

bushmead local structure plan

PREPARED FOR DUNLAND PROPERTY PTY LTD

APRIL 2019

Title	Bushmead Local Structure Plan (Amendment No. 2)
Prepared for	Cedar Woods Properties Ltd
Reference	CWP BUS
Status	Final (for Endorsement)
Version	I
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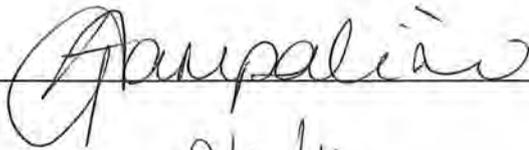
This structure plan is prepared under the provisions of the City of Swan Local Planning Scheme No.17

IT IS CERTIFIED THAT BUSHMEAD LOCAL STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: 7 June 2016

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

8/6/16

Date

Date of Expiry: 7 June 2026

TABLE OF AMENDMENTS

Amendment No.	Summary of Amendment	Amendment type	Date approved by WAPC
1	Modify base residential density code as follows: <ul style="list-style-type: none">• In the density range R10 / R15, from R15 to R20; and• In the density range R20 - R60, from R20 to R25.	Minor	15 May 2017
2	Inclusion of land transferred to the 'Urban' zone and minor textual amendments	Major	27 August 2019

TABLE OF DENSITY PLANS

Density Plan No.	Area of density plan application	Date endorsed by WAPC
WAPC Ref. No. 152 785	Stage 1	7 April 2017
WAPC Ref. No. 155 962	Stage 6	7 March 2018
WAPC Ref. No. 157 337	Stages 4 - 6	6 February 2019



executive summary

The Bushmead Local Structure Plan (LSP) has been prepared to guide the subdivision and development of the 'Special Use' zoned portion of the Bushmead Estate in accordance with the requirements of 'Schedule 4 – Special Use Zone No.14 of the City of Swan Local Planning Scheme No. 17 (the Scheme).

The Bushmead development will be a sustainable urban development that protects and enhances the existing natural values and character of the site, minimises environmental impacts, and is home to an engaged, healthy, connected and inclusive community. A true community - shaped by nature.

The LSP has been prepared based on a comprehensive review of relevant town planning, environmental and engineering considerations. The design of the LSP aims to create a distinctive and ecologically responsive new community with a mix of lot sizes to facilitate a range of housing typologies and lifestyle opportunities. The LSP depicts an interconnected street and path network, linked to the surrounding bushland and responding to the unique topographical and landscape characteristics that define the site.

Indicative design of the 'Special Use' zone equivalent to the MRS 'Urban' zone indicates a notional yield of 905 lots (equivalent to approximately 980 dwelling units), with densities ranging from R10 to R60.

Item	Data	Section number referenced in Part 2 of LSP Report
Total area covered by LSP	73.27 hectares	1.2.2
Residential area	40.97 hectares	3.5
Estimated lot yield	905 lots	1.1 & 3.5
Estimated residential density: <ul style="list-style-type: none"> Dwellings per gross hectare as per Directions 2031 Dwellings per site hectare as per Liveable Neighbourhoods 	<ul style="list-style-type: none"> 13.38 du / gross hectare 23.92 du / site hectare 	3.5
Estimated population @ 2.8 pp / household	2,744 people	3.5
Estimated number and area: <ul style="list-style-type: none"> Neighbourhood Parks Local Parks 	<ul style="list-style-type: none"> 3 parks @ 4.21 hectares (nett) 7 parks @ 4.14 hectares (nett) 	3.4 & Table 2

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appendix d	Aboriginal Heritage (Ethnoscience, December 2011)
appendix e	Odour Impact Assessment for Hazelmere Egg Farm (CEE, June 2016) and Addendum (CEE, December 2018)
appendix f	Transport Impact Assessment (Cardno, October 2014) and Addendum (Cardno, January 2019)
appendix g	Preliminary Servicing Report (WGE, October 2014) and Addendum (WGE, March 2018)
appendix h	Landscape Masterplan Report (Epcad, October 2014)



part one
implementation

1.0 Structure Plan Area

This Local Structure Plan (LSP), also referred to as the Bushmead LSP, applies to the land contained within the inner edge of the line denoting the LSP boundary shown on the Structure Plan Map (Plan 1).

2.0 Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the WAPC.

3.0 Land Use and Subdivision Requirements

Plan 1 outlines land use zones and reserves applicable within the Structure Plan area in accordance with the zones and reserves listed in the Scheme. Notwithstanding the following discretionary uses, as detailed below, may be considered for approval by the City of Swan Council.

- Display Home - Means a dwelling and incidental car parking which is intended to be open for public inspection as an example of dwelling design
- Display Home Centre - Means a group of two or more dwellings and incidental car parking which are intended to be open for public inspection as examples of dwelling design.
- Residential Sales Office - Means a building, structure and associated car parking used incidental to the sale of land and dwellings.

3.1 Residential

3.1.1 Dwelling Target

- a. Objective: To provide an estimated 905 lots within the LSP area.

3.1.2 Density

- a. Plan 1 defines the broad residential density ranges that apply to specific areas within the LSP. 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.
- b. A Residential Density Code Plan is to be submitted at the time of subdivision to the WAPC and shall be consistent with the LSP, and the Residential Density Ranges identified on Plan 1 and locational criteria contained in Clause 3.1.3.
- c. The Residential Density Code Plan is to include a summary of the proposed dwelling yield of the subdivision.
- d. Approval of the Residential Density Code Plan shall be undertaken at the time of determination of the subdivision application by the WAPC. The approved Residential Density Code Plan shall form part of the LSP and shall be used for the determination of future development applications.
- e. Variations to the Residential Density Code Plan will require further approval of the WAPC, with a revised Residential Density Code Plan submitted generally consistent with the approved plan of subdivision issued by the WAPC. The revised Residential Density Code Plan shall be consistent with Residential Density ranges identified on Plan 1 and the locational criteria contained in Clause 3.1.3.
- f. A revised Residential Density Code Plan, consistent with Clause 3.1.3(e) will replace, wholly or partially, the previously approved Residential Density Code Plan, and shall then form part of the LSP as outlined in Clause 3.1.3(d).
- g. Residential Density Code Plans are not required if the WAPC considered that the subdivision is for one or more of the following:
 - i. The amalgamation of lots;
 - ii. Consolidation of land for "superlot" purposes to facilitate land assembly for future development;
 - iii. The purposes of facilitating the provision of access, service or infrastructure; or
 - iv. Land which by virtue of its zoning or reservation under the LSP cannot be developed for residential purposes.

3.1.3 Locational Criteria

The allocation of residential densities shall be in accordance with the following criteria:

- a. R10 / R20
 - i. R20 applies as the base code except where identified in clause (ii) below.
 - ii. R10 applies to single and grouped dwellings where larger lots are required to protect significant vegetation and/or to meet the requirements of an approved Bushfire Management Plan.
- b. R25 - R60 Range
 - i. R25 applies as the base code, except where identified in clauses (ii) and (iii) below.
 - ii. A Medium Density range from R30 - R40 may be applied to single and grouped dwellings which comply with the following criteria:
 - Lots adjacent to public open space; or
 - Lots fronting Neighbourhood Connector Roads; or
 - Lots at end of street blocks designated to create a unique streetscape and built-form character.
 - iii. R60 applies to multiple dwelling development which comply with the following criteria:
 - Lots adjacent to local public open space; and
 - On purposely created lots exceeding 4,000m².

3.2 Public Open Space

The provision of a minimum of 10% public open space, which may include up to 2% cash-in-lieu, will be provided in accordance with the WAPC's Liveable Neighbourhoods. Public open space is to be provided generally in accordance with Plan 1 and the Public Open Space Schedule included in Part 2, with an updated Public Open Space Schedule to be provided at the time of subdivision for determination by the WAPC, upon the advice of the City of Swan.

4.0 Development Requirements

4.1 Local Development Plans

- 4.1.1 Local Development Plans shall be required, where applicable, as a condition of subdivision and shall be prepared in accordance with the Scheme, for:
- Lots with vehicle access from a lane and lots with double street frontages;
 - Grouped and multiple dwelling sites;
 - Lots directly abutting public open space and/or regional open space;
 - Lots affected by an Asset Protection Zone; and
 - Where required to facilitate tree retention in accordance with Plan 3 (refer clause 4.5 below),

4.2 Bushfire Prone Areas

Plan 2 identifies lots declared bushfire prone in accordance with the Bushfire Management Plan, included in Appendix C. Lots that are identified as being bushfire prone are required to be constructed in accordance with the identified Bushfire Attack Level to AS3959 requirements.

4.3 Public Realm Standards

Figures 1, 2 and 3 prescribe standards for the development of thoroughfares within the LSP area. All relevant forms of development within the LSP area shall be in accordance with these standards.

4.4 Notifications on Title

In respect of applications for the subdivision of land the City of Swan may recommend to the WAPC that conditions of subdivision approval be imposed requiring the following notifications on title pursuant to Section 165 of the Planning and Development Act 2005:

- For lots notated on Plan 1 as requiring notifications on title, notification that the land is in close proximity to an existing poultry farm and may be adversely affected by odour emissions.

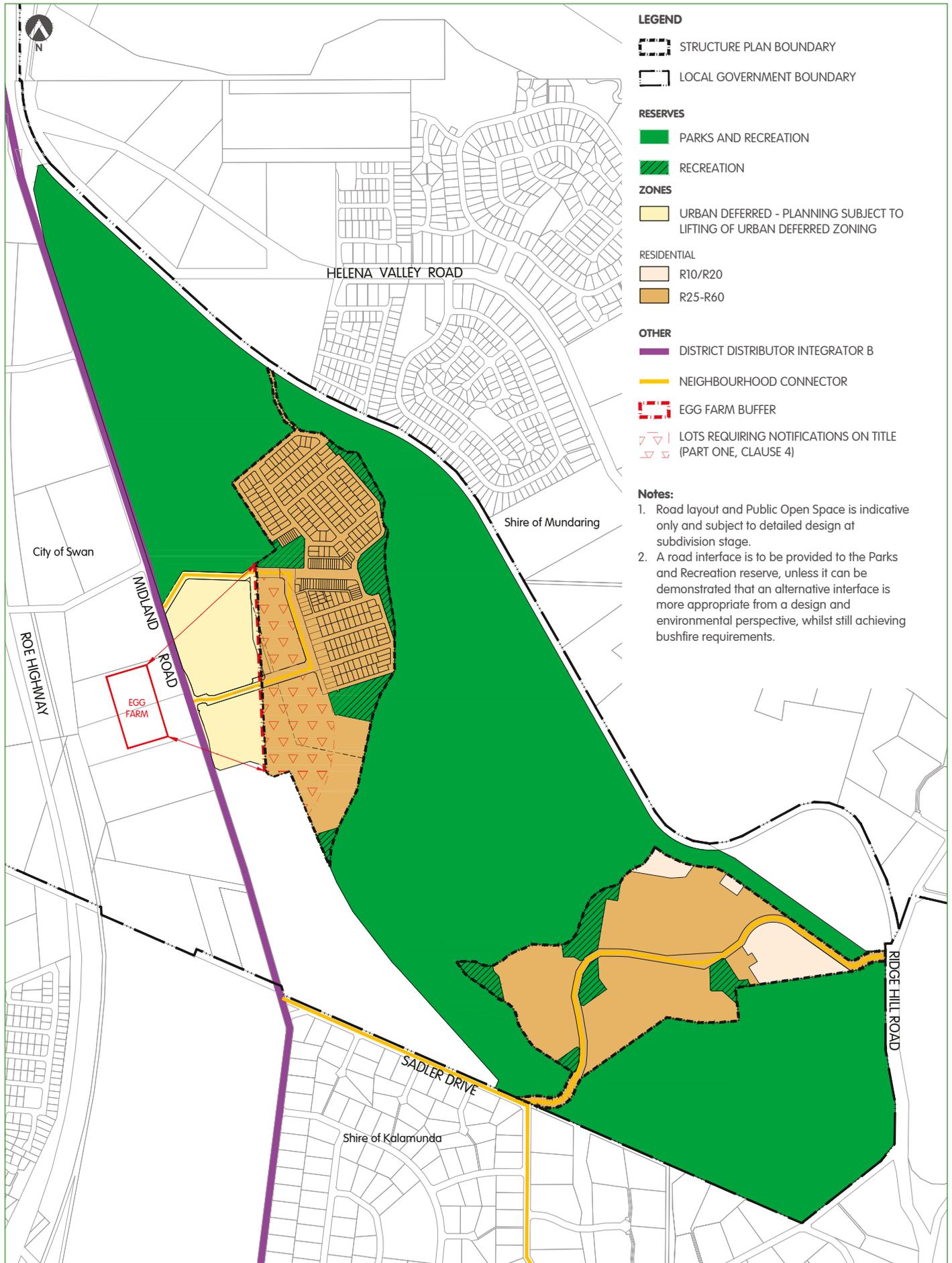
4.5 Tree Retention

Plan 3 depicts trees that are proposed to be retained within the Rural zone and the new Special Use zone (rezoned via Amendment 162 to Local Planning Scheme No. 21) to assist with mitigation of potential odour from the adjacent poultry farm.

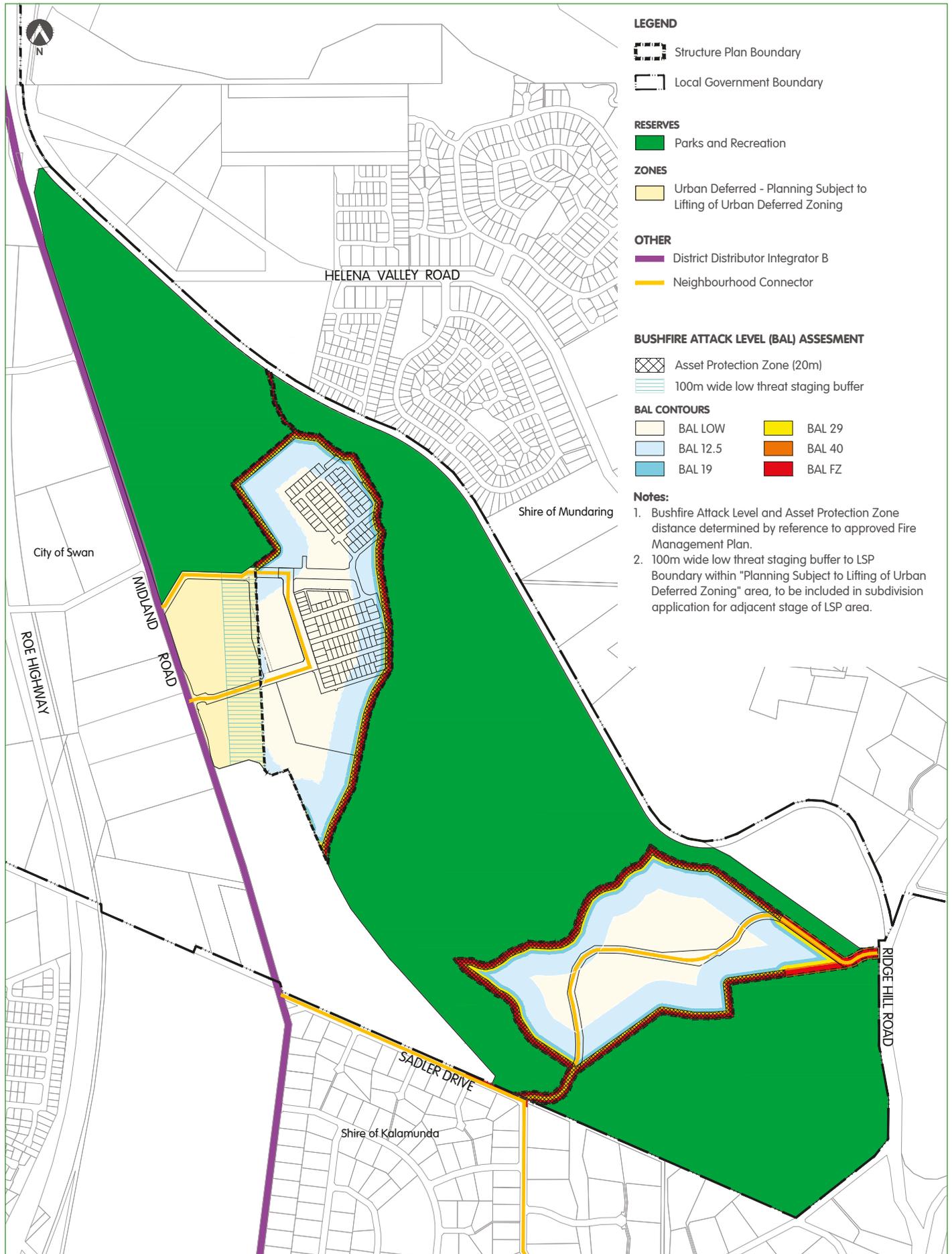
Reasonable efforts will be taken in subdivision and development design to retain the trees depicted on this plan. Mitigating factors may include natural attrition, unintended impacts from servicing requirements, managing bushfire risk, public safety and subdivision design or development requirements.

It is not a requirement of this Structure Plan to require trees to be replaced or offset where circumstances require the removal of the trees depicted on Plan 3.

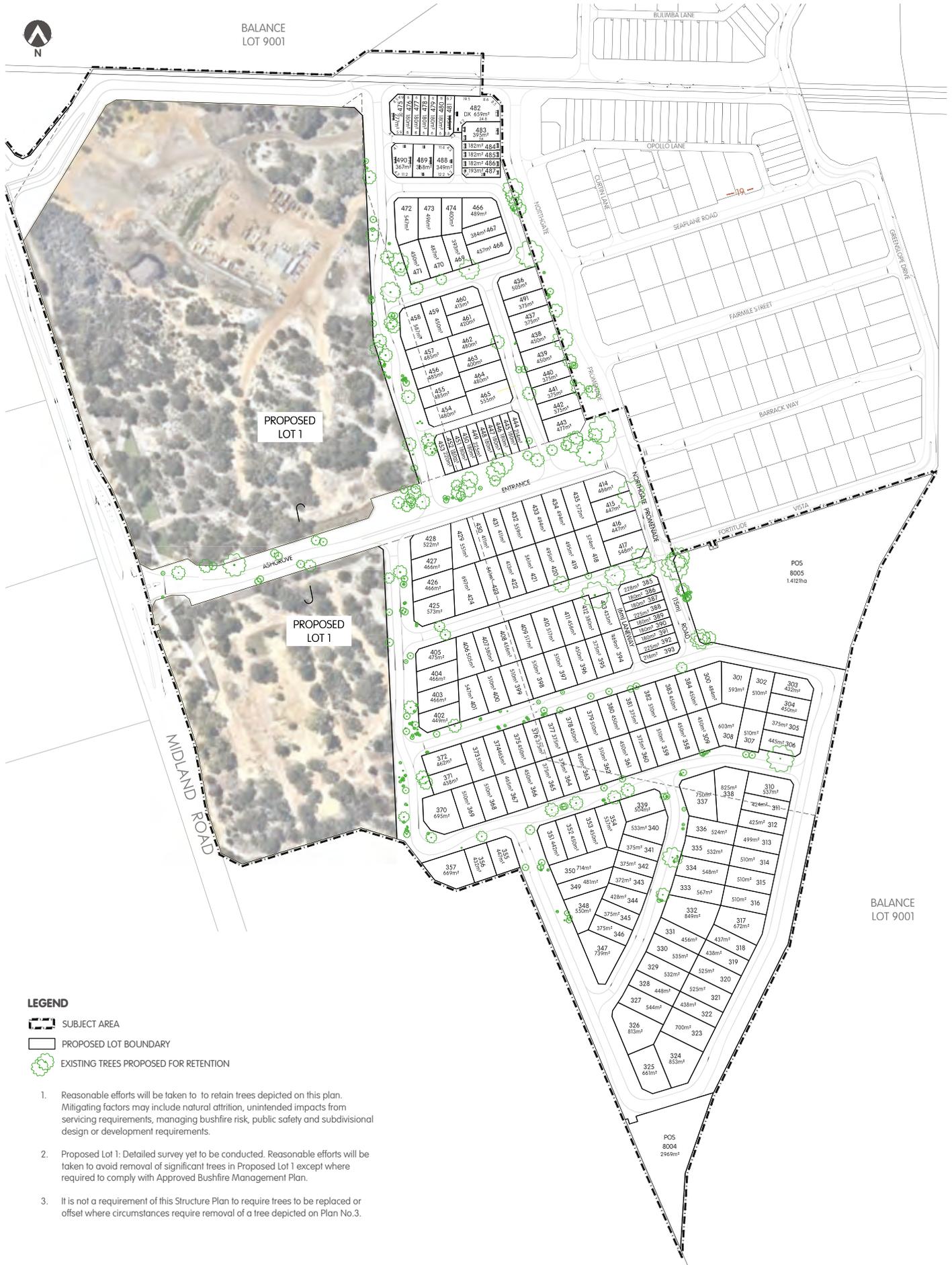
Plan 1: Local Structure Plan (VD1 0340)



Plan 2: Bushfire Attack Level Assessment



Plan 3: Indicative Tree Retention Plan (RD1077B)

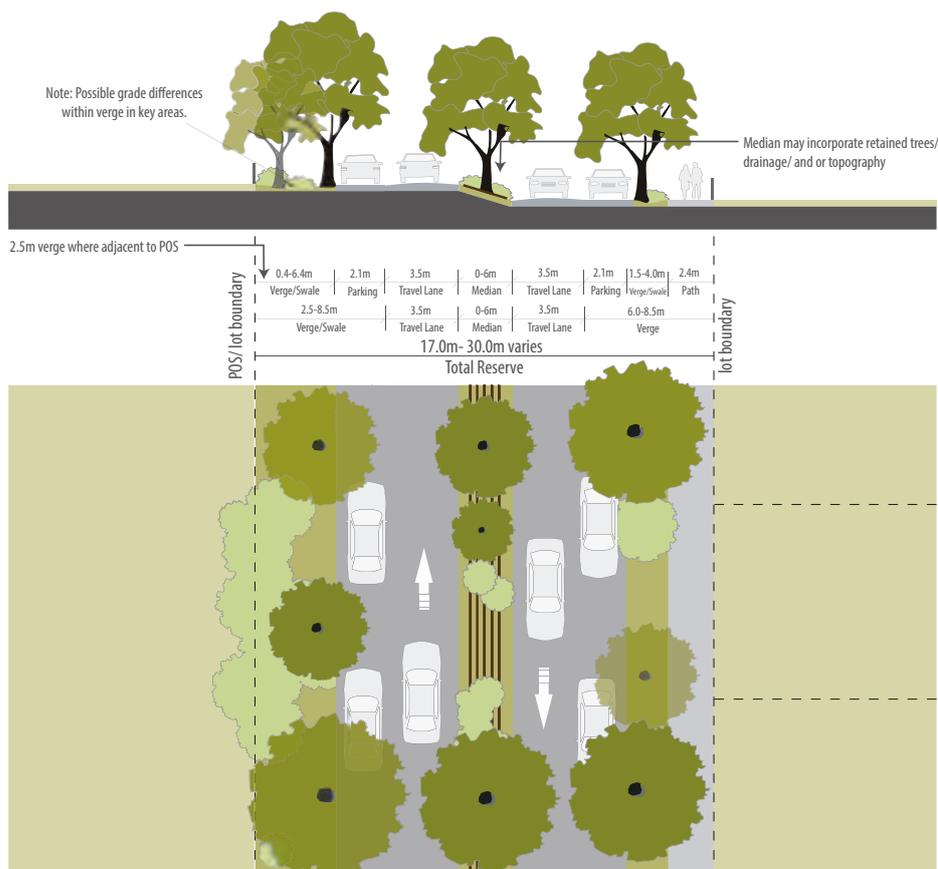


LEGEND

- SUBJECT AREA
- PROPOSED LOT BOUNDARY
- EXISTING TREES PROPOSED FOR RETENTION

1. Reasonable efforts will be taken to retain trees depicted on this plan. Mitigating factors may include natural attrition, unintended impacts from servicing requirements, managing bushfire risk, public safety and subdivisional design or development requirements.
2. Proposed Lot 1: Detailed survey yet to be conducted. Reasonable efforts will be taken to avoid removal of significant trees in Proposed Lot 1 except where required to comply with Approved Bushfire Management Plan.
3. It is not a requirement of this Structure Plan to require trees to be replaced or offset where circumstances require removal of a tree depicted on Plan No.3.

