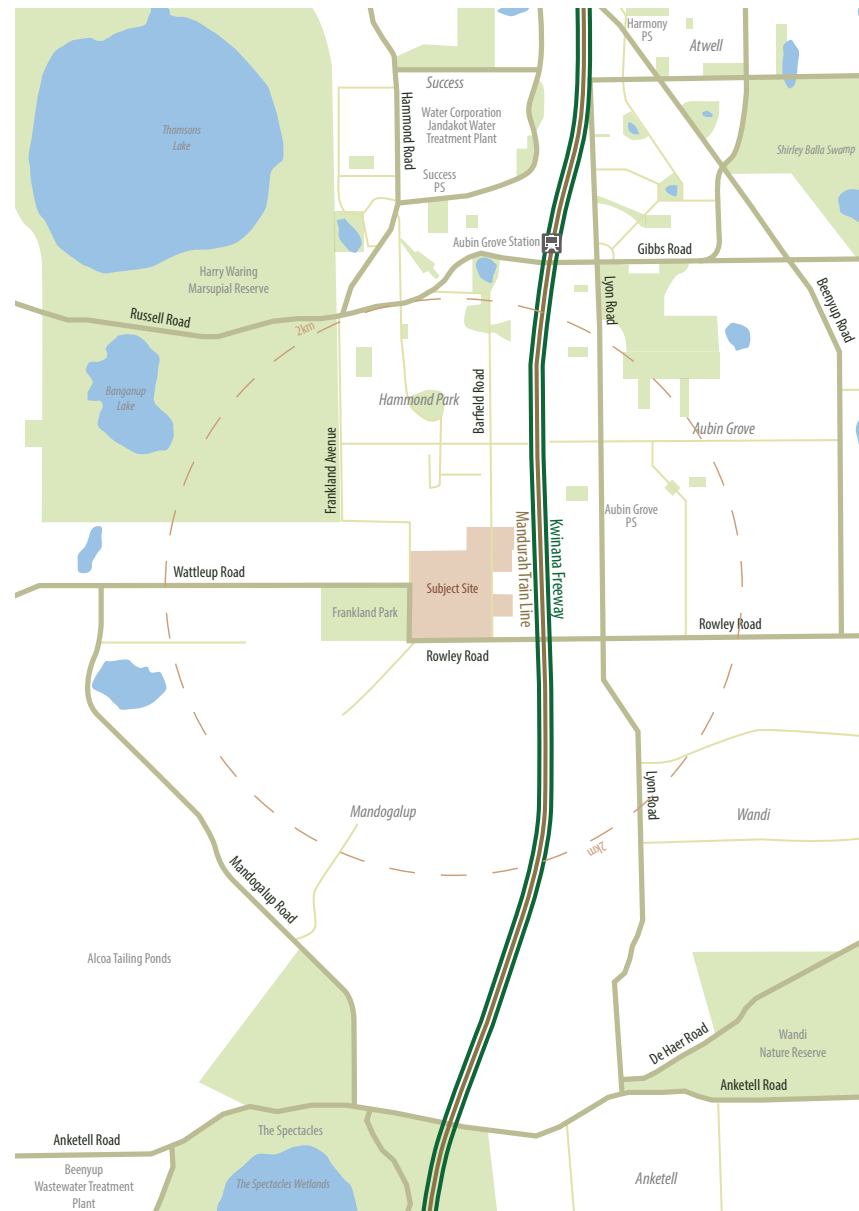
The project team responsible for the preparation of the Structure Plan are:

- Hatch RobertsDay - Town planning and design;
- Emerge - Landscape Architecture and Water Management;
- The Civil Group - Engineering;
- Emerge - Environmental;
- Kleyweg Consulting - Traffic and transport;
- Strategen - Bushfire Management
- Lloyd George - Acoustic Consultants

Figure 1: Location Plan



Figure 2: Context Plan



## 1.2 Land description

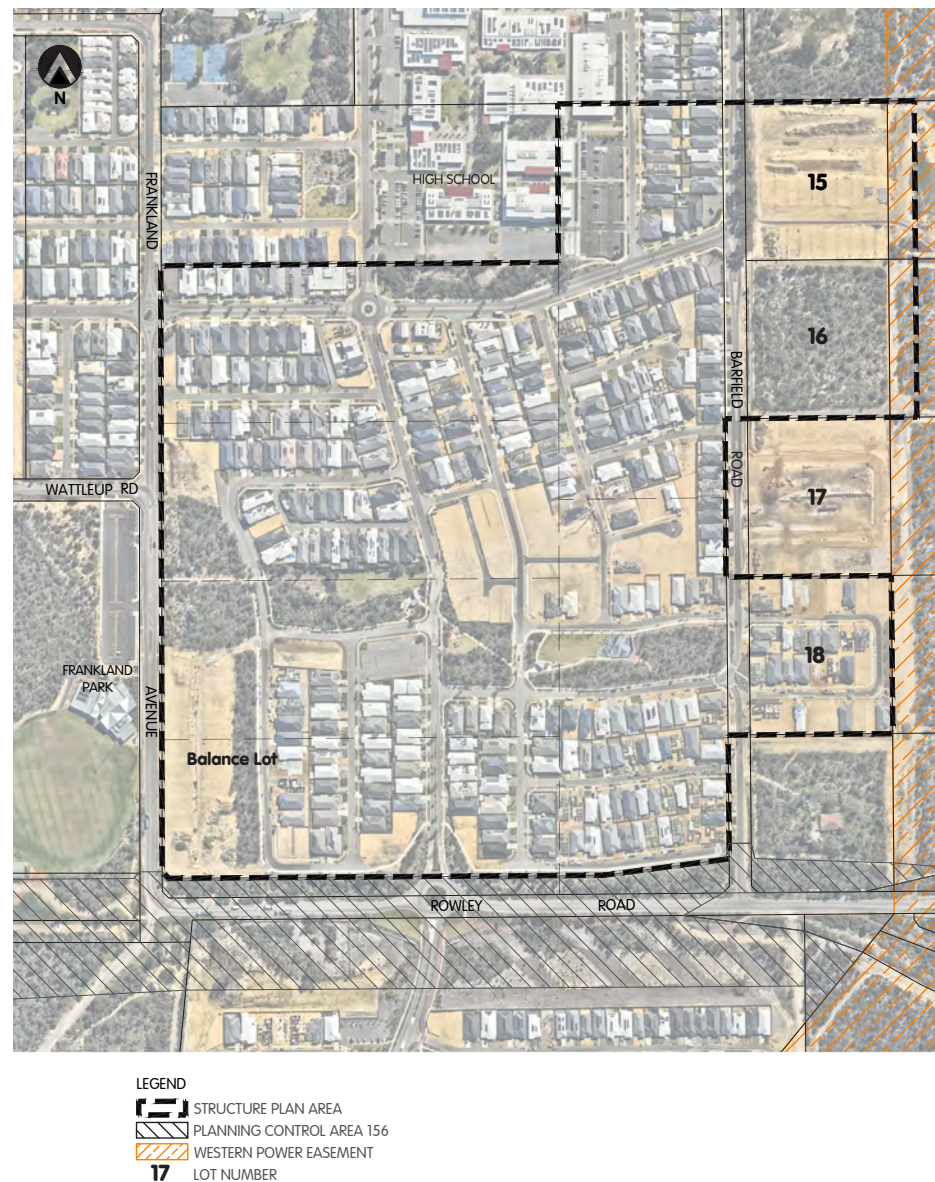
### 1.2.1 Location

The Structure Plan area is in the locality of Hammond Park which is approximately 25 kilometres south of the Perth Central Business District within the municipal boundaries of the City of Cockburn. The Structure Plan area is bounded by Frankland Avenue to the west, Rowley Road to the south and a powerline easement to the east and rural properties (zoned for urban development) to the north.

### 1.2.2 Area and land use

The Structure Plan area has a total area of 36.597 hectares and previously comprised a number of dwellings, outbuildings and cleared areas. Lot 18 was previously used for low intensity horse agistment.

Figure 3: Aerial Photograph (2023)



1.2.3 Legal description and ownership

The legal description of the subject land is provided in Table 1. Aerial photograph plan depicts the lots and their land use (Figure 3).

The Department of Housing previously owned some of the lots, but were eventually sold to Gold Estate Holdings Pty Ltd between 2013 and 2015.

