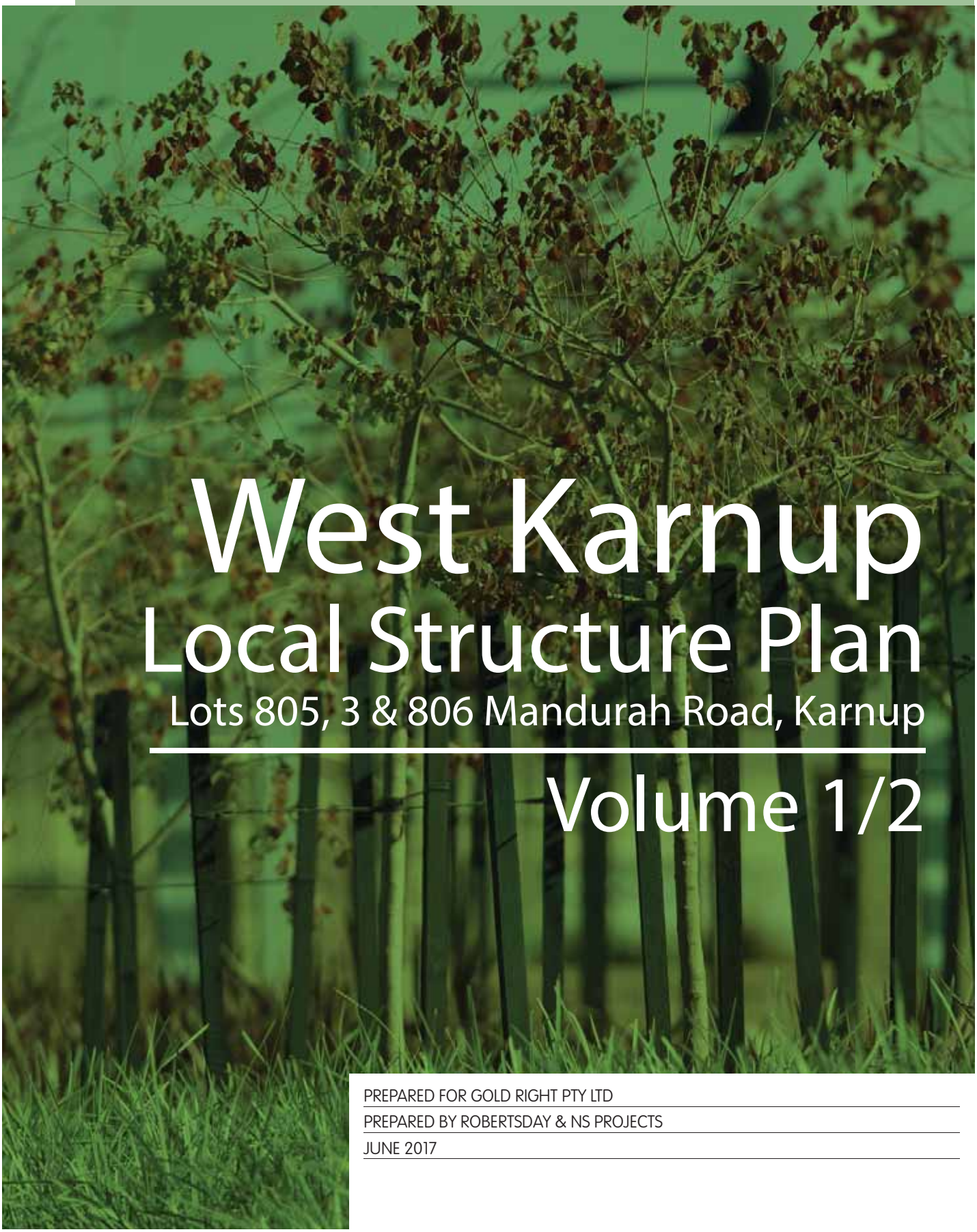
great places_



West Karnup
Local Structure Plan
Lots 805, 3 & 806 Mandurah Road, Karnup

Volume 1/2

PREPARED FOR GOLD RIGHT PTY LTD

PREPARED BY ROBERTSDAY & NS PROJECTS

JUNE 2017

ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Rockingham Local Planning Scheme No. 2.

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

24 APRIL 2013

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 2032**

Table of Changes or Departures from Structure Plan

Change/ Departure Number	Description of Change or Departure	Date considdered by Council	Date Approved by WAPC	Date Structure Plan Commences Operation
1.0	1. Amendment to Plan 1 – LSP to: • Rezone land north of the 'Commercial' zone (north of Redwood Avenue) from 'Commercial' to 'Residential R40'. • Rezone land east of the 'Commercial' zone from 'Residential R25', 'Residential R30' and 'Residential R40' to 'Commercial' zone.	21 March 2015	N/A	
2.0	1. Modification to Plan 1 – LSP to relocate Public Utility (pump station) reserve from POS Area D to POS Area G.	11 May 2015	N/A	
3.0	1. Inclusion of new clause 6.3 to introduce variations to Residential Design Codes as provided for under R-MD Codes (WAPC Planning Bulletin112/2015). 2. Modification to Plan 1 – LSP to allocate Residential Medium Density (R-MD) Codes to lots.	29 June 2015	N/A	
4.0	1. Inclusion of Lot 805 Mandurah Road, West Karnup into the Structure Plan area, resulting in the below outlined changes: <u>Executive Summary</u> • Executive summary modified to include Lot 805 and to reflect changes to the project team • Data in Executive Summary Table updated to reflect LSP design for Lots 3, 805 and 806 <u>Part 1 - Implementation</u> • Amendments to Plan 1 Local Structure Plan to include Lot 805 design • Amendment to Table 1 - Public Open Space Schedule to include Lot 805 POS areas and drainage • Modifications to cl 6.2 - 'Detailed Area Plan Requirements' to reflect CoR standard requirements / wording • Reformatting to conform with City of Rockingham Model Structure Plan provisions • Amendments to address Planning and Development (Local Planning Schemes) Regulations 2015, including modifications to cl.3.2 - 'Relationship of the Structure Plan with Town Planning Scheme No. 2' and cl.3.3 - 'Provisions, Standards or Requirements' and cl.4.2 Amendment of Structure Plan • Removal of R-MD provisions	23 August 2015	12 May 2017	

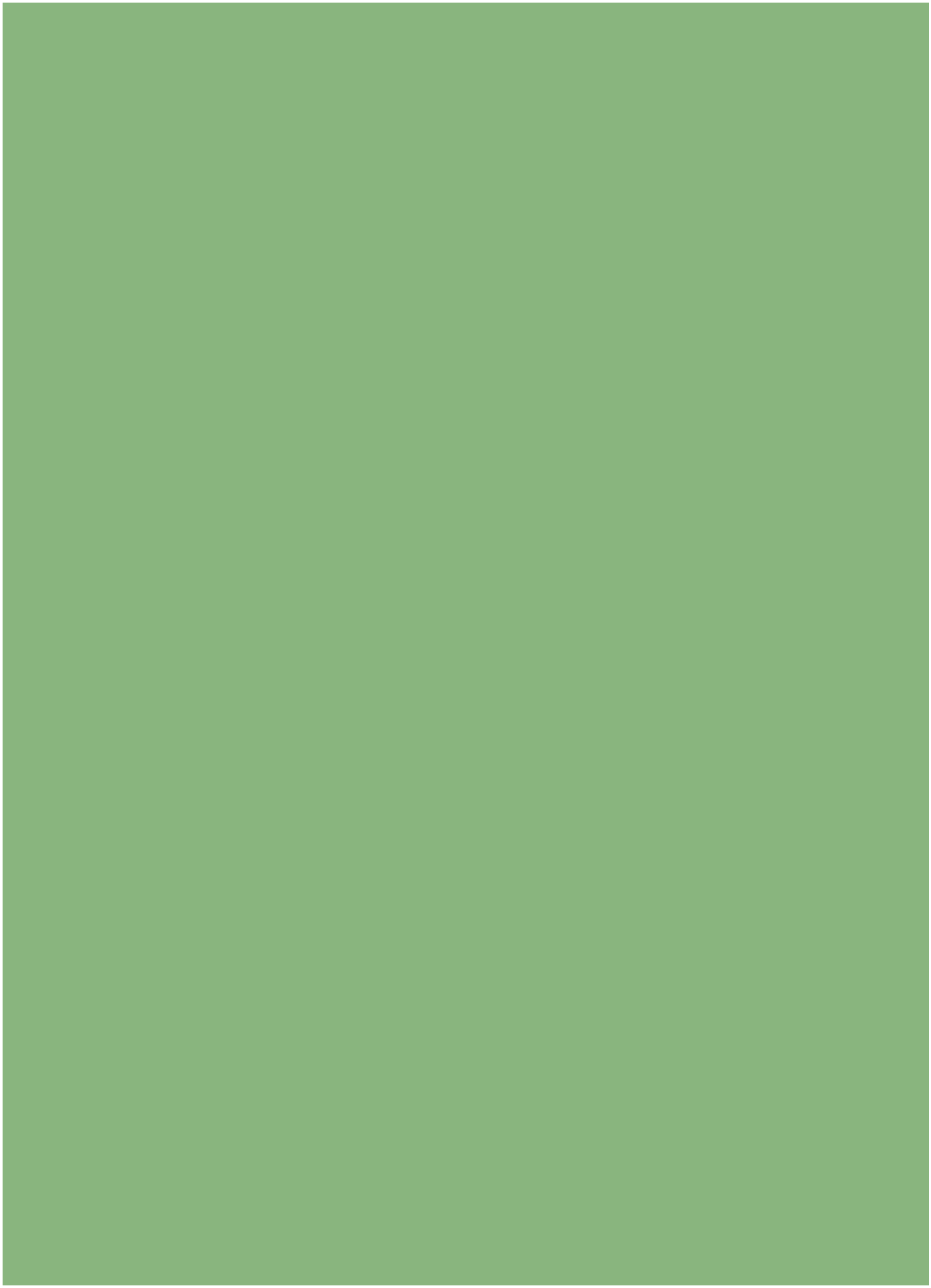


Table of Changes or Departures from Structure Plan

Change/ Departure Number	Description of Change or Departure	Date considdered by Council	Date Approved by WAPC	Date Structure Plan Commences Operation
	Part 2 - Explanatory Report • Introduction (Chapter 1.0) text modified to include reference to Lot 805 land • Update Chapter 2 - Statutory, Strategic and Policy to reflect changes in statutory/strategic planning framework including release of South Metropolitan Peel Sub-Regional Framework (WAPC 2015), Planning in Bushfire Prone Area Guidelines and State Planning Policy 3.7 - Planning in Bushfire Prone Areas, and City of Rockingham Planning Policy 3.1.2 - Local Commercial Strategy • Update section 2.2.5 to reflect current status of Karnup Train Station and LSP response • Delete references to Keralup as a future major urban development project, to reflect project's downgraded status. • Amendments to Chapter 5 to include Lot 805 design, including updates to dwelling yields, POS schedule and descriptions, street cross-sections and road network changes • Modification to Integrator B street typology cross-section to reflect cross-section 'as approved/constructed' for Redwood Avenue • Modifications to plan series to include Lot 805 area and design • Replace MRS Plan (Figure 1) with latest version (as of March 2016) Appendices • Modifications to following Technical Reports to incorporate Lot 805 design proposal: - Environmental Assessment Report - Noise Impact Assessment - Fire Management Plan - Servicing Report - Local Water Management Strategy - Transport Assessment • Modifications to Fire Management Report to address Planning in Bushfire Prone Area Guidelines and State Planning Policy 3.7 - Planning in Bushfire Prone Areas			

Document Status

Version	Comment	Reviewer	Review Date	Approved By	Issue Date
1	Initial Draft	CH/JAH (DPS)	10.08.2011		15.09.2011
2	UC comments, consultant updates	JAH (DPS)	26.09.2011		02.10.2011
3	UC comments, consultant updates	JAH (DPS)	03.10.2011	CFM (DPS)	04.10.2011
4	Update to reflect Emerge consultant reports	JAH (DPS)	30.10.2011	CFM (DPS)	01.11.2011
5	Response to CoR Preliminary Assessment	JAH (DPS)	17.02.2012	CFM (DPS)	22.02.2012
6	CoR Consent to Advertise – Retail Amdts	JAH (DPS)	04.04.2012	CFM (DPS)	04.04.2012
7	Response to Public Submissions	JAH (DPS)	23.08.2012	CFM (DPS)	29.08.2012
8	Response to CoR Council resolution	JAH (DPS)	24.09.2012	CFM (DPS)	26.09.2012
9	Response to WAPC Resolution_Final	JAH (DPS)	13.02.2013	CFM (DPS)	13.03.2013
10	WAPC Resolution_Minor Amdts_Final	MM (DPS)	23.04.2013	CFM (DPS)	23.04.2013
11	Density increase of two lots east of neighbourhood centre from R30 to R40	JAH (DPS)	14.01.2013	CFM (DPS)	14.01.2013
12	Modification to Plan 1- LSP to relocate 'Public Utility' (pump station) reserve to POS Area G	JE (RobertsDay)	05.05.2015	ER (RobertsDay)	05.05.2015
13	Amendment to LSP to include Lot 805 design	JE (RobertsDay)	06.05.2015	ER (RobertsDay)	06.05.2015
14	Modifications to LSP to address CoR pre-advertising assessment comments	JE (RobertsDay)	25.02.2016	ER (RobertsDay)	25.02.2016
15	Modifications to address requirements of WAPC Schedule of Modifications for SPN/0426/M-1 as set out in Attachment 9 to the WAPC's decision dated 12 May 2017.	JE (RobertsDay)	09.06.2017	ER (RobertsDay)	09.06.2017

Citation

This document should be cited as follows:

J. Egan (2017), West Karnup Local Structure Plan
prepared by Roberts Day Pty Ltd.

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Executive Summary

The West Karnup Local Structure Plan (LSP) has been prepared to guide the subdivision and development of 113 hectares of land on Lots 805, 3 and 806 Mandurah Road, Karnup; within the City of Rockingham municipality.

Gold Right Pty Ltd is the landowner of Lots 805 and 806 and the City of Rockingham owns Lot 3. The City has been party to the preparation, and gives in-principle support to the proposed LSP design over its landholding.

The LSP has been prepared on behalf of Gold Right Pty Ltd by the following specialist consultant team:

- DMG Property – project management
- Roberts Day - town planning
- Studio CFM - urban design
- Emerge Associates – environment, urban water management and landscaping
- JDSi – engineering and servicing
- Macroplan – commercial analysis
- Arup – traffic and transport analysis
- Lloyd George Acoustics – noise impact assessment
- Bushfire Safety Consulting – bushfire management

The LSP is supported by technical reports enunciating specialist studies undertaken.

Purpose

This West Karnup LSP provides an overarching planning framework to guide and facilitate the development of 113 hectares of land at Karnup for urban purposes, and has been prepared in accordance with the requirements of the Planning and Development (Local Planning Schemes) Regulations, 2015.

The plan provides for an integrated and coordinated approach to an appropriate mix of land uses and infrastructure, necessary to create a strong and vibrant community, whilst delivering triple bottom line sustainability outcomes.

Design Approach

The design approach has been a rigorous multidisciplinary process with continuous reflection upon the purpose of the LSP. Design principles and considerations which have informed the design approach include:

- Public Open Space allocation and community creation
- Urban structure and place making
- Movement systems and connectivity
- Leading built form
- Landform and environment

Project Overview

The West Karnup LSP will create a framework for the future urban development of an anticipated 1,320+ dwellings, which will ultimately house a new community in the vicinity of 3,715 people, a Neighbourhood Activity Centre and the provision of a Primary School.

Executive Summary Table

Item	Data
Structure Plan Area	113.28 ha
Indicative Land Use Breakdown (excluding roads & POS) Residential Commercial Primary School	 52.04 ha 2.792 ha 3.4742 ha
Directions 2031 Density/Dwelling Targets – Karnup (KA4)	1,200+ dwellings
Estimated (minimum) lot yield	1,263+ lots
Estimated (minimum) number of dwellings	1,320+ dwellings
Estimated (minimum) residential site density	~ 26.2 Dwellings / Residential Site Hectare [1]
Estimated population	3,715 people @ 2.8ppl/hh
Number of Secondary Schools	0
Number of Primary Schools	1
Estimated Commercial Floor Space (i.e. Small Neighbourhood Centre)	5,528m^2 net lettable area
Amount of Public Open Space (POS) Required Amount of restricted Public Open Space as per Liveable Neighbourhoods	8.77 hectares / 10 % 1.75 hectares / 1.3 %
Number & Total Area (Gross Total Area) of POS • District Park (PS co-located) • Neighbourhood Parks (Areas B, E & G) • Local Parks (Areas A1, A2, C1, C2 & D)	 1 site @ 4.35 ha 3 sites @ 2.28 ha 5 sites @ 3.25 ha
Remnant Bushland – 'Reserve for Conservation'	1 site @ 18.49 ha

Notes:

1. 'Residential Site Hectare' refers to the definition under Element 1 of WAPC's Liveable Neighbourhoods.
2. Projected lot and dwelling yields for the northern Lot 805 portion of the LSP area have been calculated by dividing the net residential area by the average lot area prescribed under the Residential Design Codes for the applicable density code for that land. Final lot and dwelling yields will be subject to detailed design.

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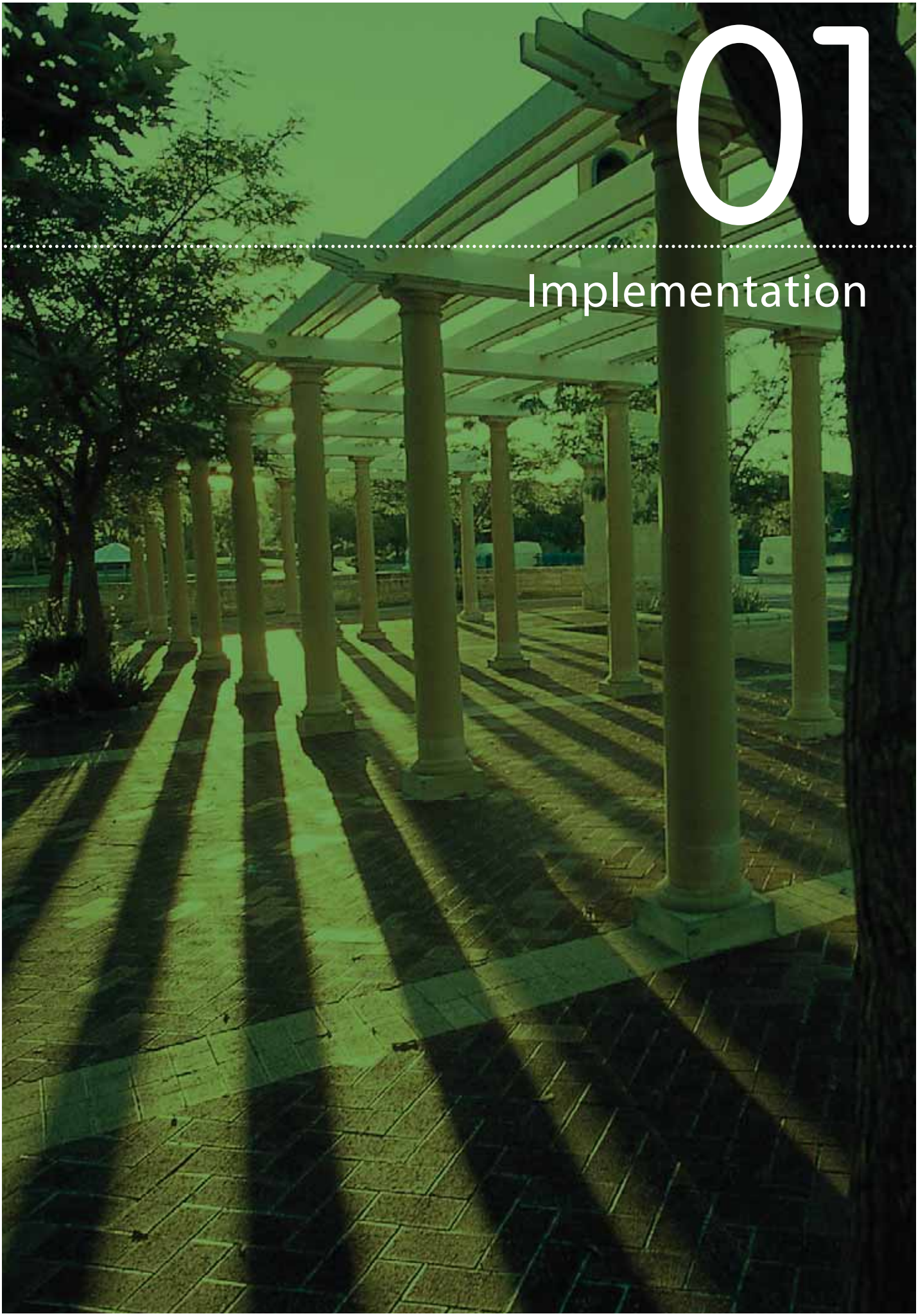


01

Implementation

1.0 Structure Plan Area

The Structure Plan shall apply to Lots 3, 805 and 806 Mandurah Road, Karnup being the land contained within the inner edge of the 'subject site' line shown on the Structure Plan Map (Plan 1).

The Structure Plan is identified as the West Karnup Local Structure Plan (LSP).

2.0 Structure Plan Content

The Structure Plan comprises the following sections:

- Part One – Implementation. This section contains the Structure Plan Map and sets out the requirements that shall be considered when assessing subdivision and development applications for land within the Structure Plan area.
- Part Two – Explanatory Section. This section provides the planning context and justification for the Structure Plan Map and the text provisions, standards or requirements contained in Part One of the Structure Plan. Part Two is to be used as a reference to guide interpretation and implementation of Part One.
- Appendices - Includes all specialist consultant reports and documentation used in the preparation of and to support the land use outcomes of the LSP.

3.0 Interpretations and Relationship With Town Planning Scheme No. 2

3.1 Terms and Interpretation

Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the City of Rockingham Town Planning Scheme No. 2 ('Scheme') including any amendments gazetted thereto.

3.2 Relationship of the Structure Plan with Town Planning Scheme No. 2.

The Structure plan has been prepared in accordance with Schedule 2, Part 4 of the Planning and Development (Local Planning Schemes) Regulations 2015.

The subject land is zoned 'Development' and contained within Development Area No 38, which is shown on the Scheme Map and included in Schedule 9.

The Structure Plan Map outlines the Zones and Reserves intended to be applicable within the Structure Plan Area. A decision-maker for an application for development or subdivision approval in an area that is covered by a structure plan that has been approved by the Commission is to have due regard to, but is not bound by the structure plan when deciding the application.

3.3 Land Use Permissibility

Land use permissibility within the Structure Plan Area shall be in accordance with the corresponding Zone under the Scheme.

4.0 Operation

4.1 Operation Date

This Structure Plan commences operation on the date it is adopted by Western Australian Planning Commission pursuant to Clause 22 of the Deemed Provisions of the Planning and Development (Local Planning Schemes) Regulations, 2015.

4.2 Amendment of Structure Plan

An amendment to this Structure Plan shall follow the procedures set out under clause 29 of Schedule 2 of the Planning and Development (Local Planning Scheme) Regulations 2015.

5.0 Land Use

5.1 Structure Plan Map

The subdivision and development of land is to generally be in accordance with the Structure Plan and any associated provisions contained within Schedule 9.

5.2 Residential Density

The residential densities applicable to the Structure Plan Area shall be those residential densities shown on the Structure Plan Map.

5.3 Public Open Space

A minimum of 10% Public Open Space (POS) is to be provided in accordance with the WAPC's Liveable Neighbourhoods. POS is to be provided generally in accordance with Plan 1 and Table 1 – POS Schedule, with an updated POS schedule to be provided at the time of subdivision for determination by the WAPC, on the advice of the City of Rockingham.

Ceding of the indicative POS areas to the State will occur at the time of subdivision.

Table 1: Public Open Space Schedule

Land Budget Summary			
	Lots 805 & 806 (Ha)	Lot 3 (Ha)	Total (Ha)
Subject Area	105.6740	7.6050	113.2790
Deductions			
1:1 Year Drainage	0.5780	0.0833	0.6612
Drainage Sump (POS H)	0.1214	0.0000	0.1214
Primary School	3.4742	0.0000	3.4742
Commercial (Core Retail Site)	2.5054	0.0000	2.5054
Commercial (East of Main Street)	0.2869	0.0000	0.2869
Reserve for Conservation	18.4993	0.0000	18.4993
Pump Station Site (POS G)	0.0914	0.0000	0.0914
Total Deductions	25.5566	0.0833	25.6398
Developable Area	80.1174	7.5217	87.6392
POS Requirement 10%	8.0117	0.7522	8.7639
Restricted Open Space Required (2%):	1.6023	0.1504	1.7528
Unrestricted Open Space Required (8%):	6.4094	0.6017	7.0111

Drainage Provision and Creditable Open Space					
		Area of Uncredited 'Green Space'	Area of Restricted Open Space	Area of Unrestricted Open Space	Total Credited Open Space
POS Ref	Total 'Green Space' (ha)	Drainage 1:1 Year (ha)	Drainage >1:1yr - 1:5yr (ha)	Above 1:5 Year (ha)	Area (ha)
Lot 806 - Stages 1 and 2 (WAPC Ref: 146429 & 148453) - Approved					
A1	0.0585	0.0000	0.0000	0.0000	0.0585
A2	0.5223	0.0139	0.0479	0.4605	0.5084
B	0.7615	0.0097	0.0320	0.7198	0.7518
C1	1.2130	0.1174	0.1156	0.9800	1.0956
C2	0.9094	0.0347	0.0868	0.7879	0.8747
D	0.5477	0.0991	0.0433	0.4053	0.4486
E	0.5614	0.0337	0.1146	0.4131	0.5277
F	4.3469	0.2075	0.4720	3.6674	4.1394
G	0.9571	0.1452	0.1390	0.6729	0.8119
Subtotal	9.8778	0.6612	1.0512	8.1069	9.2166

NOTES: The POS areas provided within lot 3 may require further adjustment to allow for drainage, whilst meeting the required 10% POS contribution for that lot.

6.0 Subdivision / Development

6.1 Notifications on Title

In respect of applications for the subdivision of land, the Council shall recommend to the WAPC 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:

i. Land or lots deemed to be affected by an identified noise impact as outlined within the Noise Impact Assessment (Lloyd George Acoustics) contained within Appendix 1.

ii. Construction standards to achieve quiet house design policy in accordance with State Planning Policy 5.4 Road and Rail Transportation Noise and Freight Consideration in Land Use Planning (as amended).

iii. Land or lots deemed to be affected by a Bush Fire Hazard as identified in the Fire Management Plan (Bushfire Safety Consulting) contained within Appendix 1.

iv. 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.

v. Land or lots deemed to be impacted by mosquito and midge nuisances in accordance with an approved Mosquito and Midge Management Plan.

6.2 Local Development Plan Requirements

1. Local Development Plans (LDP) are required to be prepared and implemented pursuant to Part 6 of Schedule 2 of the Planning and Development (Local Planning Schemes) Regulations 2015 for lots comprising one or more of the following site attributes:
    i. Lots with rear-loaded vehicle access; and/or
    ii. Lots with direct boundary frontage (primary or secondary) to an area of POS; and/or
    iii. Lots with direct boundary frontage (primary or secondary) to the LSP area's main southern entry road; and/or
    iv. Lots deemed to be affected by a recognised bushfire hazard as identified spatially in the Bushfire Management Plan (Bushfire Safety Consulting) contained within Appendix 1; and/or
    v. Lots deemed to be affected by noise from Mandurah Road or the Perth-Mandurah rail corridor as identified in the Noise Impact Assessment (Lloyd George Acoustics) contained within Appendix 1.
2. LDPs are required for all land zoned Commercial on the Local Structure Plan (Plan 1).

NOTES:

1. With reference to 6.2 (v), LDPs are to include a requirement for additional noise modelling for two-storey development.

6.3 Reserve for Conservation – Retained Remnant Bushland

A Memorial on the Certificate of Title of Lot 806 requires reservation of an 18.5ha portion of the Lot to protect native vegetation in perpetuity under the provisions of the Soil and Land Conservation Act. The 18.5ha Reserve forms the southern portion of the Lot and is identified as 'Reserve for Conservation' within this LSP. At the time of subdivision the retained remnant bushland area will be ceded as a 'Reserve for Conservation' free of cost to the Crown and incorporated into the Rockingham Lakes Regional Park to be managed by the Department of Environment and Conservation.

A Reserve Management Plan is to be prepared for the 18.5ha of retained remnant bushland that forms the 'Reserve for Conservation' area at the subdivision stage.

