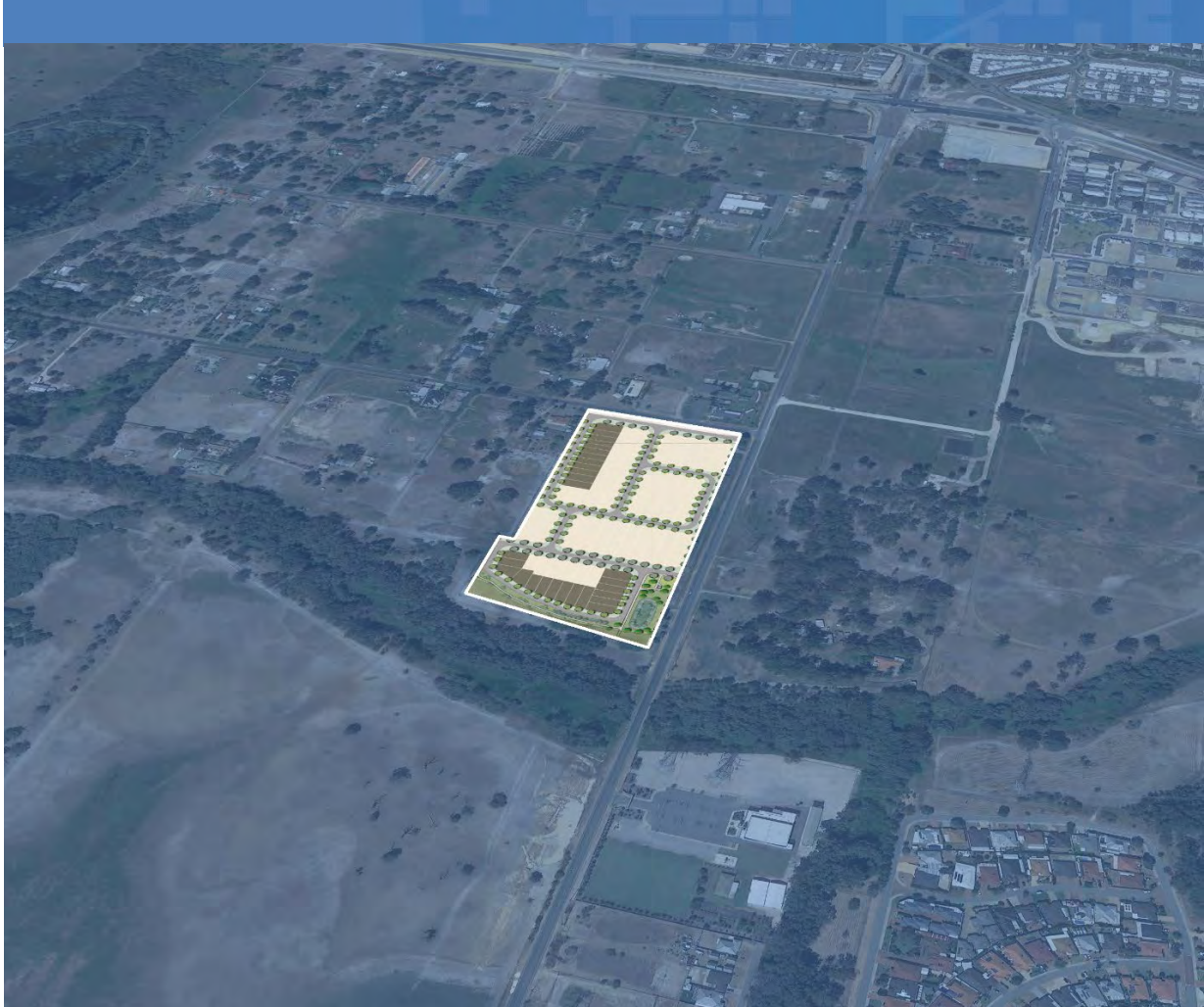


Lots 624 & 625 Marshall Road, Bennett Springs

LOCAL STRUCTURE PLAN



Prepared for **Bennett Springs Land Development Pty Ltd**
Prepared by **Taylor Burrell Barnett**



DOCUMENT HISTORY AND STATUS

Bennett Springs Local Structure Plan

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Revision	Reviewer	Date Issued
15/095-0	JF	December 2016
15/095-1	JF	March 2017
15/095-2	RC	January 2020
15/095-3	RC	June 2020

ENDORSEMENT

This Structure Plan is prepared under the provisions of the **City of Swan Local Planning Scheme 17**.

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

...24 July 2020..... Date

Signed for and on behalf of the Western Australian Planning Commission


.....

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


..... Witness

...28 July 2020..... Date

...24 July 2030..... Date of Expiry

TABLE OF AMENDMENTS

Amendment No.	Summary of the Amendment	Amendment Type	Date Approved by WAPC

TABLE OF DENSITY PLANS

Density Plan No.	Area of Density Plan Application	Date Endorsed by WAPC



EXECUTIVE SUMMARY

This Local Structure Plan (LSP) is prepared to guide the subdivision and development of Lots 624 and 625 Marshall Road, Bennett Springs, hereafter referred to as the 'LSP area' or 'subject land'. The subject land is located approximately 15km north west of Perth's Central Business District, within the City of Swan. The subject land is located within Swan Urban Growth Corridor Sub-Regional Structure Plan.

The LSP proposes development of the subject land for:

- Residential purposes comprising a mix of medium densities;
- Public open space (POS);
- Wetland buffer; and
- Neighbourhood connector and various access streets.

LOCAL STRUCTURE PLAN SUMMARY

Item	Data	Structure Plan Reference (section no.)
Total area covered by the Structure Plan	5.8072 hectares (excluding existing road reserves)	1.2
Area of each land use proposed: <ul style="list-style-type: none">• Residential• Public Open Space	4.9918 hectares 0.6392 hectares	3.3
Estimated Lot and Dwelling Yield	95 lots / dwellings	3.3
Estimated Residential Density Residential Site Density	26 dwellings per site hectare	3.3
Estimated Population	266 people @ 2.8 people/household	3.3
Estimated area and percentage of Public Open Space given over to: <ul style="list-style-type: none">• Local Park• Wetland Buffer (WAPC managed)	0.3833 hectares (60%) 0.2559 hectares (40%)	3.4



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PART ONE

IMPLEMENTATION

1 LOCAL STRUCTURE PLAN AREA

This Local Structure Plan (LSP) applies to the land contained within the inner edge of the line denoting the LSP boundary on the LSP Map. The LSP has been prepared for Lots 624 and 625 Marshall Road, Bennett Springs. Planning is underway for the future Bennett Springs East Station and the associated rail alignment on Cranleigh Street as part of the Morley-Ellenbrook Line project.

2 OPERATION

This LSP commences operation on the date it is approved by the Western Australian Planning Commission (WAPC) and the duration of approval is consistent with Part 4, Schedule 2 of the Deemed Provisions within the Planning and Development (Local Planning Schemes) Regulations 2015.

3 STAGING

Given services for the subject land will ultimately be provided via Marshall Road, development of the LSP area will likely commence from the south. The POS in the south-eastern corner provides an opportunity to create an attractive entry statement to the LSP area, with the first stage of development likely to commence off Roedean Street. The upgrading of existing roads to an urban standard will be a requirement for subdivision adjacent to these roads.

Subdivision is to occur in stages as specified in the **Staging Plan** below. Stage 2 subdivision is only to be approved if the WAPC is satisfied that the following has been addressed, on advice of the City, PTA and Metronet:

- Confirmation of land requirements for Lot 624 for the Dulwich Street bridge;
- Connection points from Lot 624 to provide for an east-west connection to be coordinated with Lot 611 Marshall Road;
- Connection points north of Lot 624 to be coordinated with Lot 623 Roedean Street; and
- Residential lot configuration and density adjacent to future public open space.



Staging Plan

4 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

4.1 LAND USE

The LSP Map (**Plan 1**) identifies the following classifications applicable to the LSP area:

- Residential;
- Public Open Space; and
- Local Road.

Land use permissibility within the LSP area shall accord with the land use permissibility of the corresponding zone/reserve in the City of Swan Local Planning Scheme No. 17 (LPS17).

4.1.1 RESIDENTIAL (R30-R40)

4.1.1.1 DWELLING TARGET

Subdivisions are generally to achieve 26 dwellings per residential site hectare.

4.1.1.2 DENSITY

- Plan 1** (Local Structure Plan) defines a residential density range. Lot specific residential densities, generally in accordance with the defined residential density ranges, are to be assigned in accordance with a Residential Density Code Plan determined by the WAPC.
- A Residential Density Code Plan is to be submitted at the time of application for subdivision approval to the WAPC, and shall indicate the residential density code applicable to each lot within the proposed subdivision. The Residential Density Code Plan shall be generally consistent with the residential density ranges identified in the LSP and the locational criteria outlined in clause 4.1.1.3.
- The Residential Density Code Plan is to include a summary of the proposed dwelling yield of the proposed subdivision.
- Determination of the Residential Density Code Plan shall be undertaken at the time of determination of a subdivision application by the WAPC. An approved Residential Density Code Plan shall then form part of the LSP and be used for the determination of future development applications.

4.1.1.3 LOCATIONAL CRITERIA

Subdivision applications are encouraged to provide R40 density particularly adjacent to public open space. However, R30 can be provided subject to individual applications demonstrating that some R40 lots will be provided and the density target in clause 4.1.1 is being achieved.

4.2 RECREATION

4.2.1 PUBLIC OPEN SPACE AND DRAINAGE

Public open space (POS) is to be provided generally in accordance with **Plan 1** and shall be vested in the Crown and managed by the local government, with the exception of the Bennett Brook Conservation Category Wetland (CCW) buffer and the strip of adjoining POS. The area of CCW buffer and adjoining strip of POS is to be credited as restricted open space at the time of subdivision with the ultimate intention of this area being managed by the WAPC and included in future Regional Open Space.

The POS areas can accommodate stormwater generated from the proposed development and WAPC will reassess the urban water management requirements at subdivision stage on the advice of City of Swan. The Bennett Brook CCW buffer is to only accommodate pre-development flowrates.

For the shortfall of 10% requirement for public open space (land component), the subdivider is required to make a cash-in-lieu contribution equivalent to the shortfall as part of the subdivision of the land.

4.2.2 ENVIRONMENTAL CONSERVATION

A 30m buffer has been provided to the Bennett Brook CCW. The buffer is identified as a future Parks and Recreation reserve and is consistent with the management arrangements for the Bennett Brook CCW, whereby the CCW buffer shall be managed by the WAPC.

5 LOCAL DEVELOPMENT PLANS

Local Development Plans (LDPs) shall be prepared for the following lots:

- lots smaller than 260m²;
- lots adjoining POS;
- lots impacted by transportation noise;
- rear-loaded (laneway) lots; and
- lots with access restrictions (including lots adjacent to Marshall Road).

Matters to be addressed in the LDPs may include (but are not limited to) the following:

- access and parking arrangements/restrictions;
- dwelling orientation and passive surveillance;
- setback variations; and
- noise amelioration measures.

6 OTHER REQUIREMENTS

6.1 BUSHFIRE MANAGEMENT

This LSP is supported by a Bushfire Management Plan (BMP) refer **Appendix D**.

6.2 NOISE

A Transportation Noise Assessment has been prepared for the LSP by Lloyd George Acoustics and is contained in **Appendix E**.

As identified on **Plan 1**, options for noise mitigation measures are outlined in the Transport Noise Assessment, and include noise wall treatments and quiet house design packages. The preferred option is to be justified by the applicant at subdivision stage and further noise assessment may be required by the WAPC in consultation with the City of Swan.

A Local Development Plan is required to be prepared for all lots with noise levels beyond the target, as outlined in section 5.

6.3 DEVELOPMENT CONTRIBUTION ARRANGEMENTS

Developer contributions will be required if a Development Contribution Plan (DCP) applies to the Structure Plan area under the Scheme. If at the time of considering a subdivision or development application, in the interim period where a DCP has been advertised but not implemented into the Scheme, the WAPC or the City of Swan may require the landowner to enter into a Deed of Agreement with the City pursuant to Clause 5A.2.7.2 of LPS17 to the satisfaction of the WAPC.

6.4 ROAD WIDENING AND UPGRADING

Plan 1 depicts road widening for Marshall Road (5m) and Dulwich Street (up to 2.2m) to provide for future traffic volumes based on the ultimate development of the West Swan (West) area, in accordance with the Transport Assessment contained in **Appendix F**. The land required for road widening shall be ceded at the time of subdivision of adjacent land.

In addition to the land required for widening on Marshall Road and Dulwich Street the subdivider is responsible for:

- Dulwich Street and Roedean Street being upgraded within the LSP area when subdividing adjacent land; and
- A contribution to the upgrade of Marshall Road when subdividing adjacent land. The contribution is not to include any costs associated with the upgrading of land ceded at subdivision stage.

Additional requirements are to be assessed at subdivision stage for the following:

- Road widening and upgrading at both the Marshall Road intersections of Roedean Street and Dulwich Street.

7 ADDITIONAL INFORMATION

Prior to any subdivision or development of the land being supported, the following management plans, reports and strategies are to be prepared, as applicable, to the satisfaction of the relevant authority and provided at the relevant submission stage nominated in **Table 1**.