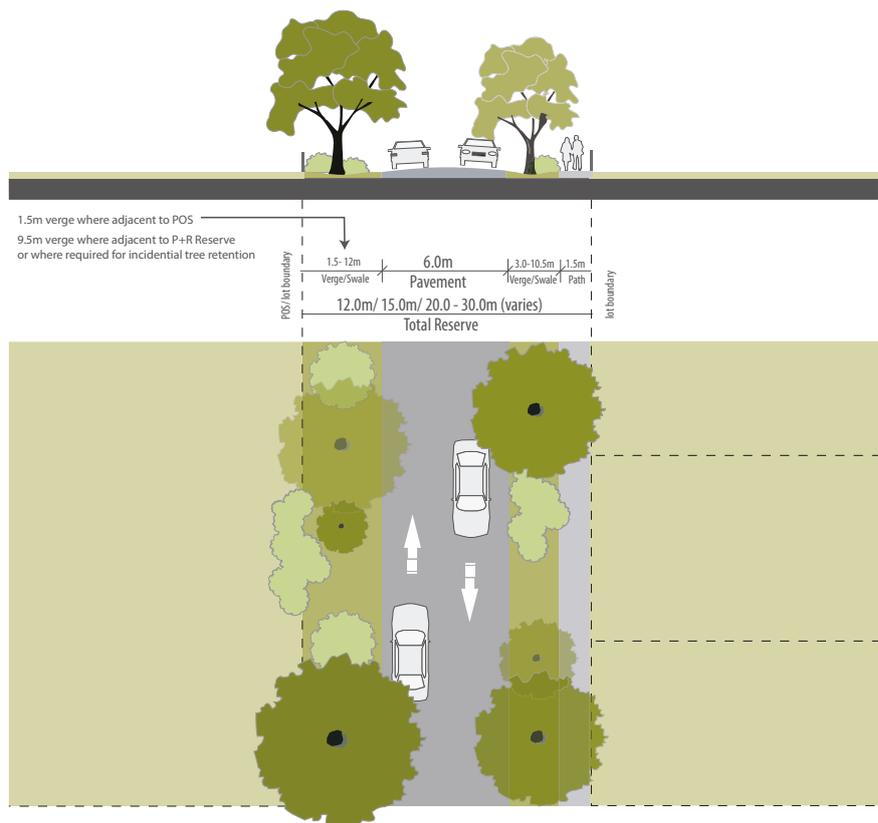
Figure 1: Neighbourhood Connector



PUBLIC REALM STANDARDS

Thoroughfare Type	Neighbourhood Connector
Movement	Free Movement
Design Speed	50kmph
Road Reserve	Typically 17.0m adjacent to POS Typically 22.0m in all other locations Note: The line of the road reserve and pathways will meander occasionally with traffic islands and incidental green spaces providing green links and spaces for ecological transect of local fauna. The road reserve width in these locations may be increased to 30m.
Pavement Width	3.5 on both sides
Traffic Flow	Two Way
Parking Width/ Type	Both sides parallel within verge
Kerb Type/ Radius	Flush/ No kerb as appropriate to facilitate drainage swales / 12.0m
Median	Typically nil. May be provided to retain trees or/ and accommodate drainage and/ or topography.
Planter width/ Type	Incorporate stormwater control systems to celebrate storm events
Planting Pattern	Informal groups of trees and vegetation
Tree Type	TBA
Street Light Type/ Spacing	TBA
Cyclist Provision	Path
Footpath Type/ Width	2.4m shared path one side

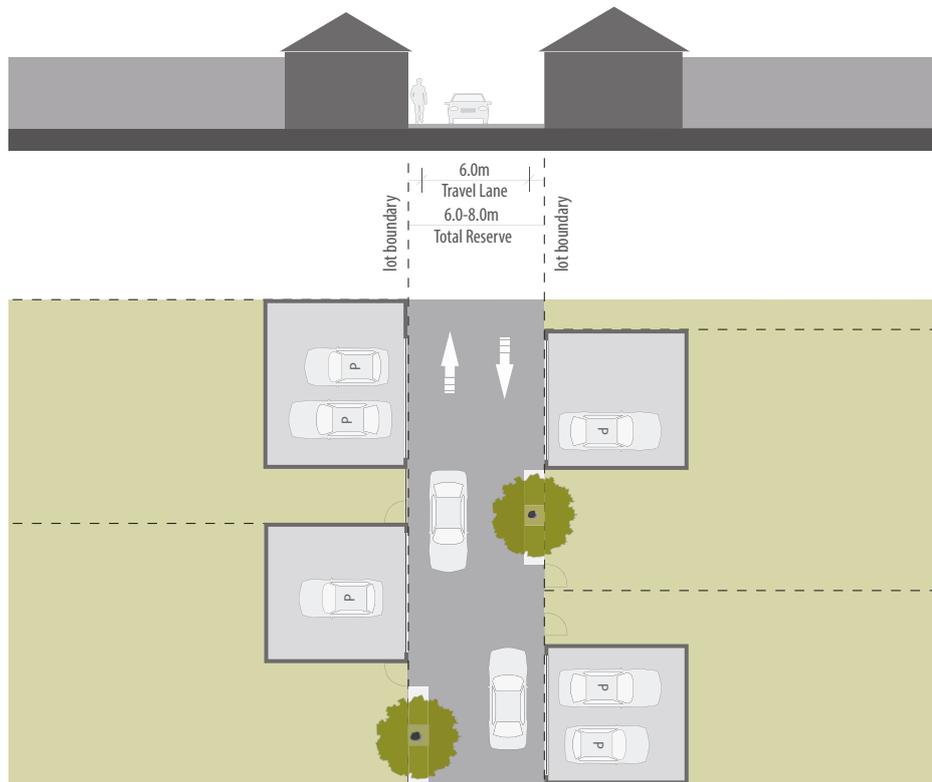
Figure 2: Access Street



PUBLIC REALM STANDARDS

Thoroughfare Type	Local Access Street
Movement	Yield
Design Speed	40kmph
Road Reserve	Typically 12.0m adjacent to POS Typically 20.0 - 30.0m adjacent to P+R reserve / Kadina Brook Typically 15.0m in all other locations (Note: the line of the road reserve and pathways will meander occasionally with traffic islands and incidental green spaces)
Pavement Width	6.0m
Traffic Flow	Two Way Yield
Parking Width/ Type	Staggered parallel within pavement where applicable
Kerb Type/ Radius	Flush / no kerb as appropriate to facilitate drainage swales / 12.0m
Median	N/A
Planter width/ Type	Incorporate stormwater control systems to celebrate storm events
Planting Pattern	Informal groups of trees and vegetation
Tree Type	TBA and including retained trees where appropriate
Street Light Type/ Spacing	TBA
Cyclist Provision	No cycle lanes
Footpath Type/ Width	1.5m one side

Figure 3: Laneway



PUBLIC REALM STANDARDS

Thoroughfare Type	Laneway
Movement	Yield
Design Speed	15kmph
Road Reserve	Typically 6.0m Typically 8.0m to accommodate occasional landscaping elements
Pavement Width	6.0m
Traffic Flow	Two Way Yield
Parking Width/ Type	NA
Kerb Type/ Radius	Flush 3.0m
Planter width/ Type	TBA
Planting Pattern	Irregular groups
Tree Type	Groundcovers and small bushes
Street Light Type/ Spacing	NA
Cyclist Provision	NA
Footpath Type/ Width	NA

part two
explanatory

1.0 Planning Background

1.1 Introduction And Purpose

The Bushmead Local Structure Plan (LSP) has been prepared to guide the subdivision and development of the 'Special Use' zoned portion of the Bushmead Estate (subject site) in accordance with the requirements of 'Schedule 4 – Special Use Zone No.14 of the City of Swan Local Planning Scheme No. 17 (the Scheme).

The LSP has been prepared based on a comprehensive review of relevant town planning, environmental and engineering considerations. The design of the LSP aims to create a distinctive and ecologically responsive new community with a mix of lot sizes to facilitate a range of housing typologies and lifestyle opportunities. The LSP depicts an interconnected street and path network, linked to the surrounding bushland and responding to the unique topographical and landscape characteristics that define the site.

Indicative design of the 'Special Use' zone equivalent to the MRS 'Urban' zone indicates a notional yield of 905 lots (equivalent to approximately 980 dwelling units), with densities ranging from R10 to R60.

1.2 Land Description

1.2.1 Location and Ownership

The Bushmead Estate is located approximately 16 kilometres northeast of the Perth Central Business District and 4.7 kilometres southeast of Midland. The subject site has access to Midland Road to the west, Ridge Hill Road to the east and Sadler Drive to the south.

Roe Highway, a primary regional road is located to the west of Midland Road. The site is 500 metres from the intersection of the Great Eastern Highway Bypass. The Perth Domestic and International Airport is within 5 kilometres of the site.

The Registered Proprietor of the subject site is Dunland Property Pty Ltd.

1.2.2 Area and Land Use

The subject site has a total land area of 272.53 hectares comprising approximately:

- 73.27 hectares of 'Special Use' zone equivalent to the MRS 'Urban' zone and being the subject of this LSP (See Section 1.3.1.2 below);
- 12.49 hectares of 'General Rural' zoned land equivalent to the MRS 'Urban Deferred' zone; and
- 186.77 hectares of 'Parks and Recreation' reserve.

Until 2010, the subject site formed part of a larger landholding known locally as the Bushmead Rifle Range and owned by the Department of Defence on behalf of the Commonwealth Government. The land was used by the Australian Army for shooting practice, driver training, staff housing and unit administration.

The site presents land in a variety of conditions resulting from its previous uses, which include:

- A rifle range with two parallel ranges;
- An effluent disposal area where wastewater from an abattoir was discharged to the environment by spray irrigation over a portion of the land where there are permeable sandy soils;
- Grazing of stock over the majority of the site excluding the rifle range;
- Vehicle traversing associated with its defence force usage for driver training; and
- Ongoing uncontrolled recreational vehicle usage, timber cutting and rubbish dumping.

The land lies at the foot of the Darling Scarp and presents a transitional landscape between the easternmost edge of the Bassendean Dune System, the Ridge Hill Shelf, and the lower sector of the face of the Darling Scarp.

The site supports a section of Kadina Brook, an ephemeral stream that rises on the lower slopes of the Darling Scarp and discharges (off the site) to the Helena River.

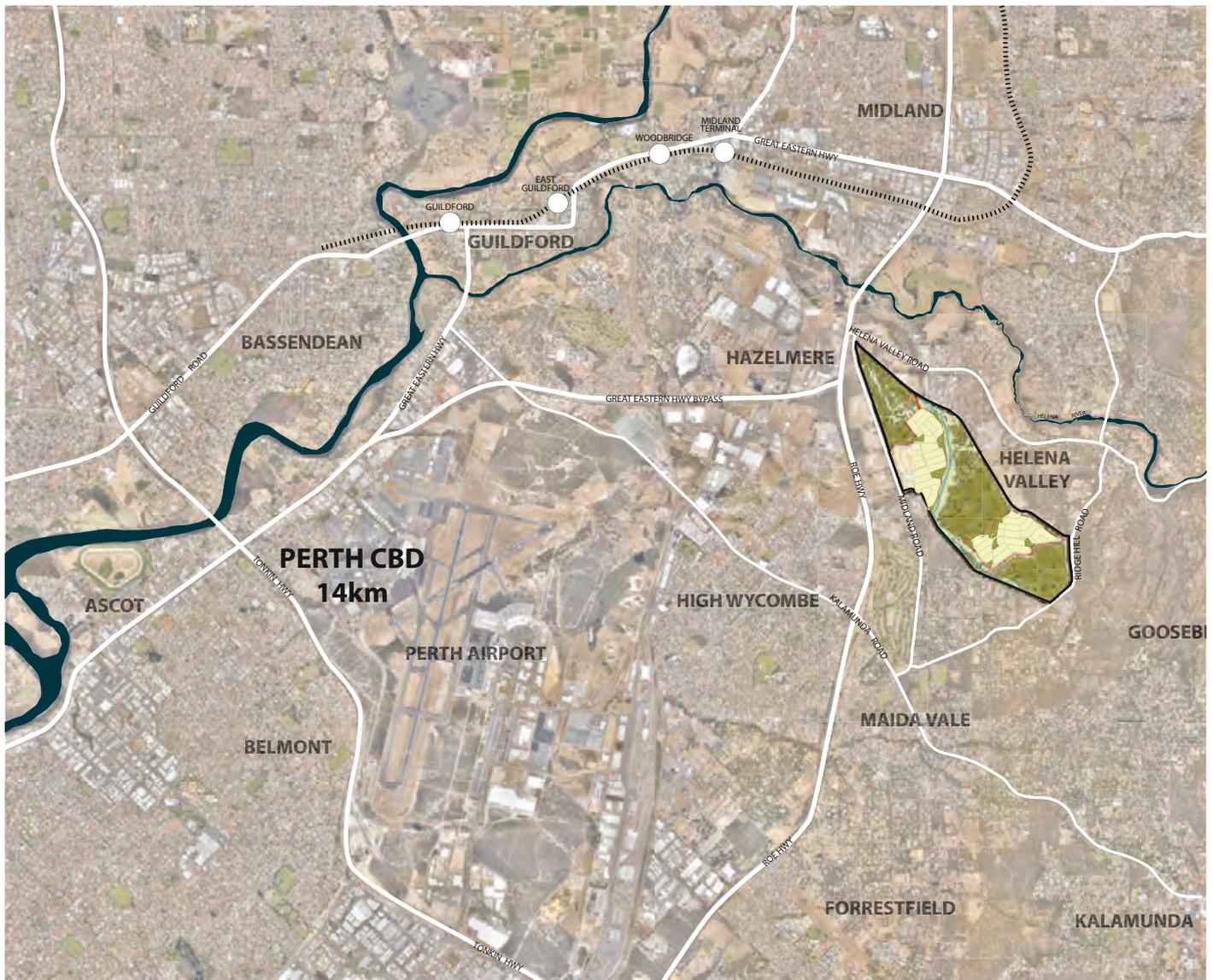
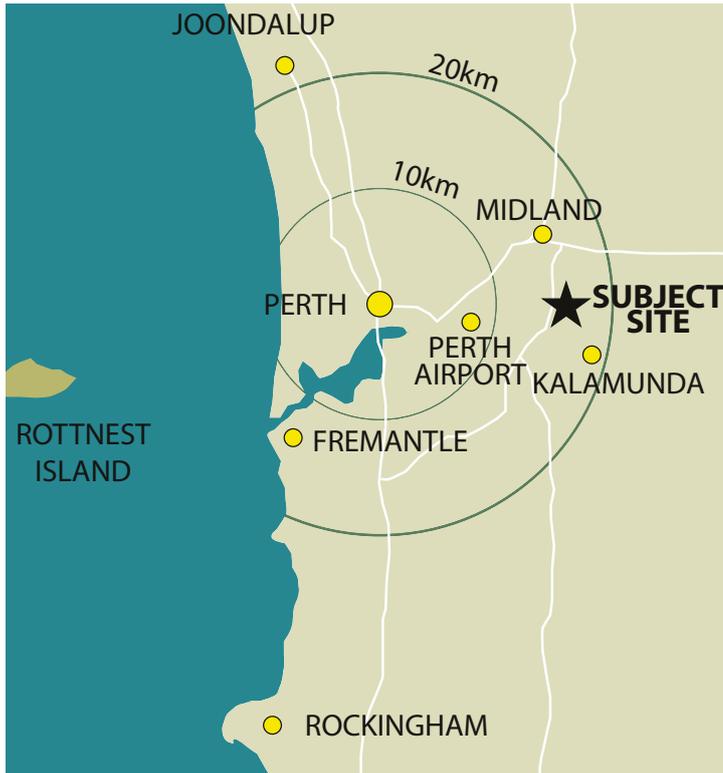
Whilst parts of the site support sizable expanses of native vegetation in very good condition, other parts of the site have been either completely cleared or parkland cleared to support the uses, or as a result of the uses, noted above. The area the subject of the LSP represents land determined to be in poor biological condition through the rezoning proposals for the site and identified as suitable for urban development.

1.2.3 Conservation Covenant

In 2009 the Department of Defence (Commonwealth of Australia) signed a Restrictive Conservation Covenant with the (then) Department of Environment and Conservation (DEC), now the Department of Biodiversity, Conservation and Attractions (DBCA). The general purpose of the Covenant is to restrict activities that are not consistent with the use of demarked areas of land for the purpose of conservation. These areas currently comprise two portions of the site focusing on cleared and otherwise degraded land and two further areas of land, referred to as 'habitat tree protection zones'.

Approaches to DBCA in its capacity as the Executive Authority under the terms of the Covenant, resulted in agreement to modify the Covenant boundary to match the boundary of the 'Parks and Recreation' reserve proposed in MRS Amendment 1242/41. A Conservation Management Plan for this land was approved by DBCA on 15th July 2016 and the modified Conservation Covenant was registered with Landgate on 27th July 2016.

Figure 1: Location Plan



It is intended that DBCA will be the perpetual custodian of the reserve and will manage this land for the purpose of conservation, in accordance with the approved Conservation Masterplan and Management Plan. Cedar Woods Properties will install all of the appropriate conservation infrastructure and complete revegetation within approximately 38 ha of cleared land prior to handover of management to DBCA. When these measures have been completed, this large area of land will make a valuable addition to the inventory of secure conservation reserves in the ownership and management of the State, as well as provide for public access and recreation opportunities.

1.3 Planning Framework

1.3.1 Zoning and Reservations

1.3.1.1 Metropolitan Region Scheme

In accordance with the provisions of the Metropolitan Region Scheme (MRS) the subject site is zoned 'Urban' and 'Urban Deferred', with the balance of the land reserved 'Parks and Recreation.' The 'Parks and Recreation' reserve is also designated as a 'Bush Forever Area' under the MRS.

The current zoning and reservation of the land was effected by MRS Amendment No. 1242/41 (gazetted 21 October 2014) which rezoned the land from 'Public Purposes' and 'Parks and Recreation'.

The Western Australian Planning Commission (WAPC) consented to the transfer of portion of the 'Urban Deferred' zone to the 'Urban' zone on 17th January 2018, giving rise to this Amendment to extend the approved Structure Plan over this new 'Urban' zoned area.

1.3.1.2 City of Swan Local Planning Scheme No. 17

Under the provisions of the Scheme portions of the site are zoned 'Special Use' (corresponding to the 'Urban' zone in the MRS) and 'General Rural' (corresponding to the 'Urban Deferred' zone in the MRS), with the balance of the land reserved for 'Parks and Recreation.' The LSP applies only to the area of the site zoned 'Special Use'.

Current zoning and reservation of the land was effected by Local Planning Scheme Amendment No. 81 (Amendment No. 81) which rezoned the land to complement the MRS zoning and reservation. Amendment No. 81 was gazetted on 13th March 2015.

The City of Swan commenced preparation of a Basic Amendment to the Scheme (Amendment No. 162) to rezone the relevant portion of the 'General Rural' zone to 'Special Use' to bring it into line with the WAPC's decision to transfer the land to the 'Urban' zone. Amendment No. 162 was gazetted on 14th August 2018.

At the time of lodgement of Amendment No. 2, the land remained in the 'General Rural' zone. Schedule 2, Part 4 of the Deemed Provisions specifies the requirement for Structure

Plans to be prepared in specific zones within the Scheme area, which includes the 'Special Use' zone, but not the 'General Rural' zone. Pursuant to Clause 15 of the Planning and Development (Local Planning Schemes) Regulations 2015 (Regulations), where the requirement for a Structure Plan is not specified for a particular zone, in this case the current 'General Rural' zone of portion of the land, then preparation (in this case extension) of a Structure Plan requires the agreement of the WAPC. To this effect the proponent wrote to the Chairman of the WAPC on 5th February 2018 seeking this consent.

The Chairman subsequently authorised extension of the Structure Plan via this Amendment No. 2 pursuant to Clause 15(c) of the Regulations on 28th March 2018.