6.4 Access

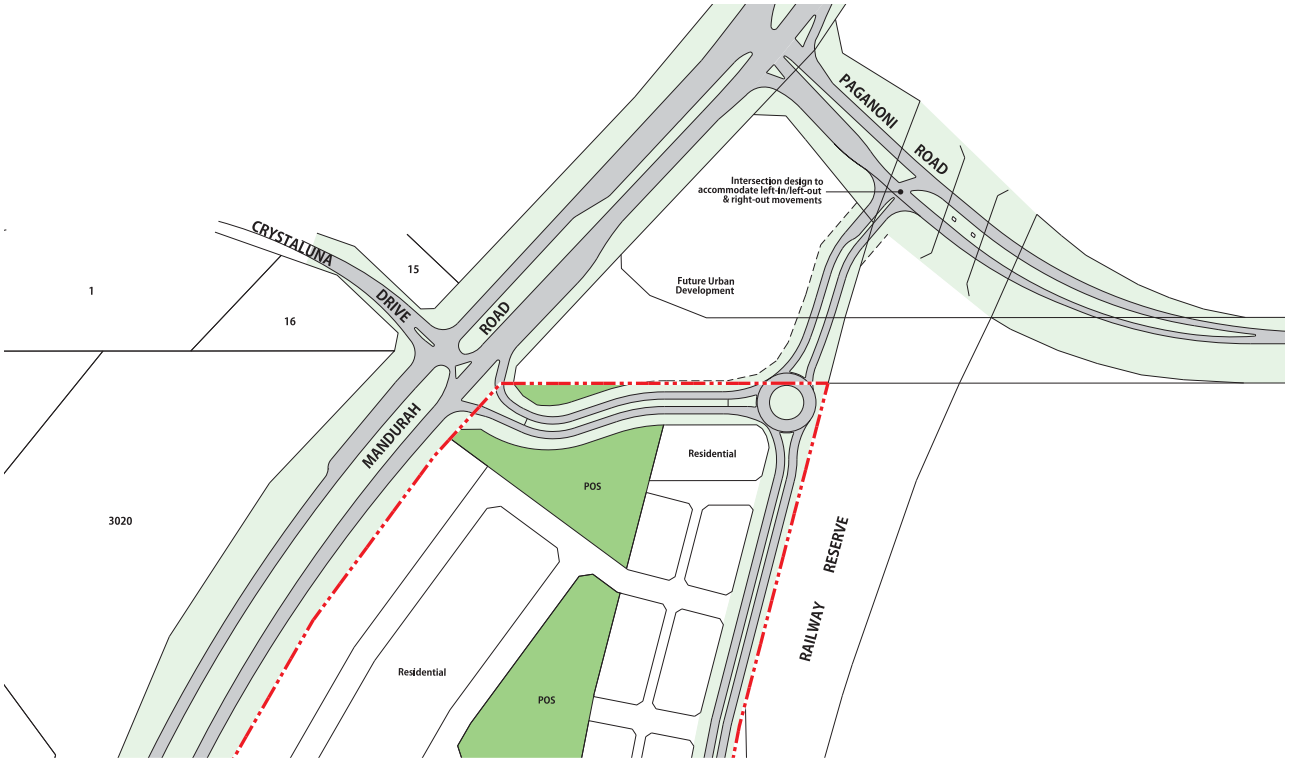
In order to provide for necessary traffic circulation from the development of the overall LSP area, Aquamarine Parade and Paganoni Road are to be upgraded in accordance with Figure 1.

6.5 Tree Protection

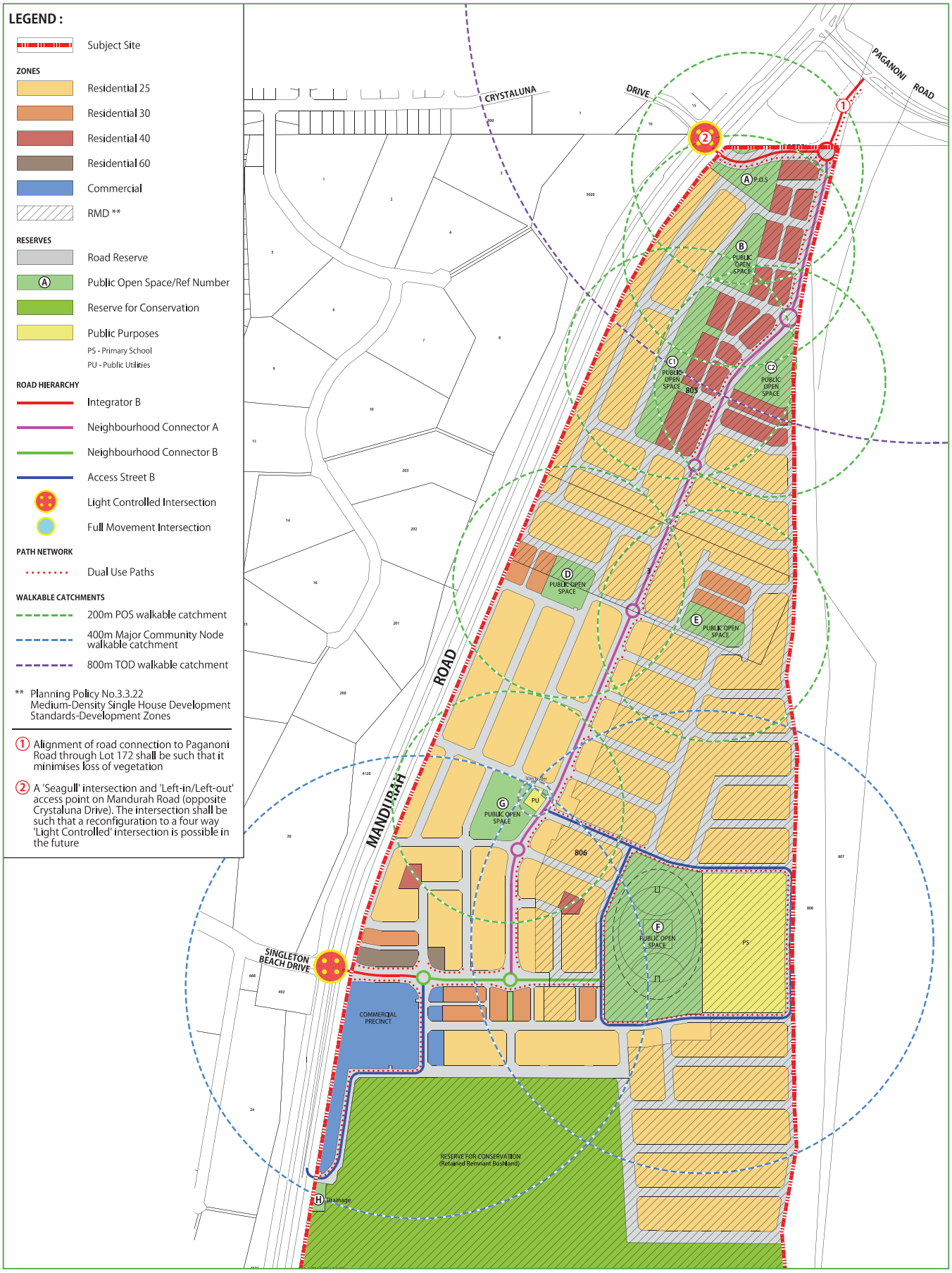
As part of a subdivision application the landowner shall provide from a qualified arborist a Tree Inventory Plan that provides an on-site evaluation of trees worthy of retention. The inventory shall be represented in table format showing the GPS co-ordinate of identified trees, species, diameter at breast height, canopy/critical root zone and condition.

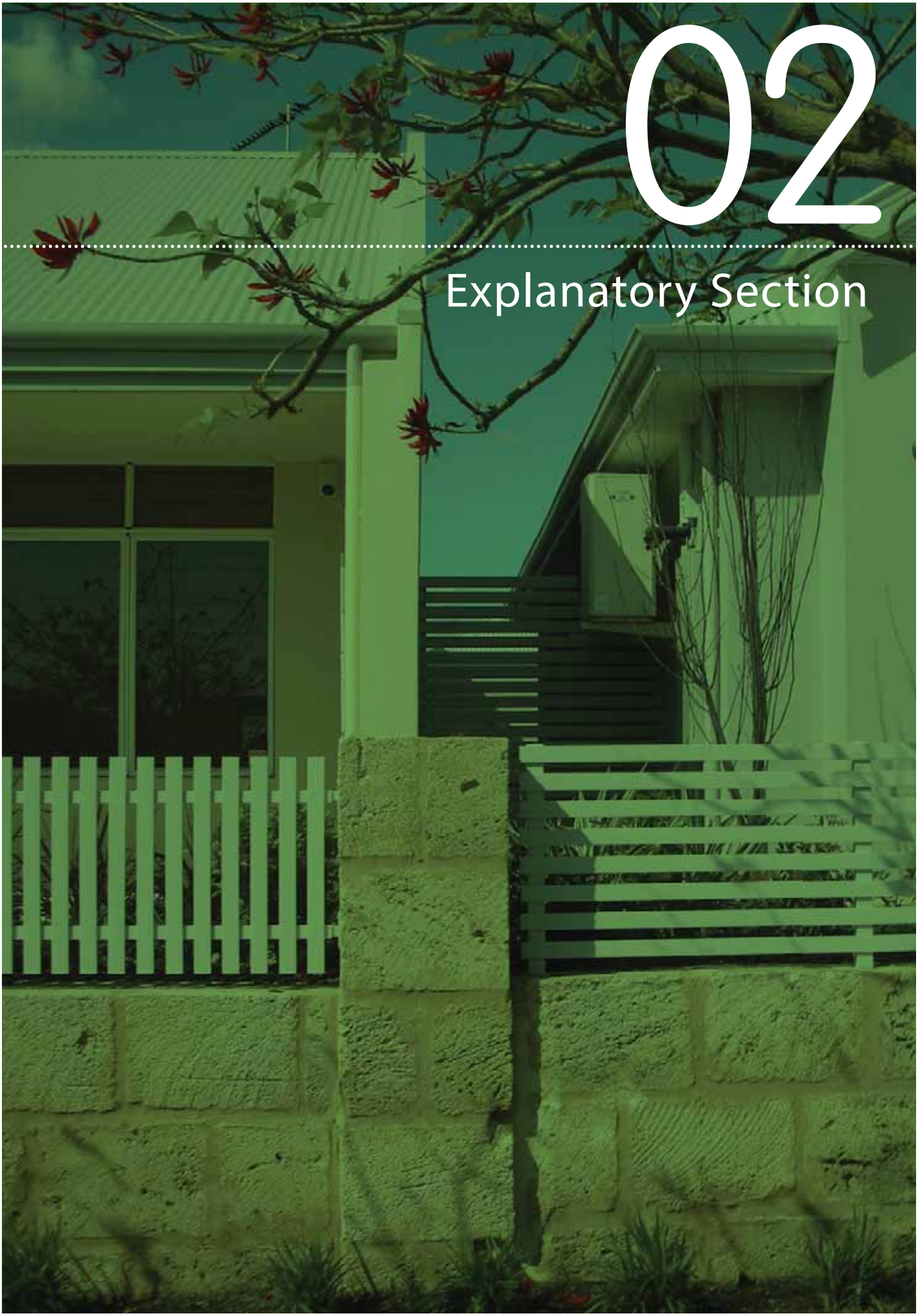
The Tree Inventory plan shall be accompanied with a Tree protection Management Plan that identifies each tree that will be protected during subdivision works by survey location.

Figure 1: Northern Access Solution



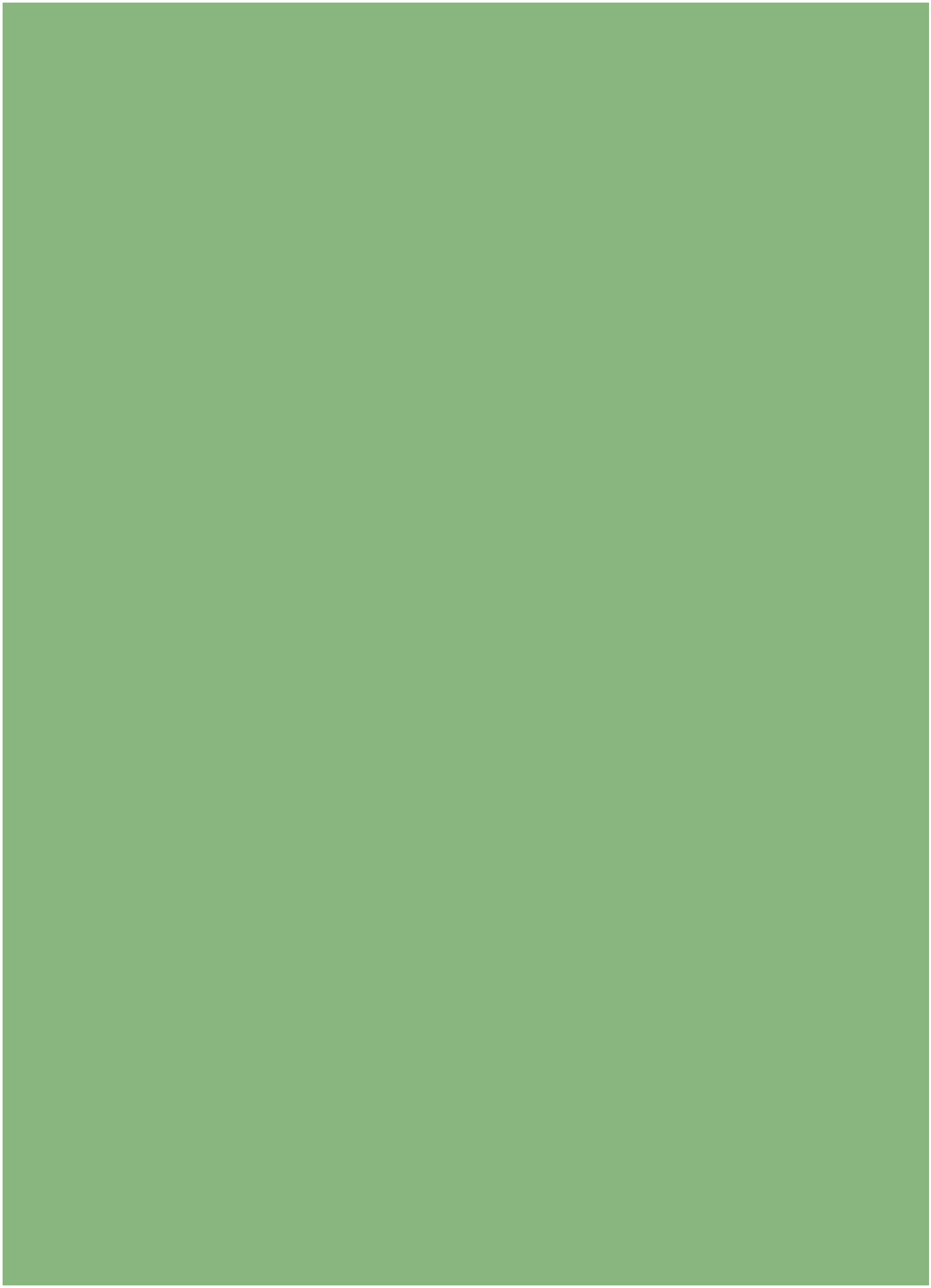
Plan 1: Local Structure Plan





02

Explanatory Section



1.0 Introduction

1.1 Purpose

The purpose of this report is to provide for the orderly and proper subdivision and development of Lots 805, 3 and 806 Mandurah Road ('subject site'), Karnup generally for residential purposes.

The Structure Plan represents a design and land use response to the principles and objectives of State and Local Government policy and guidance, including Directions 2031, Liveable Neighbourhoods and the Baldivis (North) District Structure Plan.

The information contained in this section provides justification and support for the comprehensive and co-ordinated design response provided for the Local Structure Plan (LSP).

1.2 Background

Historically, the progression of the planning and urban development over the subject site was delayed by several issues. These issues included:

- Urban Deferred zoning;
- The lack of a co-ordinated approach to planning for the area;
- The site's primary use as an active limestone quarry; and
- Services required for urban development not being scheduled within service agencies' allocated budgets.

These issues however were addressed, as interest grew in the urban development potential of the Karnup locality, primarily led by WAPC strategic initiatives such as Directions 2031.

Major servicing issues were resolved within the locality and in November 2012 MRS Amendment 1234/27 was gazetted. This amendment lifted the 'Urban Deferred' zoning and zoned the site to 'Urban'. The land was correspondingly rezoned under the local town planning scheme to 'Development' zone, paving the way for the preparation of a LSP to guide future urban subdivision and development.

In February 2013 the West Karnup LSP was endorsed by the WAPC and on May 2013 the LSP was formally adopted by the City of Rockingham. The Lot 805 design was however excluded from the adopted LSP to allow for resolution of the access connections to the northern portion of the LSP area.

This planning to resolve the northern access issues occurred during 2015 and early 2016, in consultation with the City of Rockingham, Department of Planning and Main Roads Western Australia. This culminated in an access solution that provides for a high level of service to the northern portion of the LSP area, whilst providing flexibility to integrate with future road network modifications required for the planned Karnup Station and TOD, which according to Metronet is to be delivered as part of Stage 1 and prior to 2025.

The transport solution presented in this LSP received the support of all parties concerned, allowing the LSP to be amended in 2016 to include the new design across Lot 805. The original design over Lots 806 and 3 that formed part of the 2013 approved LSP has been retained.

1.3 Land Description

1.3.1 Location

The subject site is located 54 kilometres south-west of the Perth Central Business District and 8 kilometres north of the Mandurah City Centre, albeit within the City of Rockingham. The composite site abuts the eastern portion of Mandurah Road, and is located opposite the Singleton Beach Estate. To the north lies a Metropolitan Region Scheme (MRS) Parks and Recreation reservation and Paganoni Road, with the Perth-Mandurah railway line forming the eastern boundary of the site. Bush Forever Site 395 is located to the east of the railway line and immediately to the south of the site.

1.3.2 Ownership, Area and Legal Description

The site comprises of three landholdings totalling approximately 113 ha in area.

Table 2: Land Details

Lot Number	Owner	Certificate of Title	Area (Ha)
806	Gold Right Pty Ltd	2571/263	83.49
3	City of Rockingham	1260/678	7.605
805	Gold Right Pty Ltd	2571/262	22.24

1.3.3 Land Use

There are two remnant limestone quarries ('Tamala Limestone') on the site.

All subject lots have been used for sand and limestone quarrying for several years. Cemex (formally CSR Readymix), which operated the quarry, was granted an extractive industry licence by the City of Rockingham in early 2008; which expired at the end of 2011. The site contractor formally ceased quarrying activity on site as of 31 December 2011.

Quarrying was confined to the central portion of Lot 805, and the very south eastern portion of Lot 806. Land previously used for limestone quarrying will be remediated appropriately to prepare it for development as set out in this LSP.

Approximately half of the site (Lot 806) is undergoing urban development in accordance with the West Karnup LSP as approved in May 2013. Portion of Lot 805 has been cleared to make way for a high pressure sewer main that runs north /south through the property. The remaining areas have remnant bushland or are vacant.

Site Context – former quarry on Lot 806

Plan 2: Location Plan

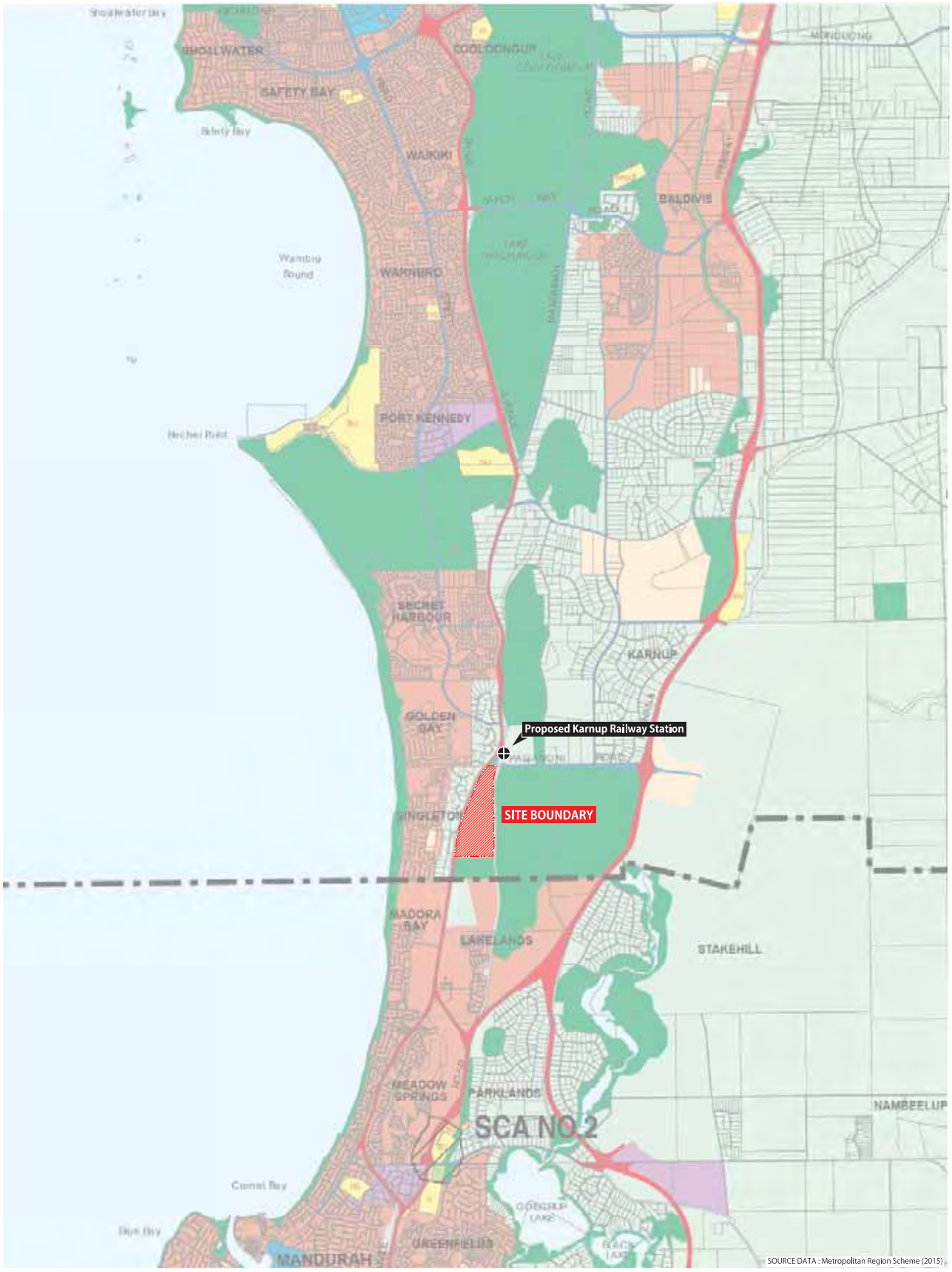
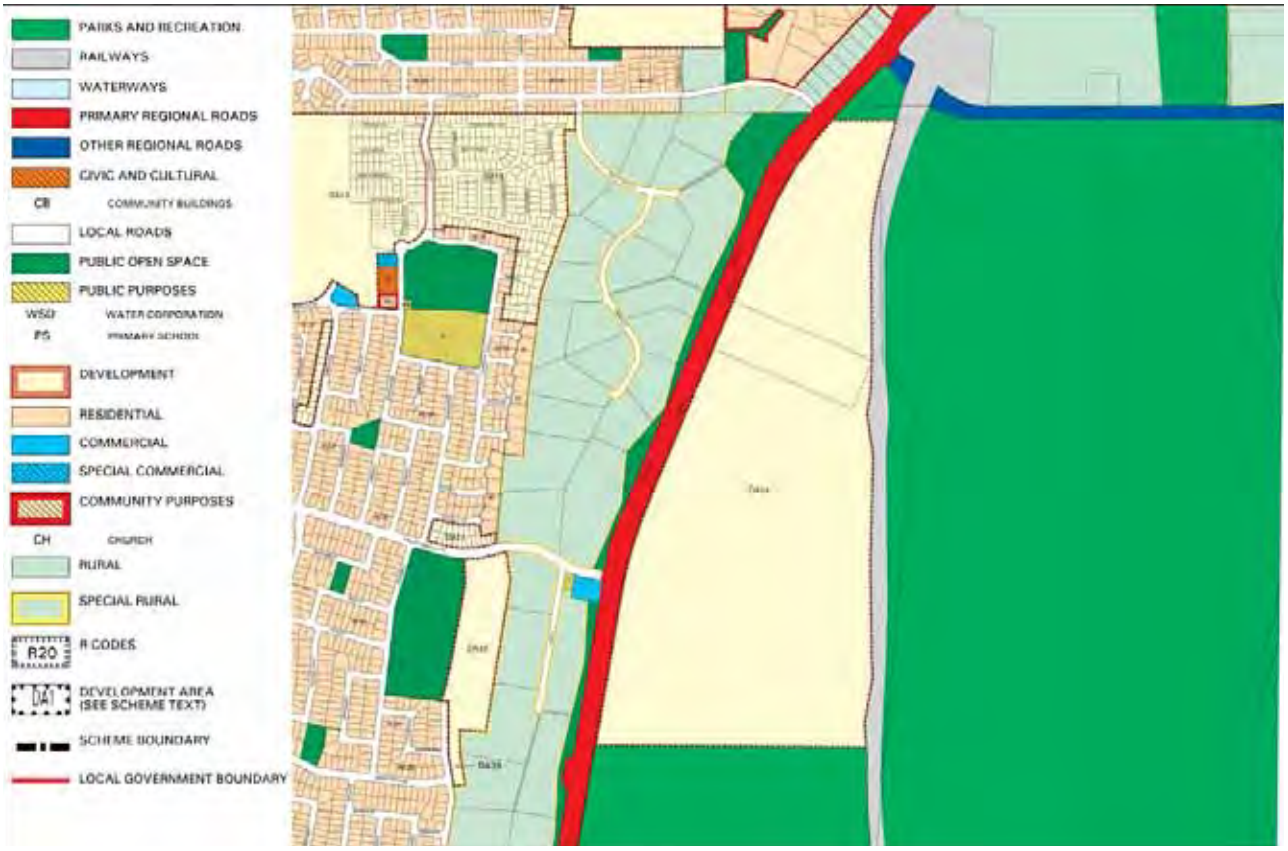


Figure 2: Metropolitan Region Scheme

Figure 3: Town Planning Scheme No. 2



2.0 Statutory, Strategic And Policy Considerations

2.1 Zoning and Reservations

2.1.1 Metropolitan Region Scheme

Under the provisions of the Metropolitan Region Scheme the subject site is currently zoned 'Urban'.

A Memorial on the Certificate of Title for Lot 806 requires reservation of an 18.5ha portion of the Lot to protect native vegetation in perpetuity under the provisions of the Soil and Land Conservation Act. The 18.5ha Reserve forms the southern portion of the lot.

The rezoning of Lot 805 to 'Urban Deferred' under the MRS was effected in October 2010. 'Proposal 71' of the MRS Amendment reflects a Negotiated Planning Solution (NPS) whereby Lot 805 was zoned 'Urban Deferred' having previously been Reserved for 'Parks and Recreation'; and concurrently Lot 807 was reclassified from 'Urban Deferred' to 'Parks and Recreation Reserve'.

The MRS Amendment ensured protection of the environmental values of the Lot 807 Mandurah Road reservation and of the ecological link between Lot 807 and Paganoni Swamp, located east of the Perth-Mandurah train line. At the same time, it was acknowledged that Lot 805 supported limited conservation value and should be made available for land uses other than Conservation.

MRS Amendment 1082/33 was referred to the EPA in September 2003, with the EPA determining that the overall environmental impact would not warrant assessment under Part IV of the Environmental Protection Act.

Lot 806 Mandurah Road was zoned 'Urban Deferred' by MRS Amendment 937/33 in 1994. The Amendment report states that the Amendment itself reflected the outcomes of the South-West Corridor Structure Plan (1993), which identified Lot 806 as 'Category B' urban land; this category defining land suitable for urban development which is currently constrained, but which may become available for urban development in the longer term.

Proposals derived from MRS Amendment 937/33 were assessed by the Environmental Protection Authority in 1994 (Bulletin 746). Formally assessed aspects included the creation of a rapid transport reserve (now the Perth to Mandurah railway line), deletion of System Six Areas, and the widening of Safety Bay Road.

A request to lift the urban deferment of the land under the MRS was lodged with the WAPC in June 2011. MRS Amendment 1234/27 to rezone the site from 'Urban Deferred' to 'Urban' was gazetted in November 2012.

2.1.2 City of Rockingham Town Planning Scheme No.2

The subject land is zoned 'Development' under the provisions of the City of Rockingham Town Planning Scheme No. 2 (TPS2).

In conjunction with MRS Amendment 1234/27, a request by the City of Rockingham for the 'parallel' amendment of Lot 805 Mandurah Road, Karnup from 'no zone' to a 'Development' zone under TPS2 was gazetted in November 2012, using the provisions of section 126(3) of the Planning and Development Act.

The total site area is designated as DA38 under Schedule 9 – Development Areas of TPS2.

2.2 Government Strategies and Policies

2.2.1 Statement of Planning Policy No 2.4 – Basic Raw Materials

State Planning Policy 2.4 (SPP2.4) identifies areas of strategic mineral resources and seeks to protect them from incompatible land uses that could limit their future exploitation. The subject site is identified by the Policy as 'Extraction Areas'. 'Extraction Areas' are areas that are currently used for extractive industry, protected in the short term, but will eventually be replaced by other uses.

Given the designation of the site for urban purposes in Directions 2031 and the recent urban development of Lot 806, the site is no longer suitable for an extractive industry use.

The extractive licence expired in 2011, by which time the operators of the quarry indicated that the majority of the sand and limestone mined on subject site would be exhausted. All quarrying activity has since ceased and the former quarry will be fully remediated to facilitate urban development, as guided by the LSP.

2.2.2 Statement of Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning

This policy is designed to protect residential development from unreasonable levels of transport noise; by establishing a standardised set of criteria to be used in the assessment of proposals and encourage best-practice design and construction standards for new development. This policy is relevant to the site given it abuts Mandurah Road, a 'Primary Regional Road' and the Perth-Mandurah railway line which is reserved 'Railway' under the MRS.

The policy sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development. The objective of this policy is to achieve acceptable indoor noise levels in noise-sensitive areas (for example, bedrooms and living rooms of houses) and a reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot.