TABLE 1: MANAGEMENT PLANS, REPORTS AND STRATEGIES

Additional information	Approval Stage	Approving Authority
Water Management		
Urban Water Management Plan	Condition of Subdivision	City
Environment		
Wetland Management Plan	Condition of Subdivision	City, DWER
Ethnographic and Archaeological Survey	Prior to Subdivision	DPLH
Engineering		
Acid Sulfate Soils	Condition of Subdivision	DWER
Geotechnical	Condition of Subdivision	City
Other		
Local Development Plan(s)	Condition of Subdivision	City

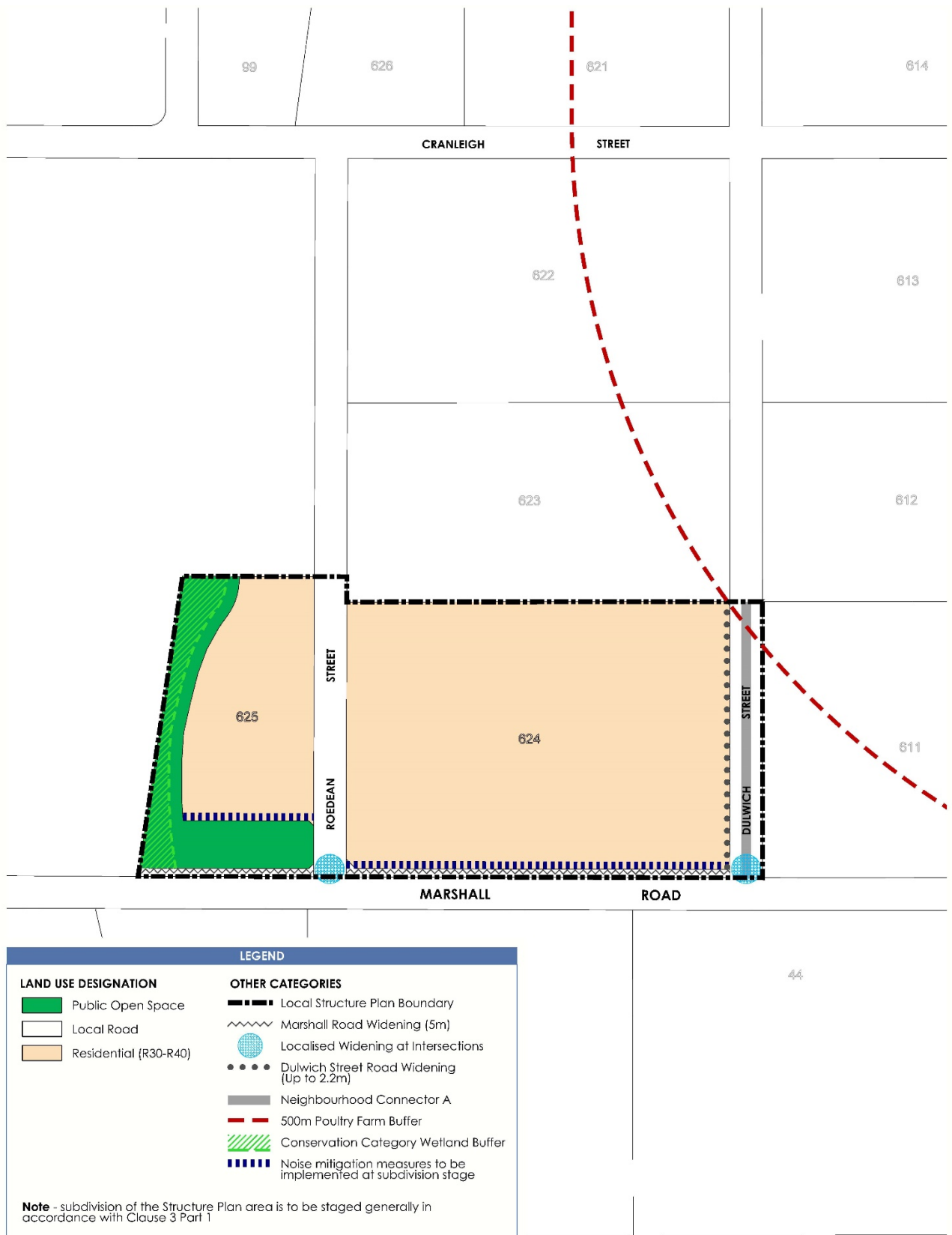
City City of Swan

DPaW Department of Parks and Wildlife

DWER Department of Water and Environmental Regulation

DPLH Department of Planning, Lands and Heritage

WAPC Western Australian Planning Commission



Plan 1 - Local Structure Plan

PART TWO EXPLANATORY INFORMATION

1 PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

This Local Structure Plan (LSP) has been prepared on behalf of Bennett Springs Land Development Pty Ltd and includes land located in the north western portion of the West Swan West area, north of Marshall Road within the suburb of Bennett Springs.

The LSP will accommodate the future subdivision and development of the subject land primarily for residential purposes, providing an additional level of detail over the existing Swan Urban Growth Corridor Sub-Regional Structure Plan (Sub-Regional Structure Plan).

The LSP has been prepared to address the requirements of the City of Swan Local Planning Scheme No. 17 (LSP17) and the Planning and Development (Local Planning Schemes) Regulations 2015 (the Regulations). The LSP and report has been prepared in accordance with the Western Australian Planning Commission's (WAPC) Structure Plan Framework August 2015. Consultation has been undertaken with the City of Swan and relevant state agencies in the preparation of this LSP, as summarised in **Appendix A** Pre-lodgement Consultation. The LSP will guide future subdivision and development of the subject land and the determining authorities shall have due regard to the LSP in the assessment of subdivision and development applications.

The following technical documentation has been prepared in support of this report:

- Environmental Assessment Report (refer **Appendix B**);
- Engineering Servicing Report (refer **Appendix C**);
- Bushfire Management Plan (refer **Appendix D**);
- Transportation Noise Assessment (refer **Appendix E**);
- Transport Impact Assessment (refer **Appendix F**); and
- Local Water Management Strategy (refer **Appendix G**).

The Project Team responsible for preparing the information contained within this report, in consultation with the City of Swan and the relevant servicing authorities are outlined in **Table 1**.

TABLE 1: PROJECT TEAM RESPONSIBILITIES

Project Role	Consultant
Town Planning and Urban Design	Taylor Burrell Barnett
Civil Engineering	TABEC
Environmental	360 Environmental
Transport Assessment	Transcore
Hydrology	Hyd20
Noise Assessment	Lloyd George Acoustics
Bushfire Management	Bushfire Prone Planning/RUIC
Landscape Masterplan	LD Total

1.2 LAND DESCRIPTION

1.2.1 LOCATION

The subject land is located in the suburb of Bennett Springs, within the City of Swan.

The subject land is located immediately north of Marshall Road and bound by Dulwich Street to the east and Whiteman Park to the west. The subject land is located approximately 15km north west of Perth's CBD and less than a kilometre west of the Marshall Road/Lord Street interchange, refer **Figure 1**.

The surrounding area consists of Rural zoned land to the north and east. Land reserved in the MRS for Parks and Recreation as part of Whiteman Park is located to the west of the subject land and further north.



Figure 1: Location Plan

1.2.2 OWNERSHIP, AREA AND LAND USE

The subject land consists of 2 separate allotments. The lot areas and ownership details are included in **Table 2**.

TABLE 2: LAND OWNERSHIP

LOT	Registered Proprietor	Certificate of Title	AREA (HA)
624	Bennett Springs Land Development Pty Ltd	V 1431 F 330	4.0432
625	Bennett Springs Land Development Pty Ltd	V 1857 F 739	1.7640
TOTAL			5.8072

Historically, the subject land appears to have been used for broad acre farming and a small-scale vineyard, with rural residences built on both lots. Currently, the subject land is used for rural purposes (including horse grazing) and contains rural residences (refer **Figure 2**).

Existing land uses within the surrounding area consists of predominantly rural properties to the north and east of the subject land. Bennett Brook, a Conservation Category Wetland (CCW) and Whiteman Park (designated Bush Forever Area (Site No. 304)) are located immediately to the west of the subject land. A poultry farm is located on Lot 600 Cheltenham Road as shown in **Figure 2**. The 500m buffer from the poultry farm is located just outside the LSP area.

The Iluma Estate is located south of the subject land and is currently under development for residential purposes. A temple is also located at Lot 597 Cheltenham Road approximately 480m east of the subject land.

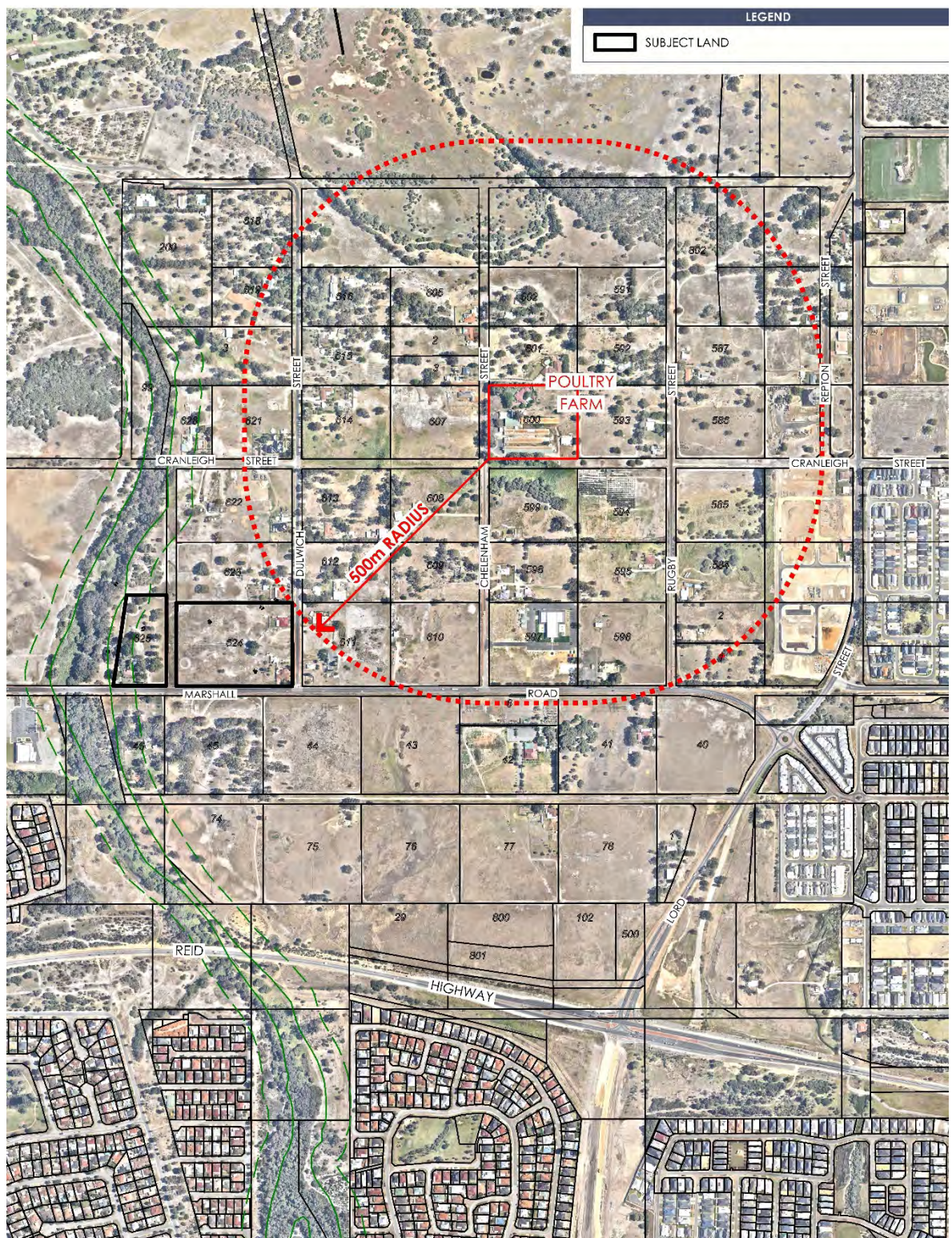


Figure 2: Site Plan

1.3 PLANNING FRAMEWORK

1.3.1 ZONING AND RESERVATIONS

1.3.1.1 METROPOLITAN REGION SCHEME

The subject land is zoned Urban under the Metropolitan Region Scheme (refer **Figure 3**). The lifting of urban deferment was gazetted on 23 September 2016. The land immediately to the north and east of the LSP area, which is located outside of the poultry farm buffer, is zoned Urban. Land within the 500m poultry buffer is zoned Urban Deferred. The land to the east of the subject land is reserved for Parks and Recreation with a Bush Forever Area Notice of Delegation. The land to the south is zoned Urban.

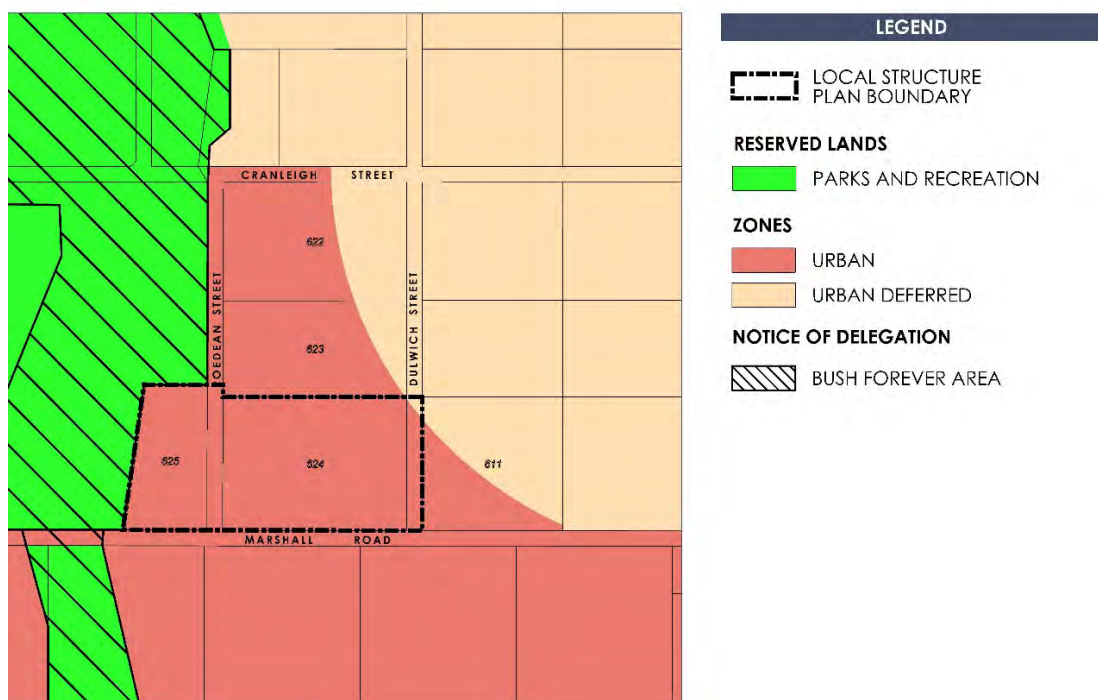


Figure 3: Metropolitan Region Scheme

1.3.1.2 CITY OF SWAN LOCAL PLANNING SCHEME NO. 17

The subject land is zoned Residential Development under LPS17, refer **Figure 4**. The adjoining land located within the 500m poultry buffer is zoned General Rural. A portion of Lot 625 is identified as a 'Flood Prone Area' and a 'Municipal boundary' extends along Roedean Street.

The Residential Development zone requires subdivision and development to be guided by a WAPC endorsed Local Structure Plan.

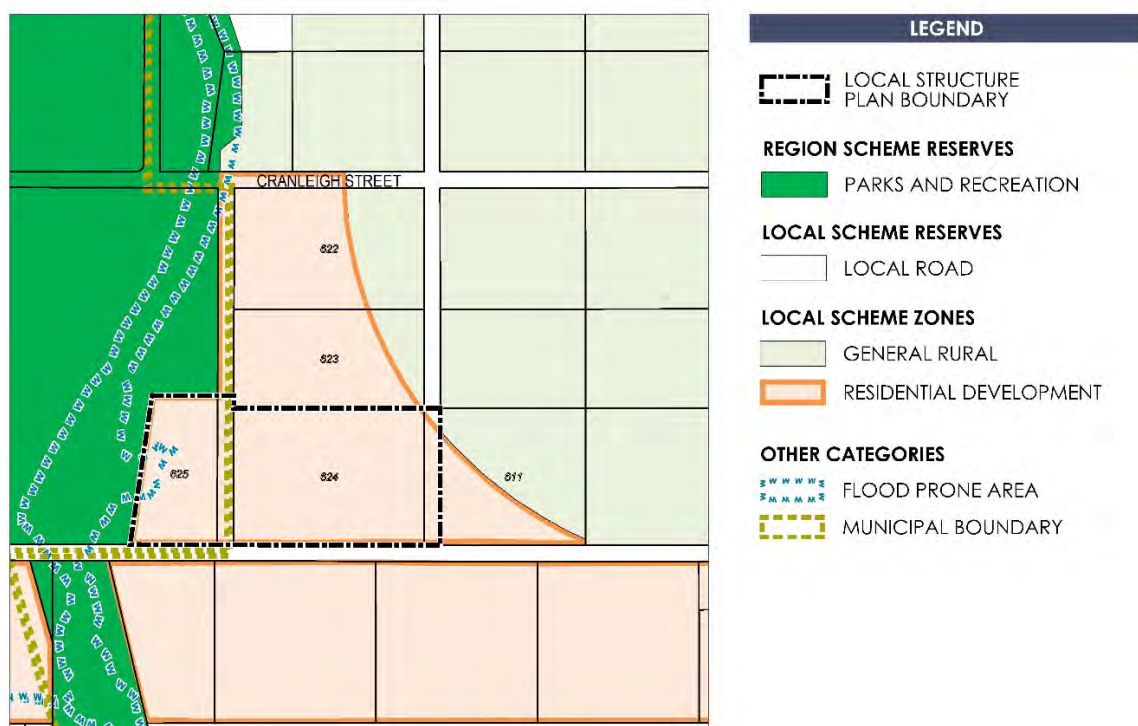


Figure 4: City of Swan Local Planning Scheme 17

1.3.2 REGIONAL AND SUB-REGIONAL STRUCTURE PLANS

1.3.2.1 SWAN URBAN GROWTH CORRIDOR SUB-REGIONAL STRUCTURE PLAN

The Sub-Regional Structure Plan was prepared by the WAPC to provide a strategic planning framework to guide future development and provide a coordinated response to planning considerations.

