



BENNETT SPRINGS EAST STRUCTURE PLAN

Portion of Lots 40 and 41 and Lots 6, 43, 45 and 46 Marshall Road,
Lots 1, 42, 44, 74, 75, 76, 77 and 78 Coast Road,
Portion of Lots 29 and 500 and Lot 800 Victoria Road, and
Portion of Lots 102 and 103 Reid Highway, Bennett Springs

April 2017
(As Amended September 2019)

Mirvac (WA) Pty Ltd



Table of Amendments

AMENDMENT NO.	SUMMARY OF THE AMENDMENT	AMENDMENT TYPE	DATE APPROVED BY WAPC
1	Adjustment of CCW Buffer and amendment to developable area– Parent Lot 46 Marshall Road & Parent Lot 74 Coast Road. Removal of density (walkable catchment) provisions re: Ellenbrook Rapid Bus Transit Station	Minor	26 March 2019 (Schedule of Modifications)
2	Amend the designation of the western portion of the Cambodian Temple Site from 'Private Clubs & Institutes' to 'Residential R25 – R60'; and Modify the land distribution and lot yield percentages to reflect the additional 'Residential' land and Marshall Road / Dulwich Street / Luminous Boulevard round-about intersection.	Minor	31 July 2020

Table of Density Plans

DENSITY PLAN NO.	AREA OF DENSITY PLAN APPLICATION	DATE APPROVED BY WAPC
1	Iluma Stage 1 – WAPC 154593	3 April 2017
2	Iluma Stage 1A – WAPC 155174 (Superseding portion of Density Plan No.1)	2 August 2017
3	Iluma Stage 2 – WAPC 155454	13 October 2017
4	Iluma Stages 2B, 4 and 5 – WAPC 156100	23 March 2018

DOCUMENT STATUS

VERSION	COMMENT	PREPARED	REVIEWED	REVIEW DATE	APPROVED	ISSUE DATE
8	WAPC Schedule of Modifications • Re-issue (Lot Ref update to Plan 1)	CH	JH	30.03.17	JH	11.04.17 03.05.17
9	Draft Only – MD (R80) Precinct	JH	JH	-	-	-
10	Amendment No.1 – CCW Buffer + Density Adjustment	JH	JH	01.02.2018	JH	06.04.2018
10a	Amendment No.1 – CCW Buffer + Density Adjustment Response: City of Swan comments	JH	JH	24.04.2018	JH	28.04.2018
10b	Amendment No. 1 – CCW Buffer + Density Adjustment Response: DWER LWMS and Bennett Brook Foreshore Approval	JH	JH	09.10.2018	JH	16.10.2018
11	Amendment No. 1 – CCW Buffer + Density Adjustment Response: WAPC Schedule of Modifications	JH	JH	27.03.2019	JH	04.04.2019
12	Amendment No. 2- Cambodian Temple Site Adjustment	MT	JH	04.04.2019	JH	09.09.2019

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BENNETT SPRINGS EAST STRUCTURE PLAN

APRIL 2017

(AS AMENDED SEPTEMBER 2019)

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EXECUTIVE SUMMARY

The *Bennett Springs East Structure Plan* (Structure Plan) has been prepared to guide the subdivision and development of approximately 58.771ha of land, comprising Portion of Lots 40 and 41 and Lots 6, 43, 45 and 46 Marshall Road, Lots 1, 42, 44, 74, 75, 76, 77 and 78 Coast Road, portion of Lots 29 and 500 and Lot 800 Victoria Road, and Portion of Lots 102 and 103 Reid Highway, Bennett Springs, within the City of Swan municipality.

The Structure Plan has been prepared on behalf of Mirvac (WA) Pty Ltd by the following specialist consultant team:

- Creative Design + Planning – *urban design, town planning*
- JDSi Consulting Engineers – *engineering*
- RPS – *environment, hydrology*
- Emerge Associates – *landscaping*
- GTA Consultants – *traffic and transport analysis*
- Strategen Environmental – *bushfire management*
- Herring Storer Acoustics – *noise management*
- McMullan Nolan Group (MNG) – *surveying*

Purpose

This Structure Plan provides an overarching planning framework to guide and facilitate the development of the Structure Plan area for urban purposes, and has been prepared in accordance with the provisions under *Schedule 2 Part 4 of the Planning and Development (Local Planning Scheme) Regulations 2015*.

The plan provides for an integrated and coordinated approach to an appropriate mix of residential land uses and infrastructure, necessary to create a new, vibrant residential community in the Swan municipality.

The Structure Plan has been submitted for approval by the Western Australian Planning Commission.

Design Approach

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

- Urban structure and place making;
- Movement systems and connectivity;
- Public Open Space allocation, including community creation and interface to Bennett Brook and Conservation Category and Resource Enhancement wetlands; and
- Landform and environment.

Project Overview

The Structure Plan will create a framework for the future urban subdivision development of an anticipated 665+ dwellings, which will ultimately house a new community in the vicinity of 1,892+ people within a variety of lot product and dwelling types.

EXECUTIVE SUMMARY TABLE

ITEM	~ DATA
Total area covered by the Structure Plan	58.771 ha
Area of each land use proposed (approx.):	
Residential:	25.26 ha
Private Clubs and Institutions (Cambodian Temple):	2.20 ha
Public Open Space + Wetland Core/Buffers:	5.61 ha
Western Power Easement:	5.52 ha
Roads (inclusive 'Primary Regional Roads' Reservations):	19.10 ha
'Railways' Reservation:	1.10 ha
Total estimated lot yield	676 lots ¹
Estimated number of dwellings	676 dwellings
Estimated residential site density	~ 15+ dwellings/gross urban zone ² ~ 26.7+ dwellings/site hectare ³
Estimated population (based on 2.8 persons per dwelling)	1,892+ people
Number of high schools	0
Number of primary schools	0
Estimated commercial floor space	0
Estimated number and % of public open space given over to:	
Regional Open Space:	0ha
District Open Space:	0ha
Neighbourhood Parks (>3,000m ²):	3 parks @ 3.0865 ha (~55%)
Local Parks (<3,000m ²):	4 parks @ 2.526 ha (~45%) ⁴

FOOTNOTES:

- ¹ Figure excludes the potential redevelopment of the Cambodian Temple site; this may accommodate up to 32 lots/dwellings @ 15 dwellings per gross urban zone.
- ² Gross Urban Zone' refers to the definition under WAPC's Directions 2031 and supporting documents.
- ³ 'Residential Site Hectare' refers to the definition under Element 1 of WAPC's Liveable Neighbourhoods.
- ⁴ 'Local Parks' figure is inclusive of englobo wetlands and associated buffers.
Western Power High Voltage Powerline Easement excluded from public open space figures above.

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PLANS

Plan 1: Bennett Springs East Structure Plan

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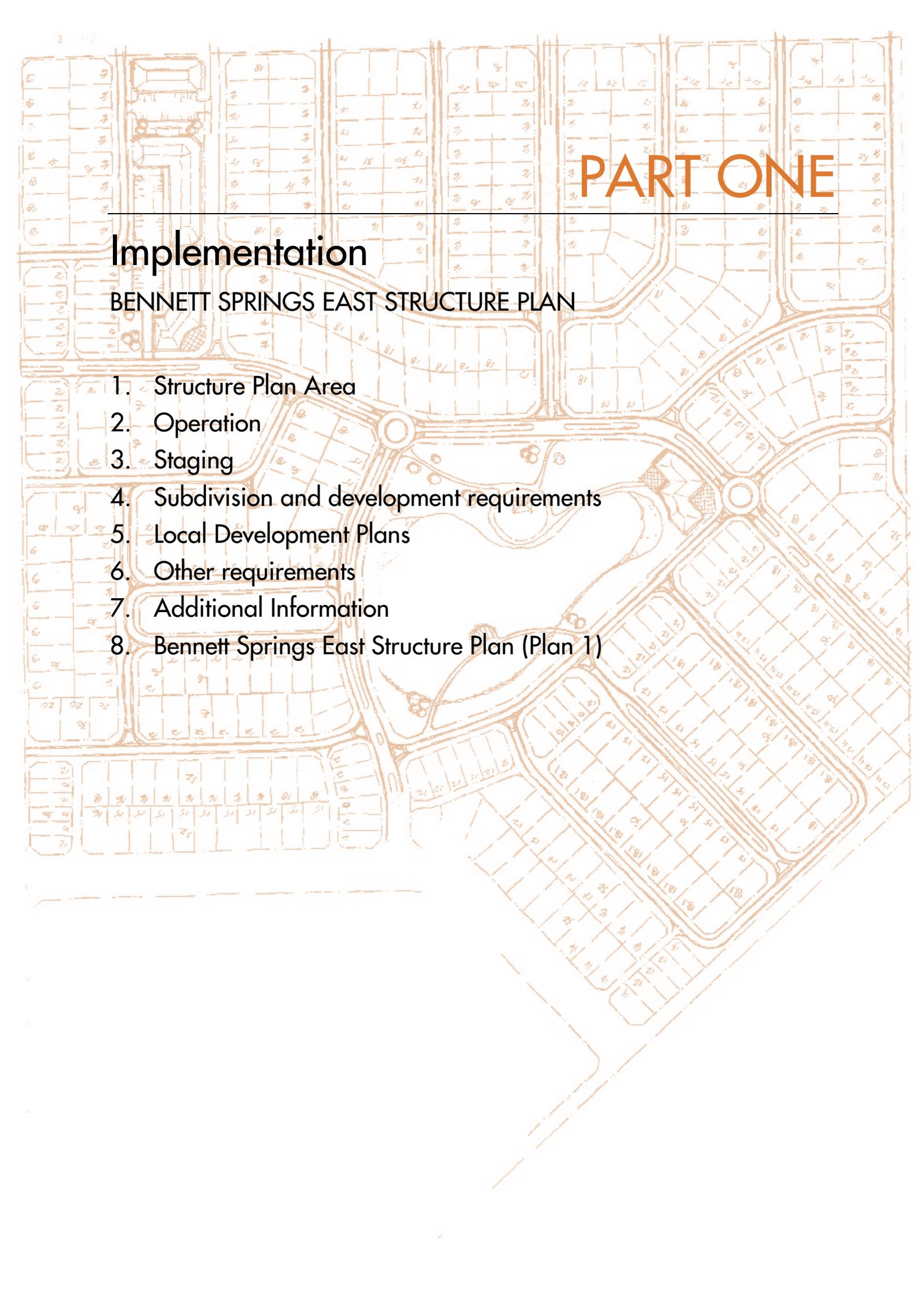
Figure 1:	Location Plan	Figure 12:	Road Cross-Sections
Figure 2:	Metropolitan Region Scheme Plan	Figure 13:	Preferred Bus Routes
Figure 3:	City of Swan LPS17 Zoning Plan	Figure 14:	Indicative Path Network
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Figure 10:	Road Hierarchy	Figure 20:	Stormwater Treatment Plan
Figure 11:	Road Cross-Sections	Figure 21:	Staging Plan

SECTION FOUR – TECHNICAL STUDIES (APPENDICES)

Appendix 4.1:	City of Swan Policy POL-LP-11 – <i>Variation to Deemed to Comply Requirements of the R-Codes – Medium Density Single House Development Standards (R-MD Codes)</i>
Appendix 4.2:	Bushfire Management Plan – Dec 2019 Revised (Strategen Environmental)
Appendix 4.3:	Transportation Noise Assessment (Herring Storer)
Appendix 4.4:	Transport Assessment (GTA Consultants)
Appendix 4.5:	Environmental Assessment and Management Strategy (RPS Environment) + Memorandum – Structure Plan Amendment 1 (Oct 2018)
Appendix 4.6:	Local Water Management Strategy (RPS Hydrology) + Addendum – Structure Plan Amendment 1 (Apr 2018) + Bennett Brook Foreshore Area Report (Oct 2018) + DWER Approval (Oct 2018)
Appendix 4.7:	Engineering Servicing Report (JDSi)
Appendix 4.8:	Certificates of Title

ABBREVIATIONS

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ASS	Acid Sulfate Soils
AS	Australian Standard
BGL	Below Ground Level
BMP	Bushfire Management Plan
BRA	Bio-Retention Areas
BRT	Ellenbrook Bus Rapid Transit
CBD	Central Business District
CCW	Conservation Category Wetland
CoS	City of Swan
DAA	Department of Aboriginal Affairs
DEE	Department of Environment and Energy
DER	Department of Environment Regulation
DPaW	Department of Parks and Wildlife
DPLH (DoP)	Department of Planning Lands and Heritage (Department of Planning)
DoW	Department of Water
DWER	Department of Water and Environmental Regulation
EMF	Electric And Magnetic Fields
EPA	Environmental Protection Authority
EPR	Earth Potential Rise
FSA	Flood Storage Areas
Ha	Hectare
LDP	Local Development Plan
LFI	Low frequency induction
LILO	Left-in /Left-Out Road Intersection
LWMS	Local Water Management Strategy
LPS17	City of Swan Local Planning Scheme No. 17
MGL	Maximum Groundwater Level
MRS	Metropolitan Region Scheme
MRWA	Main Roads Western Australia
NESRF	Draft North-East Sub-Regional Planning Framework
OMSRS	Draft Outer Metropolitan Perth & Peel Sub Regional Structure Plan
POS	Public Open Space
PTA	Public Transport Authority
UWMP	Urban Water Management Plan
vpd	Vehicles per day
WAPC	Western Australian Planning Commission
WSUD	Water Sensitive Urban Design



PART ONE

Implementation

BENNETT SPRINGS EAST STRUCTURE PLAN

1. Structure Plan Area
2. Operation
3. Staging
4. Subdivision and development requirements
5. Local Development Plans
6. Other requirements
7. Additional Information
8. Bennett Springs East Structure Plan (Plan 1)

PART ONE – IMPLEMENTATION

1 Structure Plan Area

This Structure Plan applies Portion of Lots 40 and 41 and Lots 6, 43, 45 and 46 Marshall Road, Lots 1, 42, 44, 74, 75, 76, 77 and 78 Coast Road, Portion of Lots 29 and 500 and Lot 800 Victoria Road, and Portion of Lots 102 and 103 Reid Highway, Bennett Springs, being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan (**Plan 1**).

The Structure Plan is identified as the *Bennett Springs East Structure Plan*.

2 Operation

This Structure Plan comes into effect on the date it is approved by the Western Australian Planning Commission.

The Structure Plan is to be given due regard when considering development of subdivision applications.

3 Staging

The development of the Structure Plan area will be implemented in multiple stages. The staging plan is indicative as timing, location and composition of the future stages will be dependent on market demand.

The staging will commence in the eastern portion of the site, with access provided via Coast Road (Luminous Boulevard) and developed for Display Village, Sales Office and 'first release' residential purposes. The staging will move westwards with potential to skip land parcels subject to individual landowner intentions.

The provision of engineering infrastructure and primary internal road network will also need to be staged to suit development demand and/or suitable access at an early stage. A detailed programme for this will be prepared as part of ongoing detailed planning and design of service infrastructure.

4 Subdivision and Development Requirements

4.1 Land Use Permissibility

- a) Land use permissibility within the Structure Plan area is to be in accordance with the corresponding zone or reserve under the Scheme.

4.2 Hazards and Separation Areas

- a) Residential lots identified within the Bushfire Prone Area as designated under the Department of Fire and Emergency Services Mapping of Bushfire Prone Areas will require a Bushfire Attack Level assessment to be undertaken at subdivision stage.
- b) A Detailed Noise Management Plan is to be prepared and implemented in accordance with State Planning Policy 5.4 *Road and Rail Transport Noise and Freight Considerations in Land Use Planning* for lots identified as affected by noise under Figure B1 of Appendix B in the Acoustic Assessment prepared by Herring Storer (**Appendix 4.3**).

4.3 Major Infrastructure

- a) Two intersection treatments with Marshall Road are proposed; the location and type of intersection to be in accordance with the Structure Plan.
- b) The higher order road network internal to the Structure Plan area is to be provided generally in accordance with the Structure Plan.

4.4 Public Open Space

- a) The Structure Plan (**Plan 1**) nominates an area of 4.01ha as creditable Public Open Space. The proposed Public Open Space meets the minimum 10% requirement as outlined in Part Two of this report.
- b) An updated Public Open Space schedule is to be provided at the time of subdivision for determination by the WAPC upon advice of the City of Swan.

4.5 Residential Density Targets

- a) Density Targets within the Structure Plan area include:
 - i. The density target for the 'gross urban zone' is 15 dwellings per hectare across the Structure Plan area; and
 - ii. The density target in terms of 'site hectare' is 26 dwellings per hectare across the Structure Plan area.
- b) Residential density codes are to be in accordance with those shown on the plan. The allocation of residential densities will generally be in accordance with the following locational criteria:

Density Coding	General Location Principles	Criteria
R25	Applies to majority of Structure Plan area supporting delivery of traditional front-loaded product.	Applies as the base code to single dwelling units on lots that do not have a laneway abutting the rear boundary.
R40	Located in general proximity to public open space, key distributor roads, key public transport nodes and routes and commercial nodes.	Applies to: <ol style="list-style-type: none"> a) lots generally within, but not exclusive to, 100m walking distance of public open space and key distributor roads including public transport stops; b) lots within 400m of the proposed local centre at the intersection of Marshall Road/Dulwich Street identified in the Swan Urban Growth Corridor Sub Regional Structure Plan; and/or c) lots with a site area less than 300m² to a maximum density of R40.
R60	Similar locational principles to R40 but of a more intensive development than R40.	In addition to R40 criteria a) – c), the R60 density applies to: <ol style="list-style-type: none"> a) lots with a laneway abutting the rear boundary; or b) lots with: <ol style="list-style-type: none"> i. a minimum site area less than 180m² to a maximum density of R60; ii. direct frontage to two intersecting roads and with a site area of 1,000m² or greater; and/or iii. designated Medium Density development sites.

4.6 Density Plans

The Structure Plan defines the residential ranges that apply to specific areas within the Structure Plan.

Lot specific residential densities, within the defined residential density ranges, are to be subsequently assigned in accordance with a Residential Density Code Plan approved by the WAPC at the subdivision stage.

A Residential Density Code Plan is to be submitted at the time of subdivision to the WAPC and shall indicate the Residential Density Coding applicable to each lot within the subdivision and shall be consistent with the Structure Plan, and the Residential Density Ranges identified on the Structure Plan and location criteria contained in Clause 4.5.

The Density Plan is to include a summary of the proposed dwelling yield of the subdivision and demonstrate how the density target within the Structure Plan, as specified in Clause 4.5, is progressively being achieved.

Approval of the Density Plan shall be undertaken at the time of determination of the subdivision application by the WAPC. The approved Density Plan shall then form part of the Structure Plan and shall be used for the determination of future development applications.

Density Plans are not required if the WAPC considers that the subdivision is for one or more of the following:

- a) The amalgamation of lots;
- b) The purposes of facilitating the provision of access, services or infrastructure;
- c) Land which by its zoning or reservation under the Structure Plan cannot be developed for residential purposes; or
- d) Land which by its zoning under the Structure Plan is not subject to a density range.

5 Local Developments Plans

Local Development Plans are to be prepared for the Structure Plan area pursuant to the WAPC's *Local Development Plan Framework* and Schedule 2, 'Deemed Provisions for Local Planning Schemes' of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

5.1 Prescribed Requirements

Local Development Plans are to be prepared to inform applications for subdivision and development in regard to the following:

- a) Lots affected by noise which exceeds the noise target as defined by the State Planning Policy 5.4 in relation to Reid Highway, Lord Street and Marshall Road.

5.2 WAPC Planning Bulletin 112/2016

A Local Development Plan is not required to vary 'Deemed to Comply' provisions of the Residential Design Codes where such variations are adopted under City of Swan *Policy POL-LP-11 – Variation to Deemed to Comply Requirements of the R-Codes – Medium density single house development standards (RMD Codes)*; this in accordance with WAPC Planning Bulletin 112/2016 *Medium-density single house development standards – Structure Plan areas*.

Such variations may include (but are not exclusive to) design provisions relating to:

- Street Setback and Front Fences;
- Boundary Setbacks;
- Boundary Walls;
- Open Space;
- Garage Setbacks and width and vehicular access;
- Overshadowing; and
- Privacy.

6 Other Requirements

6.1 Developer Contributions

The Structure Plan area will be subject to a Development Contribution Plan (DCP) pursuant to a Local Planning Scheme No. 17 Amendment No. 140 and guided by State Planning Policy 3.6 – *Development Contributions for Infrastructure*. The DCP will be consistent with other DCP's prepared for residential development in adjoining Urban Cells and guided by the following documents:

- The Swan Urban Growth Corridor Sub-Regional Structure Plan;
- The Urban Growth Corridor-Sub Regional Planning Community Facilities Analysis, 2008 (CFA);
- The Capital Expenditure Plan for the Urban Growth Corridor;
- Urban Growth Corridor Facilities Justification Report (UGCFJ);
- Local Structure Plans and associated appendices; and
- City of Swan Transport Strategy.

6.2 Vehicular Access

- a) Upon clearance of the condition of subdivision associated with Stage 4 subdivision of the structure plan area, the left-in/left-out at the intersection of Coast Road (Luminous Boulevard) and Lord Street is to be converted to a left-in only movement, to coincide with the delivery of the full movement intersection at Coast Road (Luminous Boulevard)/Dulwich Street. The conversion of this intersection to left-in only must incorporate a design that can also support a left-out emergency egress. The design and specifications for the emergency egress are to be submitted to Main Roads Western Australia for approval, and must also be approved by the City of Swan and the Department of Fire and Emergency Services.
- b) Two vehicular access points in accordance with the 'Bushfire Management Plan' prepared by Strategen Environmental (dated March 2017) are to be provided during staging of the development and post development of the structure plan area for the purposes of providing emergency egress.

