LOTS 2, 3 AND 6 MIDLAND ROAD, HELENA VALLEY

PART ONE - IMPLEMENTATION

LOCAL STRUCTURE PLAN - SEPTEMBER 2016

tpg PLACE MATCH

Table of Modifications to Part One and Structure Plan Map

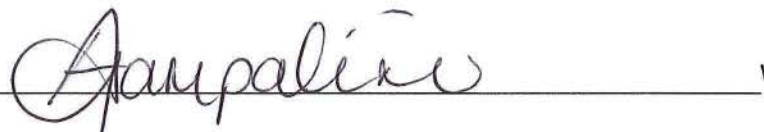
Modification no.	Description of modification	Date endorsed by Council	Date endorsed by WAPC

This structure plan is prepared under the provisions of the Shire of Mundaring Local Planning Scheme No.4

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: 3 November 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

3 November 2016

Date

Date of Expiry: 3 November 2026

Local Structure Plan

PART ONE – IMPLEMENTATION

Lots 2, 3, and 6 Midland Road, HELENA VALLEY

SEPTEMBER 2016

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Executive Summary

Overview

This local structure plan (LSP) has been prepared to guide the subdivision and development of land totalling 11.1086 hectares in area and comprising Lots 2, 3, and 6 Midland Road, Helena Valley within the Shire of Mundaring.

The structure plan has been prepared on behalf of the landowners J and J Stefanelli and N Di Candilo and has been informed by investigations undertaken by the following consultant team:

- TPG Town Planning, Urban Design and Heritage – urban design, town planning
- Emerge Associates – environmental investigations, local water management, bushfire management
- Bushfire Safety Consulting – bushfire hazard assessment and management
- McDowall Affleck – Servicing and civil engineering
- Worley Parsons – Geotechnical

Purpose

This local structure plan provides a statutory framework to guide and facilitate the future subdivision of the land into predominantly residential lots with land also to be set aside for regional open space, conservation and public open space. The structure plan is to be implemented in accordance with Clause 5.17 of the Shire of Mundaring Local Planning Scheme No. 4.

Design Approach

The design of the structure plan is a product of a multidisciplinary approach which was predicated on the need to respond to a number of site issues and constraints in order to deliver a balanced and better environmental outcome for the site to that currently documented. Listed below is a summary of the design response to these issues:

1. Creation of a 30 metre buffer from the mapped Resource Enhancement Wetland (REW) to provide an appropriate buffer between the ecological values of the wetland and proposed development. The Kadina Brook and associated wetland buffer will be the focus of extensive revegetation works to improve the ecological linkage to the Helena River reserve and the over all environmental functionality of this watercourse feature.
2. Ultimate remediation of the structure plan area in accordance with the process and requirements of the *Contaminated Sites Act 2003* in order to resolve pre-existing landfill and contamination issues.
3. Preparation of a Local Water Management Strategy (Emerge Associates 2014) in accordance with *Better Urban Water Management* (BUWM) (WAPC 2010) to integrate and improve drainage within the structure plan area, including the philosophy of directing waterflow to the Kadina Brook to improve the creeks function.
4. Preparation of a Bushfire Management Plan (Emerge Associates and Bushfire Safety Consulting 2014) and placement of a road reserve to interface with the Resource Enhancement Wetland (REW) buffer to accommodate a 20 m Bushfire Protection Zone (BPZ) required to manage bushfire threats resulting from retained vegetation within the REW area and "Parks and Recreation" reserve.
5. Transfer of the "Parks and Recreation" reserve into State management for integration with the wider Helena River catchment reserve.
6. Integration with the surrounding local road network.

Executive Summary Table

Item	Data
Total area covered by the structure plan	13.2332 ha
Area of residential land use proposed	3.3089 ha (residential) 0.5472 ha (rural-residential)
Estimated lot yield	67
Estimated number of dwellings	67
Estimated residential site density	19.64 dw/ha[1] calculate based on residential zoned land only, exclude roads and POS
Estimated population	186 persons[2]
Estimated number and % of public open space: • Regional Open Space (ROS) • Resource Enhancement Wetland (REW) • Wetland Buffer (REW Buffer) • Local Public Open Space (Local POS) • Restricted Open Space	 ROS = 3.3259 ha REW = 1.3907 ha REW Buffer = 0.9605 ha Local POS = 0.6244 ha Restricted Open Space = 0.1597 ha
Estimated number and area of natural area and biodiversity assets	REW area = 1.3909 ha REW buffer = 0.9605 ha Local Natural Areas within open space = 0.3700 ha[3]

NOTES:

[1] 'Residential Site Hectare' refers to the definition under Element 1 of WAPC's Liveable Neighbourhoods.

[2] based on average household size of 2.83 (Source: Shire of Mundaring Community Profile, 2011).

[3] this figure relates to Local Natural Areas accommodated within open space outside of the Resource Enhacement Wetland and buffer.

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1. Structure Plan Area

This Structure Plan shall apply to Lots 2, 3, and 6 Midland Road, Helena Valley, being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan Map (**Plan 1**).

2. Structure Plan Content

The Structure Plan comprises:

a) Part 1 – Statutory Section

   This section contains the structure plan map and statutory planning provisions and requirements.

b) Part 2 – Explanatory Report

   This section is to be used as a reference guide to interpret and justify the implementation of Part 1.

c) Appendices – Detailed Technical Reports and supporting plans and maps.

3. Interpretation and relationship with the Scheme

3.1 Interpretations

a) Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meaning given to them in the Shire of Mundaring Local Planning Scheme No. 4 (the Scheme) including any amendments gazetted thereto.

3.2 Relationship with the Scheme

a) A decision-maker for an application for development or subdivision approval within the Structure Plan area is to give due regard to the provisions and requirements of this Structure Plan (Part 1 and Part 2).

b) The Structure plan map (Plan 1) outlines land use, zones and reserves applicable within the structure plan area. The zones and reserves designated under this structure plan are to guide future land use and development.

4. Operation

a) In accordance with Clause 5.17.12 of the Scheme, this Structure Plan shall come into operation on the day on which it is endorsed by the Western Australian Planning Commission (WAPC).

5. Land Use and Subdivision Requirements

a) The Structure Plan Map (**Plan 1**) outlines land use, zones, reserves and the residential density codes applicable within the Structure Plan area. The zones, reserves and residential density codes designated under this Structure Plan apply to the land within it as if the zones, reserves and residential density codes were incorporated into the Scheme.

5.1 Land Use Permissibility

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

5.2 Residential

5.2.1 Dwelling Target

a) Objective

To provide for a minimum of 60 dwellings within the structure plan area.

b) Subdivision is to be generally in accordance with this structure plan to facilitate a desirable residential dwelling yield.

5.2.2 Residential Density

a) Plan 1 defines the broad residential density ranges that apply to specific areas within the Structure Plan. Lot specific residential densities, within the defined residential density ranges, are to be subsequently assigned in accordance with a Residential Code Plan approved by the WAPC.

b) A Residential Code Plan is to be submitted at the time of subdivision to the WAPC and shall indicate the R-Codes applicable to each lot within the subdivision and shall be consistent with the Structure Plan, and the Residential Density Ranges identified on Plan 1.

c) The Residential Code Plan is to include a summary of the proposed dwelling yield of the subdivision.

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

e) Variations to the Residential Code Plan will require further approval of the WAPC, with a revised Residential Code Plan submitted generally consistent with the approved plan of subdivision issued by the WAPC. The revised Residential Code Plan shall be consistent with Residential Density ranges identified on Plan 1.

f) A revised Residential Code Plan, consistent with Clause 5.2.2 (e) will replace, wholly or partially, the previously approved residential density code plan, and shall then form part of the Structure Plan as outlined in Clause 5.2.2 (d).

g) Residential Code Plans are not required if the WAPC considers 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, services or infrastructure; or

(iv) land which by virtue of its zoning or reservation under the Structure Plan cannot be developed for residential purposes.

5.3 Public Open Space

a) The provision of a minimum of 10 per cent public open space being provided in accordance with the WAPC's Liveable Neighbourhoods. Public open space is to be provided generally in accordance with **Plan 1** (and **Table 1**), 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 Shire of Mundaring.

Table 1: POS Schedule

Public Open Space Schedule	Sub Total	Total
Structure Plan Area		12.2586 ha
Less Deductions		
Regional Open Space	3.3259 ha	
Resource Enhancement Wetland	1.3907 ha	
Rural Residential Land	0.5472 ha	
Sub Total	**5.2638 ha**	
Net Residential Subdividable Area		6.9733 ha
Residential Public Open Space @ 10 percent		**0.6973 ha**
Net Rural Residential Land Area	0.5472 ha	
Rural Residential Public Open Space @ 5 percent		**0.0274 ha**
Total Public Open Space Requirement		**0.7247 ha**
Public Open Space Contribution		
Unrestricted Public Open Space		
POS (Area B)	0.2850 ha	
POS (Area C)	0.3394 ha	
Sub Total		0.6244 ha
Restricted Public Open Space		
Portion of Resource Enhancement Wetland Buffer (Area D)		0.1597 ha
Sub Total		0.1597 ha
Total POS Provision		**0.7841 ha**

5.4 Reports/Strategies Required Prior to Subdivision

a) Prior to the lodgement of an application for subdivision, the following investigations are to be prepared to the satisfaction of the relevant authority and provided with the application for subdivision:

   i) Preparation of a Sampling and Analysis Plan (SAP) and completion of a Detailed Site Investigation (DSI).

   ii) A Vegetation Survey that identifies vegetation for retention.

5.5 Conditions of Subdivision Approval

Table 2 prescribes the regulatory provisions of the Structure Plan pertaining to requirements and prerequisites for subdivision within the Structure Plan area.

a) At the time of subdivision, the Shire of Mundaring may recommend conditions to the WAPC, as applicable, requiring the preparation and/or implementation of the following approaches as outlined in **Table 2**.

Table 2 – Conditions of Subdivision

1. Soil and Groundwater Contamination and Investigation	1.1 Prior to commencement of subdivision works, investigation for soil and groundwater contamination is to be carried out to determine if remediation is required. 1.2 If required, remediation, including validation of remediation, of any contamination identified shall be completed prior to the issuing of titles to the satisfaction of the Western Australian Planning Commission on advice from the Department of Environment Regulation, to ensure that the lots created are suitable for the proposed use.
2. Bushfire Management	2.1 A bushfire management plan being prepared, approved and relevant provisions implemented during subdivisional works, in accordance with the WAPC's Guideline Planning for Bushfire Protection (Edition 2) to the specifications of the local government and/or the Department of Fire and Emergency Services Authority. (Department of Fire and Emergency Services Authority) OR (Local Government) 2.2 A notification, pursuant to Section 70A of the Transfer of Land Act 1893 is to be placed on the certificate/s of title of the proposed lot/s. Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows: *"The lot/s is/are subject to a bushfire management plan." (Local Government)*
3. Foreshore Management	3.1 Prior to the commencement of subdivisional works a foreshore management plan for the Kadina Brook is to be prepared and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan (Department of Water) OR (Local Government).
4. Stormwater Management	4.1 Prior to the commencement of subdivisional works, an Urban Water Management Plan is to be prepared and approved, in consultation with the Department of Water, consistent with any approved Local Water Management Strategy. (Local Government)
5. Detailed Area Plans	5.1 Detailed Area Plans (DAPs), pursuant to Clause 5.17.15 of the Scheme, are to inform applications for subdivision and development in regard to the following: a) Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space; and/or b) Lots identified as being bushfire prone within an approved Bushfire Management Plan relating to the subject lots.
6. Building Envelopes	6.1 Prior to the commencement of subdivisional works, a detailed plan identifying building envelope/s is to be prepared in consultation with the local government to ensure the appropriate siting of development, to the satisfaction of the Western Australian Planning Commission and shall be prepared and endorsed pursuant to Clause 5.7.2 of the Scheme.
7. Fencing	7.1 In relation to the future 'Rural-Residential' lot/s, the following condition relating to fencing may be imposed: *"The landowner/applicant installing suitable rural fencing of good standard to the satisfaction of the Western Australian Planning Commission."* (Local Government)
8. Control of mosquito breeding	8.1 Prior to the commencement of subdivisional works, a mosquito management plan shall be prepared to the satisfaction of the local government to put in place suitable measures to control mosquito breeding on wetland within the Structure Plan area.

6. Development Requirements

The Structure Plan (**Plan 1**) and **Table 3** forms part of the regulatory provisions of this structure plan and prescribe the land use permissibility, standards, requirements and prerequisites for development within the Structure Plan area.

Table 3 – Development Requirements

1. Dwelling Orientation	1.1 Dwellings must address the street and/or public reserve in terms of main entry, major openings, articulation, materials and detailing. Dwellings directly abutting a public reserve shall orientate as follows: i) If vehicle access is via a laneway, the public reserve is considered as the primary façade. ii) If vehicle access is via a street, the street shall be considered the primary façade, however the secondary façade overlooking the public reserve must be articulated and include at least one major opening.
2. Lots abutting Public Open Space	2.1 Dwellings on lots abutting public open space shall be oriented so that they provide passive surveillance over the open space. Major openings and habitable rooms should, where possible, be located to look onto the open space.
3. Corner Lots	3.1 Dwellings located on corner lots shall address both streets through their design by extending the primary elevation features onto the secondary street elevation where forward of a boundary fence. Exposed secondary street façade shall incorporate major openings.
4. Rural-Residential Zone	4.1 In addition to any requirement or provision of the Scheme, this Structure Plan or a planning policy; land use and development of the Rural-Residential land designated within this Structure Plan will be subject to any requirements or encumbrances contained within any restrictive covenant relating to that lot/s. 4.2 The local government may impose the following requirements on any land use and development of the 'Rural-Residential' lot: a) Preparation of a Dust Management Plan in relation to any future grazing activities; b) Consideration of the siting and location of any horse stables and other rural outbuildings in relation to residential dwellings and lots; and/or c) Preparation of a management plan in relation to any application for a 'Rural Pursuit' to address issues such as nutrient loading, pasture management, dust control, manure control including fly management and other issues.