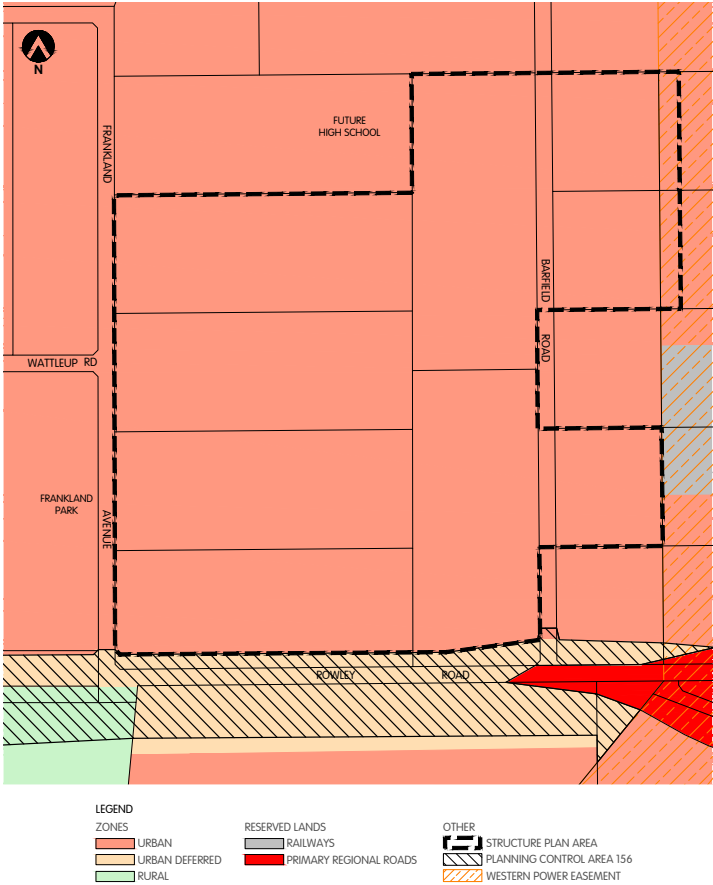


Figure 5: TPS Zoning

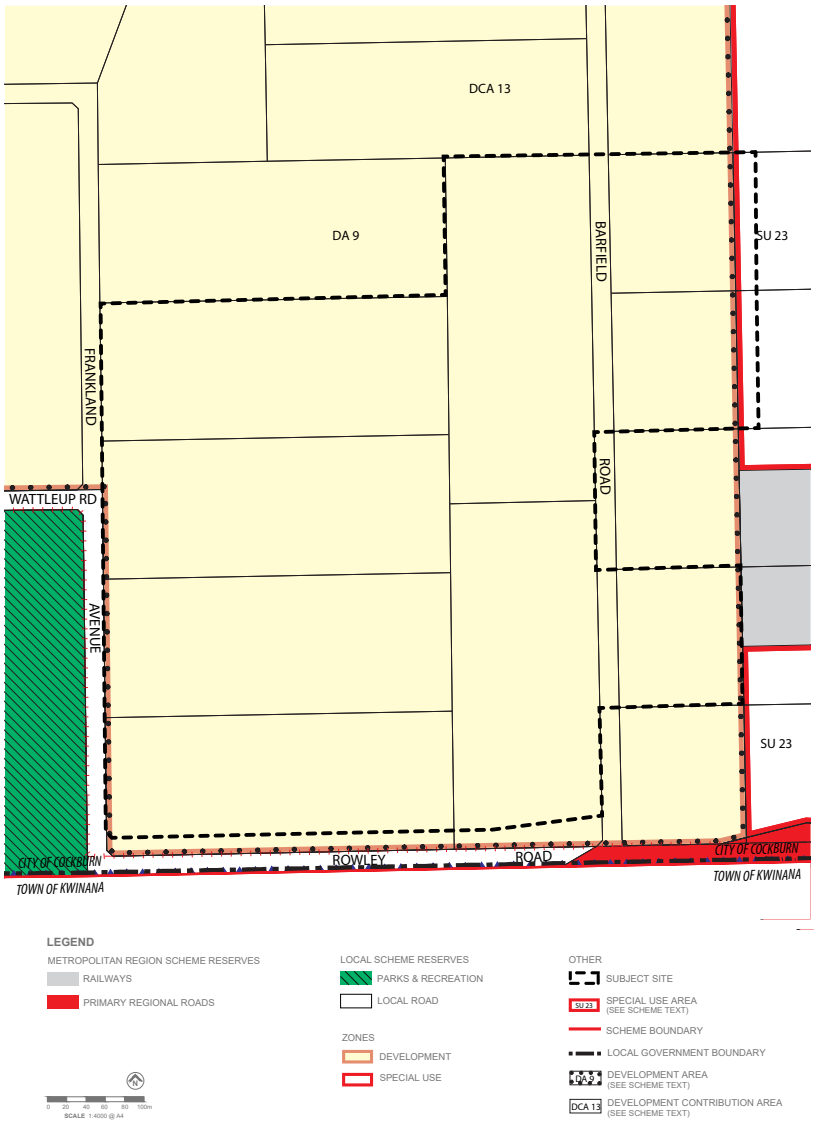




Table 1 - Lot Details and Ownership Summary

Lot No.	Street Address	Ownership	Volume & Folio (CT)	Plan No.	Area (ha)
15	171 Barfield	Gold Estates Holdings Pty Ltd	1913/170	30747	1.8650
16	Not Allocated	Gold Estates Holdings Pty Ltd	1913/48	30747	1.8606
18	205 Barfield	Gold Estates Holdings Pty Ltd	2058/447	30747	1.8614
Area Previously Subdivided					29.15
Total Area (not including portion of Barfield Road in Structure Plan area)					34.7370
Total Structure Plan Area					36.597

## 1.3 Planning framework

### 1.3.1 Zoning and reservations

#### 1.3.1.1 Metropolitan Region Scheme

The Structure Plan area is zoned 'Urban' under the provisions of the Metropolitan Region Scheme (MRS). A portion of the Structure Plan area, being the Rowley Road Planning Control Area, is zoned 'Urban Deferred'.

#### 1.3.1.2 City of Cockburn Town Planning Scheme No. 3

The Structure Plan area is zoned 'Development' (Development Area 9) under the provisions of the City of Cockburn Town Planning Scheme No.3 (TPS 3). CI 4.2.1 provides the following objectives for the 'Development' zone:

##### i. Development Zone

To provide for future residential, industrial or commercial development in accordance with a comprehensive Structure Plan prepared under the Scheme.

As a requirement for land zoned 'Development' in TPS 3, a Structure Plan has to be prepared prior to Council providing comment on subdivision applications and determining development applications. This Structure Plan report has been prepared in accordance with requirements listed under CI. 6.2.6 of TPS 3.

In addition, the Structure Plan area is subject to Development Area 9 (DA 9) where there is a requirement that in the event that retail uses are proposed in the Local Centre, these are not to exceed a maximum of 200m<sup>2</sup> NLA.

### 1.3.2 District Structure Plan

#### 1.3.2.1 Southern Suburbs District Structure Plan Stage 3

The Structure Plan area is subject to the provisions of the Southern Suburbs District Structure Plan Stage 3 (SSDSP3) prepared by the City of Cockburn. The SSDSP3 was endorsed by the City of Cockburn Council and adopted in September of 2012.

The SSPDP3 provides a framework for urban land uses that integrates with the broader Sub-Regional context. Under the provisions of the SSDSP3 medium and high density residential development, a local centre and public open space network are identified for the Structure Plan area. The Structure Plan is consistent with the intent of the SSDSP3 providing a network of open spaces, medium density residential development, with higher densities and a childcare centre within the identified local centre.

### 1.3.3 State Policies

#### 1.3.3.1 State Sustainability Strategy

The State Sustainability Strategy provides an overarching framework for the State Government to respond to the sustainability agenda. The Strategy identifies the following six broad goals and 42 strategy areas intended to fulfil these goals and to guide Government action towards achieving its vision for a sustainable Western Australia:

- Sustainability and governance;
- Contributing to global sustainability;
- Sustainable natural resource management;
- Sustainability and settlements;
- Sustainability and community; and
- Sustainability and business.

The policy objectives of the State Sustainability Strategy are incorporated into the planning system through State and Local Government policy and formally applied through planning decisions. The role of sustainability - economic, environmental and social - is fundamental to the planning of the site and is implicitly embodied in the content of this Structure Plan.



### 1.3.3.2 State Planning Strategy

The State Planning Strategy (1997) was prepared by the WAPC as a whole of Government approach to guide sustainable land use planning throughout the State up until 2029. The Strategy is aimed at developing a land use planning system to help the State achieve a number of key goals. These include generating wealth, conserving and enhancing the environment and building vibrant and safe communities for the enjoyment of this and subsequent generations of Western Australians. The Strategy was last audited in 2000- 2001. The Structure Plan is consistent with the goals and objectives of the State Planning Strategy.

### 1.3.3.3 Directions 2031 and Draft Outer Metropolitan Perth and Peel Sub-Regional Strategy

Directions 2031 and beyond (Directions 2031) is the high level spatial framework and strategic plan for metropolitan Perth and Peel regions. Directions 2031 provides a framework for the detailed planning and delivery of housing, infrastructure and services necessary for a variety of growth scenarios.

Directions 2031 identifies growth scenarios for low, medium (Connected City approach) and high-density rates of infill and greenfield development. The Connected City scenario, identified as the preferred growth scenario, was modelled to determine the area of greenfield land required to provide for a city of 3.5 million people. Consistent with the outcomes of this approach, Directions 2031 sets a target of 15 dwellings per gross urban zoned hectare land in development areas.

Directions 2031 is supported by a series of Sub-Regional Strategies. Each Sub-Regional Strategy provides information about the levels of expected population growth in individual local government areas. They also identify development opportunities and prospects for increased density within Greenfield areas, facilitating the housing targets outlined in Directions 2031.

The Structure Plan area is included within the South-West Sub-Region identified within the Draft Outer Metropolitan Sub-Regional Strategy for Perth and Peel (Draft OMPPSS). The South-West Sub Region is expected to supply 119,760 dwellings under the adopted 'Connected City' scenario. 18,280 of these dwellings are expected to come from greenfield sites within the City of Cockburn.

The Draft OMPPSS identifies the Southern Suburbs District Structure Plan area as 'urban zoned undeveloped' with an expectation to provide '3000+' dwellings. In proposing approximately 545 dwellings the Structure Plan provides for 18% of the estimated dwellings in this location.

#### 1.3.3.4 Liveable Neighbourhoods

Liveable Neighbourhoods, Edition 3 (LN 3) is a Western Australian Planning Commission (WAPC) policy used to guide the design and assessment of structure plans (regional, district and local) and subdivision and development applications for new urban areas. Its aims include promoting the design of walkable neighbourhoods; places that support community and a sense of place; mixed uses and active streets; accessible and sustainable parks; energy efficient design; and housing choice.

The key initiatives of LN 3 are covered under eight design elements. The implementation of each of these elements and the fulfilment of the overall principles of LN 3 will be fundamental to ensuring that development of the structure plan area and the wider metropolitan region occurs in a thoughtful and sustainable manner. Application of the LN 3 principles is therefore relevant to all levels of planning for the site from the proposed Structure Plan through to detailed lot and building design.

By providing for a diverse range of housing within a connected and walkable neighbourhood, configured around a range of accessible open space areas, the Structure Plan reflects the requirements of LN 3. A comprehensive justification of the design in relation to the principles outlined in LN 3 is provided in Section 3.0.

#### 1.3.3.5 State Planning Policy No.1: State Planning Framework

State Planning Policy No.1: State Planning Framework (SPP1) unites existing state and regional policies, strategies and statements under a central framework to provide a context for decision-making on land use planning and development matters in Western Australia. The Structure Plan is consistent with the primary aim of this overarching policy, which can be summarised as "...to provide for the sustainable use and development of land." The WAPC and local government will refer to the relevant planning instruments referred to under SPP1 for all planning decisions, including those concerning the Structure Plan and subsequent planning proposals presented for the site.

#### 1.3.3.6 State Planning Policy No.2: Environmental and Natural Resources Policy

State Planning Policy No.2: Environment and Natural Resources (SPP2) sets out a planning response to environment and natural resource management issues within the framework of the State Planning Strategy.

Specific policy areas of relevance to the site include those relating to, soil and land quality, biodiversity, landscapes, greenhouse gas emissions and energy efficiency. Site responsive measures are detailed in Section 2.0.

#### 1.3.3.7 State Planning Policy No.3 Urban Growth and Settlement

State Planning Policy No.3: Urban Growth and Settlement (SPP3) applies to the whole of the State in promoting sustainable and well planned settlement patterns that have regard to community needs and are responsive to environmental conditions. The objectives and principles of Directions 2031 and Liveable Neighbourhoods are enshrined in this Policy.

SPP3 recognises that a majority of new development in metropolitan Perth has been in the form of low-density suburban growth. This form of development intensifies pressure on valuable land and water resources; imposes costs in the provision of infrastructure and services; increases the dependence on private cars; and creates potential inequalities for those living in the outer suburbs where job opportunities and services are limited.

To promote growth that is sustainable, equitable and liveable, SPP3 encourages a more consolidated urban form. In general terms the proposal for the site is consistent with the high level principles of SPP3.

This Structure Plan will facilitate:

- access to public transport (bus and rail);
- suitable access to areas of high quality POS;
- the creation of cohesive and walkable communities through the application of traditional neighbourhood design principles; and
- a diversity of housing types and lot sizes.

#### 1.3.3.8 State Planning Policy No. 5.4 Road and Rail Noise

State Planning Policy No.5.4: Road and Rail Noise (SPP5.4) addresses transport noise from within major transport corridors, including primary freight routes and their impact on sensitive land uses in close proximity. SPP5.4 is relevant as the Structure Plan represents:

- A proposed new noise-sensitive development in the vicinity of an existing or future major road, rail or freight handling facility.

Rowley Road has been identified as an important future strategic freight route and is expected to undergo significant redevelopment. SPP5.4 sets out the outdoor noise criteria that applies to proposals for new noise sensitive development and proposes a variety of possible noise management and mitigation measures including the use of:

- Noise attenuation barriers (noise walls); and
- Building design and construction techniques.

Details relating to noise and the treatment of the interface between Rowley Road and the Structure Plan area are provided in Section 3.4.

### 1.3.4 City of Cockburn Strategies and Policies

#### 1.3.4.1 City of Cockburn Local Planning Strategy

The SSDPS3 states that the District Structure Plan is consistent with the following actions outlined in the City of Cockburn Local Planning Strategy (LPS):

- Promote higher density and mixed use developments to reduce car use and promote, walking and public transport;
- Ensure there is an appropriate housing and density mix to fulfil existing and potential demand from various groups;
- Promote medium and high density housing in and near regional and district centres and near public transport facilities;
- Provide a range of housing opportunities; and
- Promote mixed land uses in communities, especially through the location of housing in commercial centres.

The Structure Plan remains generally consistent with the SSDPS3 and as such is in accordance with the above actions within the LPS.