7 Additional Information

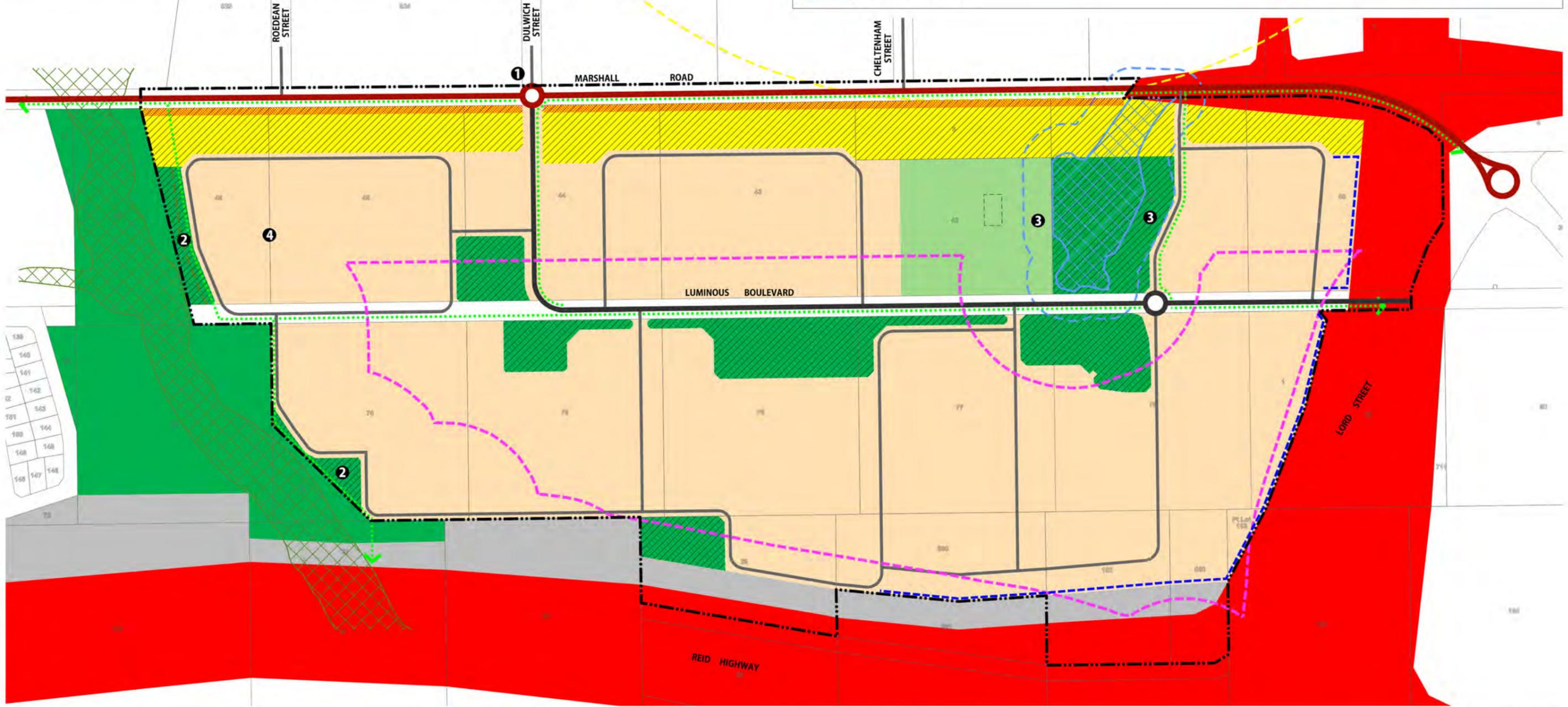
Additional Information	Approval Stage	Approval/ Consultation Required
Density Plans	Subdivision application	WAPC City of Swan
Public Open Space Schedule	Subdivision application	City of Swan
Detailed Noise Management Plan	<ul style="list-style-type: none"> • Subdivision application/condition of Subdivision for identified lots, or • Development application for identified lots. 	City of Swan Main Roads WA Dept of Water and Environmental Regulation
Bushfire Attack Level Assessment	<ul style="list-style-type: none"> • Subdivision application/condition of Subdivision for identified lots, or • Development application for identified lots 	City of Swan Dept of Fire and Emergency Services
Bennett Brook Foreshore Management Plan and/or Revegetation Plan	Subdivision application - refer to note on Plan 1	City of Swan Dept of Water and Environmental Regulation
Wetland Management Plan and/or Revegetation Plan	Subdivision application - refer to note on Plan 1	City of Swan Dept of Water and Environmental Regulation
Acid Sulfate Soil Assessment	Subdivision application	City of Swan and/or Dept of Water and Environmental Regulation

NOTES

- 1 The four way intersection proposed at the intersection of the local road and Marshall Road (currently identified as a roundabout), may be upgraded to a signalised intersection when traffic volumes trigger the need for such an upgrade.
- 2 The CCW and associated buffer and adjacent recreation areas are to be the subject of a Foreshore Management and/or Re-vegetation Plan. Following the Department of Water and Environmental Regulations' approval of the plan, a Bushfire Attack Level Contour Plan is to be prepared and reflecting the outcomes required by the Management Plan, to determine any bushfire risks and potential impacts on the adjoining residential zoned land within. The Management Plan and Bushfire Attack Level Contour plan are to be submitted to support any subdivision application for land within 100m of "Classified Vegetation" associated with the CCW.
- 3 The REW and associated 30m buffer is to be the subject of a Foreshore Management and/or Re-vegetation Plan. Following the Department of Water and Environmental Regulations' approval of the plan, a Bushfire Attack Level Contour Plan is to be prepared reflecting the outcomes required by the Management Plan, to determine any bushfire risks and potential impacts on the adjoining residential zoned land.
- 4 Lots 45 & 46 contain mature remnant native vegetation that may serve as habitat for black cockatoo species.

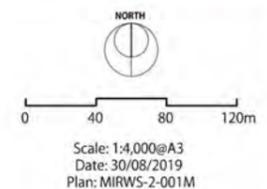
LEGEND

LOCAL SCHEME ZONES	LAND USE PLANNING ELEMENTS THAT INFORM THE STRUCTURE PLAN	CONSERVATION CATEGORY WETLAND (CCW)
RESIDENTIAL R25 - R60	STRUCTURE PLAN BOUNDARY	CCW / FORESHORE MANAGEMENT AREA
PRIVATE CLUBS AND INSTITUTIONS	INTEGRATOR ROAD	RESOURCE ENHANCEMENT WETLAND (REW)
LOCAL SCHEME RESERVES	NEIGHBOURHOOD CONNECTOR	REW BUFFER 30m
LOCAL ROAD	KEY ACCESS ROADS	LOTS WITHIN 100m OF "CLASSIFIED VEGETATION" AND SUBJECT TO BUSHFIRE ATTACK LEVEL ASSESSMENT. REFER BUSHFIRE MANAGEMENT PLAN AND ANY SUBSEQUENT BAL ASSESSMENTS.
RECREATION	PRIMARY PATH / PEDESTRIAN LINKAGES	ACOUSTIC NOISE WALL
PUBLIC UTILITIES	POULTRY BUFFER	
METROPOLITAN REGION SCHEME RESERVES	BUILDINGS TO BE RETAINED	
PRIMARY REGIONAL ROADS	FUTURE MARSHALL ROAD WIDENING	
RAILWAYS		
PARKS AND RECREATION		



BENNETT SPRINGS EAST STRUCTURE PLAN

Various Lots,
BENNETT SPRINGS EAST

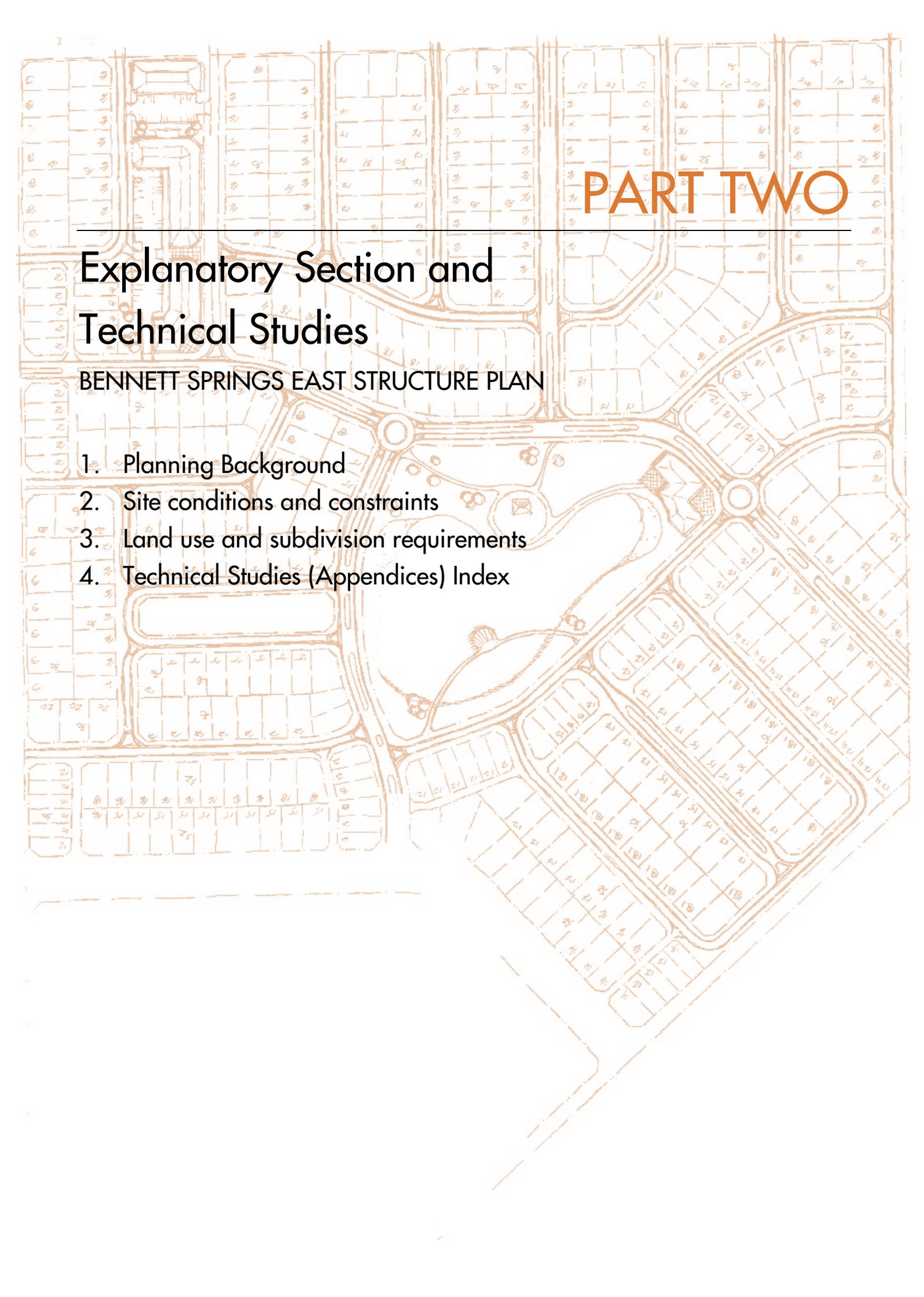


Plan 1



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The background of the page is a detailed architectural site plan for Bennett Springs East. It features a complex grid of streets, numerous rectangular lots, and several circular or semi-circular structures, possibly representing ponds or roundabouts. The drawing is rendered in a light, sketchy style with fine lines and some shading to indicate depth and structure.

PART TWO

Explanatory Section and Technical Studies

BENNETT SPRINGS EAST STRUCTURE PLAN

1. Planning Background
2. Site conditions and constraints
3. Land use and subdivision requirements
4. Technical Studies (Appendices) Index



PART TWO – EXPLANATORY SECTION AND TECHNICAL STUDIES

1 Planning Background

1.1 Purpose

The purpose of the Bennett Springs Structure Plan report is to provide for the orderly and proper subdivision and development of the Structure Plan area for 'Urban' purposes.

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

1.2 Land Description

1.2.1 Location

The Structure Plan area is located within the municipality of the City of Swan and in the locality of Bennett Springs (**Figure 1** refers).

The Structure Plan area is generally bound by Reid Highway to the south, Lord Street to the east, Marshall Road to the north and Bennett Brook to the west. The Structure Plan area is situated approximately 14.5km north-east of the Perth CBD and approximately 5.5km north-west of the Midland Strategic Metropolitan Centre. Whiteman Park, reserved for 'Parks and Recreation' under the Metropolitan Region Scheme (MRS), is located to the north-west of the Structure Plan area.

1.2.2 Area, Land Use and Ownership

The Structure Plan area encompasses ~58.771ha and has historically been used for semi-rural activities, namely cattle and sheep grazing, albeit there are pockets of natural degraded vegetation and a Resource Enhancement Wetland (REW).

Homesteads and associated semi-rural outbuildings can be found intermittently throughout the Structure Plan area, and a Cambodian Temple (Lot 42 Coast Road) will be retained and incorporated into the future residential development.

The Structure Plan comprises Portion of Lots 40 and 41 and Lots 6, 43, 45 and 46 Marshall Road, Lots 1, 42, 44, 74, 75, 76, 77 and 78 Coast Road, portion of Lots 29 and 500 and Lot 800 Victoria Road, and Portion of Lots 102 and 103 Reid Highway.

The Structure Plan boundary comprises 58.771ha however noting this figure incorporates land reserved as 'Primary Regional Roads' and 'Railways' under the MRS that is subject to ceding pursuant to Clause 42 guidance. Portions of the Marshall and Coast Road reservations directly abut or traverse the Structure Plan area. A Certificate of Title for each Parent Lot is provided under **Appendix 4.8**.

1.3 Planning Framework

1.3.1 Zoning & Reservations

1.3.1.1 METROPOLITAN REGION SCHEME

The majority of the Structure Plan area is zoned 'Urban' under the MRS, this gazetted on the 1st December 2015 (Amdt No. 1305/27).

The southern portion of Lots Pt 29, 102 and 500 parallel to Reid Highway are reserved as 'Railways' and 'Primary Regional Roads'. The eastern/northern parts of Lots 1, 40 and 41 are reserved as 'Primary Regional Roads' under the MRS. The western portion of the site abuts a 'Parks and Recreation' Reservation associated with Bennett Brook.

1.3.1.2 CITY OF SWAN LOCAL PLANNING SCHEME NO.17

The majority of the Structure Plan area is zoned 'Residential Development' pursuant to gazettal of Amendment 139 to the City of Swan *Local Planning Scheme No. 17* (LPS17) on 1 June 2017.

The 'Residential Development' zone established general development provisions for the Structure Plan area.

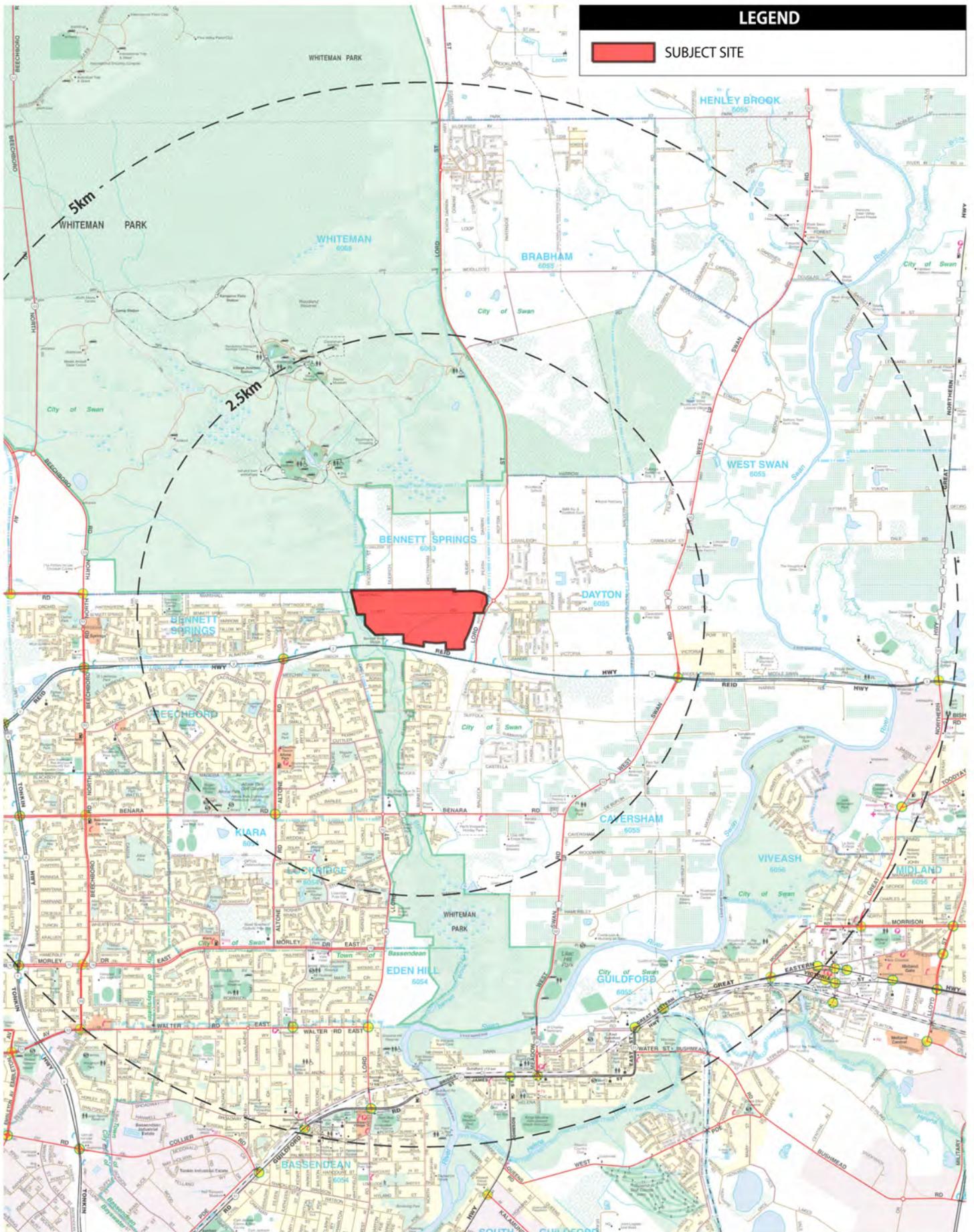
Small portions are reserved to reflect the MRS reservations detailed above - **Figure 3** refers.

1.3.2 Regional & Sub Regional Structure Plans and Strategies

1.3.2.1 DIRECTIONS 2031 AND BEYOND

Directions 2031 and Beyond, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, is a high level strategic plan that establishes a vision for the future growth of the Perth and Peel region. It provides a framework to guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate that growth.

The Structure Plan area is identified within the 'North-East Sub-region', which is expected to grow by 69,000 people, to a total population of 258,000. Based on a 'Connected City' scenario, a growth target of 15 dwellings per *gross urban zoned hectare* is set by *Directions 2031*.



LOCATION PLAN

Various Lots,
BENNETT SPRINGS EAST

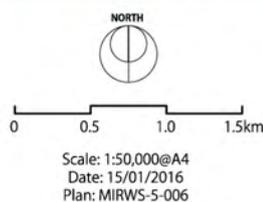
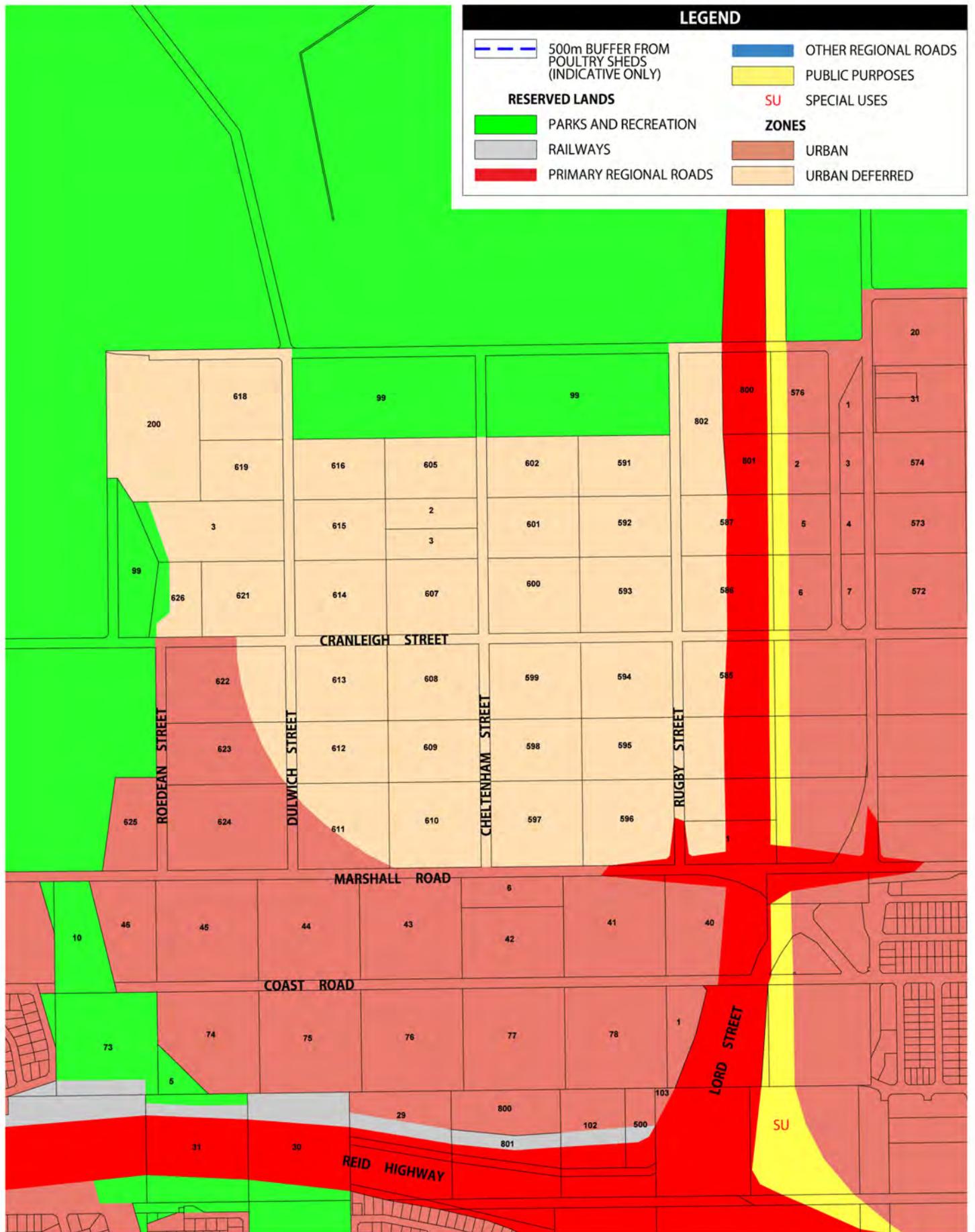
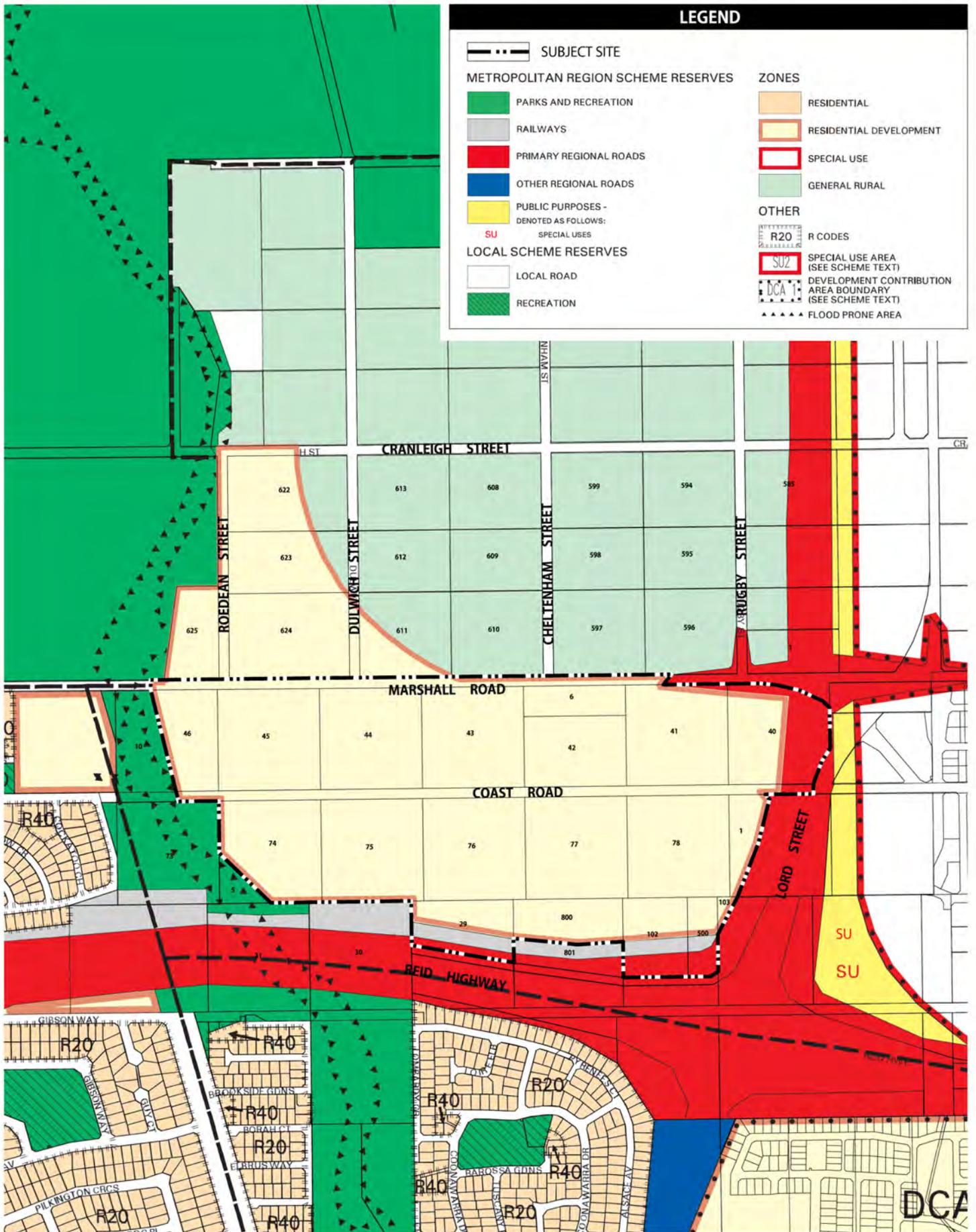


Figure 1



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LPS17 ZONING PLAN

Various Lots,
BENNETT SPRINGS EAST

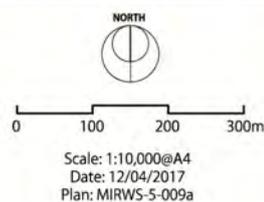


Figure 3



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1.3.2.2 DRAFT OUTER METROPOLITAN PERTH & PEEL SUB-REGIONAL STRATEGY

The draft *Outer Metropolitan Perth and Peel, Sub-Regional Strategy* (OMSRS) provides a framework for delivering the objectives of *Directions 2031*. The document provides a more detailed analysis in terms of strategic plans of action, stakeholder responsibilities and timeframes for delivery of development within the metropolitan corridors.