PLAN 1
STRUCTURE PLAN
Lots 2, 3 & 6 Midland Road, Helena Valley

Date: 22 September 2016
Scale: 1:2000 @ A3
Project Manager: TP
Checked: TP
Drawn: LC
Drawing No. 714-128 ST1G Plan 1 2016-09-22.dwg

0 50 100m

LEGEND

- Structure Plan boundary
- Residential R20
- Residential R30
- Rural Residential
- Development (Subject to future structure planning of adjoining landholdings)
- Public Open Space / Drainage
- Regional Open Space
- Creekline
- Resource Enhancement Wetland
- 30m wetland buffer

NOTES

1. Land use and development subject to further detailed geotechnical investigation (excluded from Structure Plan Area)

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LOTS 2, 3 AND 6 MIDLAND ROAD, HELENA VALLEY

PART TWO - EXPLANATORY REPORT

LOCAL STRUCTURE PLAN - SEPTEMBER 2016

tpg
TOWN PLANNING
URBAN DESIGN AND HERITAGE

Table of Modifications to Part One and Structure Plan Map

Modification no.	Description of modification	Date endorsed by Council	Date endorsed by WAPC

Local Structure Plan

PART TWO – EXPLANATORY REPORT

LOTS 2, 3 AND 6 MIDLAND ROAD, HELENA VALLEY

SEPTEMBER 2016

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Figures

Abbreviations

AHD	Australian Height Datum
ARI	Average Recurrence Interval
AAMGL	Annual Average Maximum Groundwater Levels
BAL	Bushfire Attack Level
BPZ	Building Protection Zone
DAP	Detailed Area Plan
DoW	Department of Water
DPaW	Department of Parks and Wildlife
DSI	Detailed Site Investigation
EPA	Environmental Protection Authority
LSP	Local Structure Plan
LWMS	Local Water Management Strategy
MRS	Metropolitan Region Scheme
POS	Public Open Space
PSI	Preliminary Site Investigation
SoM	Shire of Mundaring
UWMP	Urban Water Management Plan
WAPC	Western Australian Planning Commission

1. Planning Background

1.1 Introduction and Purpose

This local structure plan (LSP) has been prepared by TPG Town Planning, Urban Design and Heritage (TPG) on behalf of the landowner of Lots 2, 3 and 6 Midland Road, Helena Valley (the site or Structure Plan area).

This local structure plan provides a statutory framework for the residential subdivision of the site into 67 freehold lots and associated public open space.

The subject land is zoned Urban within the Metropolitan Region Scheme and is included within the Development zone of the Shire of Mundaring Local Planning Scheme No. 4. This LSP has been prepared to satisfy the requirements of the Development zone and prepare the site ready for subdivision and development.

A large portion of the site is set aside as public open space and conservation, to accommodate the resource enhancement wetland and other environmental features of the site.

Supporting documentation in the form of separate technical reports have been prepared to inform this LSP and are appended to this document. These documents include:

- Helena Valley LSIP Geotechnical and Environmental Assessment (2008) prepared by Worley Parsons;
- Servicing and Infrastructure report prepared by McDowell Affleck;
- Environmental Assessment and Management Strategy (EAMS) prepared by Emerge Associates; and
- Bushfire Management Plan.

This Structure Plan is addressed in two Parts.

Part One covers the Statutory Planning Report.

Part Two covers the Explanatory Report. **Section 1** provides an introduction to the Structure Plan area and outlines the planning framework. **Section 2** outlines the site conditions and constraints. **Section 3** outlines the land use and subdivision requirements.

1.2 Land Description

1.2.1 Location

The local structure plan comprises Lots 2, 3 and 6 Midland Road, Helena Valley (the site or Structure Plan area). The site is located approximately 16 kilometres east of Perth, 3.5 kilometres south east of the Midland Regional Centre within the Shire of Mundaring (SoM) and is also located approximately 530 metres east of the intersection of Helena Valley Road and Roe Highway. Roe Highway provides the area with good connectivity south and west via the Great Eastern Highway to the Perth CBD and Reid Highway.

The Helena River is located immediately to the north of the subject site within a Parks and Recreation reserve. Kadina Brook flows off from the Helena River and travels south through the western portion of the subject site.

Land immediately to the west of the site is identified for rural-residential subdivision and land to the east and south of the site is zoned residential, with a majority of the adjoining land having previously been subdivided at densities ranging from R10 to R20. A local road network has been established to the south and east of the Structure Plan area through this previous subdivision.

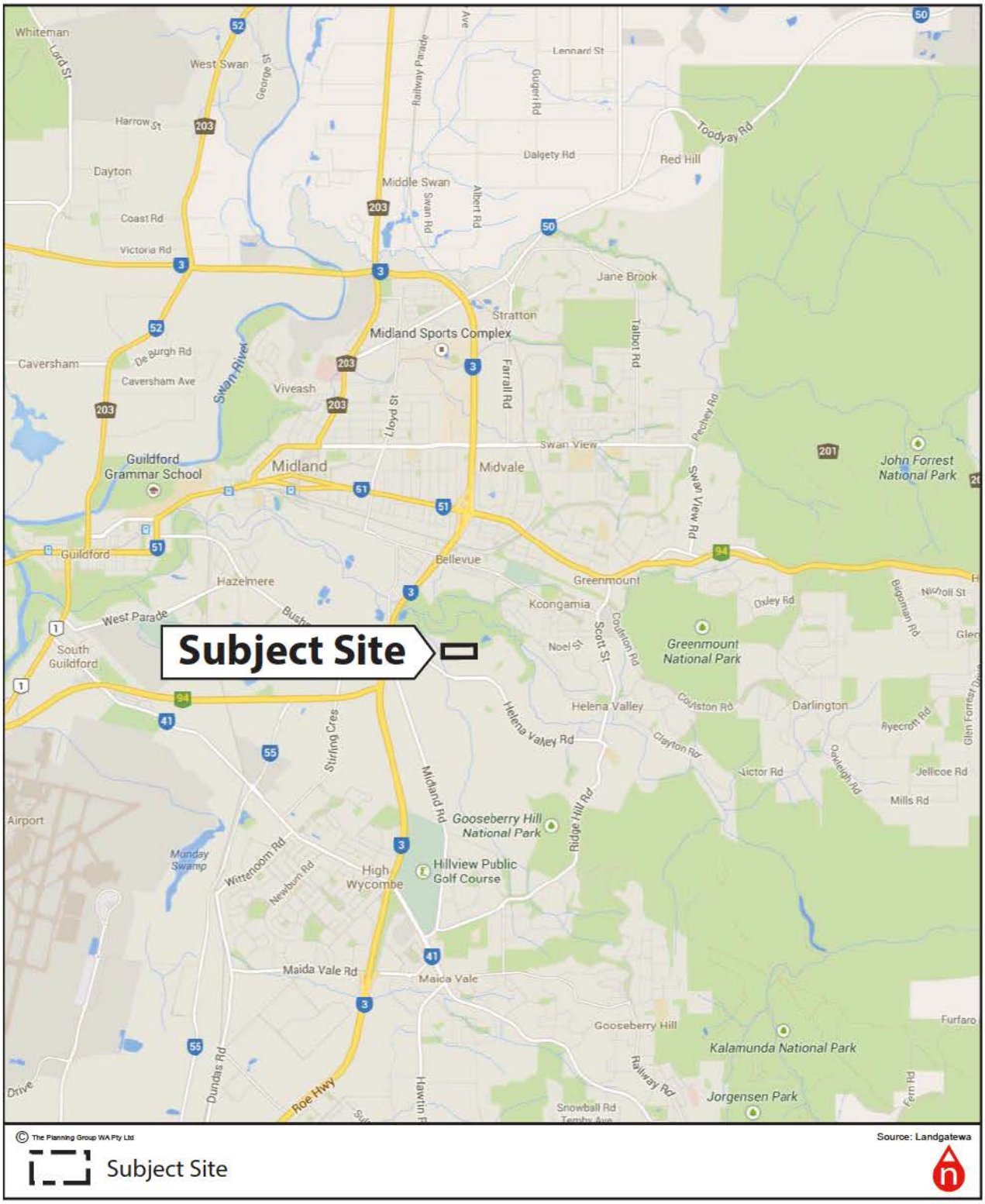
The site is also located within 480 metres of the Helena Valley Local Centre located to the south of the subject site on Helena Valley Road.

The Bushmead Rifle Range is located further to the south of the subject site on the Southern Side of Helena Valley Road.

Perth airport is also located in relatively close proximity to the subject site.

Refer to Figure 1 – Location Plan.

Figure 1 – Location Plan



1.2.2 Area and Land Use

The structure plan area comprises a total of 13.2332 ha of land.

Historically, it is understood that the north western portion of the structure plan area was previously used for the excavation of a clay deposit to supply a brick factory also located within the site boundary, from roughly 1979 until 1993 (Worley Parsons, 2008). The pit created as a result of the clay extraction was backfilled with uncontrolled fill and the clay pit within the confines of the sites boundaries is now completely backfilled. The landfill area has been capped with imported material.

A summary of the historical uses of the subject site is also listed below:

- Brickworks (including clay extraction and brick manufacture), salvage.
- Salvage yard.
- Construction of transportable buildings.
- Repair and renovation of buildings transported to the site.
- Recycling of dry demolition rubble and material for resale.
- Disposal of dry demolition rubble.

The brick factory infrastructure still remains in its current location, being a central portion of the structure plan area, but is no longer used for this purpose. The main sheds are predominantly used for the storage of parts, machinery, paints and miscellaneous items, or for vehicle maintenance and repair and the storage of oils, greases and mechanical fluids. The majority of the land surrounding the shed is in use as a laydown yard for material and machinery.

The subject site is also currently used for cattle grazing and as a base operations for a drilling contractor.

1.2.3 Legal Description and Ownership

The structure plan area comprises three separate land parcels being Lots 2, 3 and 6 Midland Road, Helena Valley. The details of the relevant Certificates of Title are provided in the table below.

Table 1 – Certificate of Title details

Lot No.	Street Address	Volume / Folio	Plan	Area
2	Lot 2 Midland Road, Helena Valley	1409/591	D3284	8.9031 ha
3	Lot 3 Midland Road, Helena Valley	1409/592	D3958	2.2055 ha
6	Lot 6 Midland Road, Helena Valley	1409/593	D3259	2.1246 ha

A copy of the Certificates of Title is included at Appendix A.

The site details are also illustrated in the Site Plan contained at Figure 2.

Refer to Figure 2 – Site Plan

1.3 Planning Framework

1.3.1 Zoning and Reservations

1.3.1.1 Metropolitan Region Scheme

Lot 3 Midland Road, Helena Valley is wholly located within the 'Urban' zone of the Metropolitan Region Scheme (MRS).

A majority of Lot 2 Midland Road, Helena Valley is also zoned 'Urban' however the north-western portion of the lot is zoned 'Rural' and the north eastern portion of the site is reserved for 'Parks and Recreation'.

The eastern portion of Lot 3 is reserved for 'Parks and Recreation' whereas the western portion is zoned 'Rural'.

Refer to Figure 3 – Metropolitan Region Scheme extract

1.3.1.2 Shire of Mundaring Local Planning Scheme No. 4

Lot 3 Midland Road, Helena Valley is wholly located within the 'Development' zone pursuant to the Shire of Mundaring Local Planning Scheme No. 4 (LPS4).

A majority of Lot 2 Midland Road, Helena Valley is also within the 'Development' zone of LPS4, however the western portion of the site is zoned 'Rural-Residential' which corresponds with the 'Rural' zoning under the MRS.

The western portion of Lot 3 is zoned 'Rural-Residential' under LPS4.

The portion of the site reserve for parks and recreation under the MRS is not zoned under LPS4.

