

Chase III Estate
Lots 129 & 302 Zig Zag Road, Baldivis



LOCAL STRUCTURE PLAN



Prepared By: **Taylor Burrell Barnett**
On Behalf Of: **PEET Ltd**

FEBRUARY 2016

PEET



DOCUMENT STATUS

		07/067	Revision	Reviewer	Date Issued
Prepared By: Taylor Burrell Barnett Town Planning and Design 187 Roberts Road SUBIACO WA 6008 Phone: 9382 2911 Fax: 9382 4586 admin@tbbplanning.com.au			0	LB	06/05/2014
			1	DR	25/02/2015
			2	DR	29/02/2016

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

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: 16 October 2015

Signed for and on behalf of the Western Australian Planning Commission



an officer of the Commission duly authorised by the Commission pursuant to Section 16 of the *Planning and Development Act 2005* for that purpose, in the presence of:



Witness

16 March 2016

Date

Date of Expiry: 16 October 2025

EXECUTIVE SUMMARY









This Local Structure Plan (LSP) is prepared to facilitate the coordinated development of Lots 129 and 302 Zig Zag Road, Baldivis, hereafter referred to as the 'structure plan area', 'subject site' or 'LSP'.

The subject site is located within the South West Corridor of the Perth Metropolitan Region within the municipality of the City of Rockingham, some 2 km north of the Baldivis Town Centre and immediately east of the Baldivis Nature Park and Reserve, on the opposite side of Baldivis Road adjacent the former Tramway reservation.

The subject site presently comprises vacant, disused farm land. The LSP proposes development of the land for 'Residential' purposes at densities ranging between R25 and R40, plus associated public reserves, predominantly open space in the form of an eastward expansion of the Baldivis Reserve District Playing Fields facility. The LSP also establishes a framework for the trading of what would otherwise be surplus POS, in exchange for the right to integrate and develop the existing drain that runs through the middle of the land.

The subject site forms portion of, and is consistent with the Baldivis East District Structure Plan (DSP) which identifies the site for residential development and public open space.

STRUCTURE PLAN SUMMARY TABLE

Item	Data	Section number referenced within the Structure Plan Report
Gross Structure Plan Area	26.2212 hectares	1.2.3 CT's / Appendix B
Area of each Land Use proposed <u>Zones</u>		
 Residential	14.6426 hectares	3.3
<u>Reserves</u>		
 Road Reserve	6.1745 hectares	3.4
 Public Open Space	5.0469 hectares	3.2
 Public Purposes	0.3572 hectares	3.5 & 3.8
Estimated Lot Yield	422 lots	3.3.4 Development Concept / Figure 9
Estimated Number of Dwellings	422 dwellings	3.3.4 Development Concept / Figure 9
Estimated Residential Density		
 Dwellings per gross hectare (As per Directions 2031)	16.1 dwellings per gross hectare	3.3.4
 Dwellings per site hectare (As per Liveable Neighbourhoods)	28.6 dwellings per site hectare	POS Schedule / Figure 10
Estimated Population	1,173 people @ 2.8 people/household	3.3.4
Number of Secondary Schools	Nil	3.6 Development Concept / Figure 9
Number of Primary Schools	Nil	3.6
Gross Amount of Public Open Space:	5.0469 hectares	
Creditable Amount of Public Open Space:	3.8968 hectares or 15.7%	3.2
Amount of restricted Public Open Space (As per Liveable Neighbourhoods)	1.3602 hectares (reduced to 20% limit of 0.5121 hectares)	POS Schedule / Figure 10
Composition of Public Open Space		
 District Open Space	4.0000 hectares 80%	3.2
 Local Parks	1.0469 hectares 20%	

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PART ONE
STATUTORY SECTION

1 STRUCTURE PLAN AREA

This Structure Plan shall apply to the MRS Urban zoned portion of Lot 129 and Lot 302 Zig Zag Road, Baldivis; being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan Map.

The Structure Plan is identified as the Zig Zag Road Local Structure Plan (LSP).

2 STRUCTURE PLAN CONTENT

This Structure Plan comprises the following:

(i) **Part One – Statutory Section**

This section contains the Structure Plan Map and any textual provisions, standards or requirements that require statutory effect.

(ii) **Part Two – Explanatory Section (Non-Statutory)**

This section provides the planning context and justification for the Structure Plan Map and the textual 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 the implementation of Part One.

(iii) **Appendices**

Includes all specialist consultant reports and documentation used in the preparation of and to support the land use outcomes of the Structure Plan.

3 INTERPRETATION AND RELATIONSHIP WITH TPS NO.2

3.1	Terms and Interpretations	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	This Structure Plan has been prepared under Clause 4.2 of the Scheme as the subject land is zoned 'Development' and contained within Development Area No. 40 which is shown on the Scheme Map and contained within Schedule No. 9. The Structure Plan Map outlines the zones and reserves applicable within the Structure Plan Area. The zones and reserves designated under this Structure Plan apply to the land within it as if the zones and reserves were incorporated into the Scheme.
3.3	Provisions, Standards or Requirements	Pursuant to Clause 4.2.9.4 of the Scheme, the provisions, standards or requirements specified under Part One of this Structure Plan shall have the same force and effect as if it were a provision, standard or requirement of the Scheme. In the case of any inconsistency between the Scheme and any provisions, standards or requirements specified under Part One of this Structure Plan, the Scheme prevails to the extent of any inconsistency.
3.4	Land Use Permissibility	Land use permissibility within the Structure Plan Area shall be in accordance with the corresponding zone under the Scheme.

4 OPERATION

4.1	Operation Date	This Structure Plan commences operation on the date it is adopted by Council, pursuant to Clause 4.2.6.15 of the Scheme.
4.2	Change or Departure from Structure Plan	Clause 4.2.7 of the Scheme outlines the manner in which a change to or departure from a Structure Plan is determined.

5 LAND USE AND SUBDIVISION

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 in Schedule No. 9.
5.2	Residential Density	Residential densities applicable to the Structure Plan Area shall be those residential densities shown on the Structure Plan Map.

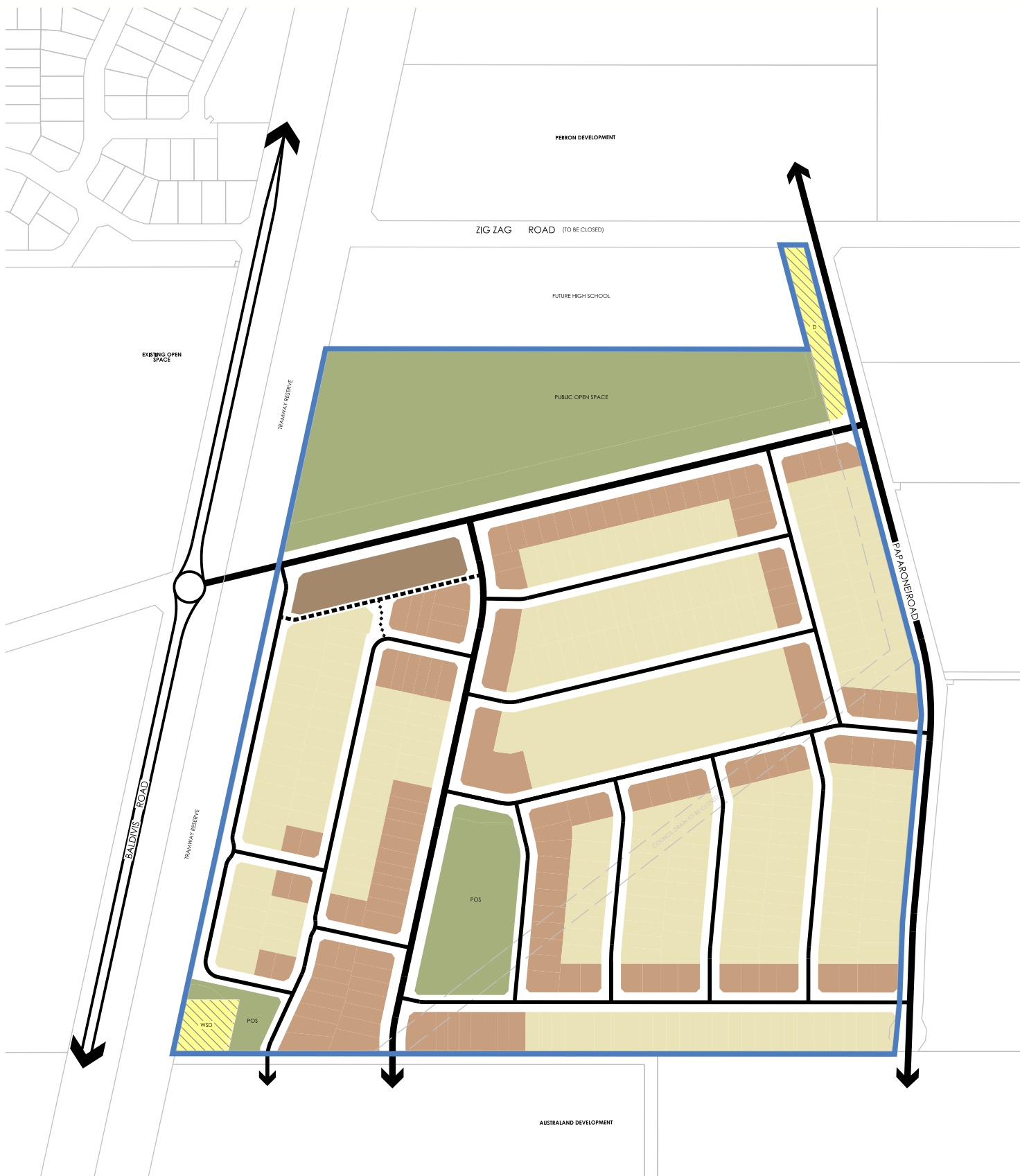
6 SUBDIVISION/DEVELOPMENT

6.1	Notifications on Title	<p>In respect of applications for the subdivision of land the Council shall recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval for a notification to be placed on the certificate(s) of title(s) to advise of the following: -</p> <ol style="list-style-type: none"> 1. Land or lots deemed to be affected by a Bush Fire Hazard as identified in the Fire Management Plan contained within Appendix D. 2. Building setbacks and construction standards required to achieve a Bushfire Attack Level 29 or lower in accordance with <i>Australian Standards (AS3959-2009): Construction of Buildings in Bushfire Prone Areas</i>. 3. Land or lots deemed to be impacted by mosquito and midge nuisances as identified in a Mosquito and Midge Management Plan, prepared as a condition of subdivision approval. 4. Lots affected by noise levels exceeding the noise target as per <i>State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning</i>.
6.2	Detailed Area Plans (Local Development Plans)	<p>Detailed Area Plans (DAP's) are required to be prepared and implemented pursuant to Clause 4.23 of the Scheme for lots comprising one or more of the following site attributes:</p> <ol style="list-style-type: none"> 1. Lots with access provided via a rear laneway; 2. Lots deemed to be affected by noise from Kwinana Freeway, as determined within an Acoustic Consultant Report as a condition of subdivision approval 3. Lots deemed to be affected by a recognised Bush Fire Hazard as identified spatially in the accompanying Bushfire Management Plan in Appendix D (as amended).
6.3	Other Provisions / Standards / Requirements	<ol style="list-style-type: none"> 1. <u>Bushfire Construction Standards</u> This Structure Plan is supported by a Bushfire Management Plan (BMP – refer Appendix D). Any land falling within 100 metres of a bushfire hazard identified in the BMP is designated as a Bushfire Prone Area for the purposes of the <i>Building Code of Australia</i>. 2. <u>Residential Design Codes</u> Table 1 (within the Part 2 section of this report) sets out variations to the Residential Design Codes that constitute deemed to comply standards for development within the Structure Plan area and which, therefore, do not require neighbour consultation and planning approval.



LEGEND

ZONES	RESERVES	OTHER	
RESIDENTIAL R25	PUBLIC OPEN SPACE	STRUCTURE PLAN BOUNDARY	ACCESS STREET
RESIDENTIAL R30	PUBLIC PURPOSES	ARTERIAL INTEGRATOR	LANEWAY
RESIDENTIAL R40	-WSD : WATER CORP -D : DRAIN	NEIGHBOURHOOD CONNECTOR	MEWS



LOCAL STRUCTURE PLAN

Lots 129 & 302 Zig Zag Road, Baldvis
A Peet Limited Project



s: 1:4000@A4
d: 22 Dec 2015
p: 06/082/019F

Taylor Burrell Barnett Town Planning and Design
187 Roberts Road Subiaco Western Australia 6008
p: (08) 9382 2911 f: (08) 9382 4586
e: admin@tbbplanning.com.au

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PART TWO
EXPLANATORY INFORMATION

1 PLANNING BACKGROUND




1.1 INTRODUCTION AND PURPOSE

Local Structure Plans are forward-planning documents that resolve regional and/or localised issues concerning land use and infrastructure and are often prepared as a precursor to extensive subdivision and development.

The purpose of this Structure Plan is to facilitate urbanisation of the subject site. Through the use of graphics and supporting technical data, the Structure Plan recommends the preferred:

-  pattern of land use;
-  network and hierarchy of roads;
-  public open space network; and the
-  necessary servicing strategy for the precinct.

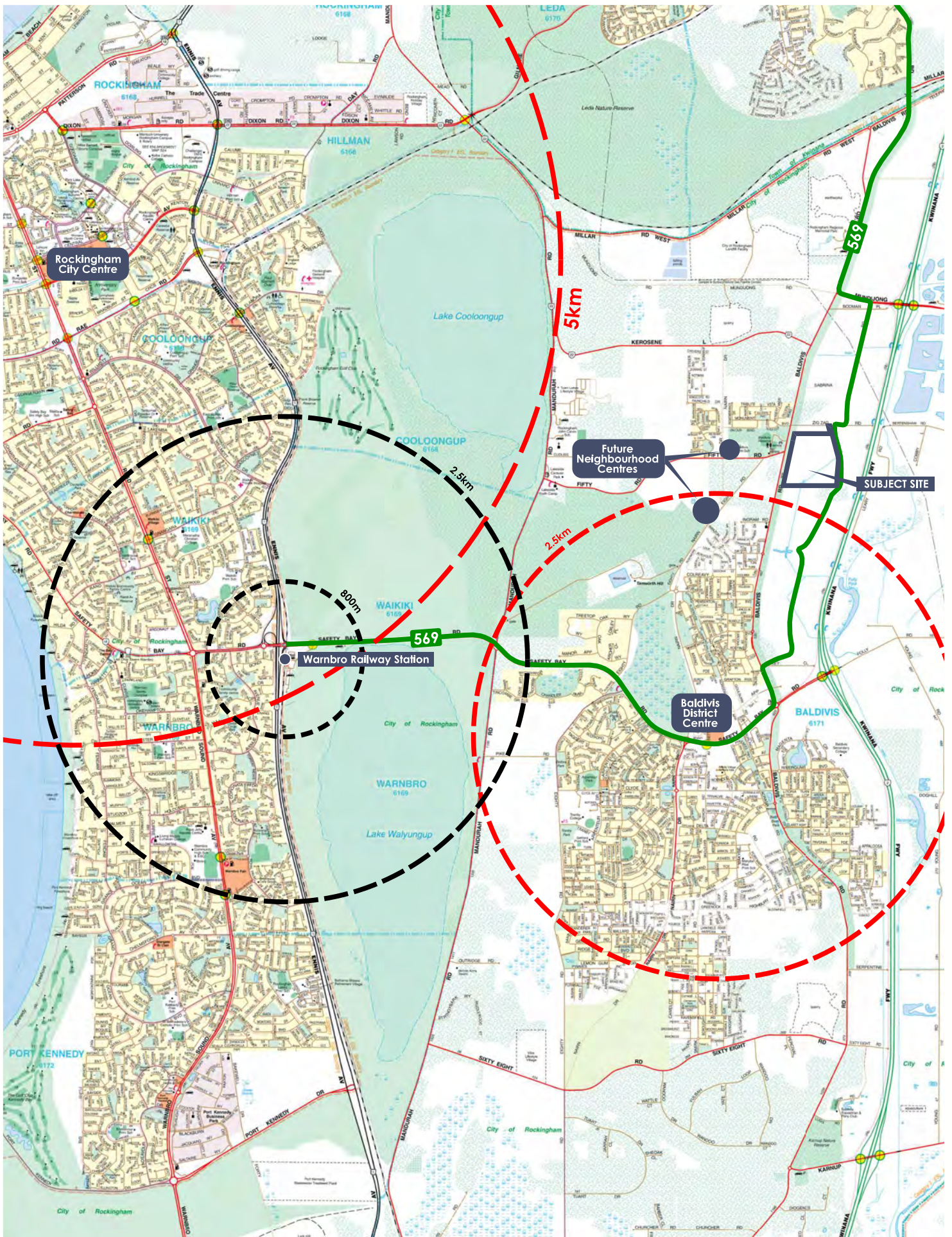
The Structure Plan has been prepared in accordance with:

-  section 4.2 of the City of Rockingham Town Planning Scheme No.2;
-  City of Rockingham 'Planning Procedure 1.6' (*Preparation and Assessment of Structure Plans*); and
-  the WAPC's 'Structure Plan Preparation Guidelines' (August 2012).

The plan is supported by a range of technical reports including environmental, traffic, hydrological and servicing analysis that can be found as Appendices to this report. Once endorsed, the LSP will become the reference document for all future subdivision and development within the subject site.

The Project Team responsible for preparing the information contained within this report (in consultation with the City of Rockingham and relevant Service Authorities) include the following:

PROJECT ROLE	COMPANY
Town Planning & Urban Design:	Taylor Burrell Barnett
Civil Engineering:	The Civil Group
Environment, Hydrology & Landscape:	Emerge Associates
Bush Fire Hazard Assessment & Management:	Bushfire Safety
Transport Analysis:	Riley Consulting



LOCATION PLAN

Lots 129 & 302 Zig Zag Road, Baldy
A Peet Ltd Project



s: 1:50000@A4
d: 06 Nov 2015
p: 06/082/021A

figure

01

1.2 LAND DESCRIPTION

1.2.1 LOCATION

The LSP covers two landholdings, being Lot 129 Zig Zag Road Baldivis, plus an adjoining reserve (Lot 302), which contains a rural farm drain that at its southern end bisects Lot 129 on a 45 degree angle. Closure of the majority of the reserve and absorption of that drainage function into the design of the estate is essential to ensuring optimum development of the land for urban purposes consistent with the aspirations of State Planning Policy. This forms the subject of a separate reserve closure process under the *Land Administration Act*.