Situated within the 'North-East Sub-region', the Structure Plan area is identified as part of a broader 'urban deferred zoned undeveloped' site, known as 'AL3 West Swan West', which is expected to provide 1800+ dwellings under a 'Connected City' scenario (Figure 4 refers).

1.3.2.3 PERTH AND PEEL @3.5 MILLION

The *Perth and Peel@3.5million* report adopted in March 2018 sets the context for the four sub-regional planning frameworks. The frameworks build upon the principles of *Directions 2031* and provide guidance for future urban development and supporting infrastructure.

The Structure Plan area is identified as 'Urban Zoned – Undeveloped', under the *North East Sub-Regional Planning Framework*.

1.3.2.4 DRAFT PERTH AND PEEL GREEN GROWTH PLAN FOR 3.5 MILLION

The *Draft Perth and Peel Green Growth Plan for 3.5 Million* provides for the growth of the population to 3.5 million people while protecting the unique biodiversity and other environmental values of the regions. It sets out a framework which delivers improvements to the protection and management of state and national biodiversity and environment matters.

The Structure Plan area is identified as 'Urban Class of Action' under the Strategic Conservation Plan. This Class of Action provides for existing, new and proposed urban development. This includes residential land uses and associated functions such as employment, education, retail, civic facilities, light industry and open space.

1.3.2.5 SWAN URBAN GROWTH CORRIDOR SUB-REGIONAL STRUCTURE PLAN

The *Swan Urban Growth Corridor Sub-Regional Structure Plan* (SUGCSRSP) was adopted by the WAPC in 2009. The broader area is expected to accommodate approximately 33,000 residents. The general objectives of the SUGCSRSP include:

- providing coordination of development, including regional infrastructure within areas of the Swan urban growth corridor marked for urbanisation;
- providing for key transport links throughout the sub-regional structure plan area;

- ensuring appropriate provision and equitable access to community facilities, open space areas and employment centres for future residents;
- recognising the importance of environmentally-sensitive and important agricultural areas; and
- promoting an appropriate range of residential densities to suit the needs of the community.

The Structure Plan area is identified within the 'West Swan West' Urban Cell; this identifies the Structure Plan area as 'Residential' with a power line easement traversing on an east-west alignment along the Marshall Road boundary (Figure 5 refers).

1.3.3 Planning Strategies

1.3.3.1 URBAN HOUSING STRATEGY

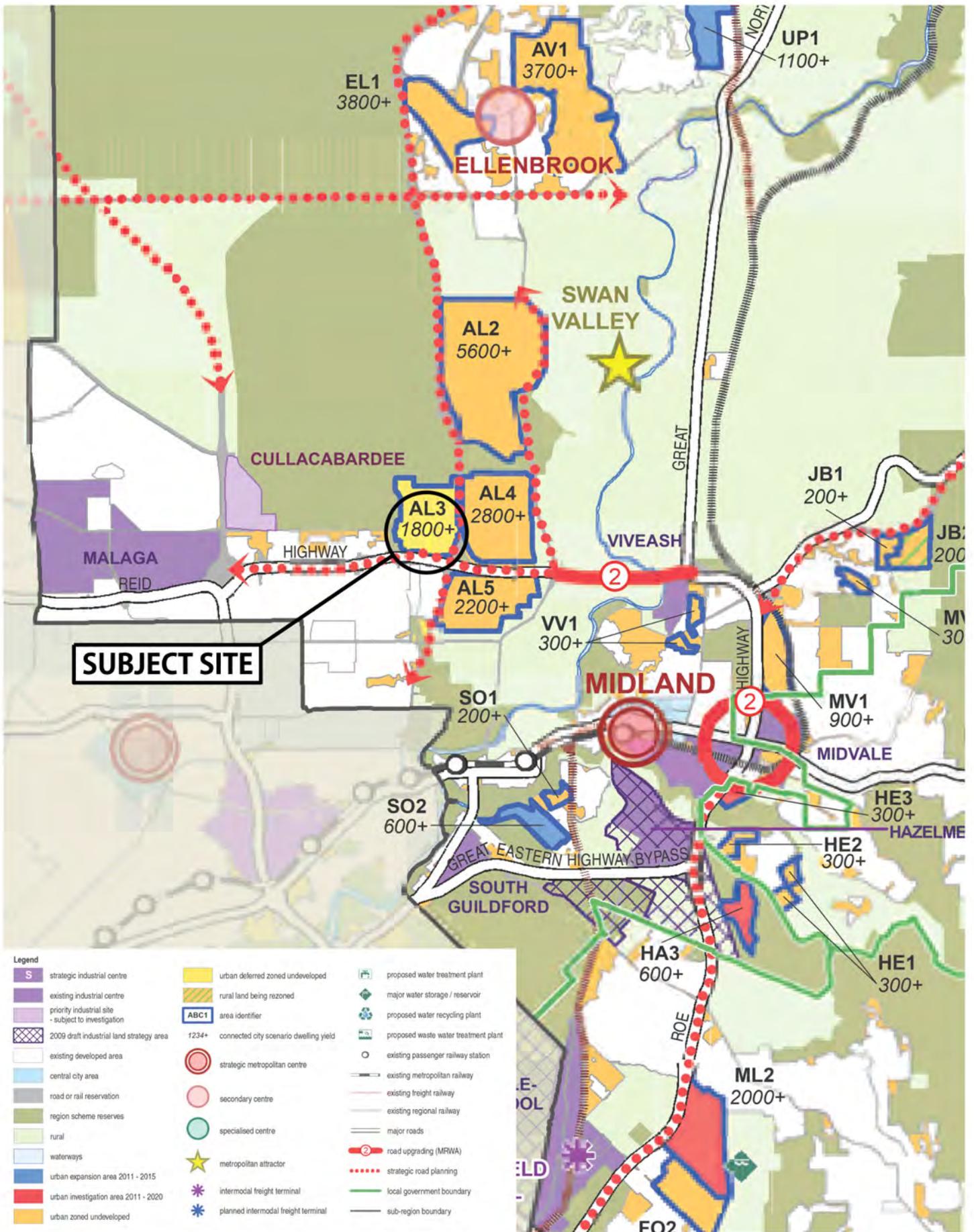
The Urban Housing Strategy addresses future housing needs within the City of Swan. It aims to ensure long term sustainable future residential development through the creation of an accessible, well connected and sustainable community where all demographics has access to varied housing.

The Urban Housing Strategy comprises an Infill Strategy and a Greenfields Strategy which both respond to *Directions 2031*, and projects the need for an additional 35,510 dwellings in the locality.

The Infill Strategy identifies 15,500 sites with the capacity to accommodate higher residential densities.

The Greenfields Strategy applies to greenfield areas which are subject to current and future structure planning.

The Structure Plan will meet the objectives of the strategy through the provision of a range of housing densities and styles which will facilitate an accessible, amenable and walkable community. This will assist the City of Swan to fulfil its housing targets as its population grows.



DRAFT OUTER METROPOLITAN PERTH AND PEEL SUB-REGIONAL STRATEGY (Extract)

Various Lots, BENNETT SPRINGS EAST

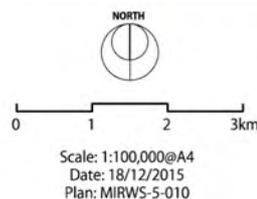
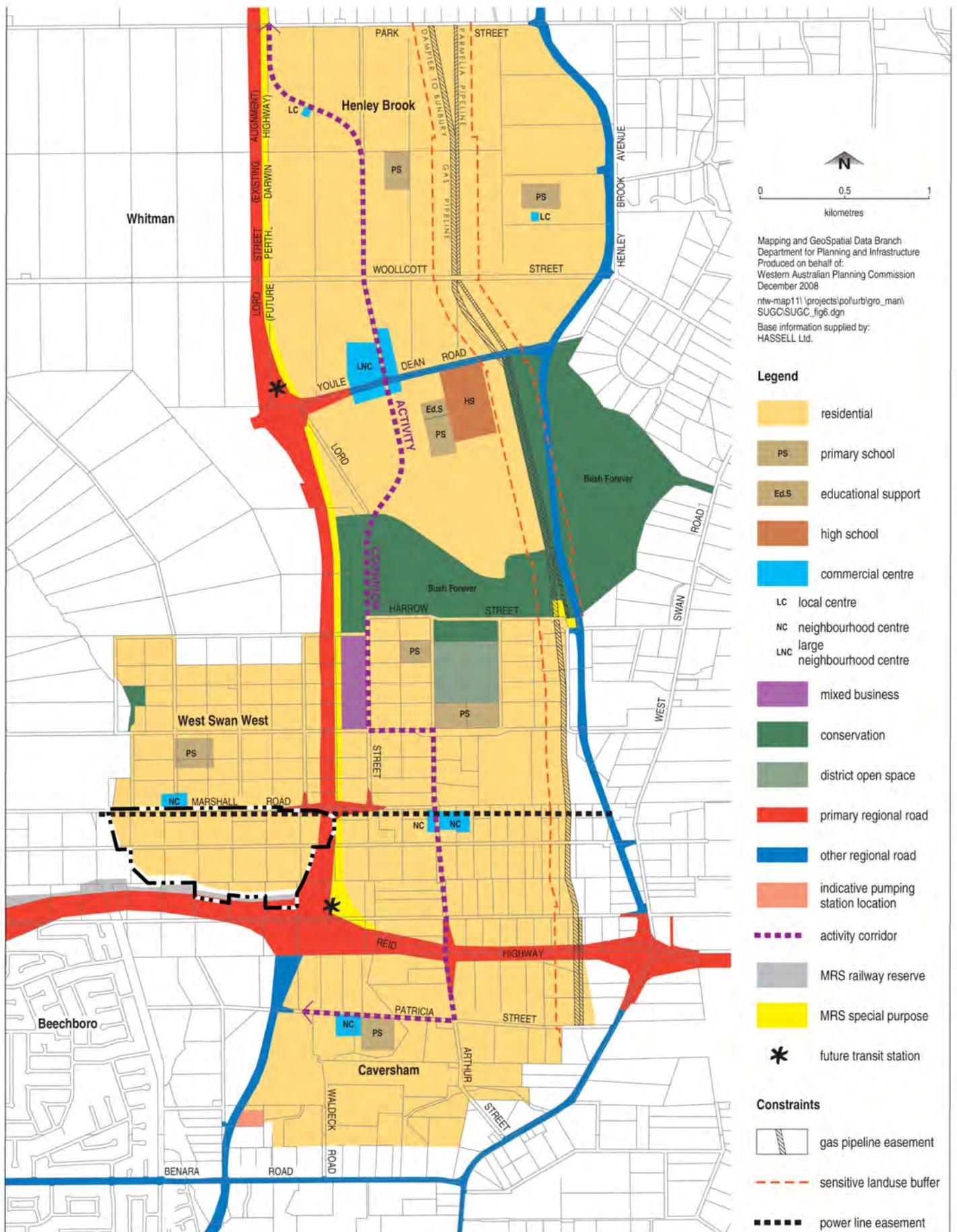


Figure 4

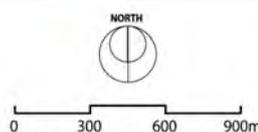


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SWAN URBAN GROWTH CORRIDOR SUB-REGIONAL STRUCTURE PLAN

Various Lots,
BENNETT SPRINGS EAST



Scale: 1:30,000@A4
Date: 16/12/2015
Plan: MIRWS-5-011

Figure 5



Table 2 - City of Swan Strategies and Policies

City of Swan Strategy	Design Considerations and Response
Local Biodiversity Strategy	<p>This strategy has guided planning and development of the Structure Plan Area in a manner that is sensitive to biodiversity, particularly in association with the adjacent Bennett Brook, the CCW and REW. This is achieved by ensuring the following outcomes are met:</p> <ul style="list-style-type: none"> • Establish policy and processes to ensure that biodiversity values are recognised in decision making by the Council, especially in relation to land use planning and development; • Identify high priority natural areas and make recommendations for their protection; • Assess lands managed by or vested in the City of Swan to prioritise management needs; and • Establish incentives for private land conservation.
City of Swan Play Space Strategy	<p>The Play Space Strategy is concerned with the 'play spaces' within POS and reserves. Play Spaces are defined as playgrounds and the surrounding area of park or reserve which can provide opportunities for play. The strategy has provided direction for the Structure Plan regarding distribution, design and landscaping of POS and reserves. The following aspects of play space within POS have been given consideration:</p> <ul style="list-style-type: none"> • Access and inclusion in play spaces • Placement of play spaces in the context of hierarchical approach • Design of quality play spaces • Process for review and replacement of play facilities.
Sustainable Environment Strategy	<p>The Structure Plan is sensitive to each of the following focus areas and endeavours to meet the targets set under each:</p> <ul style="list-style-type: none"> • Biodiversity retention; • Water quality; • Water efficiency; • Waste Minimisation; • Carbon reduction; • Adaptation for the future; and • Corporate capacity building. <p>This ensures that the design is environmentally sustainable; of particular importance when addressing the interfaces to Bennett Brook, the CCW and REW.</p>
Transport Strategy	<p>This strategy will inform the design process associated with road layout and hierarchy. Through the provision of green-links, pedestrian and shared path networks, the Structure Plan complies with this strategies provisions regarding active modes of transport.</p>
Water Action Plan Strategy	<p>The Structure Plan is sensitive to water management, in particular, addressing the following four areas outlined in the Strategy:</p> <ul style="list-style-type: none"> • Corporate Water Conservation; • Corporate Water Quality; • Community Water Conservation; and • Community Water Quality.

Urban Growth Policy	The Structure Plan area is within the West Swan growth area identified within the Policy. The provisions within the policy have informed the design of the Structure Plan in relation to the distribution and range of housing densities and types. Through the provision of ~632+ new dwellings, the Structure Plan will contribute to the City of Swan meeting housing targets for a growing population.
Environmental Planning Policy	This policy is of particular importance for planning associated with Bennett Brook and the CCW and REW which are considered as environmental assets. In accordance with the policy, an Environmental Management Plan, a Local Water Management Plan and a Fire Management Plan will be prepared for the Structure Plan area.
Public Open Space – Residential Development Policy	Using this policy as a foundation, the Structure Plan has been designed to ensure that all POS is easily utilised, is aesthetically pleasing and is easily maintained by the authority. The provision of a total of ~3.96ha creditable POS within the Structure Plan Area meets the requirements set by the policy for 4ha of POS per 1200 dwellings. The strategy will inform the planning, distribution and landscaping of POS within the Structure Plan area.
Inclusion of Pedestrian Access ways in residential subdivisions Policy	The information provided in this strategy will guide the design of pedestrian movement networks within the Structure Plan area to ensure that complaints and issues associated with pedestrian accessways identified in the past are overcome. This will be achieved through more innovative design which safely combines roads and pedestrian routes.
Neighbourhood Planning Policy	The provisions of this policy have informed the design of the Structure Plan area to ensure that a well-integrated, safe, and secure community is created with access to commercial and community land uses and a strong sense of identity.

2 Site Conditions and Constraints

An Environmental Assessment and Management Strategy has been prepared by RPS, June 2016 (**Appendix 4.5** refers). A Memorandum dated March 2018 is also included providing an environmental update pursuant to the 2018 Structure Plan Amendment.

A summary of key findings are noted in the sections below.

2.1 Biodiversity and Natural Area Assets

Generally the majority of the site has been cleared of natural vegetation for agricultural purposes. Sheep and cattle grazing are currently the predominant land use. Bennett Brook is included within Bush Forever Site No. 305 and is classified as a Conservation Category Wetland (CCW).

Based on the findings outlined below, potential environmental impacts and management measures have been identified. The information provided also recognises the following key environmental outcomes that require consideration during development of the Structure Plan area:

- protection and management of the Bennett Brook foreshore and CCW attributes through the preparation and implementation of a Foreshore Management Plan;
- implementation of best practise water sensitive urban design and stormwater drainage management through Urban Water Management Plan(s);
- planting trees as part of the landscaping works, as currently there is very little vegetation species and species diversity;
- management of Acid Sulfate Soils; and
- implementation of management measure to reduce potential noise and fire impacts on future residences.

2.1.1 Flora

The majority of the Structure Plan Area has been cleared for agriculture and largely consists of grassed paddocks which are devoid of native vegetation.

The native vegetation which remains consists of upper storey (trees) with a mixed exotic Closed Grassland consisting of pasture species underneath.

There are scattered eucalyptus and *Corymbia calophylla* (marri) trees throughout the Structure Plan Area, although primarily within Lots 45 and 46 Marshall Road.

Lot 44 Coast Road and Lots 45 and 46 Marshall Road contained the following species:

- *Eucalyptus microtheca*
- *Corymbia calophylla*
- **E. botryoides*
- *E. gomphocephala*

A stand of *Melaluca sp.*, exists within Lot 41 Marshall Road and is encompassed by the Resource Enhancement Wetland.

No Threatened or Priority species, nor Threatened or Priority Ecological Communities (TECs) were identified within the Structure Plan Area.

2.1.2 Bush Forever

The Structure Plan area is bordered on western boundary by Bush Forever Site No. 305 "Bennett Brook, Eden Hill to West Swan".

The Bush Forever site is some 120ha of bushland associated with seasonal and permanent wetlands and provides an ecological link to Whiteman Park – Bush Forever Site No. 304 (north of the Structure Plan area).

The vegetation within Bush Forever Site No. 305 includes *Eucalyptus Calophylla* and *E. marginata*, open forest to woodland with *Melaleuca preissiana*, *Banksia ilicifolia* or *B. grandis*; and within the Brook Low open forest of *Eucalyptus Rudis* (Government of Western Australia, 2000).

2.1.3 Fauna

In light of the extensive clearing of the Structure Plan Area for agricultural purposes, the majority of the fauna habitat values have been lost. The remaining habitat consists of the scattered trees within Lot 44 Coast Road and Lots 45 and 46 Marshall Road, as well as the stand of *Melaluca sp.* which may have value for avifauna species.

A search of DPaW's *NatureMap* database and the Commonwealth Department of the Environment and Energy's (DoEE) *Protected Matters search tool* highlighted a number of listed fauna species that potentially may utilise this habitat.

Of this list and based on the fauna habitats remaining, the key species that could potentially be impacted through development of the Structure Plan area are:

- **Baudin's Black Cockatoo** (*Calyptorhynchus baudinii*) – NB. not likely to occur within Lots 45 and 46 as it is located outside of its known distribution area (DEE 2017).

- **Forest Red-tailed Black Cockatoo** (*Calyptorhynchus banksii naso*) and **Carnaby's Black Cockatoo** (*Calyptorhynchus latirostris*) – NB. Lots 45 and 46 are not located within known breeding areas for Carnaby's (i.e. Wheatbelt region) or Forest Red-tail Black Cockatoos (DEE 2017).

Site inspections were undertaken in 2015, and in March 2018 across Lots 45 and 46 in response to the proposed 2018 Structure Plan Amendment.

The findings of both site inspections, and in reference to an *Environmental Protection and Biodiversity Conservation Act 1999* review:

- The potential impacts are focused on a very small area of 0.31ha, limited to 15 individual foraging trees;
- The trees are located within a highly modified (historically cleared) environment with no native vegetation understorey. Lots 45 and 46 do not contain kwongan heathland and/or any woodland dominated by proteaceous plant species.
- The existing vegetation has a low quality black cockatoo score as the site contains only individual foraging plants; and
- There is no evidence to suggest the single hollow identified on site is (or has been) used by black cockatoos as a nesting site.

Bennett Brook Foreshore

The remnant native vegetation within the Bennett Brook and foreshore environments has some value for native terrestrial and avian species with the creek line potentially allowing for the lateral movement of fauna through the local Bennett Springs landscape.

The Bennett Brook and foreshore environments may support the following fauna species:

- Rainbow bee-eater (*Merops ornatus*) – migratory.
- Water-rat (*Hydromys chrysogaster*) – Priority 4
- Southern Brown Bandicoot (*Idoodo obesulus/Isoodon obesulus* subsp. *Fusciventer*) – Priority 5.

The proposed management and use of the Bennett Brook will replicate the predevelopment conditions associated with both surface and groundwater availability to the existing vegetation. Therefore avifauna, in particular rainbow bee-eaters, can continue to utilise the Brook area and the surrounding buffer after seasonal rain events.

The Structure Plan responds to the objectives outlined in EPA Bulletin No. 20 *Protection of natural areas through planning and development* (EPA 2013).

2.2 Landform and Soils

2.2.1 Topography

The Structure Plan Area is generally flat with a gradual decline from north to south toward Reid Highway. The northern boundary is ~16m Australian Height Datum (AHD) at Marshall Road, while the southern boundary is ~12m AHD.

2.2.2 Regional Geomorphology

The majority of the Structure Plan area is composed of Bassendean Sands in various thicknesses, overlaying Guildford Formations. Close to the Bennett Brook, the Bassendean Sands occur over alluvium. Bennett Brook itself is composed of clayey silt.