Refer to Figure 4 – Local Planning Scheme No. 4 extract

Figure 2 - Site Plan

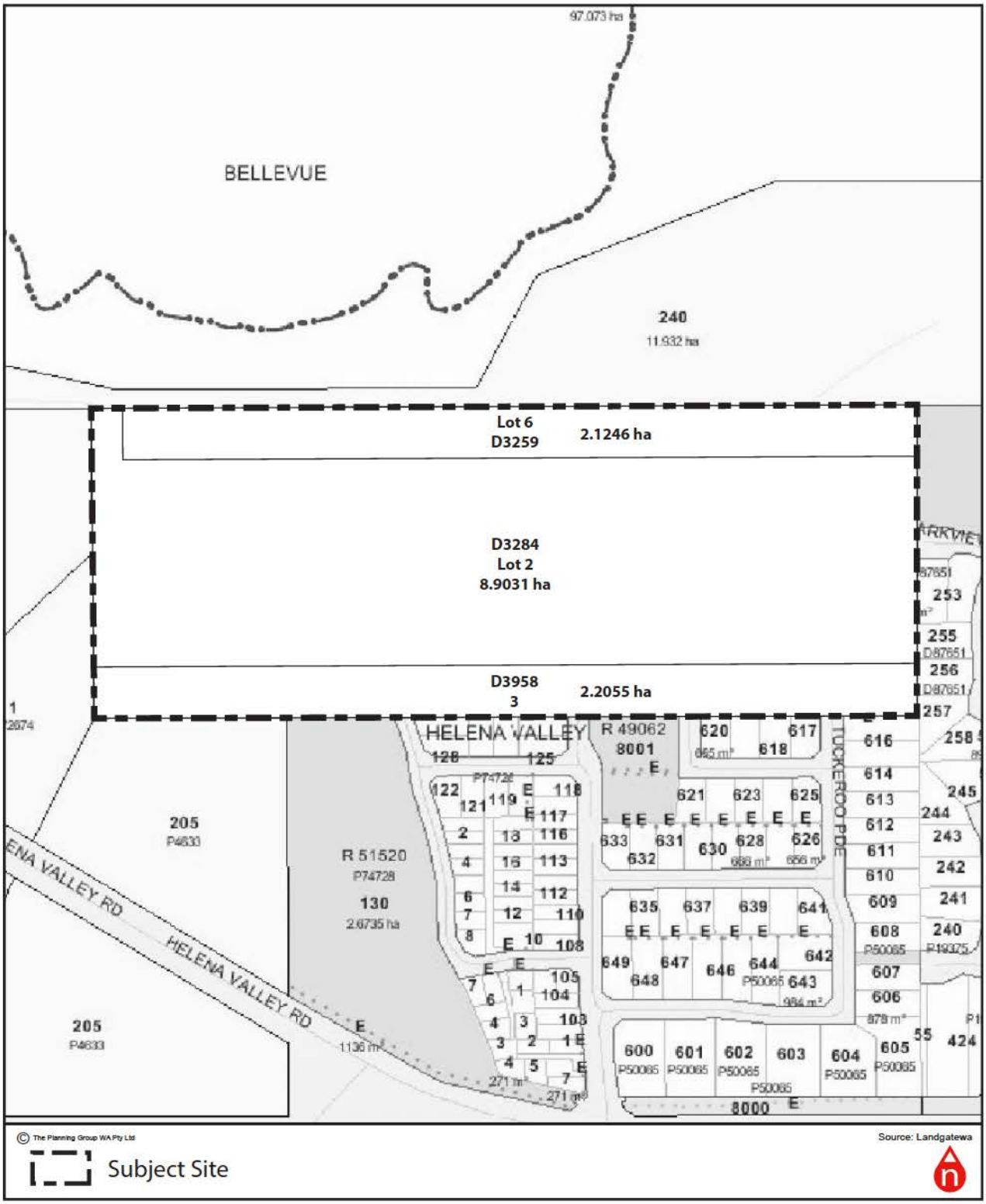


Figure 3- Metropolitan Region Scheme extract

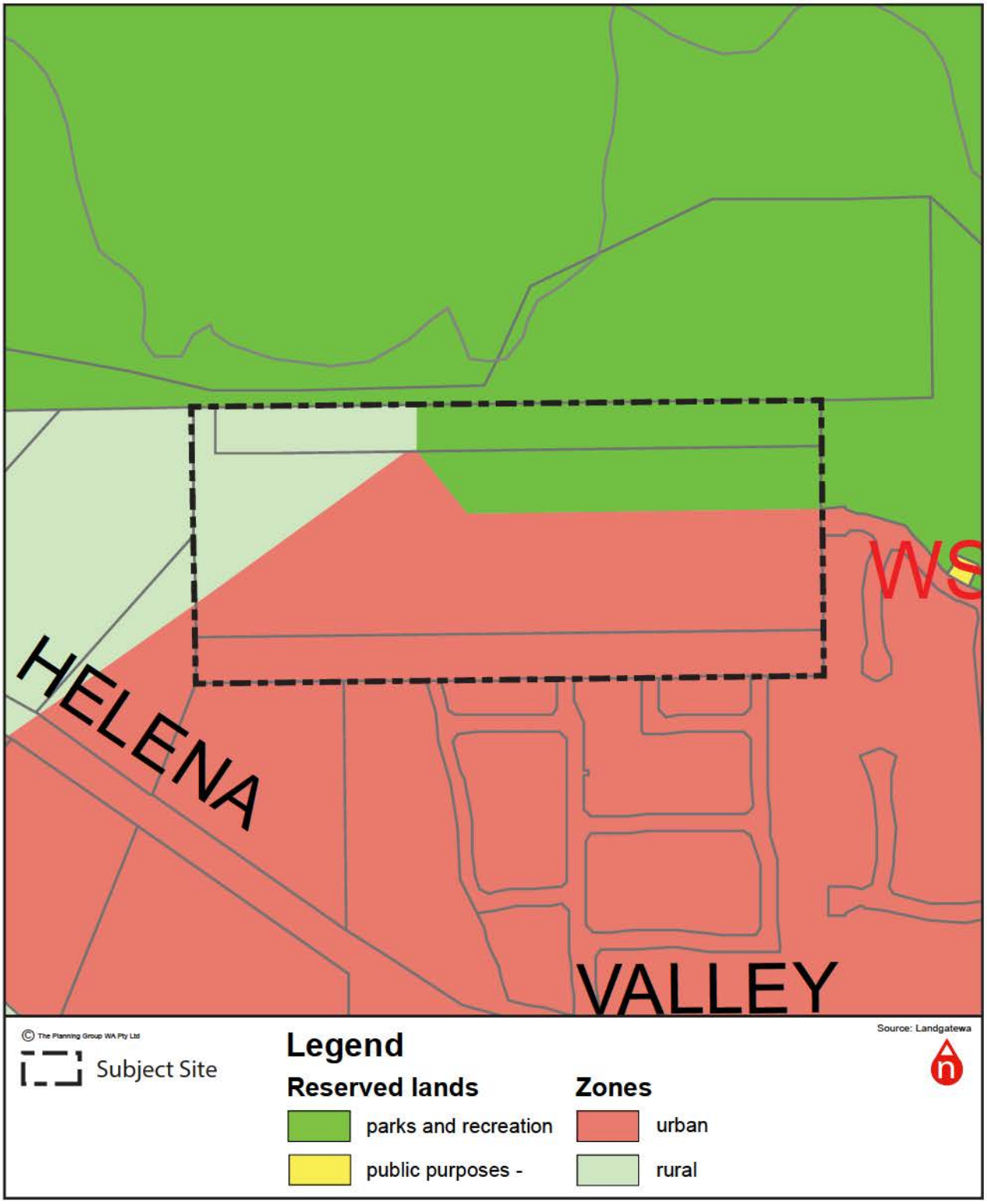
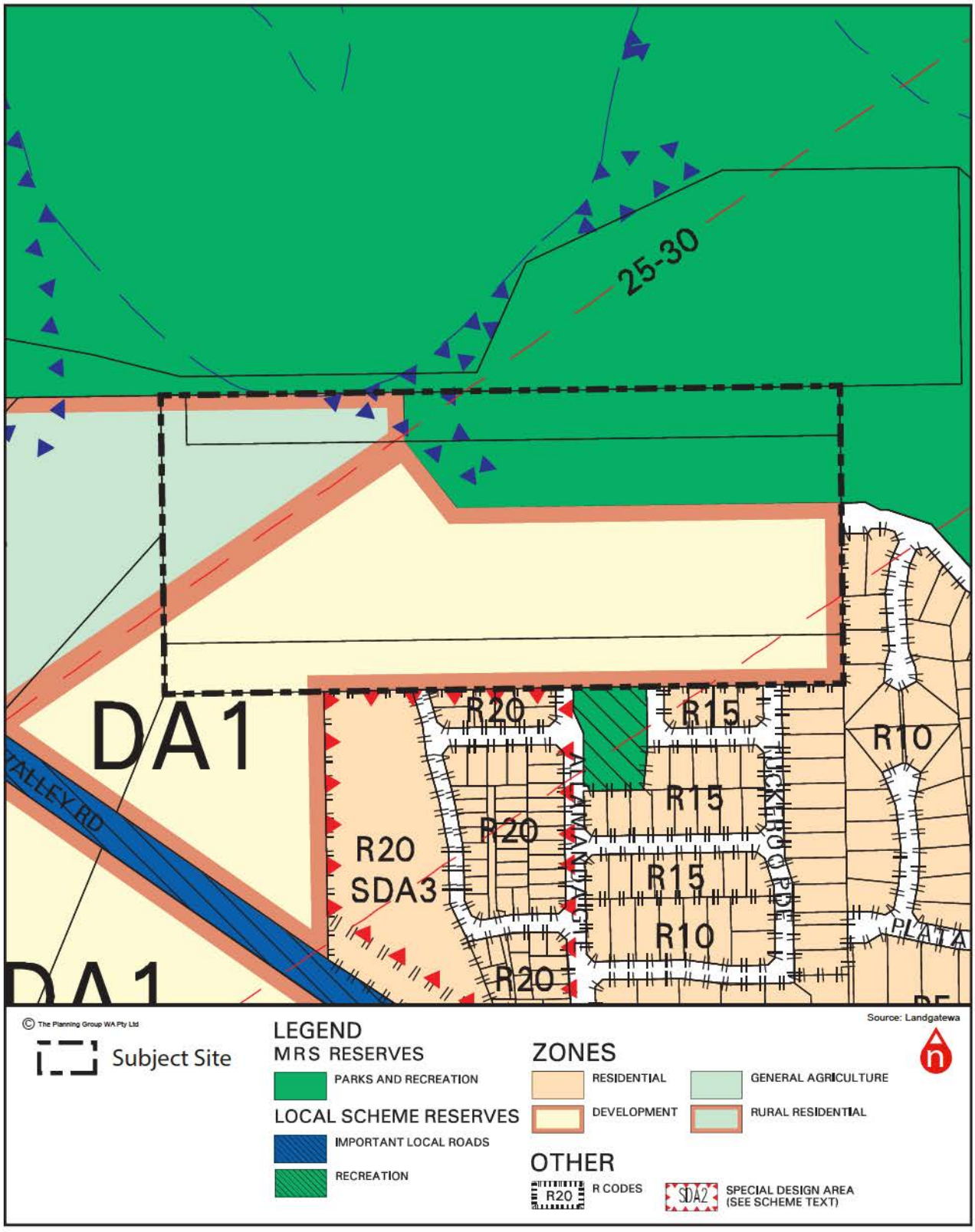


Figure 4 – Local Planning Scheme No. 4 extract



The objectives of the 'Rural-Residential' zone are:

- To provide for residential use in a rural setting, in suitable and appropriate locations in reasonable proximity to services.
- To conserve the natural environment as far as possible for the enjoyment of residents as well as the maintenance of ecological and landscape values, particularly by the protection of native vegetation (trees and understorey) and by water-sensitive development.
- To provide for other uses compatible with and complementary to rural living, subject to appropriate land capability and suitability and protection of residential amenity.

The portion of the site zoned 'Rural-Residential' has been set aside for open space to conserve and protect the resource enhancement wetland and associated buffer.

The objective of the 'Development' zone is to *'provide for the orderly planning of large areas of land for residential and other purposes through comprehensive structure planning which will provide the basis for future subdivision and development.'*

This structure plan has been prepared to address the requirements of the Development zone.

Watercourse Protection

Clause 5.7.5 of LPS4 relates to watercourse protection and establishes the following requirements:

(a) *"the setback specified for a particular watercourse in a watercourse hierarchy and protection strategy adopted by the Shire;*

(b) *in the absence of a specific setback for a particular watercourse in a watercourse hierarchy and protection strategy adopted by the Shire, 20 metres in the Residential zone and 30 metres in all other zones, or such greater distance as may be required by the Shire in the case of watercourses within the Middle Helena Catchment Area or the Mundaring Weir Catchment Area."*

The proposed structure plan proposes a 30 metre buffer to the Resource Enhancement Wetland which contains the Kadina Brook in the south-western portion of the subject site.

Local Natural Areas

Clause 5.7.13 of LPS4 deals with Local Natural Areas and establishes the following requirements with respect to LNA's:

(a) Where clearing of vegetation in a LNA is proposed or would be a consequence of a Scheme Amendment, Structure Plan, subdivision or development requiring planning approval, the Shire may require or recommend that the subdivider or landowner prepare, or cause to be prepared, a Native Fauna and Flora Report and Management Plan to the satisfaction of the Shire prior to supporting or approving the proposal, or prior to clearing the land.

(b) The Shire may recommend or impose conditions of approval requiring actions to protect and manage fauna or flora identified pursuant to the above clause.

The LNA's are addressed further on in this report.

Aircraft Noise Exposure Forecast Special Control Area

Clause 6.4 establishes an Aircraft Noise Exposure Forecast Special Control Area. All land subject to the 20 and 25 Australian Noise Exposure Forecast (ANEF) contours are subject to the provisions of the Special Control Area.

Land within the north-western portion of the Structure Plan area is located within the 20 and 25 ANEF countour.

The objectives of the Special Control Area are to:

(a) protect Perth Airport from unreasonable encroachment by incompatible development, particularly noise-sensitive development, to provide for its ongoing development and operation; and

(b) minimise the impact of airport operations on residents within the Shire of Mundaring.

The Shire shall also have regard to the provisions of State Planning Policy 5.1 and any advice received from the Westralia Airports Corporation in considering any application for planning approval.

Bushfire Hazard

Clause 6.5 of LPS4 establishes a Bush Fire Hazard Special Control Area. Portions of the subject site are identified as being subject to moderate bushfire hazard levels according to the bushfire hazard mapping contained on the scheme maps.

The objectives of the Bush Fire Special Control Area are:

(a) identify bush fire prone areas, where bush fires pose a significant threat to life and property;

(b) avoid any development of habitable buildings in areas where there is a significant risk to life and property from bush fires, except where such development rights existed prior to the gazettal of this Scheme and there is no alternative location for development on a particular land parcel that has a lower risk;

(c) encourage the improvement of vehicular access and egress for residents and fire fighting vehicles in bush fire prone areas;

(d) ensure that a bush fire attack level assessment is carried out on land that is subject, or likely to be subject, to bush fire hazard; and

(e) ensure that land use and development in areas where there is a significant risk to life and property from bush fires takes into account bush fire safety requirements and includes specified protection measures, while having regard for the amenity and environmental values of the locality.

Clause 6.5.5 requires that prior to the adoption of a structure plan introducing or proposing the intensification of development, a bush fire attack level assessment which satisfactorily addresses the level of bush fire hazard is to be submitted to the Shire.

A bushfire management plan has been prepared and contained at Appendix B and is further summarised and addressed within this report.

1.3.2 Relevant Legislation

1.3.2.1 Swan and Canning Rivers Management Act 2006

The *Swan and Canning Rivers Management Act 2006* establishes protection and management functions in respect of the Swan and Canning Rivers and associated land.