At the time of lodgement of SP Amendment No. 2 the City was also progressing Amendment No. 149 to the Scheme which permits the Additional Use right of 'Office (Residential Sales Office)' within the 'General Rural' zone of the Bushmead site. The purpose of this proposal is to allow for a temporary Residential Sales Office to be situated on the land to support development of the Bushmead Estate. Amendment No. 149 was gazetted on 12th October 2018.

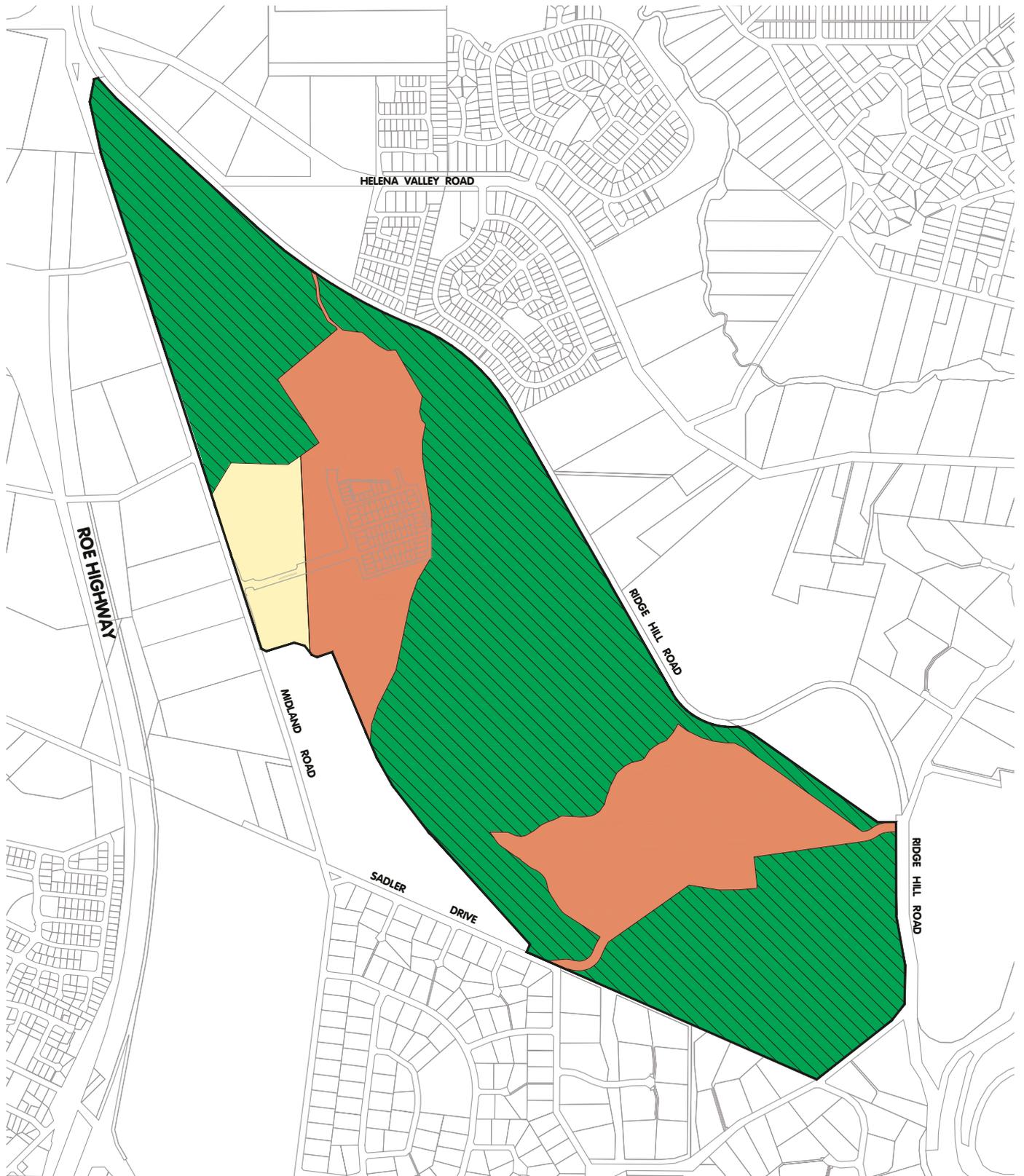
The northern portion of the site is within the 'Airport Noise Exposure Area' (ANEA) and affected by contours of 20 and 25 intervals. The Scheme requires planning approval for any development considered either 'conditionally acceptable' or 'unacceptable' with respect to the relevant noise exposure zone as identified within Statement of Planning Policy 5.1. This affects only the portion of the site reserved for 'Parks and Recreation' and is therefore not a relevant consideration in the determination of the LSP.

Schedule 4 – Special Use Zone No.14 of the Scheme applies to the land. This describes the objectives of the 'Special Use' zone for which the City is to have regard when dealing with any proposed Structure Plan, Detailed Area Plan or other proposed development and/or subdivision of the land. These are:

1. To provide a quality living environment within the City of Swan;
2. To retain and enhance the aesthetic qualities, natural environmental values and physical character of the site; and
3. To provide a variety of living options that appeal to a broad market spectrum and cater for future community needs and lifestyles.

These objectives are addressed by the LSP.

Figure 2: Metropolitan Region Scheme Map



LEGEND

RESERVED LANDS

 PARKS AND RECREATION

 NOTICE OF DELEGATION

 BUSH FOREVER AREA

ZONES

 URBAN

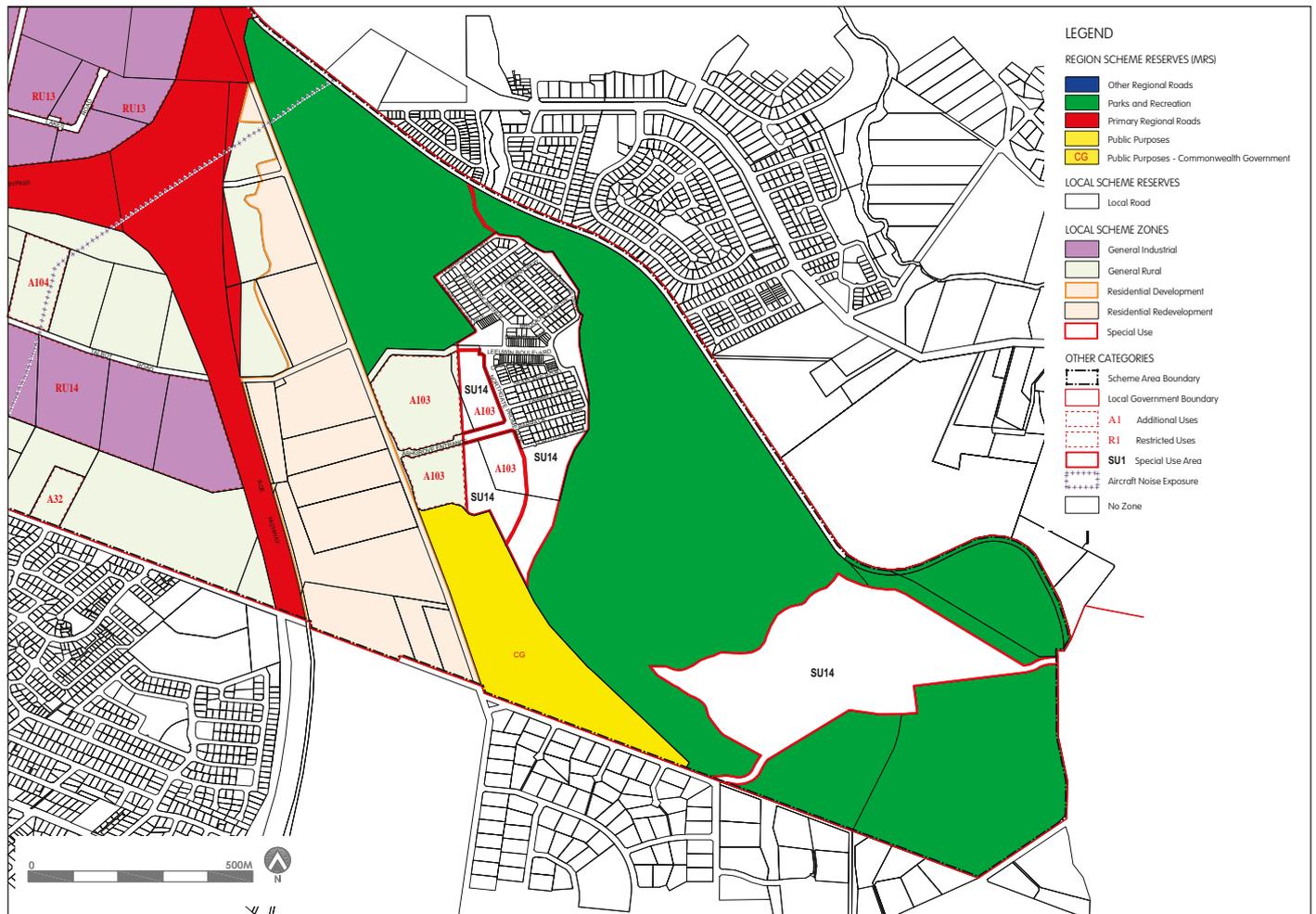
 URBAN DEFERRED



Schedule 4 – Special Use Zone No.14 also identifies a number of conditions applicable to the land, being:

1. Condition 1 - Subdivision and development shall be subject to the provisions of Part 5A of the Scheme, including the preparation and approval of a Structure Plan.
Approved SP satisfies this requirement.
2. Condition 2 – Local Water Management Strategy (LWMS) prior to endorsement of the LSP.
LWMS approved 13th October 2015 (Appendix B) satisfies this requirement.
3. Condition 3 – LSP, subdivision and development to be in accordance with WAPC’s Planning for Bushfire Protection Guidelines.
Approved Bushfire Management Plan (Appendix C) satisfies this requirement.

Figure 3: Local Planning Scheme No. 17 Map



1.3.2 Regional and Sub-Regional Structure Plans

1.3.2.1 Directions 2031 and Beyond – A Spatial Framework for Perth and Peel (WAPC, 2010)

Directions 2031 and Beyond (Directions 2031) provides an overarching strategic framework for the detailed planning and delivery of housing, infrastructure and services for the Perth and Peel regions to support an estimate population of 3.5 million people in 2031. Directions 2031 typically seeks a 50 per cent increase from the current average residential density of 10 dwellings per gross urban zoned hectare to 15 dwellings per gross urban zoned hectare in new development areas.

The subject site is within the 'North-east sub-region', which in accordance with the connected city scenario, is forecast to grow to an estimated population of 258,000 by 2031, representing a 37% increase on current population levels. An estimated additional 40,000 dwellings will be necessary to accommodate this growth. Directions 2031 specifically notes that future development will need to be carefully planned to ensure the natural attributes, built heritage and local character of the area are protected.

Development of the Bushmead LSP achieves a density of 13.38 dwellings per gross urban zoned hectare. While this is marginally below the Directions 2031 target, this is mitigated by several factors specific to this site, as follows:

1. The anticipated yield of 980 dwellings surpasses the 600+ dwelling yield proposed in the Draft Outer Metropolitan Perth and Peel Sub-Regional Strategy (Draft OMPPSRS);
2. The minimum yield in the Draft OMPPSRS is equivalent to an average residential density of 7.07 dwellings per gross urban zoned hectare. The proposed development exceeds this target with a density of 13.38 dwellings per gross urban zoned hectare;
3. The development achieves a residential density of 23.92 du/ha exceeding the Liveable Neighbourhoods (LN) recommendation of a 12 - 20 du/ha for standard lot layouts;
4. Design efficiency, and therefore yield, is reduced by the irregular shape of the development cells, required to preserve environmental values in the adjoining 'Parks and Recreation' reserve and the need to protect significant trees and levels within the urban areas; and
5. Design efficiency is also reduced by the requirement to achieve fire separation distances between residential development and the conservation area.

The development will make a significant contribution to meeting the forecast housing needs of the region in accordance with Directions 2031 and contribute much needed housing diversity and lifestyle choices within the locality.

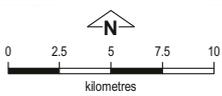
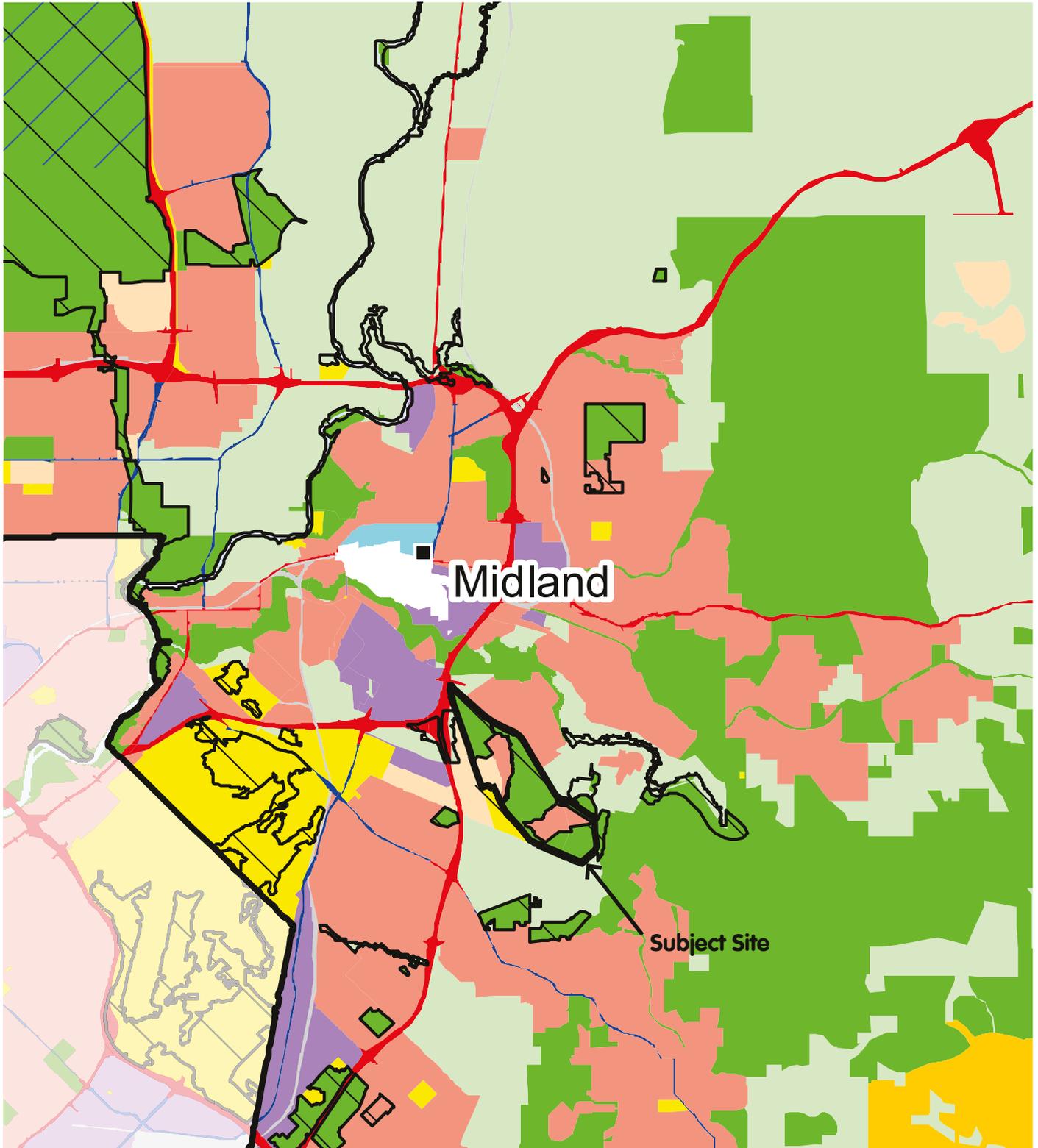
1.3.2.2 Perth and Peel @ 3.5 Million - North-East Sub-regional Planning Framework (WAPC, 2018)

Perth and Peel @ 3.5 Million is intended to realise the vision articulated in Directions 2031 through four detailed land use planning and infrastructure frameworks for each sub-region. The land is located within the area of the North-East Sub-regional Planning Framework which identifies the zoned portion of the site as 'Urban' and 'Urban Deferred' consistent with the MRS zoning, except that the transfer of land to the 'Urban' zone effected by the 2018 WAPC resolution is not depicted.

The North-East Sub-Regional Planning Framework aims for a target density of 15 dwellings per gross urban hectare for new Structure Plans, where appropriate.

The amended Structure Plan inclusive of the recently rezoned 'Special Use' zone achieves an average residential density of 13.38 dwellings per gross urban zoned hectare. This is considered to be a suitable density response in this location for the reasons outlined at 1.3.2.1 above.

Figure 4: North-East Sub-regional Framework Plan (WAPC, 2019)



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 Western Australian Planning Commission
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 SLIP 944-2017-1

Legend

Metropolitan Region Scheme

- | | | |
|----------------------|-------------------------------|------------------------|
| Central city area | Rural - water protection | Primary regional roads |
| Civic and cultural | Rural | Other regional roads |
| Industrial | Special industrial | Railways |
| Parks and recreation | State forests | Bush Forever |
| Port installations | Urban | Water catchments |
| Public purposes | Urban deferred | |
| Private recreation | Redevelopment Scheme/Act area | |

1.3.2.3 Hazelmere Enterprise Area Structure Plan (WAPC, 2011)

The subject site is located within the Hazelmere Enterprise Area and is subject to the Hazelmere Enterprise Area Structure Plan (HEASP), prepared in accordance with the recommendations of the Kewdale Hazelmere Integrated Master Plan. The HEASP was endorsed by the Commission in October 2011.

The aim of the HEASP is to unlock the Hazelmere Enterprise Area's full potential, strengthening its role as a logistics hub and fostering local employment growth. The HEASP provides the following vision for the area:

"Hazelmere Enterprise Area will become an inter-regional transport hub that integrates logistics infrastructure with digital communication in a dynamic business-focussed location. Regional ecological assets will be enhanced by connecting the Helena River and Hazelmere Lakes with a network of landscaping, stormwater management and infrastructure corridors to ultimately improve the water quality through an integrated swale system; improving a quality environment for workers and surrounding residents."

The HEASP operates as a strategic District Structure Plan, guiding future rezoning within the Structure Plan area.

The subject site is located within Precinct 9B of Precinct 9 – Bushmead. Precinct 9 also incorporates the land west of Midland Road as Precinct 9A. The land use intent for Precinct 9B is given as:

- *"Potential for residential and some non-residential uses to be identified through the local structure planning process and dependent on suitability within constraints and surrounding land uses; and*
- *Conservation of Bush Forever sites - A Special Use zone under the local planning scheme will be required to facilitate structure planning and determine appropriate land uses and land use provisions."*

Based on this intent, the HEASP recommendations for future amendments to the zoning of Precinct 9B are as follows:

- *"Reclassification of Precinct 9B from Public Purposes reserve to Urban zone and Parks and Recreation reserve under MRS; and*
- *Reclassification of Precinct 9B from Public Purposes reserve to Special Use zone under LPS 17."*

The rezoning for Precinct 9B via the gazettal of MRS Amendment No. 1242/41 and Amendment No. 81 give effect to the recommendations of the HEASP.

The HEASP identifies a suite of Development Requirements for Precinct 9B to be effected by local structure planning for the site, detailed as follows:

- *Local structure plans for Precinct 9A and 9B required. Structure plans are to consider development on both Precinct 9A and Precinct 9B;*
- *Local structure plans to address, but not limited to:*
 - *Traffic impact assessment and traffic management plan;*
 - *Local water management strategy;*
 - *Protection of Aboriginal heritage;*
 - *Poultry farm buffer assessment;*
 - *Protection of Kadina Brook; and*
 - *Protection of Carnaby's Black Cockatoo habitat.*
- *Servicing strategy (including waste water disposal);*
- *Subdivision and development subject to connection to reticulated sewer;*
- *Midland Road and intersections to be upgraded to an appropriate standard identified in the Traffic Impact Assessment and Traffic Management Plan;*
- *Limit flows discharging from lots to those discussed in the District Stormwater Management Strategy."*

The abovementioned matters have been addressed in detail within this report and the accompanying technical reports. No constraints to progressing the LSP were identified.

1.3.3 State Government Planning Strategies and Policies

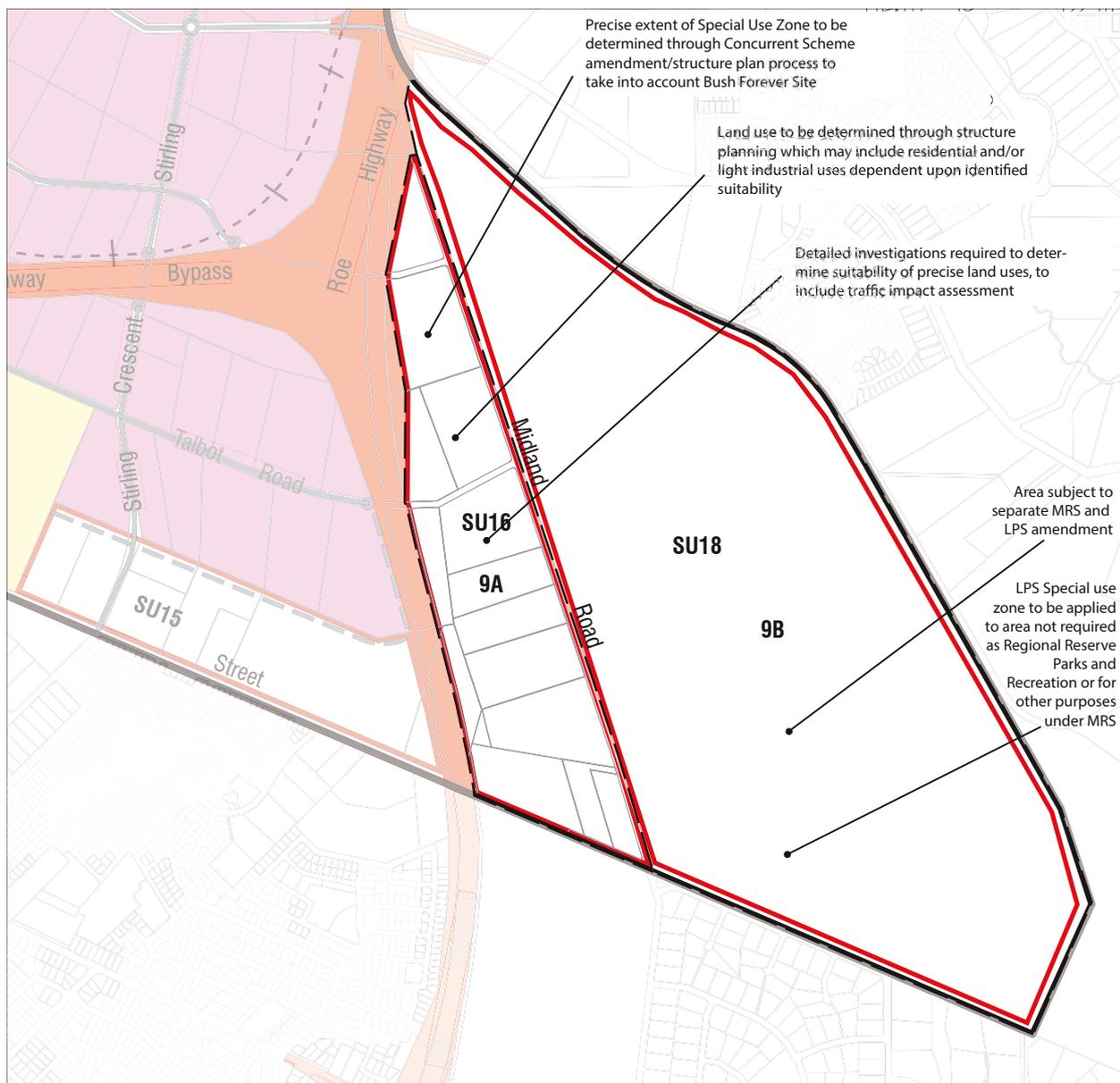
1.3.3.1 Liveable Neighbourhoods (WAPC, 2007)

Liveable Neighbourhoods (LN) is the WAPC's operational policy guiding the design and approval of structure plans. The objective of LN is the delivery of new developments that provide high quality living, working and recreational environments, thereby contributing to the successful implementation of the State Planning Strategy and State Sustainability Strategy.