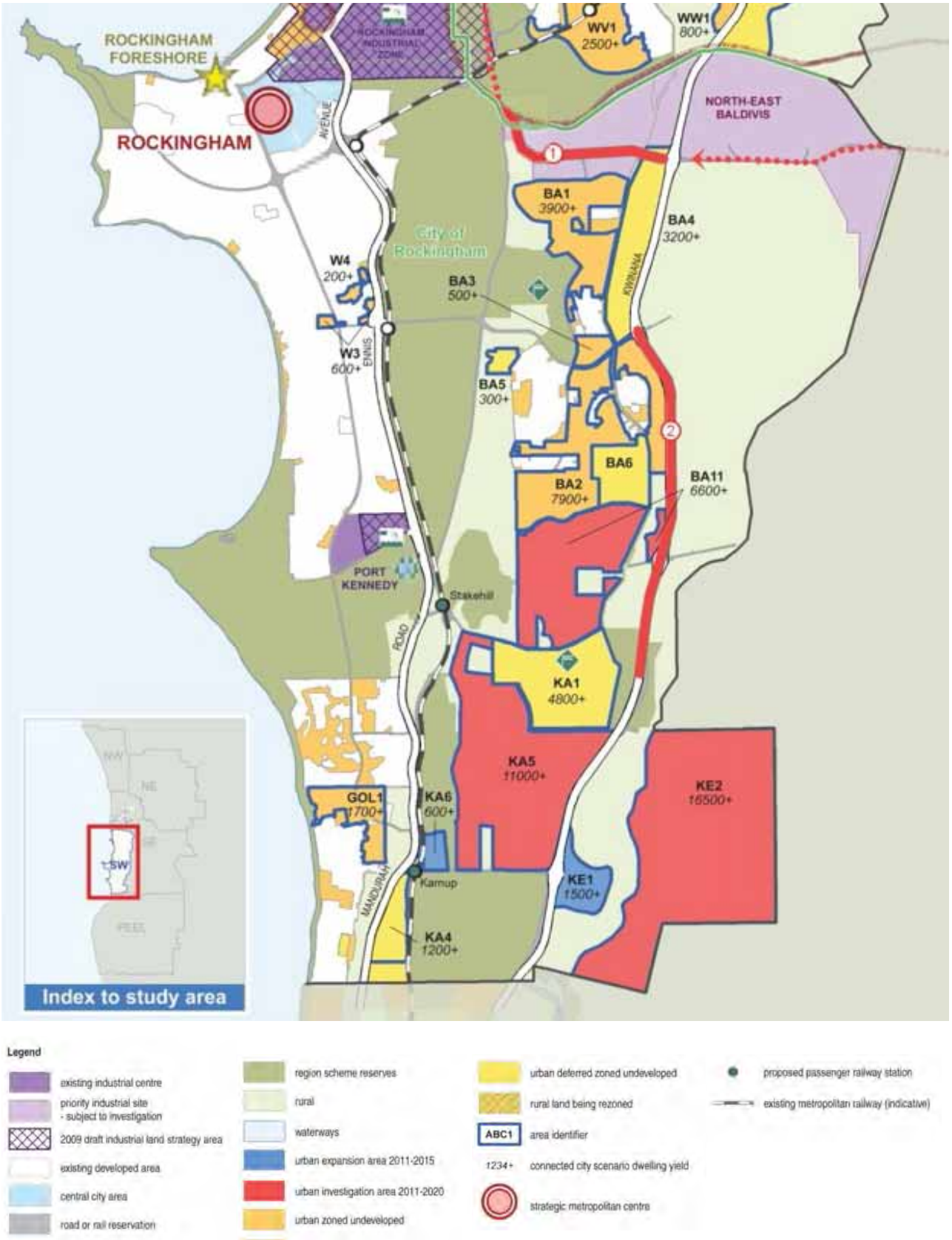
A Transportation Noise Assessment (Lloyd George Acoustics, 2017) has been prepared which demonstrates that compliance with SPP 5.4 will be achieved through a combination of noise mitigation features including noise walls and building design treatments.

2.2.3 Directions 2031 – Spatial Planning Framework for Perth and Peel

Directions 2031, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, designates the subject land for urban development. Specifically, the subject site is identified as 'urban deferred zoned – undeveloped' under the associated 'Outer Metropolitan Perth and Peel Sub-Regional Strategy' (refer Figure 4). Additionally, the subject site is identified in the urban expansion plan for the south-west sub-region; and likely to be influenced by the transit oriented development (TOD) proposed around the future Karnup Transit Station; in proximity to the north-east corner of the subject site.

Identified as 'KA4' in Directions 2031, the subject site has been forecast to ultimately provide approximately 1,200+ dwellings. Despite the numerous site constraints to development identified in this report, the LSP achieves this target, with a projected yield of 1,320+ dwellings.

Figure 4: Outer Metropolitan Perth and Peel Sub-Regional Strategy



2.2.4 South Metropolitan Peel Sub-Regional Framework (WAPC, Draft - released May 2015)

At the time of preparing this report, the Draft South Metropolitan Peel Sub-Regional Framework (WAPC, 2015) had been released for public comment with the intent of being finalised as a 'sub-regional structure plan'.

The Draft Framework builds upon the principles of Directions 2031 and accordingly is focussed on accommodating growth in a consolidated urban form, whilst still providing for greenfield development opportunities in appropriate locations. The locations proposed for accommodating growth therefore include a combination of infill, undeveloped urban and urban deferred zones, urban expansion and urban investigations areas.

The Draft Framework indicates the City of Rockingham will accommodate significant growth over the next 30+ years.

Table 3: City of Rockingham - Existing and Projected Dwellings and Population 2011 - 50

	Existing (2011)	Target (2050)
Dwellings	42,461	93,592
Population	109,415	235,935

Source: Draft South Metropolitan Peel Sub-Regional Framework (WAPC, 2015)

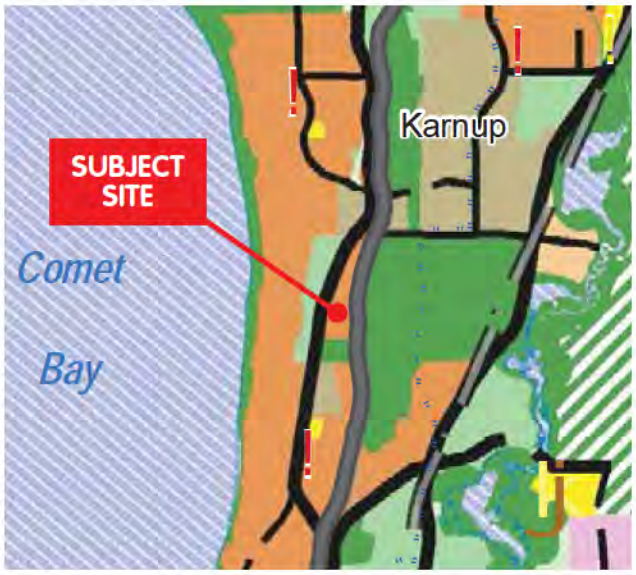
The Karnup area is expected to take on a notable proportion of this growth, identifying the West Karnup LSP as undeveloped 'Urban' and large areas of land north of Paganoni Road between Mandurah Road and the Kwinana Freeway and land between Dampier Drive and Crystaluna Drive on the west side of Mandurah Road, for Urban Expansion

In regard to transport infrastructure, the Framework shows a future train station at Karnup to the north of the LSP area, which the Framework projects will be operating at some time prior to 2025. There is no specific recommendation for a TOD precinct adjacent to this station, however it is understood this is the expectation under Metronet and that its design will be further resolved through future structure planning.

The Framework also makes provision for the extension of Dampier Drive east of Mandurah Road to Nairn Drive. The expectation is that the extension would coincide with the Karnup Station to complete the network between Rockingham and Karnup and to improve accessibility between the station and the population it serves west of Mandurah Road.

The urban development proposed for the West Karnup LSP area is therefore consistent with the Draft Framework. Importantly, the density of development proposed satisfies Directions 2031 targets, transitioning into a higher intensity urban character precinct within the northern portion of the LSP area, closer to the planned Karnup Station.

Figure 5: South Metropolitan Peel Sub-Regional Framework (Draft)



LEGEND

Peel-Harvey Coastal Plain Catchment Area (SPP 2.1)

Framework Land Uses

- Railway
- Urban
- Urban Deferred
- Urban Expansion
- Industrial Expansion
- Waterway
- Rural
- State Forest
- Open Space
- Open Space Investigation
- Public Purposes
- Proposed Public Purposes

Regional Roads (MRS/PRS)

- Existing
- Proposed

Rail

- Passenger Rail - Existing
- Passenger Rail - Proposed
- Potential Perth - Bunbury Passenger Rail (conceptual only and subject to further investigation)

Activity Centres

- District
- Specialised Node

2.2.5 Development Control Policy 1.6 – Planning to Support Transit Use and Transit-Oriented Development

The WAPC's Development Control Policy 1.6 requires transit-supportive development patterns (urban form and spatial patterns) to be delivered in transit precincts and for development to cater for a mix of land uses within transit precincts that promote transit use. Supported land uses include a mix of higher density residential development, employment generating uses, educational facilities and other public uses. The policy also requires appropriate design of the public domain in transit precincts.

The Public Transport Authority's (PTA) draft strategic plan, Public Transport for Perth in 2031 (2011) indicates the Karnup Transit Station will be constructed in the next 5 to 10 years to serve the rapidly expanding population between Warnbro and Mandurah. The more recently released Draft South Metropolitan Peel Sub-Regional Framework (WAPC, 2015) indicates a timeframe before 2025.

The State Government has accordingly facilitated preliminary planning for the station and surrounding land to achieve transit oriented design outcomes consistent with DC Policy 1.6. This work is conceptual and will be subject to future review as part of the State Government's Metronet platform.

The following assessments have occurred to give context to this LSP proposal and demonstrate how it relates to the broader Karnup Transit Oriented Precinct:

- Karnup Transit Oriented Precinct Land Use Analysis (see Plan 3 and Section 2.2.6)
- TOD Ped-Shed Analysis for the West Karnup LSP area (see Plan 4 and Section 2.2.7)

These are preliminary assessments based on the information available at the time of preparing this LSP. Final land use and ped-shed analysis will occur once the planning for the Karnup Transit Oriented Precinct is resolved.

2.2.6 TOD Land Use Analysis

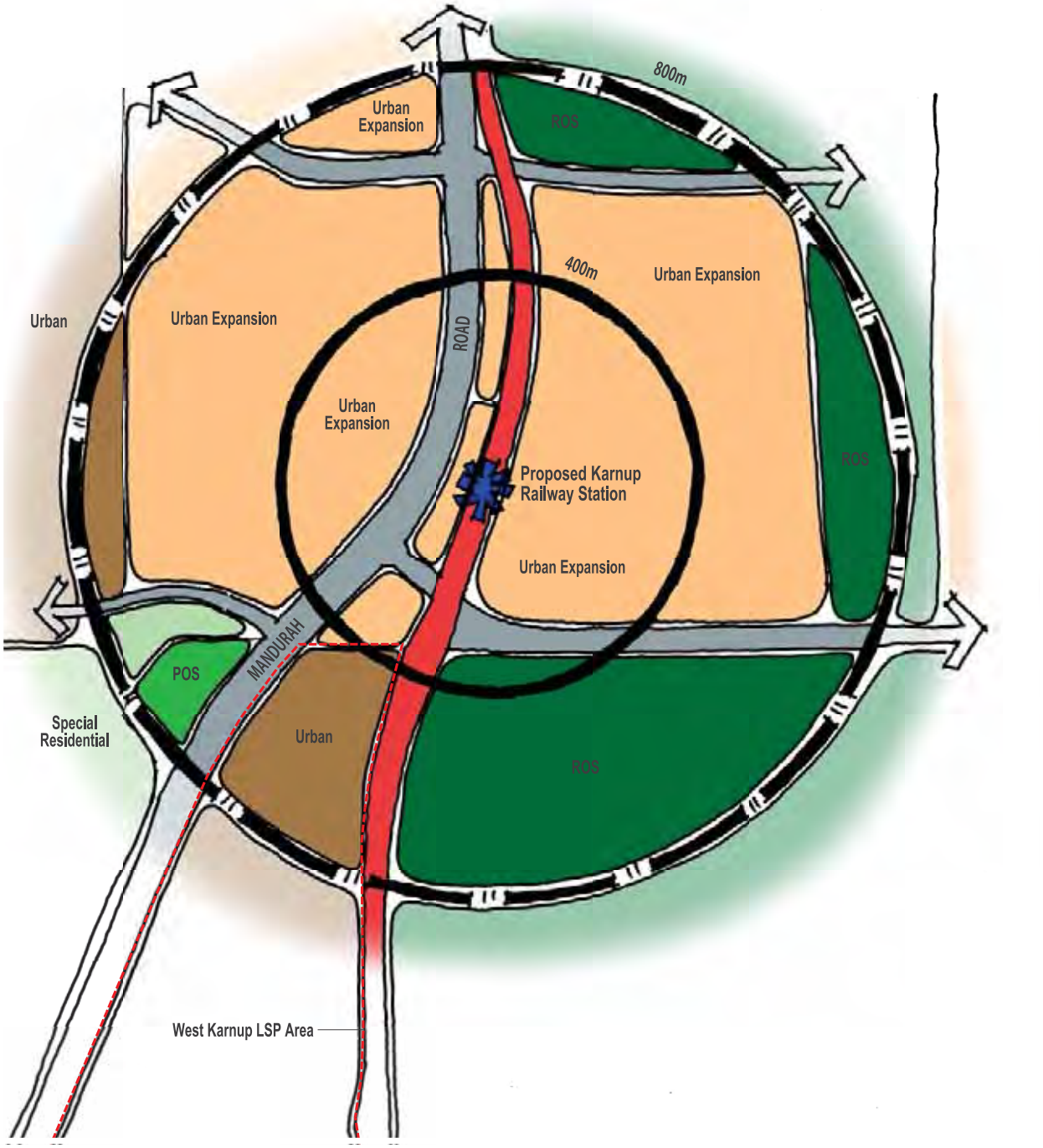
The land use analysis for the 800m catchment to the proposed Karnup Transit Oriented Precinct is illustrated in Plan 3. Accompanying this is the land use break-down provided in Table 4 - Karnup Station TOD (800m) Land Use Breakdown. The allocation of land uses recorded in this table is based on the South Metropolitan Peel Sub-regional Planning Framework (Draft) and the CoR's Town Planning Scheme No. 2.

Table 4: Karnup Station TOD (800m) Land Use Breakdown

	Within 400m Catchment		400-800m Catchment		Overall 800m Catchment	
Land use	Area (ha)	Percentage	Area (ha)	Percentage	Area (ha)	Percentage
Urban	0	0.00%	5.31	3.52%	5.31	2.64%
The Vista	0.55	1.09%	11.06	7.33%	11.61	5.77%
Urban Expansion	29.63	58.93%	67.30	44.63%	96.93	48.21%
Special Residential	0	0.00%	3.35	2.22%	3.35	1.67%
POS	0	0.00%	3.38	2.24%	3.38	1.68%
Regional Open Space	3.22	6.40%	44.98	29.83%	48.2	23.97%
Railway Reserve	9.29	18.48%	4.33	2.87%	13.62	6.77%
District Distributor Roads	7.59	15.10%	11.09	7.35%	18.68	9.29%
Total	50.28		150.8029		201.0785	100%

The land use analysis shows that the LSP area occupies a relatively small percentage of the total 800m catchment to the station, being 5.7% (11.6ha). The land east and west of the Karnup Station, which is earmarked as 'Urban Expansion' in the Sub-regional Planning Framework (draft), occupies approximately 48% (96ha). A further 2.6% (5.3ha) forms part of the 'Urban' zoned land in Golden Bay. The balance 43% (87.2ha) consists of Parks and Recreation, Regional Roads and Railway reservations and rural-residential development.

Plan 3: TOD Land Use Analysis



2.2.7 TOD Ped-Shed Analysis

The design of the northern portion of the LSP area which falls within the 800m (10-minute) radius of the proposed rail station, addresses the requirements of DC Policy 1.6, including its requirements for compatible land use and an integrated transport network. The LSP and DC Policy 1.6 however recognises there are limitations to the extent to which the design can achieve higher residential densities as part of the initial stages of subdivision given there will be some time lapse in the provision and operation of a train station at Karnup.

The LSP therefore has built in sufficient robustness to allow for future more intensive subdivision and development as the project area matures and train services come on line. This includes the opportunity to increase residential densities up to R60 (serviced by laneways), and locating POS and a road reserve adjacent to the northern LSP boundary to provide flexibility for future integration with transit-related development to the north.

Outlined below are the key measures introduced into the LSP to allow for a future TOD outcome consistent with DC Policy 1.6. These measures are also illustrated in Plan 4 - Ped-shed Analysis for the Karnup Transit Oriented Precinct Plan.

Diversity & Intensity of Residential Lots:

The LSP responds to the future train station with a flexible street block pattern that allows for intensification of residential development over time. Allocated densities of R25 to R40 are provided within the 400 - 800m walkable catchment to the station to facilitate a diversity of housing, including smaller terrace lots on laneways.

The 'Ped-Shed' analysis establishes that 4.91ha of net residential land within the LSP area is located within an 800 metre radius of the station. Of this land, the density break-down is as follows:

- 2.39 hectares of net residential area coded R40.
- 2.52 hectares of net residential area coded R25.

This density of development within an 800m radius of the station equates to 36 dwellings per site hectare, which exceeds the 20 - 30 dwelling target recommended by Liveable Neighbourhoods (refer R12 of Element 3).

In addition, the urban structure, extensive parkway amenity, and generous use of laneways creates the conditions and flexibility to increase densities through a minor LSP amendment. The feasibility of doing this will be reviewed and considered closer to time of delivering this stage of the project having regard to the timing for delivery of the Karnup Station under Metronet and favourable market conditions for higher yielding building typologies.

Transport Connectivity: The street pattern provides for a high level of permeability and connectivity to allow for direct access connection to the future station and TOD development. This includes a permeable block pattern and provision for an access connection to the north of the LSP area. Initially this northern access will connect into Paganoni Road, west of the railway bridge, to provide the primary point of access and egress for the northern portion of the LSP area. Provision is also made in the LSP design to accommodate the creation of four-way full movement, signalised intersection at Crystaluna Drive/Mandurah Road. This option may be pursued in the event that the existing Mandurah Road/Paganoni Road signalised intersection is decommissioned and the connection north from the LSP to Paganoni Road is removed as part of future road network modifications for development of the Karnup TOD.

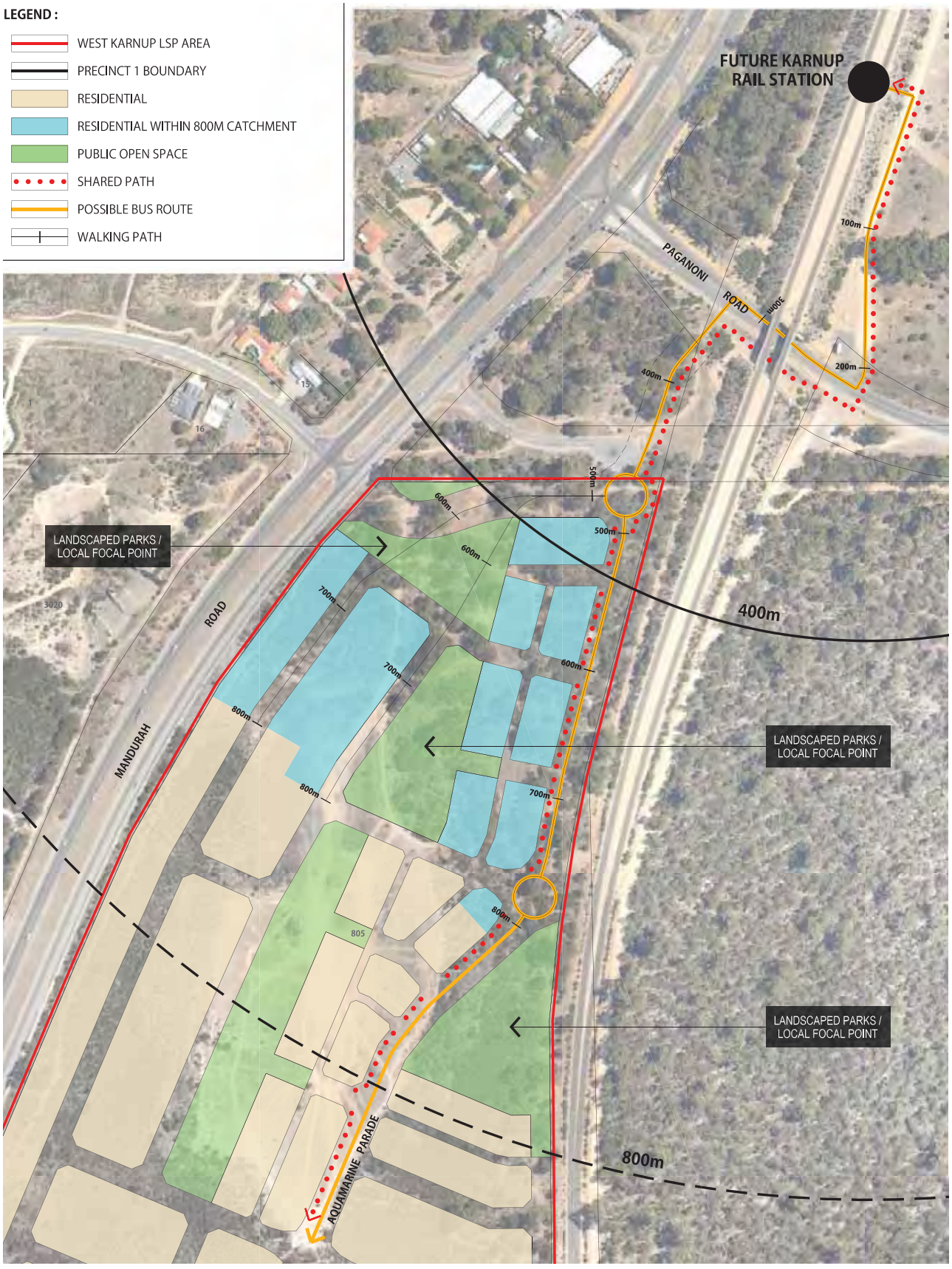
Pedestrian / Cycle Access: The interconnected street network and public space network supports an efficient and legible movement network for pedestrians/cyclists that provides good accessibility to key destinations including the future station, primary school, southern neighbourhood centre and Singleton Beach.

Pedestrians and cyclists will be able to move through the local network and POS areas to converge on Aquamarine Parade and travel north to access the future Karnup Station.

Three landscaped parks (A, B and C1) are designed to achieve an interconnected greenway through the centre of the northern LSP area. These spaces provide a safe alternative route for pedestrian/cyclist access. The location of these spaces, central to the neighbourhood cell, allows the landscape character to flow through the development, providing opportunities for higher yielding dwelling densities and types that can leverage off this amenity.

Public Transport: The street network is designed to accommodate a future bus service along Aquamarine Parade being the main north-south spine. This connection extends to the TOD precinct, providing for future integration with the rail service.

Plan 4: TOD Ped-Shed Analysis



2.2.8 Public Transport for Perth in 2031 (Draft for Consultation - DoT, July 2011)

This document illustrates the proposed combined public transport network for the Perth Metropolitan area to be developed by 2031. The final rapid transit infrastructure at 2031 includes a transit station at Karnup and a rapid transit bus system between Karnup and Mandurah rail stations servicing current and future development at Nambeelup, Lakelands, Mandurah city and Keralup (which was an active proposal when the draft plan was released).

This document outlines that the Karnup Transit Station will be constructed in the next 5 – 10 years to serve the rapidly expanding population between Warnbro and Mandurah.

This is consistent with State Government's Metronet transport plan, which nominates Karnup Station as a Stage 1 project, scheduled for delivery by 2025.

2.2.9 State Planning Policy No. 3.7 - Planning in Bushfire Prone Areas

The Fire and Emergency Services Commissioner has identified and designated land across Western Australia as being 'bushfire prone areas' pursuant to the Fire and Emergency Services Act 1998 (as amended). The designated areas are shown as 'bush fire prone areas' on the Map of Bush Fire Prone Areas. The objectives and provisions of State Planning Policy No. 3.7 - Planning for Bushfire Prone Areas (SPP 3.7) apply to the identified bushfire prone areas.

All of Lots 3 and 805 and the portions of Lot 806 within 100 metres of the edge of bush fire prone vegetation are identified as a 'bushfire prone areas' (refer Plan 5). The objectives and provisions of State Planning Policy No. 3.7 - Planning for Bushfire Prone Areas (SPP 3.7) therefore apply to the subject land.

The principal objective of SPP 3.7 is to facilitate effective risk-based planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. Accompanying SPP 3.7 are Guidelines for Planning in Bushfire Prone Areas, which provide supporting information to assist in the interpretation of the objectives and policy requirements set out in SPP 3.7

Following development of the LSP area, existing remnant vegetation within the site will be mostly cleared, which will result in a contraction of the identified bushfire prone areas. However vegetation surrounding the site will remain. This includes Bushforever Site 395 to the south, the Perth-Mandurah Railway reserve and conservation land to the east, the MRS Parks and Recreation reserved land to the north and rural residential development to the west (on the opposite side of Mandurah Road to the LSP area).

To manage the risks associated with both the staging of the subdivision and with vegetation surrounding the LSP area and to address the requirements of SPP 3.7, a Bushfire Management Plan has been prepared for the LSP area (refer Appendix 1, Emerge Associates and Bushfire Safety Consulting, 2017) that details the following:

- a description of the site, the surrounding area, fire climate and bushfire history;
- those portions of the site designated as bushfire prone under the Map of Bush Fire Prone Areas (OBRM 2015);
- the results of the bushfire hazard assessment, which sets applicable hazard levels across the site;
- a description of the proposed road network and how this addresses vehicular access for bushfire risk purposes;
- an outline of the water supply requirements within the site for firefighting purposes;
- an outline of the requirements for the internal siting of buildings to include asset protection zones and hazard separation zones, where applicable;
- identification of determined site specific Bushfire Prone Areas based on the assessment of
- classified vegetation within the site and surrounding 100m.

The endorsed BMP will be implemented as part of the subdivision and development of the land.

Plan 5: Map of Bushfire Prone Areas

Part Two: Explanatory Section

Plan 6: Site Plan & Ortho

3.0 Site Conditions and Environment

An Environmental Assessment and Management Strategy has been prepared by Emerge Associates for the LSP proposal (Appendix 1 refers). The following section summarises the key findings of this report.

3.1 Flora and Vegetation

Historical use as a quarry has reresulted in significant clearning. The vegetation that remains is representative of the 'Cottesloe (Central and South)' and 'Yoongarillup' complexes (Heddle et al. 1980). These vegetation complexes are briefly described below:

- Cottesloe – Central and South complex: occurs on the western side of the subject site and is described as a mosaic of woodland and tuart (Eucalyptus gomphocephala) and open forest of E. gomphocephala, jarrah (E. Marginata) and marri (Corymbia calophylla), with closed heath on the limestone outcrops.
- Yoongarillup complex: occurs on the eastern side of the subject site and is woodland of E. gomphocephala with peppermint (Agonis flexuosa) in the mid-storey. Less consistently, the complex appears as an open forest of E. gomphocephala, E. marginata and C. calophylla.

Data provided by the Perth Biodiversity Project (PBP, 2013) indicate that approximately 35.2% of the Cottesloe – Central and South complex and 38.7% of the Yoongarillup complex remains compared to pre-European settlement extent. These percentages are in accordance with generally accepted (best practice) 30% complex retention targets (Commonwealth of Australia 2001 and EPA 2006) and well in excess of the10% target for 'constrained areas' on the Swan Coastal Plain (EPA 2006) and within the Bush Forever study area.

Several flora and vegetation surveys have been progressed over the subject site, with the most recent being conducted by Emerge Associates in late 2010 (Emerge Associates 2011 a – refer Appendix 1). This survey covered the full extent of Lots 3, 805, 806 and 807 and encountered no Threatened Ecological Communities (TECs) or Threatened (Declared Rare) Flora within the subject site. Vegetation condition ranged from 'Completely Degraded' to "Very Good" with the majority of the vegetation being in 'Completely Degraded' or 'Degraded' condition, most of which is situated adjacent to Mandurah Road in Lot 806, in addition to the former quarry and internal tracks. Vegetation in 'Very Good' condition is dispersed across the site, however is limited to small areas.

A number of identified priority Flora and Priority Ecological Communities identified within the site will be protected in the conservation reserve, which will be retained in perpetuity and managed by DPaW. Furthermore, mature tuart and jarrah trees will be retained in areas of POS throughout the site. These environmental outcomes address the policy objectives of the EPA and WAPC.

3.2 Fauna

A level 1 fauna survey was conducted in 2011 (Harewood 2011), which identified three fauna species of conservation significance within the site: Carnaby's Black Cockatoo, the Peregrine Falcon and the Southern Brown Bandicoot (Quenda). A further ten fauna species of various conservation significance were deemed to potentially access the site at times based on available fauna habitat, however no evidence of their presence was observed during the site survey.

The 18.5ha conservation reservation will enable retention of significant fauna habitat. A Reserve Management Plan has been prepared for this reserve, which outlines the management requirements for the area to ensure fauna habitat is retained and conserved. In addition to this, mature tuart and jarrah trees will be retained in POS within Lot 805 to the extent practicable. Furthermore, a trapping program targeting the Southern Brown Bandicoot (Quenda) species will be undertaken prior to the clearing of native vegetation, with captured individuals to be released in nearby bushland, most likely in BF 3955 to the south of the site.