The combined site is situated within the south west corridor of the Perth Metropolitan area, in the municipality of the City of Rockingham, 40 km south of the Perth Central Business District, 7 km south east of the Rockingham Strategic Metropolitan Centre and 2.6 km north of the Baldivis District centre. Kwinana Freeway lies a short distance to the east of the site providing convenient access to the regional road network (refer **Figure 1**).

1.2.2 AREA AND LAND USE

The combined 'Urban' zoned portion of the site measures 26.2212 hectares in area, consisting predominantly of disused pasture. Existing development on Lot 129 is limited to a rural dwelling plus numerous outbuildings that take access directly from Baldivis Road through the historic Baldivis Tramway Reservation that defines the entire western boundary of the site. Zig Zag Road, Paparone Road and an unmade road reservation define the northern, eastern and southern edges of the site, though none are currently used to provide access to the site.

The unmade reservation to the south was recently closed at the request of the adjoining developer, whose approved LSP shows their estate backing directly onto the southern boundary of the site.

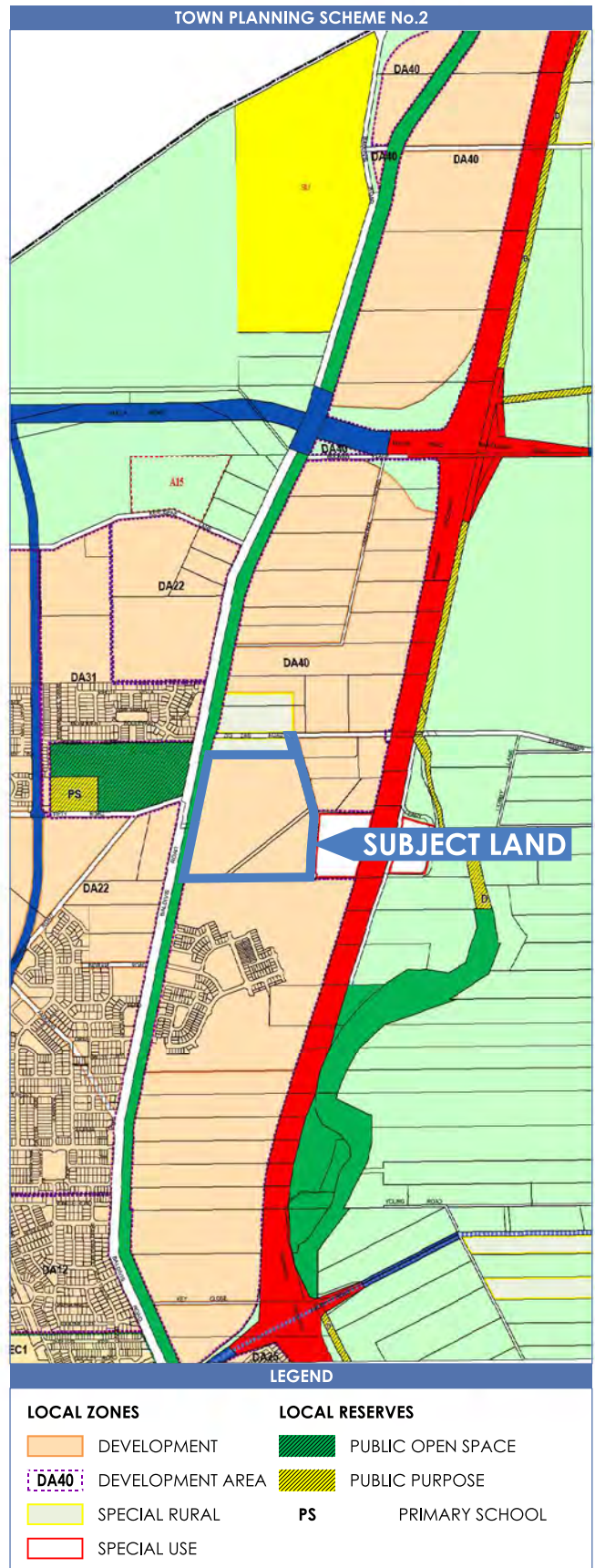
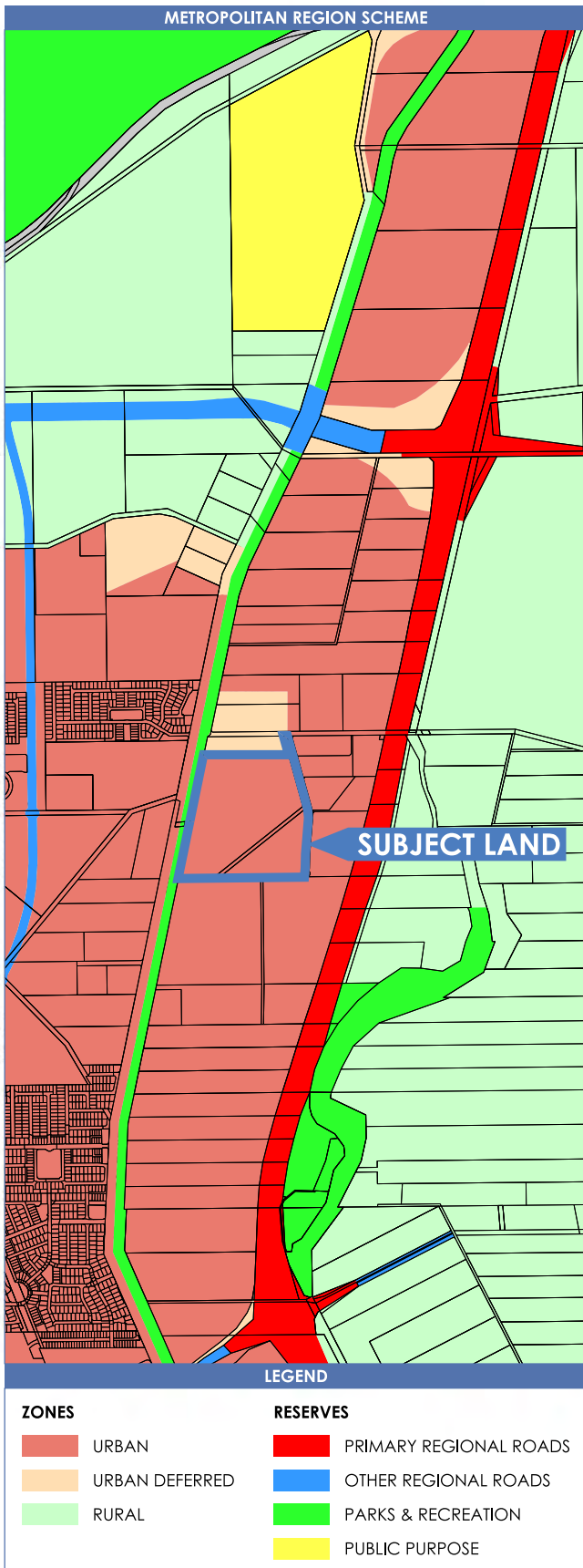
The surrounding area is predominantly rural land undergoing similar transformation to urban use. To the east are a small number of rural-residential landholdings and a vacant site that has approval for a future Freeway Service Centre, whilst to the west on the opposite side of Baldivis Road is the Baldivis Nature Park Reserve inclusive of the Baldivis Recreation Centre, associated active and passive recreational facilities and Baldivis Primary School.

1.2.3 LEGAL DESCRIPTION AND OWNERSHIP

The property details and tenure of the land the subject of this application are described in Table 3 below. Copies of the Certificates of Title are attached as **Appendix B**.

TABLE 3: PROPERTY DETAILS

Lot No.	Reserve	Volume	Folio	Deposited Plan	Urban Zoned Area (ha)	Owner	Vested
129	N/A	2604	885	42725	24.9984	Peet Ltd	N/A
302	49555	LR3151	403	42725	1.2228	Crown	City of Rockingham



MRS & TPS ZONES & RESERVES
 Lots 129 & 302 Zig Zag Road, Baldvis
 A Peet Limited Project

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 d: 22 Dec 2015
 p: 06/082/042A

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1.3 PLANNING FRAMEWORK

1.3.1 ZONING AND RESERVATIONS

METROPOLITAN REGION SCHEME



The LSP land is zoned 'Urban' under the Metropolitan Region Scheme (MRS), having formed part of an April 2014 WAPC decision to approve lifting of the lands 'Urban Deferred' status.

The residual portion of Lot 129 (external to the LSP area) is zoned Urban Deferred, pending a future proposal to reserve the land for "Public purpose: high school" (refer **Figure 2**), as foreshadowed on the East Baldivis District Structure Plan.

CITY OF ROCKINGHAM TOWN PLANNING SCHEME NO. 2


The LSP land is zoned 'Development' under the City of Rockingham Town Planning Scheme No. 2 (TPS2 - refer **Figure 2**). This reflects the outcome of Amendment No. 145 which when gazetted on the 31 March 2015, rezoned the majority of the East Baldivis area following the City's granting of final approval to the East Baldivis District Structure Plan.

Clause 4.2.3 of the TPS2 defines the purpose of the Development Zone as follows:

-  To identify areas requiring comprehensive planning prior to subdivision and development; and
-  To coordinate subdivision, land use and development in areas requiring comprehensive planning.

Clause 4.2.4 goes on to specify the requirement for an LSP to be adopted over Development zoned land prior to substantive subdivision or development. This requirement is reiterated within **Schedule 9** of TPS2, which then identifies specific matters to be addressed in the Structure Planning of identified Development Areas notated on the Scheme Map.

Lots 129 and 302 are included within **Development Area 40**, for which Schedule 9 stipulates the following matter that must be addressed in addition to the standard requirements of **Clause 4.2.5**, in order to suitably guide future subdivision and development of the land:

-  The preparation of a Fire Management Plan where a Bushfire Hazard Assessment determines the land as having a moderate to extreme risk of bushfire.

This LSP seeks to fulfil the requirements of TPS2.

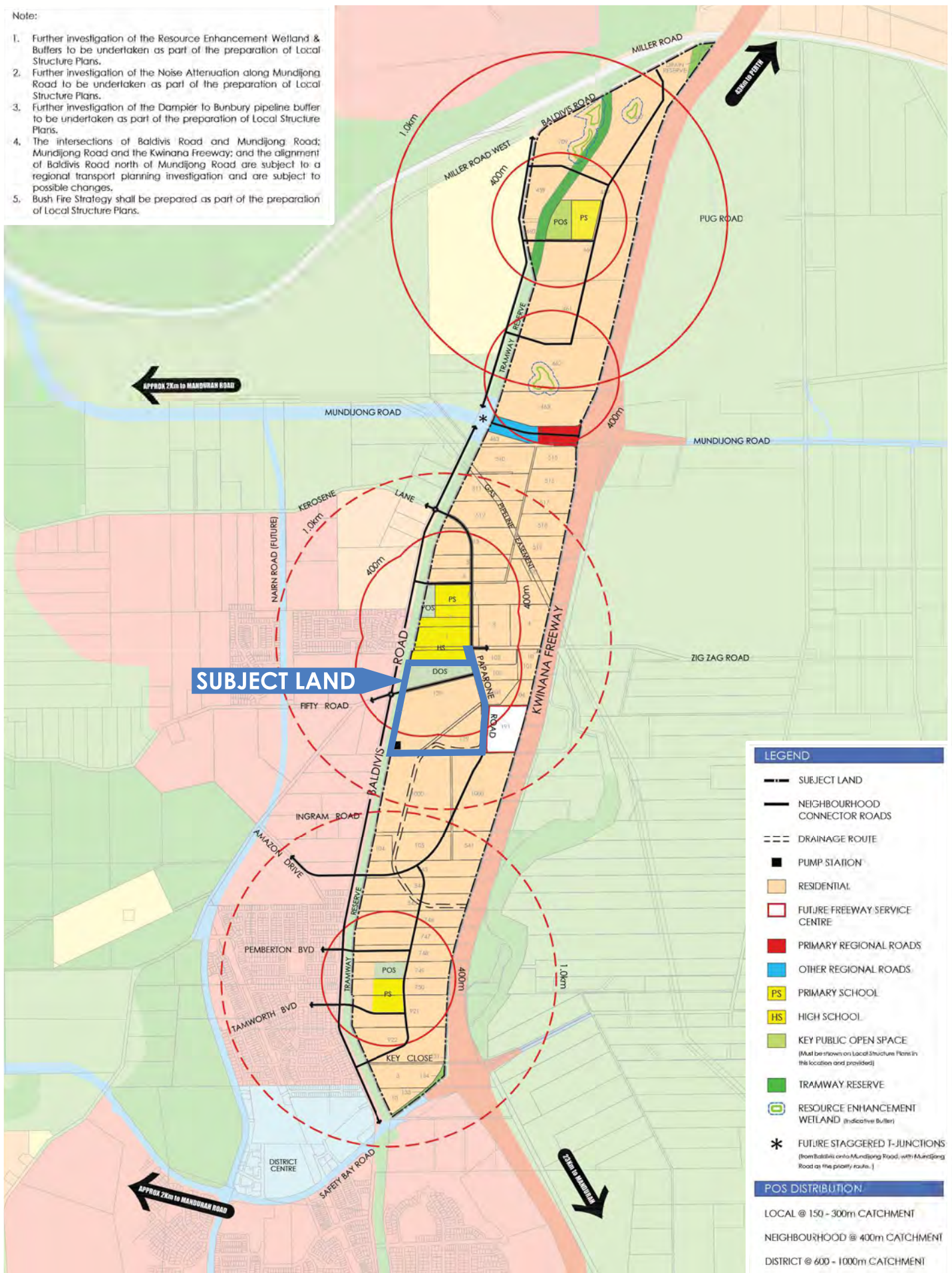
1.3.2 CITY OF ROCKINGHAM DEVELOPER CONTRIBUTION AREA NO.2

As provided for in *State Planning Policy No.3.6 – Developer Contributions for Infrastructure*, Developer Contribution Area No.2 establishes a framework for the funding of community infrastructure within the City of Rockingham by requiring developers to pay a contribution upon the creation of additional dwellings or dwelling entitlements through land subdivision or development processes.

The developer acknowledges its obligations in this regard, and anticipates imposition of a condition on subsequent subdivision and/or development applications requiring appropriate arrangements to be made in negotiation with the City. Reviewed on an annual basis, the 2014/15 per dwelling contribution rate for the Baldivis North Precinct is \$1,963.

Note:

1. Further investigation of the Resource Enhancement Wetland & Buffers to be undertaken as part of the preparation of Local Structure Plans.
2. Further investigation of the Noise Attenuation along Mundijong Road to be undertaken as part of the preparation of Local Structure Plans.
3. Further investigation of the Dampier to Bunbury pipeline buffer to be undertaken as part of the preparation of Local Structure Plans.
4. The intersections of Baldvis Road and Mundijong Road; Mundijong Road and the Kwinana Freeway; and the alignment of Baldvis Road north of Mundijong Road are subject to a regional transport planning investigation and are subject to possible changes.
5. Bush Fire Strategy shall be prepared as part of the preparation of Local Structure Plans.



EAST BALDIVIS DISTRICT STRUCTURE PLAN

Lots 129 & 302 Zig Zag Road, Baldvis
A Peet Limited Project






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d: 06 Nov 2015
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figure 03

1.3.3 EAST BALDIVIS DISTRICT STRUCTURE PLAN

District Structure Plans provide a strategic framework for the coordination and preparation of underlying Local Structure Plans including (but not limited to) the location and disposition of land uses, activity centres, regional and district infrastructure, schools, open space, road networks and other matters considered relevant by the City.

In February 2014 the City of Rockingham resolved to adopt the East Baldivis District Structure Plan (DSP - **Figure 3**), which anticipates development of Lots 129 and 302 for primarily residential purposes. More specific elements of the DSP as they relate to this land include:

-  An eastward extension of Fifty Road to create a four-way intersection with Baldivis Road, as one of a select number of Neighbourhood Connector entrances into the precinct;
-  The area north of the extended Fifty Road reservation being reserved for public open space and portion of a high school as an integral part of a Central Education/Open Space Precinct; &
-  Recognition of an existing pump station site in the southwest corner of Lot 129.








1.3.4 BALDIVIS TRAMWAY RESERVE MANAGEMENT PLAN

The Baldivis Tramway, encompassing 95ha of land over an approximate 12 km length, sits within a largely unused portion of road reservation with care, control and management vested with the City of Rockingham. The land was originally set aside for a tramway between Jandakot in the north and Karnup in the south, however it was never constructed in the Baldivis region.

The land was reserved 'Parks and Recreation' in the MRS and TPS2 as a result of the 1987 Tramway Reserve Study, with a Management Plan being adopted by the City for the land in 2000. Since that time the Baldivis area has undergone significant change with the growth of new subdivisions and the expansion of the Baldivis Town Centre, all of which have had a significant impact on the use and associated pressures experienced by the tramway.

In light of these new management challenges, in 2013 the City undertook a review of the *Baldivis Tramway Management Plan*. Adopted in June 2014, the renamed *Baldivis Tramway Master Plan* identifies the adjoining section of the Tramway as being within 'Precinct Two', being a section that is currently largely devoid of vegetation, and for which the following Management Objectives and Goals are outlined:

Management Objectives:

-  Maintain/protect existing vegetation, utilise firebreak for DUP where possible to minimise fragmentation.
-  Manage priority weed species and focus revegetation in key feature nodes and access points.
-  Utilise designated offset areas for future revegetation of native species to improve landscape connectivity.
-  Provide potential solutions to manage the interface between the Tramway and residential development.
-  Ensure adequate fire safety measures, such as breaks and slashing.
-  Establish an integrated DUP network, inclusive of a safe detour around the Safety Bay Road intersection.
-  Create a Heritage Concept Area adjacent to the Old Baldivis School site with unique interactive and interpretive play scapes based on the settlement era period.