The LSP meets the requirements of LN with a particular focus on the following key aims:

- *An urban structure based on interconnected, safe and walkable neighbourhoods;*
- *Creating a sense of community, identity and place by responding to the site's unique characteristics;*
- *Providing a variety of lot sizes and housing types to cater for the diverse housing needs of the community; and*
- *Achieving a residential density of 23.92 du/ha exceeding the LN recommendation of a 12 - 20 du/ha for standard lot layouts.*

Figure 5: Precinct 9 Bushmead Hazelmere Enterprise Area – Structure Plan (WAPC, 2011)



1.3.3.2 Statement of Planning Policy 1 – State Planning Framework Policy

Statement of Planning Policy 1: State Planning Framework (SPP1) unites existing State and regional policies, strategies and statements with a central framework to provide a context for decision making on land use planning and development matters in Western Australia.

The LSP is consistent with the primary aim of SPP1 that is to provide for the sustainable use and development of land.

1.3.3.3 Statement of Planning Policy 2 – Environment and Natural Resources Policy

Statement of Planning Policy 2: Environment and Natural Resources Policy (SPP2) aims to integrate environmental and natural resource management within the planning framework in order to protect and conserve the natural environment and to assist with the sustainable use of natural resources.

The proposed LSP will facilitate an improved environmental outcome for the subject land, consistent with the provisions of SPP2. The LSP proposes the following key design and environmental responses to facilitate this outcome:

1. Kadina Brook is located within the MRS 'Parks and Recreation' reserve with a minimum 50 metre buffer to residential development. The draft Conservation Masterplan and Management Plan addresses foreshore management and the need to maintain water quality and retain habitats consistent with the requirements of Part 5.2(iii) and 5.2(iii) of SPP2 relating to water resources;
2. Pursuant to rezoning of the site, development is appropriately located having regard to the site specific impacts of the adjacent egg farm as demonstrated by the proponents technical modelling consistent with the requirements of Part 3(ii) of SPP2 relating to air quality;
3. Contaminated land in the southern cell as a result of former land use has been successfully remediated to accommodate highest and best use as residential development consistent with the requirements of Part 5.4(ii) of SPP2 relating to the soil and land quality;
4. Biodiversity is protected across the site by the reservation of more than 186.77ha of the best quality vegetation and habitat for 'Parks and Recreation'. In accordance with the requirements of Part 5.5 of SPP2:
 - a. This reserve comprises the portions of the site identified as Bush Forever that satisfy the requirements for on-site verification set out in Statement of Planning Policy No.2.8 – Bushland Policy for the Perth Metropolitan Region (SPP2.8) – as per Part 5.5(i)(e) of SPP2;
 - b. The reserved area contributes to the regional representation of vulnerable habitat and establishes valuable ecological linkages as per as Parts 5.5(iii) and (iv) of SPP2;

- c. Ensures the return of high value conservation land to the public estate as per Part 5.5(v) of SPP2; and
- d. Supports the rehabilitation and long-term management of the conservation reserve via the approved Conservation Management Plan.

5. Landscape values across the site including views from the adjacent Gooseberry Hill National Park are protected by ensuring the retention of vegetation in the 'Parks and Recreation' reserve along the eastern and north-eastern boundaries of the site, and the future siting of development through the proposed LSP for the site, consistent with the requirements of Part 5.9 of SPP2 relating to landscape.

1.3.3.4 Statement of Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region

Statement of Planning Policy 2.8: Bushland Policy for the Perth Metropolitan Region (SPP2.8) provides a policy and implementation framework to ensure bushland protection and management is appropriately addressed and integrated with broader land use planning and decision-making.

The Bushmead LSP has been developed in accordance with Clause 5.2 of SPP 2.8, which generally states that proposals or decision-making should:

- have regard to the protection of significant bushland sites recommended for protection and management in an endorsed local bushland strategy;
- support a general presumption against the clearing of bushland or other degrading activities; and
- proactively seek to safeguard, enhance and establish ecological linkages between Bush Forever areas and those areas identified for protection through the implementation.

The approved Bushmead Conservation Management Plan prepared by RPS (2016) is the overarching bushland strategy which addresses the impacts arising from the proposed urban development cells and outlines the management measures required to ensure the ongoing protection and management of native vegetation, fauna habitats and Bush Forever Area 213.

Additionally, the Environmental Assessment Report presented in Appendix A sets out the management framework and measures to be implemented as development progresses and thereby, ensure the ongoing protection and management of bushland within the site, as well as the ecological linkages through and around the site.

The MRS 'Parks and Recreation' reserve surrounding the 'Special Use' zone is designated as 'Bush Forever Area 213.' This area is subject to the requirements of a registered Conservation Covenant and an approved Conservation Management Plan. DBCA will be the perpetual custodian of Bush Forever Area 213 (for more details see Section 1.2.3).

These measures will ensure the rehabilitation and permanent management of Bush Forever Area 213 such that it will make a valuable addition to the inventory of secure conservation reserves in the ownership and management of the State, consistent with the objectives of SPP2.8.

1.3.3.5 Statement of Planning Policy 2.9 – Water Resources

Statement of Planning Policy 2.9: Water Resources (SPP2.9) aims to protect, conserve and enhance water resources, assist in ensuring the availability of suitable water resources, and promote the management and sustainable use of water resources. The provisions of SPP2.9 are to be implemented through local planning strategies, structure plans and town planning schemes.

A District Water Management Strategy (DWMS) was prepared by RPS in support of the rezoning of the land and was approved by the Department of Water in August 2012.

As required at condition 2 of Schedule 4 – Special Use Zone No.14, the LSP is accompanied by a LWMS provided at Appendix B (13th October 2015). The LWMS provides the framework for the application of total water cycle management to the proposed urban structure, consistent with the Department of Water (DoW) principles of Water Sensitive Urban Design (WSUD), described in the Stormwater Management Manual (DoW, 2007).

The approved LWMS demonstrates the availability of water resources to support the proposed residential development together with the sustainable management of the resource.

1.3.3.6 Statement of Planning Policy 2.10 – Swan Canning River System

Statement of Planning Policy 2.10: Swan Canning River System (SPP2.10) applies to the Swan and Canning rivers and their immediate surroundings. The objectives of the Policy are to provide a framework for consistent decision-making that will ensure that activities, land use and development maintain and enhance the health, amenity and landscape values of the river, including its recreational and scenic values. This is to be achieved primarily through the development of precinct plans that specify the objectives and performance criteria applying to various areas comprising the Swan River system.

The subject site is located within the Helena Valley Precinct identified in Figure 1 of SPP2.10. Kadina Brook, a seasonal tributary, traverses the subject site from south to north, ultimately flowing off site into the Helena River. The policy statement for the Helena Valley Precinct notes various objectives that are to inform planning decisions within the precinct, of which the following are relevant to development of the Bushmead site:

- Enhance the natural riparian vegetation, especially in the lower reaches of the river;
- Enhance the potential for water flows to be returned to the river;

- improve public access to the river and extend contiguous foreshore reserves;
- Ensure that earthworks associated with subdivision and development complement landscape values, particularly in the upper reaches of the valley; and
- Protect places of cultural significance, in particular places on the State heritage register and the Department of Indigenous Affairs register of significant places.

The rezoning of the land achieved these objectives by including Kadina Brook within the MRS 'Parks and Recreation' reserve with a minimum 50 metre setback to adjoining residential development and requiring the preparation of a Foreshore Management Plan as a condition of subdivision approval for adjacent development. Foreshore management is being addressed as part of the Conservation Management Plan (and subsidiary management plans) approved by DBCA, addressing issues such as the retention and enhancement of the Brook's ecological value and minimising disturbance. The LSP is therefore consistent with the provisions of SPP 2.10.

1.3.3.7 Draft Statement of Planning Policy 4.1 – State Industrial Buffer

Draft Statement of Planning Policy 4.1: State Industrial Buffer (SPP4.1) aims to provide a consistent State wide approach for the protection and long-term security of industrial zones, transport terminals, utilities and special uses; and to secure the safety and amenity of surrounding sensitive land uses while having regard to the rights of landowners.

SPP4.1 establishes the framework for the technical analysis of the required buffer zones to different land uses, and the means for prescribing any required buffer controls through the statutory planning framework.

As the subject site is adjacent to an existing egg farm, further consideration of the relevant issues as they apply to Draft SPP4.1 is provided below.

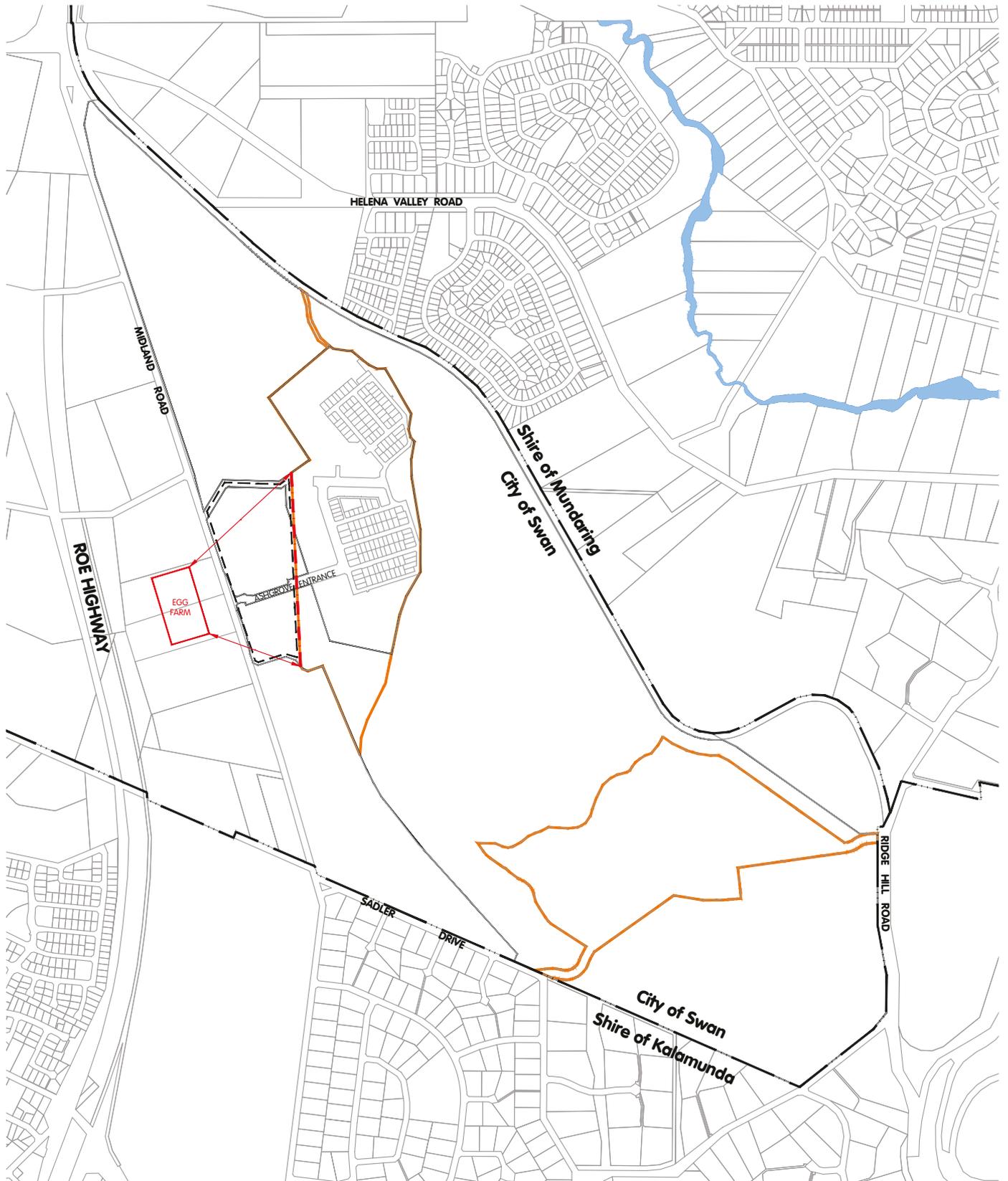
1.3.3.8 State Planning Policy 2.5: Rural Planning

State Planning Policy 2.5: Rural Planning (SPP2.5) was gazetted in 2016 to establish a framework for ensuring the orderly and proper planning and development of rural land. It is germane to this LSP in so far as it deals with establishing appropriate separation distances to poultry farms, such as the egg farm located adjacent the development on the western side of Midland Rd.

Gazetted of SPP 2.5 was accompanied by revocation of State Planning Policy No. 4.3 – Poultry Farms Policy (SPP4.3), which had previously been applied to define the extent of the 'Urban Deferred' zoning of the land via imposition of a 500 metre generic separation distance to the egg farm on Midland Rd.

In lieu of specifying a minimum separation distance, clauses 3.4(f), 5.12.1(b) and 5.12.3(a) of SPP2.5 refer the determination of the required separation distance to the Environmental Protection Authority's (EPA) Guidance Statement No. 3

Figure 6: Egg Farm Buffer



-  EXISTING LOT 9001
-  STRUCTURE PLAN AREA
-  LOCAL GOVERNMENT BOUNDARY
-  SUBJECT TO LIFTING OF URBAN DEFERMENT
-  EGG FARM BUFFER



(GS3) Separation Distances between Industrial and Sensitive Land Uses (June 2005) (GS3) which recommends generic buffer distances ranging from 300 – 1,000 metres.

The WAPC approved an application to transfer of portion of the 'Urban Deferred' zone to the 'Urban' zone on 17th January 2018, considering the requirements of SPP2.5 relative to a new Odour Impact Assessment (OIA) prepared by Consulting Environmental Engineers (2016). The OIA demonstrates that odour emissions from the farm require a lesser separation distance than the generic 500 metre buffer recommended by the revoked SPP4.3. The OIA demonstrated that the lesser separation distance complies with applicable state planning policies and environmental guidelines and that the area outside of the revised buffer is free of constraint and could be transferred to the 'Urban' zone to facilitate urban development.

On this basis, the requirements of SPP2.5 in relation to the protection of amenity for sensitive uses and the security of operation of the existing egg farm are satisfied.

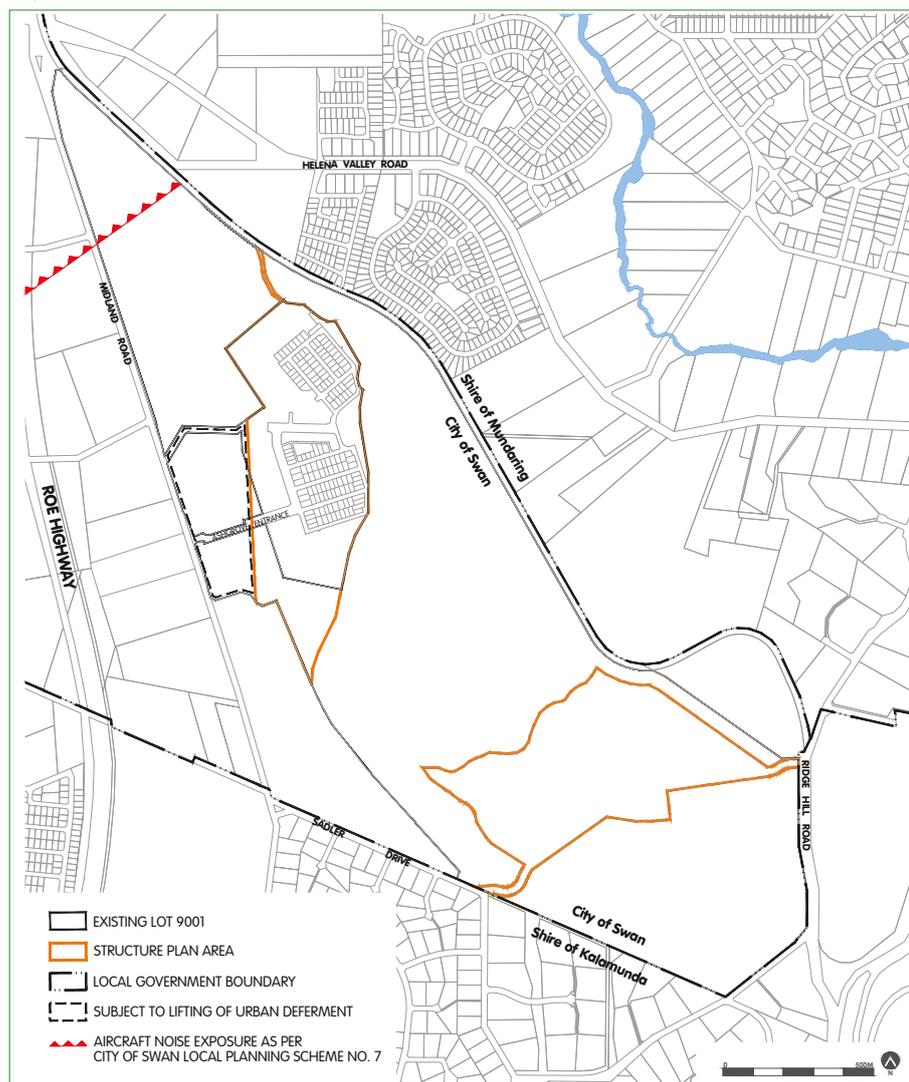
1.3.3.9 Statement of Planning Policy 5.1 – Land Use Planning in the Vicinity of Perth Airport

Statement of Planning Policy No.5.1: Land Use Planning in the Vicinity of Perth Airport (SPP5.1) applies to land within the vicinity of Perth Airport and may be affected by aircraft noise. The objective of SPP5.1 is to protect Perth Airport from unreasonable encroachment by incompatible development and to minimise the impact of airport operations on existing and future communities.

The northernmost portion of the subject site is affected by the 20 and 25 Australian Noise Exposure Forecast ('ANEF') contours. SPP5.1 imposes no restriction on zoning or development within the 20 ANEF contour, however a number of restrictions are prescribed for development within the 20 - 25 and 25 – 30 ANEF contour ranges. This area of land is located within the 'Parks and Recreation' Reserve and is not intended to be developed.

The 'Special Use' zone is not within an ANEF contour and therefore can be developed in accordance with the LSP.

Figure 7: ANEF contours



1.3.4 Local Government Planning Strategies and Policies

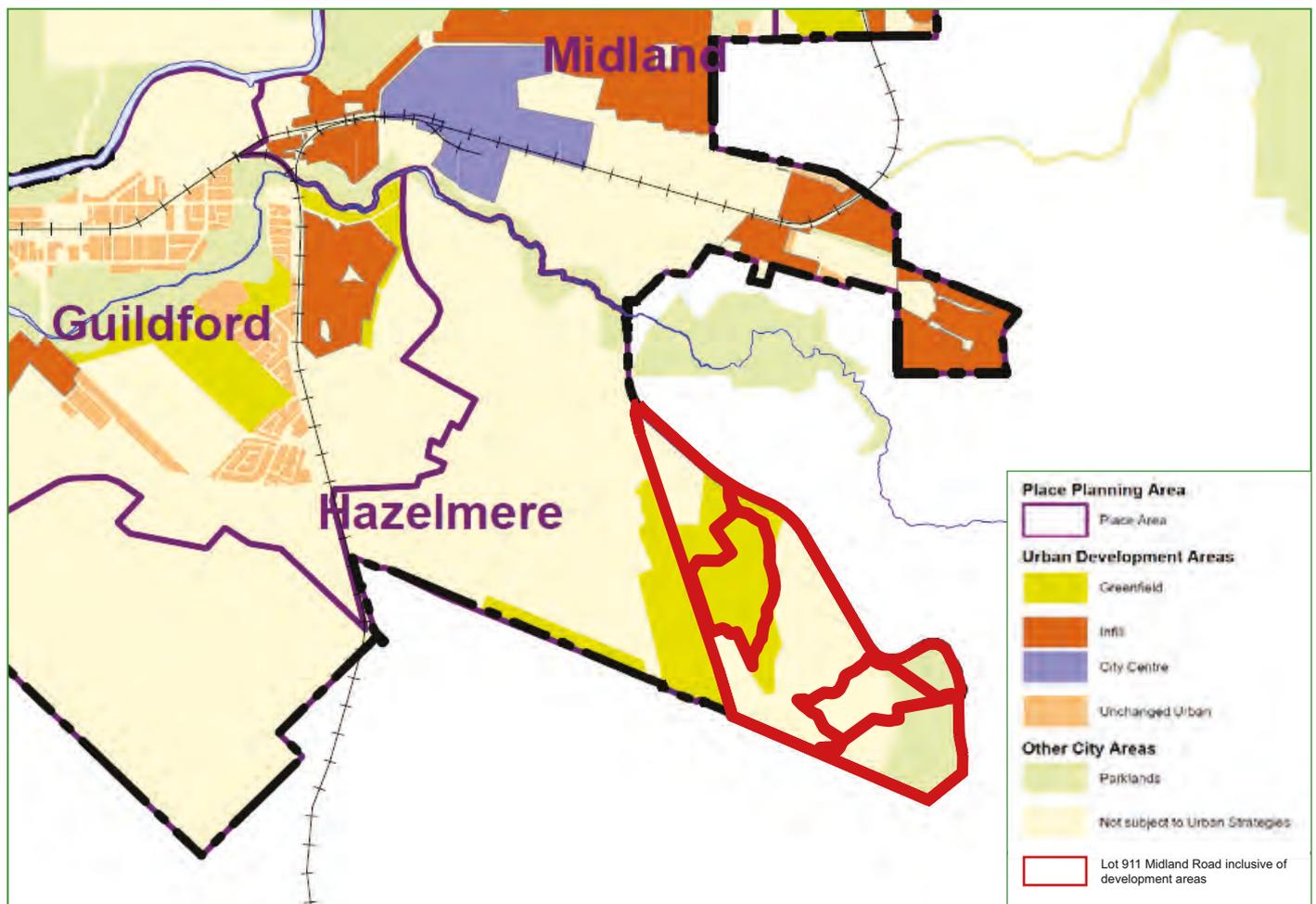
1.3.4.1 Urban Housing Strategy – The Greenfields Strategy (City of Swan, 2012)

The Urban Housing Strategy was prepared in response to Directions 2031 to address future housing needs within the City. The Strategy comprises a Greenfields Strategy that is applicable to the future development of the subject site as well as an Infill Strategy (not applicable).