3.3 Wetlands and Waterways

The subject site falls outside of the physical and administrative boundaries of the Peel-Harvey Estuary surface water catchment, and therefore does not sit within the area covered by either Statement of Planning Policy No. 21: The Peel-Harvey Coastal Plain Catchment (WAPC, 2003) or the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992. The western most boundary of the Peel-Harvey Estuary surface water catchment lies to the east of the subject site, which is part of the Serpentine River sub-catchment draining in a south easterly direction to the Peel-Harvey Estuary.

There are no recognised wetlands or waterways located within the subject site. Conservation Category Wetlands (CCWs) are located approximately 120 metres to the east of the subject site in a Parks and Recreation Reserve that encompasses Rockingham Lakes Regional Park.

3.4 Landform and Soils

Broadly, the subject area lies within the Swan Coastal Plain, and specifically the Spearwood dune geomorphic unit.

The natural topography ranges from a maximum height of 29 metres AHD in the west to a minimum of 5 metres AHD in the east. Historic limestone quarrying by previous landowners has resulted in significant modification to the natural landform through vegetation clearing and the removal of limestone from the ridge that occurs along a north-south orientation across the site.

Bunding along Mandurah Road had screened former quarrying activity. The bund is 3-5 metres in height, with the LSP Area generally lower or at grade compared to Mandurah Road. The eastern boundary of the site abutting the Perth to Mandurah railway reserve also varies in height and grade, as the rail reserve is grade separated over Paganoni Road and sits within a large cuttings adjacent to the central section of the site.

Based on Churchward and McArthur (1980) the site is situated on two broad soil-landform formations, the Cottesloe formation in its western extents and the Yoongarilup formation in its eastern extents. These are described further below:

- Cottesloe formation – low hilly landscape with shallow brown sand over limestone, with much exposed limestone.
- Yoongarilup formation – plains with low ridges and swales, with shallow yellow and brown sands over marine limestone.

Geotechnical investigations undertaken by Galt Geotechnics (2011) encountered deep sands, sand over limestone and limestone at 15 locations across Lot 805 and Lot 806. Advice provided by Coffey Geotechnics (2011) for Lot 805 and Lot 806 indicates that the risk of significant karst features occurring within the subject site that would potentially impact on the future urban/residential land use and associated development is very low.

The site generally drains freely, with tests confirming high infiltration rates of up to 20 cubic metres a day (Galt Geotechnics 2011).

3.5 Acid Sulfate Soils

Acid Sulfate Soil (ASS) risk mapping compiled by the Department of Environment and Conservation indicates that the entire site has been classified as having no known risk of ASS occurring within 3m of natural soil surface or deeper.

3.6 Groundwater

According to Department of Water (DoW) mapping, the regional groundwater information indicates that groundwater flows to the west towards the coast (DoW 2009). Groundwater levels are expected to occur at approximately 1m AHD across the site, which is between 4 to 28 m below the current ground surface.

Groundwater monitoring has been carried out to confirm the depth to groundwater and groundwater flow direction and to support the preparation of a Local Water Management Strategy (LWMS) for the subject site. Six monitoring bores were installed across the site to identify levels and monitoring was carried out over an 18 month period. There is no surface water expression of the groundwater within the site.

3.7 Heritage

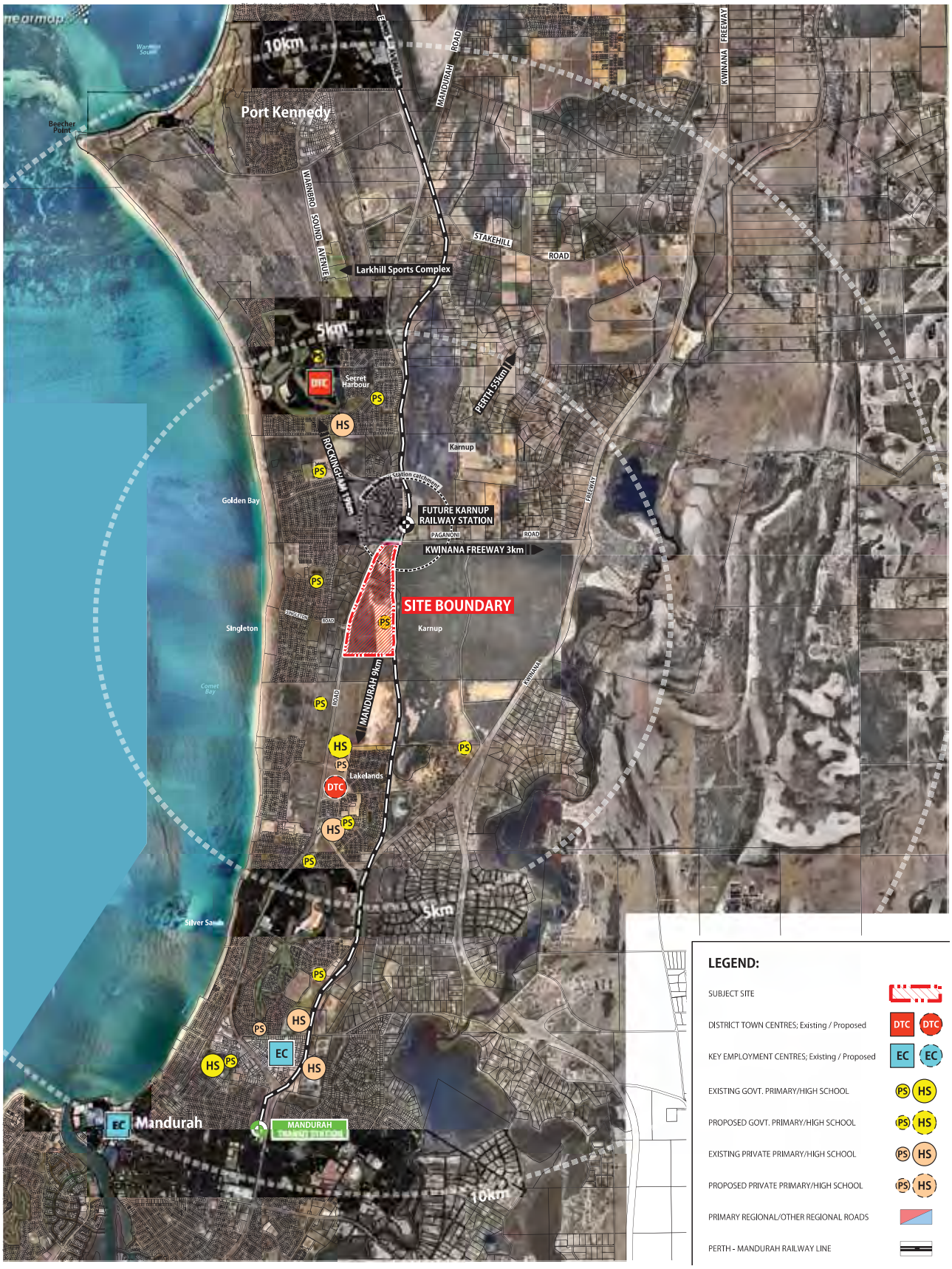
The previous and current quarry activities across the LSP area have significantly disturbed the site. Notwithstanding this activity, a desktop investigation has been undertaken and found that the site contains no indigenous heritage sites (DAA 2015). If Aboriginal artefacts or sites are uncovered during construction, works will cease and a suitably qualified expert will be brought in to survey the potential site, and if required, obtain approval under the Aboriginal Heritage Act 1972.

A desktop search of the State Heritage Office database (Heritage Council 2015) and the Australian Heritage Database (Department of the Environment 2015) indicated there are no Registered Heritage Sites within the LSP area. A search of the City of Rockingham Municipal Heritage Directory (City of Rockingham 2015) also did not identify any heritage sites within or adjacent to the site.

3.8 Adjacent Conservation Reserves

The site is located immediately adjacent to large areas historically set aside for conservation purposes associated with Bush Forever Site No. 395 and Paganoni Swamp within the Rockingham Lakes Regional Park. The "Agreement to Reserve" area located within the southern portion of Lot 806 was required as a condition of a clearing permit from the previous landowner. At the time of subdivision the land the subject of the "Agreement to Reserve" area was ceded as a reserve for Conservation free of cost to the Crown and is intended to be incorporated into the Rockingham Lakes Regional Park managed by the Department of Parks and Wildlife (DPaW).

Plan 7: Regional Context



4.0 Context Analysis

The Regional Context Plan (Plan 7) illustrates the surrounding movement network and land uses described in further detail below.

4.1 Surrounding Land Uses

The site is physically bounded on all four sides by:

- Mandurah Road (Primary Regional Road) to the west;
- WAPC 'Parks and Recreation' landholding and Paganoni Road (Other Regional Road) to the north;
- Perth-Mandurah Railway line (Railway Reserve) and Bush Forever Site 395 – 'Paganoni Swamp and Adjacent Bushland' (Parks and Recreation Reserve) to the east; and
- Bush Forever Site 395 (Parks and Recreation Reserve) to the south.

West of Mandurah Road the area is defined by the City of Rockingham as 'Dune Landscape/Landform' protection zone. Further to the west are the residential areas of Singleton and Golden Bay.

The land immediately to the north-east of the LSP Area is reserved for Railways under the MRS and is planned to accommodate the future Karnup Transit Station. The Draft Metropolitan Peel Sub-Regional Framework (WAPC, 2015) and Metronet indicates this station will be operational prior to 2025.

Mandurah Road is located adjacent to the western boundary and the Perth-Mandurah rail line is located adjacent to the eastern boundary. Both reserves have the potential to generate noise and a detailed noise impact assessment has been undertaken (Lloyd George, 2012) in accordance with Statement of Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning (WAPC 2009). This noise impact assessment found that noise impacts could be managed through a number of mechanisms, including noise attenuation walls, local development plans, and quiet house design. This matter is further addressed in Section 5.9 and the Transportation Noise Assessment is included as Appendix 'D' under the Environmental Assessment and Management Strategy (Appendix 1 refers).

4.2 Movement Networks

The subject site abuts Mandurah Road, a MRS 'Primary Regional Roads' reservation on the western boundary. Paganoni Road, reserved 'Other Regional Roads' in the MRS, is located to the north of the site. These regional roads connect the site to regional centres including Rockingham and Mandurah. Approximately 3 kilometres to the east (via Paganoni Road) lies Kwinana Freeway which provides access to both the Perth Central Business District, and Mandurah City Centre and beyond.

The Perth to Mandurah railway line is located immediately to the east of the subject site. Planning by the Department of Transport indicates that Karnup Transit Station will be located immediately to the north-east of the subject site, providing residents with a future train service connected via a bus feeder network.

To allow for the train station and associated TOD, the Draft South Metropolitan Peel Sub-Regional Framework makes provision for Dampier Drive to be extended east of Mandurah Road to Nairn Drive. This extension would complete the network between Rockingham and Karnup and improve accessibility between the station and its service catchment.

A further option that has been considered by MRWA and the DoP to improve the regional road network in association with Karnup Station is for Paganoni Road to be deviated south of its current alignment to connect with a controlled four-way intersection at Mandurah Road and Crystaluna Drive. Although this is one of several options that may ultimately be considered to improve the operation of the regional road network, the LSP design provides extra wide road reserves to allow for this option.

4.3 Activity and Employment Centres

The site is located approximately 10 kilometres to the north of Mandurah Strategic Metropolitan Centre and 19 kilometres south of Rockingham Strategic Metropolitan Centre.

Several important activity centres and employment generators exist (and are proposed) in proximity to the site, including:

- Lakelands District Town Centre located ~3 kilometres south of the site
- Secret Harbour District Town Centre located ~3 kilometres north of the site;
- North Mandurah Business Park and industrial area ~ 6 kilometres to the south of the site;
- Port Kennedy Business Park ~ 6 kilometres to the north of the site.

Furthermore, the subject site benefits from proximity to a strong regional and district road network that includes Kwinana Freeway, Paganoni Road and Mandurah Road. This already established road network provides direct connections to regional employment centres in Mandurah, Kwinana, Rockingham, Fremantle, and Perth Central Business District.

Opportunities for local employment will be further encouraged by the development of future industrial areas nearby, including Latitude 32, Nambeelup and North-East Baldivis. These areas are earmarked by Directions 2031 and the Draft Industrial Land Strategy for Perth and Peel for future expansion of employment land uses.

In addition to the on-site Neighbourhood Town Centre, the future development of the Karnup TOD, will also create opportunities for long term local employment.

4.4 Education

Several educational facilities exist in proximity to the site.

Nearby Public Primary Schools include those in Singleton, Secret Harbour and Lakelands Estate. With a projected yield of 1,260 dwellings the Lakelands Estate provides an almost 'self-sufficient' catchment for a local primary school. Accordingly, the LSP makes provision for a 3.5ha primary school site that includes shared school/community active playing fields.

The Comet Bay Public Secondary school is ~2km north of the subject site. A further public Secondary School is earmarked in the northern portion of Lakelands Estate, this being ~3 kilometres south of the subject site. Several options for private education exist in the locality, including Mandurah Baptist College and Frederick Irwin Anglican School to the south.

The Rockingham and Mandurah campuses of Murdoch University and Challenger TAFE offer an expanding range of tertiary facilities in the area.

4.5 Open Space

The site immediately abuts a large area of bushland protected by Bush Forever, which may provide a future passive recreation function for local residents.

District level playing field facilities are located at the Larkhill Sportplex, situated 5 kilometres north-west of the subject site and district level sports facilities will be developed adjacent to the future Lakelands Secondary School site, to the south of the LSP area.

Additionally, the regional road network provides direct connection to Golden Bay foreshore, Rockingham Lakes Regional Park, Paganoni Swamp and the Peel Inlet. Future open space areas within the LSP area will provide a diverse range of recreational areas for the benefit of future West Karnup residents and include a large active playing area adjacent to the primary school site.

5.0 Local Structure Plan

5.1 Design Philosophy

5.1.1 Design Objectives

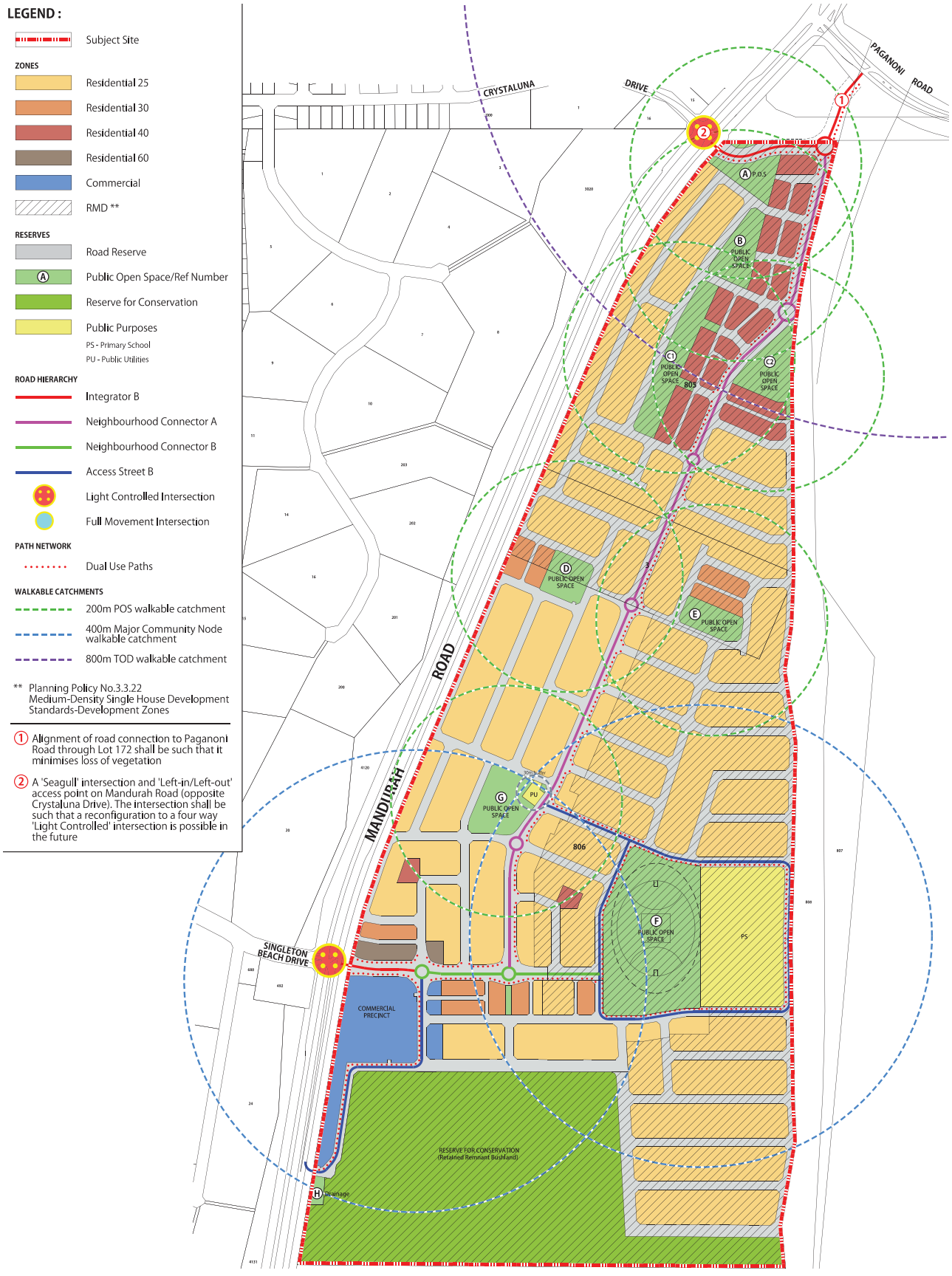
A primary objective of the LSP is to create a relatively self-contained neighbourhood that fosters a sense of community and promotes a quality lifestyle for all residents. The need to ensure an adequate level of locally provided services and facilities is particularly important for this site given the external barriers, namely the conservation reserve to the south, the railway corridor to the east, Mandurah Road to the west; and undeveloped land to the north.

The design therefore makes provision for a diversity of lot sizes/dwelling types, supported by active and passive open spaces, neighbourhood retailing and associated services/ community uses, a local primary school and generous provision of pedestrian and cycle pathways.

The following project objectives have informed the LSP design:

- Location and provision of public open spaces to ensure accessibility, diversity in types and usability, tree retention where practical, visual aesthetics and view corridors ('green-links') and the integration of stormwater management within these open spaces and wider road reserves;
- Provision of a diverse range of lot sizes, and ultimately dwelling product, thereby offering housing options to the market;
- Delivery of a safe and connected pedestrian and cyclist environment through a strategic dual use path and footpath network, on route to regional networks along the Perth-Mandurah Railway line and stations, and Mandurah Road and Kwinana Freeway Reserves;
- Suitable interface with Mandurah Road, Railway Reserve, remnant bushland and 'Bush Forever' sites, including bushfire risk management measures; and
- Implementation of a suitable earthworks, engineering and drainage solutions for the site.

Plan 8: Local Structure Plan



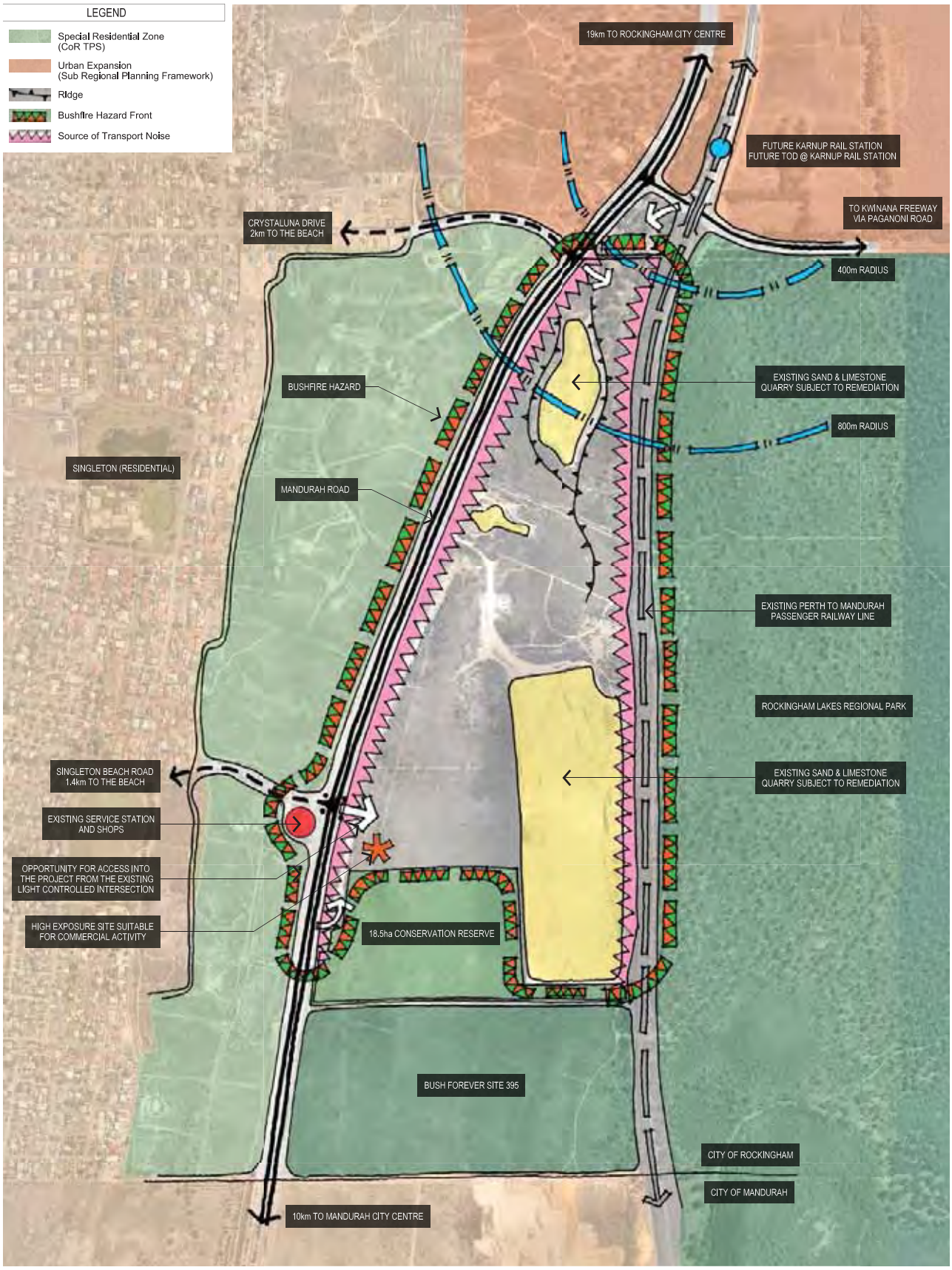
5.1.2 Opportunities and Constraints

Detailed site investigations have identified a number of opportunities and constraints to the future development of the LSP area that have informed the LSP design. These are described in the below table and are illustrated in Plan 9. The LSP design responds to these findings as outlined in the table below.

Table 5: Opportunities and Constraints

OPPORTUNITIES	RESPONSE
Karnup Station - Northern portion of LSP area falls within 800m walkable catchment to development area	• Allocated residential densities of R25 - R40 within 800m walkable catchment to facilitate a diversity of housing types, including compact terraces and cottages on laneways with flexibility to increase to R60 through the minor LSP amendment process • Street block layout and lanes allows for future intensification of residential development • Street pattern provides for high level of permeability and connectivity to future station and TOD development • POS along northern boundary creates flexibility for interface and integration with future TOD to the north • Street network provides for cycle/pedestrian connections and bus service to the future TOD precinct
Primary School - Requirement for Primary School site to be provided within LSP area	• Allocates level site for primary school within south-eastern portion of LSP area • Site co-located with district playing field to facilitate shared use • Dwelling mix includes product suitable for families with school aged children • High level of access provided to school site including road interfaces and pedestrian/cycle connections
Commercial opportunity - Commercial exposure available to Mandurah Road (~55,000vpd)	• Provision for neighbourhood centre development with exposure to Mandurah Road.
CONSTRAINTS	**RESPONSE**
Noise - Rail corridor and Mandurah Road	• Acoustic Assessment accompanying LSP makes provision for quiet house design and installation of acoustic walls
Access - Restrictions apply for access to Mandurah Road and the LSP area does not interface with any other external roads	• Full movement, signalised intersection built at existing Mandurah Road/Singleton Road • An additional northern connection will be created onto Mandurah Road opposite Crystaluna Drive. This intersection will be restricted to left-in/left-out movements. • Aquamarine Parade will also be extended northwards to Paganoni Road where left-in/left-out and right-egress movements will be available.
Bushfire - Risks associated with staged development and surrounding vegetation	• Bushfire Management Plan accompanies the LSP that establishes level of fire risk and identifies management responses in accordance with SPP 3.7
Tree Retention - Ability to retain trees limited by extent of required earthworking (due to former quarry and fixed external levels of Mandurah Road, rail corridor, MRS reserve to the north and conservation reserve to the south)	• As part of the LSP development the southern portion of Lot 806, comprising 18.5ha of remnant vegetation, was reserved for conservation and ceded free of cost to the Crown to be incorporated into the Rockingham Lakes Regional Park • Trees with landscape and/or fauna habitat value will be surveyed and retained to the extent possible • Landscaping plan makes provision for tree planting within road reserves and POS areas • Distribution of landscaped POS areas will share amenity across LSP area to benefit all residents

Plan 9: Opportunities & Constraints Plan



5.2 Residential Densities and Dwelling Forecasts

5.2.1 Dwelling Forecasts – Directions 2031 and Beyond

The Directions 2031 and accompanying Outer Metropolitan Perth and Peel, Sub-Regional Strategy sets the following dwelling target rates for the Structure Plan area, identified as area 'KA4' in this document:

Table 6: Directions 2031 Dwelling Targets:

Directions 2031 Scenario	Projected Dwellings:
'Connected City' @ 15 dwellings per gross urban zone	1,200+ dwellings
'Business as usual' @ 10 dwellings per gross urban zone	800+ dwellings

The relevant Directions 2031 dwelling yield forecast is based on a 'Gross Urban Zone Density'; this interpreted to include all 'urban' zoned land (i.e. residential cells, Public Open Space, roads, Primary School, Neighbourhood Centres etc; and exclusive of Parks and Recreation Reserves, Regional Roads and Railway Reserves, High School Reservations, District Centres, etc).

A dwelling yield projection prepared by the project team, and based on generic lot sizes, suggests a minimum yield in the order of 1,320 dwellings across the LSP area, hence satisfying the estimated Directions 2031 dwelling targets. The dwelling target has been achieved despite an 18.5ha parcel of land being retained as remnant bushland (agreed Reserve for Conservation area) in the southern portion of the site. Furthermore, the projected dwelling yield does not take into consideration the WAPC landholding to the north, identified also within the 'KA4' site. Development of this landholding will ensure the Directions 2031 dwelling targets are well exceeded within this particular area, given higher density objectives in proximity to the future Karnup TOD.

The proposed forecast across the LSP area is subject to the final design for respective subdivision stages which will respond to detailed drainage, engineering and environmental considerations (including tree retention objectives) as well as market demand which may alter the lot mix at the time of subdivision.

5.2.2 Dwelling Forecasts – Liveable Neighbourhoods

The majority of the LSP area has been assigned an R25 Residential Density Coding; with medium density (R30, R40 and R60) development proposed in proximity to Public Open Space areas, the future Karnup Transit Station (TOD Catchment) and proposed Neighbourhood Town Centre.

The R25 – R40 density codings offer a minimum and average lot product considered suitable for this location within the outer-metropolitan area of Perth; being a combination of lot product ~200m^2 – 550m^2 in area. Estimated dwellings yields are in the order of:

- Residential R25: 1,043+ dwellings
- Residential R30: 69+ dwellings
- Residential R40: 156+ dwellings
- Residential R40 (GH) 11 dwellings (max) / 2 sites
  Residential R60 44 dwellings (max)

Based on the Liveable Neighbourhoods 'Site Hectare' definition, the overall density for the LSP equates to approximately 26.2 dwellings per site hectare, therefore fulfilling LN density objectives.

5.2.2.1 Dwelling Forecasts within 800m of TOD Site

The LSP has been designed to a mix of densities ranging from R25 through to R40 within the 400-800m walkable catchment of the future Karnup Transit Station (TOD). These densities equate to 36 dwellings per 'Site Hectare' within 400 - 800m of the future train station; exceeding the 20 – 30 dwelling target recommended by Liveable Neighbourhoods.

A POS area and road reserve interface with the LSP area's northern boundary. This is to provide maximum flexibility for the design and integration of future interfacing development of the land to the north that will ultimately form part of a future Karnup TOD.

5.2.2.2 Dwelling Forecasts within 400m of Proposed Neighbourhood Activity Centre

The LSP has been designed to facilitate medium density development up to Residential R60, within the 400m walkable catchment of the future West Karnup Neighbourhood Centre.

In accordance with Liveable Neighbourhoods definitions, the proposed LSP achieves 24 dwellings per 'Site Hectare' within 400m of the Neighbourhood Centre; this being within the prescribed 20 – 30 dwelling target under LN.

5.3 R-MD Codes

In May 2015, the WAPC introduced medium density single-house development standards. These standards (referred to as R-MD Codes) can be introduced into LSP areas to replace the standard Residential Design Code requirements as they apply to medium density single houses within areas coded R25, R30, R40 and R60.