Goals:

4. Managing the interface between the Tramway and neighbouring residential development.
5. Increase community involvement and educational opportunities through provision of a heritage precinct (immediately adjacent this LSP between the active playing fields and the existing Baldivis Reserve).
6. Ensuring a continuous path network throughout the reserve that allows for a trail-based sustainable recreation experience.

Adjoining developers are encouraged, but not obligated under the current statutory planning framework to develop the adjacent reserve in accordance with the Master Plan. Developers are however, required to ensure adjacent development suitably transitions/integrates with the reserve and does not compromise the City's ability to deliver on the Master Plan vision as funding becomes available for this purpose.

LEGEND

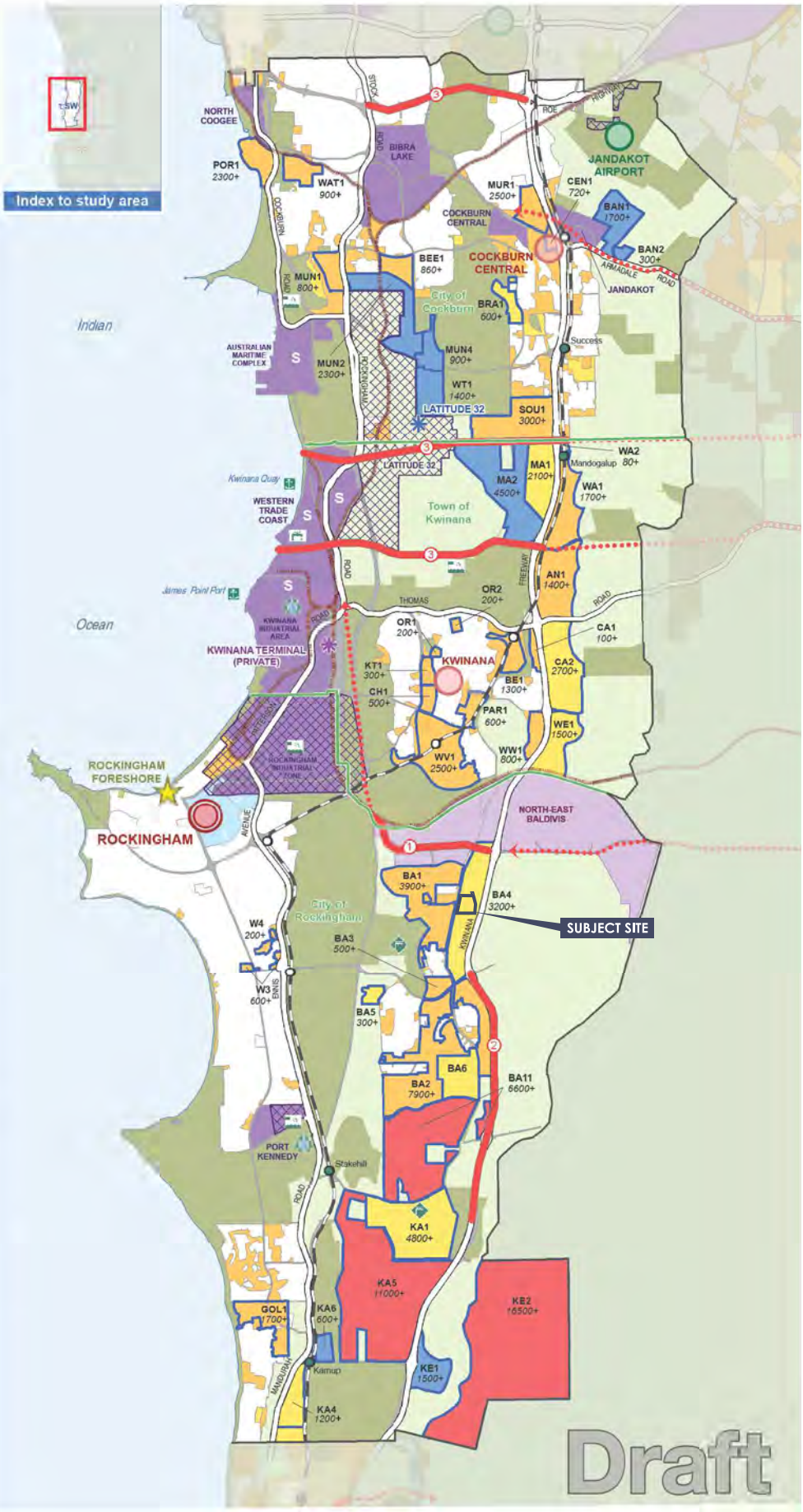
- strategic industrial centre
- existing industrial centres
- priority industrial site - subject to investigation
- 2009 draft industrial land strategy area
- existing developed area
- central city area
- road or rail reservation
- region scheme reserves
- rural
- waterways
- urban expansion area 2011-2015
- urban investigation area 2011-2020
- urban zoned undeveloped
- urban deferred zoned undeveloped
- rural land being rezoned
- ABC1 area identifier
- 1234+ connected city scenario dwelling yield
- strategic metropolitan centre
- secondary centre
- specialised centre
- metropolitan attractor
- intermodal freight terminal
- planned intermodal freight terminal
- proposed water treatment plant
- major water storage / reservoir
- proposed water recycling plant
- proposed waste water treatment plant
- proposed port facility
- existing passenger railway station
- proposed passenger railway station
- existing metropolitan railway (indicative)
- existing freight railway
- major roads
- 1 new road construction (MRWA)
- 2 road upgrading (MRWA)
- 3 road planning (MRWA)
- strategic road planning
- local government boundary
- sub-region boundary

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 Mapping & GeoSpatial Data Branch
 Department of Planning, WA
 On behalf of:
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NS-001MapGasProjeWVpwm2011
 Data: RegionalandPublicationMaps
 Fig54_SouthWestSubRegionSpatialFrameworkMap.rnd

Base information supplied by:
 Western Australian Land Information Authority
 L1 430-2009-4
 Railways supplied by:
 Geopredict Solutions Pty Ltd

Note:
 Map is based on Region Scheme zones and
 does not include redevelopment authority areas.



DRAFT SOUTH WEST SUB-REGIONAL SPATIAL FRAMEWORK
 Lots 129 & 302 Zig Zag Road, Baldvis
 A Peet Ltd Project



s: NTS
 d: 06 Nov 2015
 p: 06/082/022A

figure
04

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1.4 PLANNING STRATEGIES

1.4.1 DIRECTIONS 2031 AND BEYOND

Published in August 2010, *Directions 2031 and Beyond: Metropolitan Planning Beyond the Horizon* “is a high level spatial framework and strategic plan that establishes a vision for future growth for the metropolitan Perth and Peel region...”. It “provides a framework to guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate a range of growth scenarios.”

In addition to providing broad strategic guidance on accommodating Perth’s population into the future, *Directions 2031* divides the metropolitan area into sub-regions, and discusses how growth should be accommodated within these specific geographic units. The subject site located within the south-west sub-region, where an additional 41,000 dwellings are anticipated as being required to accommodate a projected population of 278,000 by 2031. Based on the preferred ‘connected city’ pattern, this growth is to be achieved through a combination of infill and green field development.

1.4.2 DRAFT OUTER METROPOLITAN PERTH AND PEEL SUB-REGIONAL STRATEGY

Sub-Regional strategies provide a framework for delivering the objectives of *Directions 2031*. They identify a strategic plan of actions, stakeholder responsibilities and timeframes for delivery. Importantly, they also express dwelling targets based on defined areas that strive to improve land efficiency and counter the trend towards urban sprawl.

The *Draft Outer Metropolitan Sub-Regional Strategy* (2010) identifies the subject site as being located within the Cell ‘BA4’ area, being undeveloped land within an existing Urban Deferred zone. Encompassing the entirety of the East Baldivis District Structure Plan area, a target of an additional 3,200 dwellings is identified in the Draft Strategy for this cell (refer **Figure 4**). A finalised version of this Strategy is expected to be released by the Department of Planning in 2015.

1.4.3 SOUTH WEST METROPOLITAN CORRIDOR STRUCTURE PLAN

Corridor Structure Plans provide the next level of detail necessary to coordinate MRS rezoning and ensure subsequent layers of structure planning proceed in accordance with the vision and broad level framework identified in *Directions 2031* and the *Draft Outer Metropolitan Sub-Regional Strategy*.





A draft of the *SW Corridor Structure Plan* is expected to be released for public consideration in early 2015. As it relates to this site the SW Corridor Structure Plan is expected to simply reflect the outcomes of the recent MRS Amendment process (discussed in **Section 1.3.1** above). At present there is no indication that the Corridor Structure Plan will have any other significant bearing on the site, or preparation of this LSP.

1.5 RELEVANT PLANNING POLICIES

1.5.1 STATE PLANNING POLICIES





SPP 2.1 – PEEL HARVEY COASTAL PLAIN CATCHMENT

By virtue of its location, the LSP is subject to the requirements of the *Peel-Harvey Coastal Plain Catchment Policy*, which seeks to control and negate land use changes likely to cause environmental damage to the Peel-Harvey estuarine system. Objectives of the policy which have had a significant bearing on the Local Water Management Strategy in particular for the LSP (refer **Appendix H**) include:

-  Improving the social, economic, ecological, aesthetic and recreational potential of the catchment;
-  To balance environmental protection with the economic viability of the primary sector;
-  To increase high water-using vegetation cover within the catchment;
-  To prevent land uses likely to result in excessive nutrient export into the drainage system.

OPERATIONAL POLICY – LIVEABLE NEIGHBOURHOODS

Liveable Neighbourhoods (LN) is the WAPC's operational policy guiding the design and approval of structure plans for green field sites. The objective of LN is the delivery of new developments that provide high quality living, working and recreational environments, thereby contributing to the successful implementation of the *State Planning* and *State Sustainability Strategies*. The LSP strives to meet the aspirational requirements of LN, with a particular focus on the following key aims:

-  An urban structure based on interconnected, safe and walkable neighbourhoods;
-  Creating a sense of community, identity and a sense of place;
-  Providing a variety of lot sizes and housing types to cater for the diverse housing needs of the community at density that can support local services and public transport; and
-  Maximising land efficiency wherever possible.
















GUIDELINES – PLANNING FOR BUSHFIRE PROTECTION

Prepared pursuant to 'State Planning Policy 3.4 – Natural Hazards and Disasters', the *Planning for Bushfire Protection Guidelines* set out a range of matters that need to be addressed at various stages of the planning process, to provide an appropriate level of protection to life and property from bush fires, and avoid inappropriately located or designed land use, subdivision and development on land where a bush fire risk is identified.

Bushfire considerations form an integral part of the LSP design, as outlined in **Section 2.4** of this report and the Bush Fire Hazard Assessment and Management Plan attached at **Appendix D**.

1.5.2 LOCAL PLANNING POLICIES & PROCEDURES

A number of Council Policies and/or Procedures also exist of relevance to the preparation of this LSP, or that will be used to inform future detailed design and implementation of staged development and use of the site, inclusive of:

- | | | | |
|--|---------------------------|--|------------------------------|
|  LPP 3.1.2 | Local Commercial Strategy |  Procedure 1.4 | Street Names & Themes |
|  LPP 3.3 | Community Facilities |  Procedure 1.6 | Structure Plan Assessments |
|  LPP 3.3.7 | Display Home Centres |  Procedure 1.8 | Water Sensitive Urban Design |
|  LPP 3.3.10 | Home Businesses |  Procedure 1.9 | Detailed Area Plans |
|  LPP 3.3.20 | Residential Design Codes |  Procedure 1.11 | Development Conditions |
|  LPP 3.4.1 | Public Open Space |  Procedure 1.13 | Subdivision Conditions |
|  LPP 3.4.2 | Subdivision Fencing |  Procedure 1.18 | Bulk Earthwork Proposal |
|  LPP 7.2 | Local Bushland Strategy | | |

2 SITE CONDITIONS AND CONSTRAINTS

2.1 BIODIVERSITY AND NATURAL AREA ASSETS

A consolidated Environmental Assessment Report for the land was initially prepared by Emerge Associates in April 2014 (refer **Appendix C**). The report identifies that the environmental aspects of the land are heavily influenced by its former use for broad acre agricultural purposes. With the limited size of the property no longer capable of sustaining a viable rural activity independent of other landholdings, this component of the land's history has effectively ceased. Key elements of Emerge Associate's report appear in the sections below.

2.1.1 EXTENT OF REMNANT VEGETATION

Site inspections undertaken by Emerge Associates in January and March 2014 confirmed that there is very little intact remnant vegetation within the site, and what remains consists of scattered native tree species over parkland cleared areas. A review of historic aerial photography indicated that the majority of the site was cleared of native vegetation prior to 1953, most likely for broad scale farming/agricultural uses.

Vegetation within the site has been subject to high levels of historical clearing, stock grazing and weed invasion, and as a result is in a 'Completely Degraded' condition (in accordance with the Bush Forever scale) over the majority of its area. Vegetation consists of scattered remnant native *Eucalyptus rudis*, *Corymbia calophylla*, *Melaleuca preissiana* and *M. raphiophylla* trees, as well as occasional native shrubs and sedges with introduced (weed) grass species being dominant. Some small patches of marginally more intact vegetation in 'Degraded' condition remain in the southern portion of the site. These patches include an area of *Eucalyptus rudis* woodland over weeds as well as an area of isolated *Melaleuca preissiana* trees over open shrub land of *Melaleuca teretifolia* and *Jacksonia furcellata* along the open drain in the south of the site.

The City of Rockingham's Tramway Reserve is located between Baldivis Road and the western boundary of the site. Based on a recent site inspection by Emerge the tramway reserve contains some intact areas of *Corymbia calophylla* and *Eucalyptus marginata* woodland over low woodland of *Banksia* spp. in 'Degraded' to 'Very Good' condition. The central areas however, have been historically cleared and contain planted trees, a vegetated sump and scattered native trees and shrubs over pasture grasses.





2.1.2 FLORA AND VEGETATION VALUES

Regional vegetation mapping undertaken by *Hedde et al (1978)* indicates that the site was originally composed primarily of the 'Serpentine River' vegetation which is described as "closed shrub of *Melaleuca* spp. and fringing woodland of *E. rudis* – *M. raphiophylla* along streams." According to the *Perth Biodiversity Project (PBP, 2010)* it is estimated that 8.59% of the pre-European extent of this complex remains.

The *Baldivis East DSP Environmental Assessment Report (RPS, 2011)* did not identify any areas of vegetation with significant values within the site or broader district area. Detailed investigations for landholdings to the north of the site found that, due to the widespread historic clearing that had occurred across the surveyed lots, any remnant vegetation was in 'Degraded' or 'Completely Degraded' condition (ENV, 2012). A Level 1 flora and vegetation survey undertaken for the landholding immediately south of the site (RPS, 2013) found there to be no Declared Rare Flora species, Priority Flora species, Threatened/Priority Ecological Communities, or species/communities of any other conservation significance located within the survey area. Vegetation condition within the survey area ranged from 'Completely Degraded' to 'Degraded'.


Based on these investigations and a recent site visit by Emerge botanists, and taking into account the similar condition and fragmented nature of the remnant vegetation across the site and the wider area, it is considered unlikely that any flora species or vegetation communities of conservation significance occur within the site.

LEGEND

-  STRUCTURE PLAN BOUNDARY
-  GROUNDWATER BORES
-  4.6 RECORDED MGL (mAHD)
-  40 TOPOGRAPHIC CONTOURS (mAHD)



MAXIMUM GROUNDWATER LEVELS
 Lots 129 & 302 Zig Zag Road, Baldiys
 A Peet Limited Project

 0m 20 40 60m
 s: 1:4000@A4
 d: 06 Nov 2015
 p: 06/082/024A

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2.1.3 FAUNA AND FAUNA HABITAT

Given the majority of the site has been historically cleared for agricultural activities, limited fauna habitat values remain. The *Baldivis East DSP Environmental Assessment Report (RPS, 2011)* suggested that any fauna habitat values would be limited to areas of remnant vegetation.

Any potential fauna habitat would be limited to a small number of the larger scattered native trees that could provide potential habitat for black cockatoo species, however this would not be considered a significant habitat value that would constrain future used and specifically future urban development.

2.1.4 WETLANDS

Based on the *Department of Parks and Wildlife's (DPaW) Geomorphic Wetland* series mapping, there are Multiple Use (MU) wetland areas covering the majority of the site (DPaW, 2013).

MU wetland areas are recognised as having few wetland attributes, but still provide some hydrological functions. The management objective for these wetlands is to “use, develop and manage in the context of water, town and environmental planning through land care”. These MU wetlands do not form any significant constraint to the proposed future urban development, but will need to be considered in the context of groundwater levels and fill requirements as part of stormwater management and engineering design, which is addressed in the supporting *Local Water Management Strategy (LWMS)*.

2.2 LANDFORM AND SOILS


2.2.1 LANDSCAPE AND TOPOGRAPHY


The site is generally low-lying, and topography ranges from approximately 4m AHD to 7m AHD.

2.2.2 SOILS AND GEOTECHNICAL

Landform and soil mapping prepared by *Churchward and MacArthur (1980)* indicates that the site is representative of the 'Serpentine River' unit, which is described as "poorly drained plains with fine textured alluvial soils."

Geological mapping by *Gozzard (1983)* identifies the soils within the site as 'Sand' (S8) and 'Silt' (M4), which are described as follows:

 **Sand (S₈):** very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted, of eolian origin. This soil type covers the western and south-eastern corners of the site.

 **Silt (M₄):** very pale brown silt, soft when moist, firm when dry, low clay content, of alluvial origin. This soil type covers the majority of the site, extending from the north-east corner through the central corridor of the site.