The Greenfields Strategy applies to greenfield areas subject to current and future structure planning. The Greenfields Strategy earmarks the subject site as ‘Future Greenfield Areas - Urban Investigation Areas 2011-2020.’ The strategy estimates that the site could be developed for 600+ dwellings, consistent with the OMPPSRS and Directions 2031.

It is noted that the areas of the site identified on the Urban Housing Strategy Map as ‘Urban Development Areas - Greenfield’ and ‘Other City Areas – Not subject to Urban Strategies’ do not correlate with the zoning and reservation of the land resulting from the recent rezoning amendments. The MRS and Scheme zoning prevails to the extent of the inconsistency in determining the application of the Strategy requirements.

Figure 8: Urban Housing Strategy Map (City of Swan, 2012) (extract)



The Strategy notes that structure planning should be consistent with the relevant sub-regional strategic plans and district structure plans as well as the principles of Liveable Neighbourhoods and relevant Development Control Policies to ensure:

- A variety of residential densities and housing types;
- Higher residential densities near activity centres and along major public transport routes;
- Provision of community facilities;
- Provision of sufficient active and passive public open spaces; and
- Protection of environmentally sensitive areas.

The LSP achieves the stated requirements of the Urban Housing Strategy, Liveable Neighbourhoods and relevant Development Control Policies.

1.3.4.2 POL-C-102 Urban Growth Policy (City of Swan, 2006)

POL-C-102 Urban Growth Policy (the Policy) sets out the City's expectations and guidelines for development in urban growth areas to ensure that population growth in the region is sustainable. The Policy includes growth objectives and priorities to be achieved through the Structure Plans, Development Plans, accompanying Management Strategies and Management Plans, and Planning Scheme Amendments.

The Policy is supported by a suite of additional urban growth policies, including POL-C-103 - Neighbourhood Planning, POL-C-104 Environmental Planning, POL-C-105 Community and Economic Planning and POL-C-112 Public Open Space – Residential Areas.

Although the subject site is not identified within an 'Urban Growth Corridor,' it falls within the definition of a 'Priority area for urban growth' based on its 'Urban' zoning under the MRS and 'Special Use' zoning under the Scheme. Section 4 of the Policy prescribes a number of requirements for Structure Plans such as the preparation of relevant management plans, the consideration of social, economic and environmental opportunities and constraints and early consultation with approval authorities and other relevant stakeholders. It can be confirmed that consultation with relevant stakeholders, government agencies and surrounding landowners has formed part of the rezoning and structure planning processes, and is ongoing.

The Policy also cites the requirement for the preparation of a Financial Assessment Report looking at infrastructure provision and contributions. In relation to this Structure Plan the City has not requested this Assessment be prepared, however discussions are ongoing with the City regarding the potential upgrading of Midland Rd.

The requirements and targets of the Urban Growth Policy and the supporting policy suite are satisfactorily addressed by this Structure Plan and accompanying technical appendices.

1.3.4.3 DRAFT POL-LP-3.1 Structure Planning Areas – Subdivision and Development (City of Swan, 2012)

The objectives of the Draft POL-LP-3.1 Structure Planning Areas – Subdivision and Development (Draft Policy) are to ensure that development occurs in a coordinated manner and that structure plan proposals are presented in a consistent and agreed format. It is understood that the Draft Policy has not been progressed beyond the stage of public advertising.

In relation to this Structure Plan proposal the City of Swan and the Department of Planning, Lands and Heritage have indicated that the Structure Plan is to be prepared in accordance with the WAPC's adopted 'Structure Plan Preparation Guidelines (WAPC, 2012).

1.3.4.4 Water Action Plan (City of Swan, 2013)

The City's Water Action Plan outlines the City's position and goals regarding water management. Relevant to structure planning and subdivision stages of a project, the Action Plan seeks to ensure that Water Sensitive Urban Design (WSUD) outcomes are adopted to guide the design of a development and management of water resources.

A Local Water Management Strategy accompanies the LSP addressing the requirements of SPP2.9, the Commission's Better Urban Water Management Framework and the City's Action Plan.

1.3.4.5 Local Biodiversity Strategy (City of Swan, 2005)

The intent of the Local Biodiversity Strategy is to integrate biodiversity conservation into the Council's core business by providing a strategic framework for decision-making. Of particular relevance to consideration of the LSP, the Strategy:

- Identifies portions of the subject site as 'Bush Forever' within 'Figure 1 - Vegetation Extent by Administration Planning Category', characterised by the Forrestfield Complex;
- Depicts a notional 'Regional Corridor' traversing the site from south to north (Figure 5 - Regional Ecological and Local Linkages for the City of Swan); and
- Details a range of Ecosystem and Habitat goals at Tables 1.1 and 1.2 to maintain the representation and viability of key flora and fauna species.

The Biodiversity Strategy objectives have been achieved via the rezoning amendments reserving 186.77 ha of land for 'Parks and Recreation' and 'Bush Forever'. This provides a permanent, continuous ecological corridor throughout the site and connecting to adjacent habitats such as the Gooseberry Hill National Park.

2.0 Site Conditions And Constraints

2.1 Planning And Environmental Assessment Status

The subject site has been subject to significant environmental investigations and assessment since the mid 2000's. The key investigations undertaken which underpinned the determination of the development area and LSP design include:

1. Vegetation and flora survey and assessment of priority flora and threatened ecological communities
2. Fauna survey and assessment of black cockatoo and bandicoot habitats
3. Contamination assessment
4. Groundwater and surface water assessment
5. Environmental Impact Assessment

Additionally, the subject site in finalising the development areas and management response has been subject to extensive liaison with relevant state government agencies including:

- Department of Parks and Wildlife (DPaW) Threatened Ecological Communities Branch;
- DPaW Mundaring District Office;
- Department of Planning - Bush Forever Branch;
- DPaW Covenants Branch;
- City of Swan; and
- Office of the Environmental Protection Authority.

The technical surveys and environmental assessment for the site and feedback from the relevant agencies formed the basis of identifying the development and conservation areas. This was the foundation for the Bushmead MRS Amendment 1242/57.

The Environmental Assessment Report (EAR) is provided as Appendix A. A summary of the existing environment and management requirements proposed is as follows.

2.1.1 Bushmead MRS Amendment 1242/57

Bushmead MRS Amendment 1242/57 was assessed by the Environmental Protection Authority (EPA) in 2013. The EPA assessed the Bushmead MRS Amendment inclusive of all the key environmental impacts, including vegetation, fauna, watercourses and water quantity and quality, acid sulfate soils, contamination, odour and mosquitoes.

Key Agreed Environmental Outcomes

The following key agreed environmental outcomes from the environmental agencies and EPA assessment of the MRS Amendment have been adopted in the LSP:

- The 'development' areas (zoned MRS 'Urban' and 'Urban deferred') are focused on historically cleared or impacted sites. The areas vegetation and fauna habitat identified and agreed by the relevant agencies as being locally and regionally significant are to be ceded to the State for conservation purposes as the 'Parks and Recreation' reserve. The key outcome of defining the development area has meant:
 - Approximately 85.76 ha of the total landholding is available for use and development under the amendment. This is approximately 31% of the total landholding;
 - The balance of the land, some 186.77 ha or 69% of the land will be ceded to the state free of cost under the management of DBCA;
 - The retention and management of substantial tracts of vegetation and habitats in good condition;
 - Unbroken habitat linkages and ecological transition zones between stream zone and upland habitats within the site and ensuring links to adjacent land; and
 - Managing and rehabilitating portions of the conservation area
- The Bushmead MRS Amendment finalises the agreed Bush Forever and Conservation Covenant boundary consistent with the conservation areas defined in the Amendment as 'Parks and Recreation';
- The Conservation Management Plan approved by the DBCA provides a framework to ensure appropriate ongoing management of the conservation areas consistent with the requirements of the registered Conservation Covenant;
- An approved LWMS (13th October 2015) demonstrates best practice surface and groundwater management for the proposed development; and
- The Bushmead site has been subject to extensive investigations and remedial works undertaken in accordance with the Contaminated Sites Act 2003 and an independent auditor assessment. Consistent with the advice from the Department of Water and Environmental Regulation (DWER), Cedar Woods has successfully remediated all site contamination within the urban cells. The DWER has now confirmed in writing that there is no longer any restriction to develop the site for residential purposes.

2.1.2 Environment Protection and Biodiversity Conservation Act 1999 Approvals

The Bushmead residential development was referred to the Department of the Environment (DoE), now Department of the Environment and Energy (DEE) on 23rd December 2014 and was determined to be a Controlled Action, approved with conditions under EPBC 2015/7414, on 17th June 2016.

As part of the EPBC assessment, the following matters of national environmental significance were assessed:

- Calyptorhynchus banksii naso (Forest Red-tailed Black-Cockatoo);
- Calyptorhynchus baudinii (Baudin's Black Cockatoo);
- Calyptorhynchus latirostris (Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo); and
- Threatened Ecological Community 20c – Shrublands and woodlands of the eastern Swan Coastal Plain.

2.2 Biodiversity And Natural Area Assets

2.2.1 Vegetation And Flora

2.2.1.1 Vegetation Complex

The land lies at the toe of the Darling Scarp and presents a transitional landscape between the easternmost edge of the Bassendean Dune System, the Ridge Hill Shelf, and the lower sector of the face of the Darling Scarp. The associated vegetation complex present over the Bushmead site is the Forrestfield Complex (Heddlé et al. 1980).

Vegetation in the Forrestfield Complex ranges from open forest of *E. calophylla* – *E. wandoo* – *E. marginata* to open forest of *E. marginata* - *E. calophylla* – *C. fraseriana* – *Banksia* species (Government of Western Australia 2000). Fringing woodland of *E. rudis* occurs in the gullies that dissect this landform.

Whilst the subject site comprises approximately 272.53 ha, only 85.76 ha is identified for development on the basis that it is already in a 'Degraded' or 'Completely Degraded' condition. This vegetation in 'Degraded' and/or 'Completely Degraded' does not contribute to the retention of the Forrestfield Complex within the Perth Metropolitan Region.

2.2.1.2 Vegetation Communities

Two Threatened Ecological Communities have been identified on the Bushmead site:

- FCT 20c – Shrublands and woodlands of the eastern Swan Coastal Plain
- FCT 20a – *Banksia attenuata* woodlands over species rich dense shrublands.

FCT 20c is listed under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) as 'Endangered' and as 'Critically Endangered' by the DBCA.

FCT 20a is classified as 'Endangered'.

FCT 20a is listed as a sub-community of the Federally listed Threatened Ecological Communities (TEC) *Banksia* woodlands of the Swan Coastal Plain under the EPBC Act. Whilst FCT 20c is also listed as a sub-community of *Banksia* Woodlands of Swan Coastal Plain, this FCT corresponds with a separate EPBC ecological listing, which is Shrublands and Woodlands of the eastern Swan Coastal Plain and therefore, should be considered under that separate listing.

In response to the presence of FCT 20a and 20c, a Conservation Reserve was created and an approved Conservation Management Plan was prepared by RPS (2016) to ensure ongoing management of the reserve. The management plan includes (but is not limited to) the following:

- Addressing the impacts arising from the proposed urban development cells;
- Protecting and managing Threatened Ecological Communities;
- Controlling invasive weed species;
- Preventing the spread of plant diseases;
- Fire management;
- Ongoing management;
- Rehabilitating degraded areas in the proposed Conservation Reserves to improve vegetation condition, fauna habitat and the Kadina Brook; and
- Fostering community understanding of, and involvement in, the management of conservation reserve.

The Conservation Management Plan also outlines the following key management plans, which have been prepared to the satisfaction of the DBCA and/or the appropriate decision-making authority:

- Rehabilitation and Revegetation Plan;
- Weed Management Plan;
- Construction Management Plan – includes Dieback Management Plan;
- Fire Management Plan;
- Urban Water Management Plan; and
- Stream Restoration Plan – Kadina Brook.

The agreed key outcome with DBCA was for all the extent FCT 20c and FCT 20a in good condition to be retained and included within the 'Parks and Recreation' reserve. No instances are located within the LSP area.

2.2.1.3 Vegetation Condition

The majority of the proposed development areas have been rated as 'Completely Degraded', consisting of isolated stands of native trees over weed species or cleared areas dominated by pastoral weeds. Disturbance to remnant vegetation within the development area was often associated with high densities of weed species and anthropogenic disturbance such as recreational off road vehicles and trail bikes, illegal dumping of green waste and rubbish, illegal wood collecting and historical earth works associated with the old rifle range site.

The vegetation in the northern portion of the northern development area is dominated by coloniser shrub species such as *Adenanthos cygnorum*, *Melaleuca nesophila* and *Chamelaucium uncinatum*. In the context of the survey the latter two species mentioned are considered introduced (weed) species as they are not endemic to the area.

2.2.1.4 Priority and Rare Flora

Information obtained from database searches indicate that three different species of Priority flora have previously been recorded on the site. These include *Isopogon drummondii* (P3), *Halgania corymbosa* (P3) and *Calothamnus accedens* (P4). *Isopogon drummondii* (P3) was recorded at two localities in the northern land parcel of the Project area in 1990. *Halgania corymbosa* (P3) and *Calothamnus accedens* (P4) were recorded in 1977 and 2006 respectively in the southern land parcel of the Project area.

No rare flora species are located within the LSP area.

2.2.1.5 Fauna

Habitat values of the areas proposed for development have been impacted through various agricultural and human use activities (such as tree lopping, rubbish dumping and trail bike riding), with the majority of remnant vegetation ranging from 'Degraded' to 'Completely Degraded'. However, there are some pockets within the development boundaries where the vegetation ranges from 'Very Good' to 'Good' condition. These areas are likely to provide important fauna habitat. There are ten fauna habitat types mapped within the development areas which provide habitat for different species.

Kadina Brook provides the key ecological linkage through the site, connecting remnant vegetation to the north (e.g. Helena River) and south (e.g. Gooseberry Hill National Park). Consequently, the LSP has been designed to retain this permeability and facilitate ongoing movement of fauna species post-development.

Key fauna that is likely to occur on site and utilise the potential habitat mentioned was identified as follows:

- *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) – Vulnerable (EPBC Act)
- *Calyptorhynchus baudinii* (Baudin's Black Cockatoo) – Vulnerable (EPBC Act)
- *Calyptorhynchus latirostris* (Carnaby's Black Cockatoo) – Endangered (EPBC Act)
- *Dasyuris geoffroyi* (Chuditch) – Vulnerable (EPBC Act)
- *Apus pacificus* (Fork-tailed Swift) – Migratory (EPBC Act)
- *Ardea alba* (Great Egret) – Migratory (EPBC Act)
- *Ardea ibis* (Cattle Egret) – Migratory (EPBC Act)
- *Merops ornatus* (Rainbow Bee-eater) – Migratory (EPBC Act).

The fauna study indicates that the areas of the site most likely to support fauna are those with the least 'degraded' native vegetation. However, other parts of the site are likely to support species of conservation significance. For example, almost all of the native vegetation on the site (particularly areas containing Marri and Jarrah), may be used as habitat for the Carnaby's Black-Cockatoo, Baudin's Black Cockatoo and Forest Red tailed Black Cockatoo, all of which are listed by either the EPBC Act or State legislation. In addition, areas around Kadina Brook and areas with a dense understorey may be important for the Quenda.

As previously stated, the Bushmead residential development was referred to the DOE, now DEE, on 23rd December 2014 and was determined to be a Controlled Action, approved with conditions under EPBC 2015/7414, on 17th June 2016 (See Addendum to Appendix A).

To inform the EPBC assessment Bamford Consulting Ecologist undertook additional surveys that identified 543 potential breeding trees within the proposed development. Of the 543 tree identified, most did not have suitable looking hollows, 119 had suitable looking hollows but with no signs of recent use; and of the 119 trees, 10 trees had suitable-looking hollows with chew marks around the entrance. No active nests were detected.

In summary, Bamford (2015) states that Black Cockatoo sightings and foraging signs indicate the site (including the development area) serves as foraging habitat and may also provide breeding habitat due to the presence of suitable-looking hollows, foraging habitat, water sources and proximity to a roosting site. However, the areas proposed to be retained are larger and in better condition than the impact areas (Bamford 2015).

Given the above, the relative risk of impact to all species of conservation significance is considered to be negligible, low or low-moderate because:

- There is either a low likelihood of the species being present within the survey area;
- There is a low likelihood of these species being strongly affected by the development of the site for residential purposes; and
- ☒ Two-thirds of the site comprising the best condition remnant vegetation and fauna habitat will be reserved and protected.

As the site is located adjacent to the Gooseberry Hill National Park (which is expected to contain habitat suitable for these highly mobile species) and in conjunction with the proposed fauna management (including retention of habitat trees where possible and the offsetting of cleared trees within the proposed conservation areas), it is considered that potential impacts on these species is relatively low.

2.3 Landform And Soils

Topography at the site varies from 100m Australian Height Datum (AHD) in the south to 20m AHD in the north. The site is broadly dissected along a north to south axis by Kadina Brook which falls through an approximately 20m elevation within the site from 40m AHD at the southern boundary to 20m AHD at the western boundary.

Regional geology mapping indicates the following soil units occurring on the site:

- SAND (S8) – very light grey at the surface and yellow at depth fine to medium grained Bassendean Sand.
- SAND (S10) – S8 sand overlying clay from the Guildford Formation.
- SAND (S12) – yellow fine to medium grained sand
- SANDSTONE (SS) – light grey, very hard, compact fine grained silty sandstone.
- LATERITE (LA1) – cemented laterite up to 4m thickness overlying mottled and/or pallid clays and saprolite.
- GRAVEL (G2) – strong, brown, coarse lateritised granite pebbles in clay-silt mixture.
- GRAVELLY SILT (Mgs2) – strong, brown with common pebbles of fine to coarse grained granite with variable sand content.
- PEBBLY SILT (Mgs1) – strong brown silt with fine to occasionally coarse grained, laterite quartz, heavily weathered granite pebble, with some fine to medium grained quartz sand.
- GRANITE (GR) – fine to coarse grained ranging in composition from granodiorite to granite.

According to the DBCA's Acid Sulfate Soil (ASS) risk mapping, the majority of the site is in an area of "moderate to low risk" of encountering ASS within depths greater than 3 metres. The mapping indicates is a small portion of land identified as "high to moderate risk" in the northern portion of the southern development cell. However, a preliminary ASS assessment (Golder Associates, 2014) indicates that ASS is absent within the Study Area to the maximum depth of investigation of 2.5m. Results from the assessment suggest that soil conditions in the Study Area may be naturally acidic due to the presence of organic acids from the oxidisation of organic matter. Notwithstanding, if ASS is encountered then this will be addressed via the preparation and implementation of an ASS Management Plan imposed as a condition of subdivision approval as required at Part One, Section 5.4 of this Structure Plan.

2.4 Groundwater And Surface Water

2.4.1 Groundwater

The Superficial Aquifer underlying the site is known as the Cloverdale Groundwater System which has a maximum saturated thickness of 30 m. Approximately 150 m³/day of groundwater leaks downward from the Superficial Aquifer into the Leederville Aquifer which in turn also leaks upward to recharge the Superficial Aquifer at approximately 100 m³/day (Davidson 1995).

The Yarragadee Aquifer is a major confined aquifer that underlies the site. The Aquifer has a saturated thickness of more than 2000 m and the upper confining layer is known as the South Perth Shale (Davidson 1995). It is only where this shale is absent that the aquifer is recharged by downward leakage from the Leederville Aquifer.

The direction of groundwater flow is in a north-westerly direction towards the Helena and Swan River.

2.4.2 Surface Water

Surface water flows into Kadina Brook running south to north through the site and into the Helena River off-site which is a tributary of the Swan River.

Kadina Brook is an ephemeral stream with a partly cleared and developed catchment that encompasses the whole site. Kadina Brook is the only natural surface water feature present on the site and is not mapped as a wetland by the DBCA's geomorphic wetlands database.

2.5 Bushfire Hazard

2.5.1 Bushfire Assessment Overview

A Bushfire Management Plan (BMP) was prepared and approved in accordance with the requirements of (then) Planning for Bush Fire Protection Guidelines Edition 2 (PFBFP Guidelines, WAPC et al. 2010) with consideration of the Draft State Planning Policy 3.7 Planning for Bushfire Risk Management (Department of Planning and WAPC, 2014) and accompanying draft guidelines, in support of the original SP application. The approved BMP detailed the approach to bush fire management for the proposed development and the measures to be implemented to protect future life, property and environmental assets on an ongoing basis and achieve a suitable, compliant and effective bush fire management outcome for the site. The approved BMP is provided at Appendix C. The summary of the original assessment is detailed below at Section 2.5.2.