#### 1.3.4.2 Local Planning Policy 5.19 - Structure Plans and Telecommunications Infrastructure (LPP 5.19)

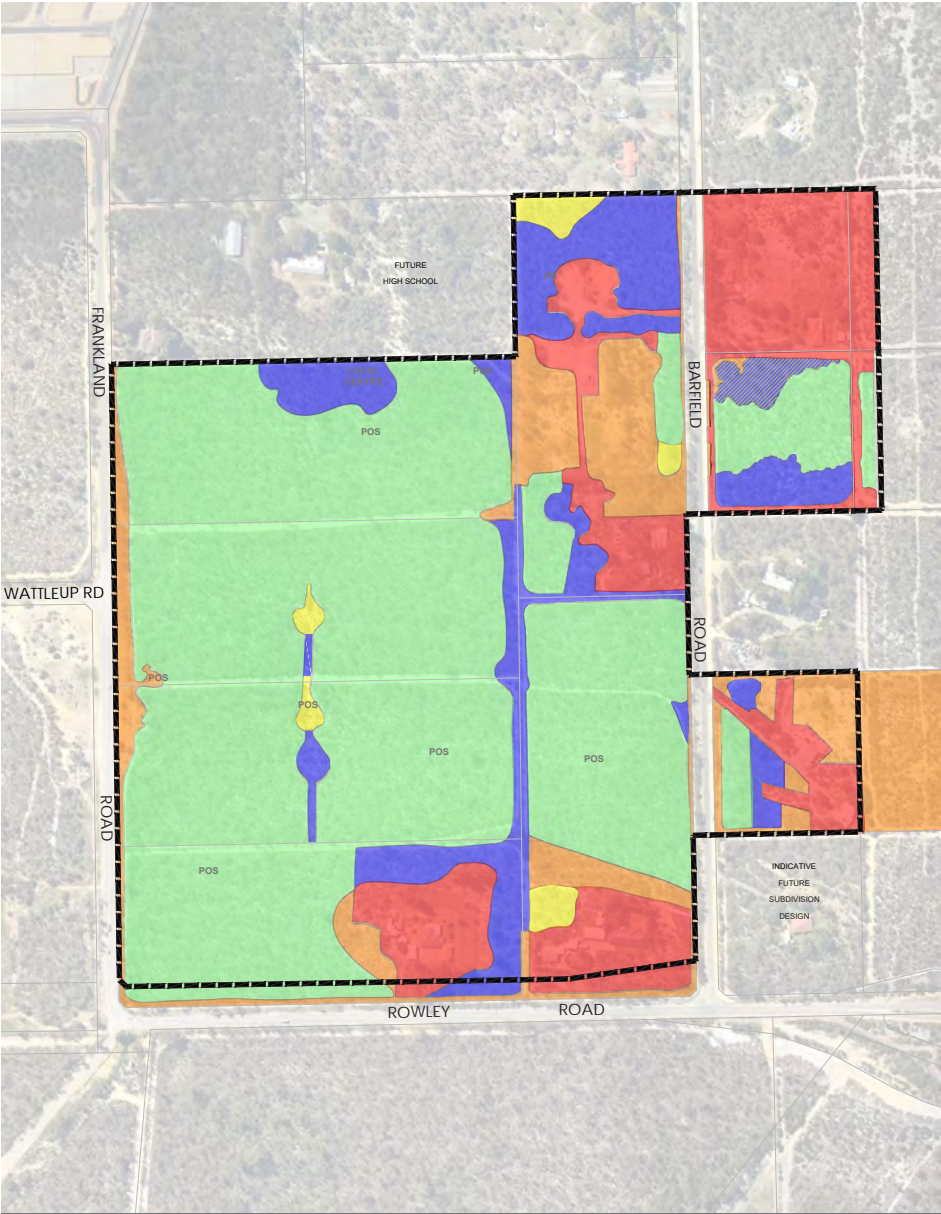
LPP 5.19 requires structure plans to provide evidence of consultation with telecommunications carriers responsible for operating mobile telecommunications infrastructure, to ensure infrastructure requirements are outlined at the earliest stage of planning. As identified within the Structure Plan, a fibre optic cable located along Rowley Road will service the proposed subdivision with Lot 16 being serviced through extending the existing network on Barfield Road. Mobile coverage from all major providers is available throughout the Structure Plan area.

Hatch have attempted to contact the major service providers to obtain written confirmation regarding the operation and potential upgrades of telecommunication services in the area, however, no direct line of contact has been possible. Every attempt to contact the providers directly, resulted in being referred to the general enquiry number. Through the coverage mapping provided on each providers website, confirmation of the provision of telecommunication services is provided, with all major providers (Optus, Telstra and Vodafone) providing the structure plan area with 4G, and Telstra and Vodafone providing 5G across the structure plan site.

1.3.4.3 Local Planning Policy 1.12 - Noise Attenuation (LPP 1.12)

Local Planning Policy 1.2 – Noise Attenuation (LPP1.12) requires structure plans to demonstrate that consideration has been given to future noise levels and proposes appropriate mitigation measures. Lloyd George Acoustics have prepared a Noise Management Report (Appendix 5) in support of this structure plan, in accordance the current version of LPP 1.12.

Figure 6: Vegetation Condition



## 2.0 Site Conditions And Environment

### 2.1 Environmental assets and constraints

#### 2.1.1 Vegetation and Flora

A Level 2 flora and vegetation assessment was undertaken by Ecoscape during October and November 2008. The vegetation within the Structure Plan area is described as being predominantly Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes of various ages, including the Bassendean System (Ecoscape, 2009a).

According to Heddle et al. (1980), the Structure Plan area is comprised of the Bassendean (Central and South) Vegetation Complex. The Complex is described as ranging from woodland of *Eucalyptus marginata*-*Allocasuarina fraseriana*-*Banksia* spp., to low woodland of *Melaleuca* spp. and sedgelands on moister sites (Ecoscape, 2009a).

While only one vegetation community was recorded on-site: *Banksia* spp. - *Allocasuarina fraseriana* Low Woodland, there was variation in the density of the various species within the community across the Structure Plan area.

The vegetation condition of the Structure Plan area was assessed and mapped using the Keighery (1994) Bushland Condition Scale and ranged from excellent (with few weeds and little sign of human disturbance) to completely degraded (associated with houses, gardens and areas of high disturbance). The condition of vegetation in the Structure Plan area is shown in Figure 6 and is described in more detail in the Environmental

Assessment Report contained in Appendix 1.

##### 2.1.1.1 Threatened Ecological Communities

A search of the Department of Environment and Conservation's (DEC) Threatened and Priority Ecological Communities (TECs and PECs) database was undertaken and four TECs were identified as occurring in the vicinity of the Structure Plan area:

- SCP 26a - *Melaleuca huegelii* - *Melaleuca acerosa* shrublands on limestone ridges (Endangered)
- SCP 10a - Shrublands on dry clay flats (Endangered)
- SCP 08 - Herb rich shrublands in clay pans (Vulnerable)
- SCP 30a - *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain (Vulnerable)

In addition, two Priority Ecological Communities are also known to occur in the vicinity of the Structure Plan area:

- SCP 24 - Northern Spearwood shrublands and woodlands
- 29a - Coastal shrublands on shallow soils

None of the TEC or PECs identified by the DEC's database search was found during the field survey of the Structure Plan area (Ecoscape, 2009a).



### 2.1.1.2 Flora

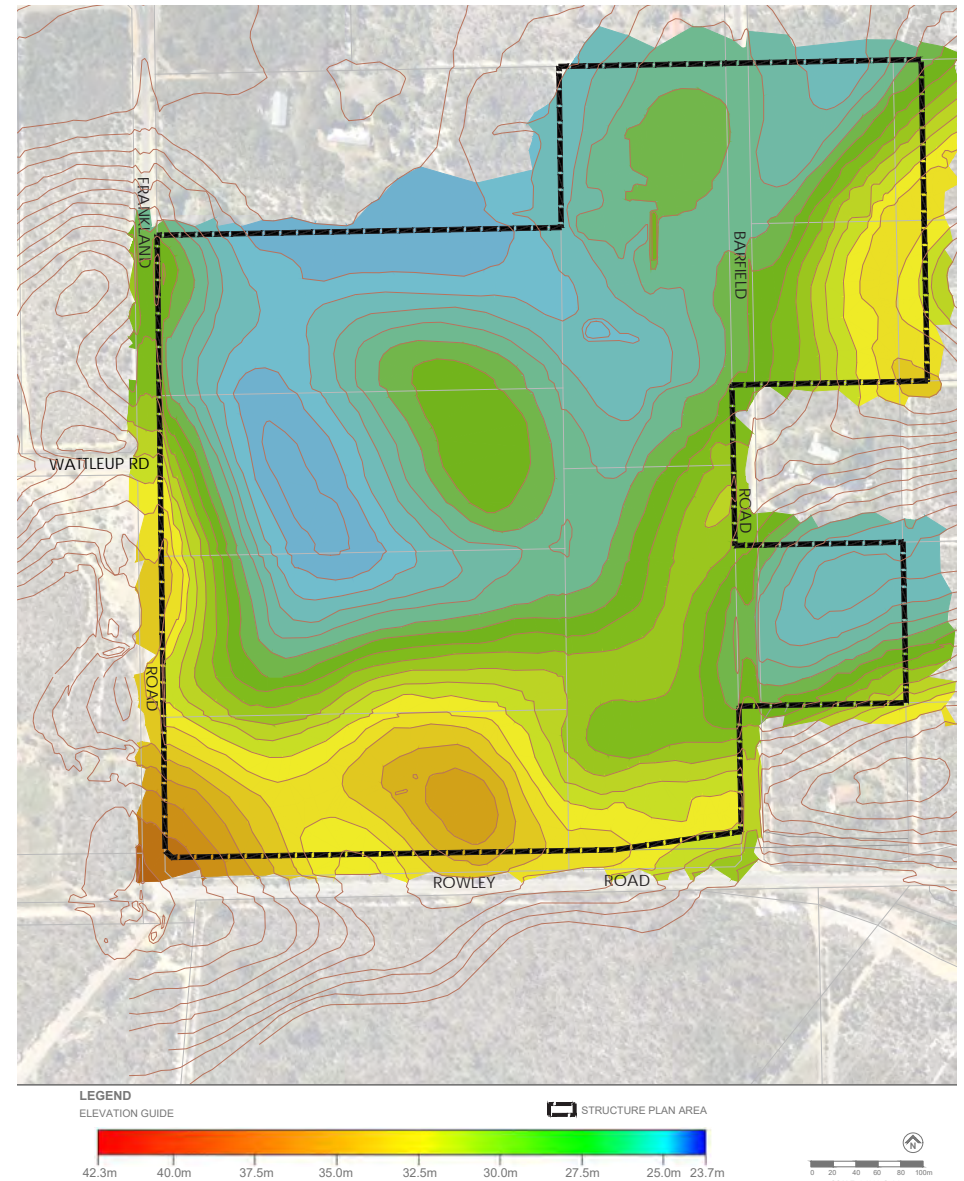
In total 149 vascular plant species were recorded from the Structure Plan area including 32 introduced weed species (Ecoscape, 2009a). The weeds recorded on-site include 10 species rated as high risk according to the Environmental Weed Strategy for Western Australia (Department of Conservation and Land Management, 1999), and one that is a Declared Plant (Department of Agriculture and Food Western Australia, 2008). Weeds that are high risk are those that have the ability to invade bushland that is in good to excellent condition, have a wide current or potential distribution, and have the ability to change the structure, composition and function of ecosystems, often forming monocultures (Ecoscape, 2009a).

During the field survey, a targeted search for Threatened and Priority Flora was conducted using a grid survey at 20m spacing 10m either side of a walked line. No Threatened Flora listed under the Western Australian Wildlife Conservation Act (1950), species listed under the EPBC Act (1999), or DEC Priority listed species were found to be located on-site during the spring survey (Ecoscape, 2009a).

The POS network has been designed to maximise the retention of vegetation identified as being in an excellent condition. There are no Threatened or Priority Flora or Threatened or Priority Ecological Communities found on-site. Landscaping will focus on the retention of the overstorey canopy of Banksia woodland where possible in order to provide potential foraging habitat for Carnaby's Cockatoo.

The updated Environmental Assessment and Management Strategy concludes that Lot 16 consists of native regrowth vegetation with no threatened or priority flora species identified within the site.