2.2.3 Acid Sulphate Soils

The (former) Department of Environment and Regulation (DER) has compiled broad-scale mapping of the risk of acid sulphate soils for regions of Western Australia. The majority of the Structure Plan Area has “no known risk of Acid Sulfate Soils (ASS) occurring within 3m of the natural soil surface (or deeper)”.

A portion of the Structure Plan area adjacent to Bennett Brook is designated as “Moderate to low risk of ASS occurring within 3m of the natural soil surface”.

Bennett Brook and the foreshore environments are mapped as “High to Moderate risk of ASS occurring within 3m of the natural soil surface”.

2.3 Groundwater and Surface Water

2.3.1 Groundwater

The Structure Plan Area is located within the Swan and Mirrabooka Groundwater areas. Both are extensively allocated with some small available volumes, predominately in the superficial aquifers.

Groundwater levels fluctuate seasonally, however the encompassing District Water Management Strategy (DWMS) prepared by consultants TME, 2011 identifies that groundwater during the winter peak is at, or close to, surface level.

Groundwater flows through the greater area is generally eastwards from the Gngangara Mound to the Swan River. There is however localised deviations from this due to the effects of other drains and waterways such as Bennett Brook. These results suggest that groundwater is moving generally in a south-westerly direction towards the brook. Average Annual Maximum Groundwater Level (AAMGL) contours for the site range from 19m AHD down to 13m AHD.

Groundwater pH below the site it likely to be slightly acidic. The levels of nutrients in groundwater are likely elevated above the targets of the Healthy Rivers Action, which are 0.1mg/L total phosphorous and 1.0mg/L total nitrogen (TME, 2001).

2.3.2 Surface Water

The key water feature of the Structure Plan area is Bennett Brook, which traverses the western boundary. Bennett Brook drains a total catchment of 69km², of which the Structure Plan area is ~ 2.5% of the total catchment area (TME, 2011).

The DWMS identifies the 1:100 ARI flood fringe of Bennett Brook extends to the 18.65m AHD contour where bordering the Structure Plan area. The flood level then drops to 10.84 m AHD along the southern boundary prior to discharging under Reid Highway. The water then drops again to 9.93 m AHD, shortly after Reid Highway (TME, 2011).

2.3.3 Wetlands and Waterways

The Structure Plan area includes one Resource Enhancement Wetland (REW) and interface to a Conservation Category Wetland (CCW) pursuant to the DEC's dataset/mapping.



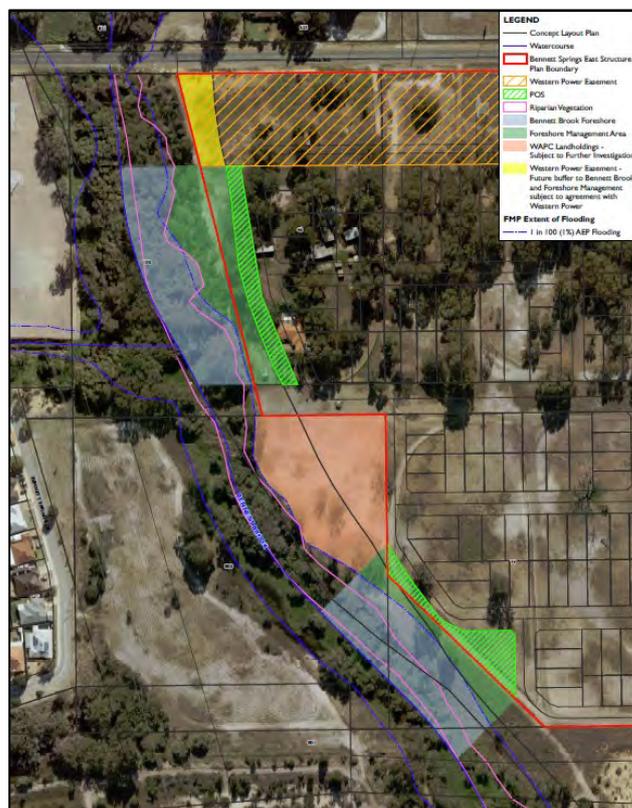
Extract 1 - Appendix 4.5: Inconsistency between CCW and Bennett Brook watercourse alignments (DEC dataset/mapping, 2017).

The mapped CCW is located within the Bennett Brook and foreshore. Whilst the Bennett Brook watercourse and CCW are incorrectly aligned in the DEC dataset/mapping, the Structure Plan originally adhered to the CCW boundary alignment traversing Lot 46 (**Extract 1** refers).

In April 2018, on behalf of all affected lot owners, Mirvac submitted a minor Structure Plan amendment to reconfigure the residential development area, roads and Public Open Space pertaining to Lots 46 and 74 on the western side of the Structure Plan. This amendment essentially to challenge the incorrect CCW boundary alignment dataset/mapping previously followed.

To facilitate the minor amendment, and in response to a request from the Department of Water and Environmental Regulation (DWER), environmental consultants RPS undertook a biophysical assessment of the Bennett Brook foreshore; this to rationalise the foreshore buffer distances adjacent to the western boundary of Lots 46 and 74. DWER, as part of its initial consultation, recognised that Bennett Brook is in fact a waterway, thus an appropriate buffer to a waterway foreshore area/reserve was to be assessed in lieu of a wetland buffer.

The resultant *Bennett Brook Foreshore Assessment Area Report* prepared by RPS (Oct, 2018), as now approved by DWER, defines a revised foreshore buffer less intrusive than the previous wetland buffer alignment (**Extract 2** below and **Appendix 4.6** refers). This alignment now reflected in all mapping and plans detailed in this Structure Plan.



Extract 2 – Appendix 4.6: *Bennett Brook Foreshore Area Report* – revised foreshore alignment.

As referenced in the DEC's *Geomorphic Wetlands, Swan Coastal Plain* dataset) located just south of Marshall Road on Lot 41 are allocated aquifers extending into Lot 42 and Lot 6. The REW (UFI 14129) consists of remnant melaleuca trees with limited native understorey. The REW is currently being utilised for sheep grazing and rubbish disposal has been identified within the mapped wetland boundary.

A review of the wetland conservation management category is proposed to be undertaken in accordance with *A methodology for the evaluation of specific wetland types on the Swan Coastal Plain, Western Australia* (DPaW 2013). For the EPA's consideration, this assessment will establish the wetland values and appropriate conservation category.

Based on the outcomes from this assessment an appropriate buffer will be established.

Management of all wetlands and associated buffers/foreshore areas will be subject to various management plans; all relevant plans detailed and supported by submission timeframes under Part One – Section 7 of this Structure Plan.

2.3.4 Monitoring

Post-development monitoring will consistent with the pre-development monitoring of hydrological conditions, with best management practices also monitored to ensure their continued effectiveness. Structural management measures will be confirmed prior to hand over to the City of Swan: these monitoring programs will be further detailed at the Urban Water Management Plan (UWMP) phase.

2.4 Heritage

A search of the (former) Department of Aboriginal Affairs (DAA) Aboriginal Heritage Inquiry System (AHIS) database identified three potential registered Aboriginal sites of significance within or adjacent to the Structure Plan area, these include:

- Bennett Brook (Site ID 3692)
- Marshalls Paddock (Site ID 3744)
- Bennett Brook: Camp Area (Site ID 3840)

An ethnographic consultant has been engaged to undertake a *section 18* application and engagement with the Traditional Owners in accordance with the *Aboriginal Heritage Act 1971*.

Where registered Aboriginal sites are located within POS, and as approvals under the Act do not transfer with change of ownership, the City requests that the relevant developer shall transfer the land to the Crown and undertake Aboriginal consultation in the City of Swan's name for future maintenance works in the POS.

A search of the Heritage Council's database resulted in no matches for European Heritage within the Structure Plan Area.

2.5 Context and Other Land Use Constraints and Opportunities

2.5.1 Odour

A poultry farm is located to the north of Marshall Road and east of Cheltenham Street.

The poultry farm consists of a range of sealed and open ventilation sheds, a shop/office area, as well as subsidiary sheds and transportable buildings.

An odour buffer of 500m applies to the poultry farm site, as required by EPA.

Semi-Rural lots are generally found within the 500m poultry buffer, as well as an approved Sikh Temple (sensitive land use) development on the corner of Cheltenham Street and Marshall Road (~200m to the south of the poultry farm).

Immediately south-east of the 500m buffer are the residential developments of Brookleigh Estate and St Leonards Estate.

The Structure Plan area is located ~520m south of the poultry farm as its closest point. This is a sufficient distance away and as such anticipated it does not require any modifications or management of the proposed Structure Plan area.

2.5.2 Potential contamination

A search of the DER's *Contaminated Sites* database in July 2015 identified no contaminated sites within the Structure Plan Area.

Given the historical use of the site for agriculture there is potential for the associated infrastructure to contain asbestos. Areas subject to demolition will be remediated in accordance with the *Contaminated Sites Act 2003*.

2.6 Existing Movement Networks

A Transport Assessment, prepared by GTA Consultants (**Appendix 4.4** refers), identified the following characteristics of the existing movement network.

2.6.1 Reid Highway

The Structure Plan area is located immediately north of Reid Highway, a 'Primary Regional Roads' reservation under the MRS; this providing excellent access to the broader Perth metropolitan region.

Reid Highway is classified as a 'Primary Distributor' by the MRWA with existing volumes of ~24,400 vehicles per day to the west of Lord Street (MRWA Stats, 2015). It is a two-lane, undivided two-way road with a 12m carriageway proximate to the Structure Plan Area. The road width expands proximate to the intersection with Lord Street.

Reid Highway is set within a road reservation of minimum 78m width, and has a local posted speed limit of 90km/h.

2.6.2 Lord Street

The MRWA designates Lord Street as a 'Distributor B' road with volumes of approximately 20,000 vehicles per day to the south of Marshall Road (GTA, 2015). It is a two-lane, two-way road with an 11m wide carriage way, within a 36 – 40m road reservation. Lord Street has a posted speed limit of 80km/h adjacent the Structure Plan boundary.

The Lord Street/Reid Highway intersection was upgraded in 2014 to a signalised intersection, with a four-lane divided approach on Lord Street.

Lord Street, to the east of the Structure Plan area was previously earmarked as the southern leg of the future Perth-Darwin Highway. Main Roads WA and other relevant government agencies have now selected an alternative alignment located approximately 4km to the west of the Structure Plan area, thus the ultimate design and alignment of Lord Street is subject to review.

2.6.3 Marshall Road

Marshall Road forms the northern boundary of the Structure Plan area with existing volumes of approximately 9,900 vehicles per day (GTA, 2015). Rugby Street, Cheltenham Street, Dulwich Street and Roedean Street intersecting with Marshall Road to the north.

Marshall Road is classified as a 'Local Distributor' road by the MRWA. It is a two-lane, two-way road with a 10m carriageway within a 20m wide road reservation. It has a posted speed limit of 80km/h.

The upgrade of Marshall Road to a dual carriageway is planned to cater for the anticipated future traffic flows; the upgrade is anticipated to be consistent in design to the Marshall Road upgrade further west in Malaga. Upgrade of Marshall Road will also need to consider connection to the Ellenbrook Bus Rapid Transit (BRT) along Lord Street, and any future planned priority lanes along Marshall Road.

2.6.4 Coast Road (Luminous Boulevard)

The existing Coast Road comprises a 20m road reservation, with the small section adjacent to Lord Street constructed to a rural standard and currently serving ~630 vehicles per day (City of Swan, 2012). This road will require upgrading to an urban standard as part of subdivision works in the Structure Plan area.

2.6.5 Existing Pedestrian and Cyclist Networks

There is an existing footpath on the southern side of Marshall Road, connecting the existing bus stop, the Lord Street intersection and St Leonards Estate to the east.

2.6.6 Existing Public Transport

The Structure Plan area currently has access to the following bus services, all of which pass the northern boundary of the site – Marshall Road.

Bus Route	Nearest Stop	Frequency (minutes)			
		Mon-Fri Peak	Mon-Fri interpeak	Sat & Sun	Nights
955	Marshall Road;	10	15	30	60
956	After Roedean Street	10	15	-	-
345W	Before & after Cheltenham Street	2 extension services in each direction (currently running on a trial basis)			

3 Land Use and Subdivision Requirements

An Orthophoto and Context Plan are included as **Figure 6 and 7**; these plans provide illustration of the following sections. **Figure 8** illustrates the overall 'site analysis' for the Structure Plan area and **Figure 9** provides illustration of the concept master plan to support the Structure Plan (Plan 1).

3.1 Land use

The surrounding land uses adjacent the Structure Plan area include:

- Lord Street (MRS Primary Regional Roads Reservation) and St Leonards residential estate to the east;
- Reid Highway (MRS Primary Regional Roads Reservation) and Beechboro residential community to the south;
- Rural landholdings and Whiteman Park to the north; and
- Bennett Brook and the Bennett Springs residential estate to the west.

3.1.1 Existing Education Facilities

The *Swan Urban Growth Corridor Sub-Regional Structure Plan* (SUGCSRSP) identifies a number of proposed Primary Schools and a High School in proximity to the Structure Plan area, namely in the Dayton and Brabham Urban Cells. The closest Primary School, and likely long term catchment for residents of the Structure Plan area, is earmarked to the north of Marshall Road in the northern portion of the 'West Swan West' Urban Cell.

Existing nearby schools, include:

- Caversham Primary School;
- East Beechboro Primary School;
- Lockridge Senior High School;
- Riverlands Montessori;
- Beechboro Christian School;
- Midland Christian School; and
- Swan Christian College.

The Midland Polytechnic College is approximately 5km south of the Structure Plan area.

3.1.2 Existing District and Regional Open Space

The *Swan Urban Growth Corridor Sub-Regional Structure Plan* (SUGCSRSP) identifies a key District Open Space and Playing Fields in the Dayton Urban Cell, for which all development within the SUGCSRSP financially contribute to under mechanism of a Development Contribution Plan.

Whiteman Park, immediately to the north-west of the Structure Plan area, provides regional open space servicing a regional catchment.

3.1.3 Existing Activity Centres and Employment

The Structure Plan area is well located with respect to proximity and access to activity and employment centres as outlined below:

- 4.8km north west of the Midland Strategic Metropolitan Centre;
- 7.7km south west of the Ellenbrook Secondary Activity Centre;
- 5km east of the Malaga Industrial Area; and
- 7.4km north east of the Morley Strategic Metropolitan Centre.

3.2 Design Philosophy

The Structure Plan design has taken into consideration the environmental and physical attributes within and external to the site, as well as acknowledging abutting land uses and how these can best be addressed with regard to interfacing with future residential land uses.

The design philosophy has been predicated upon the following objectives:

- to provide a range of residential densities according with the density targets of *Directions 2031* to encourage diversity of lot product, built form and affordability measures;
- to provide suitable interface to the MRS Primary Regional Roads reservations and Rail Reservation to address noise mitigation;
- to provide suitable interface to external boundaries and internal remnant vegetated areas where the threat of fire requires mitigation;
- provide suitable location and amenity within public open space areas to ensure accessibility, visual aesthetics and view corridors to foster a local sense of identity and community for specific internal 'precincts' as well as the Structure Plan area as a whole;
- to deliver a safe pedestrian and cyclist environment with pathways linking residential precincts and associated local parks as well as providing for external connectivity to strategic community nodes; and

- to implement sound engineering and drainage solutions for the Structure Plan area.

In response to the above objectives, the Structure Plan proposes an urban layout utilising an interconnected road network and open space system branching off the existing Coast Road (Luminous Boulevard) reservation. The Structure Plan has been designed in a manner to encourage safe pedestrian movements within the site, and to connect to regional infrastructure enroute to various City of Swan community nodes.

3.3 External Design Influences

3.3.1 Acoustics & Noise Targets

A *Transportation Noise Assessment* was prepared by Herring Storer to address the adjoining regional and district road networks (**Appendix 4.3** refers).

The assessment was undertaken in accordance with the WAPC's State Planning Policy 5.4 – *Road and Rail Transportation Noise and Freight Considerations in Land Use Planning*, with the key findings as follows.

The acoustic assessment carried out for the Structure Plan Area found that without mitigation, 'noise targets' set by SPP 5.4 would be exceeded for dwellings close to Reid Highway, Lord Street and Marshall Road. Affected lots are indicatively illustrated under Figure D1 of the *Transportation Noise Assessment*.

To mitigate the noise impacts, 'Quiet House' Design is required for the 'first and second row' of dwellings adjacent to the roads.

The level of noise created by the roads will be subject to the configurations and road surfaces used. As such there are variations in the possible noise mitigation required:

- Reid Highway – 2m high noise barrier and 'Package A Quiet House' design principles.
- Lord Street – With chip seal road surface, a 2.2m high barrier and 'Package A Quiet House' design principles. With dense grade asphalt, the barrier wall to Lord Street can be reduced to 2m.
- Marshall Road – With chip seal road surface, 'Package B Quiet House' design principles. With dense asphalt upgrade, 'Package A Quiet House' design principles.

All affected residential lots will require a notification on the Title where noise targets are exceeded.

The recommendations above are made for single storey dwellings. Specialist acoustic advise should be sought for double storey dwellings.

3.3.2 Bush Fire Management

The Bushfire Management Plan (BMP) has been updated (December 2019) by Strategen Environmental to include the Structure Plan - Minor Amendment pertaining to the re-zoning of the western portion of the Cambodian Temple Site from 'Private Clubs and Institutions' to 'Residential R25 – R60' (**Appendix 4.2** refers). Further amendments to the updated BMP include the reclassification of vegetation with the Western Power easement and the reclassification of vegetation to the west of the LSP boundary to reflect a more realistic revegetation strategy. The document has been prepared in accordance with the WAPC's Guidelines for Planning in Bushfire-Prone Areas 2015, and SPP 3.7: *Planning in Bushfire Prone Areas*, and the Australian Standard AS3959-2009 *Construction of buildings in bushfire prone areas* (AS3959) (Standards Australia 2009).

The assessment of the vegetation within the Structure Plan Area (refer Figures 1 – 2 under **Appendix 4.2**) identified that vegetation within the Bennett Brook foreshore area and internal Resource Enhancement Wetland (REW) on Lot 41 Marshall Road as permanent bushfire hazard considerations. Hazards are also identified within the Reid Highway and Lord Street reservations and Western Power easement; these being interim hazards subject to the development intentions and specific management of these respective sites.

A portion of the nett residential development area (as depicted in BMP Addendum – Figures 3 - 4 of **Appendix 4.2**) is within 100m of vegetation assessed as having 'moderate' bushfire hazard levels. These areas will require implementation of increased building construction standards and application of 'Performance Principle' requirements unless otherwise addressed via management plans/agreements and updating of BAL contouring as part of any subdivision application encompassing affected lots.

The proposed vehicular access network will provide up to two links to Marshall Road and up to one link to Lord Street. This meets acceptable standards by ensuring all residents and visitors of the development are provided with at least two vehicular access routes connecting to the surrounding public road network at all times. Three access points will be ultimately provided for the development however due to staging works, it is not possible for all three access points to be provided from the commencement of development. However, Mirvac has committed to providing a minimum of two access points in and out of the project area at all times. Emergency access ways will be provided during staging if two formal access points to the surrounding road network cannot be provided.

3.3.3 High Voltage Power Line Easement

A 60m wide easement traverses the northern-most portion of the Structure Plan area, this relating to a Western Power 330kV High Voltage Power Line corridor from the Muja and Kwinana Power Stations to the Northern Terminal.

The proposed Structure Plan design provides suitable interface to the corridor, with intention for the internal road network to utilise the periphery of the easement area.

Western Power Consultation

The associated infrastructure is aging and Western Power's *Long Term Network Development Plan* estimates that the line will start presenting issues around 2028 – 2033. The line may need increased maintenance and/or be replaced subject to deterioration or possible load growth; therefore unrestricted access to the infrastructure is imperative.

Permissibility of land uses within the power line corridor is based on a case by case basis by Western Power, however there is a general presumption against permanent building structures or storage being permitted within the easement area. Any deviation from the standard easement conditions will require Western Power approval.

Roads, ground level changes and proposed lighting within the easement also need to be assessed by Western Power on a case by case basis. The location of roads is typically determined on a best balance of clearance to tower base and clearance to the lowest point of sag from the lines. There will be specific design requirements for height and materials used within road reserves, such as limited height of streetlights, all materials being non-inductive and/or earthed and no vehicle parking.

There are no additional setback requirements beyond the easement itself.

Western Power typically allow stormwater drainage above the 1:5 year event within the easement. This is subject to specific locations and design requirements. The location of any ponding should avoid the tower base clearance areas for structural reasons. Unencumbered trafficable access along the easements needs to be maintained at all times and should not be impeded by any drainage.

A 30m x 30m clearance area around tower bases is used as a guide but is subject to line specifics, Earth Potential Rise (EPR)/Low Frequency Induction (LFI) clearance and civil/structural assessments. No tree species are to be planted within 15m either side of the outermost conductors. Vegetation can be planted within the corridor provided it does not grow to more than 4m in height.

Whilst Western Power prefers the easement to be reserved and managed as 'Public Open Space', however, the City requests for the land to be designated a 'Public Utilities' land use/zoning.

Management of the easement will require an agreement between Western Power and the City, recognising that whilst the majority of the easement will be undeveloped, there will be road reservations and areas of landscaping adjacent/within or crossing the easement area. The Western Power towers, general infrastructure and associated access tracks will be managed by Western Power. Relevant induction rise studies will be undertaken prior to detailed subdivision design to ensure electrical safety (EPR and LFI) clearances and structural assessments are fulfilled.

Department of Health Consultation

The Department of Health documentation identifies that it does not have any fixed boundary setback requirements for high voltage powerlines.

However, Schedule I of the Radiation Safety (General) Regulations 1983, administered by the Radiological Council, requires that persons are not exposed to 50/60 Hz electric and magnetic fields which exceed the limits specified in *Interim Guidelines On Limits Of Exposure To 50/60 Hz Electric And Magnetic Fields* (1989).

The limits apply to 'occupationally exposed' and 'non-occupationally exposed' and includes activities underneath the powerlines.