The results of a detailed Geotechnical Report prepared by Douglas and Partners based on a January 2014 field investigation, is further discussed in **Section 3.8** of this report.

2.2.3 ACID SULPHATE SOILS

Acid Sulfate Soils (ASS) is the name commonly given to naturally occurring soils and sediment containing iron sulphide (iron pyrite) materials. In their natural state ASS is generally present in waterlogged anoxic conditions and do not present any risk to the environment. When oxidised, ASS produce sulphuric acid, which can pose risks to the surrounding environment, infrastructure and human health.

Available information (*Department of Environment and Conservation, 2010*) indicates that the site has been classified as having a 'moderate to low' risk of ASS occurring within three metres of the natural soil surface.

Detailed ASS investigations will not be required to support the LSP, however may be required as part of future subdivision and associated development approvals depending on the extent of excavations or dewatering (e.g. for services, including sewer).

2.2.4 HISTORIC LAND USE AND POTENTIAL CONTAMINATION

A search of the *Department of Environment Regulation's (DER) Contaminated Sites Database and Register (DER, 2013)* found there to be no registered sites within or immediately adjacent to the site.

Based on a review of historical aerial photography, the site has been historically cleared for broad scale farming/agricultural purposes. Anecdotal evidence suggests a history of hay farming within the site and surrounding areas. There does not appear to be any historic evidence of market gardening within the site, a land use that is generally associated with potential soil and groundwater contamination.

Based on the historic land uses within the site and the generally available information, there is not expected to be any significant risk of soil and/or groundwater contamination within the site.

2.3 GROUNDWATER AND SURFACE WATER



2.3.1 GROUNDWATER QUALITY

Groundwater level monitoring has been carried out on the site. The maximum recorded levels were observed in September 2013 and these have been used to calculate the Maximum Groundwater Level (MGL). Depth to groundwater ranges between 1.55 m and 0 m Below Ground Level (BGL).

Groundwater monitoring results show that groundwater beneath the site is slightly acidic with mean Total Phosphorus (TP) concentrations generally below guidelines (ANZECC 2000). Total Nitrogen (TN) concentrations are above guidelines, however, they are not considered excessively high.

A groundwater licence has been obtained from the Department of Water (DoW), initially for temporary construction purposes before transferring to the City for the irrigation of POS.

The key groundwater management issues for the site include:





-  Development protection from high groundwater levels;
-  Treatment of groundwater prior to discharge from site; &
-  Groundwater use for irrigation of POS.

2.3.2 SURFACE WATER QUALITY

The site contains an artificial open drain which runs along the eastern boundary and traverses diagonally across the site to the south-west corner. The drain acts both as a groundwater control and conveys surface water from upstream catchments and within the site downstream rate of 4.5 litres per second per hectare (L/s/ha - as advised by DoW and Water Corporation) results in a lower rate of 0.43 m³/s to be maintained.

Surface water quality monitoring shows that water within the drain is slightly acidic and mean TN and TP concentrations are above guideline levels (ANZECC 2000). While the concentrations are above trigger values they are not considered excessively high, as the default trigger values are intended to be for slightly disturbed ecosystems, not highly modified environments such as the site.






The key surface water management issues for the site include:




-  Conveyance of upstream flows through the site;
-  Maintaining required peak flow rates of 4.5 L/s/ha;
-  Accommodating the loss of flood detention provided in existing low lying areas; &
-  Treatment of minor event surface runoff.

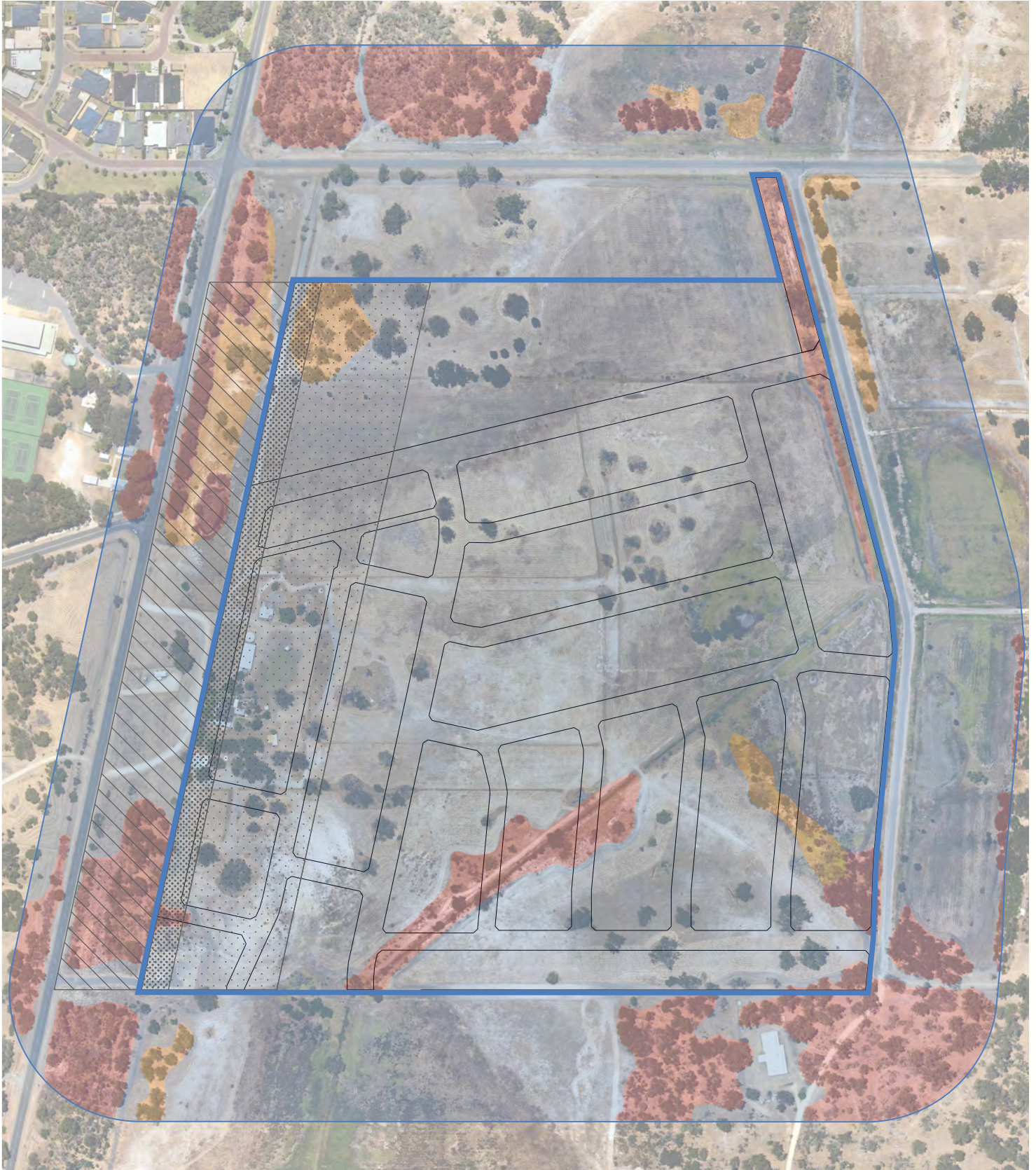
2.3.3 PUBLIC DRINKING WATER SOURCE AREAS

There are no Public Drinking Water Source Areas located within, or adjacent to the site (DoW, 2013).

LEGEND

-  STRUCTURE PLAN BOUNDARY
-  INDICATIVE 100m ASSESSMENT BOUNDARY
-  INDICATIVE 20m BUILDING PROTECTION ZONE FROM POST DEVELOPMENT HAZARD
-  100m HAZARD SEPERATION ZONE FROM POST DEVELOPMENT HAZARD
-  EXPECTED LONG TERM POST DEVELOPMENT HAZARD

- HAZARD RATING**
-  EXTREME
 -  MODERATE
 -  LOW



2.4 BUSHFIRE HAZARD

There are a number of vegetated areas which require consideration in terms of future bushfire hazards. Vegetation within and surrounding the site has been classified according to *AS3959 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009)*. Hazard ratings have been based on the vegetation classifications which in turn define necessary responses within the LSP and for future development.

Vegetation that is to be permanently retained surrounding the site will pose permanent bushfire hazard considerations. Vegetation that is to be cleared for future urban purposes in the short to medium term will pose only temporary bushfire management considerations. Remnant vegetation within the site is limited in extent, and is intended to be largely cleared for urban development, and therefore does not require consideration in terms of posing future bushfire hazards.

Based on the *East Baldivis DSP*, urban development is planned for landholdings directly adjacent to the northern, eastern, and southern boundaries of the site, therefore vegetation within these lots will pose only temporary bushfire management considerations within the LSP area until such a time as the areas are cleared or managed as part of the development process.

The only permanent hazard posed for the site is associated within the woodland vegetation within the Tramway Reserve adjacent to the western boundary of the site. This area is reserved for "Parks and Recreation" under the MRS and City of Rockingham Town Planning Scheme No. 2. Associated remnant vegetation has an 'Extreme' bushfire hazard rating, and any habitable dwellings will require a 20 metre Building Protection Zone (BPZ) from the edge of this vegetation within the Tramway Reserve.

A 20m BPZ from the Tramway Reserve has been provided for through a combination of setbacks for built form within each lot and the placement of a road reserve along the western boundary of the site. This road reserve extends the length of the proposed residential area, allowing for any potential additional requirements triggered by revegetation within the Tramway Reserve. This has been shown in **Figure 6**.

In addition to BPZ requirements, classified vegetation is likely to present increased Bushfire Attack Levels (BALs) which considerably influences building standards for dwellings at the construction stage. Dwellings within 100m of permanently retained vegetation (within the Tramway Reserve) will have increased building requirements to meet the increased BALs. BAL requirements will be finalised at the time of subdivision to accommodate the temporary nature of some areas of bushfire hazard.

The LSP is supported by a Fire Management Plan that is included as **Appendix D**.

2.5 HERITAGE

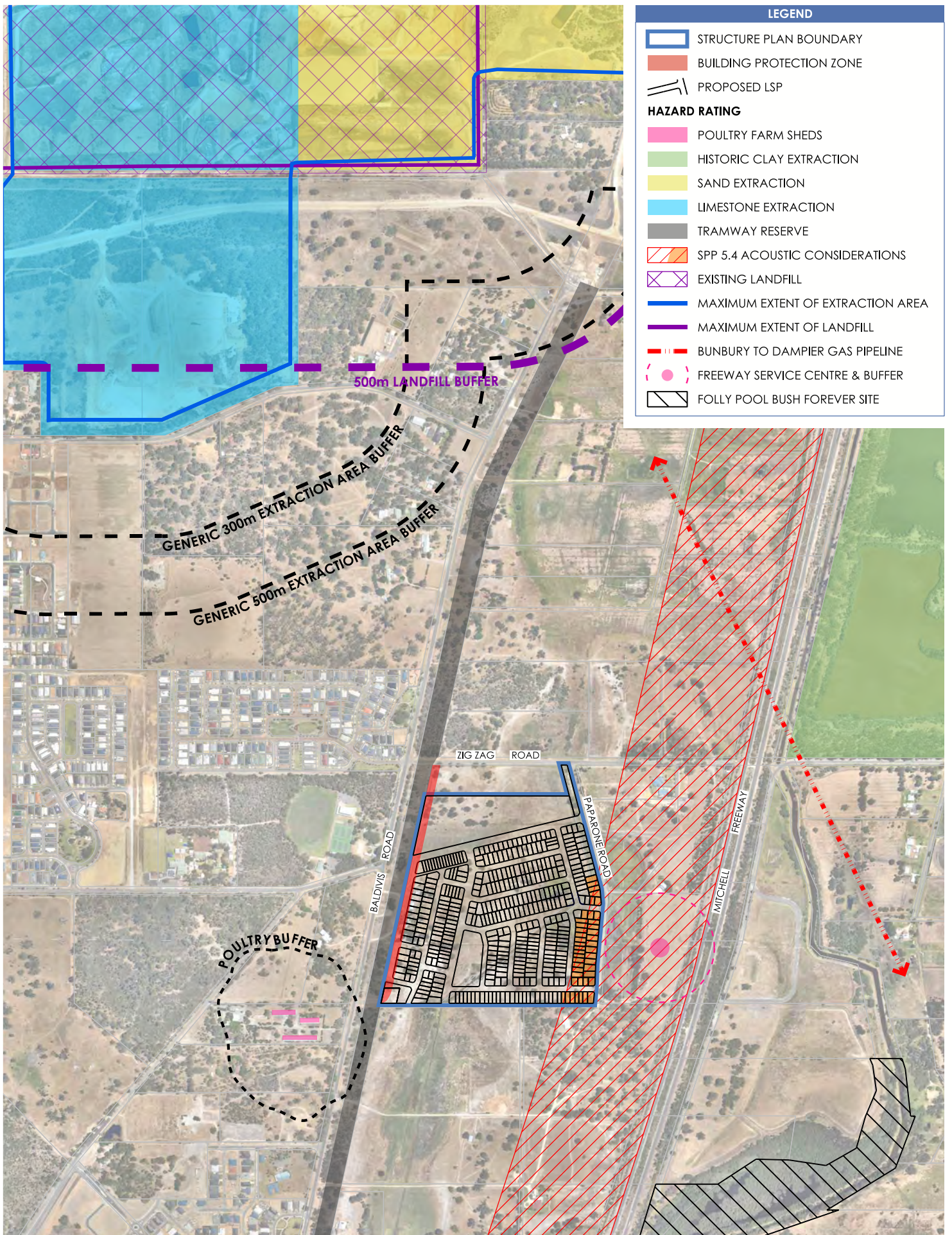
2.5.1 INDIGENOUS HERITAGE

A review of the *State Heritage Register*, the local *Municipal Heritage Inventory* and the *Department of Aboriginal Affairs Register* has resulted in no known or listed Aboriginal Heritage or European Heritage sites being identified within the site.

2.5.2 NON-INDIGENOUS HERITAGE

A desktop search of the *State Heritage Office database (Heritage Council 2012)* and the *Australian Heritage Database (Department of Environment 2013)* indicated there are no registered heritage sites within the site.

Baldivis Primary School, located approximately 500m west of the site, is listed under City of Rockingham's *Local Municipal Heritage Inventory*, but this will not be relevant for the urban development within the site.



EXTERNAL INFLUENCES

Lots 129 & 302 Zig Zag Road, Baldvis
A Peet Limited Project



s: 1:12500@A4
d: 22 Dec 2015
p: 06/082/030D

figure
07

2.6 SURROUNDING LAND USES & LAND COMPATIBILITY

The *Baldivis East DSP Environmental Assessment Report (RPS, 2011)* indicated that there were various potentially incompatible land uses in the area. These have been further investigated in terms of their relevance to the site, and those potentially relevant land uses are shown in **Figure 7** and discussed further below.

2.6.1 POULTRY FARM

An existing poultry farm is situated to the south-west corner of the site. Based on *EPA Guidance Statement No. 3 Separation Distances between Industrial and Sensitive Land Uses (EPA, 2005)* there is a recommended generic separation distance of 300-1000m (depending on the size of the operation) between poultry farming facilities and sensitive land uses.

A detailed and site specific odour impact assessment was undertaken for the poultry farm, as part of local structure planning for the landholdings directly south of the site. The purpose of this assessment was to understand the extent to which this land use could impact on proposed urban development, and to derive recommended buffer requirements (TOU, 2010). This assessment indicated an off-site odour impact of up to 100m in any direction from the poultry sheds based on the specific operations of the poultry farm and the existing site conditions.




This recommended separation distance will not result in any constraint on urban development within the site.

2.6.2 BASIC RAW MATERIALS

Basic raw materials are described as sand (including silica sand), clay, hard rock, limestone (including metallurgical limestone) and gravel and other construction and road building materials, which are generally important to land development. *State Planning Policy No. 2.4 Basic Raw Materials* provides for the protection of the basic raw materials, with the intention of this policy to ensure these resources can be fully utilised, through appropriate land uses and timeframes for development that may otherwise conflict with this intention.

The site is not located within a designated extraction area or resource location according to mapping provided in *State Planning Policy No. 2.4 Basic Raw Materials (WAPC, 2000)* therefore there are no associated constraints on the timing of the proposed future urban development within the LSP area.

There is, however, both a 'Priority Resources Location' and 'Extraction Area' located to the north/north-west of the site (shown in **Figure 7**) including sand and limestone, and an historic clay extraction operations approximately 600m east of the site. Details of those areas are as follows:

-  Kerosene Lane and Millar Road limestone and sand extraction activities north-west of the site. This facility is operated by WA Limestone and is planned for ongoing extraction activities;
-  Baldivis Road sand extraction activities north of the site. This facility is operated by Italia Stone Group, and is planned for ongoing extraction activities;
-  Historic clay extraction activities by Alcoa east of the site. This area is no longer actively operated and has since been decommissioned.

EPA Guidance Statement No. 3 Separation Distances between Industrial and Sensitive Land Uses (EPA, 2005) recommends a generic separation distance of 300 to 500m between limestone/sand extraction activities and sensitive land uses. The extraction operations outlined above are located outside of this recommended generic separation distance and therefore will not require consideration within the LSP, or restrict future urban development within the LSP area.