Clause 10 of the Act establishes the Swan River Trust Development Control Area (SRT DCA). The SRT DCA as it relates to the Structure Plan area is defined in Figure 5 below.

Refer to Figure 5 – Swan River Trust Development Control Area

It is noted that the SRT DCA only applies to the portion of the Structure Plan area that is reserved for Parks and Recreation. However development of future lots directly abutting the SRT DCA will trigger the requirement for the local authority to refer the application to the SRT for advice and recommendations.

1.3.3 Planning Strategies

1.3.3.1 Directions 2031

Directions 2031 is the highest level spatial strategic plan that establishes a vision for the future growth of the Perth and Peel metropolitan region. At its core, the Directions 2031 framework seeks to coordinate the provision of housing, infrastructure and services.

The strategic document establishes a number of principles for development, including:

- Identification of a network and hierarchy of activity centres which will create an equitable distribution of jobs and amenity throughout the City, while also encouraging intensification of residential density in and around these activity centres.
- It seeks to establish an integrated system of public and private transport networks.
- A green network of parks, reserves and conservation areas to support biodiversity, preserve natural amenity and protect valuable natural resources.

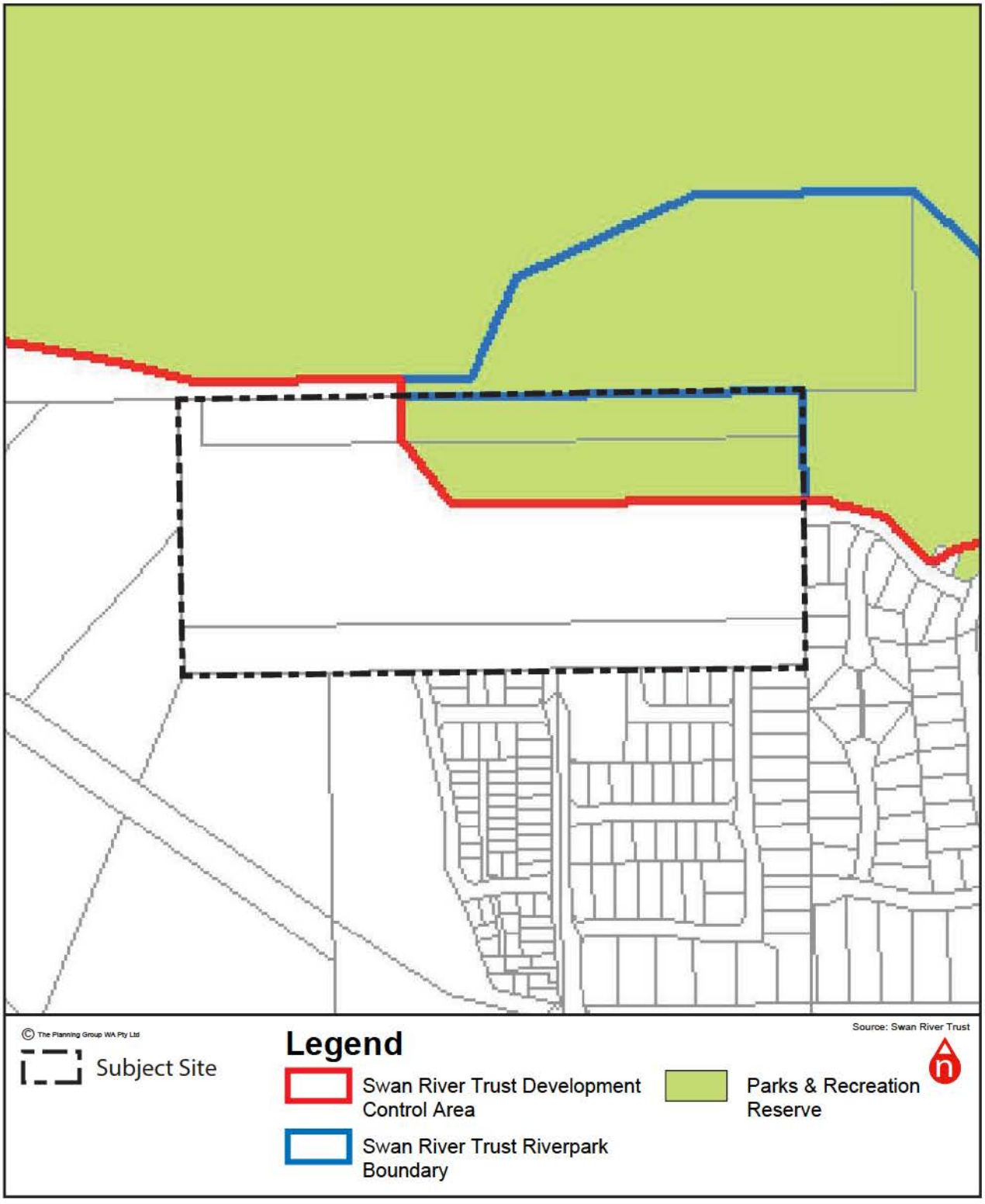
In relation to the above, it is important to note that the subject site is not identified as part of the green network of parks and natural bushland identified by Directions 2031.

Directions 2031 also establishes infill residential targets within each local government area in order to minimise the extent of new greenfield land required to be developed and in order to provide new housing in established areas with existing services and amenity.

The Shire of Mundaring is located within the north-east sub-region. Within this sub region, Direction 2031 sets a target of an increase in population of 69,000 people and an additional 40,000 dwellings to accommodate this additional population.

This structure plan proposes the creation of 67 new residential lots to contribute toward meeting these targets.

Figure 5 – Swan River Trust Development Control Area



1.3.3.2 Outer Metropolitan Perth and Peel Sub-Regional Strategy

A number of sub-regional strategies, including the Outer Metropolitan Perth and Peel Sub-Regional Strategy (the Strategy), have been prepared to support Directions 2031 and deliver strategic planning at a local level. The sub regional strategies address issues that extend beyond local government boundaries to provide a regional response to common issues, such as the provision of housing.

Within the North-East sub region, Midland is identified as continuing to provide a regional activity centre function and Mundaring is identified as a District Centre.

The Strategy identifies an estimated dwelling supply of between 3,950 to 4,970 dwellings within the Shire of Mundaring. With respect to this, the Strategy identifies the subject site as falling within an undeveloped urban zoned area that has potential to generate in excess of 300 residential lots.

The Strategy also acknowledges the intersection upgrade of Roe Highway and the Great Eastern Highway.

1.3.3.3 Perth and Peel @ 3.5m

The *Draft Perth and Peel at 3.5 Million* document is the Western Australian Planning Commission's (WAPC) most recent strategic planning framework for the Perth and Peel Region. *Perth and Peel at 3.5 million builds* on the vision and objectives of *Directions 2031 and beyond* and provides a link across the four sub-regional planning frameworks that define the spatial plan for the Perth and Peel regions for the next 35 to 40 years.

The structure plan area is located within the North-East sub Regional Planning Framework (the Framework), which is expected to more than double its population to 450,500 by 2050.

The Structure Plan area is identified as 'Urban' under the Framework.

1.3.3.4 Shire of Mundaring Local Planning Strategy

The Local Planning Strategy (LPS) sets the strategic direction for land use planning and development for the Shire over the next 10 to 15 years and makes a number of recommendations in relation to zoning and development requirements which have informed LPS4.

Key strategic objectives of the LPS include:

- To set out the long-term planning directions for the Shire;
- To outline, interpret and, as appropriate, apply State and regional planning policies and strategies; and
- To provide the rationale for zones and reserves, Special Control Areas and other provisions of the Shire's accompanying Local Planning Scheme No. 4.

The following strategies contained within the LPS are relevant to this proposal:

1. Include land in Helena Valley already zoned Urban in the MRS but zoned Rural Landscape Living in TPS3 in a Development zone in LPS4, to allow for determination of residential densities and disposition of land uses through structure planning.
2. In structure planning for residential development within the Development zone in Helena Valley, seek to achieve a net residential density of around 15 dwellings per hectare.

In addition to the above, the other relevant recommendations of the LPS relevant to this proposal are summarised below.

Local Natural Areas

Local Natural Areas identified within the Shire's Local Biodiversity Strategy are mapped in the LPS and are subject to a range of recommendations to encourage retention and protection.

The maps contained within the Strategy identify portions of the subject site as being identified for 'Protection'.

The Strategy notes that where land contains 'Protection' category Local Natural Areas and has subdivision potential, structure planning and subdivision should minimise (and if possible avoid) clearing and fragmentation of Local Natural Areas and that these should be retained within a single landholding with a conservation covenant or within public open space.

In regards to this, the Strategy further requires where a structure plan may adversely impact on a Local Natural Area, the structure plan is to *"provide vegetation, flora and fauna reports or management plans. Such reports should be provided at the earliest possible stage in 51 and 56 and matters of national environmental significance, and may include the involvement of environmental agencies where appropriate."*

The landowner has subsequently commissioned more detailed investigations into the quality of vegetation and habitat within the areas identified for protection and the outcomes of this investigation are discussed later on in this report.

Bushfire Hazard

The Strategy recommends that bushfire planning occurs in accordance with the *Planning for Bush Fire Protection Guidelines* and recommends a Special Control Area to be applied to those areas with an 'Extreme' or 'Moderate' bushfire hazard.

A Bushfire Hazard Assessment has been prepared to address this requirement and is summarised later in this report and contained within the Bushfire Management Plan located at Appendix B.

Residential Hills (Existing towns/villages)

The relevant strategies applicable to this structure plan in relation to residential hills development are listed below:

- Where land containing Retention Category Local Natural Areas has subdivision potential, structure planning and subdivision should minimise clearing and fragmentation of Local Natural Areas where possible.
- Special environmental features are to be identified at the rezoning or structure planning stages, and wherever possible, included within POSL.
- Encourage medium density housing development where reticulated sewerage is available, to provide greater housing choice and better meet the housing requirements of the Shire's residents over time.

Helena Valley Locality

The relevant strategies applicable to the Helena Valley locality include:

- In structure planning for the balance of future residential land in Helena Valley, south of the Helena River, investigate the possibility of securing a site for an oval and/ or other recreational facilities to provide for the population of Helena Valley south of the river.
- In structure planning for residential development within the Development zone in Helena Valley, seek to achieve a net residential density of around 15 dwelling per hectare.

1.3.3.5 Mundaring Local Biodiversity Strategy

The Shire of Mundaring is the first local government to incorporate its endorsed local biodiversity strategy within its local planning strategy and local planning scheme. Within the Local Biodiversity Strategy, the Shire has defined Local Natural Areas (LNA's) based on their conservation significance, land zoning, and other planning considerations such as structure plans and lot size. LNA's are categorised into three categories being:

- **Conservation:** LNA's generally have high ecological values and are either on Crown land vested for a conservation purpose, included within a Local Reserve for Conservation in the Shire's new Local Planning Scheme No. 4, or protected by a Conservation Covenant.
- **Protection:** LNA's have high ecological value but are located on private lands.
- **Retention:** LNA's have a relatively lower ecological value and also generally located on private lands.

LNA's are natural areas that exist outside of Bush Forever Sites, the CALM Managed Estate and Regional Parks.

LNA'S were identified through remnant vegetation mapping undertaken in 2007 and by interpretation of 2005 aerial photography. The Mundaring Local Biodiversity Strategy states *"any decision relating to the retention, protection or management of a Local Natural Area should be supported by site-specific assessments using standardised formats."*

1.3.4 Relevant Policy Framework

1.3.4.1 State Planning Policy No. 3 – Urban Growth and Settlement (SPP 3)

State Planning Policy No. 3 – Urban Growth and Settlement (SPP 3) sets out the key considerations with apply to planning for urban growth and settlement in Western Australia.

Of particular relevance to this Structure Plan, SPP 3 identifies the need to give priority to infill development in established urban areas and areas well serviced by employment and public transport in order to effectively manage the urban growth of the Perth metropolitan area.

1.3.4.2 State Planning Policy 3.4 – Natural Hazards and Disasters (SPP 3.4)

State Planning Policy 3.4 (SPP 3.4) identified the need for the planning of urban areas to consider natural hazards including flooding, bush fire, landslides, earthquakes, cyclonic activity, coastal erosion, severe storms, storm surge and tsunamis. Of particular relevance to this Structure Plan is flooding and the risk of bushfire.

The Structure Plan area is located in proximity to the Helena River and the Kadina Brook, which would both be subject to flooding from time to time. Flood mapping associated with these water systems and the associated impact on the Structure Plan area has been examined.

Flood mapping for the Helena River shows that the 1 in 100 year flooding level extends approximately 400 metres up Kadina Brook, but terminates 100 metres north of the site. Therefore the site is not subject to flooding from the Helena River. Flood levels for the Kadina Brook are likely to be contained within the reserve and buffer associated with this wetland.

The risk of bushfire is discussed in further detail in relation to the Draft Planning for Bushfire Management policy.

1.3.4.3 Draft Planning for Bushfire Management (Draft SPP 3.7)

Draft SPP 3.7 establishes a risk minimisation approach to assist in decision making with respect to planning and development in proximity to bushfire-prone areas. The policy is to be read in conjunction with the document *Planning for Bushfire Risk Management Guidelines* (the Guidelines) and relevant legislation.

Bushfire prone areas may be identified by a number of ways, one of which being via a local government bushfire map. In this instance, the Shire of Mundaring has adopted its bushfire prone mapping pursuant to LPS4 via a Special Control Area (Clause 6.5 of TPS4). The mapping identifies areas of 'Extreme' and 'Moderate' bush fire hazard which has been determined in accordance with the Type 1 and Type 2 Bush Fire Hazard Assessment Procedures in *Planning for Bush Fire Protection (2001)*.

In this instance portions of the Structure Plan area and land adjacent to the Structure Plan area in the north and west have been mapped as being of a 'Moderate' bushfire hazard.