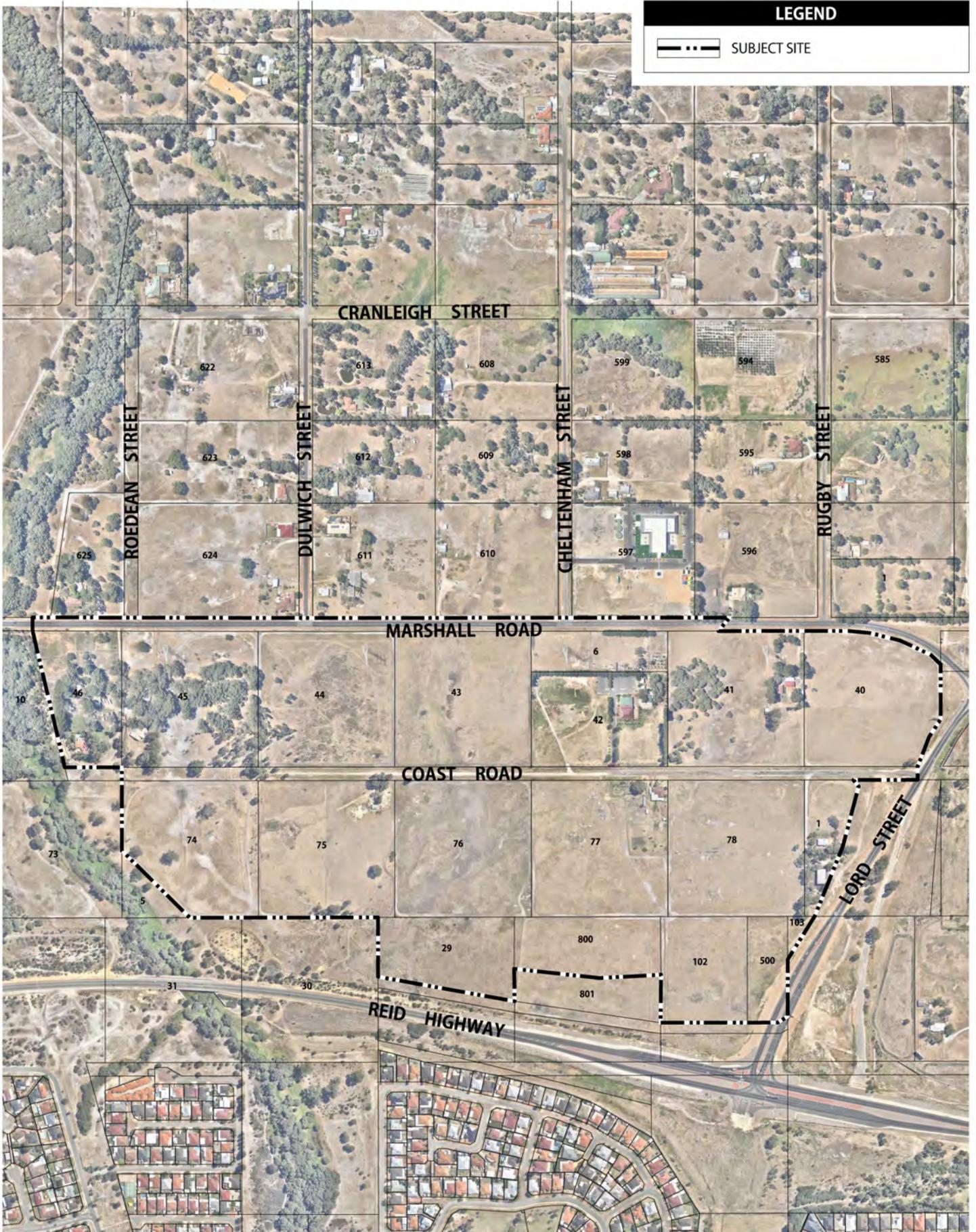
Western Power's established easement addresses the above Electric and Magnetic Fields (EMF) requirements.

3.4 Land Composition

The Structure Plan area will be predominantly developed for 'Residential' purposes as noted:

Table 1: Land Composition

Land Uses	Area (ha)	Percentage
Residential	25.26	43%
Private Clubs & Institutions (Cambodian Temple)	2.20	3.7%
Green Space Public Open Space – 3.861ha Wetland (REW) Buffers – 0.591ha	4.45	7.6%
Wetland Areas CCW (Core) – 0ha CCW/Foreshore (Buffer) – 0.176ha REW (Core) – 0.986ha	1.16	2%
Western Power High Voltage Line Easement	5.52	9.4%
MRS Primary Regional Roads Reid Highway – 1.312ha Lord Street – 1.864ha	3.18	5.4%
Other Roads Marshall Road – 2.761ha Coast Road Reservation – 2.395ha Internal Roads – 10.766ha	15.92	27.1%
MRS Rail Way Reservation	1.095	1.9%
Total	58.77	100%



SITE ORTHOPHOTO

Various Lots,
BENNETT SPRINGS EAST

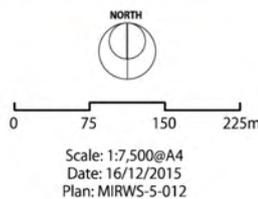
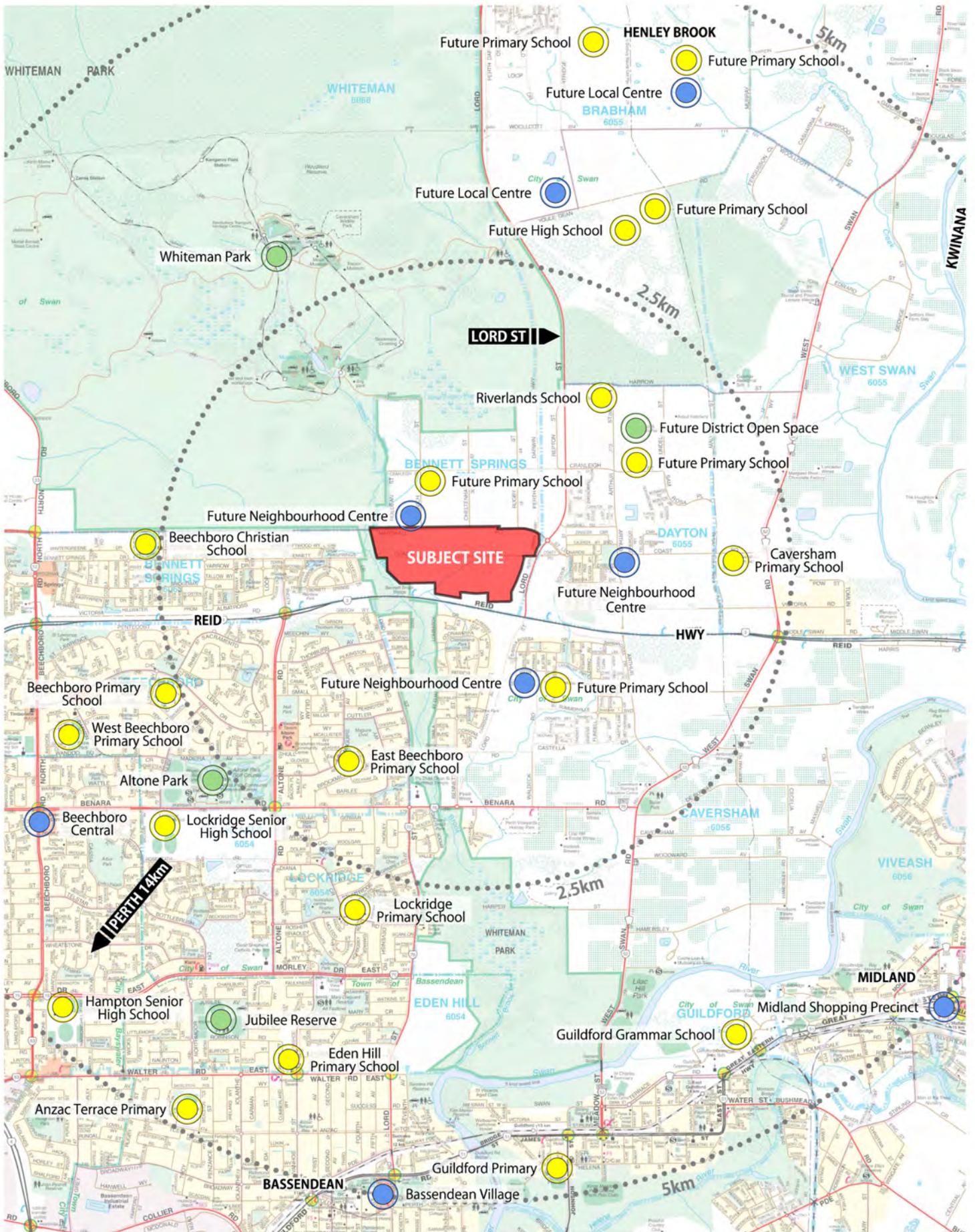


Figure 6



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DISTRICT CONTEXT PLAN

Various Lots,
BENNETT SPRINGS EAST

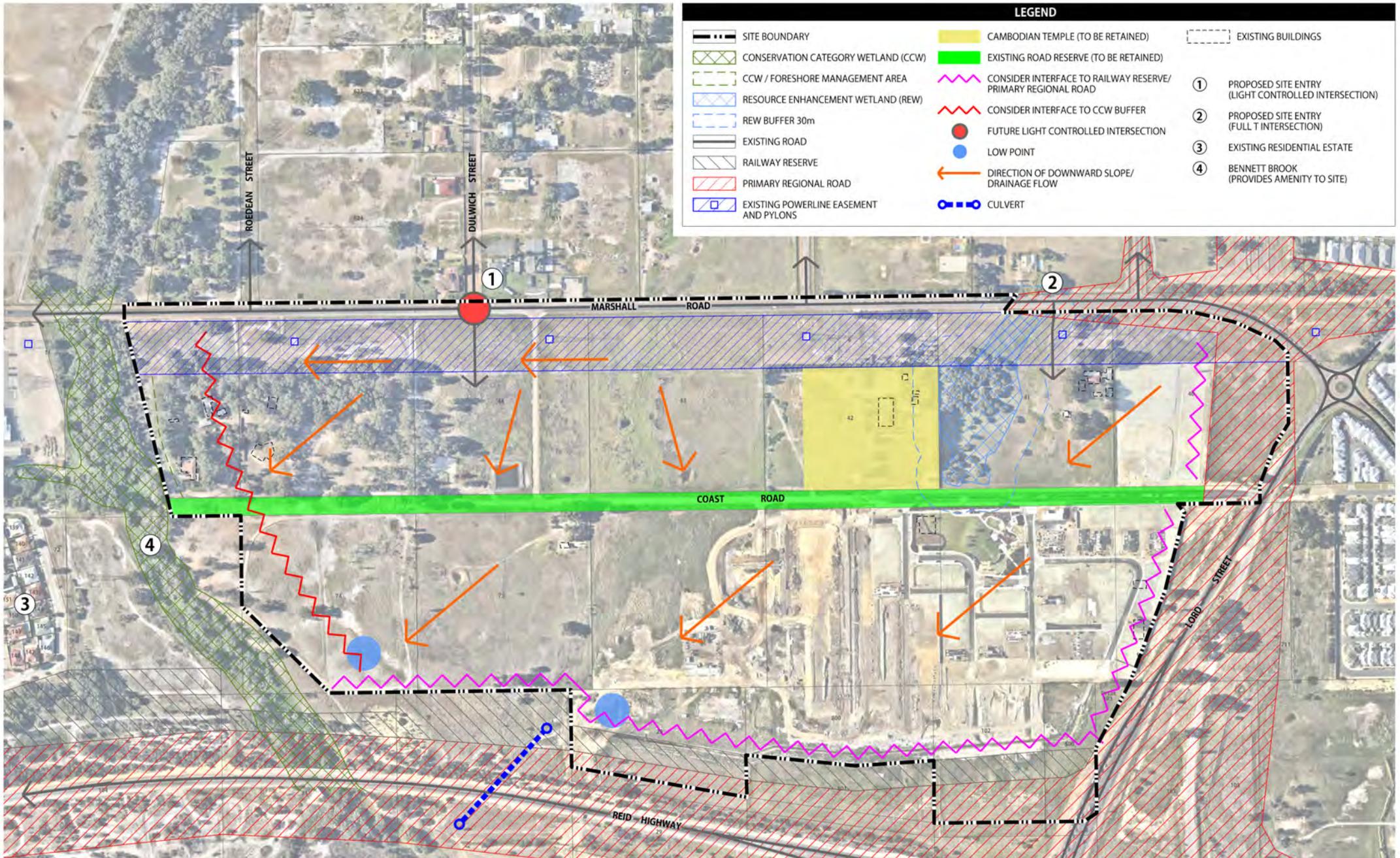


Scale: 1:40,000@A4
Date: 02/02/2016
Plan: MIRWS-5-018

Figure 7



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SITE ANALYSIS

Various Lots,
BENNETT SPRINGS EAST

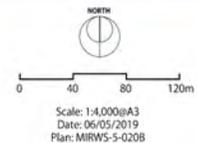


Figure 8



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3.5 Dwelling Forecasts

3.5.1 Directions 2031 Forecasts

Situated within the 'North-East Sub-region', the Structure Plan area is identified as part of a broader 'urban deferred zoned undeveloped' site, known as 'AL3 - West Swan West'.

The *Directions 2031* and accompanying OMSRS sets the following dwelling target rates for the broader *West Swan West* area:

Table 2: Directions 2031 Targets (West Swan West)

Directions 2031 Scenario	Projected Dwellings:
'Connected City' @ 15 dwellings per gross urban zone	AL3: 1,800+ dwellings
'Business as usual' @ 10 dwellings per gross urban zone	AL3: 1,400+ dwellings

The Structure Plan area itself comprises 58.771ha or approximately one-third of the broader *West Swan West* cell.

Minus the MRS Primary Regional Roads Reservations, MRS Rail Way Reservation, Marshall Road and Coast Road reservations, and Western Power High Voltage Power Line Easement, the 'Urban' portion of the Structure Plan area comprises a *gross urban zone* of 43.83ha.

Based on the dwelling targets under *Directions 2031* and accompanying OMSRS, the Structure Plan area is projected to generate the following dwelling yields:

Table 3: Directions 2031 Dwelling Targets (Structure Plan Portion of West Swan West)

Directions 2031 Scenario	Projected Dwellings:
'Connected City' @ 15 dwellings per gross urban zone	657+ dwellings
'Business as usual' @ 10 dwellings per gross urban zone	430+ dwellings

The Structure Plan indicates in the order of 676 dwellings based on Mirvac (WA) Pty Ltd's lot mix and yield projections.

This projected yield is notwithstanding several significant site restrictions, including Conservation and Resource Enhancement wetlands and associated buffers, and retention of a Cambodian Temple site that erode the effective developable land area available for residential purposes.

Should the residual of the Cambodian Temple site (Lot 42) be developed in the future for residential purposes, depending upon wetland buffers and POS requirements, this would equate to ~32 lots added to the Structure Plan Area.

The dwelling yield projections thus address the 15 dwellings per *gross urban zone* targets of *Directions 2031*, and will potentially accommodate a population in the order of 1,839+ people, at a rate of 2.8 persons per household, excluding the potential development of the Cambodian Temple site.

The projected dwelling yields across the Structure Plan area are subject to subdivision design and detailed review of drainage and environmental constraints. Preferred lot mix and market demand at the time of land release will also influence final dwelling yields.

3.5.2 Liveable Neighbourhoods Forecasts

Based on the *Liveable Neighbourhoods* 'Site Hectare' definition, the Structure Plan's 'developable area' equates to ~42.07ha, of which ~25.25ha relates to (nett) residential cells. As such the overall LN density for the Structure Plan will be in the order of:

- 676 dwellings = ~26.7 dwellings per site hectare.

The projected densities will fulfil the *Liveable Neighbourhoods* targets of average 22 dwellings per site hectare for the overall development; or 26 dwellings per site hectare target set by the WAPC for this Structure Plan.

The Structure Plan has been assigned a base coding of R25; with R40 development and intended 'density bonus' provisions to maximum R60 density distributed throughout the Structure Plan area.

The R25 to R60 density range offers a flexible minimum and average lot product for this Swan Urban Growth Corridor location; resulting in single lot product generally 180m² – 600m² in area, however with flexibility to develop higher density product (i.e. minimum ~120m²) subject to addressing performance criteria addressed later in this report.

3.6 Streetscapes and Built Form Environment

The Structure Plan provides for an urban structure which enables sub-precincts to be developed at the landowner's discretion. There are a number of ways in which sub-precincts may be developed, including but not exclusive to:

- the prevailing design of the general streetscape (i.e. variation in road reserve widths and verge and median treatments, materials used within the road reserves and verges, landscaping, retaining and fencing);
- the prevailing built form (i.e. number of storeys, lot widths, front and rear loaded, setbacks etc); and
- the prevailing Public Open Space design and its usability, function and configuration of POS areas.

The housing typologies envisaged in the Structure Plan area will include Single and Double-Storey, Traditional Front Loaded Cottages and potentially Terraces - Attached and Semi-Detached in the case of higher density development.

All such design measures will be further explored as part of the subdivision design phase, Estate branding, Covenants and Guidelines, and Local Development Plan preparation.

3.7 Residential Density Coding

The Structure Plan offers a density coding range of R25 to R60 to maximise opportunities for diversity in lot product and housing types; and enables the Structure Plan design to evolve to suit market demand at the time of staging release.

A specific density coding will be allocated to residential lots at the time of subdivision application. The specific density coding will be determined based on the lots complying with one of the following design criteria:

3.7.1 Residential R25



This density coding applies to the majority of Structure Plan area, generally supporting the delivery of traditional front loaded product of 300m² or greater.

This density coding will apply as the base code to single dwelling units on lots that do not have a laneway abutting.

3.7.2 Residential R40



This density coding will generally apply to lots:

- lots generally within, but not exclusive to, 100m walking distance of public open space and key distributor roads including public transport stops;
- lots within 400m of the proposed local centre at the intersection of Marshall Road/Dulwich Street identified in the Swan Urban Growth Corridor Sub Regional Structure Plan; and/or
- lots with a site area less than 300m² to a maximum density of R40.

Proximity to Public Open Space generally defines those lots within a 100m walkable catchment of this amenity. This definition however does not preclude larger lots within the lower R25 density coding from being intermittently positioned in proximity to public open space or other areas of public amenity on a case by case basis.

Higher densities in proximity to amenity nodes, including local centres and bus stops is also encouraged to promote greater use of these services.

This density will also apply to lots with a site area less than 300m², recognising that said lots will not comply with minimum standards of the R25 density coding. Lots with a frontage of 12.5m or less, or depth of 25m or less will typically fit the R40 density coding.

3.7.3 Residential R60



To further promote lot product, housing diversity and tenure (i.e. Grouped and Multiple Dwellings) the Structure Plan encourages a R60 density coding subject to meeting one of the following criteria (in addition to R40 criteria above):

- lots with a laneway abutting the rear boundary; and/or
- lots with:
 - a minimum site area less than 180m² to a maximum density of R60;
 - direct frontage to two intersecting roads and with a site area of 1,000m² or greater; and/or
 - designated Medium Density development sites.

The higher density coding for laneway lots encourages higher density development with enhanced streetscapes by virtue of vehicle parking being mandated at the rear of the site.

The higher density coding for nominated development sites also encourages higher density and product diversity throughout the Structure Plan area; said sites to be identified during the subdivision design phase.

'Two intersecting roads' is defined as *Access Streets* or greater under WAPC's *Liveable Neighbourhoods*. Direct lot frontage to two intersecting roads consequently precludes 'mid-cell' development that achieves the 1,000m² minimum lot size from being developed for higher density purposes.

Frontage to two intersecting roads will impose higher density development to be positioned generally on the 'book-ends' of residential cells. This is to assist higher density development to achieve:

- better built form outcomes for street interface and interaction (i.e. balconies fronting the dedicated street as opposed to internal communal driveways);
- minimising any adverse impacts on adjoining properties (i.e. alleviates overshadowing and visual privacy constraints compared to 'mid-cell' developments); and
- Parking arrangements to be at the rear of lots in the case of Grouped and Multiple Dwellings (albeit not mandatory).

The minimum lot size of 1,000m² has been determined based on an anticipated high density development cell with dimensions 20m x 50m. This provision ensures that high density development is not adhoc and promotes development by a single landowner or partnership, particularly in the case of designated Grouped or Multiple Dwelling sites.

The minimum lot size provision will also avoid individual lots being further subdivided (i.e. a 15m frontage lot into two x 7.5m front loaded), thus mitigating scenarios whereby single narrow lots are later positioned between wider lots in established, built out areas; and resulting in construction constraints particularly for narrow frontage lots with a boundary to boundary house design.

3.8 Local Development Plans

3.8.1 RMD Codes

Appendix 4.1 of the Structure Plan refers to the City of Swan *Policy POL-LP-11 – Variation to Deemed to Comply Requirements of the R-Codes – Medium density single house development standards (RMD Codes)*.

The September 2017 Council adopted policy corresponds to the WAPC's Planning Bulletin 112/2016 *Medium-density single house development standards – Structure Plan areas*; this providing standard built form provisions to be implemented within the Structure Plan area and applicable to the R25 – R60 density ranges. 'Estate wide' Local Development Plans (LDPs) are not required to implement the RMD provisions.

3.8.2 Prescribed Requirements

Notwithstanding the RMD variations discussed above, there will be circumstances where LDPs will be required; this generally relating to development comprising the following attributes:

- a) ***Lots affected by excessive noise in relation to Reid Highway, Lord Street and Marshall Road.***

Note: Buildings requiring upgrades to facade construction (i.e. quiet house principles) shall be in accordance with State Planning Policy (SPP) 5.4 – *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*.

The height and location of noise barriers required to achieve the noise limit criteria is also outlined in State Planning Policy 5.4 *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*.

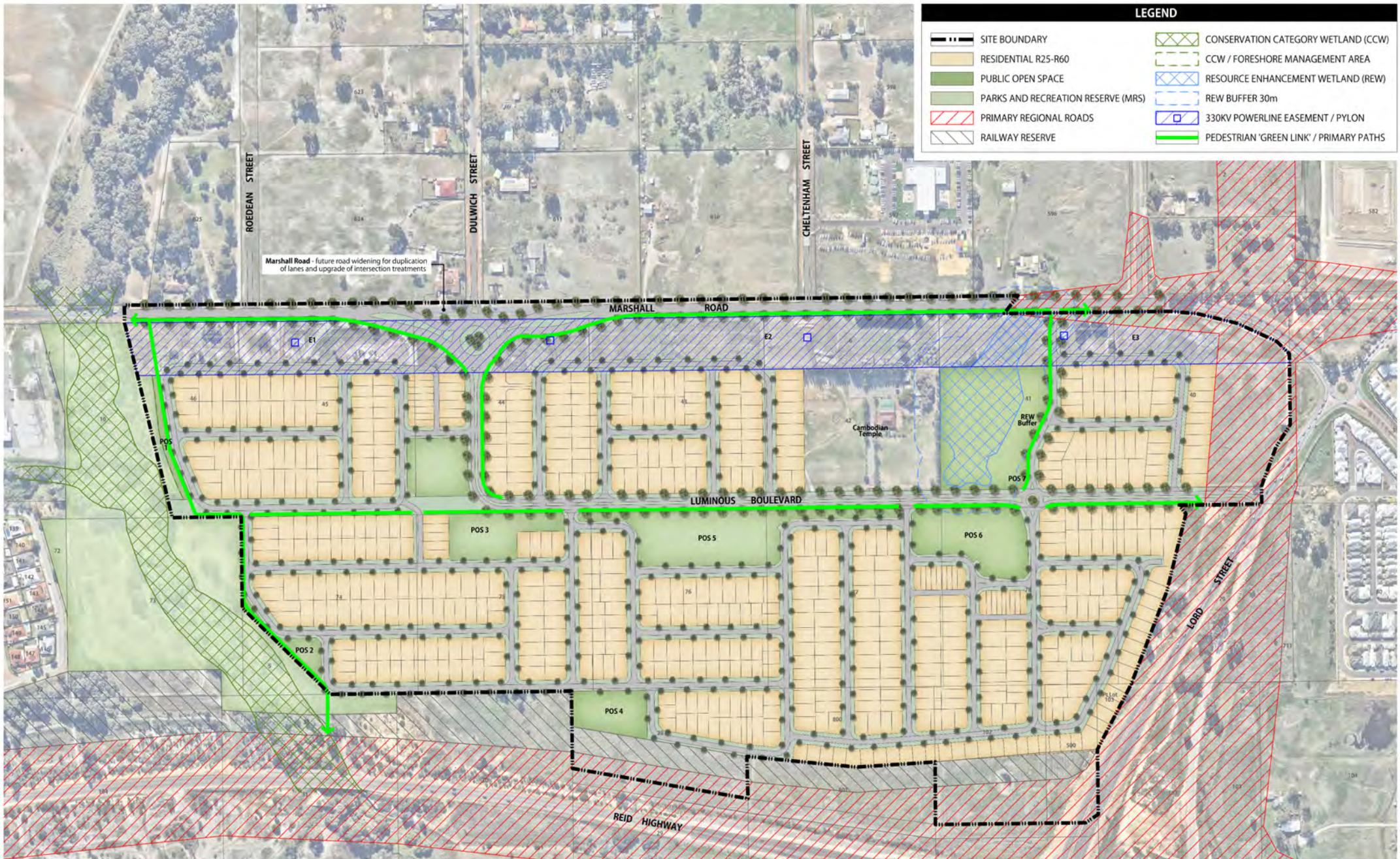
Affected lots may be identified spatially in the accompanying *Transportation Noise Assessment*, refer Figure D1 of **Appendix 4.3** of the Structure Plan; this to be updated subject to finished ground levels adjacent or type of built form design being developed and road surface upgrades to Lord Street and Marshall Road.