Figure 7: Contour Plan



### 2.1.1.3 Fauna

A level 1 fauna assessment of the Structure Plan area was undertaken by Ecoscape in 2009. The assessment included a reconnaissance survey by suitably qualified personnel to undertake selective, low intensity sampling of the fauna and faunal assemblages in order to verify the accuracy of the desktop assessment and to further delineate and characterise the fauna and faunal assemblages present within the Structure Plan area.

None of the species identified on-site during the reconnaissance survey were conservation significant species (Ecoscape, 2009b).

The remnant vegetation of the Structure Plan area is predominantly Banksia Woodland which is a preferred foraging species for the Black Cockatoo species. Minor signs of Cockatoo feeding activity were observed on-site during the reconnaissance survey although the species could not be definitively identified (Ecoscape, 2009b). The site also contains some significant Jarrah (*Eucalyptus marginata*) trees, defined by the Department of Sustainability Environment Water Population and Communities as having a diameter at breast height (DBH) exceeding 0.5 m, or showing development of hollows suitable for cockatoo nesting.

The Structure Plan provides a network of POS areas which maximise the retention of vegetation identified as being in very good to excellent condition. In addition to the POS network, road reserves have been widened in places to retain significant trees. This will ensure that some habitat which may have the potential for Carnaby's Cockatoo foraging will be retained.

Due to the proposed clearing of potential foraging and nesting habitat, the proposed development is likely to have an impact on the Carnaby's Black Cockatoo species. An EPBC Act referral is therefore currently being prepared for the site for submission to the DSEWPoC.

## 2.2 Landform and soils

The Structure Plan area is located in the transition area between the Spearwood Dune System and the Bassendean Sands System (Gozzard, 1983), with the Spearwood Dune System overlying the older Bassendean Sands System that lies to the east (Churchward and McArthur, 1980). The topographic elevation at the site ranges from 24m AHD along the northern and eastern boundaries, to 40m AHD along the south-western corner with multiple ridge lines running through the site. The grade of the topography in some areas is up to 15%.

The site is identified as having a moderate to low risk of Acid Sulphate Soils occurring within 3m of natural soil surface or deeper (Western Australian Planning Commission, 2009a).

A search of the DEC's Contaminated Sites database confirmed that there are no known contaminated sites within the site.

As a result no management recommendations or commitments are required to be implemented with respect to either of these factors.

The site's topography is shown in Figure 7.



## 2.3 Groundwater and surface water

A desktop analysis of the Structure Plan area confirms that there are no wetlands identified in the DEC's Geomorphic Wetlands Swan Coastal Plain dataset as being located either on or adjacent to the site.

The Department of Water's (DoW) Perth Groundwater Atlas (2008) identifies that the groundwater flow beneath the Structure Plan area is generally in a westerly to south-westerly direction. Based on the groundwater monitoring, groundwater levels underlying the Structure Plan area range from 18.75 mAHD to 21 mAHD with a depth to groundwater ranging from 5m to 10m (Cardno WA)

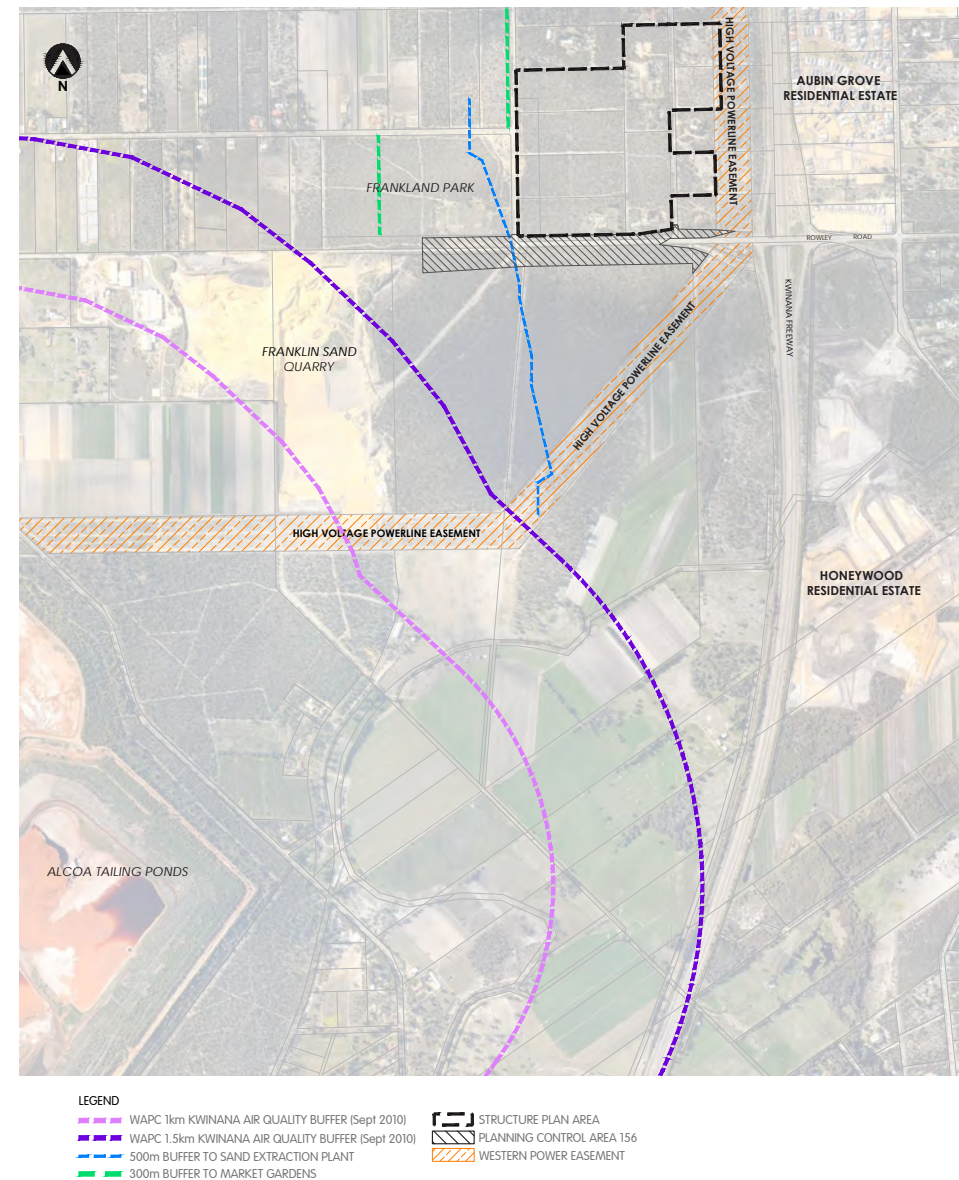
The EPBC Protected Matters Search Tool identifies the site as being located upstream from the Peel-Yalgorup System catchment (Australian Government, 2012), while two Ramsar wetlands are located within 10 km of the Structure Plan area: Forrestdale Lake is located approximately 7.45 km to the north-east and Thomsons Lake approximately 3.13 km to the north-west.

A search of the WA Atlas confirms that there are no wetlands identified in the DEC's Geomorphic Wetlands Swan Coastal Plain dataset as being located either on or adjacent to the Structure Plan area.

There are no defined watercourses, streamlines or floodways located on-site (Cardno, WA).

Surface water and drainage is addressed in the detail in the Local Water Management Strategy (LWMS) prepared by Emerge Associates following groundwater monitoring in accordance with agency requirements. The LWMS is provided in Appendix 2.

Figure 8: Context and Constraints Plan



## 2.4 Bushfire hazard

A Bushfire Management Plan has been prepared in order to address the requirements for bush fire preparedness and bush fire damage mitigation. The implications of the Bushfire Management Plan are outlined further in 3.7 and a copy of the report is contained in Appendix 3. An updated BMP has been prepared by JBS&G to include Lot 16.

## 2.5 Context and constraints analysis

A Western Power easement and the Kwinana Freeway are located directly east of the Structure Plan area with Rowley Road, which runs in an east west direction, abutting the site's southern boundary. Land on the southern side of Rowley Road is currently uncleared and zoned 'urban deferred'. A sand quarry and the ALCOA Mandogalup Residue Disposal Area are a further 540m and two kilometres respectively to the south west. Frankland Park is located immediately to the west of the Structure Plan area.

### 2.5.1 Western Power Easement

A Western Power easement abuts the Structure Plan area to the east. Subdivision will encroach into part of the Western Power easement on Lots 37 and 38 Barfield Road, to provide a subdivisional road.

### 2.5.2 Rowley Road

Rowley Road borders the Structure Plan area to the south and has been identified as a future strategic freight route and as such is designated as a Planning Control Area by the Western Australian Planning Commission (WAPC). With the planning and development of the Latitude 32 Industry Zone and the future Outer Harbour to the west, Rowley Road has been identified as an east-west freight link of strategic importance. Redevelopment of Rowley Road to a single carriageway in order to allow for efficient and safe truck movement is seen as a high priority in the SSDSP3. To maintain the viability of Rowley Road as a freight route and progress the development of the Structure Plan area, it is a requirement that the interface is treated appropriately (in accordance with SPP 5.4 outlined in Section 1.3.3.8). The treatment of this interface is outlined in Section 3.4 of this report.

Figure 9: Structure Plan

LEGEND

 STRUCTURE PLAN AREA

ZONES

 RESIDENTIAL

 LOCAL CENTRE

RESERVES

 PARKS AND RECREATION

 PUBLIC PURPOSE - EDUCATION

OTHER ELEMENTS THAT INFORM THE LSP

 PROPOSED BUS ROUTE

 RESIDENTIAL DENSITY CODE

 PLANNING CONTROL AREA No. 156

 WESTERN POWER EASEMENT



Figure 10: Residential Density Plan

### 2.5.3 Sand Extraction Plant

A sand extraction plant is located on the southern side of Rowley Road approximately 540 metres southwest of the site and is identified in figure 8. The EPA's Guidance Statement 3: Separation Distance between Industrial and Sensitive Land Uses (Environmental Protection Authority, 2000) recommends a generic separation buffer of 500 m to protect sensitive land uses such as residential, from the impacts of noise and dust emissions.