Under the Sub-Regional Structure Plan, the West Swan West development cell is proposed to accommodate a residential population of approximately 5,200 people through the creation of 2,000 residential dwellings, in addition to a neighbourhood centre and primary school within the area north of Marshall Road (refer **Figure 5**).

The LSP is generally consistent with the Sub-Regional Structure Plan.



Figure 5: Swan Urban Growth Corridor Sub-Regional Structure Plan

1.4 PLANNING STRATEGIES

1.4.1 DIRECTIONS 2031 AND BEYOND

Directions 2031 and Beyond is Western Australia's high level spatial framework and strategic plan. The document provides a vision for future growth of the metropolitan Perth and Peel region, with the aim of achieving a pattern of growth which promotes a better balance between greenfield and infill development.

The subject land is located within the north-east sub-region as identified by Directions 2031, where it is noted that an additional 40,000 dwellings are required in order to accommodate a projected population of 258,000 in the region by 2031. This growth is to be achieved through a combination of infill and greenfield development and presumes that all Urban Deferred zoned land within the north-east sub-region is made available to accommodate this objective.

1.4.2 PERTH AND PEEL@3.5MILLION AND NORTH-EAST SUB-REGIONAL PLANNING FRAMEWORK

Perth and Peel@3.5Million is a suite of documents released by the WAPC in 2015 for the Perth and Peel metropolitan regions to identify:

- where future homes and jobs should be located;
- how to protect important environmental assets;
- how to best utilise existing and proposed infrastructure; and
- appropriate areas for greater infill development and residential density.

As part of this documentation, sub-regional planning frameworks have been prepared to guide future development. These will then become sub-regional structure plans to guide future development and supporting infrastructure. The subject land is included within the North-East Sub-regional Planning Framework (Sub-regional Planning Framework). The Sub-regional Planning Framework identifies the subject land within a pocket of Urban Deferred land which is bound by Lord Street to the east, Reid Highway to the south and Open Space (Whiteman Park Reserve) to the west and north (refer **Figure 6**).

The minimum urban infill dwelling targets identified for the City of Swan are 5,637 dwellings in 2016-21 and 3,090 dwellings from 2021-26. Given the urban deferred status has now been lifted, the local structure planning of the subject land will assist in achieving the infill dwelling targets for the City of Swan.

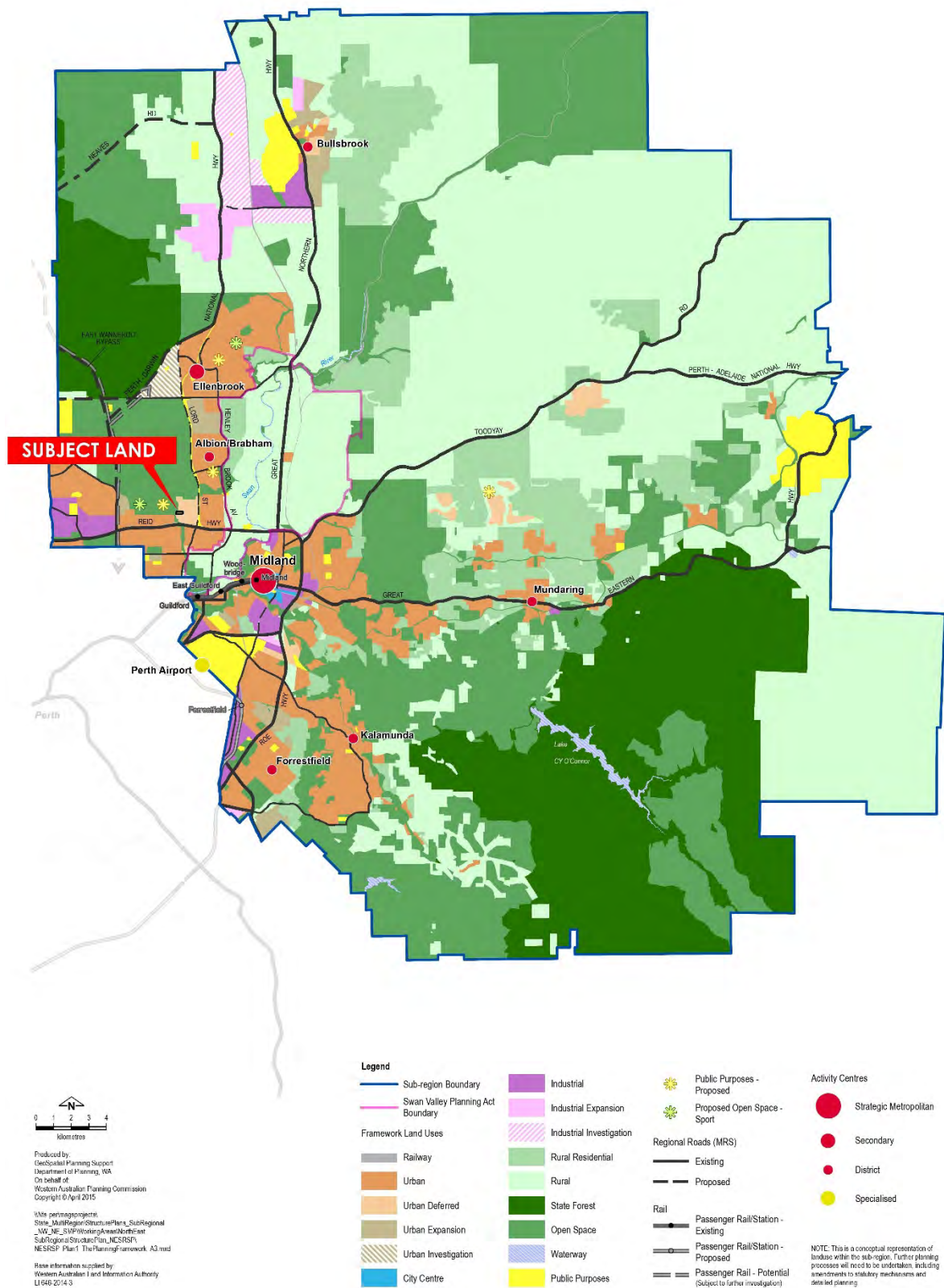


Figure 6: North-East Sub-Regional Planning Framework

1.4.3 CITY OF SWAN URBAN HOUSING STRATEGY

The City of Swan's Urban Housing Strategy has been prepared to address future housing needs resulting from population growth and to provide for the long term future residential development in the City. The Strategy includes both an Infill and Greenfields Strategy.

The LSP area is identified as a Greenfields Urban Development Area on the Urban Housing Strategy Map. The Strategy also identifies the LSP area as a Future Greenfields Area on the basis that it was zoned Urban Deferred. As the LSP area is now zoned Urban, the Strategy requires planning to progress in accordance with relevant strategic planning.

The LSP is therefore considered consistent with the requirements of the Strategy.

1.5 PLANNING POLICIES

1.5.1 STATE PLANNING POLICIES

1.5.1.1 STATE PLANNING POLICY 3.7: PLANNING FOR BUSHFIRE RISK MANAGEMENT

SPP 3.7 assists in reducing the risk of bushfire to people, property, and infrastructure by encouraging a conservative approach to strategic planning, subdivision, development, and other planning decisions proposed in bushfire-prone areas. Specifically, it:

- addresses the land use planning elements of the Keelty report;
- elevates bushfire issues to be addressed by the highest level of planning policy available, giving it clear status and effect in the land use planning policy framework;
- emphasises the need to consider bushfire management measures in strategic level policy documents, including regional and local planning schemes, sub-regional and local planning strategies and structure plans, as well as during statutory planning processes for subdivision and development applications; and
- seeks to achieve the consistent implementation of bushfire management measures across the community.

SPP 3.7 applies to all land which has been designated as bushfire prone by the Fire and Emergency Services (FES) Commissioner as identified on the Map of Bush Fire Prone Areas. Portions of the subject land are identified as bushfire prone on the Map of Bush Fire Prone Areas.

Accordingly, a Bushfire Management Plan has been prepared for the LSP area and has informed the LSP design. A copy of the Bushfire Management Plan is included in **Appendix D**.

1.5.1.2 STATE PLANNING POLICY 5.4 ROAD AND RAIL NOISE

SPP 5.4 seeks to minimise the adverse impact of transport noise, without placing unreasonable restrictions on noise-sensitive residential development. This Policy is applied where the proposal includes:

- a noise-sensitive land use within the policy's trigger distance of a transport corridor;
- new or major upgrades of roads; or
- new railways or major upgrades of railway or any other works that increase capacity for rail vehicle storage or movement and will result in an increased level of noise.

Due to the nature and volume of traffic along Marshall Road, a Transportation Noise Assessment has been undertaken in accordance with the requirements of SPP 5.4 and to inform the LSP design. A copy of the Transportation Noise Assessment is contained in **Appendix E**.

1.5.2 LOCAL PLANNING POLICIES

1.5.2.1 URBAN GROWTH POLICIES

The City has prepared and adopted an urban growth policy package, incorporating the urban growth policy, the neighbourhood planning policy, the environmental planning policy and the community and economic planning policy. In summary, these policies contain objectives for structure plans including (but not limited to):

- responding to the social and economic needs of the community;
- encouraging innovation and best practices in urban design and environmental management;
- taking a partnership approach with government, non-government and other landowners in the urban growth corridor in respect to land use and water management;
- providing choice and affordability in housing;
- creating safe and convenient access;
- encouraging an identifiable sense of place;
- minimising the impact on the natural environment;
- minimising energy, infrastructure and water costs; and
- ultimately ensuring that the urban growth contributes to sustainable urban communities.

From a community perspective the above suite of policies identifies the purpose and requirements for community and economic development planning, which are to be undertaken simultaneously with the preparation of structure plans, development plans and/or major development proposals.

Key community facilities include educational establishments (i.e. primary and high schools), whilst key economic facilities include commercial centres (both local and neighbourhood centres) and mixed business precincts. No community facilities are identified within the LSP area by the Sub-Regional Structure Plan.

The City has prepared a draft Development Contribution Plan (DCP) which provides for the delivery of community infrastructure within the West Swan West area. The draft DCP is discussed in greater detail later in this report.

1.5.2.2 CONSULTATION WITH ADJOINING LANDOWNERS

It is a requirement of developers to demonstrate an acceptable level of consultation with surrounding landowners to ensure that the relevant landowners impacted by a structure plan proposal have been informed of the plan, implementation, staging and subsequent financial contributions. As part of the preparation of the LSP, preliminary meetings were held with landowners within and adjoining the LSP area. Consultation with landowners occurred prior to the WAPC reducing the extent of the LSP area. The proponent of this LSP is now the registered proprietor of Lots 624 and 625 Marshall Road. A list of the parties liaised with, and a summary of the discussion points is included in **Appendix A**.

1.5.2.3 FINANCIAL ASSESSMENT REPORT

The above policy also requires developers to prepare a Financial Assessment Report which estimates the lifecycle costs for new and existing infrastructure (where required) and the provision, management, operation and renewal of such infrastructure. The Financial Assessment Report is required to provide details on the provision of:

- i. Public and civic open space systems;
- ii. Environmental and water management systems;
- iii. Transport networks and pathways;
- iv. Community facilities and services;
- v. Public utilities;

- vi. Any associated studies required for later stages of planning and monitoring;
- vii. Any other items the City considers relevant to the proper and orderly planning and development of the Structure Plan area; and
- viii. Detailed costings will be subject to confirmation at the subdivision stage.

In addition to the above, the policy also requires the equitable provision of various items identified for collective provision. Key aspects of this financial reporting are addressed through the City's draft DCP. The draft DCP is discussed in greater detail later in this report.

Structure Planning Areas – Subdivision and Development (DRAFT Policy)

This draft policy aims to ensure that the design of proposed Structure Plans is undertaken in a co-ordinated and integrated manner to provide the optimal development outcome. The information provided within the draft policy is intended to ensure applicants clearly understand the expectations of the City with respect to the preparation of structure plans and to ensure endorsed structure plans present data and information in a consistent format.

Notwithstanding the draft nature of the policy, its intent has been considered in the preparation of the LSP. For the purposes of this LSP report, the structure and content has been prepared in accordance with the WAPC's Structure Plan Framework (August 2015) which constitutes the manner and form in which a LSP is to be prepared in accordance with the Regulations.

Public Open Space – Residential Areas

This policy details the relevant standards and requirements of the City in relation to the provision of POS in residential areas. The requirements and standards will be incorporated into a Landscaping Plan that will be prepared at the subdivision stage.

POS within the LSP has been provided in accordance with the WAPC's Development Control Policy 2.3 – Public Open Space in Residential Areas (DC 2.3) and Liveable Neighbourhoods Element 4 – Public Parkland of Liveable Neighbourhoods.

Building and Development Standards – Residential Zones

This policy prescribes various building and development standards applicable to all development within the Residential and Residential Development zones to ensure development of land within these residential areas is consistent with the principles of proper and orderly planning.

The detailed design of future subdivision proposals will be in accordance with the requirements of Liveable Neighbourhoods, whilst the design of future residential dwellings will be in accordance with the requirements of the R-Codes, and the LDP provisions identified in **Part 1** of this report.

Floodplain Management and Development

The objectives of the City's Floodplain Management and Development policy are listed below.

- To conserve the environmental features of the floodplain;
- To ensure that development is compatible with flood management in order to minimise the risks and effects of flooding.;
- To encourage development which maintains or enhances the physical and visual amenity of the floodplain; and
- To provide guidelines for the use and development of the floodplain.

Whilst LPS17 identifies a small western portion of the LSP area as a flood prone area, this does not relate to maintaining sufficient waterway capacity within Bennett Brook. Accordingly, the earthworks strategy for the LSP area has addressed the flood management requirements to ensure compliance with the City's policy.

1.6 OTHER APPROVALS AND DECISIONS

Local structure planning has been undertaken south of the subject land, on the south side of Marshall Road; the structure plan is referred to as the Bennett Springs East Local Structure Plan. The LSP has been approved by the WAPC.