In accordance with Draft SPP 3.7, identification of an area as being bushfire-prone is not in itself an indication of bushfire risk, but it does trigger the requirement for a proponent to assess the level of risk through either a bushfire hazard assessment and/or a Bushfire Attack Level (BAL) assessment.

The BAL rating descriptions are contained in the Guidelines and are described in the table below:

Table 2 – BAL Ratings

BAL	Description
BAL-LOW	There is insufficient risk to warrant any specific construction requirements but there is still some risk.
BAL-12.5	There is risk of ember attack.
BAL-19	There is risk of ember attack and burning debris ignited by wind-borne embers and a likelihood of exposure to radiant heat.
BAL-29	There is an increased risk of ember attack and burning debris ignited by wind-borne embers and a likelihood of exposure to an increased level of radiant heat.
BAL-40	There is much increased risk of ember attack and burning debris ignited by wind-borne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. Not supported by planning.
BAL-Flame Zone	There is an extremely high risk of ember attack and burning debris ignited by wind-borne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. Not supported by planning.

Draft SPP 3.7 requires that the Bushfire Hazard Assessment identify the applicable BAL rating and any development of an area rated at BAL 40 or above is not to be supported unless it can be demonstrated that the risk can be reduced to comply with the policy requirements or the proposal is considered to be unavoidable development.

A Bushfire Management Plan (BMP), including a bushfire hazard assessment, has been undertaken and is contained in Appendix B.

This BMP provides acceptable solutions and responses to the performance criteria that fulfill the intent of the bushfire hazard management issues outlined in the Planning for Bush Fire Protection Guidelines (WAPC et al., 2010) and the draft Planning for Bushfire Risk Management Guidelines (WAPC 2014). However, community bushfire safety is a shared responsibility between governments, fire agencies, communities and individuals.

Dwellings located in bushfire prone areas (i.e. within 100m of classified vegetation) will have the risk mitigated via compliance with AS 3959 standards. BAL-29 is not exceeded and an internal Bushfire Protection Zone (BPZ) is incorporated into the Structure Plan where classified vegetation is immediately adjacent to proposed development. Road reserves and landscaped POS areas with fuel management programs can also be effective BPZs. A minimum of two access options and internal loop roads, reticulated water supply, and hydrants are provided. The proposed development will fall within the acceptable level of risk.

1.3.4.4 State Planning Policy 2.4 – Basic Raw Materials

State Planning Policy 2.4 – Basic Raw Materials (SPP 2.4) provides for the protection of basic raw materials, with the intention of this policy to ensure these resources can be fully utilised, through appropriate land uses and timeframes for development that may otherwise conflict with this intention.

The structure plan area is not located within a designated extraction area or resource location according to the mapping contained within SPP 2.4 and therefore there are no associated constraints on the timing of the proposed future urban development in accordance with the policy requirements. There have, however, been historical clay extraction activities across a large portion of the site, particularly the east.

1.3.4.5 State Planning Policy 5.1 – Land Use Planning in the Vicinity of Perth Airport (SPP 5.1)

The objectives of SPP 5.1 include:

- Protect Perth Airport from unreasonable encroachment by incompatible (noise sensitive) development, to provide for its ongoing development and operation; and
- Minimise the impact of airport operations on existing and future communities with reference to aircraft noise.

The policy establishes requirements for development in relation to different ANEF contours. With respect to areas between 20 ANEF and 25 ANEF of which portions of the subject site fall within, the following requirements are applicable.

(a) Zoning and associated development control provisions (including structure plans) should take into consideration the level of noise exposure forecast and the Building Site Acceptability for the particular noise exposure zone.

(b) Where land is zoned for residential purposes, the maximum dwelling density should generally be limited to R20, except where –

  a. There is a strategic need for more consolidated development;

  b. A higher density coding is desirable to facilitate redevelopment or infill development of an existing residential area; and

  c. There is some other public interest reason which justified the need for higher density coding.

The Structure Plan has given due regard to this policy and has designated all residential land within the 20-25 ANEF Contour with a maximum R-Code of R20.

1.3.4.6 Development Control Policy 1.5 – Bicycle Parking

Development Control Policy 1.5 – Bicycle Parking (DC 1.5) seeks to ensure that planning for new residential subdivisions caters for cyclists. Relevant requirements include:

- Ensuring that the local road network is safe for cyclists;
- Within new residential areas, the emphasis should be on on-road facilities linked by segregated paths to ensure continuity of the cycle route system; and
- Subdivision design should provide for bicycle access along river and coastal foreshores.

The proposed local road network will receive low volumes of vehicular traffic and are adequately designed to accommodate cyclists. Additionally, all proposed local roads will accommodate a shared path within the verge to accommodate pedestrians and young cyclists.

A shared path is also proposed adjacent to the Kadina Brook within the wetland buffer, which ideally would link in with cycle path connections to the north and south of the Structure Plan area.

1.3.4.7 Development Control Policy 2.2 – Residential Subdivision

Development Control Policy 2.2 – Residential Subdivision (DC 2.2) establishes requirements for residential subdivision. Residential subdivision contemplated by this Structure Plan is compliant with the requirements of this policy.

1.3.4.8 Development Control Policy 2.3 – Public Open Space in Residential Areas

Development Control Policy 2.3 – Public Open Space in Residential Areas (DC 2.3) seeks to ensure that residential development is supported by adequate public open space which contributes to the amenity of a place.

Amongst other matters, DC 2.3 typically requires the provision of 10 percent POS corresponding to the requirements of Liveable Neighbourhoods.

The policy also requires that where a subdivision includes land which is designated as 'Parks and Recreation' under the MRS, that portion of land will be created as a separate lot at subdivision stage pending acquisition by the WAPC pursuant to the MRS.

The proposed Structure Plan provides POS and Regional Open Space in accordance with the requirements of this policy.

2. Site Conditions and Constraints

2.1 Surrounding Context

The Structure Plan area is located at the northern front of a Development zone that has substantially been subdivided previously. Residential subdivision borders the Structure Plan area to the south and east and these areas are serviced by a local road network that can be extended into the Structure Plan area.

Not all the adjacent road connections are required to extend into the Structure Plan area to service the future subdivision. In this regard, it is proposed to extend Melita Drive, Carabeen Avenue, Tuckeroo Parade and Parkview Garden into the Structure Plan area to provide local connectivity back into the existing adjacent residential areas. This in turn will improve connectivity between the existing residential subdivision to the south and east.

A drainage reserve and public open space exists immediately to the south of the Structure Plan area. This drainage reserve receives stormwater from the immediate surrounding residential catchment. It is not proposed to utilise this drainage sump in relation to drainage of the future subdivision but rather to direct stormwater through an open swale system into the Kadina Brook with a view to improving the ecological function of Kadina Brook.

The Structure Plan proposes to extend the adjacent Carabeen Avenue into the future subdivision so that there is a direct vehicular and pedestrian link between this POS area and the future residential subdivision.

The residential lots created between Melita Drive and Allamanda Gate immediately to the south of the Structure Plan area sit substantially higher than the Structure Plan area and consequently a high retaining wall runs along this boundary interface.

Regional Open Space exists immediately to the north of the subject site and this is associated with the Helena River. Portion of the Structure Plan area has been reserved for 'Parks and Recreation' under the MRS and is ultimately proposed to be ceded as Regional Open Space to form part of the wider Helena River Parks and Recreation reserve.

Kadina Brook also runs through the western portion of the site and this wetland along with a buffer will be provided as public open space for the purpose of conservation.

2.2 Biodiversity and Natural Area Assets

2.2.1 Flora and vegetation values

Regional vegetation mapping undertaken by Heddle et al (1978) indicates that the site was originally composed primarily of the 'Forrestfield Complex', which is described as: Open Forest of *Corymbia calophylla, Eucalyptus wandoo* and *E. marginata* to Open Forest of *E. marginata, C. calophylla, Allocasuarina fraseriana* and *Banksia spp.* with fringing woodlands of *E. rudis* in gullies.

The site contains two main areas of remnant native vegetation in the north and west of the site, and an area of planted trees in the south-east. These natural areas range in condition from "Good – Degraded" to "Completely Degraded". Overall the western vegetation is more intact, with condition ranging from "Degraded" to "Degraded – Completely Degraded". The northern vegetation is generally "Degraded – Completely Degraded" with a very small area of "Good – Degraded". Overall, this suggests that the vegetation remaining in these areas is unlikely to be representative of the Forrestfield complex, given the absence of vegetation structure including understorey species.

Based on a preliminary flora and vegetation site assessment undertaken by Emerge Associates, vegetation within the site is made up of the following communities:

- **CcOF:** Open Forest of *Corymbia calophylla, Eucalyptus rudis* and *E.wandoo* subsp. wandoo over scattered *Acacia pulchella* and *Juncus kraussii* (or native species absent in understorey) and Closed Grassland including **Lolium rigidum, *Ehrharta longifolia* and **Avena barbata.*
- **EcOW:** Open Woodland of planted mature **Eucalyptus camaldulensis subsp. obtusa* over dense saplings (self-seeded) and Closed Herbland/Grassland of broadleaf weeds and pasture grasses.
- **ErMrLOF:** Low Open Forest of *Eucalyptus rudis* over Isolated Trees to Low Open Woodland of *Melaleuca rhaphiophylla* over occasional dense patches of **Gomphocarpus fruticosus* over Sparse Sedgeland of *Juncus kraussii* fringing the creek lines, and **Cynodon dactylon, *Paspalum dilatatum* and **Lolium rigidum Closed Grassland.*
- **ErOF:** Open Forest of *Eucalyptus rudis* over Closed Grassland/Herbland of broadleaf weeds and pasture grasses.
- **JkOS:** Open Sedgeland of *Juncus kraussii* fringing open water over Closed Herbland/Grassland of broadleaf weeds and pasture grasses.
- **Parkland Cleared:** Scattered remnant and planted *Eucalyptus spp.* over *Watsonia sp.* and Herbland/Grassland of broadleaf weeds and paddock grasses.

2.2.2 Local Natural Areas

Two Local Natural Areas (LNAs) are located over the western portion of the site, the western most associated with Kadina Brook and an area of remnant vegetation to the east of Kadina Brook.

Within the Shire's Local Biodiversity Strategy, these areas are identified as Priority 1. The LNA's were originally defined through interpretation of 2005 aerial photography. The Shire's policy framework recognises the ability for LNAs to be further defined and refined through on site ground truthing.

Emerge Associates have undertaken this ground-truthing of the values provided by the LNA for the site and this is documented in Appendix C.

The detailed site assessments undertaken by Emerge revealed that vegetation within the site and LNA's is generally in 'Completely Degraded' to 'Degraded' condition. In accordance with the Shire's Local Biodiversity Strategy and the *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region* the term 'bushland' only applies to native vegetation in 'good or better' condition, therefore the LNAs within the subject site do not represent 'bushland' in accordance with this definition.

The implementation of the proposed Structure Plan will involve the clearing of vegetation within the eastern LNA. The western LNA will, however be permanently retained within the REW reserve and buffer that is accommodated in the Structure Plan. The proponent proposes to undertake revegetation/ planting works within the REW and buffer area in order to increase the ecological values of the wetland, provide improved fauna habitat and to provide a consolidated environmental linkage.

In accordance with the Shire of Mundaring LPS No. 4, *"an owner of a lot wholly or partly affected by a Local Natural Area may request in writing that the Shire reconsider the designation of boundary of that Local Natural Area as it affects that lot".* The assessment of the Structure Plan by the Shire of Mundaring will consider the removal of the eastern LNA (and improvements to the western LNA) and on this basis it is requested that the extent of LNAs as mapped for the subject site be reviewed as part of the process of considering this structure plan.

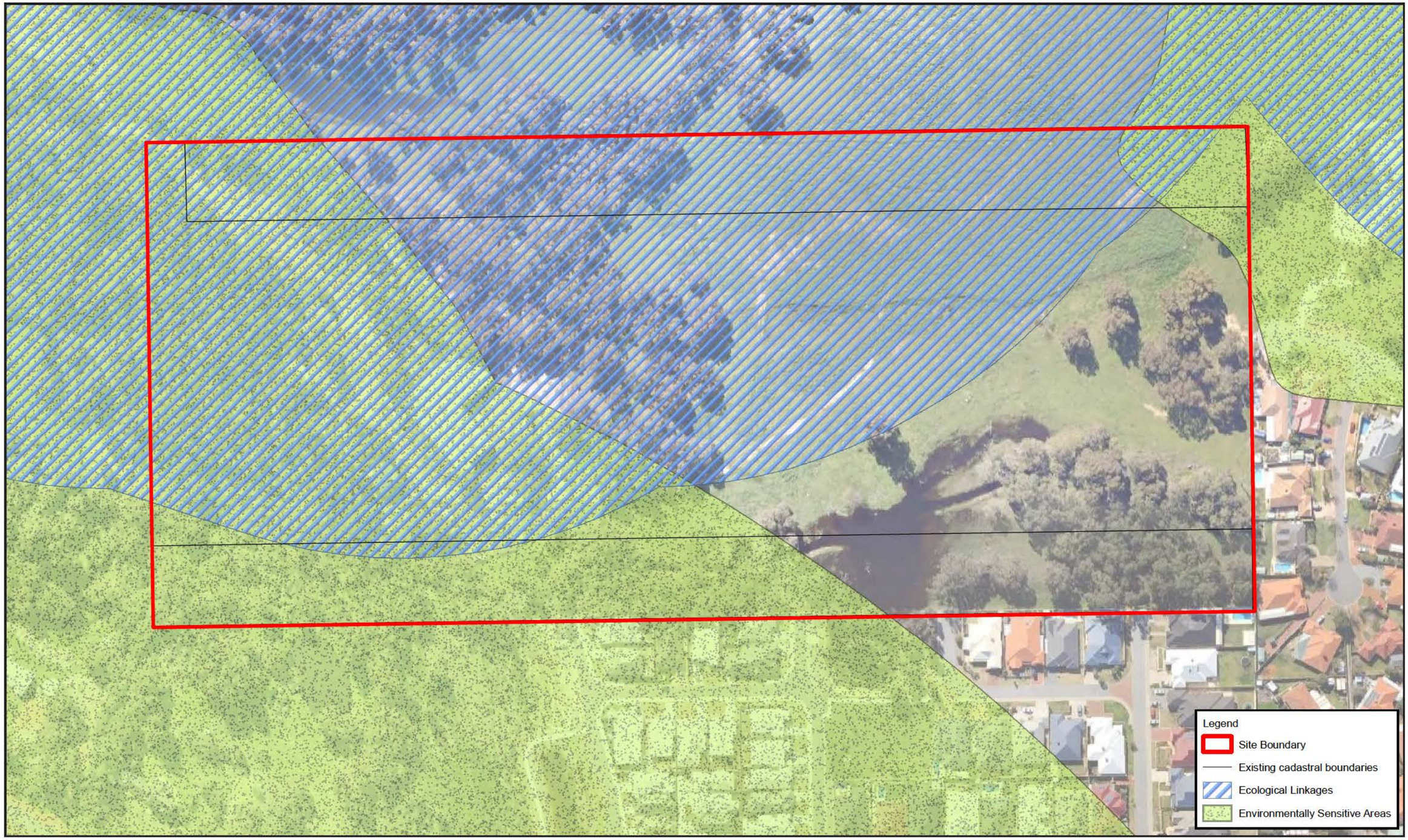
2.2.3 Ecological Linkages

The Perth Biodiversity Project's (PBP) *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region* (2004) Regional Ecological Linkage 134 covers the majority of the structure plan area, connecting the Conservation Category Wetlands to the north-west, and Resource Enhancement Wetland within the site, to further wetland areas south and east of the site.