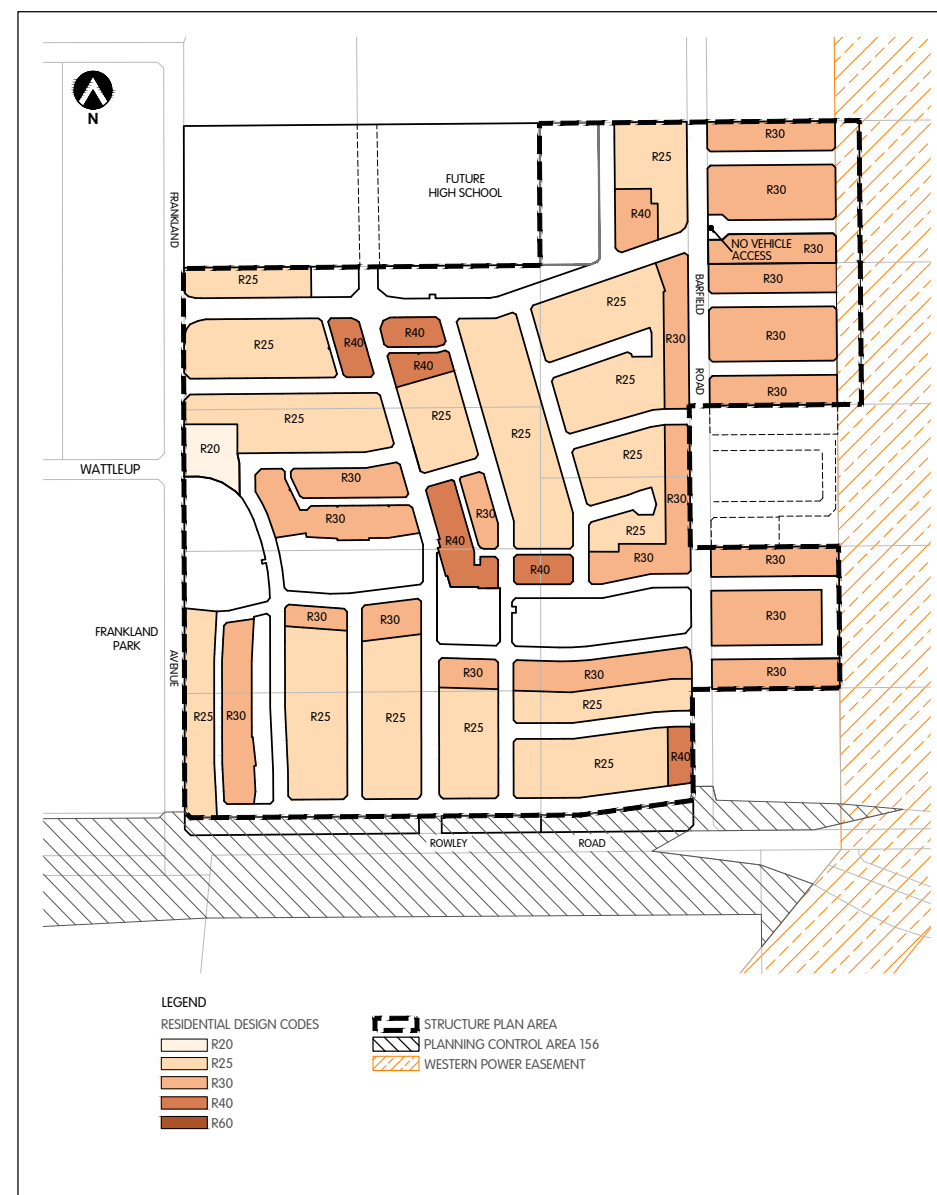
Given that the separation distance between the sand extraction plant and the site exceeds the EPA's 500m buffer and the site is nearing completion as a sand source, the plant is not a constraint to development in the Structure Plan area.

### 2.5.4 Mandogalup Residue Disposal Area

Alcoa's Mandogalup Residue Disposal Area (RDA) is located approximately two km to the south-west of the Structure Plan area (refer to figure 8). As detailed in the appended EAR a 1.5 kilometre buffer is provided for the RDA. Given that the separation distance between the RDA and the site exceeds the WAPC's 1.5 km buffer, the land use is not a constraint upon the proposed development of the site.

### 2.5.5 Frankland Park

Frankland Park is located to the west of the Structure Plan area. The land is reserved Parks and Recreation in TPS 3 to preserve and protect the existing vegetation and to provide district level playing fields in the southeast section of the Park.



## 3.0 Structure Plan

### 3.1 General

In accordance with SSDPS3 the Structure Plan provides for a range of residential densities, a well-designed POS network and a local centre. The location of POS is generally consistent with that prescribed in the SSDSP3 with some areas configured to retain significant trees and Banksia woodland identified as very good to excellent in condition.

Whilst not formally part of the Structure Plan, provision has been made for an indicative future road layout over the adjacent properties located to the east of Barfield Road. A 'shared road' design off Barfield Road has been incorporated along property boundaries to ensure development opportunities apply to all landowners.

### 3.2 Land use

A child care premises is located in the local centre. A childcare centre facility would complement the high school and primary schools identified directly north of the Structure Plan area, providing a clustering of educational uses.

Medium density development has been positioned in areas of high amenity, specifically adjacent to high quality POS. In the south west corner and the central areas of the Structure Plan, medium density development has been configured around areas of POS featuring either retained vegetation or landscaped parks capitalising on the preserved amenity or enhanced landscaping.

The proposed design for the Structure Plan is illustrated in Figure 9.

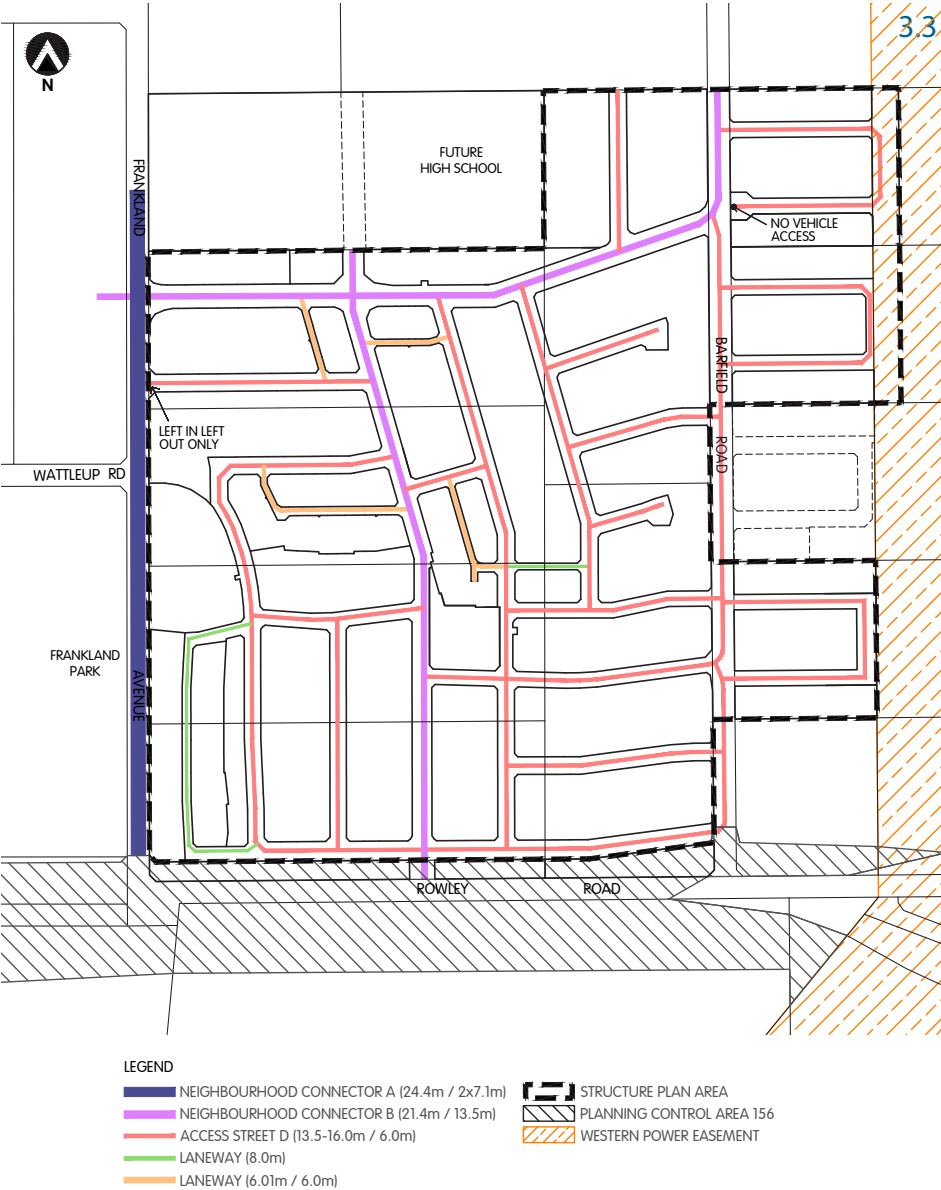
An overview of the Structure Plan and its key elements is provided in Table 2 below.

Table 2 - Structure Plan Summary Table

Item	
Total area covered by the structure plan	36.597 ha
Area of specified land use	Residential: 22.09 ha POS: 3.9 ha Road Reserve: 9.597 ha Local Centre: 0.15 ha High School Site: 0.86 ha
Estimated Lot Yield	545
Estimated number of dwellings	545
Estimated population	1400 people
Number of high schools (portion)	1
Number of primary schools	0
Estimated retail floor space	0
Estimated employment provided (no. of jobs)	5
Number and area of public open space	
: District parks	0
: Neighbourhood parks	3.9 ha



Figure 11: Movement Network Plan



### Residential

The residential densities have been configured to reflect the requirements of SSDSP3. In this regard higher densities have been provided adjacent to POS areas and the local centre.

The densities proposed within the Structure Plan range from R25 to R60, based upon the specifications of SSDSP3 and the site's conditions and characteristics. The proposed mix will respond to a variety of demographics and cater for a range of household compositions (refer Figure 10).

A high point in the south west corner of the Structure Plan area provides an opportunity to elevate residential development and obtain views to the retained vegetation in the adjacent POS. Residential development in this corner will be retained with the objective of facilitating the gradient, retaining the vegetation and maximising view opportunities.

The proposed road network orientation north-south and east-west will ensure that all lots will be able to provide passive solar design opportunities for the built form and layout of future dwellings.

Table 3 provides a summary of the dwelling yield and number of dwellings per hectare. The average yield achieves the benchmarks advocated in Directions 2031, notwithstanding the combination of the provision of POS in excess of the standard requirements for POS contribution in order to facilitate a broad range of POS functions, and the accommodation of part of the proposed High School within the Structure Plan area. The Structure Plan exceeds the dwelling target provided in Liveable Neighbourhoods.

Lot 16 proposed lot sizes range from 302m<sup>2</sup> - 450m<sup>2</sup> with an approximate yield of 40 lots. This lot range in yield accords with the R30 coding proposed for the site.

Figure 12: Rowley Road Interface



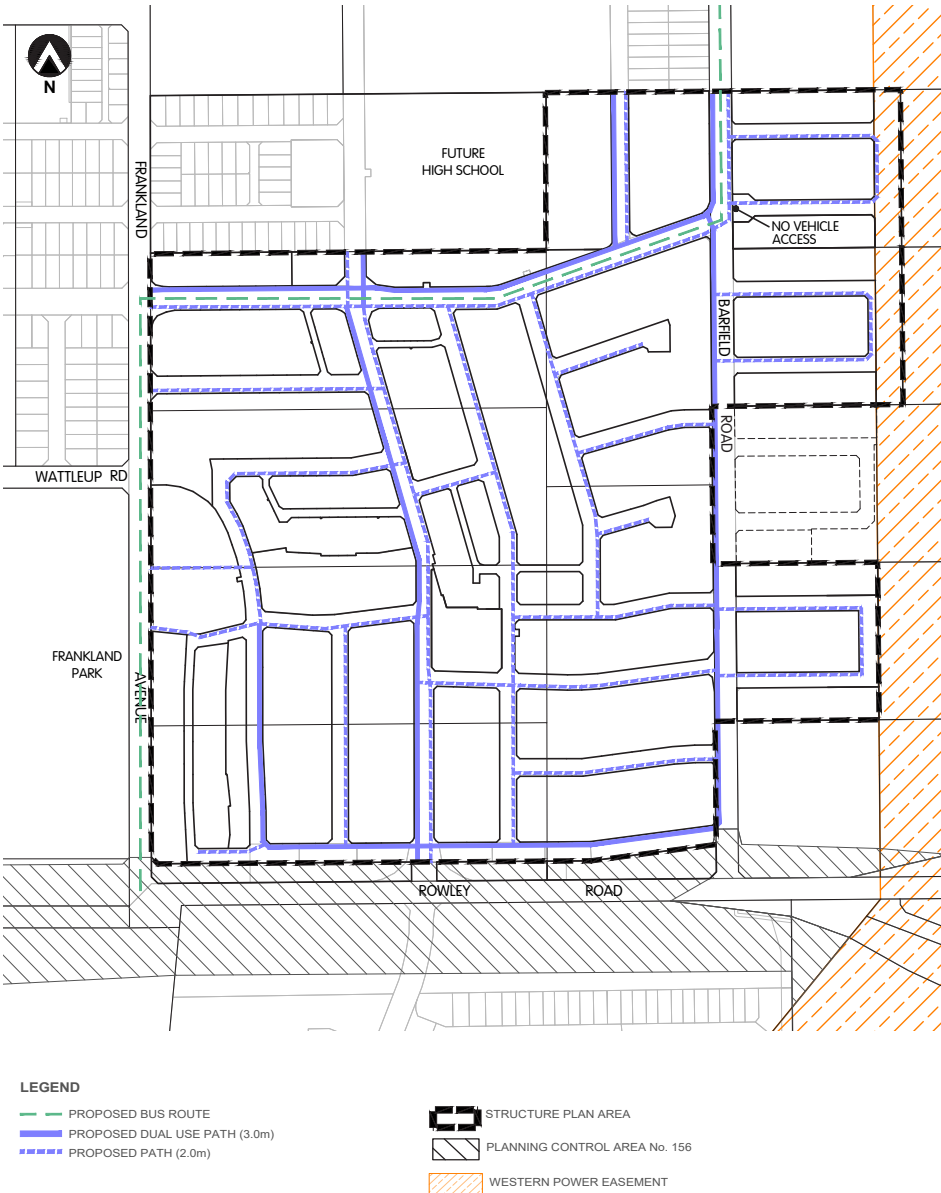
Table 3: Density Target Summary

Planning Document	Target	Proposed
Direction 2031	15 dwellings per hectare (urban zoned land: 36.597 ha)	15 dwellings per hectare
Liveable Neighbourhoods	22 dwellings per site hectare (residential land: 22.09 ha)	24.7 dwellings per hectare

3.4 Movement networks

The hierarchy of streets within and adjacent to the Structure Plan area is based on the hierarchy defined within Liveable Neighbourhoods. The proposed design provides for a permeable, interconnected road network that provides ease of movement for pedestrians, cyclists and motorists within the Structure Plan area. The below discussion on the proposed transport network relates to the Road Hierarchy Plan provided as Figure 11 and the Cycle/Footpath Plan provided as Figure 13.