1.7 PRE LODGEMENT CONSULTATION

A considerable amount of pre-lodgement consultation occurred between the Project Team, the City of Swan, key service and referral authorities and landowners during the preparation of this LSP.

A summary of the key pre-lodgement consultation undertaken during the preparation of the LSP is included at **Appendix A**.

2 SITE CONDITIONS AND CONSTRAINTS

2.1 ENVIRONMENTAL ASSETS AND CONSTRAINTS

An Environmental Assessment Report (EAR) has been prepared by 360 Environmental in support of the LSP (refer **Appendix B**). The objective of the EAR is to describe the relevant environmental characteristics of the subject land and present management and mitigation strategies in response to potential environmental impacts.

2.1.1 VEGETATION AND FAUNA

The subject land has been highly disturbed by its use as a farm. The vegetation consists of cleared parkland and lacks an understorey except for grass and weeds. Based on review of historical aerial photography, most of the site was cleared by 1953, with only scattered trees remaining. Consequently, it is unlikely to offer valuable habitat for native fauna. The scattered trees may offer habitat for native birds, however more suitable connected habitat exists directly to the west of the site along Bennett Brook and within Whiteman Park to the north.

2.1.1.1 CONSERVATION SIGNIFICANT FLORA AND FAUNA

A Department of Parks and Wildlife (DPaW) NatureMap Flora and Fauna Search was undertaken within a 2 km radius of the subject land and a Department of the Environment (DotE) Protected Matters Search was undertaken within a 1 km radius of the subject land.

The DPaW database search results are based on recorded occurrences of individuals and therefore, are considered more site specific and more accurate than the DotE Protected Matters Search Tool that often returns modelled distributions of species.

The NatureMap Report identified one Threatened fauna species, three Priority fauna species, one Priority flora species and two fauna species protected under international agreement as occurring within a 2 km radius of the subject land (DPaW 2015b). The Protected Matters Search report identified six Threatened fauna species, nine Threatened flora species and seven Migratory fauna species as occurring within a 1 km radius of the subject land (DotE 2015).

An assessment of the likelihood of any Threatened and Priority flora and fauna occurring within the subject land found that:

- no suitable habitat exists on the subject land for conservation significant flora known to occur within the area;
- there is potential for the scattered trees throughout the subject land to offer limited foraging and/or future breeding habitat for Black Cockatoos; and
- the Rainbow Bee-eater may occasionally utilise the subject land as they are known to occur in cleared areas near water bodies (DotE 2015).

2.1.2 WETLANDS

The majority of the subject land is mapped as a Multiple Use Wetland (MUW) (DPaW 2015). Development is generally permissible on MUW's as they have little remaining ecological value. A CCW (Bennett Brook) is located west of the subject land and further to the west of Bennett Brook is a REW (DPaW 2015).

The subject land is not listed under the Directory of Important Wetlands or the Environmental Protection Swan Coastal Plain Lakes Policy 1992. The subject land is also not classified as a Ramsar site.

2.1.3 CONSERVATION AREAS

Due to the presence of the CCW adjacent to the subject land, the western portion of the LSP area falls within part of an Environmentally Sensitive Area (ESA). Whiteman Park (Bush Forever Site No. 304) borders the western portion of the subject land.

The LSP area does not contain any DPaW managed land or Regional Parks. The closest DPaW managed land is approximately 2.7 km south-west of the subject land. The western portion of the subject land forms part of two Perth regional ecological linkages (No. 13 and 22). However, due to the lack of connected vegetation on the rest of the subject land, it does not contribute to any of these ecological linkages.

2.2 LANDFORM AND SOILS

2.2.1 LANDFORM AND TOPOGRAPHY

The subject land features some existing vegetation consisting of scattered trees and grassland, however both Lots 624 and 625 are largely cleared.

The topography is relatively flat with a maximum grade of approximately 0.8% toward the south west corner of the subject land. The low level in Lot 625 is approximately 15mAHD while the 17mAHD contour is located in the north eastern portion of Lot 624 which generally forms the highest point of the LSP area. Marshall Road is approximately 16mAHD.

2.2.2 REGIONAL SOILS

The Department of Agriculture and Food WA (DAFWA) Soil Subsystems mapping indicates that the subject land falls within four soil subsystems (DAFWA 2012). These subsystems are described below.

- **Bassendean Yanga Phase** - Semi-wet soils, yellow-brown shallow sands and grey deep sandy duplexes;
- **Bassendean Jandakot Phase** - Pale deep sands;
- **Bassendean drainage lines Phase** - Wet soils (peaty); and
- **Bassendean Gavin Phase** - Pale deep sands and semi-wet soils.

2.2.3 ACID SULFATE SOILS

The Acid Sulfate Soils (ASS) risk mapping indicates that the majority of the subject land is identified as being at moderate to low risk of encountering ASS within 3 m of natural surface. A small portion of the south-eastern part of the LSP area has no known ASS risk, refer **Appendix B**.

2.3 POTENTIAL CONTAMINATION

A search of the Department of Environment Regulation (DER) Contaminated Sites Database did not identify any contaminated sites present within the LSP area (DER 2015). The closest contaminated site exists approximately 2.28 km to the south-east of the site. This contaminated site is 'remediated for restricted use'.

Review of historical aerial photography identified the previous uses of the site as broad acre farming, particularly grazing livestock. Small backyard orchards or vineyards were identified and while these are potentially contaminating land uses on a commercial scale, their small scale means minor potential to have resulted in contamination. As most of the houses on the subject land were constructed in the 1970's and 1980's, there may be the potential for the houses to contain asbestos-containing materials (ACM) and possibly there may be ACM fragments present.

2.4 SURFACE WATER AND GROUNDWATER

2.4.1 SURFACE WATER HYDROLOGY

Bennett Brook flows north to south along the western boundary of the subject land however there are no defined waterways, watercourses, or drains within the subject land.

2.4.1.1 PRE-DEVELOPMENT FLOW ESTIMATES

Pre-development flow modelling for identified sub-catchments in the Swan area were published in the Swan Urban Growth Corridor DWMP (Department of Water, 2009) and the original DWMS (TME, 2011). RPS (2015) reports similar predevelopment flows to TME (2011).

The subject land falls into two of the DWMP identified sub-catchments (WsWb and WsWd) and one DWMS identified sub-catchment (R), refer Appendix G.

Peak discharge flows in the 1% AEP event for each catchment are contained in Appendix G, as flows per unit catchment area enable pro-rata methods to be applied to estimate flows at the subject land. Based on these values, the estimated predevelopment discharge rates for the 6.5 ha site would be 0.14 m³/s based on DoW (2009) and 0.32 m³/s based on TME (2011), which reports its flow estimates as a more localised refinement of the DoW (2009) values.

Due to these inconsistencies, a pre development stormwater model was run by Hyd2o using XP Storm to estimate the discharge rates to be adopted for the LWMS. The model included a single catchment with an initial loss of 20 mm and continuous loss of 10 mm/hr consistent with loss rates specified in the DWMP modelling (DWER, 2009).

The modelled pre development peak discharge rate for a 1% AEP event was estimates as 0.21m³/s which is equivalent to 32.3 L/s/ha. This value has been used to inform the stormwater management design for the subject land.

Surface Water Quality

Surface water quality sampling was undertaken by Hyd2o at two locations from Bennett Brook. SW1 was located upstream of the subject land and provides an indication of the surface water quality flowing in the brook from its upstream catchment. SW2 was located at its crossing at Marshall Road and is indicative of the surface water quality in the brook including any contribution from the subject land.

In summary:

- pH is slightly acidic upstream and downstream with mean values falling just below the ANZECC guideline range;
- TN was relatively high in the brook exceeding the ANZECC guideline value of 1.2 mg/L, the mean value was 3.38 mg/L at SW1 and 3.78 mg/L at SW2;

- TP was high in the brook, with all samples exceeding the ANZECC guideline value of 0.065 mg/L, the mean value was 0.22 mg/L at SW1 and 0.33 mg/L at SW2; and
- All heavy metals concentrations were well below the ANZECC guideline values.

2.4.1.2 BENNETT BROOK 1% AEP FLOODPLAIN

The Bennett Spring 1% AEP floodplain is shown in Appendix G.

The extent of the floodplain is based on the 1% AEP flood mapping of Bennett Brook originally undertaken performed by the Water Authority of WA. The floodway and flood fringe boundaries provided by DWER (Water Authority of WA, 1989) were based on 1988/89 data using 2 m interval topographic contours available at the time. Hyd2o have refined the floodway and flood fringe boundaries based on current 1 m LiDAR contours which indicated that flooding previously shown in Lot 625 is not included as part of the floodplain.

The revised floodplain extent was confirmed as appropriate by Simon Rogers at DWER.

2.4.2 GROUNDWATER HYDROLOGY

According to Davidson (1995) the underlying hydrogeology of the subject land is characterised by the superficial aquifer, extending to approximately -10 m AHD.

2.4.2.1 GROUNDWATER LEVELS

The Department of Water and Environmental Regulation (DWER) Perth Groundwater Map (online) indicates that groundwater flows in a westerly direction across the site.

Historical maximum groundwater contours, taken from the Perth Groundwater Map, range from 14 m AHD to 17 m AHD across the subject land. Based on these levels and current site topography, groundwater levels are expected to be relatively close to surface.

2.4.2.2 GROUNDWATER QUALITY

Groundwater quality sampling was undertaken by Hyd2o at three site monitoring bores on four occasions from October 2016 to July 2017.

In summary:

- pH is slightly acidic across the subject land with means at bores MW1 and MW4 falling beneath the ANZECC guideline value;
- TN was relatively high across the subject land, with all means exceeding the ANZECC guideline value of 1.2 mg/L - the highest mean occurred at MW2 and was 6.55 mg/L;
- TP was also high across the subject land, with all means exceeding the ANZECC guideline value of 0.065 mg/L - the highest mean occurred at MW2 and was 2.0 mg/L; and
- All heavy metals concentrations were well below the ANZECC guideline values.

The level of nutrients in groundwater for the LSP area is typical of the expected water quality range for semi-rural areas. The high nutrient levels may also be affected by the recent disposal of pumped groundwater along Marshall Road near the subject land.

2.5 BUSHFIRE HAZARD

A Bushfire Management Plan (BMP) has been prepared by RUIC, as well as an addendum prepared by Bushfire Prone Planning in support of the LSP (refer **Appendix D**). A Bushfire Hazard Level Assessment was prepared for the subject land in support of the lifting of Urban Deferment; the BMP represents a more detailed level of investigations.

The BMP is a strategic plan which identifies the bushfire protection measures to be applied to development on the subject land to accommodate compliance with:

- SPP 3.7 Planning in Bushfire Prone Areas;
- Guidelines for Planning in Bushfire Prone Areas; and
- Australian Standard for the construction of buildings in bushfire-prone areas (AS3959-2009).

2.6 HERITAGE

2.6.1 ABORIGINAL

A search of the Department of Aboriginal Affairs' (DAA) Aboriginal Heritage Inquiry System identified that the entire LSP area is within two 'Registered Aboriginal Sites' (DAA 2015). The first is the Bennett Brook: Camp Area (Place ID. 3840) which is classified as artefacts/scatter, ceremonial, fish trap, historical, man-made structure, mythological, skeletal material/burial. The second is the Bennett Brook: in toto (Place ID. 3692) which is classified as a mythological site.

2.6.2 EUROPEAN

A search of the Heritage Council of Western Australia database of culturally sites in Western Australia was undertaken for the subject land (State Heritage Office 2015). No State Heritage Places exist within or nearby the LSP area. The closest State Heritage Site is approximately 3.7 km to the east of the subject land.

2.7 EXISTING MOVEMENT NETWORK

2.7.1 MARSHALL ROAD

Marshall Road, between Beechboro Road North and Lord Street, is a single carriageway, two-lane road running east-west from Malaga Industrial Area to the west, to Lord Street to the east. Marshall Road, in the vicinity of the subject land, is constructed to 7.2m wide trafficable carriageway standard, with approximately 1.5m wide sealed shoulders doubling up as bicycle lanes.

According to the traffic count information sourced from Main Roads WA, Marshall Road (immediately east of Beechboro Road North) carried approximately 12,660 vehicles during a typical weekday in January 2014 with about an 8.5% heavy vehicle component. Based on these counts, the weekday morning peak hour occurred between 6:30AM and 7:30AM (918vph) whilst the afternoon peak period occurred between 4:15PM and 5:15PM (1,267vph).

However, based on the actual traffic counts undertaken by Transcore during the PM peak hour at the Marshall Road/Dulwich Street intersection on 28th October 2016, it is estimated that Marshall Road, in the vicinity of subject land, presently carries just over 8,000vpd. In the vicinity of subject land Marshall Road operates with a sign-posted speed limit of 80km/h.

According to the Main Roads WA Perth Metropolitan Area – Functional Road Hierarchy document, Marshall Road (between Beechboro Road North and Lord Street) is classified as a Distributor B.

2.7.2 DULWICH AND ROEDEAN STREETS

Dulwich Street is a typical rural road constructed to a single-carriageway, 6m wide standard with gravel shoulders. The road is classified as an Access Road and operates under a default built-up area speed-limit regime of 50km/h. Based on the aforementioned traffic counts it is estimated that Dulwich Street presently carries up to 600vpd.

Roedean Street is currently an unmade road which does not feature in the Main Roads WA road hierarchy document.

Marshall Road and Dulwich Street form a priority-controlled T-intersection with Dulwich Street terminating at its northern approach to the intersection. Both Marshall Road and Dulwich Street are straight and flat and as such provide for good sightlines on all approaches to the intersection. Marshall Road at its eastern end terminates at Lord Street, forming a 4-way single lane roundabout intersection with Lord Street and St Leonards Boulevard approximately 1km east of the subject land.

2.7.3 PEDESTRIAN & CYCLIST FACILITIES

There are presently no formal pedestrian paths within the locality which is consistent with the type of existing land uses in this area.

Cyclist's access to the subject land is available via the bicycle lanes/sealed shoulders which are in place along both sides of Marshall Road. The sealed shoulders on Marshall Road are complemented with sealed shoulders which are in place along Lord Street south of Marshall Road providing connection to a similar cycling facility along Reid Highway.

2.7.4 PUBLIC TRANSPORT

The subject land is served by two bus services operating along Marshall Road (service No. 955 and 956). The available bus services provide connectivity to Morley Bus Station and Bassendean Station which provides access to the greater rail network.

The nearest pair of bus stops on Marshall Road are located in the immediate vicinity of the Marshall Road/Dulwich Street intersection. There are no formal pedestrian paths to the bus stops; however, pedestrians can access these stops by walking on sealed shoulders along Marshall Road.

Existing bus service times are primarily designed for journeys to and from work, school and other trips to and from Ellenbrook/Morley/Bassendean during business hours such as shopping or personal business trips.

2.8 NOISE

A Transportation Noise Assessment has been prepared for the LSP by Lloyd George Acoustics to determine the noise impacts resulting from the Marshall Road traffic, refer **Appendix E**. Recommendations from the Noise Assessment are discussed in section 3.15.

3 LOCAL STRUCTURE PLAN

3.1 CONTEXT

Various district context plans have been prepared for the West Swan West area in accordance with the Swan Urban Growth Corridor Sub-Regional Structure Plan (Sub-Regional Structure Plan) to inform future planning for the area. A draft District Context Plan has been prepared by RPS to support a District Water Management Strategy for the area, to facilitate planning for the precinct south of Marshall Road, refer **Figure 7**. A local structure plan, referred to as the Bennett Springs East Structure Plan for Mirvac's development Iluma Estate, has now been prepared and approved for this precinct.