Since the R-MD Codes were introduced into the Western Australian planning system in mid-2015, lots within the south-western portion of the West Karnup LSP which were created at that time have proceeded under the normal R-Code requirements (unless otherwise varied through a Detailed Area Plan). The remaining undeveloped lots are subject to the R-MD standards.

This is reflected in the City of Rockingham Local Planning Policy No. 3.3.22 which applies the R-MD provisions to the northern and eastern portions of the LSP area.

5.4 Local Development Plans

Local Development Plans (LDPs) are required for residential subdivision lots comprising one or more of the following site attributes:

vi. Lots with rear-loaded vehicle access; and/or

vii. Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space; and/or

viii. Lots with direct boundary frontage (primary or secondary) to the LSP's main southern entry road; and/or

ix. Lots deemed to be affected by a recognised bushfire hazard as identified spatially in the Fire Management Plan (Emerge Associates / Bushfire Safety Consulting) contained within Appendix 1; and/or

x. Lots deemed to be affected by noise from Mandurah Road or the Perth-Mandurah rail corridor as identified in the Noise Impact Assessment (Lloyd George Acoustics) contained within Appendix 1.

With reference to Provision (vi), LDPs are to include a requirement for additional noise modelling for two-storey development.

LDPs are also required for non-residential areas including:

i. All land zoned 'Commercial' under the LSP Map.

LDPs may be prepared as part of a subdivision application or imposed as a condition of subdivision approval, on the advice of the City of Rockingham.

5.5 Lots Fronting Public Open Space

The LSP design will create laneway lots with direct frontage to POS areas.

The WAPC's Liveable Neighbourhoods allows for this approach, recommending suitable interface treatments between the dwellings and adjacent POS areas to ensure clear demarcation between the public and private realms and surveillance opportunities to the open space.

The City of Rockingham's Planning Policy 3.4.1 - Public Open Space also allows for direct frontage lots where it can be demonstrated that:

i. accessibility and usability of the POS is not compromised; and

ii. visual surveillance of the POS from adjoining development and the need for visitor parking has been addressed.

Policy 3.4.1 also sets out design criteria for POS areas that have directly fronting lots including:

- lots to be elevated a minimum 500mm above the POS;
- use of open style front fencing to POS area;
- a 1.5m wide frootpath to be provided within POS area adjacent to lot frontages;
- provision of adequate visitor parking to serve the development.

To ensure compliance with the design requirements set out in the City's POS policy, the Part 1 LSP provisions require that LDPs be approved for the direct frontage lots. The LDPs, prepared for these lots will include minimum standards to ensure appropriate design and relationship with the adjacent POS areas, including:

- finished floor level specifications;
- front fencing/walling requirements;
- dwelling orientations and major openings to habitable rooms;
- adequate provision of visitor parking;
- provision of pathways parallel to the lot frontages to cater for pedestrian/visitor access; and
- front fencing of appropriate height, character and visual permeability.

Residential dwellings with direct frontage to public open space at Ellenbrook

Residential lots constructed to address adjacent public open space at Eliza Ponds, Coogee

5.6 Interface Treatments

5.6.1 Subdivision Design Fronting Mandurah Road

The LSP design includes lots backing directly onto Mandurah Road. Whilst it is understood the City of Rockingham prefers a local road interface between residential lots and Mandurah Road due in part to concerns of rooflines being visible from Mandurah Road, in this instance it has been necessary to incorporate residential lots backing onto this reservation. The following grounds are provided in support of this approach:

i. Noise attenuation (acoustic) measures. Pursuant to the Noise Impact Assessment prepared by consultants Lloyd George Acoustics (refer Appendix 1), the entire western boundary of the LSP area (i.e. where residential lots abut Mandurah Road) will require acoustic measures, including an acoustic wall and bunding to a height of ~ 2.5m. Therefore, no dwellings will directly interface with Mandurah Road.

ii. The proposed road design, off-set from the western boundary, assists with the spacing and orientation of residential cells, particularly in the northern portion of the development where the parent lot width is narrower.

iii. The proposed road design provides for a superior design in terms of achieving a greater dwelling yield; this being a primary objective of the City, WAPC and developer.

iv. The rooflines of the dwellings that are located directly behind the acoustic wall will be largely concealed from Mandurah Road. This is because the dwellings will be sited lower than the Mandurah Road reservation and/or will be screened by the acoustic wall and existing vegetation within the Mandurah Road reservation (refer figure 6).

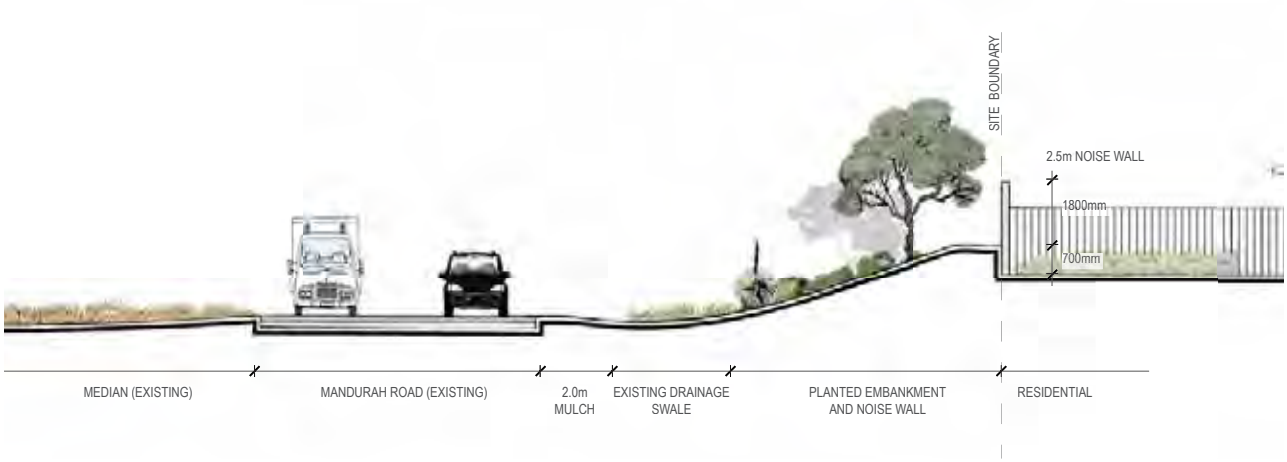


Figure 6: Cross section showing abutting dwellings relative to Mandurah Road

5.6.2 Subdivision Design Fronting Railway Reserve

A road interface will be located along most of the length of the rail reserve primarily to address the recommended asset protection zone between the site boundary and front of dwellings. The only exception is the POS reserve (POS Area C2) in the northern portion of the site that directly abuts the eastern boundary. POS Area C2 is sited in this location to avoid the 'gun-barrel' effect of a long straight road and to create attractive terminating vistas along this corridor.

In addition to the road interface, LDPs will prescribe minimum dwelling setbacks to the railway reserve boundary, as part of the response to the bushfire prone land to the east.

5.7 Planning for Bushfire Protection

A Bushfire Management Plan (BMP) has been prepared by Emerge Associates and Bushfire Safety Consulting Pty Ltd for the site to support the LSP and subdivision staging (Appendix 'E' of Environmental Assessment and Management Strategy, Appendix 1 refers).

Portions of the site have been identified as bushfire prone under the state-wide Map of Bush Fire Prone Areas, prepared by the Office of Bushfire Risk Management. The identification of Bushfire Prone Areas within any portion of the site requires a further assessment of the bushfire hazard implications on the development proposed within the site in accordance with SPP 3.7 - Planning for Bushfire Areas (WAPC 2015) and the Guidelines for Planning in Bushfire Prone Areas (WAPC and DFES, 2017).

Existing bushfire hazards within 100m of the site include vegetation within the Rockingham Lakes Regional Park and Perth-Mandurah rail reserve to the east, vacant state-owned land to the north, Mandurah Road reserve to the west and conservation areas to the south. It is assumed post-development all vegetation will be removed within the site to make way for urban development. The majority of vegetation outside the site will be retained in its current state and therefore will remain a risk to the development.

To determine the level of risk, a BAL assessment was undertaken, as well as a Method 2 assessment for Mandurah Road reservation vegetation (Method 2 was undertaken in accordance with Part A 0.5 Assessment Methods in the Housing Provisions of the BCA). The Method 2 Assessment was undertaken to consider the risk associated with vegetation in the Mandurah Road reserve interfacing with the north-western portion of the site, having regard to the shielding effects of the future acoustic wall at this interface. An indicative BAL Contour Plan (Figure 10) was prepared based on the outcomes from these assessments.

The results demonstrate that future residential development within the site can be progressed in accordance with the LSP such that no future dwellings will be exposed to a BAL rating greater than BAL-29, and demonstrates the LSP meets the required bushfire management framework. These results will be confirmed to support future stages of subdivision within the site, most likely at the subdivision and condition of clearance stages for the development. BAL ratings for dwellings can also be certified to support future building permitting processes where required.

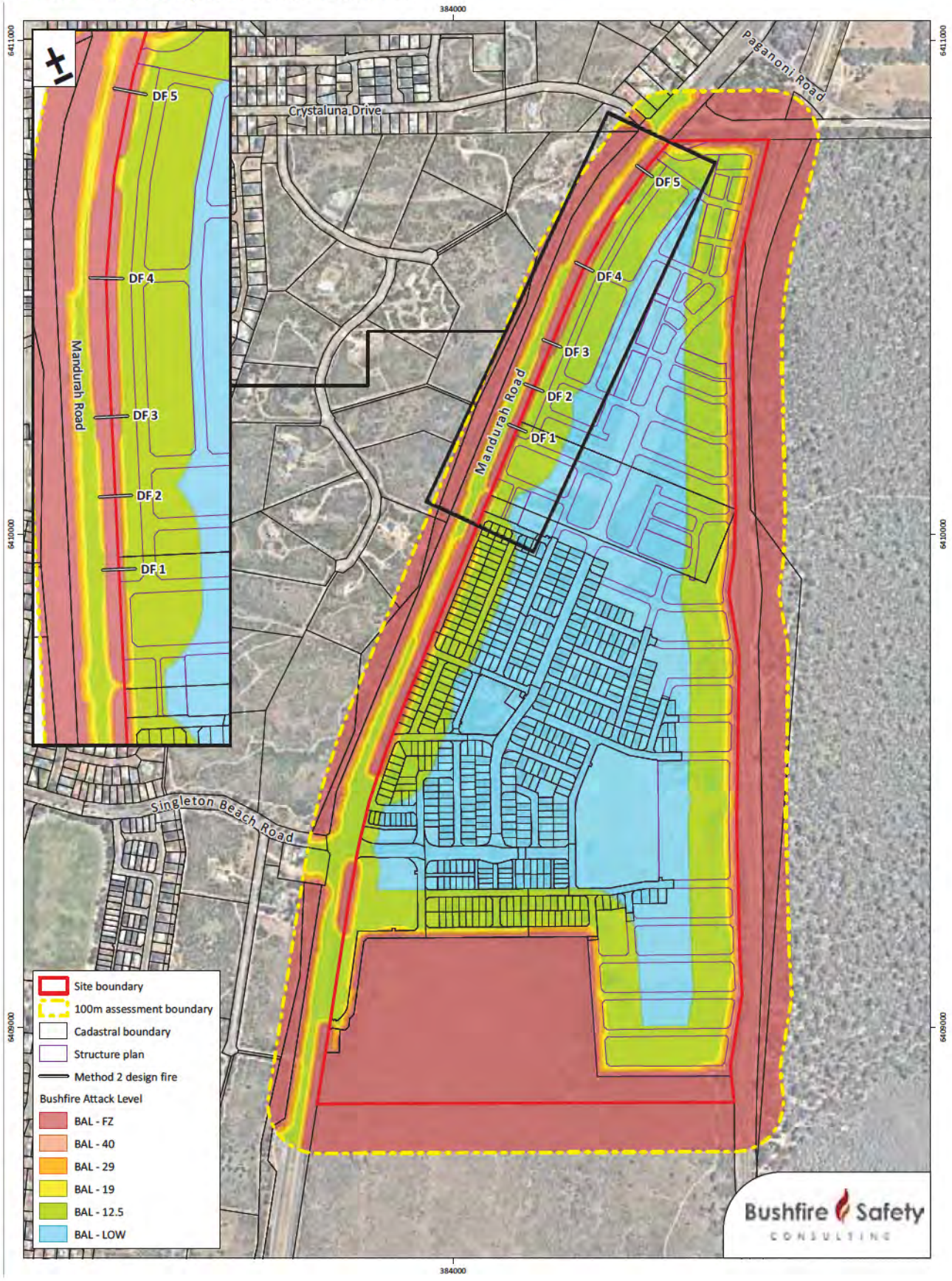
The BMP recommends a number of mitigation strategies to ensure that as development progresses, an acceptable solution and/or performance-based system of control is adopted for each of the following identified bushfire hazard management issue:

- Location of the development
- Siting and design of the development
- Vehicular access
- Water Supply

The proposed solutions are summarised below.

1. Asset Protection Zones of various width will be required in some locations to allow dwellings to achieve BAL-29 ratings. Some of these will be provided through road reserves and areas of POS, whereas others will be accommodated within the lot (regulated through Local Development Plans). Lots adjacent to Mandurah Road are the most impacted with some lots likely to require up to 11.5m APZs from the rear lot boundaries. This will effectively create a larger backyard for these lots leaving sufficient depth in the frontage zone for the development of 'squat lot housing typologies' (15m deep).
2. Each development stage to be provided with a minimum 100m cleared zone around the perimeter. Where vegetation clearing is outside the developer's control (such as subdivision near Lot 3 - owned by CoR), separation distances will either be maintained or mitigated by increases to dwelling construction standards.
3. Any new dwellings constructed within 100 m of identified classified vegetation will require consideration of the need for increased construction requirements to address AS3959. A detailed and site specific BAL assessment will be undertaken at subdivision stage to confirm the final BAL rating for each new lot created.
4. All lots identified as being exposed to a BAL rating greater than BAL-LOW will be subject to notification pursuant to Section 165 of the Planning and Development Act 2005.
5. Provision of multiple emergency fire access points through the site, including:
    - a light controlled four-way intersection at Singleton Beach Road (existing), providing egress from the site to the south and north via Mandurah Road, and to the west through Singleton Beach Road;
    - extension of Aquamarine Parade north of the site to connect with Paganoni Road to provide egress to the east and west;
    - a left-in/left-out access onto Mandurah Road, opposite the existing Mandurah Road/ Crystaluna Drive intersection;
    - a left-in access point (no left-out) from Mandurah Road approximately 350m south of Singleton Beach Road.

Plan 10: Post Development - Bushfire Prone Areas



5.8 Movement Networks

5.8.1 Introduction

Arup has prepared a Transport Assessment (TA) to accompany this LSP proposal which is submitted under Appendix 4. The Arup report, which was principally prepared to support an amendment to the LSP in 2016 to include Lot 805 into the LSP area, aims to deliver the following key outcomes:

- Ensure adequate road and intersection capacity for projected traffic volumes;
- Provide balanced internal traffic flow movements within the LSP area;
- Make provision for a future direct and legible link between the LSP area and future Karnup TOD;
- Address the objectives of the key stakeholders, including MRWA, City of Rockingham, the DoP and the proponent.

The Arup Transport Assessment replaces the earlier Traffic and Transport Management Strategy prepared by Transcore (2011). The Transcore Strategy accompanied the original LSP proposal and had encompassed Lots 3, 806 and 805, notwithstanding that Lot 805 was ultimately omitted from the LSP approval granted by WAPC.

Outlined below is background to these transport assessments, followed by:

- details of the proposed external and internal road network;
- anticipated traffic generation volumes at full development of the LSP; and
- details of the proposed road network hierarchy and street cross-sections.

5.8.2 External Access

5.8.2.1 Existing Connections

Described below are the existing access points available to the LSP area:

Mandurah Road consists of a four-lane, dual divided carriageway with a wide median cross section. At the West Karnup location, Mandurah Road operates under a 100km/hr speed limit. Mandurah Road is classified as a Primary Regional Road in the MRS and in the MRWA Perth Metropolitan Area Functional Road Hierarchy, is classified as a Primary Distributor under the care and control of MRWA.

Crystaluna Drive and Singleton Beach Road are both Local Distributor Roads constructed to a kerbed, 2-lane, single-carriageway standard. On the approach to Mandurah Road, Crystaluna Drive and Singleton Beach Road entail a speed limit of 60km/h and 50km/h, respectively. In the immediate vicinity of the LSP, Mandurah Road forms a stop-controlled T-intersection with Crystaluna Drive right-turn pocket and left turn slip lane on Mandurah Road. In the south from lot 806; Mandurah Road/Singleton Beach Road intersection was recently upgraded from a 3-way signalized T-intersection to provide an access connection to the southern part of LSP area via Redwood Avenue. A fully-channelized 4-way signalized intersection has been recently completed with right and left turn pockets and left-turn slip lanes on Mandurah Road north and south approaches. Redwood Avenue is a 4-lane dual-carriageway with a left-turn pocket and a left-turn slip lane in place to accommodate the LSP area left-turns merging with Mandurah Road southbound traffic.

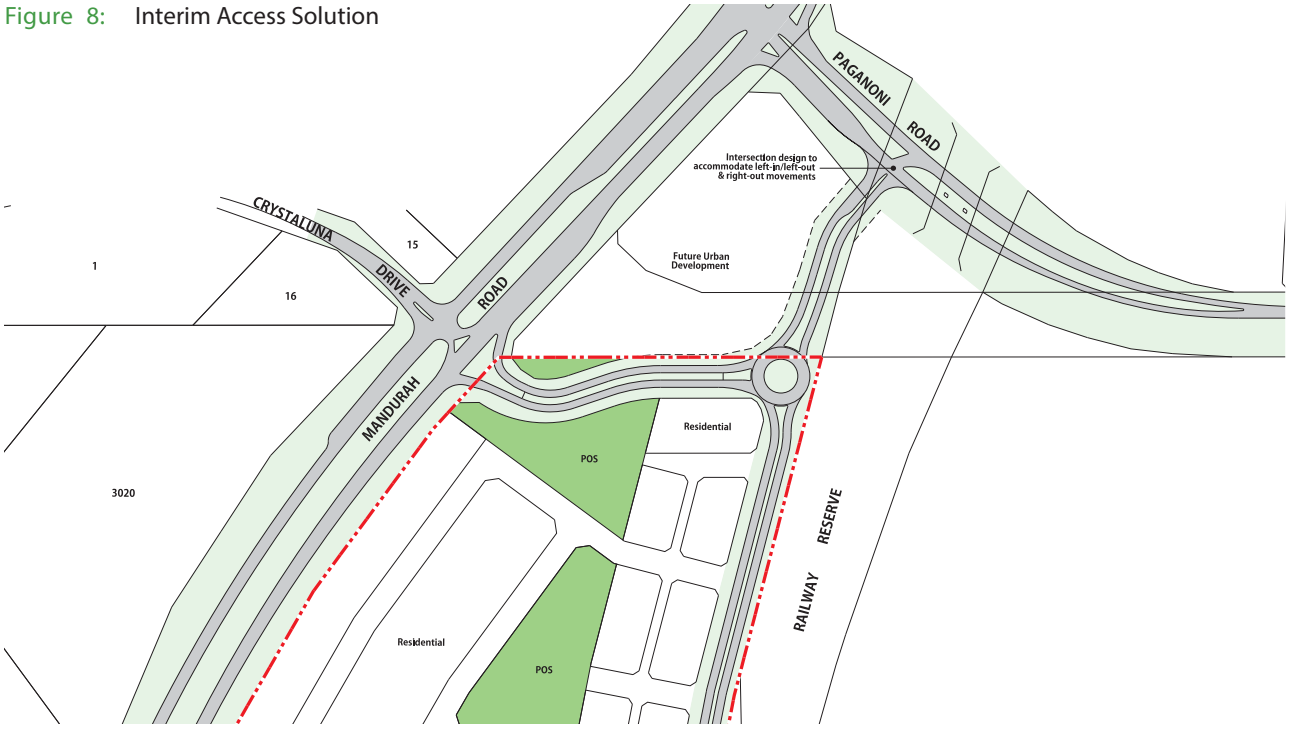
Paganoni Road is a 2-lane, single carriageway, rural standard road which provides a connection between Mandurah Road and Forrest Highway. Paganoni Road is reserved Other Regional Roads (ORR) in the MRS.

Mandurah Road forms a T-intersection with Paganoni Road which is controlled by traffic signals and is fully channelised with right-turn pocket and a left turn slip lane and is planned to be upgraded to four lanes (dual carriageways) in the future.

Left in connection on Mandurah Road, approximately 370m south of the existing Mandurah Road/Singleton Beach Road intersection

Figure 7: Existing External Connections

Figure 8: Interim Access Solution



5.8.2.2 Access Solution

Background

The Traffic and Transport Management Strategy by Transcore (2011) had modelled an 'Ultimate Access Scenario'. This Scenario made provision for two full movement, signalised intersections onto Mandurah Road to service the West Karnup development:

- a four-way intersection at Singleton Beach Road/ Mandurah Road towards the south of the development; and
- a four-way intersection at Crystaluna Drive/Mandurah Road in the north.

The northern intersection was reliant on the diversion of Paganoni Road to Dampier Drive and decommissioning of the existing Mandurah Road/Paganoni Road intersection located north of the LSP area. This was because MRWA maintained that two signalised intersections in such close proximity (i.e. Crystaluna Drive/Mandurah Road and Paganoni Road/Mandurah Road) was unacceptable to the operation of Mandurah Road. Because of this proximity, MRWA would only accept at most, an uncontrolled left-in/ left-out intersection at Crystaluna Drive until such time as Paganoni Road was diverted and the Paganoni Road / Mandurah Road intersection decommissioned.

However, at the time of preparing this LSP report the Paganoni deviation remains in preliminary design stage, with its timing and delivery dependent on the final design of the Karnup TOD. Due to these uncertainties, the Transcore 'Ultimate Scenario' could not be assumed as a given, and it was necessary to assess the full implications of an interim scenario, whereby the Mandurah Road/ Crystaluna Drive intersection would be restricted to LILO access.

Therefore as part of the 2016 amendment to the LSP to include Lot 805, Arup used SATURN modelling to assess the implications of a restricted LILO intersection on both the level of access available to the future development of Lot 805 and on the operating performance of the Singleton Beach Road intersection.

The modelling showed that by 2026, a LILO restricted access at Crystaluna Drive that hindered north-bound movements, would place pressure on the operation of the Singleton Beach Road intersection beyond that identified in the previously assessed Transcore 'Ultimate Access Scenario'.

It was therefore concluded that in the event the 'Ultimate Access Scenario' is not built and Mandurah Road/ Crystaluna Road intersection remains a LILO access, there would be the need to upgrade the Singleton Beach Road/ Mandurah Road intersection in order to minimise delays and queuing on Mandurah Road and to improve access to the LSP development.

As a result of these findings, it was agreed between MRWA, the City of Rockingham, DoP and the proponent, that an alternative to the LILO northern access was needed as part of an 'interim access solution' for development of Lot 805. It was also agreed that this solution needed to ensure an adequate level of service to the development without bringing any additional pressure to bear on the operational performance of the Singleton Beach Road intersection.

A number of options were modelled and considered by the project team in collaboration with MRWA, City of Rockingham and DoP. The results and preferred access solution are discussed below and documented in full in the Arup Transport Assessment submitted under Appendix 4.

Interim Access Solutions

In support of the amendment to include Lot 805, within the context and knowledge that the Crystaluna Drive access could be limited to LILO indefinitely, the Arup assessment tested the performance of three different interim access scenarios.

The preferred scenario which is reflected in this LSP and that was accepted by the City of Rockingham, Department of Planning and MRWA comprises the following four-point external access system:

- Extension of Aquamarine Parade north of the LSP area to Paganoni Road (west of railway bridge) forming 3-way priority controlled staged crossing, and providing flexibility to accommodate future road modifications required for the Karnup station TOD;
- The recently completed connection of the LSP area to Mandurah Road in the south from lot 806 via a 4-way intersection at the existing Singleton Beach Road Drive controlled intersection;
- A northern LILO intersection at Crystaluna Drive/ Mandurah Road that has capacity to be upgraded for a future full-movement signalised intersection if required; and
- An existing left-in intersection on Mandurah Road, approximately 370m south of the existing Mandurah Road/Singleton Beach Road intersection.

This interim solution incorporates flexibility to accommodate and respond to future changes to the external road network that may be required to accommodate development of the West Karnup Station.

The Arup assessment found this to be by far the best performing option for access and traffic operation within the constraints pertaining to the site.

Future Access Arrangements

The ultimate scenario for the LSP movement network makes allowance for the planned Karnup TOD to the north of the site.

As part of the development of the TOD, it is anticipated the surrounding road network will be modified to achieve the overall required urban outcome, including deviation of Paganoni Road to the north to link with Dampier Drive. This will free up land in the vicinity of a new railway station to support higher density development around the TOD.

As part of this deviation, it is expected that the existing Paganoni Road/Mandurah Road intersection would be decommissioned, allowing the intersection at Crystaluna Drive/Mandurah Road to be upgraded to a full-movement signalised intersection.

This would result in greater traffic volumes being redirected south of Paganoni Road through the northern portion of the LSP area to access the signalised intersection at Crystaluna Drive/Mandurah Road.

To accommodate this eventuality, the LSP allocates wider 29m road reservations for the two sections of road that form the connection between the proposed Aquamarine Parade/Paganoni Road intersection and the Mandurah Road/Crystaluna Drive intersection.

The wider 29m reserves will ensure capacity is available to accommodate future upgrades to Integrator Arterial B (dual carriageway) profiles as well as any required upgrades to the Aquamarine Parade/Paganoni Road and Crystaluna Drive/Mandurah Road intersections.

5.8.3 Estimated Traffic Volumes

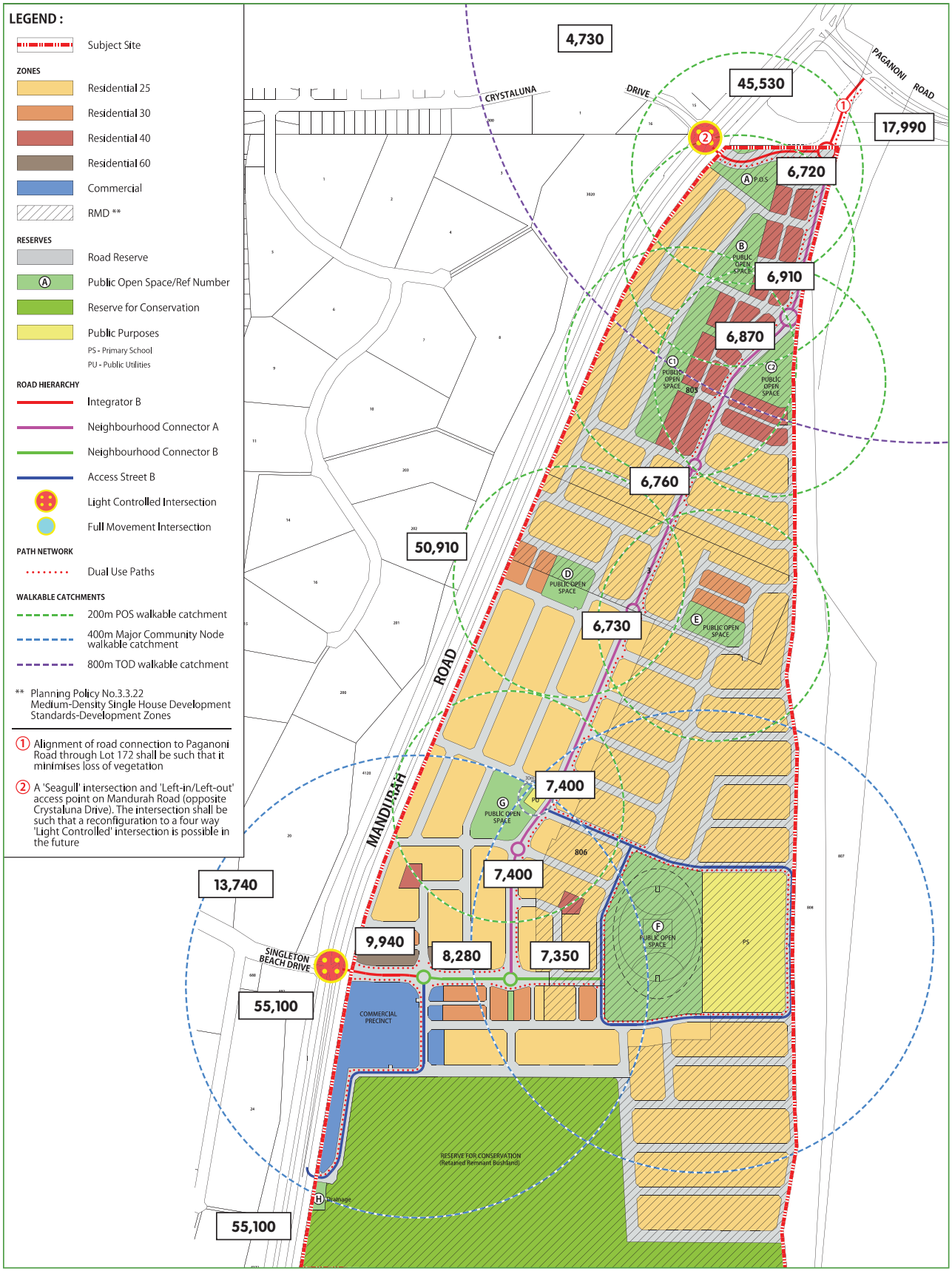
Traffic modelling indicates that at full development the LSP area will generate 15,650 total daily vehicular trips for a typical weekday (refer Appendix 4). The total daily vehicular traffic includes both inbound and outbound trips.