3.8.3 Other Built Form and Streetscape Provisions

The preparation of detailed Local Development Plans may also be considered for lots that do not fit into one of the above categories, this including:

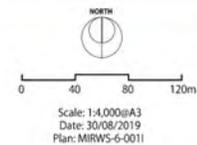
- a) ***Lots with rear-loaded (laneway) vehicle access;*** and
- b) ***Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space.***

Preparation of LDPs for lots with these design attributes will ensure consistency in built form, fencing and general streetscape throughout the medium-high density areas.



CONCEPT MASTER PLAN

Various Lots,
BENNETT SPRINGS



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3.9 Cambodian Temple Site

The Cambodian Temple site at Lot 42 Coast Road will be retained long term, however with the western portion of the site acquired by Mirvac for residential purposes, thus requiring all future residential development to provide suitable design interface and earthworking to the temple, its secondary buildings and surrounding grounds. The site is to be zoned 'Private Clubs and Institutions' under the Structure Plan and corresponding LPS17 provisions.

Any future development of the residual site for residential purposes will be subject to a Structure Plan modification; this modification demonstrating how the proposed design, including associated urban water drainage, REW buffers and infrastructure requirements, will correspond to the adjacent constructed or approved residential development.

3.10 Movement Networks

A Transport Assessment, prepared by GTA Consultants, identifies projected traffic volumes and suggested road hierarchies in and adjacent to the Structure Plan area (**Appendix 4.4** refers). Key findings from the report include:

3.10.1 Primary External Road Network

As a result of consultation with the MRWA, the following 'future planned upgrades' were identified.

- Lord Street is proposed to be realigned slightly west (within the Primary Regional Road Reservation boundary) and developed as a dual carriageway.
- The Lord Street/Marshall Road roundabout is to be upgraded along the new Lord Street alignment; ultimately developed as a signalised intersection potentially incorporating Public Transport infrastructure.
- Public Transport infrastructure may be required within this Reservation, with potential for additional road widening (west) subject to PTA and MRWA's detailed design review and land acquisition processes.
- Marshall Road is planned to be upgraded to four lane boulevard west of Lord Street, and will also need to consider public transport connections along Lord Street, and any future planned priority lanes along Marshall Road.

It is proposed that Marshall Road is designed as an *Integrator A Road*. This design is recommended based on the projected 2031 traffic volume of ~20,000+ vehicles per day (vpd).

Pursuant to *Liveable Neighbourhoods*, a road reserve of 30m is suggested, this consistent with the upgrade of Marshall Road in the Malaga area. It is anticipated that road widening may occur on both sides of Marshall Road; this subject to trunk infrastructure alignments including the Western Power High Voltage Line and gas mains on the southern side of Marshall Road.



Photograph: Marshall Road (Jan, 2016)

3.10.2 Site Access

Vehicle access to the Structure Plan area will be via the following three locations:

- A left-in only intersection to replace the existing Lord Street/Coast Road (Luminous Boulevard) intersection;
- A left-in / left-out intersection on Marshall Road approximately 250m west of the Lord Street roundabout; and
- A four-way intersection (roundabout or signals) forming the southern leg of the Marshall Road/Dulwich Street intersection.

These three access intersections would serve to provide all vehicle access to the proposed development, as no access is to be provided to Reid Highway, and Bennett Brook prevents any road connectivity to the west.

3.10.3 Proposed Internal Road Network

The proposed road hierarchy for the Structure Plan area is illustrated in **Figure 10**.

The road hierarchy focuses on the existing Coast Road (Luminous Boulevard) reservation which provides the primary east-west link through the centre of the site. Coast Road (Luminous Boulevard) will serve as the feeder road to all lower order *Access Streets* throughout the site.

The road network is based on a modified grid format; this provides a legible road hierarchy providing residents with defined directional ('way finding') routes to key nodes within and around the site.

A description of each of the proposed internal roads included in the Structure Plan area are provided with a corresponding cross-section figure.

3.10.3.1 NEIGHBOURHOOD CONNECTORS

The Structure Plan's main entrance will be via a four-way intersection with Dulwich Road. The entry road will be designed as a *Neighbourhood Connector B* road for the section between Marshall Road and existing Coast Road (Luminous Boulevard) reservation.

The road design will generally consist of a boulevard treatment and splayed subject to a roundabout or signalled treatment at the Marshall Road intersection. Accommodating up to 3,650vpd, the road cross-section will accommodate shared paths, dedicated on-street parking, landscaping/tree planting and provision of infrastructure services (**Figure 11** refers).

The original Coast Road (Luminous Boulevard) reservation is projected to accommodate traffic volumes between ~1,350 – 2,850 vpd. This existing 20m wide road reservation will be maintained and complemented by a pedestrian 'green-link' to one side (**Figures 11** and **15a** refer).

Whilst traffic volumes suggest a single carriageway design is sufficient, a boulevard treatment is proposed to offer median landscape/tree planting, drainage corridors (swales), intermittent embayment parking and service infrastructure complemented by an almost unrestricted shared path network the full length of the reservation.

3.10.3.2 ACCESS STREETS

The proposed eastern entry off Marshall Road is designed as an *Access Street B*, this to accommodate projected traffic volumes of ~1,260 vpd.

The proposed *Access Street B* design exceeds the intent of *Liveable Neighbourhoods* in providing a wider 7.4m carriageway; this to provide an enhanced entry statement road into the Structure Plan area. However, a verge variation of up to 3m is suggested in the vicinity of the adjacent wetland buffer and Public Open Space within Lot 41 (**Figure 12** refers).

The verge width on the residential side is proposed at 5.3m to accommodate shared path, landscape/tree planting, intermittent embayment parking and service infrastructure.

For the remainder of the Structure Plan area, traffic volumes on all local *Access Streets* will be generally less than 1,000 vpd. Accordingly, *Access Street D* designs will generally be provided; this comprising 6m wide carriageways and 4.5m verges within a 15m road reserve (**Figure 12** refers).

3.10.4 Public Transport

The Structure Plan area currently has access to the following bus services; all of which pass the Marshall Road boundary of the site.

Bus Route	Nearest Stop	Frequency (minutes)			
		Mon-Fri Peak	Mon-Fri interpeak	Sat & Sun	Nights
955	Marshall Road;	10	15	30	60
956	After Roedean Street	10	15	-	-
345W	Before & after Cheltenham Street	2 extension services in each direction (currently running on a trial basis)			

Early liaison with the Public Transport Authority (PTA) has identified their preference to maintain services along Marshall Road rather than deviating through the Structure Plan area; this recognising that the majority of the future residents will be within 400m walking distance of Marshall Road and existing or future bus stops (**Figure 13** refers). Also, the imminent Marshall Road terminus for the Ellenbrook Bus Rapid Transit (BRT) will be constructed immediately north-east of the Structure Plan area.

The Structure Plan Design allows for bus services (i.e. 7.4m wide carriageways as per *Liveable Neighbourhood* guidance) on Coast Road (Luminous Boulevard) and north-south access roads onto Marshall Road should a deviation route be warranted in the future; this addressing PTA recommendations.

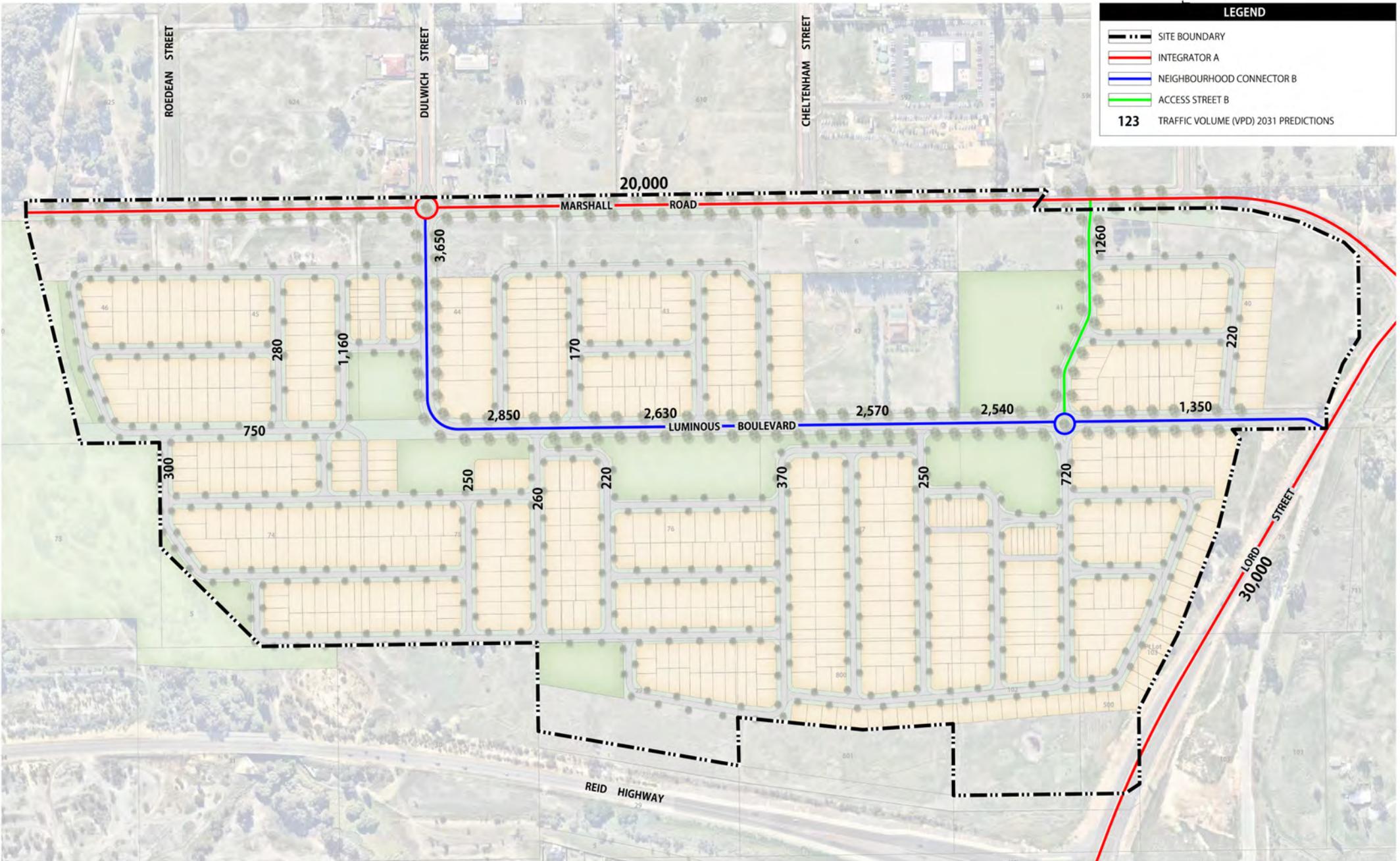
3.10.5 Pedestrian and Cycle Infrastructure

In accordance with the requirements of *Liveable Neighbourhoods*, shared paths are to be provided on all and *Neighbourhood Connector* roads, with a footpath to also be provided on the opposite side of the carriageway.

All *Access Streets* are to have a shared path or footpath on at least one side of the carriageway subject to local demand (**Figure 14** refers).

Intermittent access points on to the Reid Highway Reservation will be provided so residents have direct connecting to the Principal Shared Path (PSP) Network.

The location of these access points are indicatively illustrated on **Figure 14**. The final locations will be reviewed at subdivision stage, this subject to landownership staging and ideally adjacent to POS areas so away from sensitive land uses (residential lots). The intermittent access points will be supported by relevant noise acoustic measures for the required breaks in the Reid Highway noise barrier wall.



LEGEND	
	SITE BOUNDARY
	INTEGRATOR A
	NEIGHBOURHOOD CONNECTOR B
	ACCESS STREET B
123	TRAFFIC VOLUME (VPD) 2031 PREDICTIONS

ROAD HIERARCHY

Various Lots,
BENNETT SPRINGS EAST

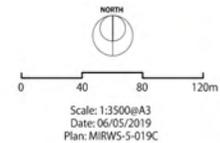


Figure 10



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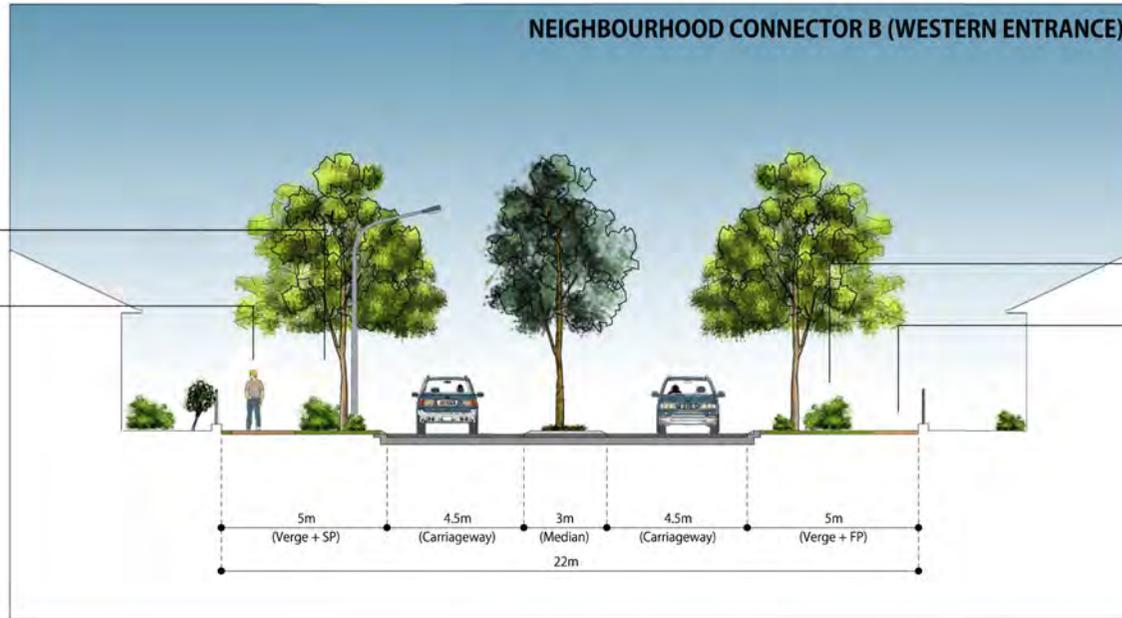
NEIGHBOURHOOD CONNECTOR B (WESTERN ENTRANCE)

Embayment parking at intervals along road

2.1-2.5m meandering shared path

Street tree planting and low, native, water wise planting to verge

1.5m footpaths to alternate side of the road



Notes:
- Reduction of verge permitted where abutting open space or easements

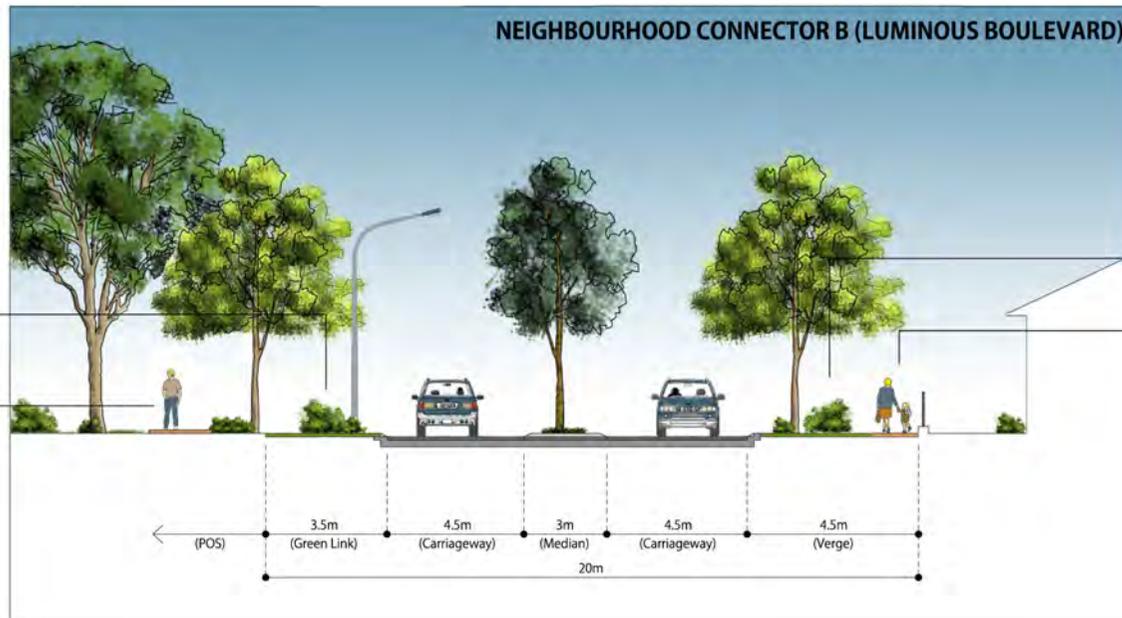
NEIGHBOURHOOD CONNECTOR B (LUMINOUS BOULEVARD)

Potential for intermittent Carparking and bio-retention swales within green link

2.1-2.5m meandering shared path within POS

Street tree planting and low, native, water wise planting to verge

1.5m footpaths to alternate side of the road



Notes:
- Reduction of verge permitted where abutting open space or easements

ROAD CROSS SECTIONS

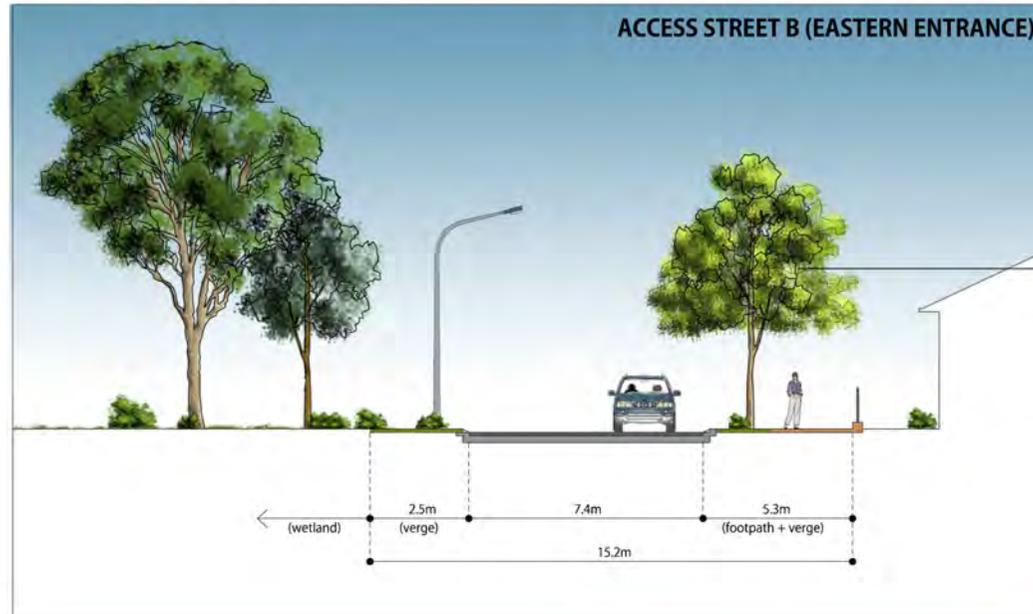
Various Lots,
BENNETT SPRINGS EAST

Scale: NTS/A3
Date: 06/04/2018
Plan: MIRWS-5-024A

Figure 11



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Street tree planting and low, native, water wise planting to verge

- Notes:
- Reduction of verge permitted where abutting open space
 - 2.1-2.5m shared path within verge
 - 1.5m for footpath



Street tree planting and low, native, water wise planting to verge

Car bays to be provided at intervals along road corridor with tree planting within nibs

1.5m footpath to alternate side of the road

- Notes:
- 15m Road Reserve may be reduced to 13m where abutting open space easements or other road reserves
 - 1.5m footpaths as standard

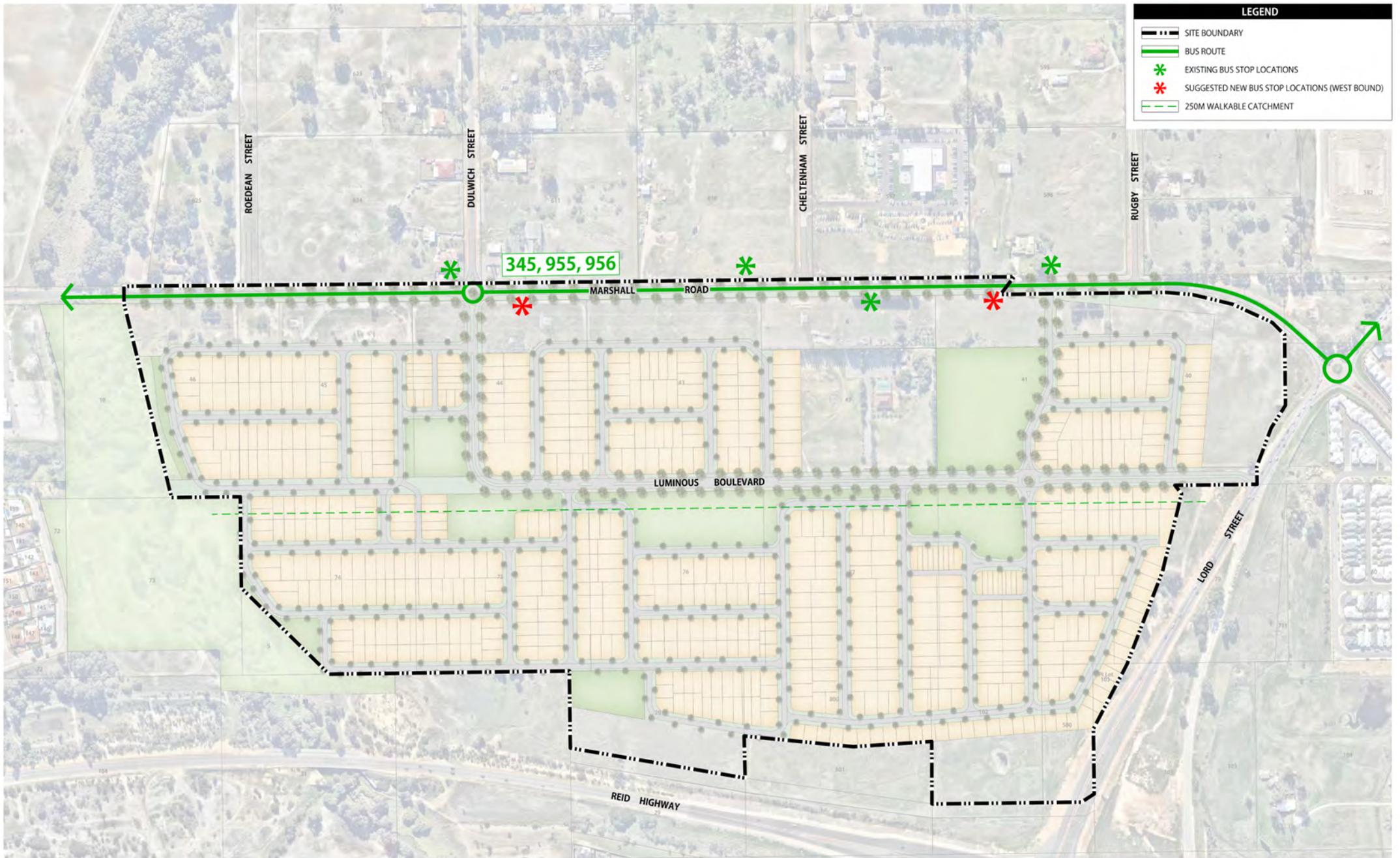
ROAD CROSS SECTIONS

Various Lots,
BENNETT SPRINGS EAST

Scale: NTS@A3
Date: 21/12/2015
Plan: MIRWS-5-024

Figure 12

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LEGEND	
	SITE BOUNDARY
	BUS ROUTE
	EXISTING BUS STOP LOCATIONS
	SUGGESTED NEW BUS STOP LOCATIONS (WEST BOUND)
	250M WALKABLE CATCHMENT