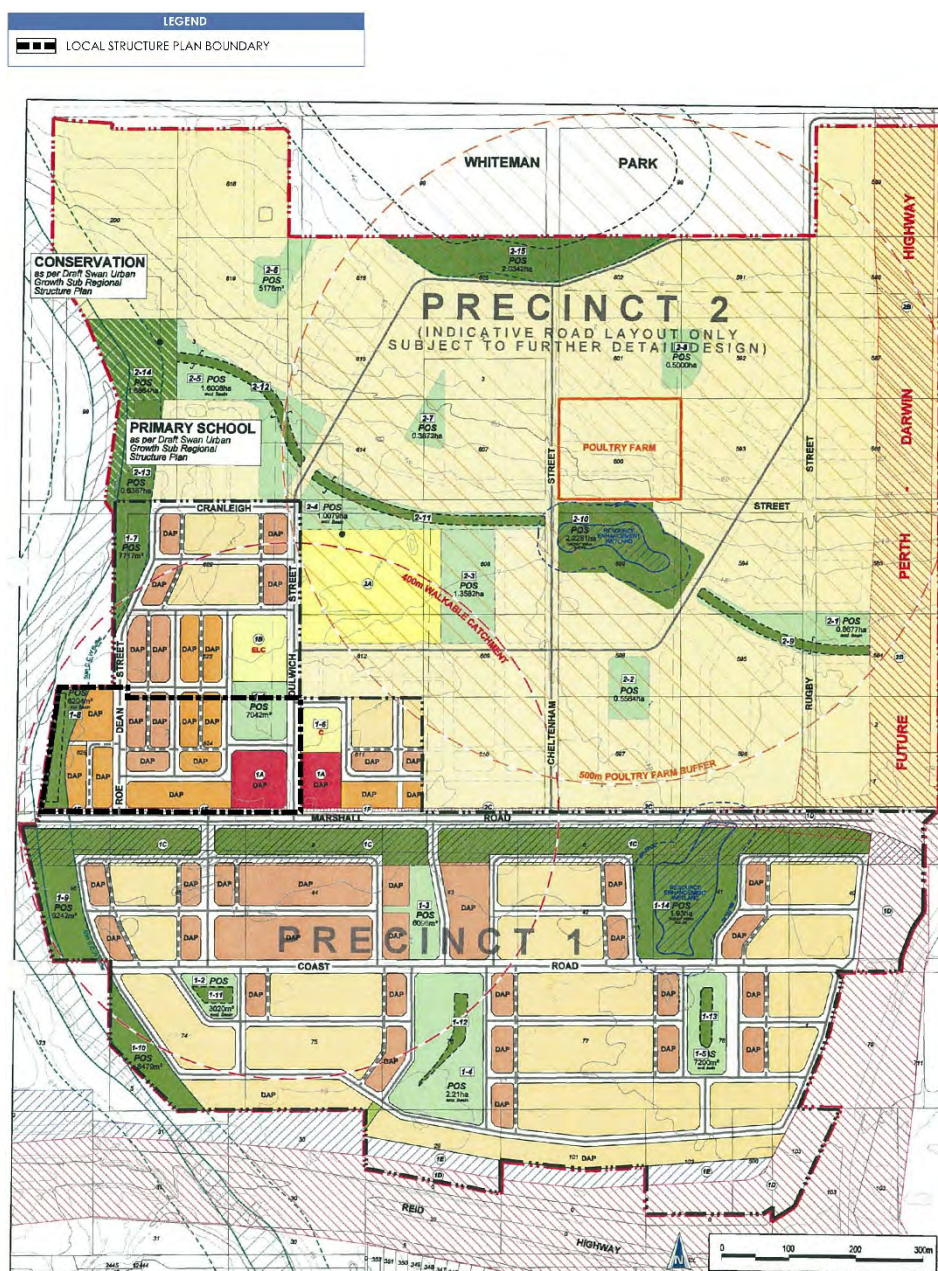


Figure 7: Draft District Context Plan [Source: RPS 2009]

A Concept Plan has also been prepared for the West Swan West area which represents a further refinement of the RPS draft District Context Plan. The West Swan West Concept Plan demonstrates how development of this broader area may unfold in accordance with the Sub-Regional Structure Plan and in conjunction with this LSP, refer **Figure 8**. In addition to an indicative residential street block structure, the Concept Plan identifies the key non-residential land uses, including a consolidated neighbourhood centre, a larger primary school site to serve the catchment and the public open space/environmental conservation areas. The Concept Plan has informed the design of this LSP, particularly in relation to identifying how this LSP can integrate with the broader West Swan West area and understanding the overall movement network.

The West Swan West Concept Plan also provides a reference for future planning in the area, once the poultry farm buffer has either been reduced or removed and when urban development can occur.

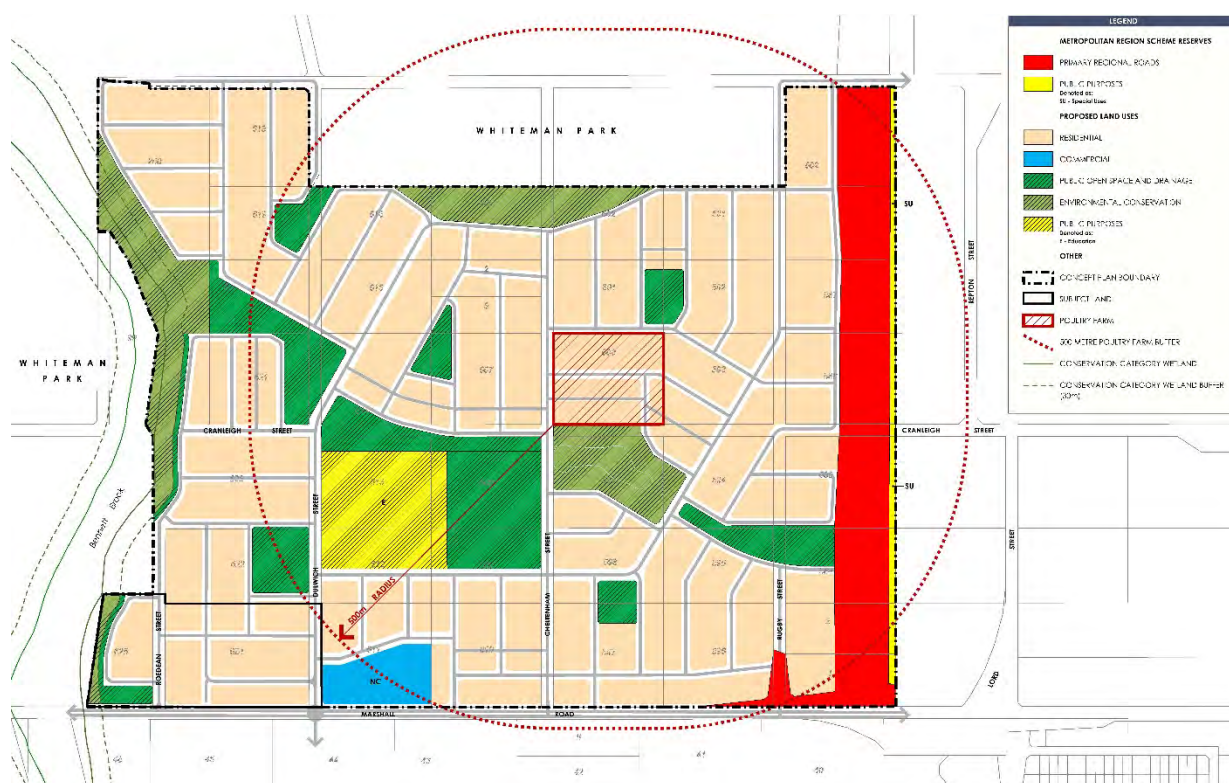
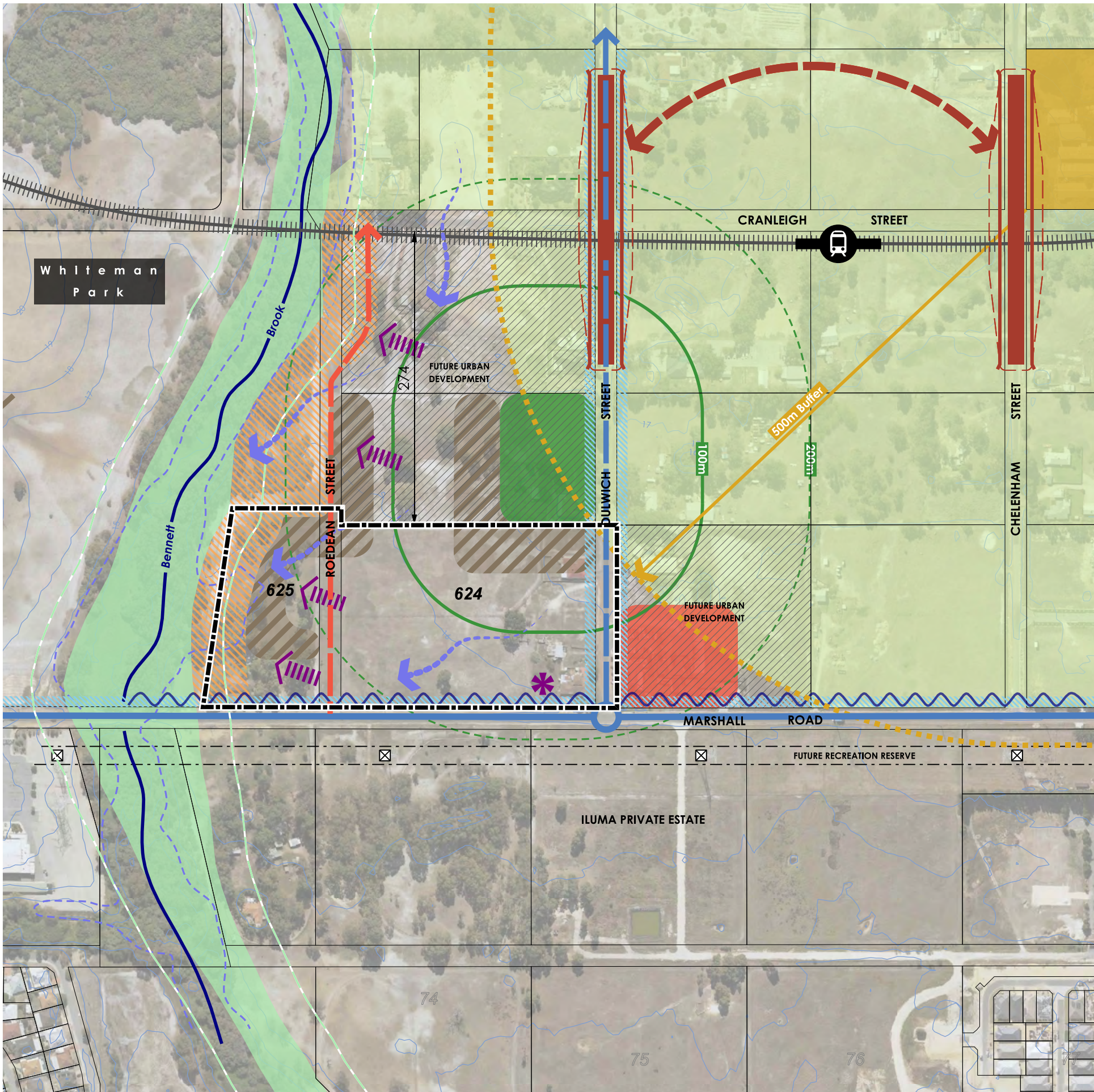


Figure 8: West Swan West Concept Plan

3.2 OPPORTUNITIES AND CONSTRAINTS

An analysis has been undertaken of the existing site conditions and the potential opportunities and constraints that require consideration in the planning and development of the subject land. The key elements of this analysis are noted and discussed on **Figure 9**.



LEGEND



STRUCTURE PLAN BOUNDARY



EXISTING SITE CONTOURS

Opportunity for future development proposal to be site responsive and utilise the existing topography.



CONSERVATION CATEGORY WETLAND (CCW) and BUFFER (30m)

Interface adjacent CCW (Bennett Brook as part of Whiteman Park) to be carefully considered. Opportunity for CCW and CCW buffer areas to be used for passive recreation and/or drainage purposes.



BUSHFIRE BAL

Bushfire prone vegetation (existing and proposed) within CCW to the west and accompanying buffer. Appropriate setbacks to be determined to achieve appropriate BAL ratings. Opportunity to consider a road interface and/or low threat vegetation.



NEIGHBOURHOOD CENTRE

Opportunity for a consolidated Neighbourhood Centre (with up to 5000m² of retail) rather than a site dissected by Dulwich Street. Site located in accordance with the Bennett Springs East Structure Plan. Site has excellent exposure to passing traffic and public transport along Marshall Road thereby capitalising on the existing and future communities shopping needs.



EXISTING BUS STOP

Opportunity to create a strong link between the existing bus stop located along Marshall Road and the proposed Neighbourhood Centre.



POULTRY FARM AND ASSOCIATED BUFFER

Existing Poultry Farm and associated 500m buffer currently prohibits residential development within buffer.



EXISTING OVERHEAD POWERLINES

Existing overhead powerlines and pylons located on the southern side of Marshall Road within a proposed recreation reserve. Visual amenity of powerlines to be considered through detailed design.



OVERLAND DRAINAGE

Opportunity for proposed development to be site responsive and utilise the existing landform that naturally falls north-west to the south west towards Bennett Brook. Further opportunity to locate drainage retention areas in existing low points and as part of proposed public open space areas.



BENNETT BROOK FLOODWAY

DoW has confirmed floodway not related to maintaining sufficient waterway capacity in Bennett Brook. Consideration to be given to the passage of local drainage that drains through the land to Bennett Brook.



MARSHALL ROAD AND DULWICH STREET WIDENING

Land required for future upgrade and widening of Marshall Road (5m). Dulwich Street may also require widening (up to 2.2m either side) depending on future design of Neighbourhood Connector.



MARSHALL ROAD NOISE MITIGATION

Noise wall and/or treatment of dwellings will be required to mitigate against traffic noise.



DISTRICT DISTRIBUTOR

Marshall Road designated as a District Distributor road.



NEIGHBOURHOOD CONNECTOR AND ROUNDABOUT

Full movement intersection in the form of a roundabout currently under construction at the intersection of Dulwich Street and Marshall Road connecting proposed development in the Bennett Springs East Structure Plan with this structure plan area.



REALIGNMENT OF ROEDEAN STREET

Roedeau Street to be realigned to avoid development within the CCW and CCW buffer (Bennett Brook).



METRON – MORLEY-ELLENBROOK LINE AND BENNETT SPRINGS EAST STATION

Proposed railway station to be located on a straight link and centrally within the Bennet Springs catchment.



FUTURE FLYOVER IF REQUIRED

Consideration of proposed railway line alignment (as proposed by State Government) located in proximity to Cranleigh Street. Future fly-over also potentially required, and aligned with Dulwich or Cheltenham Streets. Consideration for fly-over land take conservatively assumes a 1:20 rise over the proposed railway line, accommodating an approximate 7m clearance height.