Figure 13: Cycle/Footpath and Public Transport Plan



Connection to Rowley Road is proposed at two points, this being Frankland Avenue and the proposed Neighbourhood Connector B which runs north/south through the Structure Plan area. These connections are short-medium term only and subject to rationalisation in preparation for when Rowley Road is upgraded to a strategic freight route.

In this regard the following provides an access and staging strategy for Rowley Road:

- At first stage subdivision, full access provisions for an entry road to the estate (Neighbourhood Connector B) comprising a roundabout.
- At a time to be agreed between Main Roads WA and the proponent, the final intersection configurations will comprise the following:
  - Access to and from Rowley Road for the Neighbourhood Connector B being removed;
  - Barfield Road to be a cul-de-sac; and
  - Access to and from Rowley Road for Frankland Avenue will ultimately only allow for a Left In/Left Out intersection.

Future landowners will be made aware of the temporary nature of these connections through information packages made available during the sales process, notifications on title and signs at each of the intersections.

Rowley Road has been identified as an important east-west freight route, servicing the developing Latitude 32 Industry Zone (Latitude 32) and future Westport Infrastructure project. As such, Rowley Road is planned to be widened and redeveloped. It is not expected that Latitude 32 or the Outer Harbour will become operational in the short to medium term; however as a high volume of trucks use both Rowley and Frankland Roads it is expected that Rowley Road will be constructed on an alignment between Frankland and Mandogalup Roads as a first phase of upgrading works.

Because Rowley Road is designated as a major freight route, there will be a requirement to provide a three metre high noise wall along the southern

boundary of the Structure Plan area. In accordance with the requirements of the SSDSP3, residential lots do not directly abut Rowley Road. The Structure Plan proposes lots that front an internal road, are configured adjacent to a nine metre landscape verge that effectively screens the road and noise wall whilst retaining existing vegetation. A conceptual cross-section depicting the manner in which the interface will be treated is shown in Figure 12.

Notifications will also be provided on Certificates of Title for all lots in the noise affected area as identified in the Noise Management Plan contained in Appendix 5.

The SSDSP3 identifies a 'bridge structure' to allow for vehicle access between the Structure Plan area and urban development to the south. In this regard the Structure Plan retains Barfield Road on its current alignment and within a 20m reserve, if this connection is required at some point in the future.

Access to the Structure Plan area will be achieved closer to the existing Rowley and Frankland Road intersection. This access road will ultimately act as a 'civic avenue' passing through the local centre and past a Primary School and a high school. Following a comprehensive traffic assessment the intersection at Rowley Road has been deemed suitable in the short-term with the provision of a 4-way roundabout.

The internal street network is premised on a north-south and east-west pattern, with regular intersections to allow a high level of accessibility for pedestrians, cyclists and vehicles. Due to the positioning of several areas of POS, the street network also provides view corridors to these POS parcels. The internal street network primarily comprises a series of Access Street 'D' roadways (as defined in Liveable Neighbourhoods). These streets have been designed in accordance with Liveable Neighbourhoods and include six metre kerb radii at intersections.

The detailed design of the local road network will be refined through the subdivision design process to the satisfaction of the City of Cockburn.



### 3.5 Open space

The location and configuration of POS within the Structure Plan design reflects the objectives of the SSDSP3 to provide a variety of POS opportunities facilitating informal or active recreation, drainage and tree retention.

The size and useability of POS areas varies across the site. POS Areas A1 and A2 in the south west corner preserve existing vegetation and provides an attractive outlook for the adjacent medium density development.

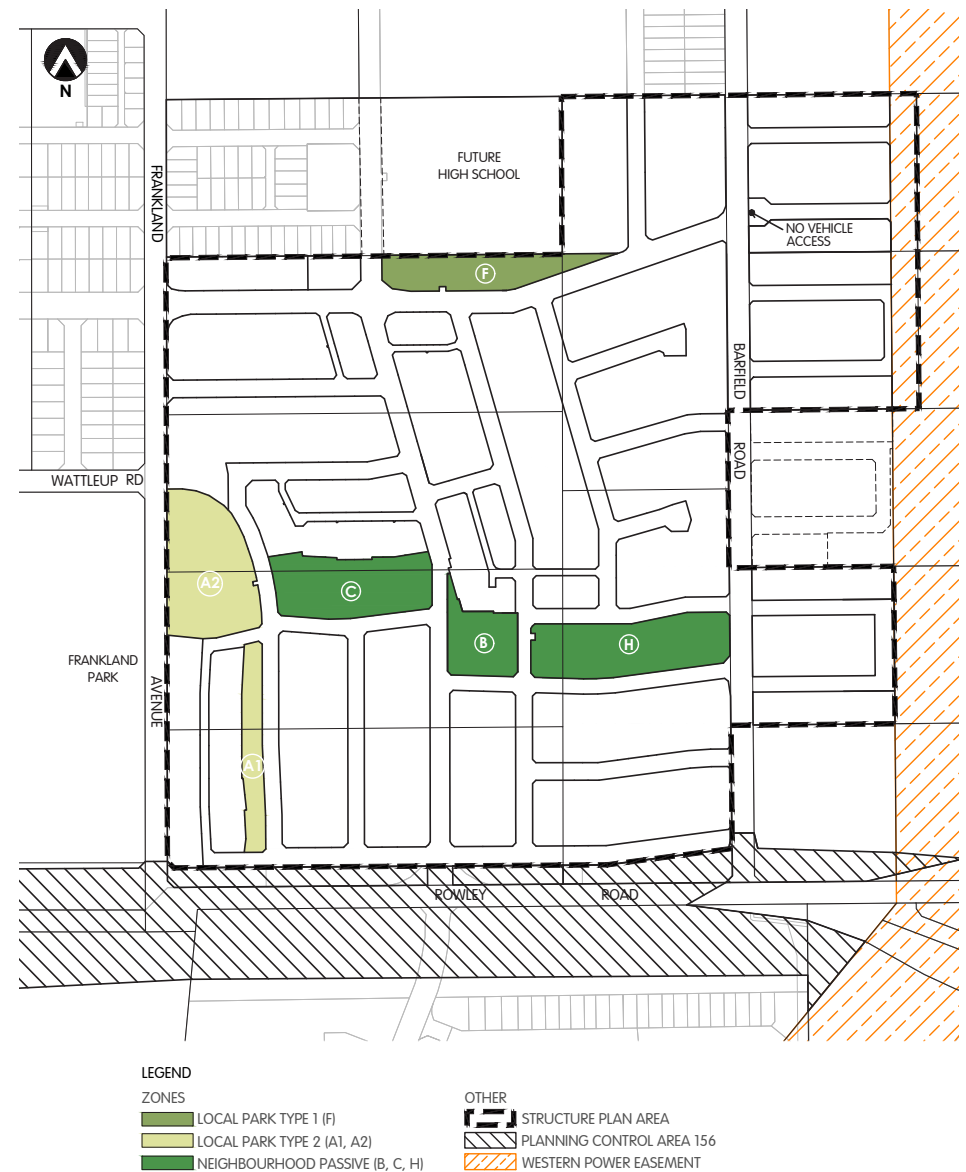
Medium density development will also border POS areas B and C, which will include some areas of retained banksia bushland areas for active play. POS area F is located in close proximity to the local centre and the future high school site and provides open turf areas for informal active recreation. POS H will provide a drainage function, a kick about area and provide an attractive view point from the Barfield Road view corridor.

The following street trees will be planted throughout the Structure Plan area:

- *Corymbia ficifolia* – Red Flowering Gum;
- *Agonis flexuosa* - WA Peppermint;
- *Jacaranda mimosifolia* – Jacaranda
- *Eucalyptus torquate* – Coral Gum
- *Eucalyptus sideroxylon* – Red Ironbark
- *Melaluca quinquinervia* - Paperbark

Liveable Neighbourhoods identifies the function of POS as: sport, recreation, and nature, which replaces the terms active and passive use. A balance between native vegetation retention and provision of urban water management is advocated through the provision of functional POS for sport, nature and recreation. Nature spaces provide a setting for people to enjoy and connect with nature. Nature spaces should be fully accessible to the public (i.e. not fenced off), although providing walking trails to prevent undue damage to vegetation is acceptable. POS Areas A1 and A2 seek to retain the

Figure 14: Public Open Space



existing native vegetation with walking trails (A1 walking path adjacent the proposed lots to also provide for front pedestrian access / A2 central walking path linking residents with Frankland Ave). Both POS area A1 & A2 accord with the principles of Liveable Neighbourhoods and thereby form part of the 10% provision as set out in Table 5.

**Table 4: Public Open Space Summary**

Public Open Space Typology	Description
Local Park Type 1	<ul style="list-style-type: none"> <li>Predominantly native planted areas with pockets of turf;</li> <li>Small gathering nodes and basic picnic/BBQ facilities</li> <li>Path network which links into the greater Hammond Park development;</li> <li>Primary focus on active recreation</li> </ul>
Local Park Type 2	<ul style="list-style-type: none"> <li>Predominantly retained vegetation;</li> <li>Path network which links into greater Hammond Park development;</li> <li>Primary focus on passive recreation</li> </ul>
Neighbourhood Passive	<ul style="list-style-type: none"> <li>Balance of native planted pockets and open turf areas;</li> <li>Large gathering nodes with BBQ/picnic facilities</li> <li>All age play areas</li> <li>Pedestrian/Cycle path network which links into the greater Hammond Park development;</li> <li>Primary focus informal active recreation spaces</li> </ul>

The Structure Plan area provides 3.6747ha of POS (not including dedicated drainage areas which are excluded from the POS requirement), equating to 10.5% of the total gross subdivisible area. This represents an over

provision 0.1747ha when assessed against the requirement for 10% POS.

Figure 14, Table 5 and Table 6 provide a detailed schedule of the provision of POS within the Structure Plan area.