Forecast traffic volumes for the LSP area are illustrated in Plan 11. It is noted that all traffic volume figures represent total daily vehicular trips. All minor internal LSP roads not showing traffic volumes entail daily traffic volumes of less than 1,000vpd.

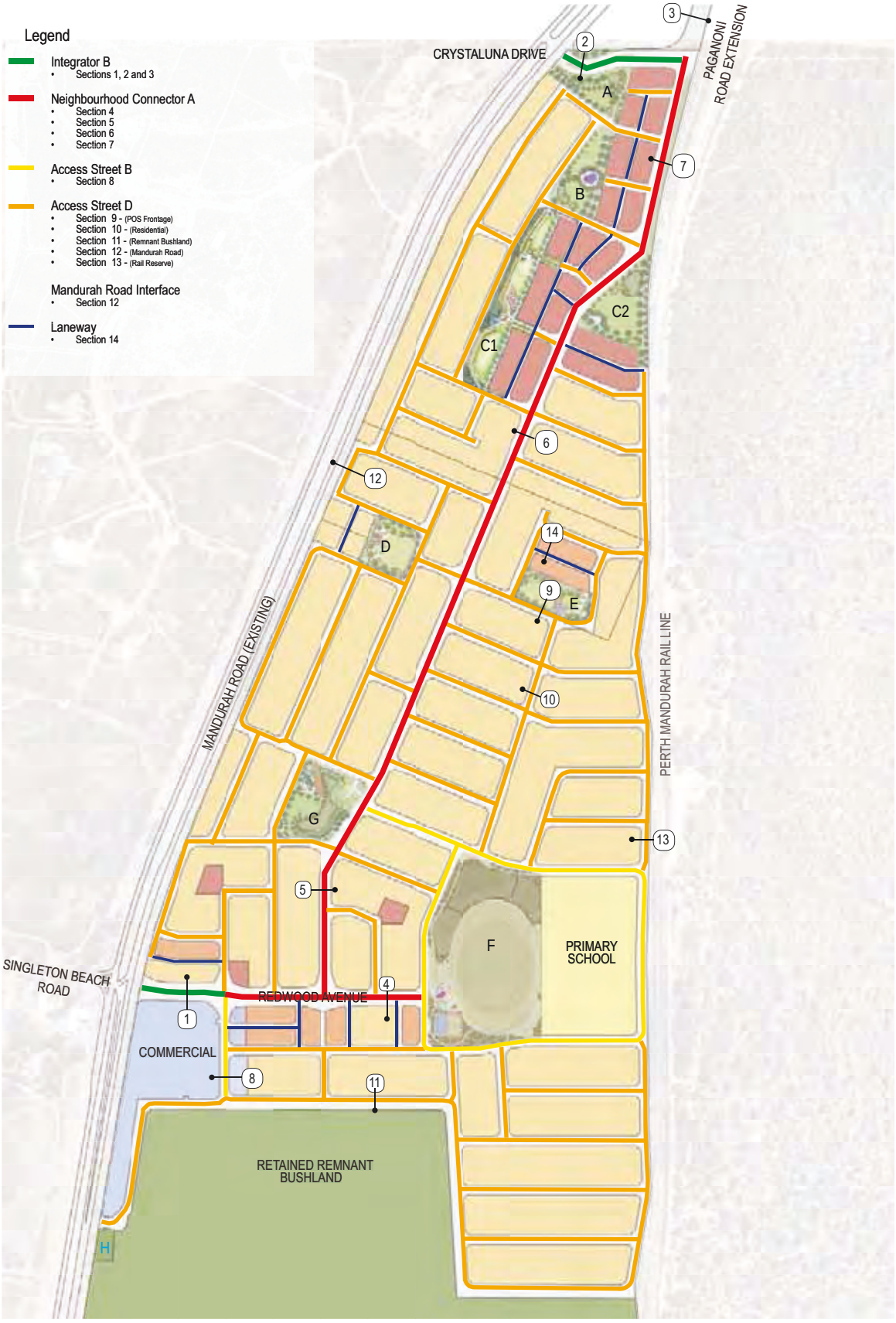
The projected traffic volumes generated from the modelling were used to determine the road hierarchy and the street reservations and cross-sections. The road hierarchy and traffic volumes represented in Plans 11 and 12 ensures permeability and efficient traffic circulation through the LSP area.

Detailed cross-sections are presented in Figures 9 to 12 for each street type. These cross-sections illustrate the intended character of the street and how the required elements, including landscaping, car parking, utilities, road pavement, and paths, will be accommodated.

Plan 11: Internal Road Hierarchy & Traffic Volumes



Plan 12: Street Section



Integrator B Roads

Integrator B Roads include the western section of Redwood Avenue; the extension of Aquamarine Parade north of the LSP area to Paganoni Road; and the northern access that connects to the Crystaluna Drive/Mandurah Road intersection.

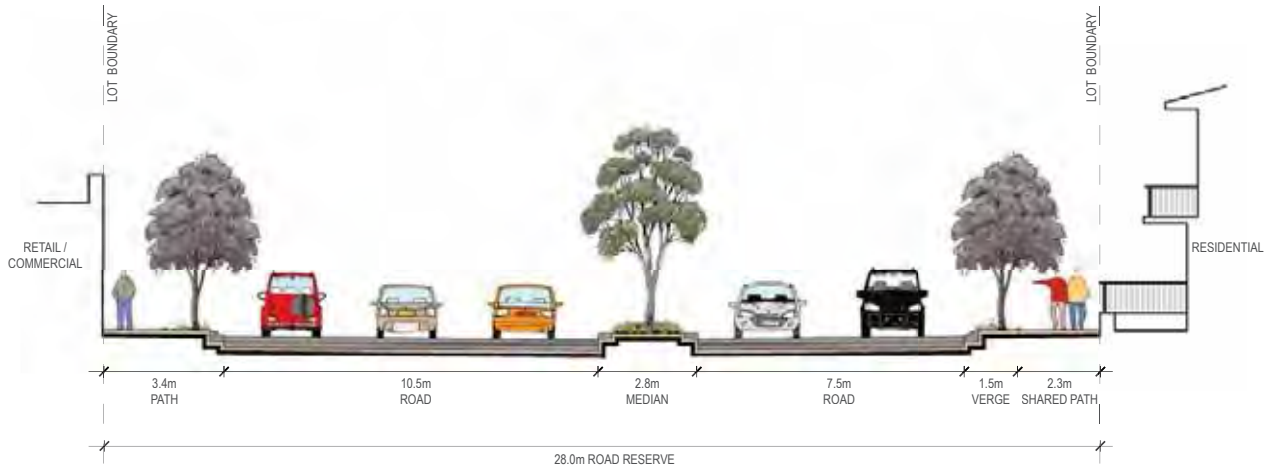
The western section of Redwood Avenue is projected to carry traffic volumes of approximately 9,940 vpd. This road features as the main gateway to the LSP but also services the neighbourhood centre to the south. As such its function is consistent with the Integrator B road (town centre main street) with a typical road reservation of 28.0m.

The typical Integrator B cross section however is modified to entail two trafficable lanes in each direction in the vicinity of Mandurah Road/Singleton Beach Road/Redwood Avenue intersection; with a median, tree planting and footpath/shared path (in lieu of on-street cycle lanes) (Refer to Figure 9, Section 1).

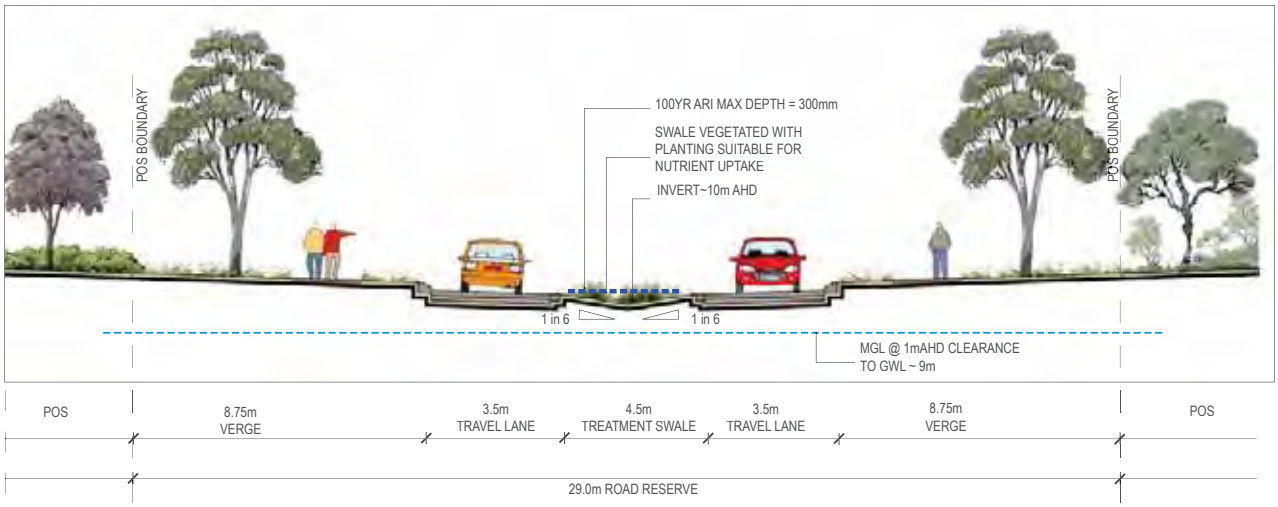
Integrator B reserves (29.0m side) are also allocated for the northern extension of Aquamarine Parade to Paganoni Road; and the northern access that connects to the Crystaluna Drive/Mandurah Road intersection. However in the interim these connections will be constructed in accordance with the profiles illustrated in Figure 9, Sections 2 and 3. The wider Integrator B reservations is provided for both connections to provide flexibility for future upgrades to dual carriageway integrator arterial standard should this be necessary to accommodate modifications to the regional road network required for the West Karnup TOD (Refer Appendix 4 - Traffic Assessment).

Figure 9: Integrator B Sections

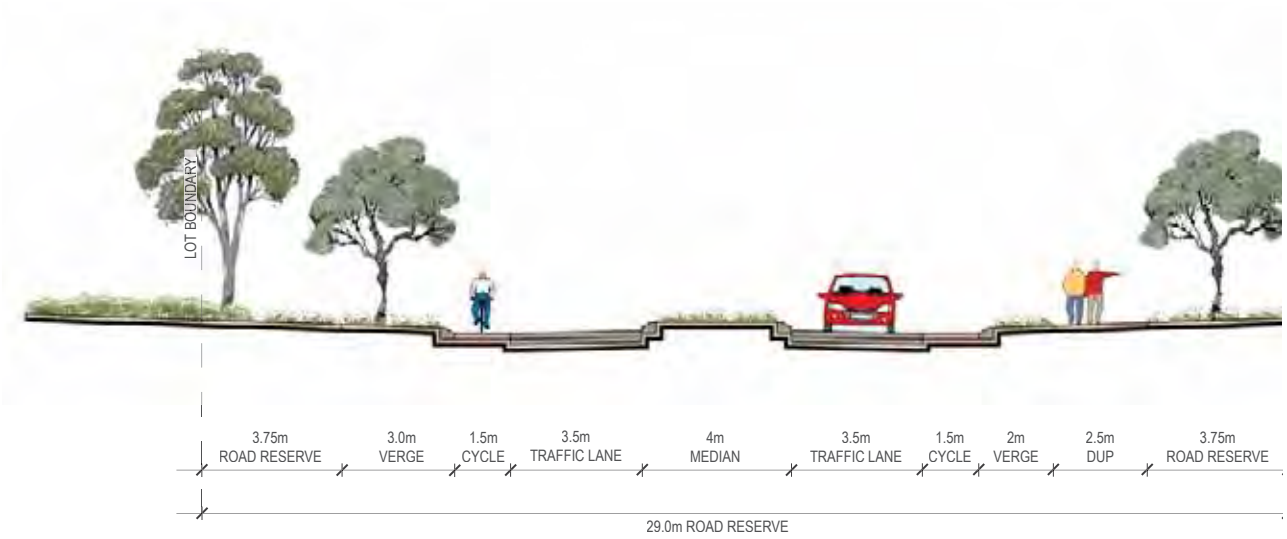
Section 1: Integrator B - Redwood Avenue West (As Constructed)



Section 2: Integrator B - Aquamarine Parade to Mandurah Road



Section 3: Integrator B - Paganoni Road North



Neighbourhood Connector Roads

East of the Neighbourhood Centre, the Redwood Avenue Main Access tapers down to a Neighbourhood Connector A profile with one lane in each direction; corresponding to the reduced volume of traffic of ~7,350 vpd. To support the proposed road hierarchy delineation and way finding, a boulevard treatment within a 28m wide reservation is proposed. The road reserve design is generally consistent with a standard Neighbourhood Connector A design, albeit providing a dual use paths in lieu of on-street cycle lanes, as illustrated in Figure 10, Section 1.

The sections of Aquamarine Parade through the LSP area will also perform the function of a Neighbourhood Connector A street types in the overall hierarchy. Three cross-sections are proposed, which are all variants on the Neighbourhood A typology.

The section for Aquamarine south of Lot 3 (Section 5), carrying between 6,730 and 7,400 vpd, includes a 22m reservation consisting of 2.0m paths on both sides, generous verges sufficient for tree planning, two 4.5m wide verges and a 2.0m wide central median.

The cross-section transitions north of Lot 806 to a 26.5m wide reservation (Section 6) that includes provision for on-street parking. This is to provide flexibility to accommodate visitor parking that may be needed to service future density increases associated with the Karnup TOD.

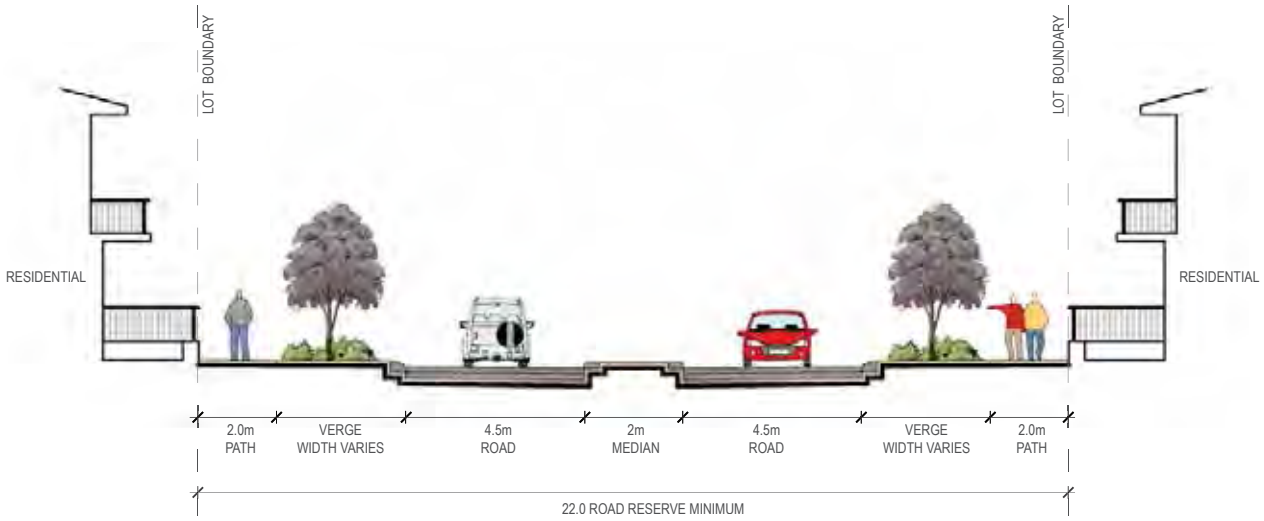
The northern section of Aquamarine Parade (Section 7) adjacent to the railway corridor, carrying up to 6,910 vpd, is within a 25.0m wide reserve that includes a 5.0m wide treatment and retention swale on the eastern side and 5.0m wide verge for a shared path, services and tree planting. This profile also makes allowance for on-street parking.

The landscaping treatments applied to the Neighbourhood Connect A streets will provide shaded pathways that contribute to neighbourhood walkability, as well as contribute to a defining sense of identity and character for the community.

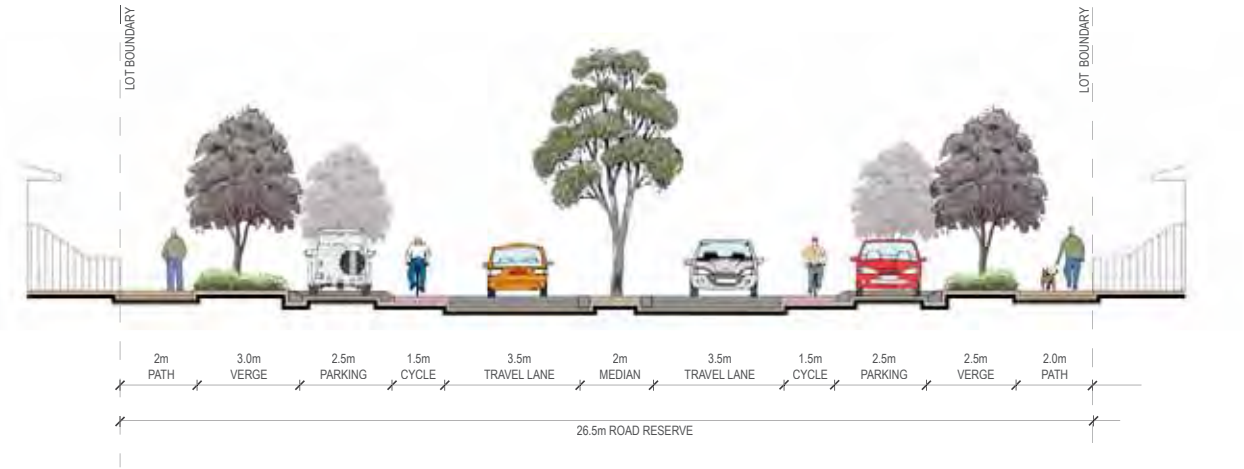
Figure 10: Neighbourhood Connector Sections

Section 4: *Neighbourhood Connector A - Redwood Avenue East (as constructed)*

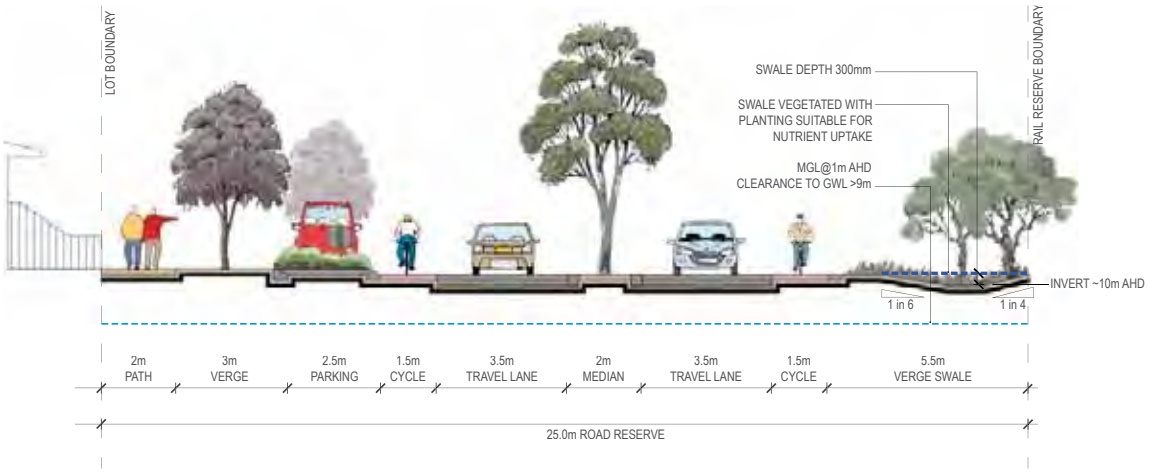
Section 5: *Neigbourhood Connector A - Aquamarine Parade South*



Section 6: *Neigbourhood Connector A - Aquamarine Parade Central*



Section 7: *Neigbourhood Connector A - Aquamarine Parade North*



Access Streets

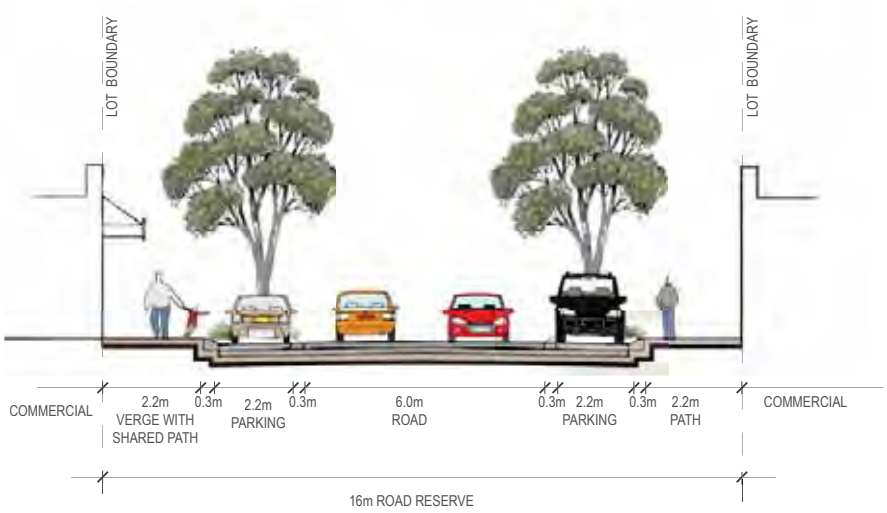
Access Street B (Figure 11, Section 8) roads are proposed adjacent the Primary School and eastern side of the commercial site. The southern section of the Access Street B road proposed adjacent to the commercial site forms the left-in/left-out access to Mandurah Road. The typical 16m wide road reserve entails a 6m road pavement, and parking embayment and shared paths within 5m wide verges. A carriageway of 7.4m will be considered for any Primary School road likely to service buses (e.g. road south of the Primary School). The maximum desirable traffic volume for this type of road is less than 3,000 vpd.

When fronting POS, Access Street verges abutting the POS may be reduced as per Liveable Neighbourhoods. This type of road is not intended for PTA bus routes or to feature on-street cycle lanes (Section 9).

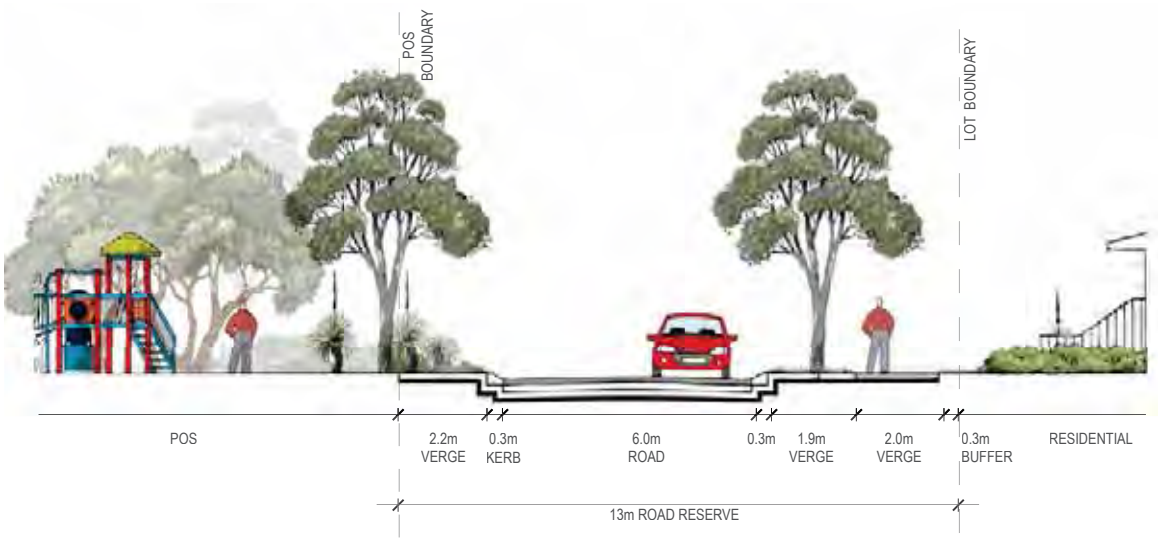
The typical profile for Access Street D roads, entails a 6m wide trafficable carriageway pavement and 5.0m wide verges (Section 10). Other variants on the Access Street profile are proposed adjacent to roadside swales and the railway and Mandurah Road transport corridors (refer Sections 11-13). With respect to these corridors, it is noted however, that in accordance with CoR standards, there is to be no reduction in verge width where an acoustic wall appplies.