DEVELOPMENT ORIENTATION

Promote passive solar benefits and opportunity to orientate development toward Bennet Brook capitalising on the amenity that it provides.



PROPOSED POS AND WALKABLE CATCHMENT

Opportunity to consolidate and locate POS centrally within a walkable catchment to residents.



FUTURE URBAN DEVELOPMENT



RESIDENTIAL DENSITY

Opportunity for increased residential density designations within a walkable catchment to the proposed future railway station and areas of higher amenity i.e. in close proximity to POS.



GENERAL RURAL ZONED LAND

Urban Deferred zoned land under MRS, General Rural zoned land under City of Swan LPS 17, constrained by Poultry Farm and associated buffer.

OPPORTUNITIES AND CONSTRAINTS

Lots 624 & 625 Marshall Road, Bennett Springs



0m 20 40 60m

s: 1:4,000@A3
d: 7 May 2020
p: 15/095/017C



3.3 CONCEPT PLAN

The Concept Plan in **Figure 10** provides an indicative subdivision design which has been prepared to support the LSP by demonstrating one scenario of how subdivision may occur in accordance with the LSP. The Concept Plan has been prepared based on the following key design considerations.

- **Road Structure** - the existing road reserves of Roedean Street and Dulwich Street have defined the structure of the Concept Plan. The proposed access streets all link into this existing road network generally via a traditional grid pattern to maximise permeability and legibility. The Bennett Brook CCW and its surrounding environment are in a degraded condition. A rehabilitated buffer will be provided to ensure the conservation values of the wetland are improved. The road interface abutting the liner POS/buffer area will also assist with bushfire management.
- **Public Open Space** - an area of POS is identified within the south west corner of the LSP area to provide a landscaped entrance statement; the POS extends adjacent to the CCW buffer. The linear POS area adjacent to the CCW buffer will provide pedestrian access adjacent to Bennett Brook and ensure a passive interface to the conservation buffer area. The POS area will also serve a drainage function.
- **Residential Development** - medium density, front loaded lots are proposed throughout the LSP area. Lots have been designed to enable houses to orientate towards POS. A diverse range of lot sizes is achievable based on the proposed street block structure through the use of different lot depths and frontages. Higher density development is proposed adjacent to areas of high amenity such as the POS. Due to the noise generated by Marshall Road, the residential lots adjacent to Marshall Road will address the internal access streets.
- **Integration** – the Concept Plan provides for integration with surrounding lots; the West Swan West Concept Plan in turn shows how the LSP area can connect with the broader urban cell.

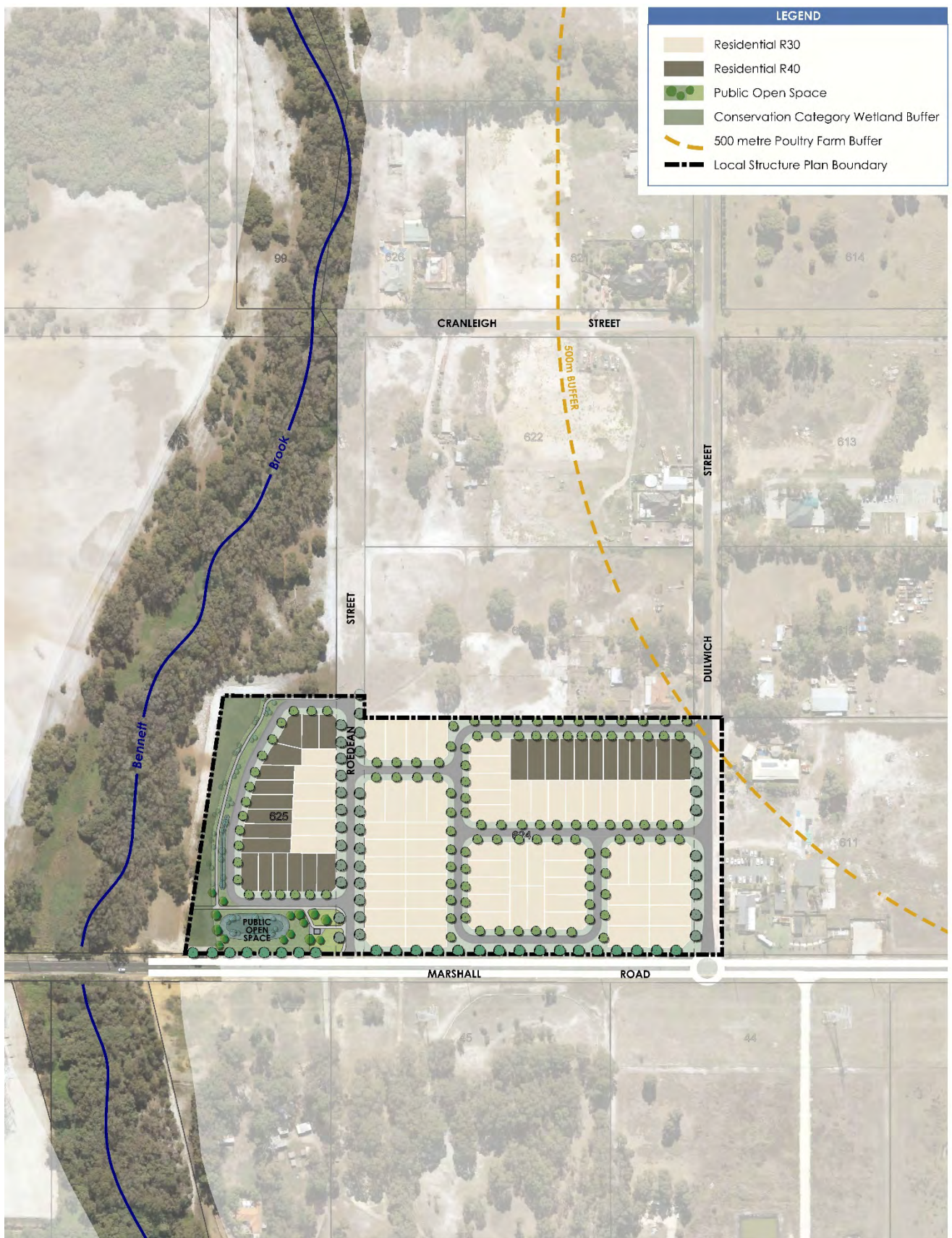


Figure 10: Concept Plan

3.4 LAND USE

The primary land use within the LSP area is residential, supplemented by open space. A summary of the land uses and areas is provided in **Table 3**.

TABLE 3: LAND USE

Land Use	Area (Ha)
Residential	4.9918
Public Open Space	0.6392

3.4.1 RESIDENTIAL

Residential development is primarily proposed within the LSP. The LSP provides for a variety of housing choices through the designation of a range of medium density R-Codes (R30-R40). The density code range is outlined on the LSP. The allocation of residential densities shall be identified at the subdivision stage through the provision of a Residential Code Plan, in accordance with the locational criteria below.

Subdivision applications are encouraged to provide R40 density particularly adjacent to public open space. However, R30 can be provided subject to individual applications demonstrating that some R40 lots will be provided and the density target in clause 4.1.1 of Part One is being achieved.

3.4.1.1 DENSITY TARGETS

The estimated dwelling yield for the LSP area, based on the residential density code is 95 lots/dwellings (refer **Table 4** below). This could accommodate a total population of up to 266 people based on 2.8 people per household.

Element 3 of Liveable Neighbourhoods requires at least 20-30 dwellings per site hectare from 400m to 800m of stations. In addition to this, the recently released Perth and Peel @3.5million recommends a residential site density of 26 dwellings per residential site hectare. The applicable density target under the LSP pursuant to the above is 26 dwellings per site hectare.

The density codes applied and the resultant lot typology will provide maximum flexibility to address the needs of the local housing market. Final yields will be determined during the detailed subdivision design process.

TABLE 4: ESTIMATED DWELLING YIELD

Density Coding	Yield
R30 (300m ² average)	67
R40 (220m ² average)	28
TOTAL	95

3.5 OPEN SPACE

A total of 0.6392 hectares of open space is provided on the LSP. The open space network, as identified on **Figure 11**, of POS and the Bennett Brook CCW buffer; a breakdown of these areas is provided in **Table 5**.

TABLE 5: PUBLIC OPEN SPACE PROVISION

Public Open Space Site	Area (Ha)
1	0.3031
2	0.2559
TOTAL	0.5590

3.5.1 PUBLIC OPEN SPACE

The POS network comprises of a linear park to support the Bennett Brook CCW and an elongated area of POS which marks the entrance to the development. The POS adjacent to the CCW will include pathways to provide controlled access adjacent to the foreshore area and managed landscaping to reduce bushfire risk. POS area 1 will accommodate drainage.

A POS calculation has been undertaken in accordance with Liveable Neighbourhoods, as detailed in **Table 6**. The POS calculation identifies a shortfall of POS in relation to the minimum 10% requirement under Liveable Neighbourhoods. The total POS will be further refined at subdivision stage with the shortfall of POS being addressed through a cash-in-lieu payment.

TABLE 6: PUBLIC OPEN SPACE SCHEDULE

Public Open Space Schedule		
Gross Site Area (ha)		5.8072
Lot 624	4.0432	
Lot 625	1.7640	
Deductions		
POS 1 – First 15mm Rainfall	0.0663	
Marshall Road Widening (5m)	0.1729	
Dulwich Street Road Widening (2.2m)	0.0361	
Surplus Restricted Public Open Space	0.1638	
Total Deductions		0.4391
Net Subdivisible Area		5.3681
Required Public Open Space (10%)		0.5368
Public Open Space Requirements		
Unrestricted Public Open Space - minimum 80%	0.4294	
Restricted Public Open Space - maximum 20%	0.1074	
Total		0.5368
PUBLIC OPEN SPACE PROVISION		
Unrestricted Public Open Space		
POS 1 – Excludes First 15mm Rainfall & 20% AEP Event	0.2215	
Total Unrestricted POS		0.2215
Restricted Public Open Space		
POS 1 – 20% AEP Event	0.0153	
POS 2 – CCW Buffer	0.2559	
Total Restricted POS		0.2712
Restricted POS Not Credited (0.2712-0.1074)	0.1638	
Total Credited Restricted POS		0.1074
Total Credited Restricted and Unrestricted POS		0.3289
Percentage of Credited POS (Unrestricted and Restricted POS Contribution)		6.13%

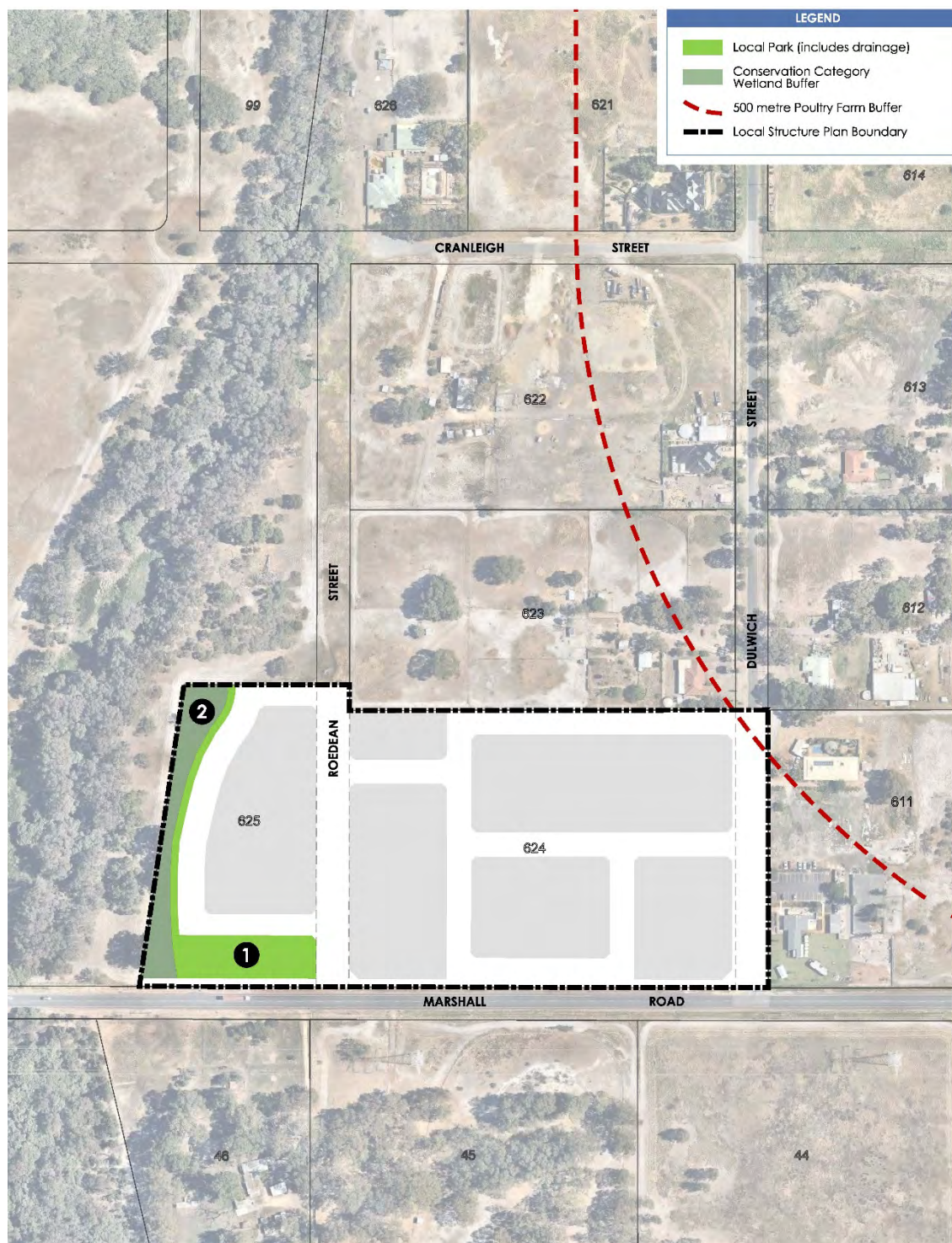


Figure 11: POS Plan

3.5.2 BENNETT BROOK CCW BUFFER

A 30m buffer has been provided to the Bennett Brook CCW. The buffer will be rehabilitated and enhanced to improve the conservation values of the wetland. It is proposed to rehabilitate the whole extent of the CCW and its 30 m buffer adjacent to the subject land. This will result in a positive environmental outcome and improved amenity for the future development.

3.6 LANDSCAPE DESIGN

A Landscape Masterplan has been prepared by LD Total to inform the detail design and development of the public open space and streetscapes (refer **Figure 12** and **13**).

The Landscape Masterplan identifies the following:

- local, informal, linear POS abutting the Bennett Brook CCW buffer which will accommodate a pathway, providing pedestrian access adjacent to the Brook and connecting to Whiteman Park;
- significant vegetation is to be retained within the CCW buffer and degraded areas revegetated in consultation with relevant agencies;
- the POS will accommodate drainage, including both 1:1 and 1:5 year rainfall events;
- tree planting along all streets in accordance with the City's requirements; and
- a potential link connecting the proposed development across Bennett Brook to the existing Goo-Lorto bush trail.