TABLE 4: PACKAGE A NOISE INSULATION PACKAGE REQUIREMENTS

Are Type	Orientation	Package A Measures
Indoors		
Bedrooms	Facing road/rail corridor	<ul style="list-style-type: none"> · 6mm laminated glazing · Casement or awning windows · No external doors · Closed eaves · No vents to outside walls/eaves · Mechanical ventilation/air conditioning
	Side-on to corridor	<ul style="list-style-type: none"> · 6mm laminated glazing · Closed eaves · Mechanical ventilation/air conditioning
	Away from corridor	No Requirements
Living and work areas	Facing corridor	<ul style="list-style-type: none"> · 6mm laminated glazing · Casement or awning windows · 35mm (minimum) solid core external doors with acoustic seals · Sliding doors must be fitted with acoustic seals · Closed eaves · No vents to outside walls/eaves · Mechanical ventilation/air conditioning
	Side-on to corridor	<ul style="list-style-type: none"> · 6mm laminated glazing · Closed eaves · Mechanical ventilation/air conditioning
	Away from corridor	No requirements
Other indoor areas	Any	No requirements
Outdoors		
Outdoor living area	Facing corridor	<ul style="list-style-type: none"> · Minimum 2.0m high solid fence (e.g. Hardifence, pinelap, or Colorbond) · Picket fences are not acceptable
	Side-on to corridor	
	Away from corridor	No requirements

2.6.3 ACOUSTIC IMPACTS

The acoustic assessment undertaken for the broader East Baldivis DSP area (Herring Storer Acoustics 2009) indicates that, without any form of noise amelioration, future noise emissions from the Kwinana Freeway would not exceed the 'Noise Limit' criteria (as outlined in *State Planning Policy No.5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning*) anywhere within the site. Subsequent to this, a site specific transportation noise assessment was undertaken for the structure plan area (Lloyd George 2015). This study confirmed that the 'Noise Limit' criteria would not be exceeded anywhere within the site. Therefore no spatial response (i.e. separation or noise wall/bund) is necessary to address noise emissions within the structure plan area.

The site specific 2015 report considered the potential noise emissions from both the freeway and Baldivis Road under the predicted future traffic volumes. It concluded that emissions from Baldivis Road would not exceed the 'Noise Target' criteria and therefore no further consideration of noise from this source is required. The future freeway service centre to the east of the site was also considered, and deemed not to have any material influence (positive or negative) on the noise levels experienced within the structure plan area. This facility has now been largely constructed and includes an acoustic barrier/wall around its perimeter.

Under existing traffic conditions, the Kwinana Freeway emissions were determined to be below the 'Noise Target' criteria except for a small number of lots in the south east corner of the site. As freeway traffic increases to 2031 predicted volumes, the extent to which emissions that exceed the 'Noise Target' extend into the structure plan area increases (requiring additional consideration should development be staged from the west), however there are no portions within which the 'Noise Limit' criteria is ever exceeded.

Future residential lots likely to be exposed to noise levels above the specified 'Noise Target' can be effectively mitigated through treatments accommodated in housing construction (i.e. through 'deemed to comply' packages for residential development in accordance with the SPP 5.4 Implementation Guidelines (WAPC 2014). The *SPP 5.4 Implementation Guidelines (2014)* provide further detail on 'deemed to comply' packages for residential development. In this instance Package A, designed for residential developments in areas adjacent to major roads or passenger railways where noise levels exceed the 'Noise Target' but are within the 'Noise Limit' may be applicable to a small number of lots/dwellings along the eastern edge of the structure plan area (or interim stages of development). Relevant requirements are outlined in **Table 4** opposite.

The structure plan layout ultimately proposes a road interface along the eastern boundary of the site, with resultant lots facing towards the freeway corridor (i.e. the noise source) and outdoor living areas oriented 'away from' the freeway corridor. Based on **Table 4**, outdoor living areas facing away from the corridor require no other treatment (due to the considerable attenuation provided by the built form itself), and the lots that side on to the corridor require a 2.0m high solid fence. The other requirements are accommodated in built form responses and do not raise major considerations or concerns that need further detailed assessment or consideration at the structure plan or subdivision stage.




















A Detailed Area Plan will need to be prepared and Notifications placed on the Title of those lots determined to require acoustic architectural treatments in accordance with the *Transportation Noise Assessment: Greenlea Estate, Zig Zag Road, Baldivis (Lloyd George Acoustics 2015)* as included in **Appendix F**. The standard subdivision condition relating to notification on title as outlined by the WAPC (model condition T24, WAPC 2012) states:

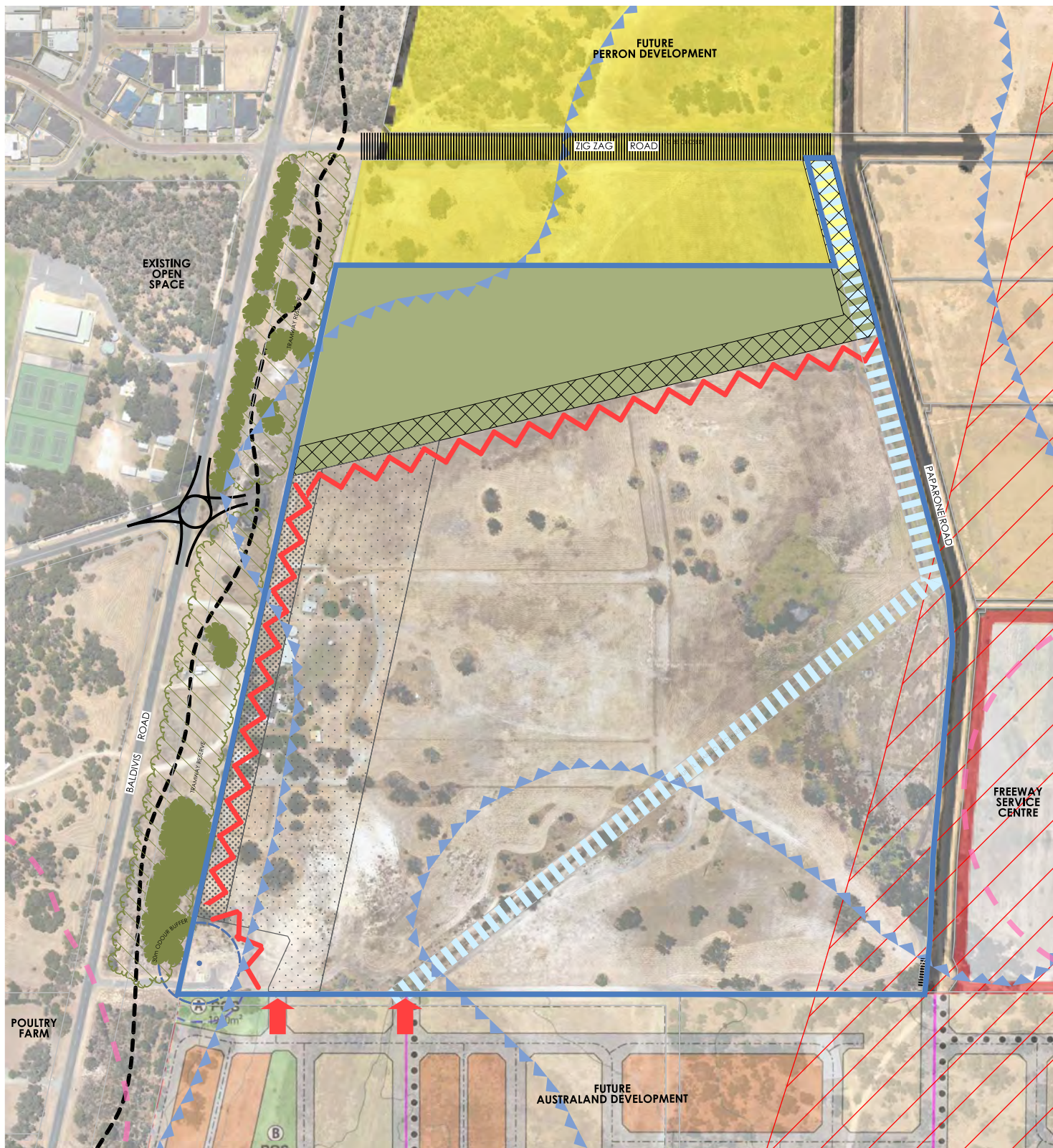
A notification, pursuant to Section 70A of the Transfer of Land Act 1893 is to be placed on the certificate(s) of title of the proposed lot(s). Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows:

"The lot/s is/are situated in the vicinity of a transport corridor and is currently affected, or may in the future be affected by transport noise." (Local Government).

Noise emission levels impacting on the structure plan area from the Kwinana Freeway will therefore be managed as part of future subdivision stages according to WAPC and local government requirements to ensure disturbance to future residents is suitably minimised.

LEGEND

 STRUCTURE PLAN BOUNDARY	 EXISTING RURAL DRAIN	 ROAD CLOSURES
 HIGH SCHOOL	 20m PIPELINE EASEMENT	 ADJOINING DEVELOPMENT INTERSECTIONS
 ACTIVE PLAYING FIELDS	 EXISTING WASTEWATER PUMP STATION	 ROAD INTERFACE REQUIRED
 POTENTIAL REVEGETATION	 30m ODOUR BUFFER	 PEDESTRIAN CONNECTION
 EXISTING VEGETATION	 LAND USE BUFFERS	 20m BUILDING PROTECTION ZONE
 MULTIPLE USE WETLAND	 INTERSECTION REDESIGN	 INDICATIVE 100m HAZARD SEPARATION
		 POTENTIAL ACOUSTIC CONSIDERATIONS








**SITE CONTEXT AND
LAND USE CONSTRAINTS**
Lots 129 & 302 Zig Zag Road, Baldiis
A Peet Limited Project





0m 20 40 60m
s: 1:4000@A4
d: 06 Nov 2015
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2.7 CONTEXT AND OTHER LAND USE CONSTRAINTS

Figures 1 & 7 provide context for the site in terms of the broader locality, whilst **Figure 8** highlights issues and opportunities within the site and its immediate surrounds. Significant elements of relevance to this LSP include:

-  **Employment Generators:** In addition to the Perth CBD and Rockingham Strategic Metropolitan Centre, the Rockingham and Kwinana Industrial Areas are expected to constitute significant employers of Baldivis residents. When developed, the North East Baldivis priority industrial site will also play an important role.
-  **Activity Centres:** The rapidly developing Baldivis Town Centre, identified as a Secondary Centre within *Activity Centre Framework for Perth and Peel (SPP 4.2)* provides supplementary employment opportunities in addition to catering for District level convenience and other retail needs for the Baldivis locality.
-  **Recreational Facilities:** The Baldivis Nature Reserve located to the west of the LSP area on the opposite side of the Tramway Reserve and Baldivis Road, is currently the only sporting facility servicing the North Baldivis locality. The East Baldivis DSP identifies an eastward expansion of this facility as being necessary to accommodate future demands of this rapidly developing area.
-  **Education Facilities:** Baldivis Secondary College (located at the corner of Safety Bay and Baldivis Roads), and Baldivis Primary School (located at the corner of Nairn and Fifty Roads) will provide for the immediate educational requirements of future residents. In the longer term the East Baldivis DSP identifies both a future primary and high school as constituting significant portions of the Central Education/Open Space precinct, which encapsulates the northern extremities of Lots 129 and 302.
-  **Key Transport Routes:** Kwinana Freeway acts as the primary regional transport route connecting the Baldivis locality with the Perth Central Business District (CBD) to the north, Mandurah and more broadly the Peel and South West Regions to the south.

Mundijong and Safety Bay Roads serve as the primary east-west aligned regional transport routes linking Baldivis with Rockingham to the west, Kwinana Freeway, Mundijong and the broader South East Metropolitan Corridor and Darling Scarp to the east.

Baldivis Road and Nairn Drive (when complete) serve as secondary north-south aligned district level transport routes that run through the Centre of the Baldivis Urban Area, connecting Stakehill/Paganoni Road at the southern end of the Baldivis locality, through to Mundijong Road at the northern end of the urban cell. A future extension of one of these connections through the Leda Nature Reserve to connect with Kwinana is currently being explored through the South West Corridor Structure Planning process.
-  **Public Transportation:** Transperth plans to service the Baldivis locality with on-road bus services that will ultimately link the Kwinana Town Centre with the Warnbro Train Station (on the South West Metropolitan Railway Line), via the Baldivis Town Centre. The East Baldivis DSP anticipates the LSP area as being serviced by Route 569 utilising Paparone Road along the eastern edge of the site.
-  **Major Utilities:** A 20m wide easement through the northern portion of the site is required to protect a future high pressure water trunk main connecting the Tamworth Reservoir Pump Station with the Mundijong Urban Cell. A supplementary Waste Water Pump Station is also required adjacent the existing facility in the south west corner of Lot 129, which will necessitate a 30m odour buffer to residential dwellings.
-  **Rural Drain:** An existing artificial open drain (Peel Rural Sub-Drain 'H') conveys water from upstream properties in addition to performing a groundwater control function. Removal and replacement of these functions needs to be accommodated in the LSP design.
-  **Adjacent Development:** Final earthwork levels, servicing and staging strategies for the estate will be heavily influenced by the timing and arrangement of works involved in implementing the abutting approved LSP to the south.

LEGEND

STRUCTURE PLAN BOUNDARY

RESIDENTIAL DENSITY CODINGS

- RESIDENTIAL R25
- RESIDENTIAL R30
- RESIDENTIAL R40



CONCEPT DEVELOPMENT PLAN
 Lots 129 & 302 Zig Zag Road, Baldivis
 A Peet Limited Project

0m 20 40 60m
 s: 1:4000@A4
 d: 22 Dec 2015
 p: 06/082/020R

figure
09

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3 LAND USE AND SUBDIVISION REQUIREMENTS

3.1 DESIGN PHILOSOPHY & LAND USE COMPOSITION

The proposed Local Structure Plan proposes integrated development of Lots 129 and 302 in a manner that delivers on the Dwelling Targets set in the Draft Outer Metropolitan Sub-Regional Strategy, is consistent with the development vision expressed in the East Baldivis DSP, and accords with the design standards of LN.

The LSP proposes subdivision and development of the land exclusively for residential purposes, other than where land is required to accommodate the delivery of key public facilities (e.g. Central Education/Open Space Precinct) as identified on the East Baldivis DSP, or the network of reserves necessary to access and service the resultant development. Consistent with the outcome of the recent Local Commercial Strategy Review, other non-residential land uses are to be consolidated within the approved network of Activity Centres, which includes the Baldivis Town Centre and two future nearby Neighbourhood Centres.

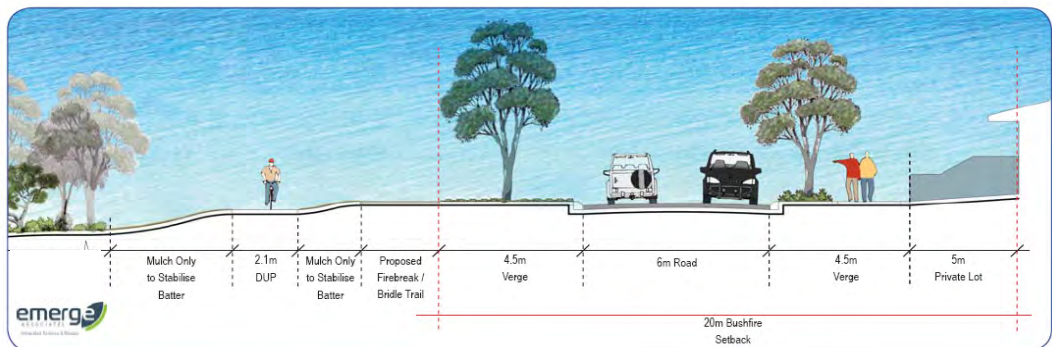
Whilst precise lot yields can only be accurately determined at the subdivision stage of development, the Development Concept Plan demonstrates that the robust nature of the LSP design is capable of delivering a range of housing typologies that match market desires and expectations in the Baldivis locality. Additional detail on anticipated housing typologies appears in **Section 3.3** of this report.

3.1.1 EXTERNAL DESIGN INFLUENCES

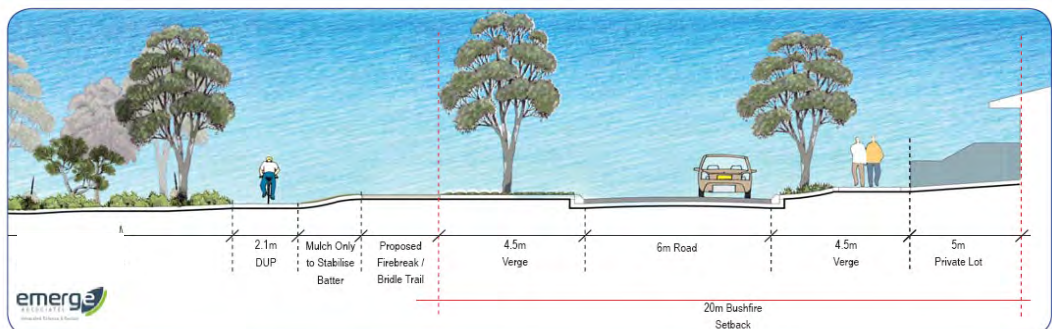
DESIGN ABUTTING BALDIVIS ROAD/TRAMWAY RESERVATION

Consistent with Crime Prevention Through Environmental Design principles, the LSP Concept specifically avoids the creation of lots that directly abut any reserve, including the historic Tramway. A significant benefit of this arrangement (as demonstrated in the following sections), is that the road then constitutes a significant portion of the necessary 20m Building Protection Zone (BPZ), as measured from the eastern edge of the reserve, within which sensitive development (such as residential dwellings) is prohibited in accordance with the WAPC’s latest guidelines on Bushfire Safety.