**Table 5: Public Open Space Calculations**

Structure Plan Area		36.597 ha
Deductions:		
Local Centre	0.15 ha	
High School	0.86 ha	
Western Power high voltage line easement	0.29 ha	
Dedicated Drainage	0.26 ha	
Gross Subdivisible Area (GSA)		35.037 ha
Public Open Space requirement @ 10% of GSA		3.5 ha
May comprise		
Minimum 80% Unrestricted Public Open Space		2.7995 ha
Maximum 20% Restricted Open Space		0.6998 ha
Unrestricted Public Open Space (minus 1 in 5 year)		
POS A1	0.3510 ha	
POS A2	0.9897 ha	
POS B	0.3983 ha	
POS C	0.6197 ha	
POS F	0.3761 ha	
POS H	0.7731 ha	
Total Unrestricted Public Open Space		3.5129 ha
Restricted Public Open Space (1 in 5 year minus 1 in 1 year)		
POS A1	-	
POS A2	-	
POS B	-	
POS C	0.0716 ha	
POS F	0.0460 ha	
POS H	0.0442 ha	
Total Restricted Public Open Space		0.1618 ha

Total Overall Public Open Space Provision		3.6747 ha (10.5%)
---	--	----------------------

**Table 6: Public Open Space Schedule**

POS Area	Total Area (ha)	Unrestricted	Restricted	Dedicated Drainage (Deduction)
A1	0.3510 ha	0.3510 ha	-	
A2	0.9897 ha	0.9897 ha	-	
B	0.3983 ha	0.3983 ha	-	
C	0.7743 ha	0.6197 ha	0.0716 ha	0.0830 ha
F	0.5355 ha	0.3761 ha	0.0460 ha	0.1134 ha
H	0.8829 ha	0.7781 ha	0.0442 ha	0.0606 ha
Total	3.9317 ha	3.5129 ha	0.1618 ha	0.2570 ha

### 3.6 Water Management

A revised Water Management Strategy (LWMS) for the Structure Plan area has been developed in accordance with Better Urban Water Management (DOW 2008), State Planning Policy 2.9 Water Resources (WAPC 2006) and Planning Bulletin 92 Urban Water Management (WAPC 2008). Water will be managed using an integrated water cycle management approach, which has been developed using the philosophies and design approaches described in the Stormwater Management Manual for Western Australia (DOW 2007). The key principles of integrated water cycle management that have guided the water management approach in the Structure Plan area include:

- Considering all water sources, including wastewater, stormwater and groundwater
- Integrating water and land use planning
- Allocating and using water sustainably and equitably
- Integrating water use with natural water processes
- Adopting a whole of catchment integration of natural resource use and management.

The overall objective for integrated water cycle management for residential developments is to minimise pollution and maintain an appropriate water balance. The Structure Plan area LWMS design objectives seek to deliver best practice outcomes using a Water Sensitive Urban Design (WSUD) approach, including detailed management approaches for:

- Potable water consumption
- Flood mitigation
- Stormwater quality management
- Groundwater management.

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving waters and their ecosystems. The LWMS provides a comprehensive summary of the existing environment, based on a number of National and State policies and guidelines and site specific studies undertaken in and around the site. The characteristics and environmental values of the site have guided the design criteria, which will achieve the design objectives for the key management areas discussed above.

The WSUD approach and measures that are proposed for the Barfield Road development include:

- Maintaining existing flow regimes by retaining all runoff within the site;
- Treatment of surface runoff prior to infiltration to groundwater;
- Bio-retention areas incorporated in POS areas;
- Major event flood storage requirements addressed by POS areas;
- Co-location of flood storage areas with natural landforms and native remnant vegetation wherever possible;
- Adopting appropriate non-structural best management practices;
- Adopting a fit-for-purpose water use approach; and
- Minimising use of both scheme and non-potable water.

The LWMS was approved by the City of Cockburn and Department of Water in July 2013. The modifications to the Structure Plan plan do not result in any changes to the water management approach detailed in the approved LWMS and as such amendments to the LWMS are not required (as detailed in Section 10.3 of the approved LWMS). Future Urban Water Management Plans (UWMP) are expected to be required to support subdivision of the development, thus providing a mechanism for detailing the changes to the Structure Plan. UWMPs will include detailed drainage designs demonstrating how the criteria detailed in the approved LWMS are being met, as required by Better Urban Water Management (DoW

2008).

The LWMS demonstrates that the design approach for the Structure Plan area is consistent with a best practice WSUD approach, that the water management objectives for the Structure Plan area can be achieved, and the requirements of the relevant State and local government policies and guidelines will be satisfied.

The LWMS is contained in Appendix 2 and Lot 16 LWMS contained in Appendix 2C (refer Section 5.3).

### 3.7 Bush Fire Management

A revised Fire Management Plan (FMP) has been prepared for the proposed Structure Plan development (refer to Appendix 3) in accordance with the requirements of Planning for Bush Fire Protection Guidelines Edition 2 (the Guidelines, WAPC et al. 2010). The FMP details the approach to bush fire management for the proposed development and the measures to be implemented for protection from permanent and temporary bush fire risks in order to achieve an effective bush fire management outcome.

Detailed assessment of the on-ground fire environment, permanent and temporary bush fire hazards and the Bushfire Attack Level (BAL) was undertaken across the Structure Plan area and adjacent land to inform FMP recommendations and the level of application of AS 3959–2009 Construction of Buildings in Bushfire-prone Areas (SA 2009). This included assessment of the on-ground vegetation types and class, slope under classified vegetation and the distance between proposed development areas and the adjacent bushland extent.

The following is a summary of key bush fire issues that were considered as part of the FMP to inform development of specified bush fire risk treatment and mitigation measures:

- the Structure Plan Area has not been subject to fire for possibly more than 20 years
- common sources of ignition within the City of Cockburn include sus-

- pected arson and accidental causes such as vehicle accidents
- response times in the event that the Structure Plan Area is threatened by bush fire is within 30 minutes from local bush fire brigades
- the Structure Plan Area contains bush fire hazards in the form of bank-sia-Sheoak low woodland ('Extreme' bush fire hazard level) with slopes of up to 15 degrees in some areas
- the on-site vegetation extent is proposed to be cleared or landscaped with on site POS not considered to pose a significant bush fire risk
- land adjacent to the Structure Plan Area contains bush fire hazards levels grading from 'Low' to 'Extreme'.
- a proportion of the proposed development cannot achieve the full 100 m hazard separation distance to surrounding bush fire prone areas and a comprehensive suite of bush fire risk treatment and mitigation measures will need to be implemented to mitigate the risk.
- performance criteria and associated acceptable solutions will be achieved for a moderate bush fire hazard level.

Based on the on-ground fire environment and BAL assessment, the following key bush fire risk treatment and mitigation measures have been recommended for the Structure Plan:

1. Implement the 20 m wide BPZ as depicted in the FMP.
2. Maintain on-site POS at less than 5 t/ha, or less than 2 t/ha in areas where the POS occurs within a designated Building Protection Zone (BPZ).
3. Maintain vacant areas of private property and undeveloped land at less than 2 t/ha.
4. Comply with the current City of Cockburn annual fire control order.
5. Undertake fuel inspections.
6. Apply BAL 19 and BAL 12.5 building construction standards as depicted in the FMP.
7. Clear and leave undeveloped all lots depicted in the FMP as being located within BAL FZ/BAL 40 areas or the 20m wide BPZ. The lots are to remain in this state until such time that the temporary bush fire hazard on adjoining land is removed. Once the affecting hazard has been removed, the BALs for these unconstructed lots are to be reassessed and new BALs assigned where applicable.
8. Revise the BALs currently depicted in the FMP that address temporary bush fire risk if the temporary bush fire hazards are removed prior to development of affected areas of the Structure Plan.
9. Construct the masonry walls depicted in the FMP.
10. Implement a 100 m wide on-site fuel reduced buffer around each stage subject to construction to address the temporary bush fire risk posed by future undeveloped stages of the site.
11. Ensure that all residents and visitors are provided with at least two public vehicular access routes for all stages of development that connect to the surrounding public road network.
12. Provide a reticulated water supply throughout the development.
13. Provide a network of hydrants along the internal road network.
14. In case of bush fire emergency, utilise the suggested muster point location at POS Area H, as depicted in the FMP.
15. Include Section 70 Notification on Title for all proposed lots located within the 100 m wide BAL assessment area to ensure prospective landowners are aware that an FMP exists over the site and that specified building construction requirements and/or building setbacks may apply.
16. Prepare DAPs as required for specified lots at the subdivision stage to address detailed fire planning requirements.

On the basis of the above, the FMP demonstrates compliance with the Guidelines and AS 3959–2009 and addresses the bush fire risk posed by both permanent and temporary hazard sources. The FMP also demonstrates that subject to careful design and future management an effective bush fire management outcome can be achieved for the site to ensure the ongoing protection from potential bush fire.

The determined worst-case BAL impact to habitable development for Lot 16 is BAL-29, which is an acceptable rating in accordance with SPP3.7 and Guideline requirements.

An updated bushfire assessment inclusive of a BAL assessment has been undertaken for Lot 16 Barfield Road. It has been determined that the worst-case BAL impact proposed to Lot 16 is BAL-29, which is deemed an acceptable rating in accordance with SPP3.7 and the Guidelines.

The BMP confirms that given the 20m road reserve no formal Asset Protection Zones (APZ's) or APZ setbacks will be required and that all proposed lots will be able to achieve BAL-29 or lower through standard low threat separation as provided for in the subdivision concept plan. On this basis there will be no additional management requirements for the City beyond those set out in the city's fire control order. In addition, the 'WA Planning Manual – Guidance for Structure Plans' only requires the identification of bushfire prone areas and to identify the need for a site-specific bushfire management plan at the time of subdivision.

### 3.8 Education Facilities

The SSDSP3 identifies a Private Primary School and High School directly north of the Structure Plan area. A portion of the High School site falls within the Structure Plan area and has been facilitated accordingly. A child care premises is located in the local centre and will complement the clustering of education facilities north of the Structure Plan area.

Operation Policy 2.4 School Sites (OP 2.4) indicates at the subdivision stage, ongoing consultation with the Department of Education, non-

government education providers and the WAPC should be conducted to ensure the acceptability of proposed school sites. OP 2.4 requires one government primary school site for every 1,500 dwellings and one secondary school for every 4-5 government primary schools.

The structure plan indicates a projected population of approximately 1,400 people, with the SSDSP3 identifying a Private Primary School and High School directly north of the Structure Plan area. A portion of the High School site falls within the Structure Plan area and has been facilitated accordingly. A child care premises is located in the local centre and will complement the clustering education facilities north of the Structure Plan area.

### 3.9 Infrastructure coordination, servicing and staging

An Engineering Servicing Report prepared by the Civil Group concludes that there are no major impediments to development within the Structure Plan area. The Engineering Servicing Report is contained within Appendix 6.

#### Earthworks

Site clearing and bulk earthworks will be required over the majority of the site to fill low lying areas to ensure that proposed gravity sewerage infrastructure can be accommodated. Retaining walls will need to be constructed on the majority of the lots, particularly in the southern portion of the site, to provide level lots to minimise building costs to homeowners.

#### Stormwater Drainage

The drainage strategy generally comprises infiltration and recharge of ground water at source via open bottomed drainage pits and discharge to infiltration type swales in the POS areas, in accordance with the LWMS.

#### Sewer

To service the area, a 300mm diameter sewer and 225mm sewer will need to be extended southwards from the north through the privately

owned land comprising Lots 31 to 33.

Should access across the privately owned land not be feasible, an alternative alignment for a 225mm sewer along Barfield Road is possible as an interim measure, subject to Water Corporation agreement.

#### Water

To service the proposed site, the existing DN250 network in Frankland Avenue will need to be extended to the site and DN150 / DN100 reticulation mains laid to service the subdivision. Easements may be required over the proposed water mains until the road reserves are gazetted.

#### Power

Extension from either the 22kV overhead network in Rowley or Barfield Roads would service the initial stages of the proposed development. Some upstream power network reinforcement works may be required as the project develops subject to the current available spare capacity in the existing 22kV network.

#### Gas

To service the proposed site, it will be necessary to extend the existing gas infrastructure from Gaebler Road in the north.