BENNETT SPRINGS

LANDSCAPE MASTERPLAN

Lots 624 & 625 Marshall Rd, Bennett Springs

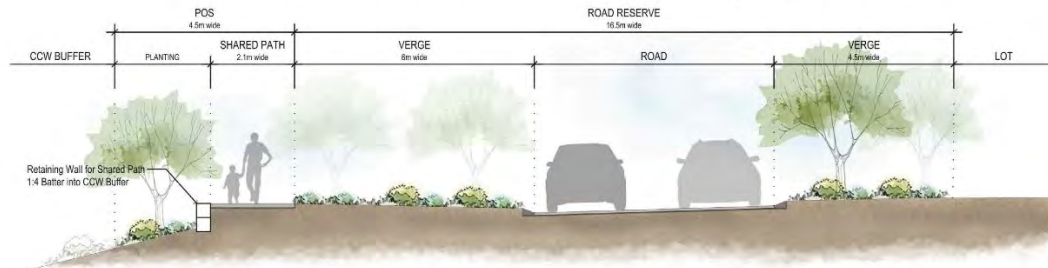


Figure 12: Landscape Master Plan [Source: LD Total]

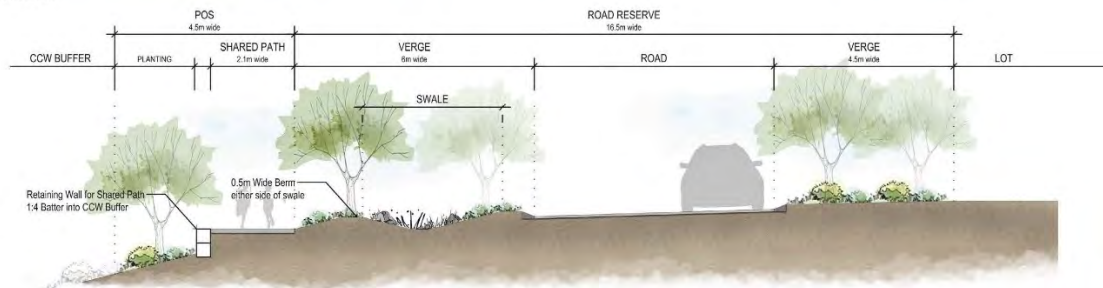
BENNETT SPRINGS
LANDSCAPE MASTERPLAN
 Lots 674 & 675 Marshall Rd, Bennett Springs



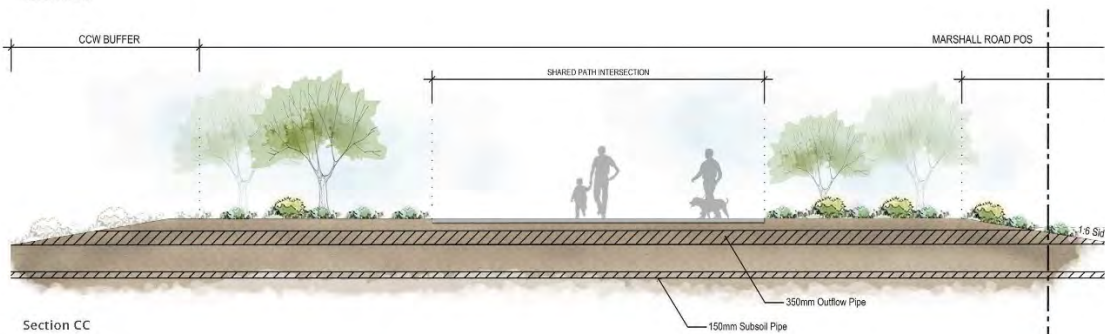
Location Key Plan NTS



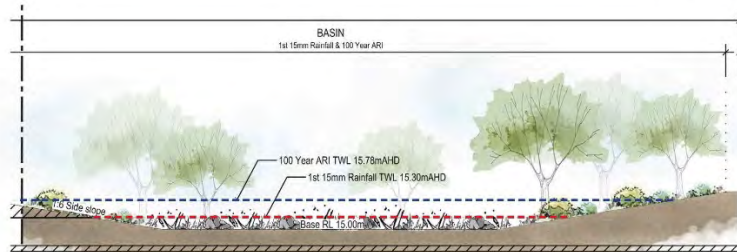
Section AA



Section BB



Section CC



Section CC - Continued

Figure 13: Landscape Masterplan - Sections [Source: LD Total]

3.7 MOVEMENT NETWORK

A Transport Impact Assessment (TIA) and Technical Note have been prepared by Transcore in support of the LSP (refer **Appendix F**). Key aspects of the TIA and Technical Note are outlined below.

3.7.1 ROAD HIERARCHY

A review of the LSP area traffic projections shows that, in accordance with Liveable Neighbourhoods policy, all internal LSP roads can be classified as an Access Street D, refer **Figure 14**. Key characteristics of the typical cross-section of this street, as defined in WAPC Liveable Neighbourhoods, are discussed further in this section.

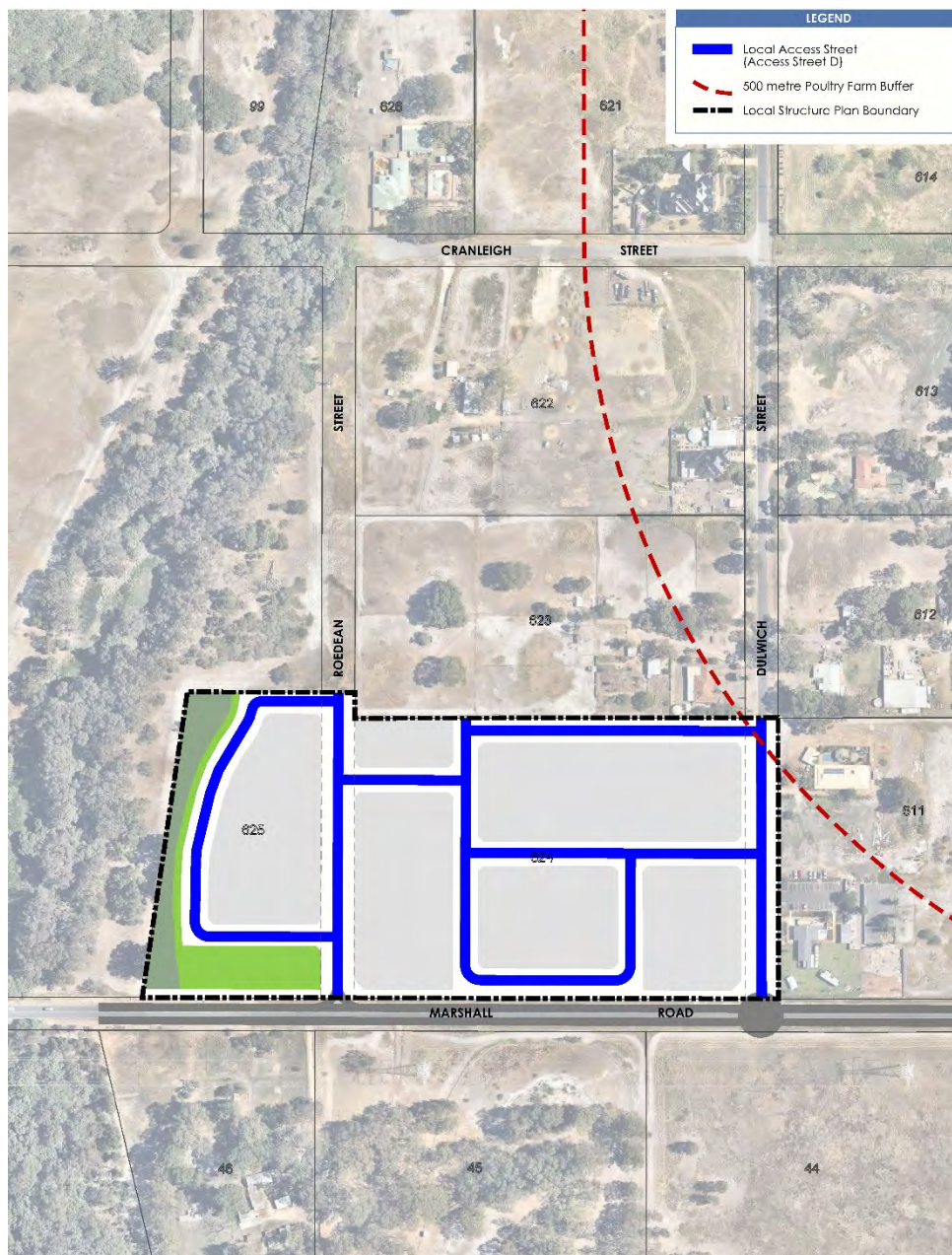


Figure 14: Movement Network Plan

The proposed hierarchy of the LSP road system with the full development of West Swan West Concept Plan is illustrated in **Figure 15**.

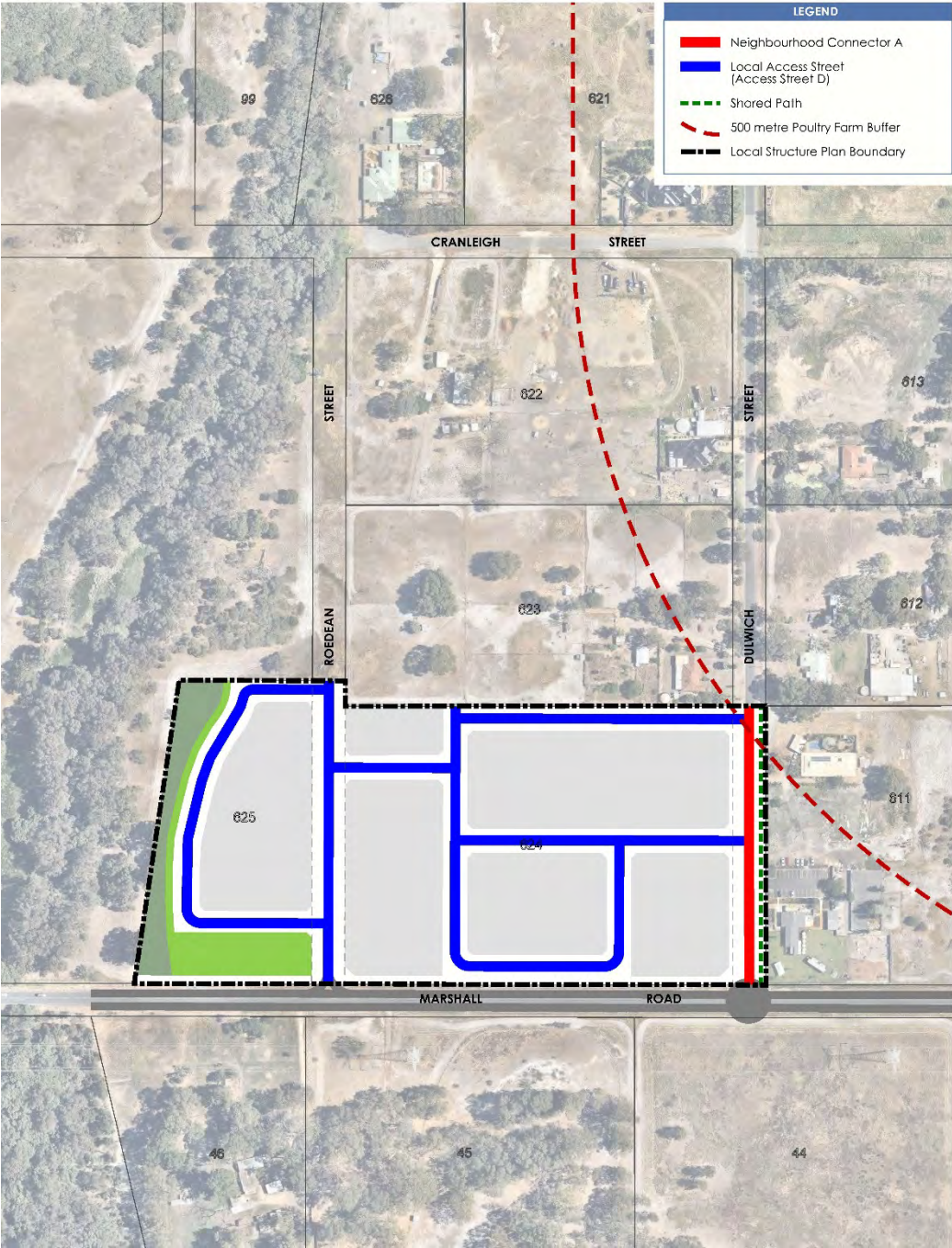


Figure 15: Ultimate Movement Network Plan

3.7.1.1 NEIGHBOURHOOD CONNECTOR

With the full development of the West Swan West Concept Plan area, Dulwich Street is expected to experience doubling of daily traffic flows. The WAPC has determined that Dulwich Street is to be ultimately classified as a Neighbourhood Connector A for its full extent within the LSP area. This classification would warrant widening of the Dulwich Street road reserve to approximately 24.4m. Accordingly, the Dulwich Street road widening, allowing up to 2.2m each side, is identified on Plan 1.

3.7.1.2 ACCESS STREETS

The typical road reserve for an Access Street D (narrow yield) includes a road reserve width of 14.2m, with 6.0m wide trafficable carriageway pavement and up to 4.1m wide verges on both sides. This type of street is recommended for the balance of LSP road network, including Dulwich Street initially given it is only forecast to accommodate approximately 600vpd as a result of traffic generated by the LSP area.

If fronting POS, access street verges adjacent to POS may be reduced. This is the case with the internal LSP roads fronting Bennett Brook and the internal LSP POS. Maximum desirable daily traffic volume for this type of road is 1,000vpd.

In order to facilitate visitor parking demand, public parking in the form of embayed parking bays are also recommended on one side of Access Streets. The full development of the West Swan West Concept Plan will have no material impact on the internal LSP roads, excluding Dulwich Street, so no requirement for changes in road classification is anticipated.

3.7.2 ACCESS TO EXTERNAL NETWORK

The proposed external access network for the LSP comprises a left-in/left-out only at the Marshall Road/Roedean Street intersection and a single-lane four-way roundabout at the Dulwich Street and Marshall Road intersection as an interim scenario. A new (southern) leg of the roundabout will be created by introduction of a new access road at the south side of Marshall Road. This roundabout is currently under construction.

The capacity assessments undertaken for the abutting roads and key access intersections indicate that the proposed LSP will not have an adverse impact on the operation of the local road network which has the capacity to accommodate the anticipated LSP-generated traffic.

The planned upgrade of the existing Marshall Road to a dual carriageway and the Marshall Road/Dulwich Street intersection to a two-lane roundabout standard will deliver the required capacity to accommodate the anticipated future traffic volumes at this location, as a result of the future development of the West Swan West area. The Marshall Road widening to accommodate the planned upgrade has been identified on Plan 1.

3.7.3 PEDESTRIAN AND CYCLING NETWORK

A shared path is proposed along the eastern side of the Neighbourhood Connector A due to the anticipated higher pedestrian/cyclist activity at this location, refer **Figure 15**. The shared path is intended to connect at the Marshall Road/Dulwich Street intersection to the future regional shared path along Marshall Road once this road is upgraded.

Pedestrian crossing facilities should be designed to facilitate pedestrian movements across Marshall Road and to enable safe pedestrian and cyclist communication between the LSP area and Bennett Springs East Structure Plan area south of Marshall Road.

Considering the level of forecast daily traffic volumes on the remainder of the internal roads, provision of separate cyclist facilities in the form of shared paths is not warranted. As per the provisions of Liveable Neighbourhoods, footpaths on one side of Access Street D throughout LSP area are recommended to cater for the anticipated pedestrian traffic demand.