TRAMWAY SECTION ONE



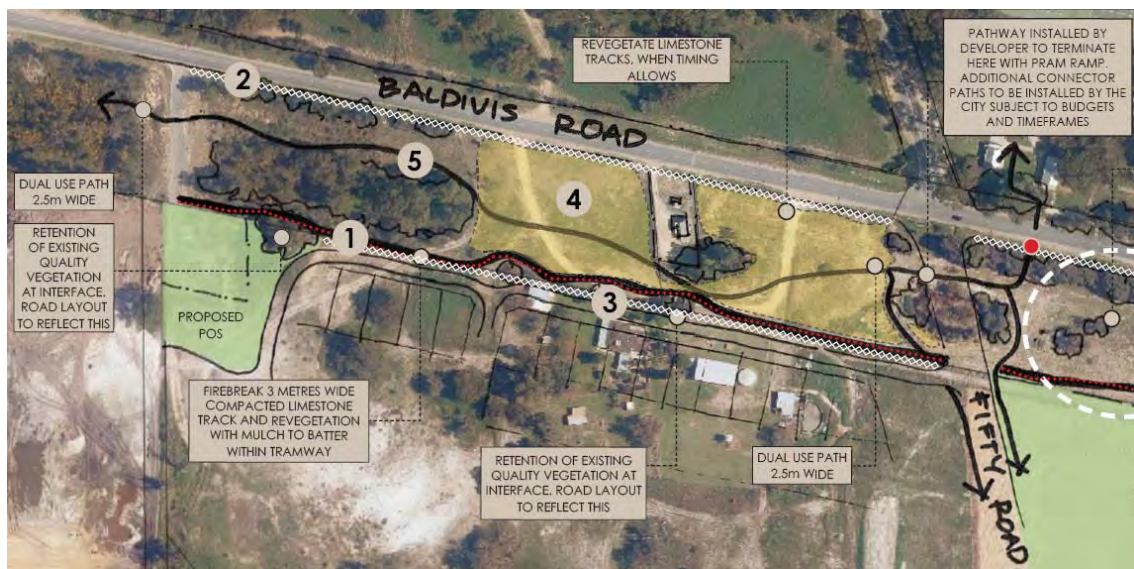
TRAMWAY SECTION TWO



Following release of the Baldvis Tramway Master Plan negotiations were entered into between the proponent and the City regarding the ability to batter supporting earthworks within the adjoining reserve. The anticipated extent of the batter necessary (as determined by The Civil Group) is depicted in the graphic below.



In exchange for accepting the proposed incursion into the reserve, the City requested and agreement was reached over a number of complimentary improvements to the Tramway, principally an amount of revegetation over denuded portions of the reserve between the batter and Baldvis Road. Key aspects of the agreement are depicted in the graphic below and are summarised on the opposite page. A copy of the full graphic (produced by the City) appears at **Appendix E**.



An acoustic assessment prepared by Lloyd George Acoustics in accordance with the WAPC's *State Planning Policy 5.4 – Road and Rail Transportation Noise and Freight Consideration in Land Use Planning (SPP 5.4 – refer Appendix F)* determined that noise received at proposed residences located adjacent the Baldvis Road reservation (on the eastern side of the Tramway) would be within prescribed 'noise limits', and that 'Quiet House' design measures would not be required.

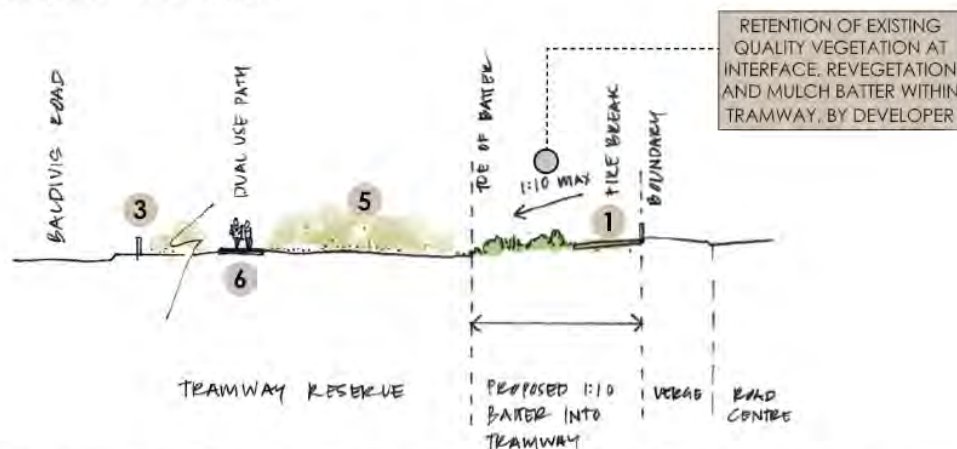
PRIORITY LANDSCAPE WORKS WITHIN THE TRAMWAY RESERVE

Suggested Landscape Works Proposed within Tramway Reserve to be undertaken by the Developer

- 1 Firebreak [2% Bitumen stabilised compacted limestone 100mm thick, 3m wide] adjoining all interface to the Development and Tramway Reserve including the POS areas. Revegetate and mulch the remaining batter within the Tramway. Batter as indicated on Civil Group Dwg 7808-0-C510 Rev B
- 2 Rural Fencing to Baldvis Road [Timber post and wire], for protection of revegetation and safe crossing connections to neighbouring Baldvis POS and Primary School
- 3 Rural Fencing to the Development internal interface, south of Fifty Road
- 4 Area One - Revegetation Priority Zone One [refer to the City's revegetation specifications and recommended plant list]
This area is currently denuded of vegetation. It is accessible and in a good state to undergo revegetation. This location will provide maximum impact both for the Development and the City
- 5 Dual Use Path 2.5m wide [100mm thick plain concrete]

NOTES FOR WORKS WITHIN PROXIMITY OF THE TRAMWAY RESERVE

- Final location of Dual Use Pathways and Firebreaks to be pegged by the Developer and confirmed on site by the City, prior to implementation.
- The Tramway Reserve is to be fenced prior to subdivision construction.
- Only the agreed access points through the Tramway Reserve shall be permitted to limit disruption and compaction to the Reserve.



SECTION ABSTRACTED FROM Civil Group Dwg 7808-0-C510 Rev B, INDICATING BATTERING AND REVEGETATION

DESIGN ABUTTING FREEWAY SERVICE CENTRE

Despite being approved as a 24 hour, 7 day a week operation, the adjacent Freeway Service Centre (currently nearing completion), poses no limitation to future residential development of the site by virtue of a specific condition imposed on its Development Approval that it contain all impacts within its own site. Erection of fencing along the northern, western and southern boundaries of the site will preclude any opportunity to provide direct pedestrian connections for future residents to access the facility. Instead those seeking to do so will first need to access the Principal Shared Path within the nearby freeway reservation. Impacts associated with freeway noise travelling through the subject site are discussed in **Section 2.6.3** of this report.

PUBLIC OPEN SPACE SCHEDULE

(22 December 2015)

Gross Site Area				(ha)			
	Lot 129 Zig Zag Road (MRS 'Urban' Zoned portion)	24,9984					
	Lot 302 Zig Zag Road (Drainage Reserve)	1.2228					
Nett Site Area			26.2212				
Deductions							
	Sewer Pump Station		0.1564				
	Balance of Existing Drainage Reserve		0.2008				
	Dedicated Drainage (up to 1:1 year event)		0.2592				
	BRA 1a	0.0641					
	BRA 1b	0.0487					
	BRA 4	0.1301					
	BRA 5	0.0163					
	Surplus Restricted Open Space		0.8481				
Gross Subdivisible Area			24.7567				
Creditable Public Open Space Required @ 10%			2.4757				
Unrestricted Public Open Space							
Public Open Space (as shown on Plan)							
	Reserve	Total	Drainage ID	less 1:1 event (deduction)	less 1:5 event (restricted)	Easements (restricted)	Sub Total
	Playing Fields	4.0000	1a & 1b	0.1128	0.2657	0.8644	2.7571
	Central Reserve	0.8318	4	0.1301	0.2035		0.4982
	WWPS Buffer	0.1723	5	0.0163	0.0266		0.1294
TOTAL Unrestricted							3.3847
Restricted Open Space							
Water Corporation Pipeline Easement							
	Playing Fields					0.8644	
Drainage Surface Area (FSA up to 1:5 year event)							
	Playing Fields					0.2657	
	Central Reserve					0.2035	
	WWPS Buffer					0.0266	
TOTAL Restricted							1.3602
Maximum Permitted							
	<i>20% of Original 10% Requirement (prior to Restricted POS Deduction)</i>					2.5605	0.5121
TOTAL Restricted Credited							0.5121
TOTAL Public Open Space Provision							3.8968
	Unrestricted POS						3.3847
	Restricted POS						0.5121
% of Provision						15.7%	

DRAINAGE CALCULATIONS (25 February 2014)

ID	BRA		Flood Storage		
	1:1	1:5	1:10	% of Reserve	1:100
1a	0.0641	0.1619	0.3270	16.2%	0.5626
1b	0.0487	0.1038	0.2069		0.3526
2	Sub-Surface				
3	Sub-Surface				
4	0.1301	0.2035	0.4241	56.6%	0.7054
5	0.0163	0.0266	0.0403	32.8%	0.0619
TOTALS	0.2592	0.4958	0.9983	-	1.6825

DENSITY CALCULATIONS

Gross Area	Dwellings	per Ha	Target
26.2212	422	16.1	15.0
Nett Area	Dwellings	per Ha	Target
14.7533	422	28.6	22.0

PUBLIC OPEN SPACE SCHEDULE

Lots 129 & 302 Zig Zag Road, Baldivis

A Peet Limited Project





d: 22 Dec 2015
p: 06/082/025B

figure
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3.2 OPEN SPACE

The Structure Plan provides for over 5ha of open space in the form of three reserves, inclusive of two smaller reserves that effectively replace the function of the existing drain running through the site (Lot 302) and form the subject of a proposed land exchange with the Department of Lands on this basis. In order to facilitate a 'like-for-like' exchange, the final tenure of these reserves will be 'Drainage' (as opposed to 'Public Open Space'), however for the purpose of this LSP they are identified and calculated as Public Open Space (POS) reflective of their intended broader long-term use.






Figure 9 shows the proposed distribution and basic function of POS across the LSP area, which is heavily influenced by:

-  Identification in the East Baldivis DSP of a 4ha reserve immediately south of the future high school site, to accommodate development of shared active playing field facilities (NB. the facilities and car parking area shown are to demonstrate spatial capacity and access potential only. These and any clubroom facility will be provided by the City as required, and are not the responsibility of the developer);
-  A desire to provide amenity further within the estate and thereby ensure an appropriate balance between the provision of active and passive recreational pursuits, despite the active playing fields exceeding the developer's 10% land requirement for POS;
-  The need to buffer future dwellings from the existing and future waste water pump stations; &
-  Relatively large stormwater drainage and flood storage requirements, caused by a high water table and low flow rates dictated by the Water Corporation in the East Baldivis District Water Management Strategy.

The general principles of the open space network proposed include:

-  Integration of the active playing fields with the Baldivis Tramway Reservation (a major place-defining element for the locality), to form an eastward continuation of the existing Baldivis Nature Reserve;
-  Integration of urban water drainage to create passively irrigated open spaces;
-  Elevation of the central reserve from its primary drainage function to accommodate a variety of passive recreational activities, inclusive of a grassed area that will be suitable during extended periods of the year as a small kick about space, in addition to acting as a landmark element that assists orientation and legibility;
-  Use of the southern reserve for both drainage purposes and as a landscaped element encompassing the majority of the 30m WWPS Odour Buffer;
-  The provision of connections to the broader open space and movement networks, in particular the City proposed 2.5m wide dual use path to be constructed within the adjacent Tramway reservation; &
-  Intended use of native plant species to contribute to sense of place, and reduce long term irrigation needs.

The schedule included as **Figure 10** demonstrates that the estate exceeds the minimum 10% land provision requirement of LN.

Typical Lot Dimensions	15 x 30m (450m ² +)	12.5 x 30m (375m ² +)	10.5 x 30m (315m ² +)
Indicative Elevations			
Indicative Floor Plans			
Typical Lot Dimensions	15 x 20-25m (300m ² +)	12.5 x 20-25m (260m ² +)	7.5 x 30m (225m ² +)
Indicative Elevations			
Indicative Floor Plans			

3.3 RESIDENTIAL DENSITIES & DWELLING FORECASTS

3.3.1 RESIDENTIAL DENSITY

A limited range of low to medium residential densities consistent with that which has been applied and approved within nearby estates is proposed, as depicted on the Structure Plan Map.

In summary, a base coding of 'R25' is proposed for the majority of the site, with pockets of 'R30' proposed in areas of high amenity, in particular within immediate proximity to POS or at cap ends, which are ideally suited to the creation of squat lot (shallower depth lot) product. A small pocket of 'R40' is also proposed where anticipated traffic volumes require the creation of rear loaded laneway allotments opposite the active playing fields at the principal entrance to the estate.

3.3.2 LOT TYPOLOGIES

It is intended that the Structure Plan will promote a housing environment inclusive of an appropriate mix of lot sizes and dwelling types, providing living opportunities that meet the desires of the Baldivis market, befitting an area that enjoys ready access to a number of high value amenities, such as the adjacent playing fields, primary and secondary education facilities, and strategic employment and commercial opportunities.

The indicative subdivision layout on the Concept Plan anticipates the creation of a variety of lot/housing typologies, accommodating between 3-4 x Bedrooms and 2 x Bathrooms on freehold allotments. **Figure 11** provides further detail on the expected size, scale and aesthetics of the built form generated by these typologies.

In terms of the distribution of the different typologies, it is intended that they be scattered throughout the estate to provide variety, create interest, accommodate a diverse demographic and avoid the creation of homogenous streetscapes. Notwithstanding the above there are a few general traits to the lot typology distribution, such as:

- 📍 The use of larger lots (with wider frontages) along the western edge, so as to minimise the number of dwellings subject to additional building requirements addressing the potential fire hazard of the Tramway;
- 📍 The use of larger lots also along the eastern edge, as a transition to adjacent Special Rural development; and
- 📍 A higher prevalence of small/narrow lot product opposite proposed open space so that the recreational needs of residents with small backyards, is offset by immediate proximity to public reserves.

3.3.3 RESIDENTIAL DESIGN CODE VARIATIONS

Residential development of created allotments will be guided by the Residential Design Codes, as amended by Planning Bulletin 112/2015 (Medium-Density Single House Development Standards – Structure Plan Areas). **Table 1** sets out variations to the Codes that constitute deemed to comply standards for development within the Structure Plan area and which, therefore, do not require neighbour consultation and/or planning approval.

3.3.4 DWELLING TARGETS

Directions 2031 and Beyond sets a target of '15 dwellings per gross urban zoned hectare' of land in new development areas within the Perth and Peel Metropolitan Regions. Element 1 of *Liveable Neighbourhoods* equates the measurement to '22 dwellings per site hectare' (encompassing land purely zoned for residential purposes) and requires that this be measured as a means of determining whether the residential densities proposed in a LSP will deliver the dwelling aspirations outlined in *Directions 2031 and Beyond*, and the dwelling targets set out in the *Draft Outer Metropolitan Sub-Regional Strategy*.

The indicative lot pattern depicted on **Figure 9** identifies some 422 dwellings across the LSP area, equating to '16.1 dwellings per urban hectare'. When measured against land solely identified for residential land use (14.6426ha), the same indicative dwelling yield equates to '28.6 dwellings per site hectare'. Both of these numbers exceed the identified targets outlined above.

Table 1: Single House (R-MD) Standards for Medium Density Housing

R-Code	Street Setback & Front Fences		Lot Boundary Setback		Open Space	
	R-Codes	R-MD provision	R-Codes	R-MD provision	R-Codes	R-MD provision
<p>R40</p> <p><u>Rear load</u> 7.5 x 30m = 225m²</p> <p><u>Front load</u> 8.5 x 30m = 255m² 8.5 x 25m = 212.5m² 10 x 20m = 200m² 10 x 25m = 250m² 12.5 x 20m = 250m²</p>	4m	<p>2m minimum, no average</p> <p>1.5m to porch/veranda, no maximum length</p> <p>1m minimum to secondary street</p> <p>Front fences within the primary street setback area being a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence</p>	<p><u>Boundary setbacks</u> 1 to 1.5m for wall height 3.5m and less (subject to wall length and major openings)</p> <p><u>Boundary walls</u> 2/3 length one side boundary, max 3.5m high and 3m average height</p>	<p><u>Boundary setbacks</u> 1.2m for 3.5m wall height (or less) with major openings</p> <p>1m for 3.5m wall height (or less) without major openings</p> <p><u>Boundary walls</u> To both side boundaries subject to: No maximum length to one side boundary, 2/3 max length to second side boundary for wall height 3.5m or less</p>	<p>45% open space (55% site cover)</p> <p>20m² courtyard</p> <p>1/3 required OLA area may be covered</p> <p>Minimum dimension 4m</p>	<p>An outdoor living area (OLA) with an area of 10% of the lot size or 20m², whichever is greater, directly accessible from a habitable room of the dwelling and located behind the street setback area</p> <p>At least 70% of the OLA must be uncovered and includes areas under eaves which adjoin uncovered areas</p> <p>The OLA has a minimum 3m length or width dimension</p> <p>No other R-Codes site cover standards apply</p>
<p>R30</p> <p><u>Rear load</u> 10m x 30m = 300m²</p> <p><u>Front load</u> 10m x 30m = 300m² 15m x 20m = 300m²</p>	4m	<p>2m minimum, no average</p> <p>1.5m to porch/ veranda, no maximum length</p> <p>1m minimum to secondary street</p> <p>Front fences within the primary street setback area being a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence</p>	<p><u>Boundary setbacks</u> 1 to 1.5m for wall height 3.5m and less (subject to wall length and major openings)</p> <p><u>Boundary walls</u> 2/3 length one side boundary, max 3.5m high and 3m average height</p>	<p><u>Boundary setbacks</u> As per R40</p> <p><u>Boundary walls</u> To both side boundaries subject to: 2/3 length to one side boundary, 1/3 max length to second side boundary for wall height 3.5m or less</p>	<p>45% open space (55% site cover)</p> <p>24m² courtyard</p> <p>1/3 required OLA area may be covered</p> <p>Minimum dimension 4m</p>	As per R40
<p>R25</p> <p><u>Front load</u> 12.5 x 25m = 312.5m² 15 x 25m = 375m² 12.5 x 30m = 375m²</p>	6m	<p>3m minimum</p> <p>1.5m to porch/ veranda, no maximum length</p> <p>1.5m minimum to secondary street</p> <p>Front fences within the primary street setback area being a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence</p>	<p><u>Boundary setbacks</u> Wall height 3.5m and less: 1m/1.5m (subject to wall length and major openings)</p> <p><u>Boundary walls</u> 2/3 length one side boundary, max 3.5m high and 3m average height</p>	<p><u>Boundary setbacks</u> As per R40</p> <p><u>Boundary walls</u> As per R30</p>	<p>50% open space (50% site cover)</p> <p>30m² courtyard</p> <p>1/3 required OLA area may be covered</p> <p>Minimum dimension 4m</p>	As per R40