Refer to Figure 6 – Local Natural Areas

The connectivity of this linkage will be maintained through the long term retention of vegetation within the wetland area in the west of the structure plan area, and areas of remnant vegetation west and east of the site. Any areas of vegetation retained in POS within the structure plan area will contribute to this linkage, however the integrity of the connection is not dependent on the vegetation within the site. No further consideration is required within this Structure Plan as further consideration will be given at the subdivision stage.

Figure 6 – Local Natural Areas



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2.2.4 Environmentally Sensitive Areas (ESA)

The entire western portion of the structure plan area, as well as the north-eastern tip is covered by ESA's, likely associated with wetland areas surrounding the site. The extent of declared ESAs within and surrounding the structure plan area is documented in the Environmental Assessment and Management Strategy prepared by Emerge Associates contained at Appendix C.

2.2.5 Wetlands

Based on the Department of Parks and Wildlife's (DPaW) Geomorphic Wetland series mapping, there is a floodplain Resource Enhancement Wetland (REW) and a floodplain Multiple Use Wetland (MUW) covering the south-west of the site (DPaW, 2013), associated with the Kadina Brook.

REW areas are recognised as wetlands with moderate natural and human use attributes that can be restored and enhanced. The management objective for these wetlands is to restore value through the maintenance and enhancement of wetland functions and attributes. Spatial considerations required for the REW associated with the Kadina Brook within the site have been provided for through the placement of a 30 metre buffer between the mapped REW and the proposed development, with a road interface along the majority of the buffer to provide additional setback from potential damage.

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

2.3 Landform, Topography and Soils

2.3.1 Landform and Soils

The site occurs on the Swan Coastal Plain, the geomorphic element that characterises the Perth area and surrounds. On the Swan Coastal Plain, the site occurs on the Ridge hill shelf, which forms the laterised foothills of the Darling Scarp. Soil deposits of the Kadina Brook (located in the western portion of the site) consist of alluvium (clay, sand and loam) and the remainder of the site consists of colluvium (valley fill deposits, variably laterised).

2.3.2 Topography

Available contours for the site indicate that elevations within the site range from approximately 17.6m Australian Height Datum (AHD) at its highest point in the east of the site to 6m AHD at its lowest point in the north-west. Land contours within the site have, however, been significantly altered from their natural elevations, likely through historic quarrying activities and associated rural land uses across the majority of the site.

2.3.2.1 Public Drinking Water Source Areas (PDWSAs)

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

2.4 Groundwater and Surface Water

2.4.1 Groundwater

Detailed groundwater monitoring has been carried out within the site by Emerge Associates on a monthly basis from October 2011 to December 2013. Peak levels were observed to occur during September or October. Depth to groundwater ranges between 4.99 and 0.07 metres below ground level (mBGL).

2.4.2 Surface Water and Existing Drainage

Kadina Brook, a tributary of the Helena River, runs through the south-west corner of the site and is also a mapped REW. Flood mapping for the Helena River shows that 1 in 100 year flooding level extends approximately 400m up Kadina Brook, but terminates 100m north of the site. Therefore the site is not subject to flooding from the Helena River. Flood levels for the Kadina Brook are likely to extend to the edge of the wetland mapping boundary, except for the eastern side where the wetland has been filled and landform raised.

Surface water ponding occurs in the south of the site in a depression formed through historic quarrying activities. Historic aerials show that while that area may have been a natural low-point within the site, quarrying operations created a drainage channel through the south of the site connecting to the Kadina Brook in the west of the site. Ponding in the area increased with the blockage of this drainage channel, resulting in the permanent wet area currently in the south of the site. This is not a natural feature, and will not require significant consideration within the Local Structure Plan other than the consideration of drainage and groundwater management.

2.5 Bushfire Hazard

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

Vegetation that is to be permanently retained within and surrounding the site will pose permanent bushfire hazard considerations. In the same way, vegetation that is to be cleared for future urban purposes in the short to medium term will pose only temporary bushfire management considerations. Remnant vegetation within the site is limited in extent, and is intended to be largely cleared for urban development, and therefore does not require consideration in terms of posing future bushfire hazards. Vegetation to be retained permanently within the site is limited to the wetland area in the west of the site, which will require long term consideration and management of bushfire hazards. This has been addressed in the detailed Bushfire Management Plan (Emerge Associates and Bushfire Safety Pty Ltd 2014) attached in Appendix B.

2.6 Heritage

2.6.1 Indigenous heritage

Based on a review of the Department of Aboriginal Affairs 'Aboriginal Heritage Inquiry System' online database (DAA 2014), there are two registered Indigenous heritage sites within the site, and one in close proximity to the north-west corner of the site. The details for these registered sites are as follows:

Table 3: Registered Indigenous heritage sites within close proximity of the site

Site ID	Description	Location
3758	HELENA RIVER – Ceremonial, Mythological, Repository/Cache	Entire site and surrounding area
3971	HOLDING PADDOCK 5-8 – Artefacts / Scatter	South-west corner of the site
3967	HELENA RIVER A-C – Artefacts/Scatter, Historical	North-west of the site

The presence of registered heritage sites within the site will require further consideration, particularly in regards to obligations under the *Aboriginal Heritage Act 1972* prior to ground disturbance within the site. Consultation will be undertaken with relevant parties to understand the extent of the heritage values within the site.

2.6.2 Non-indigenous heritage

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

2.7 Landfill and Contamination

The site has previously been used as a landfill and in response the landowners have engaged Worley Parsons to complete a Geotechnical and Environmental Site Assessment and Emerge Associates to undertake a Preliminary Site Investigation.

Given the historic land uses over the site, the site has been classified by the Department of Environment Regulation (DER) as "Possibly contaminated - investigation required" pursuant to the *Contaminated Sites Act 2003*. A Preliminary Site Investigation (PSI) was conducted by Emerge Associates (2015) to determine the extent of potential contamination within the site and to support the LSP. The PSI found that while the site will require further investigation (and potential remediation), in line with the *Contaminated Sites Act 2003*, based on the information at hand, there appear to be no significant contamination related impediments to the proposed land uses that could not be addressed during earthworks associated with a standard residential development.

The Preliminary Site Investigation (PSI) is contained at Appendix H and provides further detail regarding the form and extent of contamination and landfill recorded in relation to the structure plan area.

2.7.1 Earthworks

The geotechnical assessment indicates that the soil profile consists of pebbly silt and it is expected that filling will be required to achieve a site classification suitable for residential development and to manage the fall across the site between lots.

There is some uncontrolled fill on site from past land fill uses. The proposed structure plan has responded to the geotechnical conditions of the site relating to the uncontrolled fill by avoiding placing the residential lots and associated road system over the majority of the uncontrolled fill area. The proposed lots or roads only intersect with the uncontrolled fill in areas that have been mapped as having typically shallow levels of uncontrolled fill and so can be dealt with by either removing it or compacting the material to a suitable standard to allow development of the site. This will be the subject of further more detailed investigation prior to subdivision and development.

It is expected that additional filling will be required to achieve levels to service the site with sewer and to provide sufficient clearance to the groundwater table.

Retaining walls will be required to address the approximate 5 metre fall across the site. The final levels will be a balance between minimising retaining walls and reducing importing fill to produce lots suitable for building, which is achievable across the extent of the structure plan area.

2.7.2 Future contamination management requirements

Extensive contamination investigations, and potentially remediation, will be required through the future subdivision process and prior to any works being undertaken within the site, in line with the WAPC's model subdivision condition EN9 (WAPC 2012).

a) Prior to commencement of subdivision works, investigation for soil and groundwater contamination is to be carried out to determine if remediation is required. As a minimum, the investigation will need to confirm:

   i. The presence/absence of contaminants, including asbestos as ACM, in soil associated with the historic landfill.

   ii. The presence/absence of contaminants, including asbestos as ACM, in soil associated with the imported fill in the central raised area.

   iii. The presence/absence of contaminants in soils associated with the material storage areas including the storage of hydrocarbons, drilling fluids and painting / coating products.

   iv. The presence/absence and extent of landfill gas from the acceptance of putrescible and household waste during the operation of the former landfill. It is noted that the previous landfill was licensed to operate as an inert landfill site.

   v. A groundwater investigation to confirm local groundwater flow direction beneath the site and the presence/absence of contaminants in groundwater associated with the historic land uses which may have migrated through the soil into the groundwater or directly from the uncontrolled fill in which groundwater is currently located.

b) If required, remediation, including validation of remediation, of any contamination identified shall be completed prior to the issuing of titles to the satisfaction of the Western Australian Planning Commission on advice from the Department of Environment and Conservation, to ensure that the lots created are suitable for the proposed use.

Investigations and remediation are to be carried out in compliance with the *Contaminated Sites Act 2003* and current Department of Environment and Conservation Contaminated Sites Guidelines.

A subdivision approval (and associated conditions) provides the trigger for the site to enter the formal Contaminated Sites assessment process (pursuant to the Contaminated Sites Act 2003) and ties the remediation of the site to the subdivision approval and clearance process. The proponent will be required to demonstrate that the site has been suitably remediated to accommodate the proposed land uses prior to subdivision being granted (and titles issued) and all documentation will be required to be approved by an independent accredited auditor.

2.8 Acid Sulfate Soils

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

Available information from the Department of Environment and Conservation (2010), now Department of Environment Regulation, indicated that the area east of the site has a 'High to Moderate' risk of ASS occurring within three metres of the natural soil surface. The remainder of the site has 'no known risk' of ASS occurring within three metres of the natural soil surface (DER 2010).

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

Refer to Figure 7 – Acid Sulfate Soils Risk Mapping

2.9 ANEF Contours

As discussed previously in this report, portions of the Structure Plan area fall within the 20-25 ANEF contours associated with the Perth Airport.

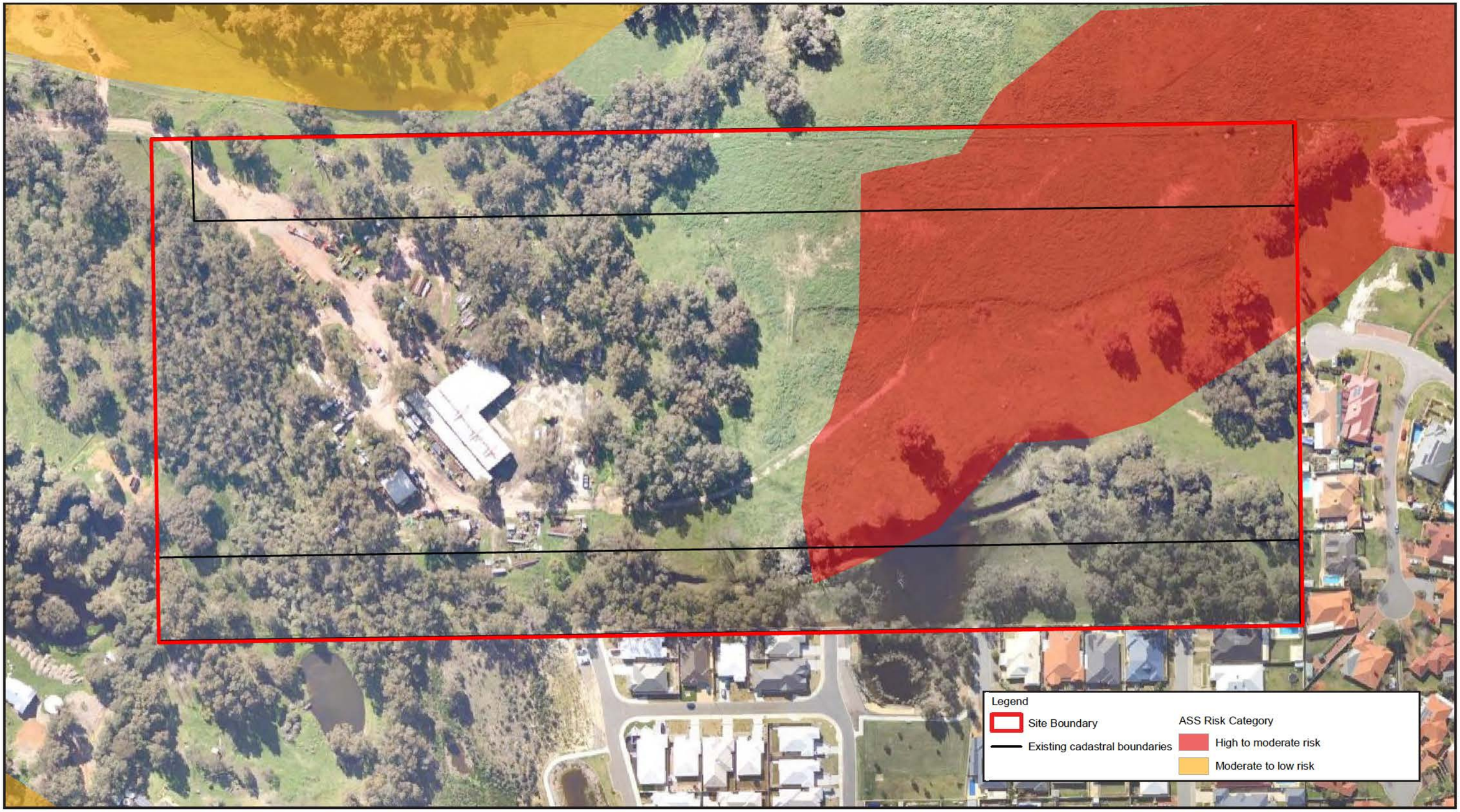
Portions of land contained within the 20-25 ANEF noise contour band is proposed to be developed for residential purposes in accordance with the R20 and R30 density code. Justification for this approach is already provided elsewhere in this report.