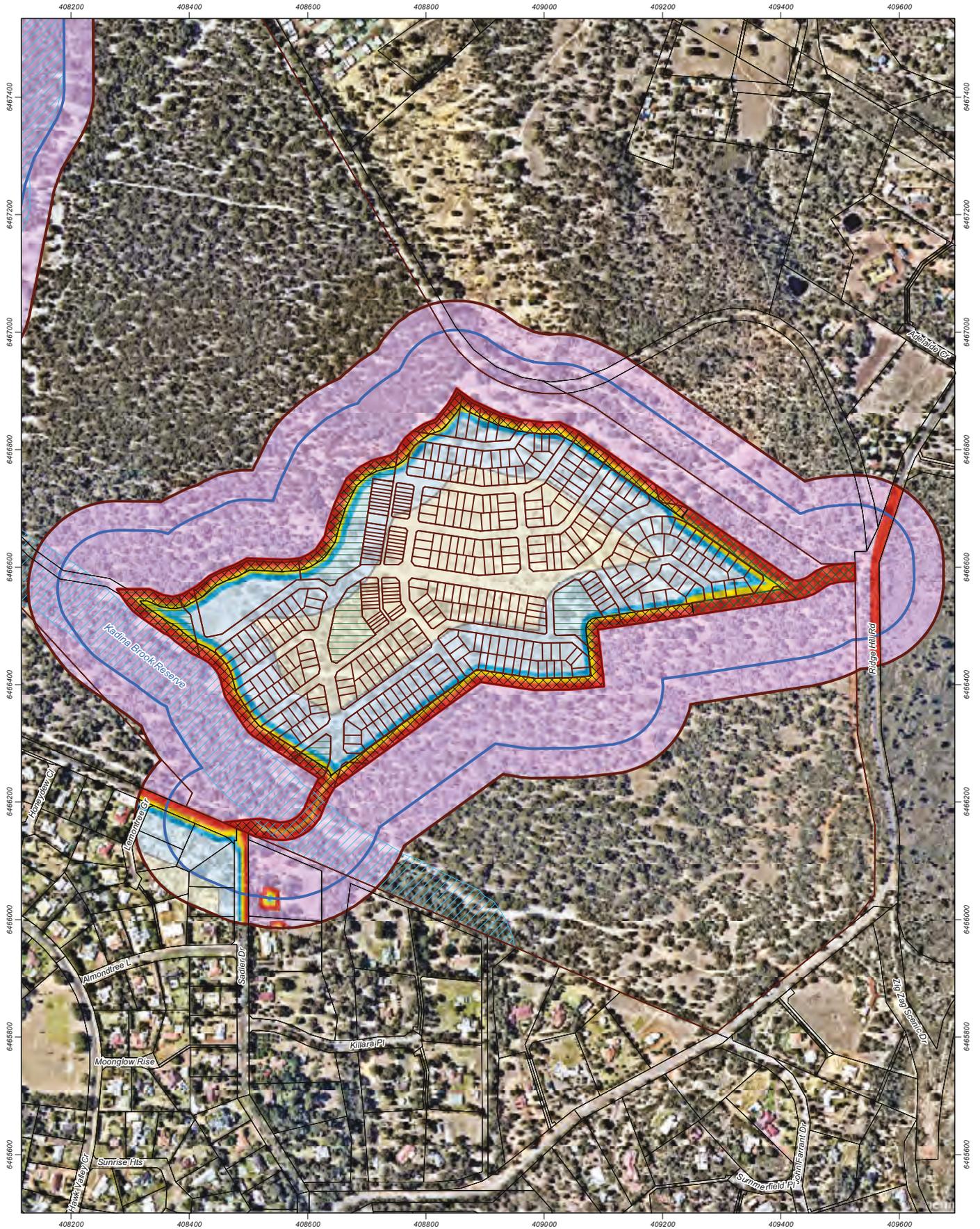
The SP Amendment No. 2 application is supported by an Addendum to the approved BMP (April 2019) which addresses the proposed modifications to the SP design and incorporates previously approved bushfire management measures over the site to consolidate the overall bushfire management approach and updating it where necessary. The proposed suite of updated bushfire management measures meet all relevant acceptable solutions of the Guidelines, resulting in full compliance with bushfire protection criteria. The BMP Addendum is provided at Appendix C and a summary is detailed below at Section 2.5.3.

2.5.2 Summary of Original BMP Assessment

The BMP involved the detailed assessment of the on-ground fire environment and the Bushfire Attack Level (BAL) was undertaken across the site and adjacent land to inform BMP recommendations and the level of application of AS 3959–2009 Construction of Buildings in Bushfire-prone Areas (SA 2009). This included assessment of the on-ground vegetation types and class, slope under classified vegetation and the distance between proposed development areas and the adjacent bushland extent. Key conclusions that informed development of the specified bush fire risk treatment and mitigation measures, include:

1. The classified vegetation to be retained within Lot 911 the site contains a combination of 'Low', 'Moderate' and 'Extreme' bush fire hazard areas due to the on-ground variation in vegetation type, slope under vegetation and levels of historical vegetation disturbance;
2. A large proportion of the northern and southern cells cannot achieve the full 100 m separation distance to surrounding bush fire prone areas, so require the application of increased building construction standards in accordance with AS 3959–2009;
3. The BAL assessment for the northern and southern cells indicates that a combination of BAL 29, BAL 19 and BAL 12.5 building construction standards be applied throughout the development to accompany the recommended Building Protection Zones (BPZs) and Hazard Separation Zone (HSZ); and
4. Compliance through performance criteria and acceptable solutions will be achieved for a moderate bush fire hazard level, focussing on the key areas of development location, vehicular access, water supply, siting of development and design of development.

Figure 10: BAL Contour Map (Southern Cell)



Based on the on-ground fire environment and BAL assessment, the BMP recommends a range of bush fire risk treatment and mitigation measures, detailed at the executive summary and body of the BMP report provided at Appendix C. A summary of some of the key recommendations is provided below:

1. Implement development in accordance with the approved LSP and fire management concept to ensure development will not be located on land subject to either an 'Extreme' bush fire hazard level or require construction standards applicable to BAL 40 or BAL FZ;
2. Apply BAL 29, BAL 19 and BAL 12.5 building construction standards where necessary to future lots of the northern and southern cells;
3. Typically, provide a 20 m wide BPZ along the internal boundary of each development cell, with annually managed fuel loads at less than 2 t/ha;
4. Construct a 100 m wide cleared buffer along a portion of the outer western boundary of the northern cell and maintain annually at less than 5 t/ha until development of this land is undertaken;
5. Maintain two access routes during development staging through provision of at least one permanent sealed road plus a temporary road as a minimum requirement for each development stage, including construction of an Emergency Access Way (EAW) within the northern cell linking with the surrounding road network of the adjacent north subdivision;
6. Provide a reticulated water supply throughout the development and a network of hydrants along the internal road network at locations that meet relevant water supply authority and DFES requirements; and
7. Place Section 70 Notification on all Titles of the development with a specified BAL classification to ensure prospective landowners are aware that an FMP exists over the land and additional building requirements may apply.

The BMP demonstrates compliance with PFBFP Guidelines and AS 3959–2009 and that subject to careful design and future management by the developer, prospective landowners and relevant authorities, a suitable, compliant and effective bush fire management outcome can be achieved.

2.5.3 Summary of BMP Addendum (April 2019)

The BMP addendum addresses proposed modifications to the SP design and incorporates previously approved bushfire management measures over the site where relevant; thereby consolidating the overall bushfire management approach and updating it where necessary.

The BMP addendum addresses the following requirements of State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7; WAPC 2015) Policy Measure 6.3:

- since lot layout is known, a Bushfire Attack Level (BAL) Contour Map to determine the indicative acceptable BAL ratings across the subject site in accordance with the Guidelines;
- identification of any bushfire hazard issues arising from the BAL contour assessment; and
- clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages.

Based on the proposed SP, the bushfire management measures proposed in previous FMPs/BMPs have been updated where applicable, and relevant management actions recommended are directly referred to in the bushfire compliance table to assist with implementation, enforcement and auditing of all relevant works.

The suite of bushfire management measures are considered to meet all relevant acceptable solutions of the Guidelines, resulting in full compliance with bushfire protection criteria. This is demonstrated in an 'acceptable solutions' assessment in Table 3, which documents assessment of the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines and demonstrates that the measures proposed meet the intent of each element of the bushfire protection criteria.

2.6 Heritage

2.6.1 Register of the National Estate

A significant area of the Bushmead site was included on the Interim List of the Register of the National Estate (RNE) in May 1995 by the then Australian Heritage Commission (AHC). Amendments to the Australian Heritage Council Act 2003 (AHC Act), has effectively frozen the Register, meaning places can neither be added nor removed.

The Register continued as a statutory register until 19th February 2012, after which all references to the Register were removed from the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the AHC Act. The RNE has been maintained after this time on a non-statutory basis as a publicly available archive. The subject site is not listed on either the State Heritage Register or the City of Swan Municipal Inventory.

There are no statutory heritage controls applicable to the site at either a Local, State or Commonwealth level.

2.6.2 Aboriginal Heritage Assessment

As part of the due diligence process with respect to the necessary development approvals required prior to subdivision, Cedar Woods commissioned Ethnoscience to undertake a desktop assessment of the Aboriginal heritage values of the subject land, which is contained in Appendix D.

The Bushmead land was subject to significant enquiry between 1989 and 2007 relative to its Aboriginal heritage values in respect to both State and Commonwealth legislation.

The desktop search of the AHIS and hard copy site files revealed one Registered Aboriginal Site (DIA Site ID 3543 Bushmead Rifle Range) and eight 'Other Heritage Places' located on the Bushmead land.

DIA Site ID 3543 Bushmead Rifle Range, which is listed as a ceremonial, mythological and camp with possibly 'other' attributes, is located in the vicinity of the Army driver training facility and is outside the 'Special Use' zone. The eight 'Other Heritage Places' do not constitute Aboriginal sites within the meaning of the AHA and therefore are not impediments to the proposed development should they be located within the 'Special Use' zone. Nonetheless the majority of these 'Other Heritage Places' will in fact be preserved within the 'Parks and Recreation' reserve.

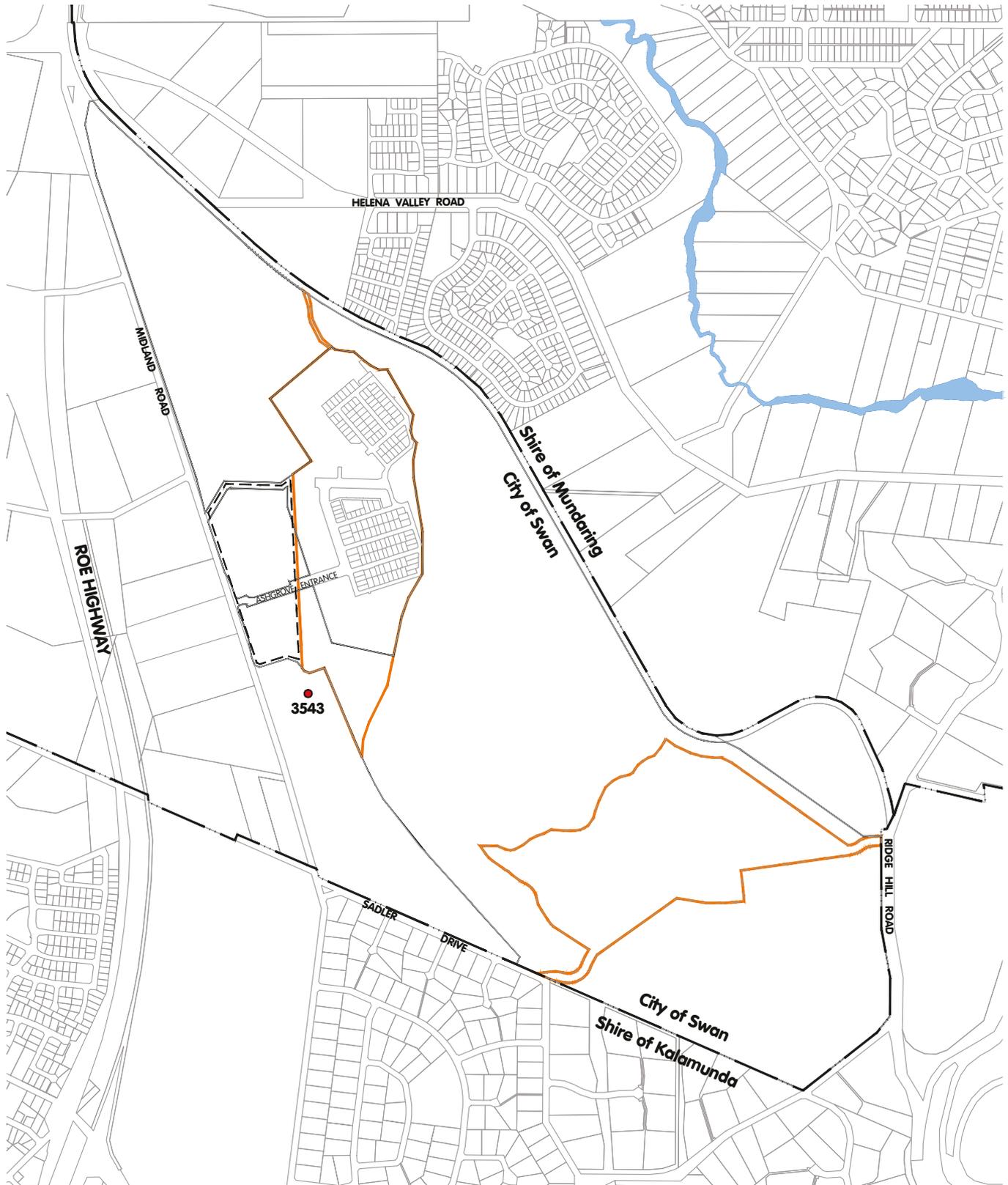
Given the presence of a number of archaeological sites on the land, this indicates that there is potential for further archaeological sites to be found and these might be determined to be Aboriginal sites.

The Aboriginal Heritage Assessment concludes:

1. At this stage no further ethnographic research or Aboriginal community consultation is required in respect of the proposed development of the Bushmead land;
2. Archaeological inspection should be undertaken of the 'Special Use' zone. Should any new archaeological sites be discovered and it is not possible to avoid them, Cedar Woods should lodge a Section 18 Notice for Ministerial consent to use the land on which the sites are located. Should a Section 18 Notice be required, further consultation with the relevant Aboriginal people, which focuses on the cultural significance of any archaeological sites, is undertaken; and
3. Cedar Woods will prepare and implement an Aboriginal Heritage Management Plan (AHMP) in order to manage the known archaeological sites on the property and to deal with the potential for material to be uncovered during earthworks.

Subject to the above recommendations there are no aboriginal heritage sites or issues precluding development of the land as proposed in the LSP.

Figure 11: Registered Aboriginal Heritage Site



-  EXISTING LOT 9001
-  STRUCTURE PLAN AREA
-  LOCAL GOVERNMENT BOUNDARY
-  SUBJECT TO LIFTING OF URBAN DEFERMENT
-  REGISTERED ABORIGINAL HERITAGE SITE

2.7 Foreshore reserve

Kadina Brook, a seasonal tributary, traverses the subject site from south to north, ultimately flowing off site into the Helena River. The Brook is included within the MRS 'Parks and Recreation' reserve to be managed by DPaW with a minimum 50 metre setback to adjoining residential development.

Foreshore management is dealt with as part of the draft Conservation Masterplan and Management Plan being considered by DPaW and addressing the following matters:

- i. The identification of suitable and controlled public access points and parking (if required);
- ii. Installation of fauna permeable fencing;
- iii. Strategies for weed control within and adjacent to a wetland environment;
- iv. Environmental education signage;
- v. Strategies to manage mosquito breeding areas if nuisance numbers of mosquitoes are identified; and
- vi. Strategies for preventing inappropriate vehicle access into and through the foreshore reserve area.

2.8 Context And Other Land Use Constraints

2.8.1 Contamination

Historical environmental investigations from 1989 have identified the potential for soil and groundwater contamination as a result of potentially contaminating activities at the site. The potentially affected areas included:

1. Former effluent disposal area – with discharge from the tallow factory via an 8,100 m² effluent pond (unlined) and/or a spray irrigation system;
2. The former pistol and rifle ranges (four in total);
3. Potential rubbish pits/piles and general low level fly tipping; and
4. Existing transport depot, which is not part of the Bushmead site addressed in this EAR.

No historic off-site potential contamination sources were identified and the risk posed by historical off-site contamination is considered to be low.

All investigations and remedial works have been undertaken in accordance with requirements and the Contaminated Sites Act 2003 and independently assessed by a registered contaminated sites auditor. Relevant documentation, including the Detailed Site Investigation (RPS, April 2014) and the Site Management Plan for Soil Contamination (RPS, May 2014) is available on request.

The DWER has now confirmed in writing that Cedar Woods has successfully remediated all site contamination within the urban cells. there is no longer any restriction to develop the site for residential purposes. There is no impediment to developing the site for residential purposes.

2.8.2 Odour Management

2.8.2.1 Odour Assessment

There is an egg farm to the west of the subject site, to which a buffer extending from 300 - 500 metres from the easternmost of the egg farm sheds applies. The buffer is contained within the MRS 'Urban Deferred' zone and corresponding 'General Rural' zone in the Scheme. The Structure Plan area includes the provision of subdivision roads, connecting the residential development to Midland Road, other service infrastructure and the proposed clearing of vegetation to comply with bushfire management requirements within the odour buffer and 'General Rural' zone. These uses are consistent with the zoning of the site and do not give rise to any land-use conflict associated with the egg farm. Consequently the odour buffer is not an impediment to the approval of the LSP.

Cedar Woods is also mindful of the importance of protecting the integrity of both the proposed light industrial land uses on the western side of Midland Road, as well as the continued operation of the egg farm, from urban encroachment, and will explore compatible land uses inside the buffer to ensure these interests are protected.

As detailed at Section 1.3.3.8, the WAPC approved an application to transfer of portion of the 'Urban Deferred' zone to the 'Urban' zone on 17th January 2018, facilitating the requirement to prepare the current LSP Amendment. The WAPC resolution resolved as follows:

1. Approve the request to transfer a portion of Lot 9000 Midland Road, Bushmead as shown on Plan 4.1646 from the Urban Deferred zone to the Urban zone as it has been demonstrated that the nearby poultry farm will not cause unacceptable odour impacts within the lifting of Urban Deferment area that cannot be addressed through measures applied at subsequent stages of the planning process; and
2. Advise the proponent that the WAPC may impose measures at subsequent planning stages to address the potential for unacceptable odour impacts within the lifting area including, but not limited to; the staging of future development, notifications on the titles of lots and/or the relocation of areas of public open space.

The Lifting of Urban Deferment request was accompanied by a new OIA that demonstrates that odour emissions from the egg farm require a lesser separation distance than the generic 500 metre buffer previously imposed. The OIA (Appendix E) included the gathering and assessment of site specific meteorological data, surveys of the permanent residential population already living within the generic buffer area to the south of the egg farm, as well as responding to methodological comments raised by the DWER in its assessment of the OIA that accompanied the original TPS and LSP applications.

The OIA demonstrates that a separation distance ranging from 300 – 500 metres from the easternmost of the egg farm sheds should be applied, with the buffer zone correlating to the direction in which odour modelling and surveys found a greater travel distance of odour.