Figure 11: Access Street Sections

Section 8: *Access Street B - Commercial (As Constructed)*

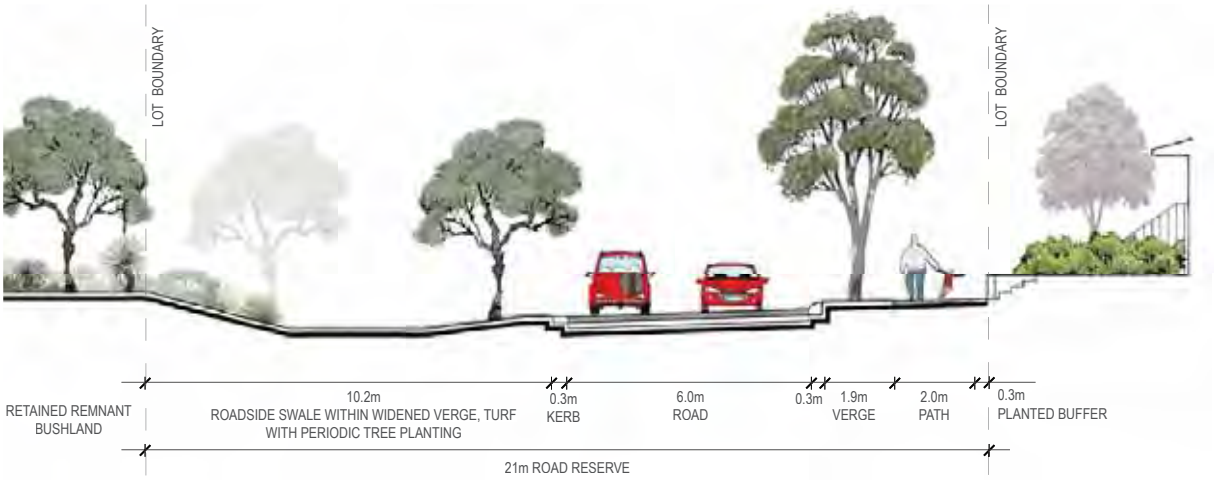


Section 9: *Access Street D - Adjacent POS*

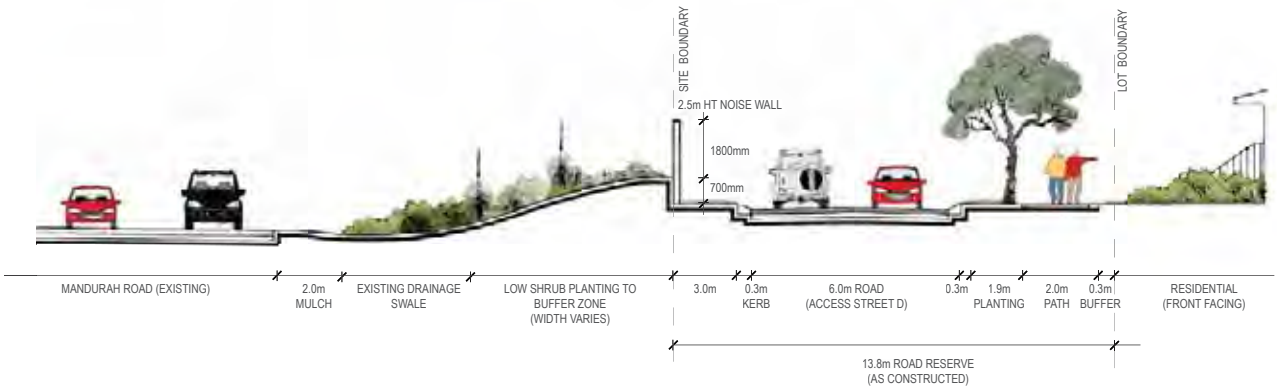


Section 10: *Access Street D - Residential*

Section 11: *Access Street D - Roadside Swale (Remnant Bushland)*



Section 12: *Access Street D - Mandurah Road Interface*



Section 13: *Access Street D - Rail Interface*

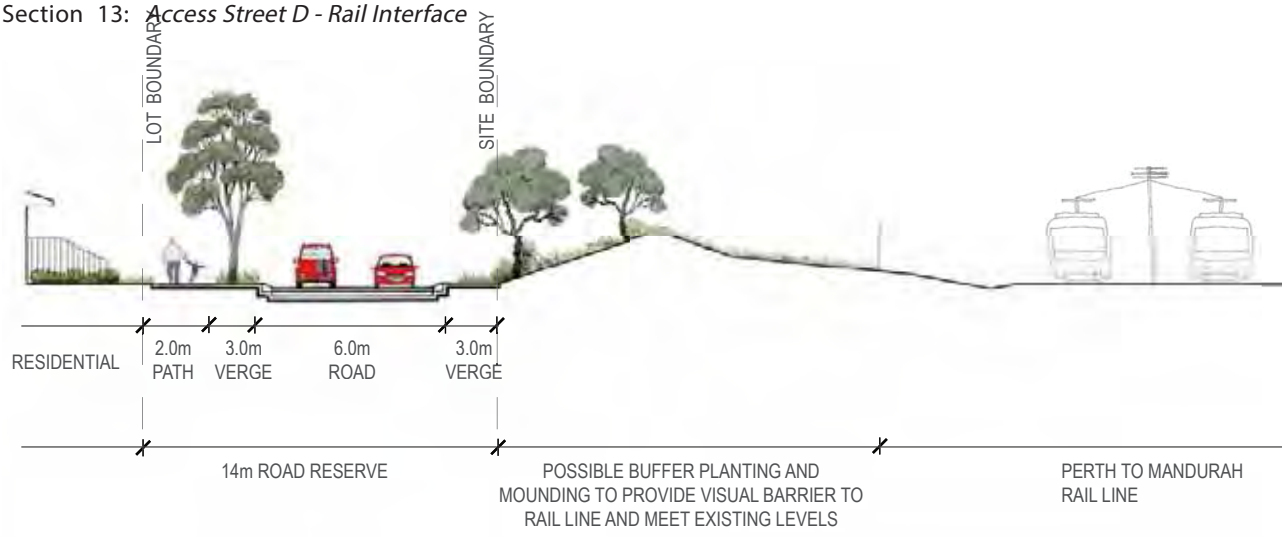
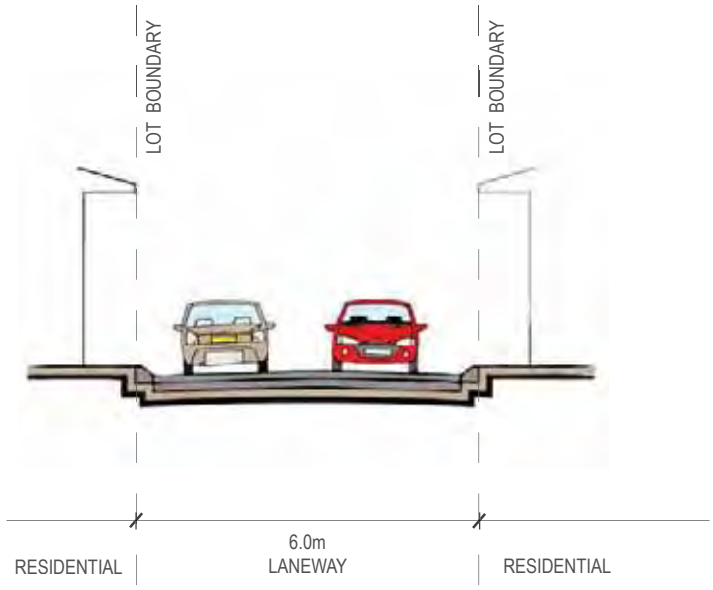
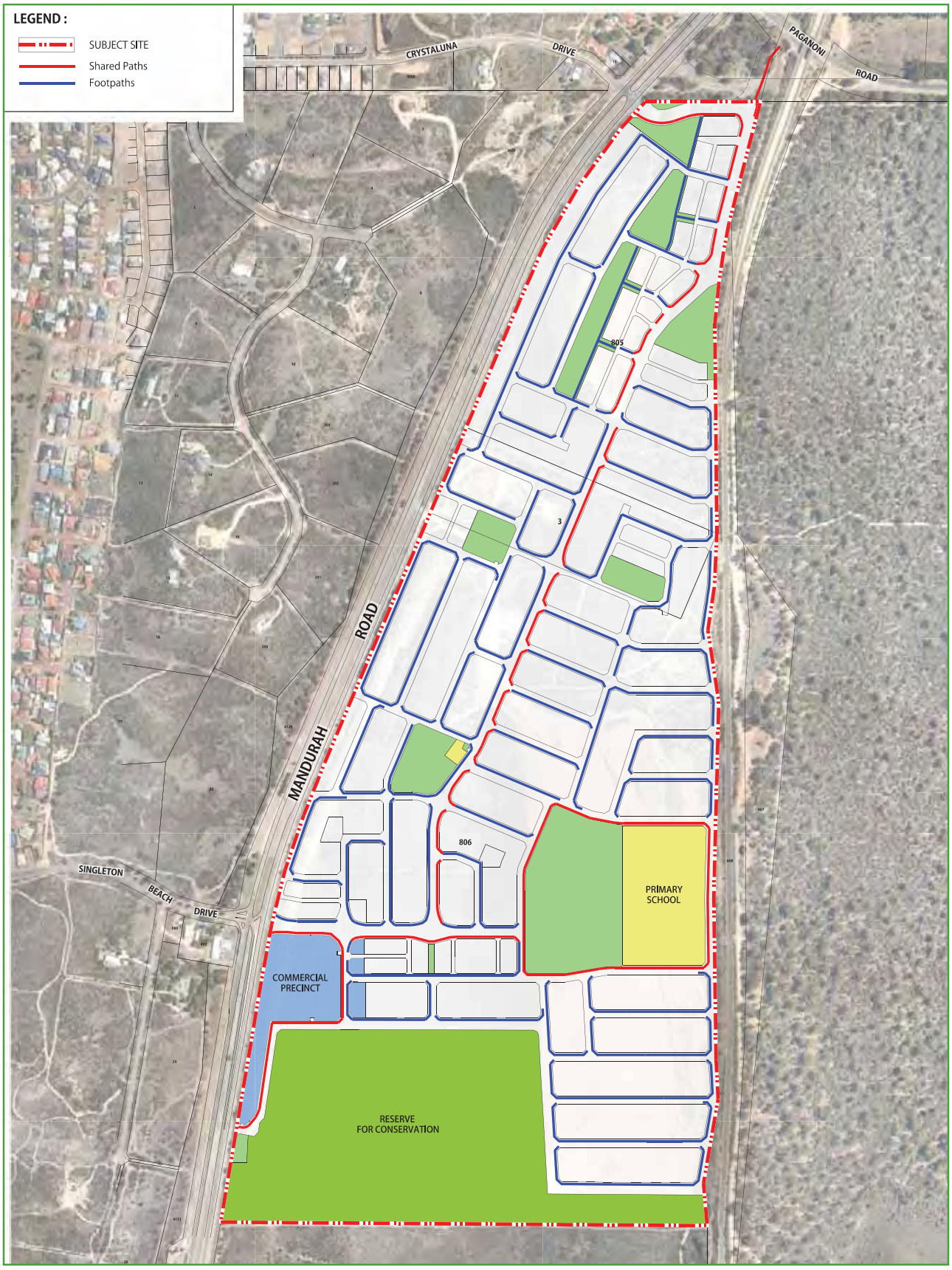


Figure 12: Typical Land Sections

Section 14: Laneway



Plan 13: Indicative Path Network



Laneways

Laneways will be contained within 6.0m reserves that will be sealed with a 6.0m wide trafficable pavement sufficient to allow two-way movements, rubbish collection and vehicle access into garages located on the rear of properties. Maximum desirable traffic flow for a laneway is 300vpd. Visitor parking for all rear-loaded lot product is proposed to be provided to the front or side of the lots depending on the location (Refer to Figure 12, Section 14).

5.8.4 Pedestrian and Cyclist Network

The reasonably flat topography of the area and the proposed permeable grid road network creates an excellent opportunity for provision of highly useable pedestrian and cyclist facilities to maximise non-motorised transport modes.

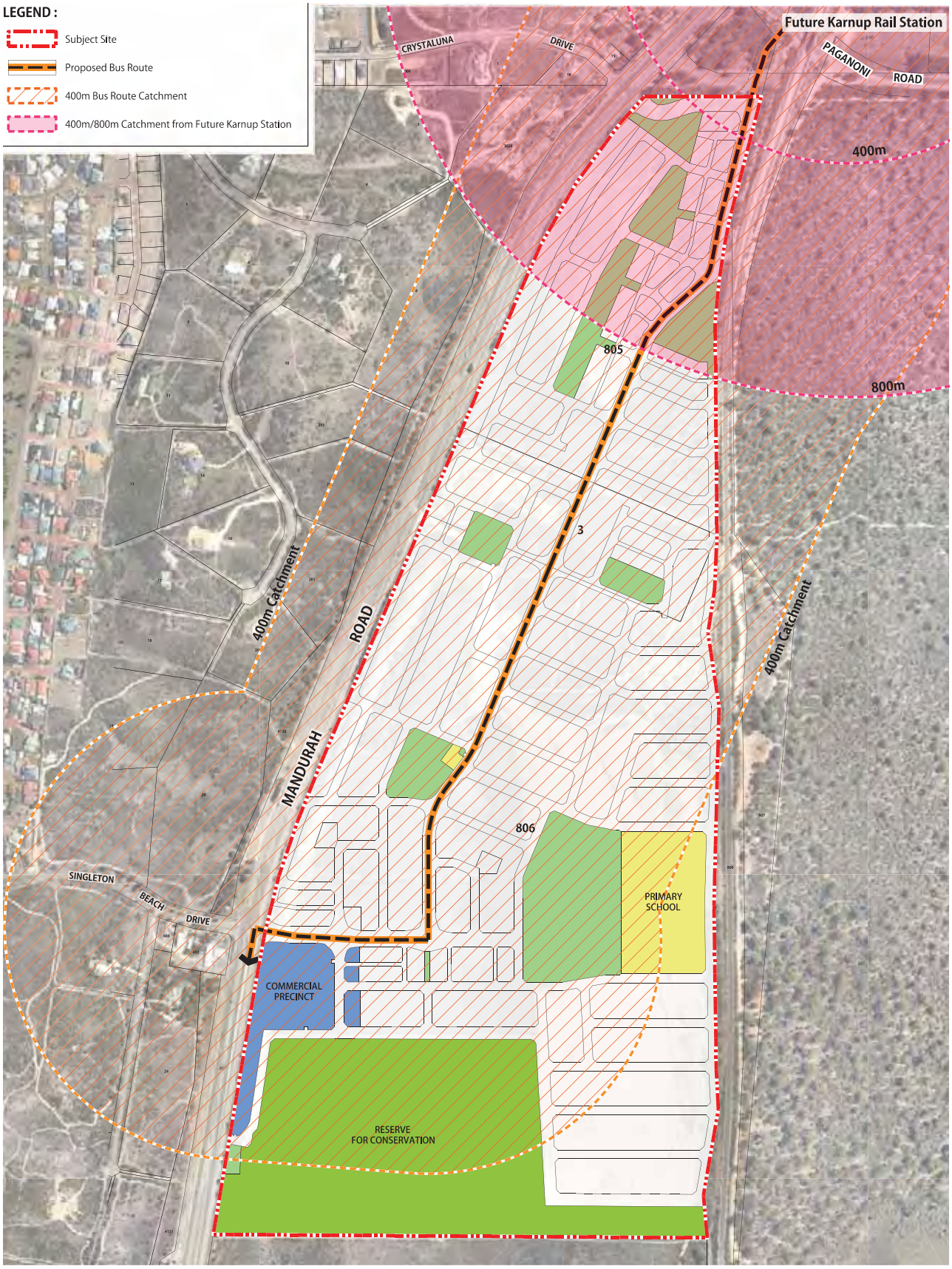
Plan 13 illustrates the proposed pedestrian and cyclist network for the LSP area. The proposed path network will provide an excellent level of accessibility and permeability for pedestrians and cyclist within the LSP area, including connections to major external nodes.

The LSP proposes continuous dual-use paths along the Integrator B and Neighbourhood Connector roads to cater for the anticipated higher pedestrian and cyclist activity. Whilst Redwood Avenue will accommodate dual-use paths on both sides of the road, generally all other higher order roads will include a dual use path on one side only in accordance with Liveable Neighbourhoods guidance.

The LSP proposes dual-use paths on some of the Access Street B and D roads where demand is anticipated; this may include those paths on-route or adjacent to the proposed Primary School site. Footpaths will be provided on one side of all lower order roads. Laneway lots are to have footpath access to the visitor parking bays provided for them in the road reserve.

The proposed comprehensive path network also allows for connectivity into cycleways constructed along Mandurah Road.

Plan 14: Preferred Bus Route



5.8.5 Public Transport

The closest existing train stations are Warnbro Station, approximately 15 kilometres north-of the LSP area, or Mandurah Station, 'back-tracking' 10km to the south. There are currently limited bus services connecting the area to any of these train stations, however combined Park and Ride facilities are available at all stations.

There is presently only one Transperth bus service (route No. 558) operating along Mandurah Road/Singleton Beach Road route with a pair of bus stops in the immediate vicinity within walking distance of the LSP area.

The nearest bus stops on Singleton Beach Road are located approximately 50m west of Mandurah Road/ Singleton Beach Road intersection. Bus service No. 558 operates between Mandurah and Rockingham Train Stations servicing Secret Harbour, Golden Bay and Singleton suburbs.

The future Karnup Transit Station is located approximately 350 metres north of the LSP area. Given the proximity of the LSP area to this transit station, the development of West Karnup will contribute to generating public transport patronage. Therefore, a feeder bus service could be introduced through the LSP area to the future transit station, once the proposed development is largely constructed and occupied. Accordingly, a suggested bus route servicing the LSP area is shown in Plan 14. The potential route has been designed in such a way to allow the target of 90% of dwellings to be within 400 metres 'straight line distance' of a bus route to be achieved.

5.9 Noise Impact Assessment – Road and Rail

Mandurah Road and the Perth to Mandurah railway are identified as a 'Primary Freight Route' and 'Passenger Railway' under the provisions of State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning. In line with the provisions of the Policy, a noise impact (acoustic) assessment has been undertaken by Lloyd George Acoustics to identify portions of the West Karnup LSP area that may be adversely affected by road and rail traffic noise (Appendix H of the Environmental Report under Appendix 1 refers).

SPP 5.4 identifies a 'target' and 'limit' which sets out acceptable noise levels for residential use. Future residential properties affected by noise levels above the 'target' and 'limit' as identified in the report will require Notifications on the Certificate of Title identifying that noise affects these properties.

Dwellings located in the areas which exceed the 'target' and 'limit' will also need to comply with construction standards (glazing, fencing, fittings) as expanded upon in the acoustic report.

The acoustic report also raises the option to mitigate noise to the 'target' level from road and rail by the construction of noise walls along the length of Mandurah Road, and/or the Perth to Mandurah railway. Wall heights, bunding and other noise mitigation measures will need to be undertaken on a case by case basis for each respective subdivision stage, where adjacent to Mandurah Road and/or the Rail Reserve. The general conclusions of the report to mitigate noise include a 2.5m high wall along the Mandurah Road boundary, and 2m high wall along the railway reserve boundary. Cross-sections under Figure 6 provide illustration of suitable bunding/fencing along the affected boundaries.

Local Development Plans will be required for all properties abutting the affected LSP site boundaries, and should include reference to suitable noise mitigation measures pursuant to the noise impact report recommendations. Lots identified as exceeding the target and limit noise levels will be subject to a notification on the Certificate of Title, and require individual acoustic reports demonstrating the house design complies with required acoustic standards.

Plan 15: Public Open Space

5.10 Public Open Space

POS is to be provided generally in accordance with the Part 1, Plan 1 - LSP and Table 1 - POS Schedule.

As illustrated in Plan 15 - Public Open Space Plan, the LSP will create nine public open space (POS) areas that will cater for a range of passive and active recreation functions. The POS areas are distributed and will be designed to create amenity and recreation opportunities within walking distance of each stage of the development. As well as being evenly distributed to ensure good accessibility, the parks are visually prominent, terminating the view corridors from surrounding streets/ pathways to form attractive vistas.

In order to satisfy the 10% POS requirement of the WAPC's Liveable Neighbourhoods, the LSP is required to deliver 8.7639 ha of POS. The LSP exceeds this requirement by providing for a total of 9.2093ha of POS. (Refer Table 7)

This total POS contribution will be reviewed with every stage of subdivision. This will entail providing an updated POS Schedule as part of the subdivision application for acceptance by the WAPC upon advice from the City of Rockingham

Outlined below is a brief description of the functions to be performed by each of the eight POS areas as represented in Plans16-18 - POS Strategy Plan:

POS A (Local Park) consisting of 0.58ha, is located adjacent to the northern and western boundaries of the LSP area, creating an attractive entrance from Mandurah Road and transition to the TOD to the north.

POS A will be used principally for passive recreation and informal activities, including grassed kick-about areas. Footpaths will provide pedestrian access between the LSP area and rear loaded lots directly abutting to the north, and will serve a minor urban stormwater drainage function as an offset to the larger drainage function anticipated on POS D.

POS B (Neighbourhood Park), consisting of 0.76ha, will provide an urban stormwater drainage function and be landscaped with mostly native vegetation. Facilities will include nature play equipment, seating/shelters, picnic facilities and turfed kick about areas.

POS C1 (Local Park) is a 1.21ha linear parkway that will form part of an alternative legible walking route connecting the LSP area with future TOD. The park will serve an urban stormwater drainage function and will include a medium sized playground, turf kick-about areas, seating/shelters and picnic facilities. Rear loaded residential lots overlooking the eastern boundary will provide passive surveillance to the park (refer to Figure 13 for Indicative Design Concept).

POS C2 (Local Park) comprising 0.90 ha, will serve as a buffer between residents and the railway reserve to the east. This park will create an attractive terminating vista for the north-south access road located parallel to the railway corridor. Whilst POS C2 will break up the length of this access road, the pathway network will continue seamlessly through this space. The park will include facilities for picnics, seating/shelter and turfed kick-about areas, as well as tree planting to buffer the railway corridor. Rear loaded residential lots will overlook this space that will be oriented north for optimum passive solar access.

POS D (Local Park), comprising a land area of 0.55ha, is shared proportionately between the landowners of Lot 3 and Lot 805/806 and will serve both a recreation and drainage function.

POS F (District Park) comprises 4.35ha and is co-located with the Primary School site immediately to the east. This site provides a destination point at the eastern end of the main access road into the neighbourhood. This POS will accommodate a formal senior playing field (i.e. football/ cricket oval) along with ample buffers around the field, as well as various secondary informal active and passive recreational spaces.

Whilst urban stormwater swales will be provided around the perimeter of the playing field surface, these swales will not impede general use of the playing field for 1:1 to 1:10 year rainfall events. The exception may be for 1:100 year rainfall events where potential overflow onto the playing surface may occur; however acknowledging use of the open space during these events is unlikely.

POS G (Neighbourhood Park) consists of approximately 0.96ha and will include children's and adventure playground equipment, picnic facilities and landscaped areas for informal active and passive recreational uses. The park will also serve an urban water management function.

Figure 13: Linear Parkway

Table 7: Public Open Space Summary Table

Land Budget Summary			
	Lots 805 & 806 (Ha)	Lot 3 (Ha)	Total (Ha)
Subject Area	105.6740	7.6050	113.2790
Deductions			
1:1 Year Drainage	0.5780	0.0833	0.6612
Drainage Sump (POS H)	0.1214	0.0000	0.1214
Primary School	3.4742	0.0000	3.4742
Commercial (Core Retail Site)	2.5054	0.0000	2.5054
Commercial (East of Main Street)	0.2869	0.0000	0.2869
Reserve for Conservation	18.4993	0.0000	18.4993
Pump Station Site (POS G)	0.0914	0.0000	0.0914
Total Deductions	25.5566	0.0833	25.6398
Developable Area	80.1174	7.5217	87.6392
POS Requirement 10%	8.0117	0.7522	8.7639
Restricted Open Space Required (2%):	1.6023	0.1504	1.7528
Unrestricted Open Space Required (8%):	6.4094	0.6017	7.0111

Drainage Provision and Creditable Open Space					
		Area of Uncredited 'Green Space'	Area of Restricted Open Space	Area of Unrestricted Open Space	Total Credited Open Space
POS Ref	Total 'Green Space' (ha)	Drainage 1:1 Year (ha)	Drainage >1:1yr - 1:5yr (ha)	Above 1:5 Year (ha)	Area (ha)
Lot 806 - Stages 1 and 2 (WAPC Ref: 146429 & 148453) - Approved					
A1	0.0585	0.0000	0.0000	0.0000	0.0585
A2	0.5223	0.0139	0.0479	0.4605	0.5084
B	0.7615	0.0097	0.0320	0.7198	0.7518
C1	1.2130	0.1174	0.1156	0.9800	1.0956
C2	0.9094	0.0347	0.0868	0.7879	0.8747
D	0.5477	0.0991	0.0433	0.4053	0.4486
E	0.5614	0.0337	0.1146	0.4131	0.5277
F	4.3469	0.2075	0.4720	3.6674	4.1394
G	0.9571	0.1452	0.1390	0.6729	0.8119
Subtotal	9.8778	0.6612	1.0512	8.1069	9.2166

NOTES: The POS areas provided within lot 3 may require further adjustment to allow for drainage, whilst meeting the required 10% POS contribution for that lot.

Plan 16: POS Strategy Plan

POS A - LOCAL PASSIVE
- Drainage function
- Native vegetation
- Partially irrigated
- Meandering path network through tree planting
- Turf kick about area
- Street furniture located at nodes along path network

POS B - NEIGHBOURHOOD PASSIVE
- Drainage function
- Native vegetation
- Fully irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating, picnic and BBQ facilities
- Nature Playground
- Turf kick-about areas

POS C1 - LOCAL ACTIVE
- Drainage function
- Native vegetation
- Fully irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating, picnic and BBQ facilities
- Playground (medium sized)
- Turf kick-about areas

POS C2 - LOCAL ACTIVE
- Drainage function
- Native vegetation
- Partially irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating and picnic facilities
- Tree planting to buffer rail
- Turf kick-about areas

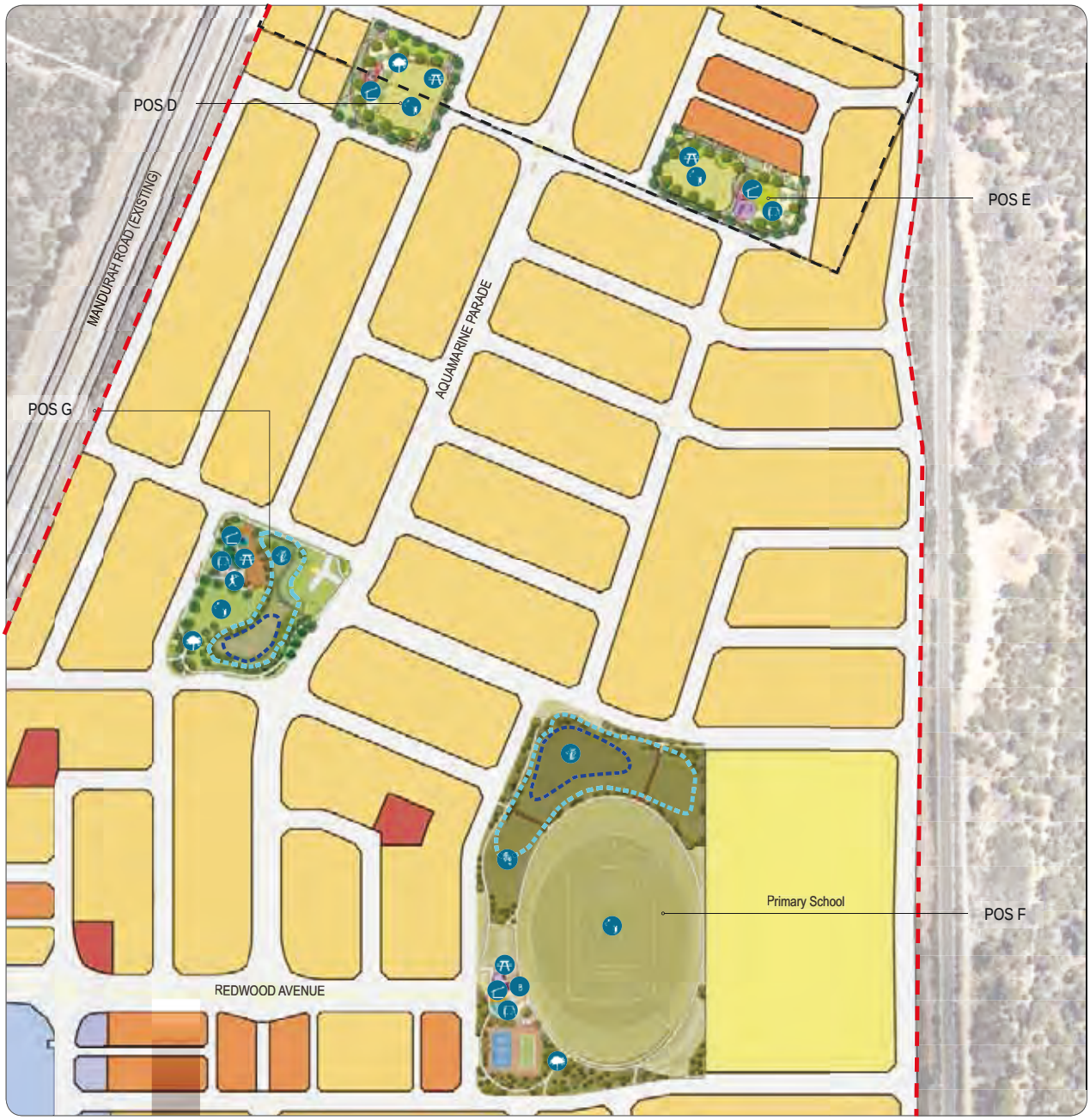
POS D - LOCAL PASSIVE
- Drainage function
- Native vegetation
- Fully irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating, picnic and BBQ facilities

POS E - NEIGHBOURHOOD ACTIVE
- Drainage function
- Native vegetation
- Fully irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating and picnic facilities
- Playground (small sized)
- Turf kick-about areas

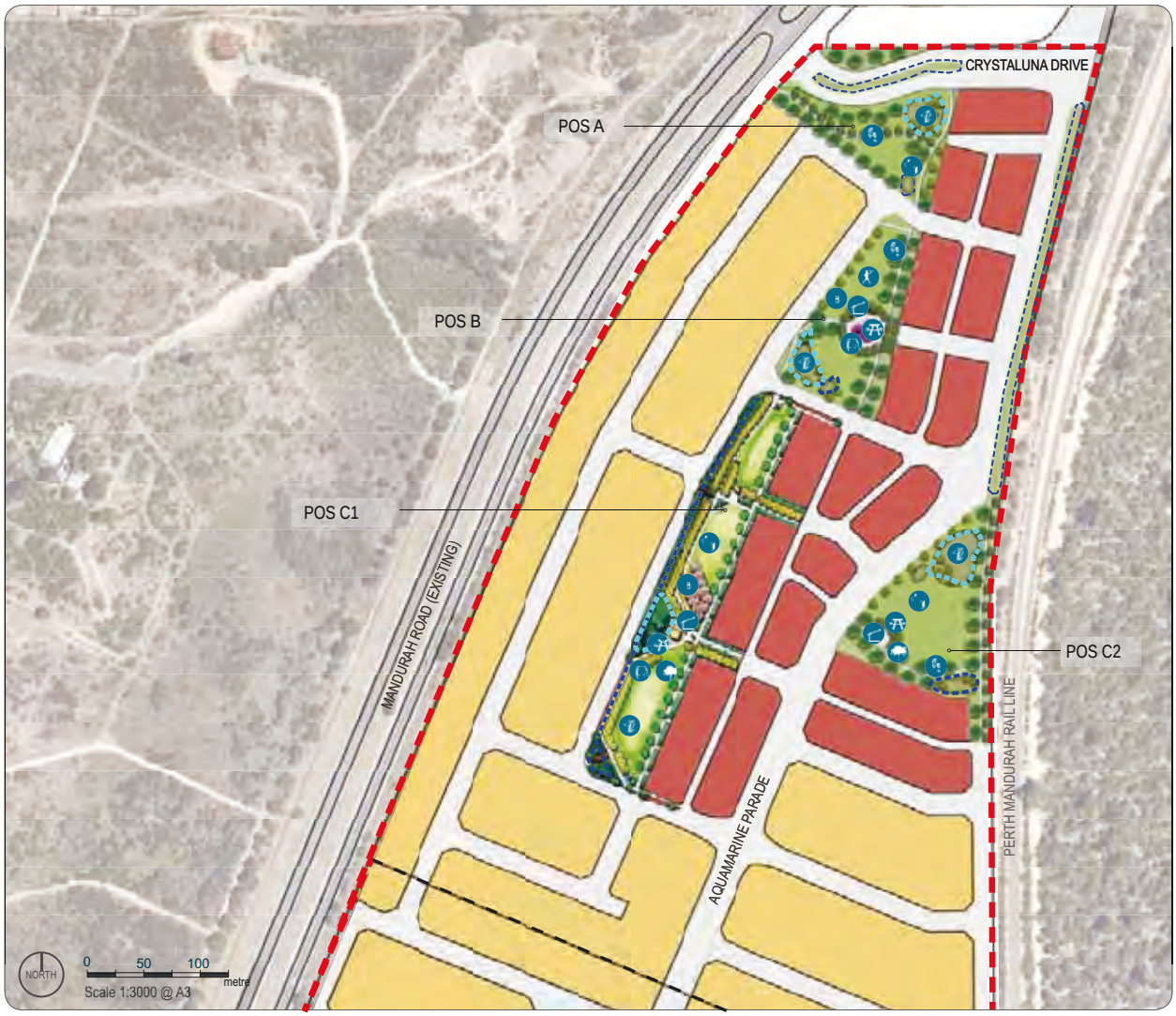
POS F - DISTRICT ACTIVE
- Drainage function
- Native vegetation
- Fully irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating, picnic and BBQ facilities
- Playground (large sized)
- Oval for formal play activities
- Shade trees

POS G - NEIGHBOURHOOD ACTIVE
- Drainage function
- Native vegetation
- Fully irrigated
- Street furniture located at nodes along path network
- Path network connecting into street path network
- Shelter, seating and picnic facilities
- Playground (small sized)
- Turf kick-about areas

Plan 17: POS Strategy Plan (South)



Plan 18: POS Strategy Plan (North)



LEGEND

- EXTENT OF WORKS
- PLAYGROUND
- SHELTER
- PICNIC FACILITIES
- BBQ
- DRAINAGE
- WALK TRAIL
- NEW SHADE TREES
- NATURE PLAY
- OPEN TURF AREA
- BIO-RETENTION AREA
- FLOOD STORAGE AREA

DRAINAGE

POS A		POS B		POS C1		POS C2	
1 YEAR 1 HOUR ARI:		**1 YEAR 1 HOUR ARI:**		**1 YEAR 1 HOUR ARI:**		**1 YEAR 1 HOUR ARI:**	
AREA:	389m²	AREA:	100m²	AREA:	1167m²	AREA:	970m²
DEPTH:	0.3m	DEPTH:	0.30m	DEPTH:	0.30m	DEPTH:	0.30m
VOLUME:	75m³	VOLUME:	25m³	VOLUME:	177m³	VOLUME:	121m³
5 YEAR ARI:		**5 YEAR ARI:**		**5 YEAR ARI:**		**5 YEAR ARI:**	
AREA:	479m²	AREA:	320m²	AREA:	1156m²	AREA:	1895m²
DEPTH:	0.6m	DEPTH:	0.70m	DEPTH:	0.40m	DEPTH:	0.6m
VOLUME:	206m³	VOLUME:	133m³	VOLUME:	441m³	VOLUME:	617m³
10 YEAR ARI:		**10 YEAR ARI:**		**10 YEAR ARI:**		**10 YEAR ARI:**	
AREA:	555m²	AREA:	375m²	AREA:	1292m²	AREA:	2065m²
DEPTH:	0.7m	DEPTH:	0.80m	DEPTH:	0.60m	DEPTH:	0.7m
VOLUME:	277m³	VOLUME:	176m³	VOLUME:	639m³	VOLUME:	786m³
100 YEAR ARI:		**100 YEAR ARI:**		**100 YEAR ARI:**		**100 YEAR ARI:**	
AREA:	840m²	AREA:	583m²	AREA:	1850m²	AREA:	2760m²
DEPTH:	1.2m	DEPTH:	1.20m	DEPTH:	1.20m	DEPTH:	1.20m
VOLUME:	590m³	VOLUME:	365m³	VOLUME:	1560m³	VOLUME:	1564m³




5.11 Street Trees

Street trees will bring many benefits to the West Karnup community, including providing amenity, shade and legibility that will encourage walking and reduce the urban heat island effect. Street tree planting will be a key focus of the development, recognising that the potential to retain remnant vegetation is constrained by the site's former quarry use and extent of earthworking that is needed to support the development.