#### Telecommunications

There is a fibre optic cable running along Rowley Road that would be sufficient to service the proposed subdivision. The telecommunications will need to comply with the requirements of the National Broadband Company.

### 3.10 Developer Contribution Arrangements

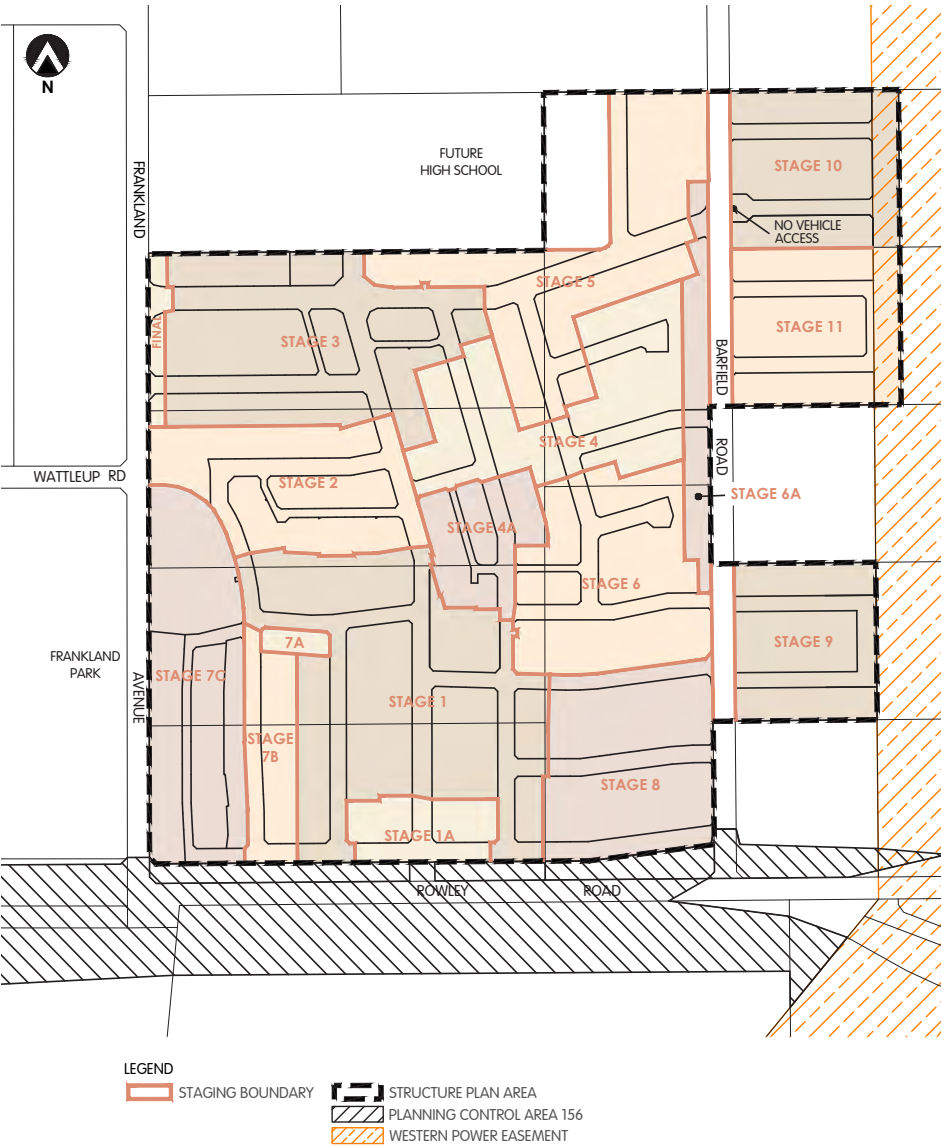
The Structure Plan area is located within two Development Contribution Areas (DCA) under Town Planning Scheme No. 3 being DCA 9 and DCA 13.

4.0 Implementation

4.1 Staging

An indicative staging plan has been prepared, with the release of lots for sale following the numerical order shown on Figure 15. It is important to note that this staging plan is indicative only and will be subject to sales rates and market trends.

Figure 15: Staging Plan





## 5.0 Amendments

### 5.1 Background

Hatch RobertsDay acts on behalf of Gold Estates Holdings Pty Ltd c/- Richard Noble & Company in modifying the approved Barfield Road Structure Plan. The Barfield Road Structure Plan establishes the planning framework for Vivente Residential Estate, which is being developed by our client.

The Barfield Road LSP was first approved by the Council of the City of Cockburn on 14 November 2013 (prior to the introduction of the Deemed Provisions to Local Planning Schemes) and endorsed by the WAPC on 16 October 2014. As part of the original determination by the WAPC, some modifications were made to the Structure Plan, including changing the location of the Local Centre zone and tweaks to the road layout. The Barfield Road Structure Plan has been subject to six formal minor amendments since being endorsed in 2014, which are outlined below:

1. Amendment 1: Removal of unnecessary road connection to Wattleup Road
2. Amendment 2: Include the Stage 13 lots and Lot 414 located adjacent to Frankland Avenue.
3. Amendment 3: Updates to density codes and tweaks to road layout (cul-de-sac-ing two east-west streets)
4. Amendment 4: Adding Lot 15 to the Structure Plan area and changing design over Lot 18 area
5. Amendment 5: Update density code over portion of land south of POS C from R60 to R30
6. Amendment 6: Introduce a new landholding into the Structure Plan area consisting of Lot 16. Update density code over portion of land south of POS C from R-60 to R30. Update density code for portion of land north of POS A2 from R60 to R30.

### 5.2 Amendment 6

#### 5.2.1 Proposal Context

Previous amendments have included further land holdings, consistent with the inclusion of Lot 16 to the Structure Plan Area.

The proposed coding of the lots will offer further diversity to the scale and type of dwelling within the area. Amendments to the density and dwelling permissibility also allows for a reduction in house and land package price points, influencing the affordability of the area. Amendments to the density coding may also encourage a mix of commercial and residential developments within the area.

The modifications proposed will further improve the amenity for existing residents through the reduction of lots and houses along shared boundaries, whilst permitting compatible mixed-use developments. The specific lots were identified to be coded as they are positioned in areas of high amenity, located adjacent to or close to area of Public Open Space.

### 5.2.2 Modifications (Amendment No.6)

#### Modification 1:

It is proposed to introduce a new landholding into the Barfield Road Structure Plan area consisting of Lot 16, located along the eastern boundary of the Structure Plan area. Lot 16 has an area of 1.8606ha and is bound by Barfield Road to the west. It is proposed that this portion of land is zoned R30, consistent with the zoning of the surrounding land.

Lot 16 will result in an additional 40 lots.

#### Modification 2:

Modification 2 is a density code change from R60 to R30 for a portion of land north of POS A2.

#### Modification 3:

Modification 3 is a density code change from R60 to R25-R30 for a portion of land south of POS C.

Proposed Modifications 2 and 3 achieve the following outcomes:

- Responds to market demand for single residential dwellings.
- Lot sizes will remain consistent with the existing lots of the Vivente Structure Plan and the adjacent residential cells.
- There is no attempt to avoid delivering on the required lot / dwelling yield for the estate. The Barfield Road LSP when first approved in 2013 / 2014 comprised 364 lots. The overall lot yield currently built or approved is 500 lots (498 residential lots & 2 Group Housing lots). This Amendment to the Structure Plan increases the yield to 545 dwellings which equates to 24.7 dwellings per residential hectare,
- The current 500 dwellings account for 16.6% of this total. The increase to the 545 dwellings would account for 18% of the total being sought, consistent with the South Metropolitan Peel Sub-regional Planning Framework.

### 5.2.2 Public Open Space

The latest approved version of the Barfield Road LSP provides 3.6747ha of POS (not including dedicated drainage areas which are excluded from POS requirements), equating to 10.5% of the total gross subdivisible area. This represents an over provision of 0.1747ha when assessed against the requirements for 10% POS.

The current approved Structure Plan provides 11.22% POS. The inclusion of the Lot 16 still provides a POS allocation for the estate of 10.5% being above the 10% requirement. In terms of the location of POS to Lot 16, future residents will be within 180-200m of the central POS area (H). This being a 3-4 minute walk.

### 5.2.3 Overall Dwelling Yield

The original yield for the Barfield Road Structure Plan approved in 2014 was 364 lots, with the recent amendment 5 estimating the dwelling yield to be in the range of 470-490. The current approved dwelling yield estimate for the Structure Plan, after the previous and current amendments, is approximately 545 dwellings.

The inclusion of Lot 16 increases the total yield by 40 dwellings, this does not alter the intended yield for the estate by more than 10%.

## 5.3 Servicing

### Infrastructure Coordination, Servicing and Staging

#### Traffic Engineering Report

An updated Traffic Engineering Report undertaken by KCTT concludes that the subdivision and development of Lot 16 will not have a negligible impact on the surrounding road network. Traffic modelling has determined that inclusive of the added traffic from the Structure Plan Area, Barfield Road will remain well under the maximum desirable traffic volume for Local Distributor Roads. The Traffic Engineering report is contained within Appendix 4B.

#### Local Water Management Strategy Addendum

An update to the Local Water Management Strategy Addendum by Emerges Associates stated that the flood storage areas (FSAs) within the POS on Whadjuk Drive (POS-F) have sufficient storage to accommodate the additional runoff resulting from the development of Lot 16. Updated XPSWMM modelling also indicates that FSAs meet relevant design criteria as well as City of Cockburn runoff and drainage requirements. The Local Water Management Strategy Addendum is enclosed in Appendix 2A.

#### Engineering Report

The Civil Group has prepared an Engineering Report for Lot 16. Existing services have been considered to assess whether Lot 16, Barfield Road has the capability of being subdivided to create residential lots. The full report can be found in Appendix 7. The following services have been considered:

#### Earthworks

The earthworks for Lot 16 include cutting and filing to create level lots. Retaining walls will also be constructed between the lots.

#### Stormwater Drainage

Emerge Associates have updated the XPSWMM modelling and have determined that existing Flood Storage Areas (FLS's) within the POS on Whadjuk drive (POS-F) have sufficient storage and is able to accommodate the additional runoff from Lot 16.

#### Roads

Barfield Road has been upgraded to urban standards, with Lot 16 fronting Barfield Road. Internal roads will connect with Barfield Road through the construction of two 'T' intersections.

#### Water Supply

Lot 16 will be supplied water through the connection of 100mm water mains to the existing 150mm water main located on Barfield Road.

#### Wastewater

Lot 16 will be serviced through the installation of 150mm diameter sewers connecting to the existing sewer in Barfield Road.

#### Underground Power

It is anticipated that residential developments on Lot 16 will initially connect into the existing LV underground cables which run along the western side of Barfield Road. However, with future development proposed for the area, a Transformer & Switchgear will likely be required to accommodate power demands. This will depend on volt drop calculations on the existing LV cables.

## Gas

There is an ATCO Gas medium pressure gas pipe located on Barfield Road. By extending this pipe, this will adequately service the developments on Lot 16.

## Telecommunications

Lot 16 will be serviced with NBN by extending the existing network on Barfield Road. The inclusion of Lot 16 into the Structure Plan area increases the total yield for the estate by 40, less than 10% of the intended yield and is only a minor amendment. Existing coverage of telecommunication services will service the whole of the structure plan area, inclusive of Lot 16, without the need of upgraded mobile telecommunication infrastructure within the area. Lot 16 is proposed for residential land and does not have the capacity to facilitate further infrastructure.

## Transportation Noise Assessment

The subject site is located west of Kwinana Freeway, an identified Strategic Freight/Major Traffic Route, triggering a noise assessment against State Planning Policy No. 5.4 Road and Rail Noise. A Transportation Noise Assessment has been undertaken for Lot 16 by Lloyd George Acoustic consultants. It is noted that some developments on Lot 16, particularly on the eastern side, will exceed the outdoor noise targets. The reporting provides architectural packages that aim to mitigate noise control for the lots. The Transportation Noise Assessment is contained within Appendix 5.