3.7.4 PUBLIC TRANSPORT

The proposed LSP can be serviced by the existing public transport services available in the immediate vicinity or within comfortable walking distance of the subject land.

3.7.5 LOCAL WATER MANAGEMENT STRATEGY

A Local Water Management Strategy (LWMS) has been prepared by Hyd20 in support of the LSP (refer **Appendix G**).

Key aspects of the report are summarised below.

3.7.5.1 STORMWATER MANAGEMENT

Stormwater management is proposed to be undertaken consistent with DWER water sensitive urban design practices. The system will consist of a series of lot soakwells, road drainage system comprising pipes, and ephemeral storage area and bioretention swale within POS to provide water quantity and quality treatment for stormwater generated from the proposed development.

Runoff from the first 15 mm rainfall event will be retained within lots using soakwells, with only road reserve runoff contributing to storage requirements during frequent minor events. Road runoff will be collected through a series of pits and pipes (sized to convey up to the 20% AEP event), with excess stormwater during greater events travelling via overland flow paths as shown in **Appendix G**.

Key elements of the system which aim to manage both stormwater quantity and quality include the following:

- Maintenance of existing surface water flow paths, catchments, and discharges consistent with overarching strategies;
- Use of POS area for vegetated swales to treat the first 15 mm rainfall event;
- Use of POS area for ephemeral storage area to provide detention of the major storm event (up to the 1% AEP event);
- Filtering of sediments and nutrient removal through natural vegetation regrowth by using topsoil generated from the subject land and additional planting of low lying native vegetation on the sides of the swales and the base of the detention storage area; and
- All lots to include soakwells to allow at source management of stormwater and avoid direct lot connections to street system.

3.7.5.1 GROUNDWATER MANAGEMENT

Due to the subject land having areas where groundwater is relatively close to natural surface, imported fill will be applied across the land to provide the minimum required separation between building floor levels for development and groundwater levels. Indicative fill levels will range from 1.0 – 2.5 m based on preliminary engineering drawings provided by Tabec (2020).

Subsoil drainage will be used in areas where minimum separation to groundwater cannot be achieved with the proposed fill levels. In general, subsoils are proposed to be at a controlled groundwater level (CGL) established at approximately 0.5 m below the predevelopment MGL. Details of the subsoil design will be provided at the UWMP stage of development, consistent with the above approach.

All subsoils will be connected to free draining outlets and shall be treated in vegetated biofiltration areas at the outfall to provide nutrient stripping. Subsoil drainage mounding calculations for predevelopment conditions are detailed in Appendix G.

These calculations are based on application of the Kraijenhoff Van De Leur – Maasland non-steady state equations (International Institute for Land Reclamation and Improvement, 1994) which calculate mounding between parallel subsoil drains based on estimates of key parameters including aquifer and soil characteristics. A spacing of approximately 70 m was modelled, considering the spacing of parallel roads in the subdivision, and a 5 m/day hydraulic conductivity was assumed. A recharge estimate of 60 % was adopted, consistent with stormwater modelling parameters.

Modelling results indicate a maximum mounding of 0.42 m between parallel subsoil drains for the critical duration 1 % AEP event (120 hr). Further more detailed modelling of subsoil drainage will be undertaken at UWMP stage.

3.8 WETLAND MANAGEMENT

To ensure the Bennett Brook CCW is appropriately managed, the LSP provides a 30 m buffer to the CCW. The 30m buffer was determined based on a biophysical assessment that was performed by 360 Environmental in 2016. The conclusions of this assessment were considered by the then Department of Water (DoW) as part of its consideration of the LWMS produced for the previous LSP for the site. This assessment was accepted by both DoW when it approved the LWMS and the City of Swan when it recommended approval to the LSP. This same assessment is provided in the current LWMS produced by Hyd20 in support of the current LSP.

A Wetland Management Plan for the buffer areas within the proposed Urban zoned portions of the site will be prepared prior to subdivision. The management plan will address (but not be limited to) revegetation of the buffer area, control of pedestrian and vehicle access, and management of fire, weeds and dieback. It is expected to describe the following:

- Retaining areas of vegetation where possible and within the CCW 30 m buffer area located along the western portion of the site;
- Planting local native species in the 30 m buffer zone;
- Preventing undesirable access to the wetland through construction of a fence around the wetland buffer boundary;
- Facilitate appropriate pedestrian access to minimise disturbance to remnant vegetation by way of pathways; and
- Maximise the use of local native vegetation species in landscaping and revegetation areas.

Bennett Brook is currently owned and managed by the WAPC. The WAPC intend to continue to manage the Brook in the future, following revegetation of the CCW and buffer area. It is therefore expected the CCW buffer will also be managed by the WAPC in the future.

3.9 POTENTIAL CONTAMINATION

The DER Contaminated Sites Database did not identify any contaminated sites as being present within the subject land. Review of historical aerial photography has identified that there are no contaminating land uses and activities within the LSP area.

There are no management issues required for potential contamination as no potentially contaminating land uses have been identified. Care should be taken in relation to the identification and management of asbestos containing material within buildings if the existing buildings are to be demolished. This will ensure demolition does not result in the contamination of the subject land's soils.

3.10 VEGETATION, FLORA AND FAUNA

Development of the subject land will most likely necessitate removal of the scattered trees remaining across the site. Potential impacts to vegetation and flora are considered unlikely to be significant due to the land's disturbed nature and there being no suitable habitat for known conservation significant flora.

Fauna habitat is limited within the LSP area and therefore, potential impacts to fauna habitat are considered unlikely to be significant. Furthermore, the limited clearing of vegetation proposed will not exceed the criteria stipulated in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Referral guidelines for three threatened black cockatoo species.

However, there is the potential for indirect impacts on the vegetation, flora and fauna located within the adjacent CCW (Bennett Brook).

The following management measures for vegetation, flora and fauna are proposed:

- Appropriate fencing and signage to be placed around areas to be excluded from clearing during construction; and
- Retain areas of vegetation where possible and within POS areas, and within the CCW 30m buffer area located along the western portion of the subject land.

3.11 ABORIGINAL HERITAGE

The entire LSP area is identified as being within two 'Registered Aboriginal Sites'. The first is the Bennett Brook: Camp Area (Place ID. 3840) which is classified as artefacts/scatter, ceremonial, fish trap, historical, man-made structure, mythological, skeletal material/burial. The second is the Bennett Brook: in toto (Place ID. 3692) which is classified as a mythological site.

An ethnographic and archaeological survey of the subject land will be undertaken by a suitably qualified consultant prior to subdivision. The survey will be undertaken in accordance with the provisions of the *Aboriginal Heritage Act 1972*.

3.12 ACID SULFATE SOILS

Most of the subject land is classified as having a moderate to low risk of ASS occurring within 3 m of natural soil surface (DER 2014). Dewatering associated with excavation for infrastructure within the LSP area has the potential to disturb ASS, particularly as the subject land is within 500 m of a wetland. However, this is not considered to be a constraint to future residential development and instead, may require the implementation of appropriate management measures during construction.

An ASS self-assessment form will be completed for the subject land once detailed engineering design has been undertaken. Should the self-assessment identify the potential for ASS disturbance from the proposed works, then an ASS investigation will be undertaken in accordance with the DER's Identification and Investigation of ASS guideline. The ASS investigation will determine whether ASS will require management during soil disturbance.

3.13 EDUCATION FACILITIES

The Sub-Regional Structure Plan identifies a future primary school site immediately east of the subject land on Dulwich Street. The primary school site is located within the poultry farm buffer. The Department of Education has confirmed its support for the primary school site in its current location as there is presently no demand (or expected demand in the foreseeable future) for the primary school. It is likely that future demand for the primary school site will arise once development can occur within the poultry farm buffer area, (i.e. post relocation of the poultry farm). The Department of Education has also confirmed that an Early Learning Centre is not required.

In the short term, the LSP area will be serviced by either the Caversham or East Beechboro Primary Schools. Other nearby schools include:

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

3.14 BUSHFIRE MANAGEMENT

As outlined in the Strategic BMP and Addendum contained in **Appendix D**, compliance with the Bushfire Protection Criteria (BPC) of the Guidelines for Planning Bushfire Prone Areas can be achieved.

A revised BMP will be prepared to support a subdivision application in accordance with SPP3.7 and the associated Guidelines for Planning in Bushfire Prone Areas.

3.15 NOISE MITIGATION

As outlined in the Noise Assessment contained in **Appendix E**, there are a number of options available to mitigate noise in relation to the residential development adjacent to Marshall Road. These options involve the application of Quiet House Design Packages outlined in SPP 5.4 and the construction of a noise wall.

As stated on **Plan 1**, one of the noise mitigation options presented in the Noise Assessment shall be implemented for the affected lots at the subdivision stage. Part One also requires the preparation of a LDP for lots impacted by transportation noise.

3.16 INFRASTRUCTURE COORDINATION, SERVICING AND STAGING

TABEC has prepared an Engineering Servicing Report in support of the LSP. A copy of the report is contained in **Appendix C**.

Key aspects of the report are summarised below.

3.16.1 WATER SUPPLY

There are no water mains currently servicing this area and therefore water supply will need to be extended in a logical manner from the surrounding network to support the proposed development. This will also be subject to the timing of surrounding projects.

Water Corporation proposes to construct a DN600 steel main along Lord Street which will be delivered initially which had previously been planned for by 2019, however it does not appear to have been delivered as yet. Another DN600 steel main is shown on Water Corporation's long term planning on Marshall Road however there is no time frame on these works and the construction would only be considered after further pressure monitoring and in relation to other surrounding developments.

Similar to the waste water servicing, there may be opportunity to extend reticulation services from other surrounding developments which is subject to timing and negotiated outcomes. Approximately 100m to the south-east of Lot 624 is a DN200mm water reticulation main.

The subdivision is expected to be served internally through DN100mm and DN150mm water reticulation mains. The internal water main construction would extend to the development boundaries to cater for future main extensions.

Standard Water Corporation headworks contributions are expected to apply to the project. Subject to orderly planning, staging and scheduling, the Corporation will fund headworks and the developer will be responsible for funding reticulation works.

3.16.2 WASTEWATER

Currently the subject land is not serviced with reticulated sewer. However, Water Corporation has existing scheme planning that covers the project area and hence advises that the LSP area can be serviced through the extension of a gravity sewer network. The ultimate outfall for the subject land is south of Reid Highway near Lombardy Crescent, which relies on access through the Mirvac owned land to the immediate south of Marshall Road.

Mirvac, through their Iluma Estate, have been progressively extending their sewer reticulation from the Reid Highway outfall and the existing sewer outfall is now currently approximately 220m south of Marshall Road. The sewer reticulation is required to be extended to the Marshall Road boundary at a future proposed invert level of 12.51mAHD.

The reticulation extension through Iluma to Marshall Road is a DN225mm sewer. A connection under Marshall Road will also be necessary to reach Lots 624 and 625. Depending on the timing for the balance of Mirvac's project to bring reticulated sewer to Marshall Road, a negotiated outcome may be required in order to resolve access issues.

Within Lots 624 and 625, the developer will be responsible for funding reticulation works to service the proposed residential lots. Standard Water Corporation headworks contributions are expected to apply and Water Corporation planning would be reviewed when the staging and timing of the development progresses further.

3.16.3 POWER SUPPLY

3.16.3.1 EXISTING POWER INFRASTRUCTURE

The subject land falls within the Malaga zone substation. The estimated loads to service the residential development of Lots 624 and 625 is 500kVA. Based on the Western Power network capacity mapping tool, it is forecasted that greater than 25MVA to 30MVA remains available at 2020.

There is currently an existing 240mm high voltage cable on north side of Marshall Road which may require relocation and certainly protection during any subdivision works on the subject land. Provided that new low voltage cables will need to be installed on this alignment, the existing high voltage cable will require relocation to a 2.7m alignment, or possibly reinstalled at lower depth to facilitate subdivision works.

There is also a low voltage overhead power line on the north side of Marshall Road, on a 2.7m alignment, that will be removed and relocated underground as part of subdivision works in relation to the subject land. On the southern side of Marshall Road, there is a major existing 132kV transmission line. The centre line to the steel towers is approximately 40m from the southern boundaries of Lots 624 and 625.

3.16.3.2 POWER REQUIREMENTS

The proposed subdivision will likely require at least two power transformers to facilitate the load requirements. A high voltage concept plan will be required for the LSP to detail the overall requirements and to appropriately locate the infrastructure with adequate land provisions.

Works within the subdivision boundary will be designed with consideration to the surrounding proposed development areas. Therefore, the standard high voltage pool and subdivision policies will apply. Street lights would be required as per the City of Swan policy.

The effects of any Earth Potential Rise (EPR) issues will need to be investigated given there is a DN500mm steel sewer main on the northern side of Marshall Road and a steel high pressure gas main in the southern verge of Marshall Road. Therefore, site testing and investigations will be required to confirm suitable transformer sites are nominated.

To confirm power supply requirements, a Western Power feasibility study will be undertaken at stage 1 of the project.

3.16.4 TELECOMMUNICATIONS

There are existing Telstra assets in the northern verge of Marshall Road and the eastern side of Dulwich Street, servicing existing homes in the area.

NBN Co is responsible for the installation of fibre in all broad acre developments within the long-term optic fibre footprint, to which this project qualifies. The NBN rollout is progressively being completed with services available in various adjoining areas. Lots 624 and 625 are identified to receive a future NBN service.

The developer is responsible for providing pit and pipe infrastructure throughout the subdivision for the fibre to be installed. NBN Co will cover the costs of installing fibre infrastructure in the development and backhaul requirements, if confirmed.

As part of the developer agreement conditions, NBN will take over ownership of the assets upon completion and ensure that fibre is ready 3 months prior to the first occupancy of a new development.

3.16.5 GAS SUPPLY

There is an existing DN350mm steel high pressure gas pipeline in the southern verge of Marshall Road. There are no existing gas mains in the Roedean Street or Dulwich Street road reserves.

There are various protection requirements and working limitations around high pressure gas mains. No works of any type within 15 metres of any high pressure gas infrastructure is permitted without prior approval from ATCO Gas Australia. The proposed development of Lots 624 and 625 must ensure this ATCO Gas safety warning is adhered to.

To ensure adequate protection, the location of the high pressure gas mains must be accurately positioned by confirming the location between two known points, and assessing the distance from this line to a proposed work area. ATCO Gas Australia may require stand-by supervision during planned work.

It is anticipated that surrounding subdivisions will install additional gas reticulation mains suitable for extension into the proposed subdivision.

Internal gas supply will be provided to each lot through common trenching at no additional cost to the project. There may be a requirement to provide a bored connection or to extend mains offsite should the proposed subdivision proceed prior to appropriate mains being available or if there are any capacity constraints. Works off site outside of normal common trenching may carry a cost component.

3.17 DEVELOPMENT CONTRIBUTION ARRANGEMENTS

Developer contributions will be required if a Development Contribution Plan (DCP) applies to the Structure Plan area under the Scheme. If at the time of considering a subdivision or development application, in the interim period where a DCP has been advertised but not implemented into the Scheme, the WAPC or the City of Swan may require the landowner to enter into a Deed of Agreement with the City pursuant to Clause 5A.2.7.2 of LPS17 to the satisfaction of the WAPC.