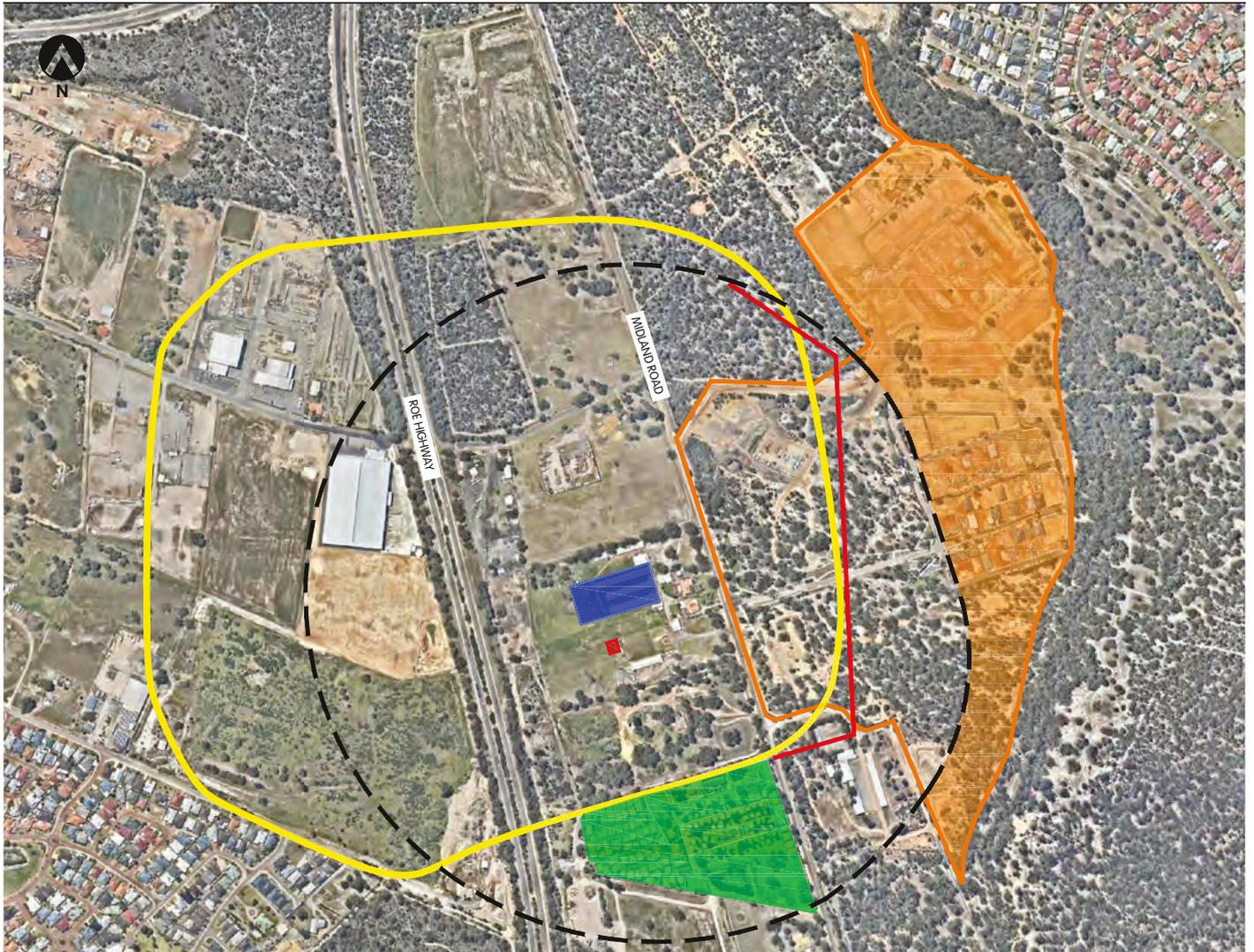
2.8.2.2 Additional Design Interventions to Mitigate Potential Odour

In response to Part 2 of the WAPC resolution an Addendum to the 2016 OIA is provided with this Structure Plan which identifies the range of design measures adopted to assist with the mitigation of potential odour. In summary these include:

1. Requiring notification on titles to advise prospective purchasers of the potential for occasional odour at Part One of the Structure Plan.
2. Excluding development from the most north-easterly portion of the 'Urban' zone by extension of the existing park.
3. Widened road reserves within and adjacent the northern portion of the new 'Urban' zone to retain trees and increase odour dispersion.
4. The additional POS and widened verge areas within the northern portion of the new 'Urban' zone comprise an area of 0.194 ha, equivalent to 7% of this part of the Structure Plan area.
5. The design response is complemented by extensive tree retention which is an effective means of increasing the dispersion of odour as it increases the roughness of the land being traversed. Tree retention efforts are focused:
 - a. Within the widened verge along the northern boundary of Ashgrove Entrance, assisting with the mitigation of odour that might be carried down Ashgrove Entrance from the west.
 - b. Within the widened road reserve and verges along the western boundary of the new 'Urban' zone, assisting with mitigation of occasional odour that might be carried across the Rural zone from the west.
 - c. Permanent tree retention throughout the adjacent Rural zone to the west. This area will not be developed for residential purposes until cessation of the poultry farm at which point odour will no longer be an issue.
6. The accompanying subdivision design which has been lodged with the Commission also reorients street blocks the northern portion of the new 'Urban' zone from the east-west orientation depicted in the Structure Plan Amendment to a north-south orientation, based on advice from the expert odour consultant that this orientation is more effective in restricting the transport of odour from west to east.

The current extent of the 'Urban Deferred' zone approved by the WAPC on 17th January 2018, reflects the recommended separation distance to the egg farm proposed in the new OIA, which considers both the policy and scientific criteria for protecting the amenity of sensitive uses within the 'Special Use' zone as well as ensuring the continued operation of the egg farm. Supplemented with the additional design interventions noted above odour therefore presents no impediment to approval of the LSP.

Figure 12: Interpretation of Buffer Zone from Predicted Odour Contours (RD1078A)



LEGEND

- Bushmead Estate
- Subject Site
- Modelled Buffer
- Arbitrary 500m Buffer
- Adopted Buffer
- Odour Source
- Weather Station
- Holiday Park

3.0 Land Use And Subdivision Requirements

3.1 Project Vision

The Bushmead development will be a sustainable urban development that protects and enhances the existing natural values and character of the site, minimises environmental impacts, and is home to an engaged, healthy, connected and inclusive community. A true community - shaped by nature.

This vision is articulated through a suite of principles that inform the project design and implementation set out in Table 1.

3.2 Sustainable Urban Development

The Bushmead site will be developed - within the context of the site and its urban location - to address and incorporate relevant principles and practices that define sustainable urban development. This takes into account both the State Planning and Development Act which refers to 'the sustainable use and development of land in the State' and the City of Swan's Sustainable Environment Strategy which details strategies and actions to pursue environmental improvement, including in key areas such as biodiversity retention, water quality, water efficiency, carbon reduction, adaptation for the future and waste minimisation.

As part of this commitment, the proponent has successfully applied for and achieved 6 leaf accreditation via the UDIA EnviroDevelopment program, successfully addressing the Ecosystems, Energy, Water, Waste, Community and Materials categories. As part of the accreditation ongoing monitoring and compliance of the Estate's performance against these categories is required, ensuring these important obligations continue to be fulfilled.

3.3 Design And Land Use

At the heart of the LSP design is the aspiration to integrate human activity with the natural environment in a respectful and responsive way. The urban structure responds to the opportunity presented by the unique bush landscape that defines the developable areas. The design of the flatter northern cell maximises the amenity provided by Kadina Brook, with added character provided through the retention of mature trees incorporated into open space and roads. The southern cell takes advantage of greater topographical variances and extensive views of the surrounding area and beyond.

The LSP depicts a predominantly residential development, with the size and the location of the development cells not suited to extensive commercial or community facilities reliant on a wider residential catchment.

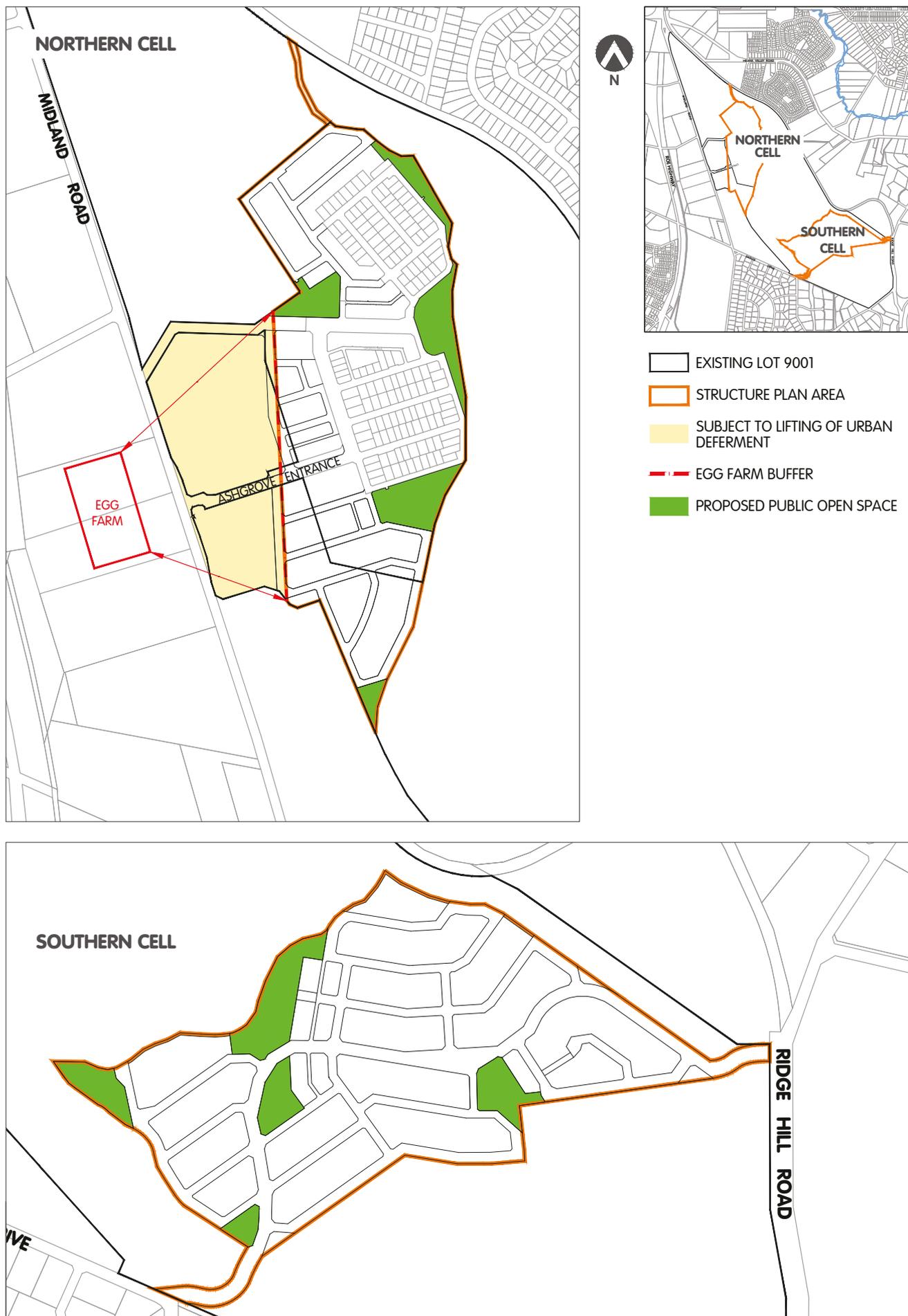
Informed by the project vision and principles, the LSP design successfully:

1. Retains key natural landforms and vegetation to protect the sense of place distinctive to the Perth foothills;
2. Creates two distinct, walkable neighbourhoods derived from consideration of the site's topography and ecological values and connected to the surrounding bushland and natural amenity;
3. Provides the opportunity for walking tracks between the northern and southern cells to provide local residents with passive recreation opportunities within the local bushland and along the banks of Kadina Brook;
4. Provides a variety of living options through provision of a range of lot sizes and potential housing types that cater for the diverse range of community needs and lifestyles;
5. Achieves high levels of solar orientation of residential lots, with at least 70% of lots aligned to meet EnviroDevelopment certification criteria;
6. Achieves views from most streets to areas of interest and amenity such as parks or bushland, resulting in a legible, attractive and safe pedestrian environment with high levels of passive surveillance; and
7. Preserves the integrity of significant views across the site from the adjacent Gooseberry Hill National Park.

Table 1: Project Vision

<u>NATURAL</u>	<ul style="list-style-type: none"> > Protect and enhance the biodiversity and conservation values of vegetation communities and flora and fauna and extend the remnant vegetation communities – providing a habitat link to the broader national park network. > Provide for State land tenure and coordinated bushland management.
<u>SETTLED</u>	<ul style="list-style-type: none"> > Create an interesting and stimulating urban environment that complements the bushland setting. > Provide a diverse lot product to meet market demand and create a diverse community. > Create a place that is safe, valued by the community and able to evolve to meet changing community needs and desires whilst maintaining respect for the environment. > Provide public and private spaces that enhance the lifestyle of the development and which are fire-safe and aesthetically enhancing of the area. > Ensure homes and other buildings are designed and constructed to complement the surrounding bushland and the best elements of local character, and achieve high environmental and social design standards. > Ensure lots are developed, where possible, to retain existing natural landform and vegetation, and with gardens that have low water demand.
<u>SHAPED BY NATURE</u>	<ul style="list-style-type: none"> > Encourage community interaction, foster ownership and pride, be capable of responding to the diverse demands of an evolving community, and express stability and safety while displaying vitality and freshness. > Ensure that water management interfaces with public open space and bushland in a natural way, not hidden, but follows along natural flow paths, moves continuously and is not stagnant. > Conserve and enhance existing linkages, creating recreational nodes within the site and promote connections to the surrounding landscape. > Embrace the natural topography with road design and lot layout.
<u>CONNECTED</u>	<ul style="list-style-type: none"> > Use the street network to act as ‘ribbons of green’ linking residents with parks and bushland and preserving key vistas to bushland. > Ensure the road network supports solar responsive lot orientation and built form. > Connectivity within the development is afforded with an aim to minimise the impact on the natural surroundings. > Road design uses natural features to reduce speed and create a safe environment for all modes > The network of informal trails is a natural benefit to the community, and enhanced through connections to the local street and path system. > The landscape will reinforce local semi-rural character and sense of place, and where possible incorporate and utilise local materials in landscaping elements.
<u>EMBRACING</u>	<ul style="list-style-type: none"> > Celebrate the bushland setting – Bushmead provides the opportunity for a ‘People’s Park’ that will become a much loved local space. > Provide low-key, sustainable and managed access for visitors to appreciate the local bushland, learn about natural values and experience the tranquillity of the natural setting. > Create a strong and safe community that is the custodian of the significant natural features and foster on-going partnerships for local environmental management. > Create a great place to live by combining modern lifestyle choices with the unique picturesque location, which integrates sensitively with the natural typography, Kadina Brook, conservation value vegetation and local fauna habitat. > Maintain and enhance landscape values and bushland within the planned residential community.
<u>RESPECTFUL</u>	<ul style="list-style-type: none"> > Recognise and celebrate the indigenous and European Heritage values through street and park naming, walk trails and public art and where relevant, retention and interpretation. > Involve local indigenous and community groups where possible.
<u>FUNCTIONAL</u>	<ul style="list-style-type: none"> > Incorporate the existing topography within the design such that it minimises disturbance to the natural contours and existing environment. > Provide infrastructure in a manner that is sensitive to natural, environmental and cultural values of the area.

Figure 13: Indicative Local Structure Plan



3.4 Open Space And Landscape Approach

3.4.1 Landscape Masterplan

The LSP is accompanied by a Landscape Masterplan Report (Appendix H) that outlines the landscape design approach for future development, based on the agreed vision. The Landscape Masterplan is strongly influenced by the setting and semi-rural characteristics of small towns in Western Australia. Retention of existing vegetation, the use of local materials and public artwork throughout the development will reinforce the vision of a settled, connected and embracing community that is 'shaped by nature'.

The Landscape Masterplan is guided by use of best practice water-wise landscape design, sustainable integrated drainage solutions and fire protection management. It identifies key landscape typologies, interfaces and streetscapes and provides examples of landscape treatments which aim to:

- Encourage community interaction;
- Foster ownership and pride; and
- Be capable of responding to the diverse demands of an evolving community.

A mixture of local and neighbourhood parks are provided in differing locations. The northern cell supports a number of small local parks bordered by access streets and surrounded by medium density development, two neighbourhood parks and open space adjacent to the Kadina Brook foreshore reserve. The southern cell provides two neighbourhood parks in strategic locations, including a hilltop park that enables extensive long views of metropolitan Perth.

The landscape approach addresses the relevant criteria of the City's 'Interim Policy for Public Open Space in Residential Areas (POL-C-112, July 2007), as follows:

1. Provision of usable areas of land – Open space is carefully designed to ensure useability, and is positioned to capitalise on areas of natural amenity allowing for excellent passive recreation opportunities.
2. Accessibility - Open space areas are evenly dispersed throughout both cells, ensuring it is easily accessible to the community;
3. Preservation of valuable vegetation – The landscape approach prioritises the retention of mature trees, providing an immediate 'established' feel, and serving an important environmental function in supporting avian nesting habitats; and
4. Planting of specimen plants where vegetation might be considered denuded - Open space in the northern cell will be landscaped with native plants, complementing the surrounding environment and retained mature trees. Extensive rehabilitation is proposed within the adjoining 'Parks and Recreation' reserve.

Landscaping in the northern cell will utilise species native to the transitional zone between the Darling Scarp and the Swan Coastal Plan. Due to the southern cells previous use as an effluent disposal area, suitable species for landscaping and the streetscape are being investigated. Higher nutrient levels in the soil may be more suited to exotic species, which will provide a point of difference to the northern cell and surrounding residential development. The proposed open space reserves will be landscaped to City of Swan standards.

3.4.2 Public Open Space

A mixture of local and neighbourhood parks is provided throughout the Structure Plan area in accordance with Liveable Neighbourhoods locational requirements. The northern cell provides five local and neighbourhood parks, variously bordered by access streets or regional open space and in some cases medium density development. The southern cell provides five local parks (including a hilltop park with long views of Perth) and a central neighbourhood park.

As detailed in the Public Open Space Schedule at Table 2, a total of 9.39% public open space is provided within the development cells contained within the Structure Plan area. This comprises the required combination of 20% restricted and 80% unrestricted open space in accordance with Liveable Neighbourhoods. The balance 0.61% POS is to be provided as cash-in-lieu.

Figure 14: Indicative Public Open Space Plan

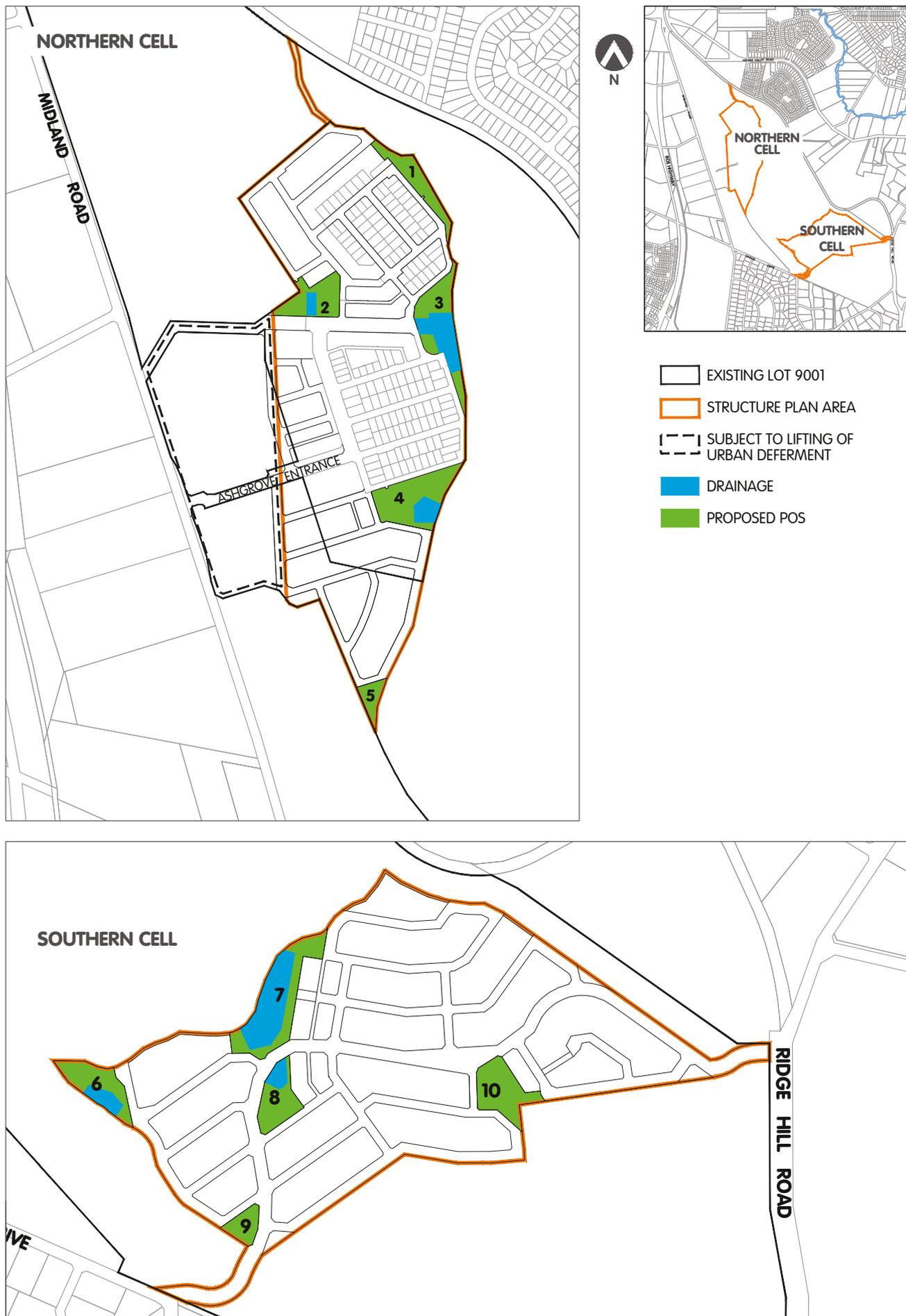


Table 2: Public Open Space Schedule

Site Area				73.27	
Gross subdivisible area				73.27	
Less Deductions					
Dedicated drainage				1.62	
Net subdivisible area				71.65	
Public open space @ 10%	7.17				
May comprise:					
- minimum 80% unrestricted POS	5.74				
- maximum 20% restricted POS	1.43				
Public open space contribution	Open Space Area (ha)	Unrestricted (ha)	Restricted (ha)	Dedicated Drainage (ha)	Stage Delivered
POS 1	0.66	0.52		0.14	3
POS 2	0.85	0.69	0.01	0.15	3
POS 3	1.35	0.69	0.53	0.13	2
POS 4	1.44	1.12		0.32	6
POS 5	0.30	0.30			6
POS 6	0.70	0.49		0.21	TBA
POS 7	1.42	0.68	0.39	0.35	TBA
POS 8	0.61	0.29		0.32	TBA
POS 9	0.28	0.28			TBA
POS 10	0.74	0.74			TBA
Sub-Total	8.35	5.80	0.93	1.62	
Total Public Open Space Provision					6.73 (9.39%)
Proposed cash-in-lieu (to make up to 10%)					0.44 (0.61%)

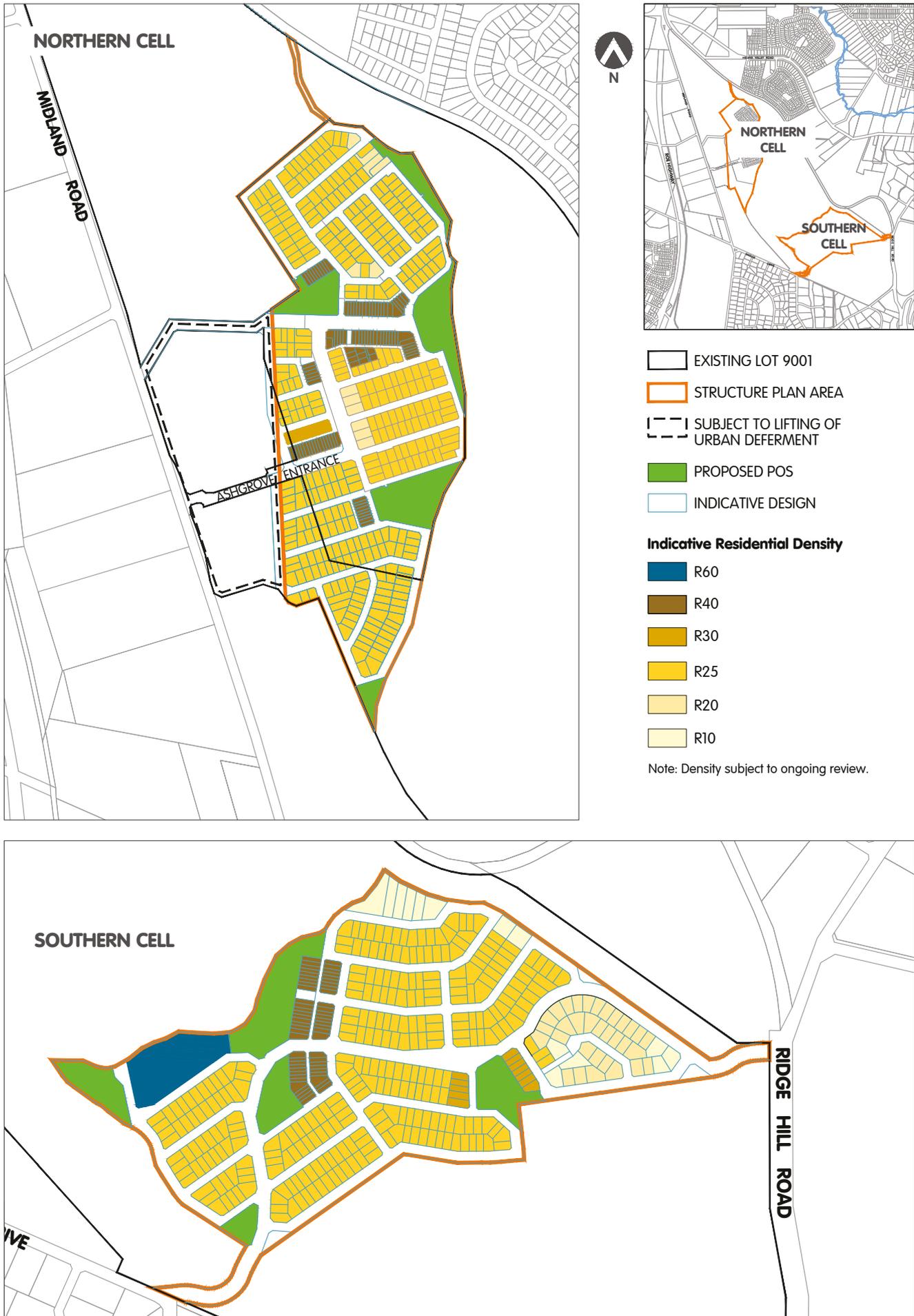
3.5 Residential

Indicative design of the 'Special Use' zone equivalent to the MRS 'Urban' zone indicates a notional yield of 905 lots (equivalent to approximately 980 dwelling units), with densities ranging from R10 to R60. This achieves a potential residential density of 23.92 du/ha for the urban zoned land, meeting the LN recommendation of a 12 - 20 du/ha for standard lot layouts.