2.10 Environmental Response

The subject site is a significantly constrained piece of land from an environmental point of view and considerable investigation work has been undertaken to understand these environmental issues in order to inform the preparation of this local structure plan. The fundamental site considerations which have also informed the placement of roads and developable land within this LSP are summarised below:

1. **Past landfill and geotechnical considerations.** A Geotechnical and Environmental Site Assessment was undertaken by Worley Parsons to map the extent of landfill on the subject site and this assessment identified areas of the past landfill that were potentially geotechnically unsuitable to accommodate residential development. This area is generally defined as zone 1 as identified on the plan contained at Appendix D. Zone 1 includes a sizeable portion of land centrally located within the structure plan area. This area has informed the positioning of roads to define the outer extent of this geotechnically unsuitable landfill area.
2. **Resource Enhancement Wetland and Buffer.** Creation of a 30 metre buffer from the mapped REW to provide an appropriate buffer between the ecological values of the wetland and proposed development. The Kadina Brook and associated wetland buffer will be the focus of extensive revegetation works to improve the ecological linkage to the Helena River reserve and the overall environmental functionality of this watercourse feature. The inclusion of the REW and its 30m buffer within a reserve has meant that development is excluded from occurring in the western extent of the structure plan area.

Figure 7 – Acid Sulfate Soils Risk Mapping



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3. **Parks and Recreation Reserve.** A portion of the northern section of the structure plan area is reserved for 'Parks and Recreation' pursuant to the MRS and therefore is required to be set aside as parks and recreation for future inclusion in the reserve associated with the Helena River floodplain.
4. **Historical 25 ANEF Airport Buffer.** The Historical 25 ANEF airport noise control area has previously defined the extent of 'Urban' zone pursuant to the MRS. While it is noted that the 25 ANEF Contour has retracted following the 2014 Airport Masterplan review and no longer impact the subject site, the MRS Zoning of Rural eliminates the north-western portion of the subject site being subdivided for residential purposes.
5. **Site Remediation.** The structure plan also identifies requirements relating to the future subdivision of the site, including the requirement to undertake remediation works in accordance with the process and requirements of the Contaminated Sites Act 2003.
6. **Local Water Management.** Preparation of a Local Water Management Strategy (Emerge Associates 2014) in accordance with Better Urban Water Management (BUWM) (WAPC 2010). The LWMS focuses the effort for improving ecological function of the Kadina Brook, which in its current condition, is significantly degraded. It is proposed to direct treated stormwater towards the brook to improve water flow as well as improving the ecological function of the Brook through revegetation of the watercourse and associated buffer. This is considered an appropriate environmental outcome for the site given that the Kadina Brook is recognised as a Resource Enhancement Wetland.
7. **Bushfire Management.** Preparation of a Bushfire Management Plan (Emerge Associates and Bushfire Safety Consulting 2014) and placement of a road reserve to interface with the REW buffer to accommodate a 20m BPZ required to manage bushfire threats resulting from retained vegetation within the REW area and Parks and Recreation reserve.

Overall, the implementation of the Structure Plan through the planning and development process will involve a number of environmental benefits including:

- Removal of existing potentially contaminating land uses from the site.
- Remediation of the site in accordance with the proposed land uses identified in the Structure Plan.
- Extensive revegetation works associated with Kadina Brook and the creation of a vegetated wetland buffer and improved ecological linkage to Helena River.
- Transfer of the "Parks and Recreation" reserve into State management for integration with the wider Helena River catchment reserve.
- Improved stormwater management for the site in accordance with a Local Water Management Strategy.

Despite these significant constraints, the LSP will facilitate remediation works to clean-up the site in accordance with the process outlined within the *Contaminated Sites Act 2003.* Additionally the LSP will provide important road connections between existing residential subdivision to the south and east to better integrate existing developed areas. The LSP will also facilitate the ceding of additional land to contribute to the Helena River catchment area.

It is considered that the local structure plan provides a viable and workable solution to the development of the site despite having significant constraints to development and in consideration of this it is deemed to deliver substantial net positive gains to the subject site and local area.

3. Land Use and Subdivision Requirements

3.1 Land Use

The predominant land use identified within this Structure Plan is residential, with a portion of the Structure Plan area proposed for the Rural-Residential purposes. The portion of land set aside for Rural-Residential zone on Lot 2 is in response to geotechnical constraints with this portion of the site and is proposed to accommodate a range of rural-residential uses, such as horse agistment, which are suitable to the geotechnical conditions of this portion of the site. Such rural-residential uses will be controlled through land use provisions proposed within this structure plan to ensure that the uses do not have a detrimental impact on the amenity of adjacent residential uses.

The structure plan proposes a total of 56 residential lots, 7 of which are designated R30 and 59 lots designated as R20. The proposed residential use of the subject site is consistent with surrounding residential land to the east and south and the proposed road network is integrated with the existing road network in this regard.

The Structure Plan also comprises the following designations:

- Public Open Space (0.6276 ha)
- Restricted Public Open Space (0.1568 ha)
- Resource Enhancement Wetland (1.3784 ha)
- Resource Enhancement Wetland Buffer (0.8305 ha)
- Regional Open Space (1.8859 ha)

The Structure Plan is provided at Figure 8 below.

Refer to Figure 8 – Structure Plan

3.2 Open Space

3.2.1 Public Open Space Provision

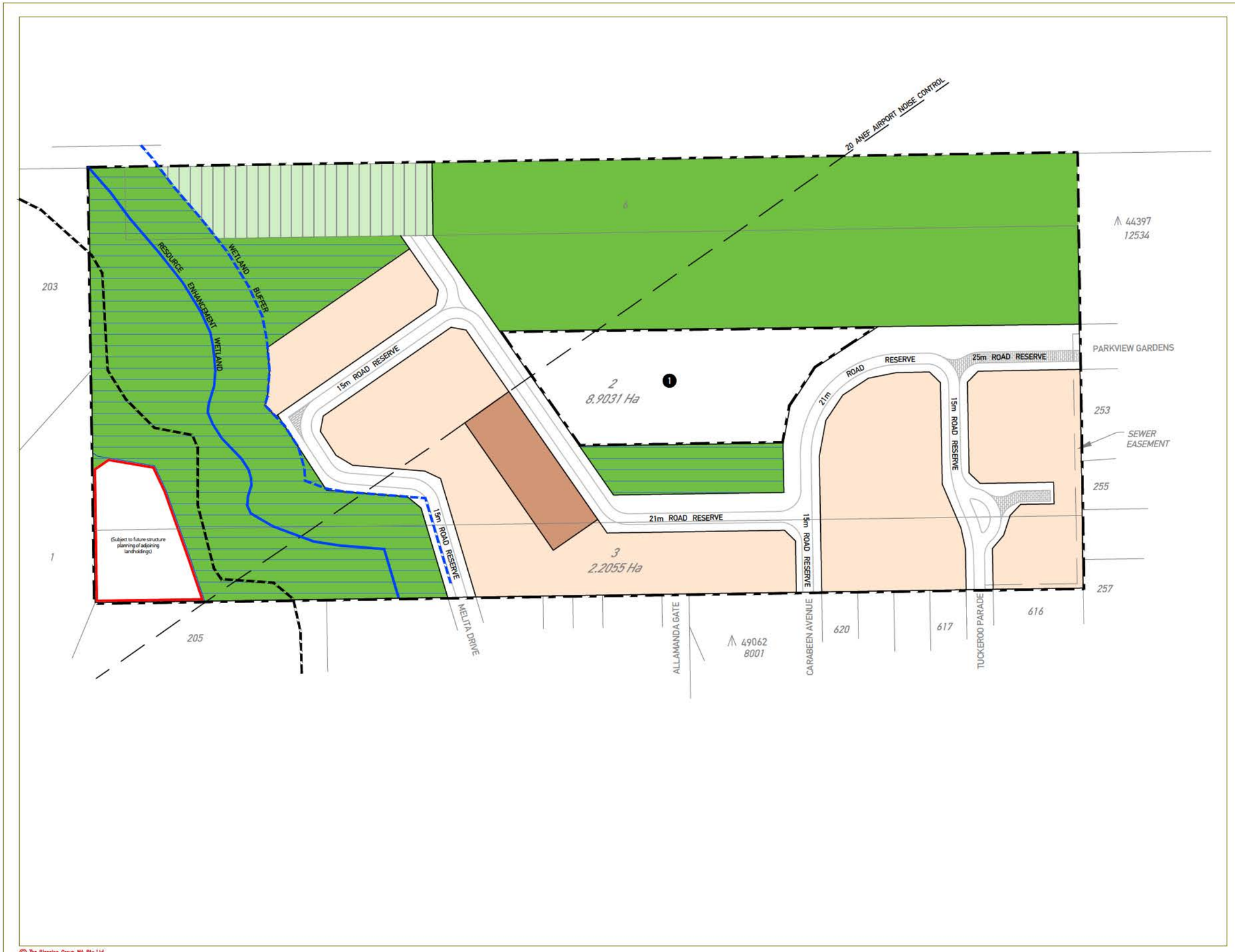
Public Open Space (POS) will be provided in accordance with the requirements of Liveable Neighbourhoods, which requires that a minimum of 10% of the Net Subdividable Area be provided as POS. Two percent of the 10% POS provision may comprise restricted use POS, such as drainage reserves and natural wetlands. In this case, it is proposed to utilise portion of the buffer associated with the Resource Enhancement Wetland as restricted use POS, as portion of the buffer area will be useable as passive recreation with a shared use path proposed within this buffer area.

The provision of public open space is identified at Figure 9.

Refer to Figure 9 – Public Open Space Provision

The POS Schedule is detailed in **Table 4.**

Figure 8 – Structure Plan



PLAN 1
STRUCTURE PLAN
Lots 2, 3 & 6 Midland Road, Helena Valley

Date: 22 September 2016
Scale: 1:2000 @ A3
Project Manager: TP
Checked: TP
Drawn: LC
Drawing No. 714-128 ST1G Plan 1 2016-09-22.dwg

0 50 100m

LEGEND

- Structure Plan boundary
- Residential R20
- Residential R30
- Rural Residential
- Development (Subject to future structure planning of adjoining landholdings)
- Public Open Space / Drainage
- Regional Open Space
- Creekline
- Resource Enhancement Wetland
- 30m wetland buffer

NOTES

1. Land use and development subject to further detailed geotechnical investigation (excluded from Structure Plan Area)

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Figure 9 – Public Open Space Provision

PLAN 2
OPEN SPACE PLAN
Lots 2, 3 & 6 Midland Road, Helena Valley

Date: 22 September 2016
Scale: 1:2000 @ A3
Project Manager: TP
Checked: TP
Drawn: LC
Drawing No. 714-128 ST2G Plan 2 2016-09-22.dwg

0 50 100m

LEGEND

- Structure Plan boundary
- Public Open Space / Drainage
- Regional Open Space
- Creekline
- Resource Enhancement Wetland
- 30m wetland buffer

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Table 4: POS Schedule

Public Open Space Schedule	Sub Total	Total
Site Area		12.2586 ha
Less Deductions		
Regional Open Space	3.3259 ha	
Resource Enhancement Wetland	1.3907 ha	
Rural Residential Land	0.5472 ha	
Sub Total	**5.2638 ha**	
Net Residential Subdividable Area		6.9733 ha
Residential Public Open Space @ 10 percent		**0.6973 ha**
Net Rural Residential Land Area	0.5472 ha	
Rural Residential Public Open Space @ 5 percent		**0.0274 ha**
Total Public Open Space Requirement		**0.7247 ha**
Public Open Space Contribution		
Unrestricted Public Open Space		
POS (Area B)	0.2850 ha	
POS (Area C)	0.3394 ha	
Sub Total		0.6244 ha
Restricted Public Open Space		
Portion of Resource Enhancement Wetland Buffer (Area D)		0.1597 ha
Sub Total		0.1597 ha
Total POS Provision		**0.7841 ha**

3.2.2 Form and Function of Public Open Space

Open Space Area A as identified on Figure 9 is Regional Open Space and is described in further detail in Section 3.2.2.

Public Open Space Area B is 2,850 m² in area and located in a position adjacent to the Regional Open Space to provide a contiguous area with the regional open space that can provide passive local scale recreational facilities. This may include the provision of playground facilities, subject to the approval of the local government.