Garage Setback & Width / Vehicular Access		Parking		Overshadowing		Privacy	
R-Codes	R-MD provision	R-Codes	R-MD provision	R-Codes	R-MD provision	R-Codes	R-MD provision
<p>Rear load</p> <p>Nil – provided laneway is minimum 6m wide</p> <p>Front load</p> <p>4.5m or 0.5m behind dwelling alignment subject to averaging requirements</p>	<p>Rear load</p> <p>0.5m garage setback to laneway</p> <p>Front load</p> <p>4.5m garage setback from the primary street and 1.5m from a secondary street</p> <p>The garage setback from the primary street may be reduced to 4m where an existing or planned footpath or shared path is located more than 0.5m from the street boundary</p> <p>For front loaded lots with street frontages between 10.5 and 12m, a double garage is permitted to a maximum width of 6m as viewed from the street subject to:</p> <ul style="list-style-type: none"> garage setback a minimum of 0.5m behind the building alignment; a major opening to a habitable room directly facing the primary street; an entry feature consisting of a porch or veranda with a minimum depth of 1.2m; and, no vehicular crossover wider than 4.5m where it meets the street <p>Lots with a frontage less than 10.5m or not compliant with the above require single or tandem garaging</p>	Two on-site bays	As per R-Codes	35% of the adjoining site area	<p>No maximum overshadowing for wall height 3.5m or less</p> <p>No maximum overshadowing for wall height greater than 3.5m where overshadowing is confined to the front half of the lot.</p> <p>If overshadowing intrudes into rear half of the lot, shadow cast does not exceed 35%</p>	<p>4.5m to bedrooms and studies</p> <p>6.0m to all other major openings</p> <p>7.5m to balconies or similar</p>	<p>Clause 5.4.1 C1.1 applies, however the setback distance is</p> <p>3m to bedrooms and studies</p> <p>4.5m to major openings to habitable rooms other than bedrooms and studies</p> <p>6m to unenclosed outdoor active habitable spaces</p>
<p>Rear load</p> <p>Nil – provided laneway is minimum 6m wide</p> <p>Front load</p> <p>4.5m or 0.5m behind dwelling alignment subject to averaging requirements</p>	As per R40	Two on-site bays	As per R-Codes	35% of the adjoining site area	As per R40	<p>4.5m to bedrooms and studies</p> <p>6.0m to all other major openings</p> <p>7.5m to balconies or similar</p>	As per R40
<p>Rear load</p> <p>Nil – provided laneway is minimum 6m wide</p> <p>Front load</p> <p>4.5m or 0.5m behind dwelling alignment subject to averaging requirements</p>	As per R40	Two on-site bays	As per R-Codes	25% of the adjoining site area	As per R40, however If overshadowing intrudes into rear half of the lot, shadow cast does not exceed 25%	<p>4.5m to bedrooms and studies</p> <p>6.0m to all other major openings</p> <p>7.5m to balconies or similar</p>	As per R40

3.4 MOVEMENT NETWORKS

Riley Consulting was engaged to prepare a Transport Assessment of the LSP Concept. A full copy of the technical report is included at **Appendix H**. Key points are summarised below.

3.4.1 ROAD HIERARCHY & TRAFFIC VOLUMES

The LSP Concept is structured by a highly permeable modified grid movement network in accordance with the design recommendations of LN. Based on the indicative 422 dwelling yield depicted on the concept Plan included at **Figure 9**, and a daily trip rate of 8 trips per day (as recommended in the WAPC's *Transport Assessment Guidelines*), ultimate development of the site is expected to generate in the order of 3,376 trips per day. Based on the expected distribution of that traffic using a distance/speed/capacity model, having regard for the attraction of internal and external facilities (schools, local and district centres and access to regional destinations) the anticipated road hierarchy for the LSP and projected traffic volumes attributed to each road are depicted on **Figure 12**. Indicative cross-sections of each road type are included at **Figure 13**.

ARTERIAL INTEGRATORS

Baldivis Road is currently constructed to a rural standard, inclusive of a 6m wide unkerbed carriageway with gravel shoulders. It is anticipated that this road will ultimately perform the role of an Arterial Integrator B with traffic volumes forecast to rise as high as 12,000 vpd. These volumes necessitate upgrading of the road to a boulevard standard inclusive of a single carriageway in either direction. Rather than the road being upgraded by abutting developers in a piece-meal manner (that would significantly disrupt traffic movement over an extended period), it is expected that the City will undertake this work in consolidated portions, with the WAPC requiring developers to pay a contribution towards the upgrade cost immediately adjacent their site as a condition of subdivision approval.

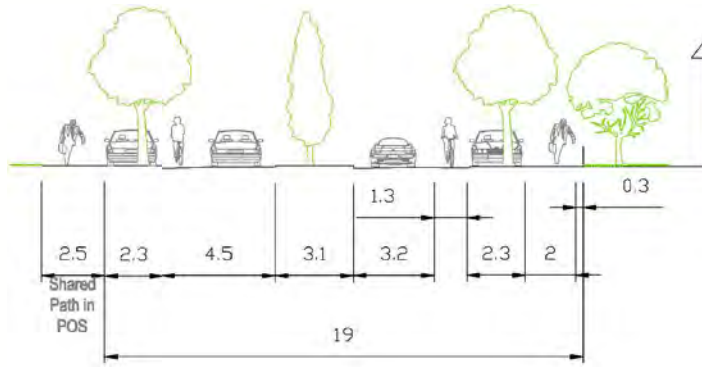
NEIGHBOURHOOD CONNECTORS

Road 1 is identified on the East Baldivis DSP as an important east-west Neighbourhood Connector road. In addition to its role as the primary entrance to the LSP and surrounding areas, it will play a key role in facilitating traffic movement to and from the adjacent Education/Open Space precinct. Accommodating anticipated volumes of between 2,500-5,300 vpd, a 19m reserve is proposed inclusive of a ghosted median (providing pedestrian refuge, without limiting turning movements) and room for parking embayments on the northern playing field side. Traffic volumes (including peak movements to/from the Playing Fields) warrant preclusion of direct vehicle access for a short section closest Baldivis Road, west of Road 2.

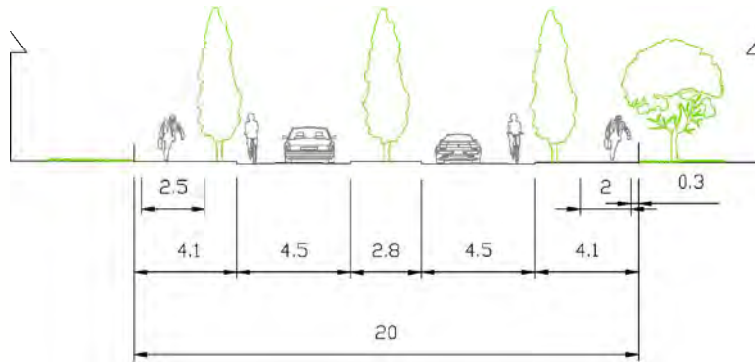
Paparone Road, a partly constructed local road is also identified on the DSP as a Neighbourhood Connector 'B', forming the basis of an important north-south route through the centre of the DSP area. Consistent with the treatment of the road by adjoining developers a 7.4m carriageway is proposed within the existing 20m reserve. Upgrade to the accepted standard will be required as a condition of subdivision approval, with Section 159 of the Planning and Development Act providing means for some of this cost to be recouped from subsequent adjoining subdividers.

Road 2, accommodating a secondary north-south road alignment through the centre of the LSP, is also classified as a Neighbourhood Connector 'B' in recognition of its connective function to development of the adjoining estate, and a resultant anticipated ultimate traffic volume of up to 2,500 vpd. A similar road treatment is proposed to that for Road 1 (divided carriageway with a ghosted median), albeit within a 20m reserve. For the short section where the road that runs adjacent the central open space reserve, rather than reduce the reserve by creating an offset verge on the POS side, a widened median (from 2.8 to 4.6m) is proposed to improve the safety of pedestrian movements to and from the reserve, as well as create a defacto traffic management device that encourages a lower speed environment.

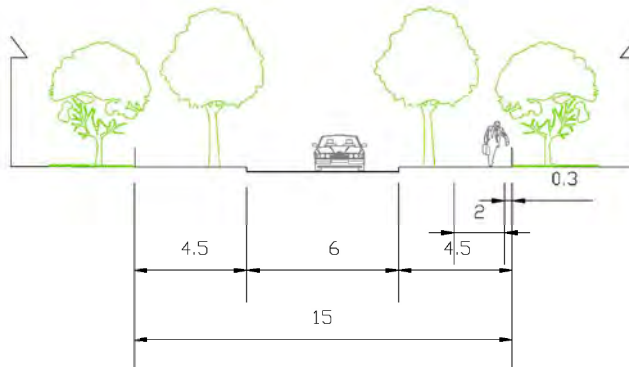
ROAD '1' INDICATIVE CROSS SECTION



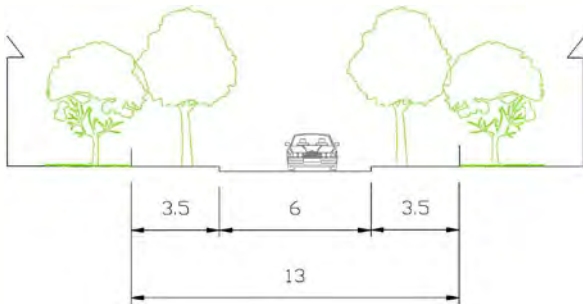
NEIGHBOURHOOD CONNECTOR INDICATIVE CROSS SECTION



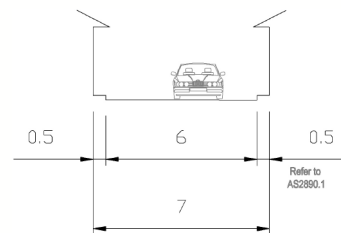
ACCESS STREET INDICATIVE CROSS SECTION



MEWS INDICATIVE CROSS SECTION



LANEWAY INDICATIVE CROSS SECTION



ACCESS STREETS

Almost all other roads within the LSP are designated as 'Access Streets'. Each of these roads will encompass a 6m road pavement (and 4.5m wide verges on either side) allowing ample room for two-way traffic and the occasional parking of vehicles on-street. 13m reserve widths are proposed where access streets abut POS, including a 2.5m verge on the reserve side to accommodate street trees and visitor parking embayments without the infrastructure extending outside the road reservation. The one exception to this rule is adjacent the Baldivis Tramway Reserve where a 4.5m verge is maintained as part of the total 20m Bushfire Protection Zone for adjacent dwellings.

LANEWAYS

Where traffic volumes along Road 1 make direct vehicle access undesirable, a 6m laneway (plus a short 13m wide Mews connecting to the nearest access street) is proposed to facilitate rear access.

3.4.2 TRAFFIC MANAGEMENT

TRAFFIC MANAGEMENT TREATMENTS & DEVICES

The primary traffic management device proposed in the LSP is a single land roundabout on Baldivis Road at the intersection of Fifty Road and proposed Road 1. Sidra analysis of the peak hour turning movements (assuming an ultimate Baldivis Road volume of 12,000 vpd) indicates ample capacity and that an excellent level of service can be expected. Sensitivity testing of increasing demand on Road 1 by 200% indicates the Level of Service will remain. In addition to the ghosted medians proposed on all Neighbourhood Connectors, in order to encourage and promote a slow speed environment within the LSP, a number of mid-block traffic calming devices may be used, such as planted medians with narrower carriageways. A select number of yield control measures are also proposed in the western portion of the plan in order to discourage use of these roads as a rat-run through to the adjoining estate.

INTERFACE WITH ADJOINING DEVELOPMENT

The design seamlessly integrates with adjoining development. Along the western and eastern boundaries of the site are existing roads within reservations sufficient to accommodate the necessary upgrading to perform its role in the designated road hierarchy previously discussed, whilst connections to the south match the width and location of roads approved on the adjoining approved LSP. To the north of the site is Zig Zag Road, identified on the DSP for closure and absorption into the Central Education/Open Space precinct. It is anticipated that the City and/or developer to the north will be responsible for this process once alternative access is provided to existing dwellings currently reliant on Zig Zag Road.

WALKING AND CYCLING

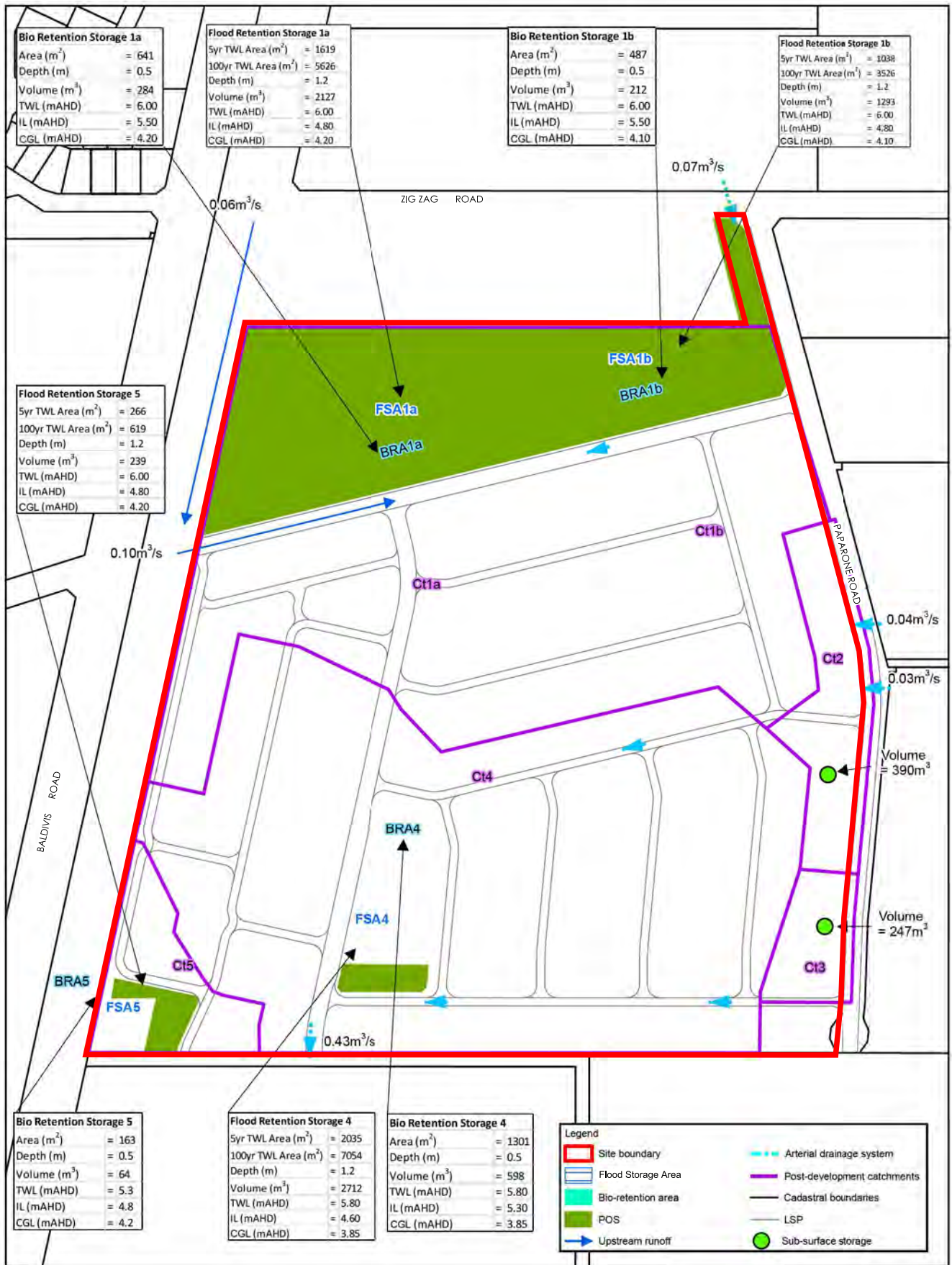
Footpaths and shared paths are to be provided in accordance with Liveable Neighbourhoods. To this end the LSP depicts a highly interconnected path network, inclusive of paths on both sides of high volume roads (i.e. Roads 1 and 2), and key connections to the broader pedestrian/cyclist network (e.g. Tramway DUP and Kwinana Freeway PSP). As the majority of streets involve volumes below 3,000 vpd, on-street cycling will occur in a safe manner, with a wider carriageway (including on-street cycle lanes) proposed on Neighbourhood Connectors to accommodate shared vehicular/cyclist use.

PUBLIC TRANSPORT

The DSP identifies future Bus Route 569 as running along the eastern boundary of the site on Papparone Road. In the longer term this service may be supplemented by other routes utilising Baldivis Road. By virtue of the site's proximity to both roads, dependant on the location of future stops, the majority of the estate is expected to be located within a 400m walkable catchment of a public transportation service. The injection of 1000+ residents into the locality will assist in improving the timeframe for delivery by increasing demand for public transport access.

VISITOR PARKING

Road reserves adjacent the playing fields, other open space and the Tramway Reserve have all been sized to accommodate the opportunity for parking embayments to be provided. The final number and arrangement of bays will be determined in consultation with the City's Engineers upon the preparation of detailed road drawings at the subdivision stage of development.



STORMWATER MANAGEMENT FEATURES

Lots 129 & 302 Zig Zag Road, BaldiVIS
A Peet Limited Project








s: 1:4000@A4
d: 06 Nov 2015
p: 06/082/032B





3.5 WATER MANAGEMENT

Emerge & Associates were engaged to prepare a Local Water Management Strategy (LWMS) based on the LSP Concept design. A full copy of the LWMS appears at **Appendix I**. Key points are outlined below.