Density is applied across the site in accordance with the following principles:

- a. R10 / R20
 - i. R20 applies as the base code except where identified in clause (ii) below.
 - ii. R10 applies to single and grouped dwellings where larger lots are required to protect significant vegetation and/or to meet the requirements of an approved Bushfire Management Plan.
- a. R25 - R60 Range
 - i. R25 applies as the base code, except where identified in clauses (ii) and (iii) below.
 - ii. A Medium Density range from R30 - R40 may be applied to single and grouped dwellings which comply with the following criteria:
 - Lots adjacent to public open space; or
 - Lots fronting Neighbourhood Connector Roads; or
 - Lots at end of street blocks designated to create a unique streetscape and built-form character.
 - iii. R60 applies to multiple dwelling development which comply with the following criteria:
 - Lots adjacent to local public open space; and
 - On purposely created lots exceeding 4,000m².

Figure 15: Indicative Residential Density



3.6 Movement Network

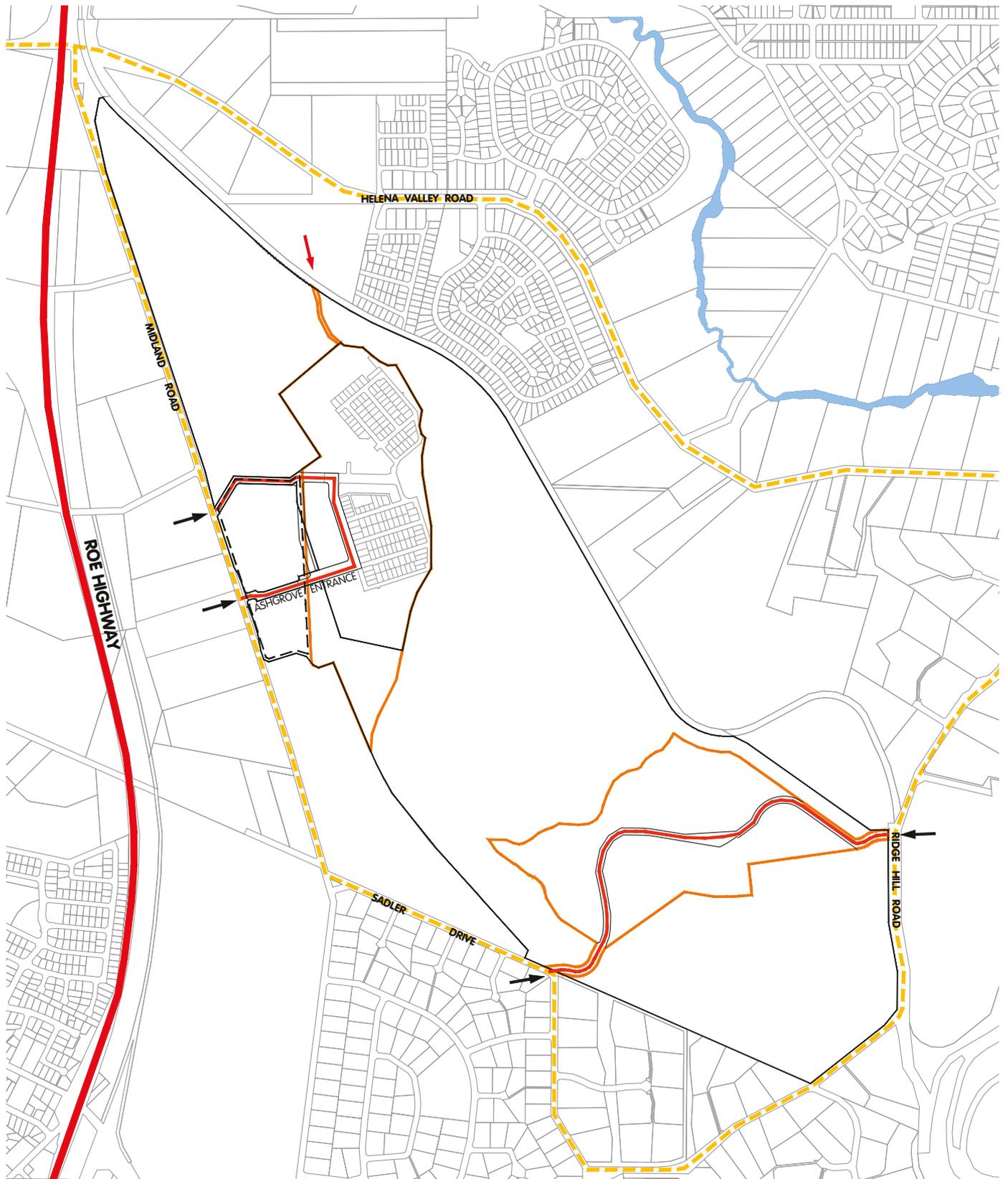
A Traffic Impact Assessment (TIA) in support of the LSP has been prepared by Cardno and is provided at Appendix F. This outlines the transport aspects of the LSP focusing on traffic operations, road reservation widths and potential safety issues. The assessment has been prepared in accordance with the WAPC *Transport Assessment Guidelines for Developments: Volume 2 – Structure Plans (2006)*.

The original TIA is supplemented by an Addendum dated March 2018 which considers traffic impacts associated with the inclusion of the portion of the former 'Urban Deferred' land into the SP area. This concludes that impacts associated with the inclusion of the additional land are generally consistent with the function of the intersections and boundary roads of previous assessments and that no additional modification to Sadler Drive or Midland Road are necessary to support the residential yield increase.

Key conclusions of the Assessment include the following:

1. This assessment shows the LSP area will generate a figure of 6,300 two-way vehicle trips per day for the complete built out scenario for 2031;
2. The proposed road cross-sections for the internal transport network will have sufficient capacity to carry the daily traffic volumes expected on the network;
3. In order to undertake the assessment of external transport network, two background traffic scenarios have been considered which include both base (2014) and future (2031) scenarios. The base scenario takes into account the 2014 existing traffic counts, and the future scenario consists of the future traffic demands for 2031 along Midland Road, taking into account the likely impact of Roe Highway upgrades on traffic distribution and assignment. The proposed Roe Highway upgrade is likely to diminish the attractiveness of the Midland Road as a bypass route. This has been taken into consideration for the analysis of the external network for the future scenario;
4. Detailed analysis of external road network was previously undertaken for the 2031 scenario, giving appropriate recommendations to the road design and safety aspects of existing roads that will serve as access roads for the development. With these improvements in place, this modelling showed that the network was expected to perform well for the future development scenario;
5. The SIDRA analysis of the nominated intersections indicates that the majority of these intersections will operate at a Level of Service A, B and C at all times. Analysis showed that upgrade for the Kalamunda Road/ Midland Road intersection may be required in the future but this requirement would not be a result of additional traffic generated by the Bushmead Development. Therefore it is reasonable to consider that the requirements for any upgrade should not be attributed to the Bushmead Development; and
6. The extra traffic on Sadler Drive caused by the development will only have a minor effect on the existing operation of this road, as it will still operate well below capacity. In terms of safety, the configuration of the new intersection of the southern cell access road and Sadler Drive will remove the hazard of limited visibility on this sharp bend, while reducing vehicular speeds.

Figure 16: Indicative Movement Network



-  EXISTING LOT 9001
-  STRUCTURE PLAN AREA
-  SUBJECT TO LIFTING OF URBAN DEFERMENT
-  PRIMARY REGIONAL ROAD
-  LOCAL DISTRIBUTOR
-  NEIGHBOURHOOD CONNECTOR
-  DESIGNATED ROAD ACCESS
-  EMERGENCY ACCESS



3.7 Water Management

As required at condition 3.1 of Schedule 4 – Special Use Zone No.14, the LSP is accompanied by a LWMS provided as Appendix B. The LWMS was approved by the Department of Water (DoW) on 13th October 2015. The LWMS provides the framework for the application of total water cycle management to the proposed urban structure, consistent with the DoW principles of Water Sensitive Urban Design (WSUD), described in the Stormwater Management Manual (DoW, 2007). A District Water Management Strategy (DWMS) was prepared by RPS (2012) and accepted by City of Swan and Department of Water (DoW). The DWMS provides guidance on water reuse options, sizing stormwater treatment measures, water-quality related monitoring and vegetation treatments for stormwater structures.

The Addendum dated March 2018 confirms that the inclusion of the portion of the former 'Urban Deferred' land into the SP area is in accordance with the approved LWMS, does not alter the assumptions of the drainage strategy and accordingly no modifications to the approved LWMS are required.

The LWMS addresses the LSP area and provides a refinement of the flood modelling, surface water management and groundwater management presented in the DWMS. This LWMS is consistent with water sensitive urban design practices described in the Stormwater Management Manual of WA (DoW, 2007). The LWMS also has regard for several site-specific factors including:

1. Site assessment under the Commonwealth EPBC Act has identified a number of significant trees for retention within open space. Retention of the trees greatly limits changes to ground levels and the ability to include drainage areas with the POS;
2. Preliminary earthworks assessment shows a combination of A Class and S Class lots will be achieved;
3. Provision for the construction of major utilities (Water Corporation trunk main) and setbacks to the conservation reserve for fire management result in some roads with a wider reserve or lots limited to one side of the road only. These roads offer a significant opportunity for roadside swales; and
4. DPaW has given preliminary support for a number of crossing's over Kadina Brook to allow pedestrian and vehicle access to the conservation reserve;

With consideration for the above, the LWMS describes the following urban water management elements to achieve a balanced drainage outcome for the site:

1. A Class lots will retain small rainfall events (15mm) onsite via soakage.;
2. Lots 300m² and over will be provided with rainwater tanks to assist in retaining small rainfall events on site. This will be mandated through covenants/sales contracts, including a requirement for rainwater tanks to be plumbed into the dwelling for toilet flushing;
3. Roadside swales will be used to store and treat road runoff. Preliminary assessment of swale capacity suggests additional capacity will be available to store and treat some of the runoff generated by the S Class residential lots;
4. Bio-retention basins located in POS areas will be sized to contain 15mm of rainfall for the connected catchment i.e. the runoff in excess of the lot and road drainage system;
5. All rainfall events above 15mm will overflow to Kadina Brook;
6. Where appropriate the Kadina Brook crossings (vehicle and pedestrian) will be designed to manage the 100 yr ARI flow in Kadina Brook by creating online storage;
7. Overflow of larger rainfall events into Kadina Brook will not negatively impact its hydrology. Pre-development monitoring shows Kadina Brook flows 3 to 4 months of the year with a relatively low baseflow, typically less than 10L/s. The brook dries up in early spring. Post-development the period of flow will remain similar and the channel has sufficient capacity to convey the 2 year ARI channel forming flow (2.9 m³/s) with a flow velocity of approximately 0.8 m/s for this event;
8. Extensive use of local native species in open space, streetscapes and vegetation buffers to reduce nutrient input and conserve water resources; and
9. Groundwater may need to be sourced from various alternatives due to a lack of available groundwater for allocation.

3.8 Infrastructure Coordination, Servicing And Staging

Wood & Grieve Engineers have prepared a Servicing Report in support of the LSP, provided at Appendix G. The findings of which are summarised below.

The Addendum dated March 2018 confirms that the inclusion of the portion of the former 'Urban Deferred' land into the SP area does not trigger any additional infrastructure upgrades that have not already been identified in previous reporting.

3.8.1 Water Reticulation

The availability of water to the area is not considered an issue with water supply being provided via extension and connection to the existing water distribution/reticulation system. The northern cell is severed by two distribution mains running on an east-west alignment. Any development around the distribution mains must allow for them to stay in their current locations and be protected by either an easement or encasement in road reserve. This is achieved in the LSP by containing the easement in a widened road reserve on the original alignment. The Water Corporation has advised that it intends to run additional distribution mains adjacent the existing mains. This may require a widening of the existing easement and/or road reserve to accommodate a proposed 1,400mm diameter water transfer pipeline and associated appurtenances. Details to be confirmed subject to survey and detailed engineering design and further discussion with the Water Corporation.

The Water Corporation has advised that supply of water to the southern cell will be via the extension to the existing water reticulation infrastructure near the intersection of Sadler Drive and Ridge Hill Road.

The Water Corporation has confirmed provision of a reticulated water supply via extension and connection to the existing water distribution/reticulation system.

3.8.2 Wastewater Reticulation

There is currently no wastewater infrastructure that can be directly discharged to by the site. Following discussion with the Water Corporation both the northern and southern cells are able to discharge wastewater to the north. The northern catchment relies on a permanent pump station being constructed on the public open space adjacent to Allamanda Gate and Carabeen Avenue and associated pressure mains through private lands to the north and east. The pump station is also required to allow the development of several other properties north of the Estate within the Helena Valley area.

The Water Corporation has advised that the southern catchment can also be discharged to the northern catchment. This supersedes the original advice provided in which the Water Corporation advised that discharge was required to the extension to the Maida Vale Main Sewer in Talbot Road to the west of the site. Discharge to the north was confirmed by the Water Corporation following a planning review of their wastewater reticulation network in 2013.

The Water Corporation has confirmed both development cells can be provided with a reticulated wastewater service to a permanent pump station being constructed on the public open space adjacent to Allamanda Gate and Carabeen Avenue. Cedar Woods as the proponent has lodged a scoping report with the Water Corporation to commence planning and design for the required pump station.

3.8.3 Power

Power exists adjacent to the site in Midland Road in the form of 22kV high voltage overhead distribution lines. To feed the subject site it is anticipated that the overhead lines fronting Midland Road will need to be undergrounded and an underground cable run into the subject development. In accordance with the lot yield identified in the LSP it is expected that the site will require a power supply of approximately 4MVA. Based on the existing feeders and configuration load, there are some spare capacities available on the 22kV network to supply part of the proposed subdivisional load.

The site is capable of being serviced with power.

3.8.4 Gas

The provision of reticulated gas to both the northern and southern cells is expected to be via extension to the existing infrastructure.

Correspondence with the Asset Services Team at ATCO Gas has confirmed that it will be possible for the Estate to be served by the existing gas infrastructure in the area.

3.8.5 Communications

The Estate falls within the NBN Co. coverage zone given the number of proposed lots in the development. The conduit and pit system is required to be funded by Cedar Woods Pty Ltd with NBN Co funding the provision of fibre and backhaul to the development.

Existing communications infrastructure is available within the road reserves adjacent to the site for extension to the development.

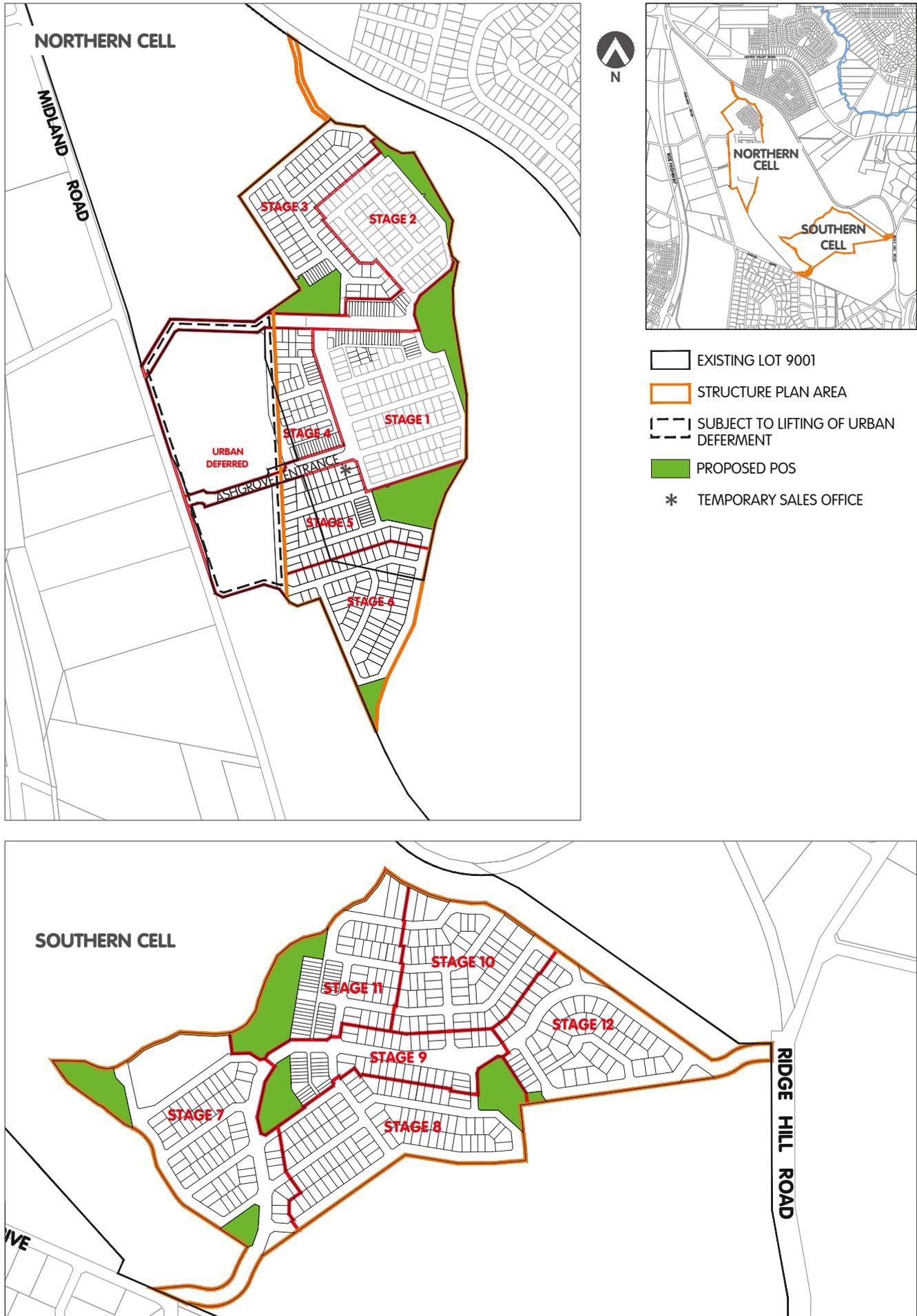
3.8.6 Staging

Indicative staging for development is based on servicing opportunities being provided from the north and is depicted in the adjacent figure. In accordance with the requirements of the FMP, and as detailed on Plan 2, subdivision applications will incorporate a 100 m wide area adjacent to the outer western boundary of the northern LSP area. This will enable this area to be used as a 'cleared buffer' (i.e. to be maintained annually at less than 5 t/ha) until development of the future stages is undertaken.

To date Stages 1 – 3 and 6 have received subdivision approval and / or commenced development.

Staging may be subject to change as detailed design and servicing considerations are progressed.

Figure 17: Indicative Staging Plan



appendix a

environmental assessment report

(RPS, September 2014)
and Addendum (Strategen, January 2019)

appendix b

local water management strategy
(JDA, October 2014) and Addendum (JDA, April 2019)

appendix c

fire management plan

(CEE, June 2016)
and Addendum (CEE, December 2018)

appendix d

aboriginal heritage

(Ethnoscience, December 2011)

appendix e

Odour Impact Assessment & Dispersion Modelling Study

(June 2016)

appendix f

traffic impact assessment

(Cardno, October 2014) and Addendum (Cardno, March 2018)

appendix g

preliminary servicing report

(WGE, October 2014) and Addendum (WGE, March 2018)

appendix h

landscape masterplan report

(Epcad, October 2014)