PREFERRED BUS ROUTES

Various Lots,
BENNETT SPRINGS EAST

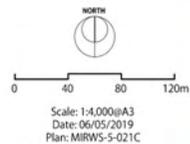
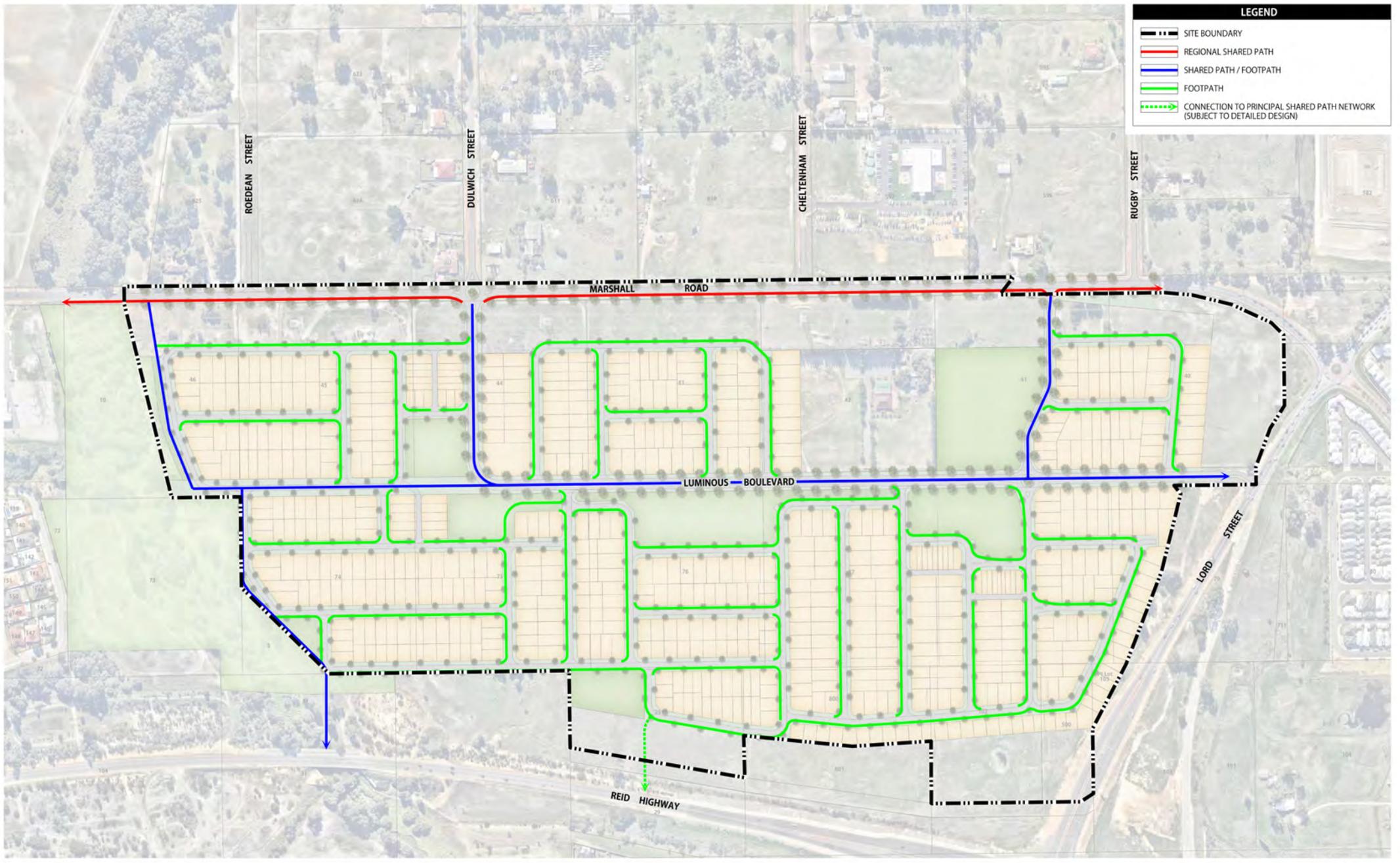


Figure 13



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INDICATIVE PATH NETWORK

Various Lots,
BENNETT SPRINGS EAST

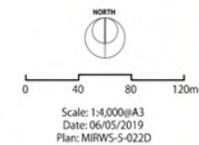


Figure 14

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3.11 Public Open Space

A Public Open Space Schedule has been prepared for the Structure Plan area (**Figure 15** refers) and illustrates compliance with the 10% creditable POS requirement in accordance with *Liveable Neighbourhoods* guidance and WAPC's Development Control (DC) Policy 2.3 *Public Open Space in Residential Areas*. A Streetscape Perspective prepared by CD+P, and Landscape and Street Tree Master Plans/Strategies have been prepared by Emerge Associates in support of the Structure Plan (**Figures 15a**, and **16 – 19** refer).

These plans collectively rationalise the land areas, POS hierarchy, required drainage provision and suggested landscape form and intended long term development. The POS areas are distributed and will be designed so as to create local 'precinct' amenity and identity throughout the Structure Plan area.

The POS Schedule will be continually reviewed under the more detailed subdivision and engineering design stages, as drainage provision, earthworks and nett residential development cells are further adjusted.

3.11.1 Local Amenity

The Structure Plan proposes a total of ten areas of 'open space', of which seven areas are to include creditable areas of Public Open Space (POS).

The positioning and configuration of the credited POS areas is strongly influenced by an objective to provide a continuous east-west 'green-link' adjacent to the original Coast Road (Luminous Boulevard) reservation; this integral to enhancing and improving pedestrian connectivity and synergy between key POS areas throughout the Structure Plan area. The streetscape perspectives under **Figure 15a** provide illustration of the intended green-link, including 20 – 30m wide POS corridors inclusive of the residual road reservation on the southern side of Coast Road.

The green-link POS layout will enable a safe, attractive and appealing pedestrian link (focus) across the entire Structure Plan area. Also of importance is the role it will play in providing a feature upon entry to the Structure Plan area at both the Lord Street and Marshall Road/Dulwich Street entrances.

POS areas, both active and passive, have been suitably designed to ensure all future residents are within 200 – 400m of an area of POS; these spaces generally being 3,000m² or greater in area.

The final configuration of POS areas may be adjusted subject to advancement in design of the pedestrian green-link, as well as the developer's intended built form outcomes for the residential cells adjacent to these amenity areas.

When undertaking calculations for POS contributions, 'Restricted POS' (2%) is commonly allocated to accommodating 1:1 to 1:5yr ARI drainage, noting these spaces generally coincide with 'Unrestricted POS' areas in forming consolidated parklands. However, based on the endorsed Local Water Management Strategy (LWMS), the broader Structure Plan area provides 1:1yr ARI drainage only, with minimal 1:1 to 1:5 yr ARI drainage areas. Consequently, this provides opportunity for the permitted 2% 'Restricted POS' to be allocated to other areas deemed useable for recreational purposes under WAPC's *Liveable Neighbourhoods*.

Other Restricted POS considerations may include the buffer pertaining to the Resource Enhancement Wetland (REW) within POS 7. Inclusion of this area as part of the creditable 2% 'Restricted POS' may be subject to a Wetland and Rehabilitation Management Plan and/or Landscape Management Plan during the subdivision phase; this to ascertain if these areas (or part thereof) offer useable recreational spaces.

For wetland buffer areas, useable recreational spaces may be limited to a path network or seating areas, thus minimising a development's impact on wetland cores and associated buffers. The POS Schedule (**Figure 15**) includes creditable POS for the REW buffer within Lot 41 Marshall Road.

Notwithstanding the ultimate land tenure, the Bennett Brook foreshore (CCW core and buffers) and internal REW area and associated buffers will need to be sensitively managed to ensure these sites are not compromised. This may be achieved via native planting and revegetation (i.e. tube stock) of disturbed peripheral areas (**Figure 19** refers), however in a manner that does not create a future bushfire safety risk for the adjoining residential development.

The remaining three 'open space' areas relate to the Western Power High Voltage Powerline easement adjacent Marshall Road, these areas to be reserved 'Public Utilities'.

Maintenance of the Western Power easement must be considered recognising in excess of 6ha of land is non-creditable open space and a gateway into the Structure Plan area. Whilst a general tidying up of the easement is expected, any landscaping works and ongoing maintenance of the area will be reflective of the easement land use; this generally to a much lower standard than designated and creditable POS areas proposed within the Structure Plan area (**Figure 19** refers).

The 'Private Clubs and Institutions' (Cambodian Temple site) on Lot 42 Marshall Road is excluded from POS calculations. Therefore, if developed for residential purposes, will require its own standalone 10% POS contribution.

The REW within Lot 41 Marshall Road results in the 30m wide REW buffer encroaching into the eastern portion of Lot 42. Any future subdivision design for Lot 42 should include a POS interfacing directly with the REW buffer, so as to provide a consolidated 'green space' across these landholdings.

3.11.2 District and Neighbourhood Amenity

Whilst the Structure Plan area does not include any 'District' Playing Field infrastructure, the SUGCSRSP identifies a key District Open Space and Playing Fields in the Dayton Urban Cell. All development within the SUGCSRSP will financially contribute to this facility under mechanism of a Development Contribution Plan.

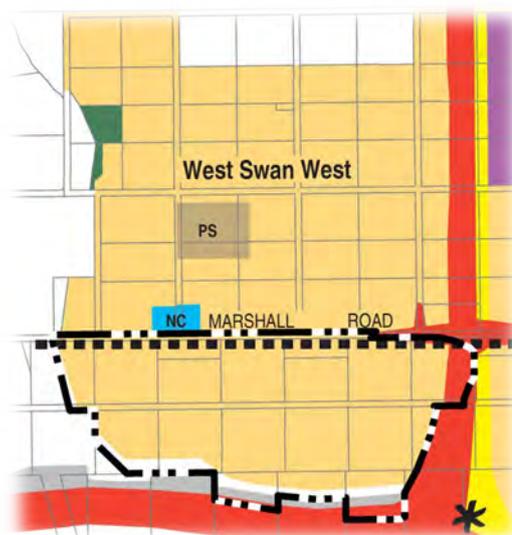
More locally, a Neighbourhood Park/Playing Field is earmarked in the northern portion of the West Swan West Urban cell; the suggested site positioned between the earmarked Primary School and Local Activity Centre. Whilst no (Local) Structure Planning has progressed over this northern cell, the positioning of the Playing Field to be co-located with the Primary School and adjacent the Local Activity Centre provides for a consolidated community hub that is financially funded by developer contributions, and benefits both the northern and southern Structure Plans of the broader West Swan West Urban Cell.

3.12 Neighbourhood Active Open Space Contribution

Development of the *West Swan West Urban Cell* as defined by *Swan Urban Growth Corridor Sub-Regional Structure Plan (SUGCSSP)* will be undertaken in two stages; generally being the 'Southern Precinct' and 'Northern Precinct' as defined by the Marshall Road reservation.

The development of two precincts and consequently preparation of potentially two – three separate Structure Plan areas is predicated upon, primarily:

- the Lifting of Urban Deferment of the southern precinct landholdings only; this by virtue of being unrestricted by the existing poultry farm and associated buffers otherwise affecting landholdings north of Marshall Road.
- the acquisition of the majority of the southern precinct landholdings by one land developer, and resultant advancement of technical studies and a Structure Plan over this southern precinct.



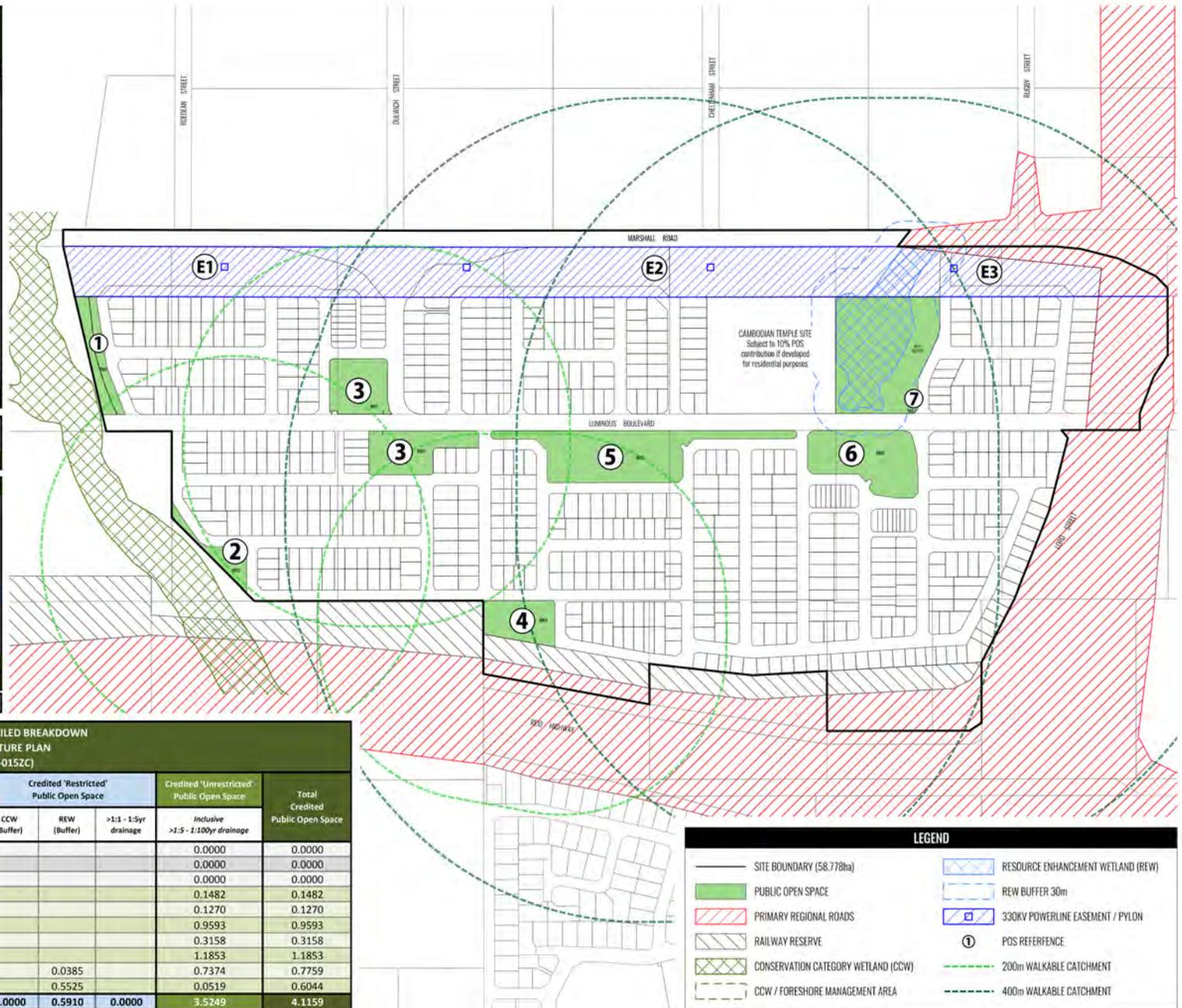
Extract – West Swan West Urban Cell (SUGCSSP)

Whilst two - three separate Structure Plans are suggested over this area, all Structure Plans will be guided by the SUGCSSP; this earmarking a Neighbourhood Centre and Primary School in the northern precinct, with the location central to the broader *West Swan West Urban Cell*. Accordingly, a Neighbourhood Active Open Space servicing this Urban Cell is also planned for the northern precinct; being minimum 3ha in size and preferably co-located with the Primary School and the future Neighbourhood Centre to combine associated community facilities.

This design objective, as per preliminary discussions with the City of Swan, will need to be addressed in any future planning of the northern precinct, however the southern precinct will financially contribute to this community infrastructure, being a beneficiary of this.

To ensure equitable distribution of community infrastructure, it is proposed that this be regulated via a Developer Contribution Plan for the broader *West Swan West Urban Cell*. In addition to District infrastructure already planned for by the City of Swan *Capital Expenditure Plan of the Urban Growth Corridor*, contributions may also be made towards Neighbourhood infrastructure including land acquisition of a 3ha Neighbourhood Active Open Space, and land and construction of associated community buildings pertaining specifically to the *West Swan West Urban Cell*.

PUBLIC OPEN SPACE SCHEDULE BENNETT SPRINGS EAST STRUCTURE PLAN (BASED ON PLAN: MIRWS-1-0152C)	
Gross Site Area	58.778
Minus Deductions	
1:1yr Drainage	0.3356
Cambodian Temple Site (balance of)	2.195
Marshall Road Reservation	2.7611
Coast Road Reservation	2.3952
WP Powerline Easement - E1	1.659
WP Powerline Easement - E2	3.2602
WP Powerline Easement - E3	0.6024
CCW Core	0
CCW Buffer (Foreshore Management Area)	0.1755
REW Core	0.9857
MRS Primary Regional Road (Lord Street)	1.8642
MRS Primary Regional Road (Reid Hwy)	1.3114
MRS Rail Reserve	1.095
Surplus Restricted Open Space	0
Total Deductions	18.6403
Gross Subdivisible Area	40.1377
Maximum 2% Restricted POS Permitted	0.8028
Minimum 8% Unrestricted POS Required	3.2110
10% POS Requirement	4.0138
POS Provision	
Restricted POS Provision	
REW Buffer	0.591
CCW Buffer	0
>1:1 - 1:5yr Drainage	0
Total Restricted POS	0.591
Creditable Restricted POS Provision	0.5910
Unrestricted POS Provision	
Credited POS (inclusive >1:5 - 1:100yr drainage)	3.5249
Creditable Unrestricted POS Provision	3.5249
TOTAL POS PROVISION	10.25% 4.1159
OVER/UNDER PROVISION OF POS	0.1021



POS AND DRAINAGE PROVISION - DETAILED BREAKDOWN BENNETT SPRINGS EAST STRUCTURE PLAN (BASED ON PLAN: MIRWS-1-0152C)											
All Figures in hectares (ha)		Uncredited Green Space (Deduction)					Credited 'Restricted' Public Open Space			Credited 'Unrestricted' Public Open Space	Total Credited Public Open Space
POS/ Easement Reference	Land Area	1:1yr drainage	WP Powerline Easement	CCW (Core)	CCW (Buffer)	REW (Core)	CCW (Buffer)	REW (Buffer)	>1:1 - 1:5yr drainage	Inclusive >1:5 - 1:100yr drainage	
E1	1.6590		1.6590							0.0000	0.0000
E2	3.2602		3.2602							0.0000	0.0000
E3	0.6024		0.6024							0.0000	0.0000
POS 1	0.3228				0.1746					0.1482	0.1482
POS 2	0.1945	0.0666			0.0009					0.1270	0.1270
POS 3	0.9913	0.0320								0.9593	0.9593
POS 4	0.4188	0.1030								0.3158	0.3158
POS 5	1.2473	0.0620								1.1853	1.1853
POS 6	0.8479	0.0720						0.0385		0.7374	0.7759
POS 7	1.5901					0.9857		0.5525		0.0519	0.6044
TOTAL	11.1343	0.3356	5.5216	0.0000	0.1755	0.9857	0.0000	0.5910	0.0000	3.5249	4.1159

LEGEND

- SITE BOUNDARY (58.778ha)
- PUBLIC OPEN SPACE
- PRIMARY REGIONAL ROADS
- RAILWAY RESERVE
- CONSERVATION CATEGORY WETLAND (CCW)
- CCW / FORESHORE MANAGEMENT AREA
- RESOURCE ENHANCEMENT WETLAND (REW)
- REW BUFFER 30m
- 330KV POWERLINE EASEMENT / PYLON
- POS REFERENCE
- 200m WALKABLE CATCHMENT
- 400m WALKABLE CATCHMENT

FIGURE 15 - PUBLIC OPEN SPACE PROVISION PLAN

BENNETT SPRINGS

A Mirvac Project

Scale: 1:5000 @ A3

PLAN: MIRWS-5-0231
DATE: 04/09/2019
PROJECTION: PCS 94
DATUM: AHD

REVISION: L
DRAWN: JF
PLANNER: BK
CHECK: JH

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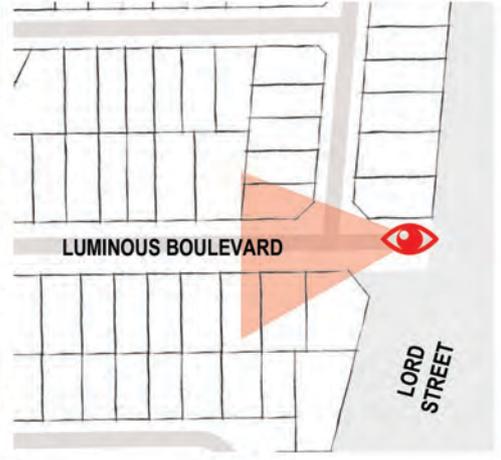
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PERSPECTIVE 1



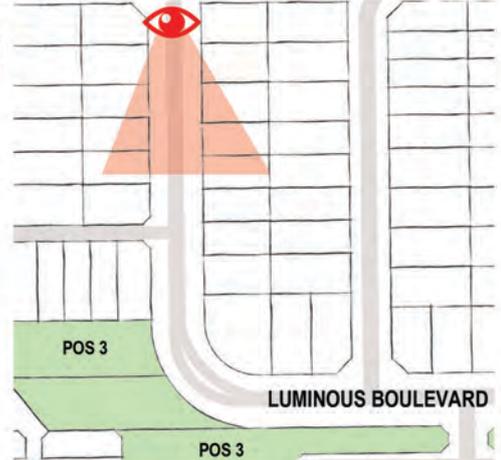
LOCATION



PERSPECTIVE 2



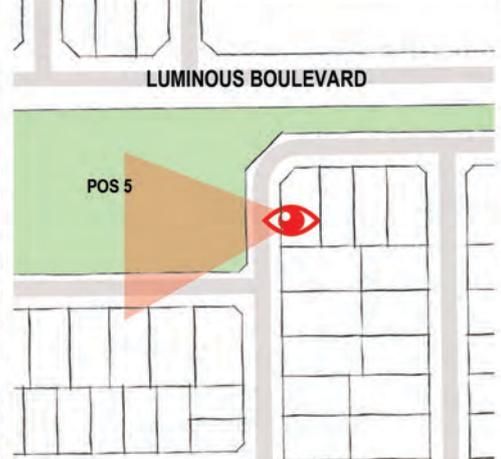
LOCATION



PERSPECTIVE 3



LOCATION



PERSPECTIVE 4



LOCATION



STREETSCAPE PERSPECTIVES

Bennett Springs East Structure Plan

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Figure 15a



FIGURE 16 - LANDSCAPE MASTER PLAN



- NEIGHBOURHOOD GREENLINK POS
- LOCAL POS
- WESTERN POWER EASEMENT
- CC WETLAND EXTENT
- REW WETLAND POS

NEIGHBOURHOOD GREENLINK POS (5 - 6)

- Centrally located to the development
- Large extensive turf area for active recreation
- Large gathering spaces to cater for community events
- Large play space catering for all ages
- Picnic facilities such as picnic seating and shelters
- Green link corridor

WESTERN POWER EASEMENT (E1,E2,E3)

- Low planting according to easement restrictions
- Pedestrian path network and connection to surrounding POS and residential areas
- Access for western power maintenance vehicles

LEGEND

--- EXTENT OF WORK	⊙ SHELTER
← CONVEYANCE SWALE	✱ POTENTIAL ARTWORK /SIGNAGE
⊞ DRAINAGE STORAGE AREAS	⊞ RESOURCE ENHANCEMENT WETLAND
✱ PLAY ELEMENTS	⊞ REW BUFFER 30m
1 PUBLIC OPEN SPACE	

LOCAL INFORMAL POS (1,2,3,4)

- Caters for residents within a 200-400mtr radius
- Predominantly native planted areas with pockets of turf
- Provides facilities such as small play element, low key seating
- Primary focus on passive recreation

WETLAND (CCW and REW)

- Retention of existing wetland topography and systems with complimentary planting.
- Sensitive implementation of footpath for path connection to the broader development and surrounding landscapes
- Shaded seating rest nodes

FIGURE 17 - STREET TREE MASTER PLAN



Eucalyptus gomphocephala - Tuart



Corymbia ficifolia - Red Flowering Gum



Eucalyptus torquata - Coral Gum



Agonis flexuosa - WA Peppermint



Eucalyptus lane-pooliei - Salmon White Gum



BENNETT SPRINGS EAST, MIRVAC
LOCAL STRUCTURE PLAN

DWG MWS-LSP-05
REV H
DATE 04-04-2018
SCALE 1:5000 @ A4
0 25 50 75 100 m
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FIGURE 18 - NEIGHBOURHOOD AND LOCAL POS STRATEGY



KEY PLAN

BRIEF DESCRIPTION

Located centrally to the development, the Neighbourhood POS provides residents with picnic and play space facilities. The park has path connections internally and a broader network to the surrounding POS areas. Drainage will be incorporated within these POS.