The LWMS for the LSP has been developed in accordance with the overarching *Baldivis East District Water Management Strategy (DWMS)* (Parsons Brinckerhoff 2007) and guidance documents *Better Urban Water Management (DoW 2008)*, *State Planning Policy 2.9 Water Resources (WAPC 2006)* and Planning Bulletin 92 Urban Water Management (WAPC 2008). Water will be managed using an integrated water cycle management approach, which has been developed using the philosophies and design approaches described in the *Stormwater Management Manual for Western Australia (DoW 2007)* consistent with the DWMS. The key principles of integrated water cycle management that have guided the water management approach for the LSP area include:











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

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

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

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

The WSUD approach and measures that are proposed for the LSP area include:

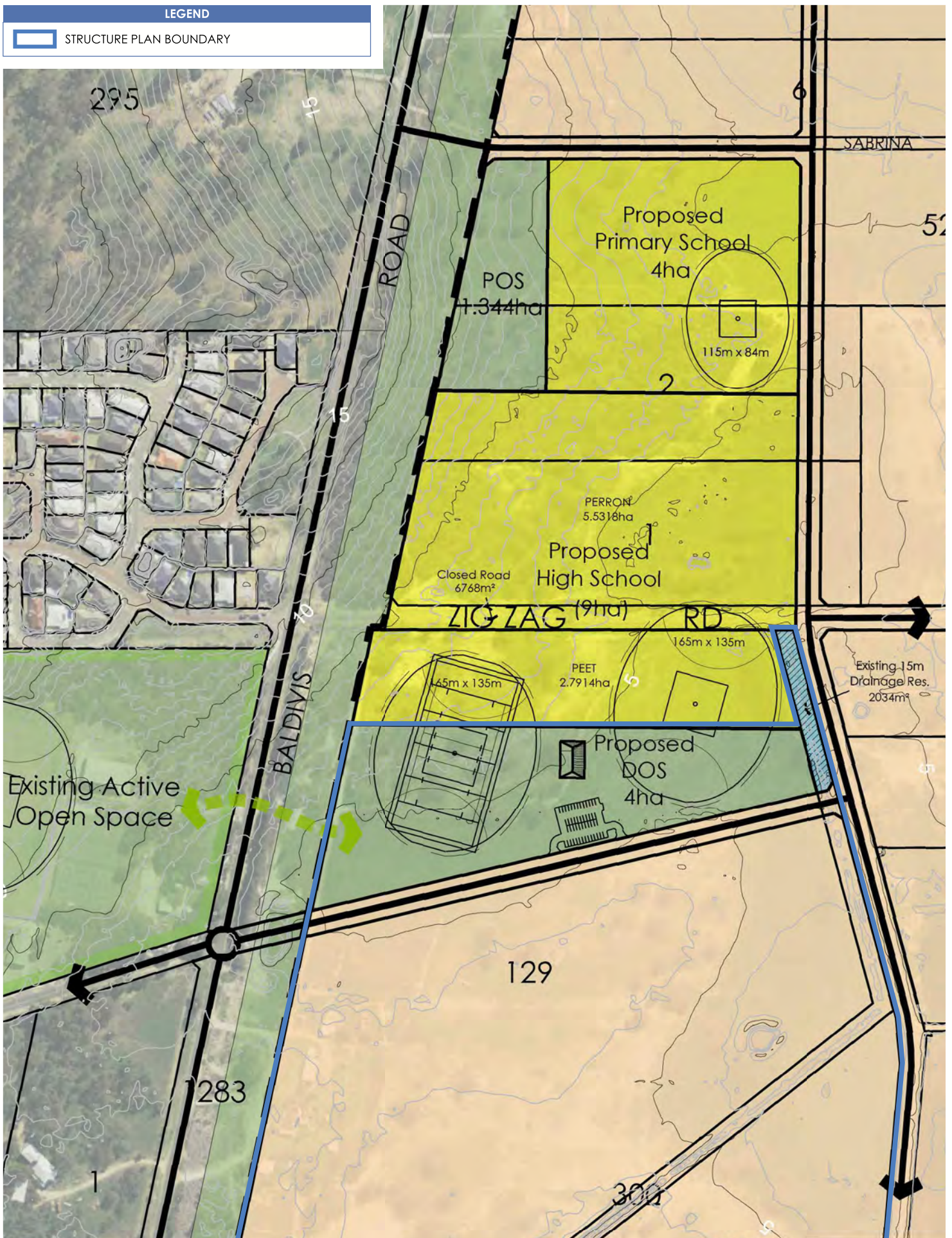
-  Maintaining existing flow regimes by conveying flows from upstream catchments through the site;
-  Maintaining peak flow rates leaving the site at 4.5 L/s/ha (as required by DoW and Water Corp);
-  Treatment of surface runoff prior to infiltration to groundwater;
-  Bio-retention areas incorporated in POS areas;
-  Major event flood storage requirements addressed through detention basins located in POS areas;
-  Control of groundwater levels across the site via subsoil drains;
-  Treatment of groundwater prior to entry to subsoil drainage network;
-  Adopting appropriate non-structural best management practices;
-  Adopting a fit-for-purpose water use approach; and
-  Minimising use of both scheme and non-potable water.

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

Further detail on the drainage aspects of the development are outlined in **Section 3.8.3** of this report.

LEGEND

STRUCTURE PLAN BOUNDARY



**DSP CENTRAL EDUCATION/
OPEN SPACE PRECINCT**
Lots 129 & 302 Zig Zag Road, Baldvis
A Peet Limited Project

0m 20 40 60m
s: 1:4000@A4
d: 06 Nov 2015
p: 06/082/032A

figure
15

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3.6 EDUCATION FACILITIES

The East Baldivis DSP identifies the sites necessary to adequately service the future educational requirements of the locality. With respect to Lot 129, the northern 2.7914ha of the site is identified on the DSP as forming the southern portion of the 9ha high school site that forms part of the Central Education/Open Space Precinct.

Future resident's need for a primary school site will be accommodated by the provision of a site at the northern end of the Central Education/Open Space Precinct, supplementing the existing facility west of the Baldivis Nature Reserve.


3.7 ACTIVITY CENTRE AND EMPLOYMENT

Given the close proximity of the Baldivis Town Centre and Rockingham City Centre (categorised as 'Secondary' and 'Strategic Metropolitan Centres' respectively), the DSP does not identify any requirement for retail or commercial uses to be provided for in the Local Structure Planning for Lots 129 and 302.


Daily convenience and comparison shopping needs will be met by the approved network of surrounding centres, identified in the City's recently updated Local Commercial Strategy for Baldivis. Two centres are proposed within close proximity to the west, a small Neighbourhood level facility within the Baldivis North Estate (opposite the aforementioned Baldivis Primary School), and a larger Neighbourhood level facility within The Spires Estate (further along Eighty Road/future extension of Nairn Drive).

Opportunities for home based employment are accommodated via the standard provisions of TPS2, with the preparation and subsequent assessment of such proposals guided by the City's *Local Planning Policy 3.3.10 – Home Occupations and Home Businesses*.






LEGEND

 STRUCTURE PLAN BOUNDARY

INDICATIVE STAGING

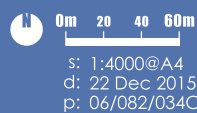
 STAGE BOUNDARY

INDICATIVE LOT LEVELS

	6.50 - 6.99m
	7.00 - 7.49m
	7.50 - 7.99m
	8.00m - 8.49m
	8.50+



PRELIMINARY STAGING & LOT LEVELS
 Lots 129 & 302 Zig Zag Road, Baldiis
 A Peet Limited Project



3.8 INFRASTRUCTURE COORDINATION, SERVICING AND STAGING

The Civil Group was engaged to prepare a servicing strategy based on the LSP Concept. A full copy of the report, which demonstrates that there are no critical impediments to development of the land in the manner proposed, is included at **Appendix J**. Key aspects of the report are summarised below.

3.8.1 GROUNDWATER & ACID SULPHATE SOILS

Groundwater levels within the subject site range between 4-5m AHD which appear to flow from the north-west corner towards the existing drain, which acts to control the fluctuations of groundwater levels. Replacement and realignment of the drain will require a subsoil drainage system to be designed to maintain the minimum 1.2 metres clearance between the average annual maximum groundwater level (AAMGL) and finished lot levels.

Creation of a controlled groundwater level (CGL) via the installation of subsoil drainage within the zone of groundwater fluctuation, will lower peak groundwater levels (and thus minimise imported fill requirements) whilst at the same time minimise potential acid sulphate soil issues.

Acid sulphate soils are expected to be encountered where excavation occurs below the current groundwater level. Management of ASS is straight forward and will involve lime-dosing any groundwater extracted by dewatering and applying lime to the excavated sand prior to its backfill in the trenches. Specific and localised ASS and groundwater investigations will be undertaken for each stage of subdivision once detailed design (i.e. depth and alignment of the sewers in particular) has been sufficiently advanced.

3.8.2 EARTHWORKS, FINISHED LEVELS & RETAINING WALLS

In order to provide adequate flood protection it is proposed to adopt a minimum finished development site level of RL 6.1m AHD as determined for the 100-year flood from the afflux of Peel Main Drain, as recommended in the Serpentine River Floodplain Management Study (refer "*Serpentine River Floodplain Management Study*", SKM, February 2010), inclusive of a 0.5m contingency added to the forecast flood level. This minimum fill level will also exceed the 1.2m minimum clearance to the AAMGL.

A geotechnical report prepared by Douglas & Partners provides recommendations relating to site preparation, which includes site stripping, soil compaction, imported fill, fill placement and compaction testing requirements. On the basis that the recommendations are adopted, the geotechnical report indicates that the entire site will achieve Class 'A' classification as defined in *Australian Standard AS2870*.

Fill levels will be coordinated with lot and road level designs for the two adjoining land owners (i.e. Australand to the south, and the Perron Group to the north). It is anticipated that minimal retaining walls will be required, as the filled land will be relatively flat. A preliminary design of likely finished ground levels appears in **Figure 16**.

3.8.3 PIPELINE CORRIDOR

The LSP depicts the agreed alignment of a trunk water main corridor twenty metres wide along the southern and eastern edges of the northern open space reserve. The Water Corporation's long-term planning plan for the metropolitan Interconnected Water Supply System is to build (in stages) two 1,200mm diameter water trunk mains within this easement. The main will interconnect the ultimate storage facility at Tamworth Hill with the Stirling Trunk mains and other future tank storages on the scarp above Byford and Mundijong. The corridor will need to be maintained free of any infrastructure or structures that would affect the ability to install these trunk mains in a timely and efficient way, and so minimise the need for any complex or costly reinstatement at the surface.

The surface level of the water main corridor can, however, be shaped for the land to fall gently from the northern edge of the primary east-west road towards the drainage basins depicted on the LWMS and therefore take some of the 1% Annual Exceedance Probability peak storm runoff. In other words the southern edge of the basins need not be aligned rigidly with the northern edge of the water main corridor.

3.8.4 STORMWATER MANAGEMENT

Peel Rural Sub Drain 'H' which currently traverses the site in a north-south direction before continuing on through land to the south before discharging through an existing 1,050mm diameter pipe under Kwinana Freeway, has a severely limited capacity that can flood adjacent properties for up to three days. As indicated in **Section 1.2.1**, a proposal is currently before the City to close the Crown reserve the drain sits within, with its physical removal to be coordinated with construction of the estate's proposed arterial drains.

In effect, the drain will be realigned/replaced with a series of arterial drainage pipes used to convey upstream existing flow (at controlled rates) and outflows from the proposed basins, as well as direct outflows of the subsoil drainage system within the development. No untreated surface runoff will be connected to the arterial drains with a bio-filter media material used around the coarse sand/gravel surrounds of the perforated subsoil pipes.

The site has been divided into a series of catchments based on a preliminary bulk earthworks and road design including the preliminary design of the arterial and subsoil drains (refer **Figure 14**). All catchments (with exception of catchments 2 and 3) have been designed to retain the 100-year storm with a restrained outlet flow in individual basins. Basin outlets will be designed to limit the outflow rates to pre-development rates.

Treatment of surface runoff will be provided in the form of bio-retention areas designed to treat the 1-year 1-hour duration storm event within excavated basins (at least 300mm above the CGL), filled with porous media and planted with vegetation. The basins operate by filtering stormwater runoff through the surface vegetation, followed by the stormwater percolating into filter media (typically sandy loam material), where filtration, extended detention treatment, denitrification and some biological uptake occurs.

Due to level constraints, catchments 2 and 3 have been designed to store up to the 100-year storm in full using modular underground stormwater storage units such as EcoAid, StormTech or similar products. Discussions have commenced with the adjoining developer to ensure that their drainage system is designed to accept outflow southwards along Papparone Road.

Soak wells will be utilised at each lot to store/manage/dispose of the more frequent 1-year storm event prior to discharge into the road drainage system. Where lot sizes go below 350m², they are likely to require lot connection pits to collect all or the excess runoff from the lots so as to allow discharge into the road system.

Further detail is contained in the LWMS prepared by Emerge Associates attached as **Appendix I**.

3.8.5 RETICULATED SEWER

The site is situated within the Water Corporation's Baldivis North Sewer District, which is planned to ultimately discharge its wastewater to the proposed East Rockingham Wastewater Treatment Plant (ERWWTP).

An existing wastewater pump station is located in the south west corner of the site ('Baldivis Road North Pump Station PS1' or BR-WWPS) servicing land south of Zig Zag Road. The BR-WWPS has a temporary pressure main that conveys wastewater north along Baldivis Road to another pump station in Johnson Road, Wellard. The pressure main will eventually be redirected westward along Fifty Road and connected via a 450mm pressure main to the ERWWTP.

Long term planning indicates that the BR-WWPS will ultimately be upgraded from a Type 40 to Type 90 facility when demand warrants, estimated to be after 2050, depending on the ultimate number of services and flows from its catchment. Positioned immediately north of the existing structure, the Water Corporation and Department of Environment Regulation require a 30m buffer (from the centrepoint of the well) around a type 90 pump station to limit the impact of possible fugitive odours, noise and light spill on nearby sensitive uses.

3.8.6 WATER SUPPLY

Access to scheme water will be facilitated by extension of distribution mains from the nearby Tamworth Hill Reservoir system. The Water Corporation has recently revised its water distribution planning for the Tamworth Gravity Scheme and has scheduled some major water distribution main projects to the east of the Tamworth Reservoir in order to provide for the anticipated developments in East Baldivis.

Of relevance to this LSP is a 720m section of 600mm diameter water distribution main (scheduled for construction in the 2014/15 financial year), along Baldivis Road between Ingram and Fifty Roads. The completed extension will enable water supply connection to the site.

3.8.7 ELECTRICITY

There are currently existing high voltage (HV) overhead aerials along Baldivis Road to the western side of the site along with HV overhead aerials to the north along Zig Zag Road.

The proposed development will consist of around 422 single dwelling residential lots and 1 high school site, requiring approximately 2.8 MVA of power, with six transformers and three switchgear installations required to distribute the necessary power. Low voltage (LV) cables will then be extended to mini pillars and uni-pillars to supply the individual lots, along with LV cables interconnecting with surrounding development.

Further investigation is required to determine the exact HV connection point, which is expected to come from the cables along Baldivis Road, which the WAPC will likely require be relocated underground. The Western Power network mapping tool indicates there is sufficient capacity if construction occurs prior to 2016.

3.8.8 RETICULATED GAS

There is currently a 160mm diameter high pressure gas main located on the western verge of Baldivis Road across the frontage of the site. The adjacent “Baldivis Central” and “Spires” estates are each connected to the ATCO gas reticulation system which can be readily extended to service this site.

3.8.9 TELEPHONE & NBN

Telstra and Nextgen Networks Broadband services exist in the area along the western verge of Baldivis Road, and could be extended to service this site. The development is expected, however, to be serviced with fibre optic as a green field site under the National Broadband Network (NBN). Under current criteria, NBN Co will provide fibre to new green fields developments of over 100 lots that are located within the NBN fibre footprint while the developer is required to install “pipe and pit” for future NBN installation.

3.8.10 STAGING

PEET Ltd is likely to develop the site in stages of 60-90 lots (i.e. approximately 5 stages over a period of 3-4 years). Stage 1 is anticipated to commence in late 2015, incorporating the north-west portion of the site. The development front will then proceed south (along the western edge of the site), then eastward towards Paparone Road. **Figure 16** depicts the currently anticipated indicative staging of the estate.

3.9 DEVELOPER CONTRIBUTION ARRANGEMENTS

As noted earlier in this LSP, PEET Ltd is aware of its obligations towards the funding of community infrastructure as outlined in Development Contribution Schedule No. 2.

It also acknowledged that in its February 2014 resolution to adopt the East Baldivis DSP, the City also advised of an intent to review the Community Infrastructure Plan and Development Contribution Schedule No. 2 to account for community infrastructure requirements associated with the active playing fields.

Section 159 of the Planning and Development Act provides the developer with means to seek proportional contributions towards road infrastructure it has prefunded (such as potential upgrading of Papparone Road), from subsequent developers who benefit from those works.

Selected works necessary to accommodate creation, servicing and development of the future high school reserve may also qualify for proportional contributions from the Department of Education under its Developer Contributions for Infrastructure process.

APPENDIX A
PRE-LODGEMENT CONSULTATION TABLE

APPENDIX B
CERTIFICATES OF TITLE

APPENDIX C
ENVIRONMENTAL ASSESSMENT AND MANAGEMENT STRATEGY

APPENDIX D
FIRE MANAGEMENT PLAN

APPENDIX E
DETAILED LANDSCAPE CONCEPTS

APPENDIX F
ACOUSTIC REPORT

APPENDIX G
DETAILED LANDSCAPE CONCEPTS

APPENDIX H
LOCAL TRAFFIC AND TRANSPORT MANAGEMENT PLAN

APPENDIX I
LOCAL WATER MANAGEMENT STRATEGY

APPENDIX J
INFRASTRUCTURE & SERVICING STRATEGY