Public Open Space Area C totals 3,394 m² in area and is located in areas adjacent to the Resource Enhancement Wetland buffer to provide a contiguous open space area adjacent to the wetland that will accommodate remnant vegetation, where appropriate, as well as providing a passive open space function and accommodating drainage requirements.

Open Space Areas D and E are associated with the Kadina Brook. Open Space Area E corresponds to the Resource Enhancement Wetland area associated with Kadina Brook and Open Space Area D is a 30 metre wide buffer to this wetland area. This wetland buffer area is proposed to be extensively revegetated to restore the ecological function of this section of the Kadina Brook.

3.2.3 Regional Open Space

A total of 3.3259ha of Regional Open Space (ROS) is proposed to be ceded in accordance with the Regional Open Space reservation of this land under the Metropolitan Region Scheme. This ROS is associated with the Helena River ROS and will ultimately form part of the Helena River catchment reserve. The ROS will be ceded upon subdivision of the parent lots.

3.2.4 Proposed Management Responsibilities

The local Public Open Space, being Area B, Area C, Area D (wetland buffer) and Area E (resource enhancement wetland) will ultimately be handed over to the local government free of cost and therefore the management of this POS will ultimately be the responsibility of the local government.

The Regional Open Space (Area A) will be ceded to the Western Australian Planning Commission free of cost. It is likely that the Regional Open Space will ultimately be transferred to the local government to take on the management responsibilities of this open space.

3.3 Residential Land Use

3.3.1 Residential Density

Residential density applicable to land within this Structure Plan area is to be determined by reference to the designated R-Code number superimposed on the Structure Plan (Figure 10).

Refer to Figure 10 – Residential Density Plan

The development of land for residential purposes is to be in accordance with the requirements of the Residential Design Codes with reference to the applicable R-Code number, except as otherwise as required by a Detailed Area Plan.

3.3.2 Dwelling / Lot Mix

The structure plan contemplates the creation of a total of 65 vacant residential lots plus one rural-residential lot, as follows:

- A total of 7 lots are coded R30 with a minimum and average lot size of 360 m^2.
- A total of 59 lots are coded R20 with a minimum lot size of 360 m^2, average lot size of 576 m^2 and maximum lot size of 857 m^2.
- 1 lot is designated as 'Rural-Residential' and is 1.2468 ha in area.

A building envelope is required to be identified on the Rural-Residential lot which designates the location of where a single dwelling can be placed on this lot. It is expected that this building envelope will be placed over the portion of the future lot to be included within the residential zone. Additional outbuildings may be approved outside of this building envelope at the discretion of Council.

3.3.3 Density Targets

The Shire's Local Planning Strategy establishes a density target of 15 dwelling units/ha for new structure plan areas within Helena Valley.

The proposed structure plan achieves an average of 19.64 dwellings per hectare over the residential zoned portion of structure plan area. This is considered acceptable given the need to accommodate various environmental constraints within open space areas.

3.3.4 Lot Orientation and Views

Lot orientation has largely been dictated by site constraints, including the need to contain past landfill activities within open space and the provision of a buffer to the resource enhancement wetland in the western portion of the site.

A total of 34 lots have been orientated east-west in order to achieve optimal or close to optimal solar orientation.

Future lots will be afforded views over the Kadina Brook and across into the Helena Valley reserve.

3.4 Rural-Residential Land Use

Rural Residential land has been designated in the north west corner of the structure plan area to reflect the Rural Zoning under the MRS.

Land use permissibility for land designated as Rural-Residential will be in accordance with Table 1 of TPS4, however this structure plan prescribes additional land use restrictions to ensure that the amenity of nearby residential lots is maintained. In this regard, the following additional provisions relating to land use and development rural residential land is proposed:

1. Rural Residential land is required to be fenced to a high standard, such as post and rail or other suitable fencing type to the satisfaction of the local authority, to maintain a high level amenity outlook for the surrounding residential lots;

Figure 10 – Residential Density Plan

PLAN 3
INDICATIVE SUBDIVISION LAYOUT

Lots 2 & 6 Midland Road, Helena Valley

Date: 22 September 2016
Scale: 1:2000 @ A3
Project Manager: TP
Checked: TP
Drawn: LC
Drawing No. 714-128 ST3G Plan 3 2016-09-22.dwg

0 50 100m

LEGEND

- Structure Plan boundary
- Residential R20
- Residential R30
- Rural Residential
- Development (Subject to future structure planning of adjoining landholdings)
- Public Open Space / Drainage
- Regional Open Space
- Creekline
- Resource Enhancement Wetland
- 30m wetland buffer

tpg
TOWN PLANNING URBAN DESIGN AND HERITAGE

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Figure 11 – Proposed path network

PLAN 4
INDICATIVE PATH NETWORK
Lots 2, 3 & 6 Midland Road, Helena Valley

Date: 22 September 2016
Scale: 1:2000 @ A3
Project Manager: TP
Checked: TP
Drawn: LC
Drawing No. 714-128 ST4E Plan 4 2016-09-22.dwg

0 50 100m

LEGEND

- Structure Plan boundary
- Residential R20
- Residential R30
- Rural Residential
- Development (Subject to future structure planning of adjoining landholdings)
- Public Open Space / Drainage
- Regional Open Space
- Creekline
- Resource Enhancement Wetland
- 30m wetland buffer
- Shared Path (2.3m)
- Footpath (1.8m)

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2. Requirement for a Dust Management Plan in relation to any future grazing activities;
3. Consideration of the siting and location of any horse stables and other rural outbuildings in relation to residential dwellings and lots; and
4. Preparation of a management plan in relation to any application for a 'Rural Pursuit' to address issues such as nutrient loading, pasture management, dust control, manure control including fly management and other issues.

3.5 Development Zone Parcel

The south-west portion of the Structure Plan area has been zoned 'Development' and is proposed to be set aside and subject to future structure planning due to current limitations in terms of access and servicing to this portion of the site due to its location in relation to the Resource Enhancement Wetland. The land to the south-west of the subject site is also zoned 'Development' and therefore it is proposed that the 'Development' zoned portion of the Structure Plan area will be subject to future structure planning at this same time as this adjacent land. This future structure plan will seek to resolve access and servicing arrangements, after which the land can be subdivided and developed in accordance with the endorsed structure plan.

3.6 Movement Network

3.6.1 Local Road Network

The road network represents an extension of the existing local road network to the subdivision to the south. All roads proposed are local roads and will be constructed to the Shire of Mundaring standards, including 6 metre wide pavement within 15m wide road reserve, except for a portion of the local road network located adjacent to the Rural-Residential lot, which is planned to be up to a 21m wide road reserve to accommodate the adjacent swale infrastructure.

Where practical, the local road network provides a hard interface with open space areas to ensure an appropriate transition between the public open space and residential lots.

The local road network also provides connection into the lot to the north to allow any future development of this site to utilise the local road connections proposed in this structure plan.

3.6.2 Paths and Cycleways

A 1.8 metre wide footpath will be provided on one side of all internal roads within the proposed subdivision to facilitate an active lifestyle by encouraging walking and cycling.

In addition, a 2.3 metre wide shared path will be provided within the buffer associated with the resource enhancement wetland.

The proposed path network is identified in Figure 11.

Refer to Figure 11 – Proposed path network

3.7 Water Management

The Local Water Management Strategy (LWMS) for the Local Structure Plan (LSP) area has been developed in accordance with *Better Urban Water Management* (WAPC 2008), *State Planning Policy 2.9 Water Resources* (WAPC 2006) and *Planning Bulletin 92 Urban Water Management* (WAPC 2008a). Water will be managed using an integrated water cycle management approach, which has been developed using the philosophies and design approaches described in the *Stormwater Management Manual for Western Australia* (DoW 2007).

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving waters and their ecosystems. Characteristics of both the existing and past environment within the site have been investigated. In summary, the environmental investigations conducted to date indicate that:

- The site receives 773 mm on average annually with the majority of rainfall received in June and July.
- The site topography ranges from 11.0m Australian Height Datum (AHD) to 17.0m AHD.
- The soil profile generally consists of silt over clayey sand over sandy clay. Uncontrolled fill occurs throughout the north east of the site.
- The majority of the site presents no known risk of acid sulfate soils (ASS). The eastern half of the site contains a region that presents a 'high to moderate risk' of ASS being present within 3.0m of the natural surface.
- No Threatened or Priority Flora occur within the site. The wetland vegetation is in a "Degraded" condition. Areas subject to uncontrolled fill are in a "Completely Degraded" condition.

- Kadina Brook is located in the west of the site (Unique Feature Identifier (UFI) 15885) and is classed as a resource enhancement wetland (REW). The surrounding floodplain (UFI 15440) is classed as a multiple use wetland (MUW). The Helena River floodplain REW is located immediately to the north of the site (UFI 14230).
- The majority of runoff flows off site towards the north-west as dictated by the natural topography.
- Total pre-development peak flows leaving the site are 0.36 m^3/s and 0.76 m^3/s for the 5 year ARI and 100 year ARI events respectively.
- A small anthropogenic drainage depression occurs in the south eastern quadrant of the site.
- Kadina Brook experiences elevated Total Phosphorous (TP) concentrations.
- Maximum groundwater levels (MGL) range between 15.17m AHD and 12.08m AHD across the site with groundwater flowing to the north west.
- Groundwater TP is elevated across the site.
- The site has experienced clearing and filling activities associated with the historic operation of a brick factory and is currently used for general industrial purposes.

The LSP includes a total land area of 13.2332ha and will incorporate areas of Public Open Space (POS) designed to achieve a balance between useable passive and active open space, as well as recognising drainage requirements within POS reserves.

The development will incorporate 67 lots comprised of 25 R30 lots, 41 R20 lots and one rural residential lot. Stormwater management infrastructure will be incorporated within POS and Regional Open Space (ROS) and will consider the adjacent REW. Where applicable, stormwater management infrastructure will be appropriately integrated with the associated wetland buffer.

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

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

The criteria proposed within this LWMS are based on the characteristics of the existing environment and a contemporary best-practice approach to integrated water cycle management.

The overall approach to water conservation is to reduce the amount of scheme water required within the development at both a lot and an estate scale. Water conservation measures proposed include fit-for- purpose water sources, including scheme water for potable uses within lots and harvested rainwater for irrigation of private lot gardens and to supplement potable water use within dwellings. Within the lot, scheme water will also be reduced by use of water efficient fittings and appliances and implementation of waterwise gardens. On an estate scale water will be reduced by use of waterwise landscaping practices including use of native vegetation within POS areas where possible.

Stormwater management focuses on stormwater runoff quantity and quality. The principle behind the stormwater management strategy for the LSP is to mimic the existing hydrology. The 1 year 1 hour ARI event runoff from the site will be retained as close to source as possible using a combination of soakwells, roadside swales and bio-retention areas. Stormwater runoff greater than the 1 year 1 hour ARI event will be conveyed to Kadina Brook, as currently occurs in the pre-development environment. The design of stormwater management infrastructure ensures overall peak discharge from the development does not exceed the pre-development peak discharge rates for up to the 100 year ARI event. Stormwater quality will be addressed using a treatment train approach, utilising the storage provisions discussed above.

Groundwater is within close proximity of the surface across the majority of the site. Groundwater level management includes the importation of fill to provide clearance of lots and inverts of drainage infrastructure from the MGL. Groundwater quality will be managed by managing nutrient inputs within surface runoff (consistent with those proposed for stormwater quality).

The Local Water Management Strategy is contained at Appendix F.

3.8 Education Facilities

No education sites are contemplated within this local structure plan. The nearest school facilities to service future residents of the estate include:

- Clayton View Primary School
- Helena Valley Primary School
- Swan View Senior High School
- Guildford Grammar

3.9 Infrastructure Coordination, Servicing and Staging

A Servicing Report has been undertaken by McDowall Affleck in relation to the proposed Structure Plan and this report is contained at Appendix G. The recommendations of this report are summarised in the following sub sections.

3.9.1 Wastewater (Effluent) Disposal

Liaison with the Water Corporation has determined that the lots can be serviced via the Helena Valley Temporary Pump station. Based on minimum grades to comply with the Water Corporation Design Manual, the final lot levels are RL 17.7 – 18.0m AHD with an expected fill depth of up to 3.3 to 3.5m in some areas. The sewer main heading west out of the Parkview Gardens pump station is at a steep grade and could be lowered. Approximately 130m of sewer main reconstructed at a lower level and flatter grades can lower the level of connection by approximately 1m. This will lower the fill required over some of the proposed lots by 1m, which will have significant cost savings with fill. The site can ultimately be serviced with sewer reticulation.

3.9.2 Water Supply

Liaison with the Water Corporation has determined that the lots can be serviced via connection to the 150 diameter main in Allamanda Gate, the 100 diameter mains in Carabeen Avenue, Tuckeroo Parade and Parkview Gardens. Parkview Gardens will require an upgrade to the 63 MDPE to a 100P-12.

The site can ultimately be serviced with water reticulation.

3.9.3 Power Supply

The Underground Power Development Pty Ltd (UPD) has advised the following:

- The power network is 22kV supplied from Hazelmere substation.
- Power supply around the area is via overhead lines along Helena Valley Road that may have capacity for supply. It would appear that there is 5MVA spare capacity from the zone substation.
- Existing ground mounted transformer in Allamanda Gate may have some capacity to supply a portion of the proposed subdivision. This transformer is 500kVA so could possibly be upgraded to 630kVA to provide some additional power.

The site can ultimately be serviced with underground power.

3.9.4 Telstra

Design for telecommunications to the new National Broadband Network (NBN) specifications will be required. Independent consultants can design the telecommunications to NBN specifications.

3.9.5 Natural Gas

WA Gas Network has been contacted regarding the provision of reticulated gas to the proposed development and have advised the following:

- There is currently a 100 PVC medium pressure main that runs along Allamanda Gate which could have the required capacity to service the development.
- The site can ultimately be serviced with natural gas reticulation.