The proposed street tree planting is illustrated in Plan 19 - Overall Tree Strategy Plan. The species selected support the intended character and function of each street within the overall hierarchy, with a combination of natives and exotics being used.

5.12 Primary School Site

A Primary School is proposed in the south-eastern portion of the LSP area.

The projected yield of the LSP cell, being in the order of 1,255 lots provides an almost 'self-sufficient' school catchment. An additional student catchment may extend to the north of the LSP boundary, this being subject to residential development (TOD) options on land within proximity to the future Karnup Transit Station. The west side of Mandurah Road may also offer a secondary catchment, however given the proximity of Singleton Primary School on the west side of Mandurah Road, it is anticipated that this road will govern the school catchment boundary. The physical barriers of the remnant bushland, Bush Forever sites and railway reserve to the south and east suggests minimal student catchments from developments in these areas.

The Primary School being co-located with a large District Park ensures maximised use of this POS during all times of the day. Suitable arrangements for joint facilities (e.g. change rooms) will need to be explored with the Department of Education in accordance with standard practice.

It is recognised that a 400m walkable catchment to the Primary School extends to two-thirds of the Structure Plan area. On this basis the number of vehicle trips to the site is expected to be reasonably low, with less than 1,000 vehicles per day projected on all adjacent roads.

For those students being dropped off/collected by car, it is suggested that circulation of vehicles and drop off areas around the site will be encouraged in an anti-clockwise direction; to provide a safe environment for children exiting and entering vehicles. Circulation of vehicles in accordance with the delineation under Figure 14 may be influenced by the location of designated internal student drop-off areas, street signage (e.g. no-standing on nominated sides of the street), as well as local advertising and community education.

Figure 14: Proposed vehicle circulation routes and drop-off areas around Primary School.

Plan 19: Overall Tree Strategy Plan

STREET TREE SPECIES


Agonis flexuosa

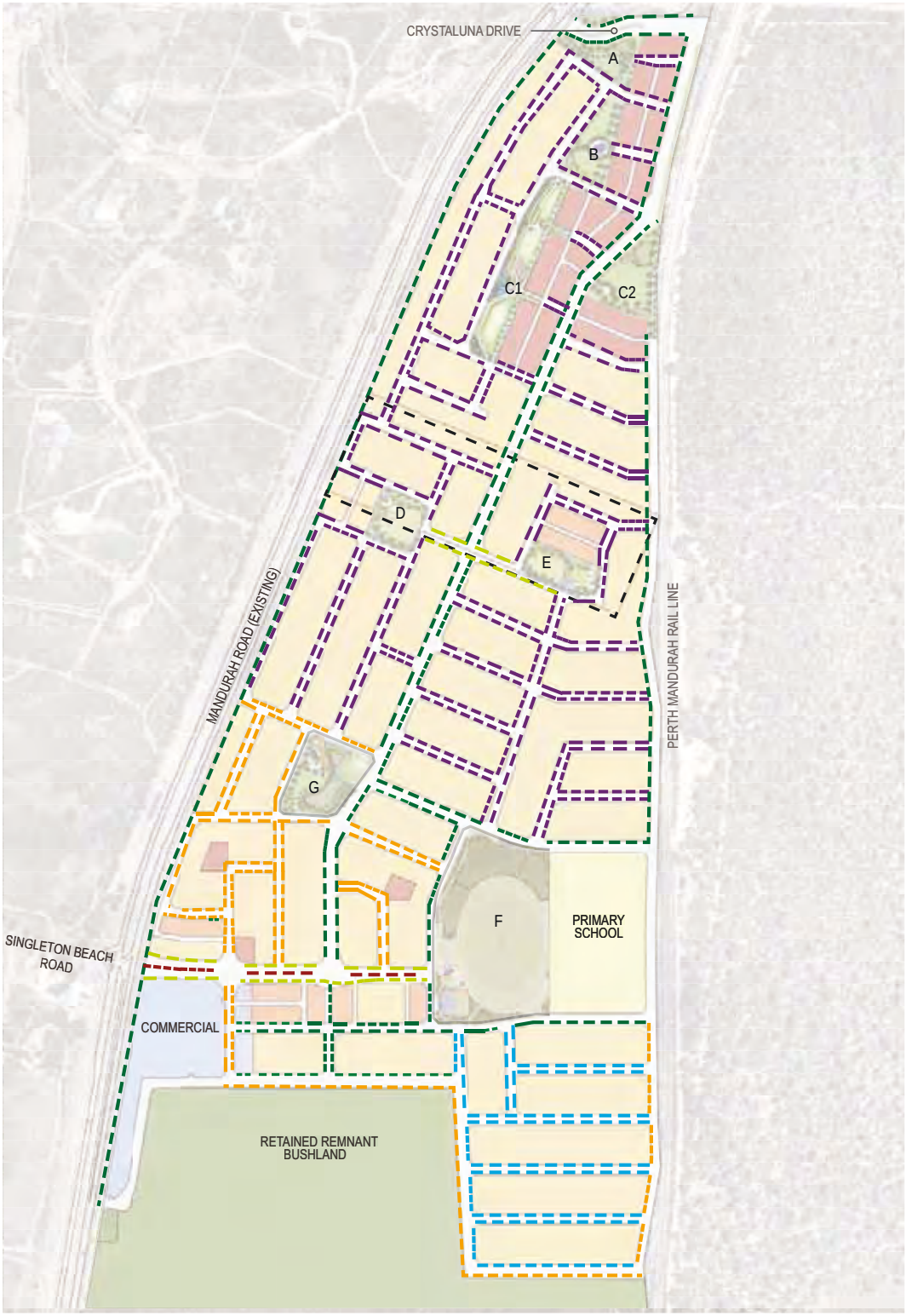

Corymbia calophylla


Eucalyptus victrix


Eucalyptus gomphocephala


Melaleuca quinquenervia


Jacaranda mimosifolia



5.13 Activity Centres and Employment

The LSP incorporates a 'Neighbourhood Activity Centre' abutting Mandurah Road and main estate entry in the southern portion of the LSP area. The inclusion of a Neighbourhood Activity Centre within the LSP area is suggested in this location based on the following observations:

- The site is well located within the Perth southern growth corridor just off the Kwinana Freeway, Mandurah Road and near the proposed Karnup transit station;
- The site has good road access from Mandurah Road, a major north-south arterial road, and access to the proposed Karnup transit station;
- Residential growth in the area has seen a large level of development in surrounding 'greenfield' areas such as Lakelands, Baldivis and Secret Harbour. Karnup is likely to experience a significant level of demand for residential dwellings as these areas reach capacity;
- The local catchment continues to experience fast growth and is forecast to reach a primary catchment population of around 6,000 residents by 2015; and
- The subject site has the potential to deliver a 'Neighbourhood' level retail development anchored by a full line supermarket and minor speciality retail stores.

The City of Rockingham Local Planning Policy 3.1.2 - Local Commercial Strategy makes provision for one neighbourhood centre within the LSP area, which the policy refers to as 'Singleton East'. The Policy caps the retail floorspace of this centre at 5,300m^2.

The Neighbourhood Centre development site will also be subject to a LDP to guide its development. The LDP will ensure that floorspace allocations, land uses, traffic management and street interface treatment (including Main Street design principles) are adequately addressed.

The linear portion of the Neighbourhood Centre site will require suitable fencing treatments along the Mandurah Road frontage to mitigate the potential for pedestrians to cross Mandurah Road mid-block, and to avoid the possibility of vehicles parking along Mandurah Road to access the Centre. In this regard the proponent will provide suitable fencing treatment options at the time of subdivision design, to ensure pedestrian access is restricted to safe crossing points (i.e. controlled intersections) along Mandurah Road.

5.14 Urban Water Management

Urban water management falls under the jurisdiction of the Department of Water, which requires the preparation of plans and strategies at the different stages of planning as administered by Local Government and the Western Australian Planning Commission (WAPC). Planning Bulletin 92 Urban Water Management (WAPC 2008) provides the State Government Policy in relation to this urban water management framework, which requires the following:

A District Water Management Strategy (DWMS), to be submitted in support of a District Structure Plan, local planning strategy or region scheme amendment.

Local Water Management Strategy (LWMS), to be submitted in support of a LSP or TPS amendment.

Urban Water Management Plans (UWMP), to be submitted at the subdivision stage.

This framework emphasises the application of water sensitive urban design to manage the way in which water within an urban context is utilised. This type of design aims to minimise the impact of urbanisation on the natural water cycle.

The Department of Water has approved the DWMS/ LWMS which was prepared in support of the lifting of the Urban Deferred zoning over the site. The Department of Water and the City of Rockingham has also approved the subsequent LWMS that was prepared in support of the structure planning for Lots 3 and 806 (Appendix 3 refers). A LWMS addendum has been prepared to support the structure planning of Lot 805 (Appendix 3 refers). This LWMS addendum is consistent with the approved DWMS and LWMS documents. All DWMS and LWMS documents have been prepared consistent with the requirements of Better Urban Water Management (WAPC 2008).

An integrated water cycle management approach to water management at the site has been developed based on detailed site-specific investigations, industry best-practice and relevant state and City of Rockingham policies relating to water management. The site is underlain by sand and limestone, and due to existing topography, all runoff is largely retained on-site, with the exception of a minor portion of the site along the eastern boundary. The overall objective for water management is to mimic the hydrological regime that currently exists prior to urban development of the site by fully retaining runoff up to the 100 year ARI event. The significant depth to groundwater means that the majority of the criteria are focussed on managing surface water runoff within the site.

The water management criteria that are proposed for the development include:

- Retain runoff from small rainfall events (first 15 mm) at source or as close to source as possible.
- Provide adequate retention within the development site to infiltrate the 100 year average recurrence interval (ARI) event.
- Provide bio-retention areas sized to a minimum 2% of the total connected impervious area.
- Utilise both structural and non-structural approaches to treat water quality.
- Groundwater quality leaving the site should be the same or ideally better than upstream groundwater quality.
- Provide appropriate clearance between maximum flood storage levels and finished floor levels in lots.
- Provide appropriate clearance between retention infrastructure inverts and maximum groundwater levels.
- Water should be conserved wherever possible, and the State Water Strategy (WA Govt 2003) consumption target of 100kL/person per year has been adopted.

The drainage design across the LSP area has been carried out having regard to site constraints (including levels, wastewater pump station, vegetation retention etc.) and to the proposed use of each POS area (detailed in Section 5.10).

Table 8: Percentage of POS Covered by 1:10 Year ARI Event

Table 9:

POS Ref	POS Area (m2)	Basin ref	Area Required 1:10 year ARI Drainage	
			1:10yr ARI Drainage Area (m2)	% of POS area
A	5,223	H	979	19 %
B	7,615	J	680	9 %
C1	12,130	K	3,024	25 %
C2	9,094	I	1,715	19 %
D	5,477	F	1,314	24 %
E	5,614	G	1,530	27 %
F	43,469	C	8,205	19 %
G	9,571	E	2,728	29 %
Total LSP 1:10 ARI Area	99,193		20,175	20 %

While two POS areas (POS E and POS G) are slightly above the City 25% requirement, the proposed POS function (as detailed in Section 5.10) can still be achieved. Several of the POS areas are below the 25%, thus resulting in an overall average provision of 20% across the LSP.

The LWMS and LWMS addendum have been prepared with the intention of not only demonstrating that the LSP is spatially able to accommodate the water management approaches proposed, but also intends to guide the future detailed designs for the site by providing clear, auditable criteria that will ensure that overall objectives are met. Stormwater drainage catchment plans are provided in the appended LWMS reports.

6.0 Infrastructure Co-ordination, Servicing And Staging

A Servicing Report was prepared by engineering consultants, JDSi, for the project area (Appendix 2 refers). The key findings of the report are summarised as follows:

6.1 Water

The subject site is located within the Tamworth - Karnup Reservoir Scheme. The DN600 distribution main feeding this area currently extends from the intersection of Safety Bay Rd and Warnbro Sound Ave, Warnbro southwards along Warnbro Sound Ave to its current terminus near the intersection of Navigator Drive and Fitch Street, Singleton. Water pressure limitations determine that the system can only serve up to approximately 20m AHD in the Singleton area.

There is a major project on the Corporation's CIP to duplicate the DN600 as far south as Secret Harbour, however the timing for this upgrade is unknown.

A recent DN250 extension has been installed along Singleton Beach Rd into Lot 806. Ultimately this DN250 main would be extended through Lot 3 to provide supply for development on Lot 805. Water Corporation have also indicated that they will be installing a DN300 water main within Mandurah Rd adjacent the study area, north of Singleton Beach Rd. This will improve supply pressures and provide security of supply to the study area.

The project engineers, JDSi, will need to liaise with the Water Corporation for the progressive extension of reticulation sized water mains throughout the development. These will include DN250 – DN100 sized pipes.

There is a major project on the Corporation's CIP to duplicate the DN600 as far south as Secret Harbour, however the timing for this upgrade is unknown.

A recent DN250 extension has been installed along Singleton Beach Rd into Lot 806. Ultimately this DN250 main would be extended through Lot 3 to provide supply for development on Lot 805. Water Corporation have also indicated that they will be installing a DN300 water main within Mandurah Rd adjacent the study area, north of Singleton Beach Rd. This will improve supply pressures and provide security of supply to the study area.

The project engineers, JDSi, will need to liaise with the Water Corporation for the progressive extension of reticulation sized water mains throughout the development. These will include DN250 – DN100 sized pipes.

6.2 Waste Water

Water Corporation has advised that the landholding is located inside the current scheme planning and the pump station catchment has considered the sewer flows from the Study Area. The subject land is situated within the catchment of the proposed East Rockingham Waste Water Treatment Plant (ERWWTP).

Wastewater in this South-West corridor is currently conveyed to and treated at the Point Peron WWTP on a temporary basis. Point Peron WWTP is nearing maximum capacity and is due to close before 2015, for capacity and environmental reasons. Wastewater from this corridor will in the near future be re-routed from Point Peron through Rockingham Main Pump Station(s) and onwards to the future ERWWTP.

The ultimate waste water strategy for this land holding is to be conveyed north towards the ERWWTP. This involves two pump stations - a Type 40 PS located within Lot 806 to service the entire landholding pumping northwards through a pressure main along Mandurah Rd, discharging into a future DN375 gravity sewer in Crystaluna Drive, Singleton Beach. This then gravitates along the DN375 in Peelfold Glen towards a future Type 90 (Peelhurst PS 'P') which will also serve the development of the future Karnup Station precinct and other surrounding land.

Pump Station 'P' will pump out westwards via a future pressure main to discharge into the main gravity sewer in Warnbro Sound Ave, gravitating to the existing main pump station on Bluestone Parkway.

JDSi has recently commenced construction of the Waste Water Pumping Station to service the Study Area. This involves construction of the Type 40 PS within Lot 806, installation of 3,435m of DN200 PN16 PVC-O pressure main running through Lot 806, Lot 3 and Lot 805 then north along Mandurah Road and west along Dampier Drive and Warnbro Sound Avenue to a proposed DN600 GRP gravity main on Warnbro Sound Avenue. This Engineering Summary Report has been formally endorsed by the Water Corporation and it is anticipated that construction of the above infrastructure will be completed in April 2016.

It can therefore be confirmed that sewer is available to all proposed lots within the LSP area.

6.3 Electricity

6.3.1 Existing Power Network Distribution

The existing Western Power (WP) distribution infrastructure in the vicinity of the project area comprises of predominately three-phase 22kV high voltage (HV) underground and overhead feeder lines along Mandurah Road. The existing HV Feeder lines consists of 240HV underground cable and HV overhead aerials with 185HV cable adjacent to the project area. These HV feeders emanate from the relatively new Meadow Springs 132/22kV (MSS) substation to the south.

The existing 22kV network will service the initial stages of this development, however once the load exceeds the existing network capacity then this may trigger the installation of a new 22kV feeder.

The development would form part of the System Charge policy and as such will receive assistance in managing high voltage costs. Electrical Consultants will work closely with Western Power to ensure appropriate timing for the additional feeder, having regard to subdivision staging and management of costs associated with high voltage.

As planning progresses, further discussions will be required with Western Power to confirm if any upgrades are deemed necessary to the existing HV feeder network.

6.3.2 Power Supply Scenario

Western Power requires that all new developments be serviced by underground three phase power. Western Power also require any existing HV and LV aerials adjacent to the land being subdivided to be undergrounded and any existing consumers affected will have to have their consumer mains reconnected to the network.

With 240HV underground feeder cable running alongside the proposed development, Western Power will likely require the land owner to interconnect with this HV feeder with either 185HV or 400HV underground cable to service the proposed residential development. If there is not sufficient capacity from this HV feeder cable, there is the option of interconnecting with the 240HV cable or overhead aerials on the opposite side of Mandurah Road. This may result in the removal of HV and LV aerial bays.

Alternatively, if there is no spare capacity in the existing HV aerial and underground network for the entire residential development, a new HV feeder will need to be brought approximately 6km north from the Meadow Springs Zone Substation and terminated into a new switchgear RMU.

HV feeders will emanate from this initial switchgear RMU and terminate into other new switchgear RMU's, which will feed distribution transformers located throughout the development.

LV feeders will extend from each transformer feeding pillar units servicing each new lot. The provision of LV & HV interconnection to the adjoining existing and future development areas will also be catered for within this subdivision. It is anticipated that eleven 630kVA transformers will be needed to service the entire proposed residential development.

6.4 Gas

ATCO Gas has advised it has an existing 200mm steel high pressure main located within the west side of the Mandurah Road reserve. To support recent development of Lot 806 a 160mm PE medium pressure gas main has been extended along Singleton Beach Rd into Lot 806. Ultimately this 160mm main would be extended through Lot 3 to provide supply for development on Lot 805. The internal gas network for the subdivision will be installed within the common trench at no cost to the developer. If there is an extension required to connect to the nearest high pressure gas main the developer will be required to pay for the trenching to the gas main as a headworks cost.

6.5 Telecommunications

There is existing telecommunication infrastructure within the eastern side of the road reserve of Mandurah Road, adjacent to the development. This infrastructure is owned by various communication authorities, including Telstra, NBN Co, Optus and Amcom.

The current development within Lot 806 is being serviced by NBN Co. The developer has funded the installation of an NBN approved pit and pipe network and NBN Co has commenced cable hauling to service the development. It is anticipated that NBN Co will continue the installation of a fibre network throughout the LSP area. A second connection point into the existing infrastructure will be required onto Mandurah Rd at the northern access point within Lot 805.

7.0 Implementation

7.1 Site Works

The site varies in height from RL 7.0m AHD in the base of the main quarry pits to approximately RL 27.0 AHD located within Lot 3, with some isolated high points through the middle of the site. Lots 3 and 805 also have existing quarries that have approximate based RLs of 5m and 6m AHD respectively.

The challenging topography meant careful consideration to the earthworks design was required. The site levels are primarily fixed on all three sides with Mandurah Road on the west, the Perth-Mandurah rail line on the east and a remnant bushland site to the south. Matching into these levels is a critical requirement in achieving good design outcomes. A majority of the site is cut to fill with some excess material being removed from site and some of the suitable limestone material being utilised on site for road base construction.

In consultation with the Water Corporation, engineering consultants JDSi have also been able to minimise the number of pump stations required for the site. This meant the site had to be cut and filled to achieve this outcome. Being able to utilise some of the existing limestone material along with reducing the number of pump stations required to one, JDSi has successfully managed to reduce the carbon footprint that the development would otherwise have produced.

7.2 Developer Contributions to Infrastructure

7.2.1 Multiple Landowners

Each developer will be responsible for construction of required service infrastructure for their respective residential development.

Based on the LSP design, a 10% Public Open Space allocation will be provided across each respective landholding.

The landowner of Lot 3 may be required to pay a per lot levy for the development of the Primary School site on Lot 806. This levy may be imposed as part of a Conditional Subdivision Approval over this landholding.

The landowners may also negotiate shared funding of infrastructure that benefits or is required to support the development of the respective landholdings, such as shared funding of road network upgrades and intersection treatments.

7.2.2 Development Contribution Area No. 2

The City of Rockingham has adopted Development Contribution Plan No. 2 to fund shared community infrastructure. Developers are required to pay a per dwelling contribution when their land is subdivided or developed. The Structure Plan area falls within the Singleton Sub-Area of this Development Contribution Plan. The requirement for the developer to contribute to this Plan is affirmed in the Part 1 provisions to this Structure Plan.

7.3 Staging

Development of the subject site requires detailed subdivision design and subdivision approval from the Western Australian Planning Commission.

Development is envisaged to commence in the south-central portion of the LSP area, directly north of the proposed Neighbourhood Town Centre. Development will then extend east and north as illustrated in the Indicative Staging Plan, provided under Plan 20.

Staging and Implementation of Specialist Reports and Studies will be required as part of future subdivision works. Table 5 provides key items that the proponent has undertaken to date as part of the LSP process, or is required to undertake as part of subdivision design/Development Application phase.

Plan 20: Staging Plan

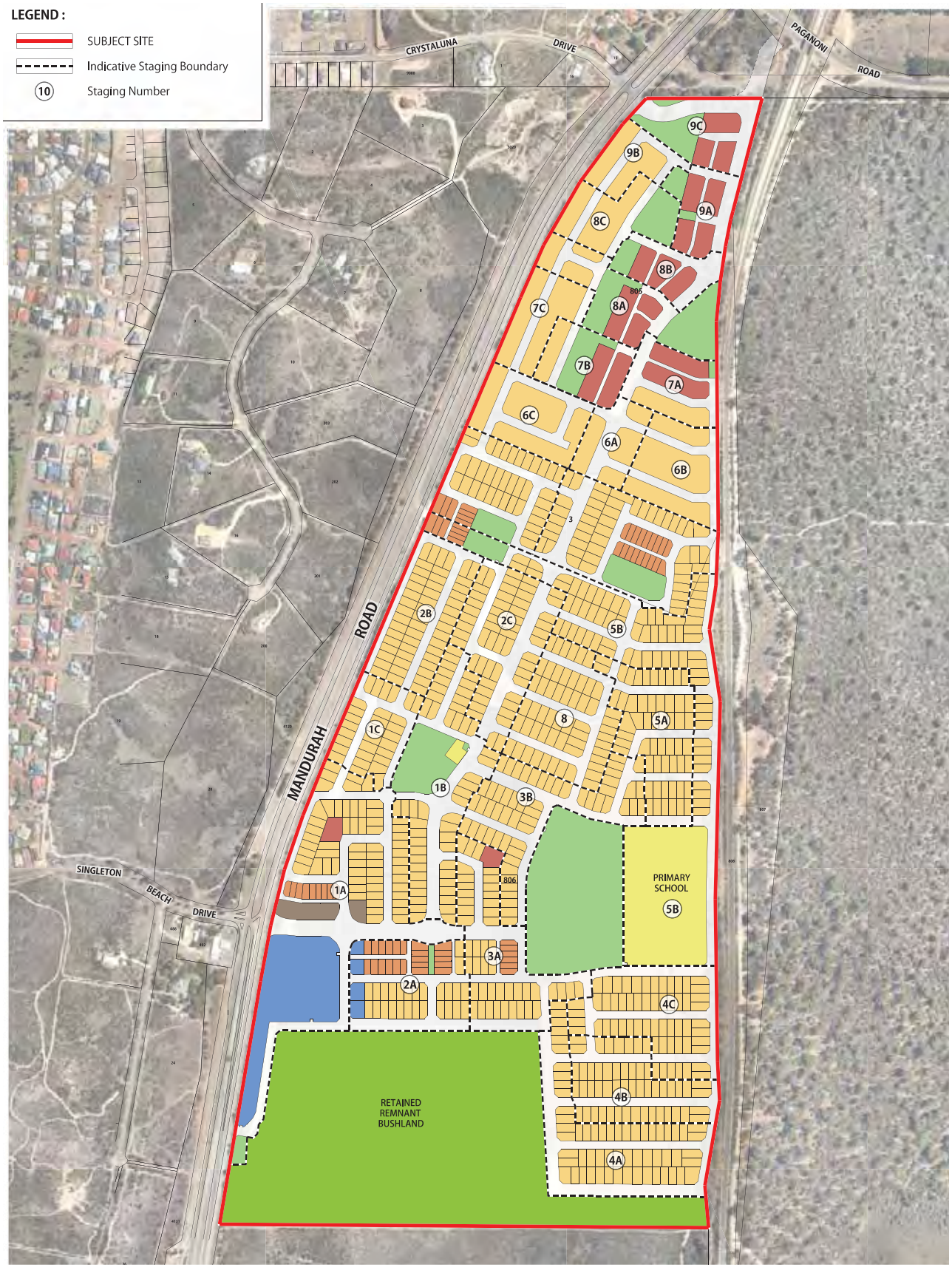


Table 10: Reports, Surveys, Strategies and Plans

Documentation	Submission Stage	Approving Authority
Vegetation Management Plan	Documented in LSP, and in conjunction with subdivision	WAPC, CoR
Environmental Assessment and Management Strategy	Documented in LSP	WAPC, CoR
Fauna Management Plan	Documented in LSP, and in conjunction with subdivision	WAPC, CoR
Local Water Management Strategy	Documented in LSP	WAPC, CoR, DoW
Urban Water Management Plan	Condition of subdivision	WAPC, CoR, DoW
Bushfire Management Plan	Documented in LSP	WAPC, CoR
Noise Impact Assessment	Documented in LSP	WAPC, CoR
Detailed Acoustic Report	In conjunction with subdivision and Local Development Plans	WAPC, CoR
Mandurah Road/Railway frontage	In conjunction with subdivision and Local Development Plans	WAPC, CoR
Open Space Strategy	Documented in LSP	WAPC, CoR
Landscape Concept Plan	Documented in LSP, and in conjunction with subdivision	WAPC, CoR
Heritage Assessment	Documented in LSP	WAPC, CoR
Traffic and Transport Management Strategy	Documented in LSP, to be further refined in conjunction with subdivision	WAPC, CoR
Detailed Traffic Report (i.e. Commercial Centre)	Condition of subdivision and/or Development Application	WAPC, CoR
Servicing Plan	Discussed in LSP, condition of subdivision	WAPC, CoR
Economic Analysis (Commercial)	Documented in LSP	WAPC, CoR
Local Development Plans	Applicable areas discussed in LSP, LDPs to be prepared in conjunction with or as a condition of subdivision	CoR
Developer Contributions	Discussed in LSP, condition of subdivision	WAPC, CoR

03

Appendicies

Volume 2/2

A01

Environmental Assessment Report

(Emerge Associates)

A02

Servicing Report

(JDSI)

A03

Local Water Management Strategy

(Emerge Associates)

A04

Traffic Assessment

(Arup)

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