SIZE (Excluding Verges)
 POS 5: 12,418 sq.m
 POS 6: 8,089 sq.m

FUNCTIONS

- Turf - informal kick-about areas
- Native waterwise vegetation
- Maximise shade trees
- Picnic facilities for family/friend gatherings
- Play elements for all ages
- Path network connecting into broader path network
- Drainage

ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement, with full irrigation requirements to the informal turf playing area
- Dry garden with organic mulch, clumping plants and limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials



KEY PLAN

BRIEF DESCRIPTION

Located throughout the development, the local POS provides residents with open space in close proximity to their dwellings. The parks have areas of turf for passive play and informal kick about area with nodes of seating and shelter either provided by trees or built structure. A path network through and around the POS allows foot path connection to surrounding streets and POS areas. Drainage will be incorporated within these POS.

SIZE (Excluding Verges)
 POS 1: 1,462 sq.m
 POS 2: 1,419 sq.m
 POS 3: 8,892 sq.m
 POS 4: 4,200 sq.m
 POS 7: 504 sq.m

FUNCTIONS

- Connecting expanses of turf
- Native, water wise planting.
- Maximise shade trees with emphasis on native species
- Limited picnic facilities
- Internal path network
- Path network connecting into the broader path network
- Drainage

ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement, with full irrigation requirements to the informal turf playing area

- Dry garden with organic mulch, clumping plants and limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials



FIGURE 19 - WETLAND EXTENT AND WESTERN POWER EASEMENT STRATEGY



KEY PLAN

BRIEF DESCRIPTION

The wetland extents located to the west end of the development will be retained as vegetation to enhance the natural function of Bennett Brook. This area will be connected to surrounding POS areas and residential dwelling with a path network and intermittent seating.

SIZE

AREA 1 : 1,745 sq.m
AREA 2 : 10 sq.m



FUNCTIONS

- Path network connecting into the broader path network
- Shaded seating rest nodes

ENVIRONMENTAL CONSIDERATIONS

- No irrigation
- Re-vegetation of native plant communities to degraded areas. Location to be determined in detail design
- Removal of weed species



KEY PLAN

BRIEF DESCRIPTION

The Western Power easement located to the north of the site will be of low planting species with creative design of compacted and loose gravels. A path connection through from east to west will provide the local residents with a footpath network to connect to the surrounding POS areas, as well as north to south path connections for residents to access. Due to the Western Power easement restrictions, this area will be limited in structural facilities.

SIZE (Excluding Verges)

POS E1 : 18,779 sq.m
POS E2 : 35,785 sq.m
POS E3 : 6,023 sq.m



FUNCTIONS

- Fitness path network connecting into the broader path network
- Dog exercise
- Drainage

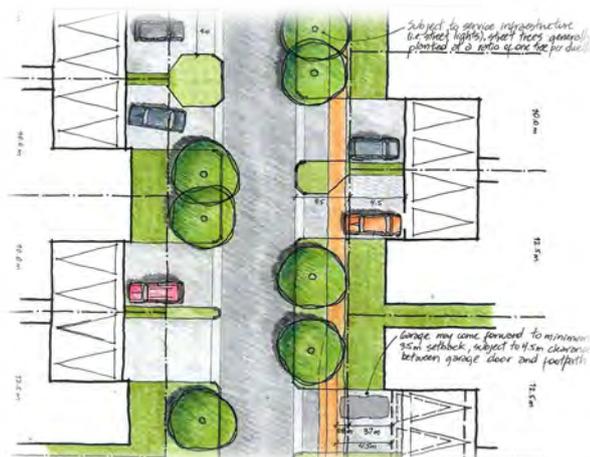
ENVIRONMENTAL CONSIDERATIONS

- Limited irrigation with hydro zoning considerations
- Waterwise native planting



3.13 Built Form, Footpath and Street Tree Strategy

To complement the POS areas, and broader street tree master plan for the Structure Plan area, a *Built Form, Footpath and Street Tree Strategy* will guide each subdivision application. This strategy will provide illustration of how built form, footpaths, street trees and service infrastructure (i.e. street lights) may function in a typical streetscape.



Sketch: Built Form, Footpath & Street Tree Strategy

As part of the broader sustainability objectives for the Structure Plan area, a street tree is recommended to be provided for every residential lot. This objective may not be suitable for each and every lot given the practicality of positioning of service infrastructure (i.e. clearance to street lights) particularly in higher density areas where a greater number of smaller (narrower) lot product is provided. Notwithstanding this, the developer will provide a street tree wherever practical, with planting undertaken once a lot has been developed and crossovers and service infrastructure positioning has been determined.

3.14 Water Management

A Local Water Management Strategy (LWMS) has been prepared for the Structure Plan area developed in accordance with *Better Urban Water Management* (WAPC 2008), *State Planning Policy 2.9 Water Resources* (WAPC 2006) and *Planning Bulletin 92 Urban Water Management* (WAPC 2008) (**Appendix 4.6** refers).

Water will be managed using an integrated water cycle management approach, which has been developed using the philosophies and design approaches described in the *Stormwater Management Manual for Western Australia* (DoW 2007).

The key principles of integrated water cycle management that have guided the water management approach for the Structure Plan area include:

- Considering all water sources, including wastewater, stormwater and groundwater;
- Integrating water and land use planning;
- Allocating and using water sustainably and equitably if possible;
- 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 maintain the existing hydrological regime and minimise pollution. The LWMS design objectives seek to deliver best practice outcomes using a Water Sensitive Urban Design (WSUD) approach, including management approaches for:

- Minimising irrigation requirements for POS and streetscapes;
- Effectively managing the risk to human life, property damage and environmental degradation from water contamination and stormwater flooding;
- Maintaining and, if possible, improving water quality (surface and groundwater) within the development in relation to pre-development water quality;
- Reducing potable water consumption within both residences and POS;

Promoting infiltration of run-off as close to the source as possible and mimic pre-development conditions;

- Implementing best management practises in regards to stormwater management; and
- Incorporating where possible, low maintenance cost-effective landscaping and stormwater treatment systems.



Photograph: Parkland and Drainage, Mirvac Project.

The LWMS provides a comprehensive summary of the existing environmental values of the Structure Plan area, which are based on site-specific studies undertaken and review of publicly available data. The characteristics and environmental values of the Structure Plan area and guidance provided by National and State policies and guidelines relevant to urban water management have guided the design criteria and propose a contemporary best practice approach to achieving the design objectives for water management.

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

- Installing water efficient fixtures and fittings in all new homes in accordance with the building design guidelines;
- Promoting water efficiency measures through educational material including water efficient appliances and the use of non-potable water supplies such as the use of rainwater tanks;
- Irrigating POS with groundwater;
- Incorporating Waterwise native plants where possible into the landscaping design to reduce irrigation demand. Turf will also be limited to areas of active recreation;
- Ensuring that all homes have a hot water system with a minimum five star rating or has a solar hot water system;
- Installation of AAA rated water efficient appliances; and
- Using Waterwise concepts in gardens.

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

3.15 Education Facilities

There are no Educational facilities proposed within the Structure Plan area.

The *Swan Urban Growth Corridor Sub-Regional Structure Plan* (SUGCSRSP) identifies a number of proposed Primary Schools and a High School in proximity to the Structure Plan area, namely in the Dayton and Brabham Urban Cells. The closest Primary School and likely long term catchment for residents of the Bennett Springs East Structure Plan is earmarked to the north of Marshall Road in the northern portion of the *West Swan West Urban Cell*. The timing of this development is however unknown given the current 'Urban Deferred' zoning and associated site restrictions.

Student catchments for Primary and High Schools will need to be determined and updated by the Department of Education prior to new residents to the Structure Plan area.

3.16 Activity Centres and Employment

The Structure Plan area does not provide for any Activity Centre or employment facilities in its boundary. Nearby major employment centres are identified under Section 3.3, and recognising new smaller centres are also planned as part of the SUGCSRSP, including a potential Local Centre earmarked to the north of Marshall Road adjacent Dulwich Street.

3.17 Infrastructure Coordination, Servicing and Staging

3.17.1 Clearing requirements

All scattered vegetation within the Structure Plan area will need to be removed prior to the undertaking of cut to fill operations. Existing buildings will also need to be demolished and asbestos removal may be required.

3.17.2 Earthworks

The Structure Plan area will be required to undergo cut to fill operations in order to satisfy the requirement for all lots to have;

- an acceptable freeboard above the 1 in 100 year ARI floodway flood level of Bennett Brook;
- to accommodate the gravity sewer system; and
- to provide clearance to the average annual maximum groundwater levels.

3.17.3 Acid sulphate soils

The majority of the site is located in a "no known risk" area, however the western portion of the site near the Bennett Brook is within a "low risk area for ASS occurring".

3.17.4 Sewage

The Structure Plan area will be serviced by an existing gravity sewer main located in Lombardy Crescent. In order to service the site, the drain sewer will be extended north by 200m to meet the southern boundary.

There is capacity for the site to be serviced by an internal reticulation system which will gravitate south to discharge into the gravity sewer.

3.17.5 Water Supply

The Structure Plan area will be sufficiently supplied through extension of services from nearby residential developments.

3.17.6 Power supply

It is estimated that the first 200 dwellings within the Structure Plan area will be serviced by an existing cable. An additional cable will provide the required power for the remainder of the site.

3.17.7 Telecommunications

NBN will be the primary telecommunication service provider for the Structure Plan area. There is existing Telstra infrastructure along all roads adjacent to the Structure Plan Area.

3.17.8 Gas

There is existing high pressure infrastructure within the Structure Plan Area on Cranleigh Street. This will be extended south-west down Lord Street to service the entirety of the site.

3.17.9 Roads

All internal roads will be developed to the standards of the City of Swan. Marshall Road and Lord Street will be upgraded to accommodate increased traffic volumes.

3.17.10 Stormwater Management & Drainage

The Structure Plan area is subject to a drainage strategy which specifies the use of underground pit and pipe storm water and subsoil networks within road verges, overland floor paths over paved areas, swales, bio-retention and infiltration basins.

3.18 Developer Contributions Arrangements

The Structure Plan area will be subject to a Development Contribution Plan (DCP) pursuant to Local Planning Scheme No. 17 Amendment No. 140 and guided by State Planning Policy 3.6 – *Development Contributions for Infrastructure*. The DCP will be consistent with other DCP's prepared for residential development in adjoining Urban Cells and guided by the following documents:

- The *Swan Urban Growth Corridor Sub-Regional Structure Plan*;
- The *Urban Growth Corridor-Sub Regional Planning Community Facilities Analysis*, 2008 (CFA);
- The *Capital Expenditure Plan for Urban Growth Corridor*;
- *Urban Growth Corridor Facilities Justification Report* (UGCFJ);
- Local Structure Plans and associated appendices; and
- City of Swan *Transport Strategy*.

The DCP will provide for community infrastructure, sub-regional community infrastructure and community facilities. More specifically, the DCP will aid in:

- The construction of a District Active Open Space in Dayton; this will consist of playing fields, hard courts, a multipurpose community building and other sporting amenities; and

- Acquisition of land in DCA 1 – Brabham for a District Community Centre.

More locally, the DCP may contribute to a Neighbourhood Active Open Space at a site north of Marshall Road; in proximity to the future primary school and Local Centre as generally identified in the *Swan Urban Growth Corridor Sub-Regional Structure Plan*.

The DCP will also provide for the construction and upgrading of existing and future roads, including:

- The upgrade of Marshall Road between Lord Street (future Whiteman Avenue) and the western boundary of the DCP area;
- Land resumptions required to accommodate the proposed designs for roads and intersections where these are not already provided for in the existing road reserves; and
- Relocation of existing underground and overhead services where they would interfere with the upgrading/construction of the proposed road designs.

In addition, under clause 5A.2.3 of the LPS17, the DCP is also permitted to provide for administrative costs. This includes the cost of preparing and administering the DCP, for review estimates by an appropriately qualified independent person and for updating schedules, register of cost contributions and infrastructure agreements.

3.19 Other Requirements

3.19.1 Staging

The development of the Structure Plan area will be implemented in multiple stages (**Figure 21** refers). The staging plan is indicative as timing, location and composition of the future stages will be dependent on market demand.

The staging is anticipated to commence in the eastern portion of the site, with access provided via Coast Road and developed for Display Village, Sales Office and 'first release' residential purposes. The staging will move westwards with potential to skip land parcels subject to individual landowner intentions.

The provision of engineering infrastructure and primary internal road network will also need to be staged to suit development demand and/or suitable access at an early stage. A detailed programme for this will be prepared as part of ongoing detailed planning and design of service infrastructure.

FIGURE 20 - STORM WATER TREATMENT



DRAINAGE CONSIDERATIONS

Drainage figures as per RPS LWMS report. Basin quantities based on basin designs 300mm depth with 1:6 side slopes.
 Note: rain events above the first 15mm to be captured in Bennett Brook.

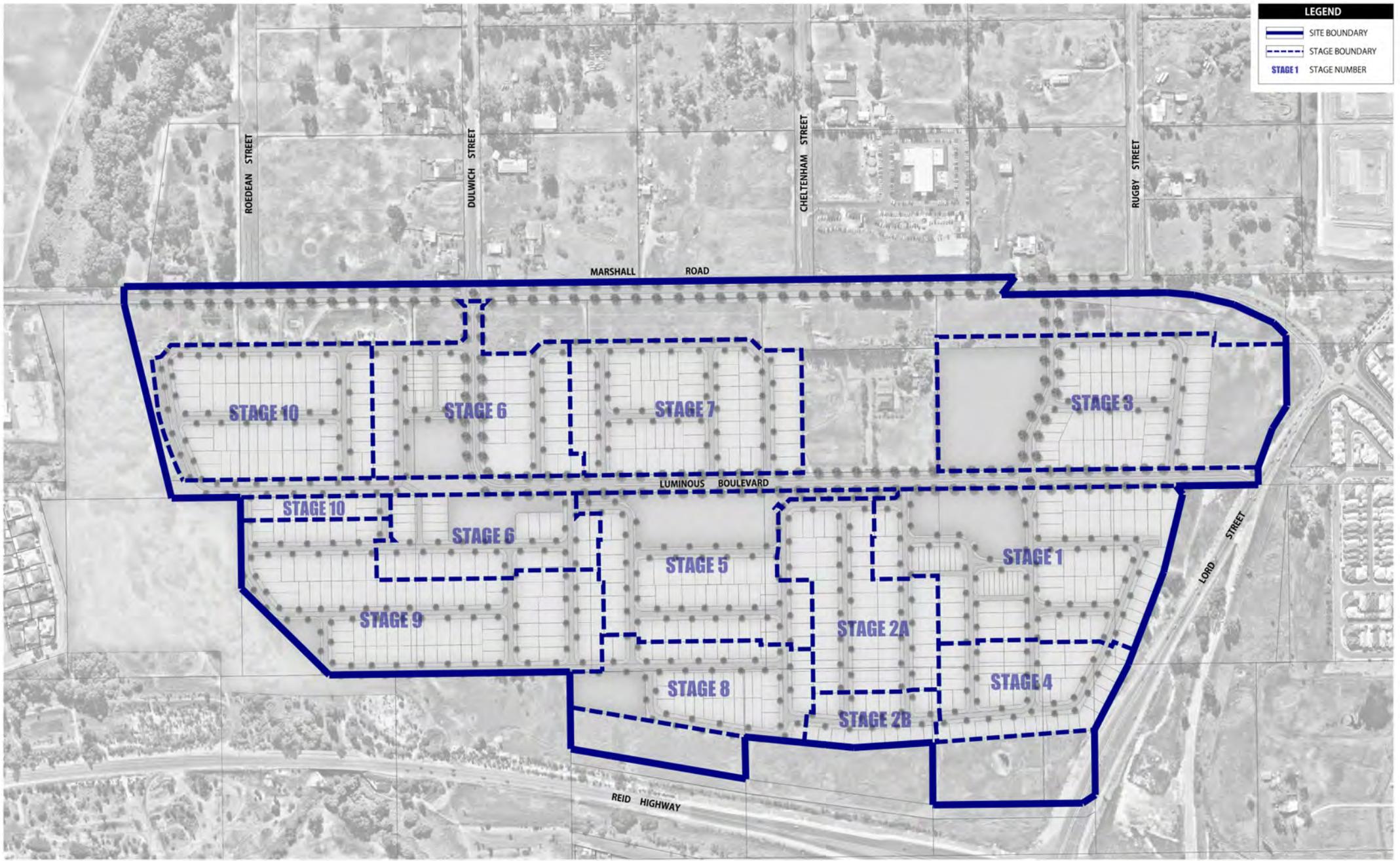
<p>Detention Storage POS 1 No storage required</p>	<p>Detention Storage POS 4 First 15mm: 940sq.m Volume : 249m3</p>	<p>Detention Storage POS 6 First 15mm: 850sq.m Volume : 213m3</p>	<p>Detention Storage POS E1 First 15mm: 150sq.m Volume : 32m3</p>
<p>Detention Storage POS 2 First 15mm: 755sq.m Volume : 197m3</p>	<p>Detention Storage POS 5 5A First 15mm: 630sq.m Volume : 162m3</p>	<p>Detention Storage POS 7 No storage required</p>	<p>Detention Storage POS E2 First 15mm: 185sq.m Volume : 41m3</p>
<p>Detention Storage POS 3 First 15mm: 440sq.m Volume : 110m3</p>			<p>Detention Storage POS E3 No storage required</p>



BENNETT SPRINGS EAST, MIRVAC
 LOCAL STRUCTURE PLAN

DWG MWS-LSP-02
 REV H
 DATE 04-04-2018
 SCALE 1:5000 @ A4
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STAGING PLAN

Various Lots,
BENNETT SPRINGS EAST

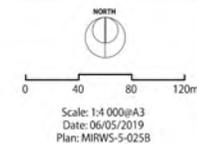


Figure 21



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4 Technical Studies (Appendices) Index

Appendix Number	Title	Prepared by
VOLUME 1		
4.1	City of Swan Policy POL-LP-11 – <i>Variation to Deemed to Comply Requirements of the R-Codes – Medium Density Single House Development Standards (R-MD Codes)</i>	City of Swan
4.2	Bushfire Management Plan – (Apr 2019 Revised)	Strategen
4.3	Transportation Noise Assessment	Herring Storer
4.4	Transport Assessment	GTA Consultants
4.6	Local Water Management Strategy + Addendum – Structure Plan Amendment 1 (Apr 2018) + Bennett Brook Foreshore Area Report (Oct 2018) + DWER Approval (Oct 2018)	RPS
4.7	Engineering Servicing Report	JDSi
4.8	Certificates of Title	
VOLUME 2		
4.5	Environmental Assessment and Management Strategy + Memorandum – Structure Plan Amendment 1 (Oct 2018)	RPS

NB.

- i. *The Structure Plan (Plan 1) referenced in the specialist consultant reports under Part 4 – Technical Studies generally correspond to the Structure Plan (Plan 1) of the Planning Report approved by the WAPC; this recognising the consultant reports were generally prepared to guide the final Bennett Springs East Structure Plan Planning report and Plan 1 within.*
- ii. *Where minor variations to Plan 1 are identified between the Planning Report and Consultant Reports under Part 4 – Technical Studies, the Planning Report (Plan 1) shall prevail.*

Notable minor variations between Plan 1 of the Planning Report and Part 4 – Technical Studies include:

- *The zoning of the land associated with the Western Power High Voltage Powerline Easement, resolved by the WAPC to have a Local Scheme Reserve - 'Public Utilities' in the approved Planning Report (Plan 1).*
- *The zoning of the land associated with Lot 42 – Cambodian Temple Site, resolved by the WAPC to have a Local Scheme Reserve – 'Private Clubs and Institutions' in the approved Planning Report (Plan 1).*
- *Minor amendments to the size and configuration of Public Open Spaces areas, notably POS 1 and POS 2 on the western periphery of the site; and removal of POS 7 reference within Lot 42 – Cambodian Temple Site.*



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