



MALF
LAND DEVELOPMENT

ARNOLD ROAD LOCAL STRUCTURE PLAN

LOTS 487, 611 & 615
ARNOLD ROAD, SERPENTINE

APRIL 2020

RD RobertsDay
planning·design·place

DOCUMENT CONTROL		
Title:	Arnold Road Local Structure Plan Lots 487, 611 & 615 Arnold Road, Serpentine	
Prepared for:	MALF Corp Pty Ltd	
Prepared by:	RobertsDay	
Contact:	MALF Corp Pty Ltd lara@malfcorp.com.au t 0439 919 697	
Project Team:	Project Manager	Cuttone Property Group
	Traffic and Transport	GTA Consultants
	Site and Soil	Douglas Partners
	Servicing and Infrastructure	Pritchard Francis
	Environmental	Emerge Associates
	Bushfire	Emerge Associates
	Landscape Architect	Plan/e Landscape Architects
	Hydrology	RPS
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C	Pre-Advertising Review	MALF Corp	MALF Corp	02.09.20
D	WAPC Schedule of Amendments	CDP	WAPC	

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ENDORSEMENT PAGE

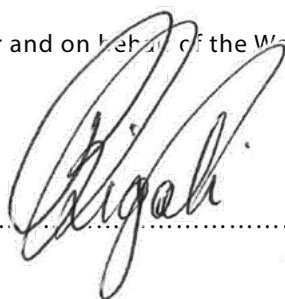
This Structure Plan is prepared under the provisions of the Shire of Serpentine-Jarrahdale Town Planning Scheme No. 2.

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

04-Feb-2022

.....
Date

Signed for and on behalf of the Western Australian Planning Commission

.....


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

.....


Witness

08-Feb-2022

.....
Date

04-Feb-2032

.....
Date of Expiry

TABLE OF AMENDMENTS

AMENDMENT NO.	SUMMARY OF AMENDMENT	AMENDMENT TYPE	DATE ENDORSED BY WAPC
1			
2			

TECHNICAL APPENDICES INDEX

APPENDIX	DOCUMENT	CONSULTANT	SUMMARY OF MODIFICATIONS

The Arnold Road Local Structure Plan (Structure Plan) has been prepared to guide the subdivision and development of Lots 487, 611 and 615 Arnold Road, Serpentine (subject site). Implementation of a Structure Plan over this 61.787 hectare development site will assist in the delivery of strategic planning objectives set out by the State Government and the Shire of Serpentine-Jarrahdale in relation to providing Rural Residential lots that support alternative housing options and lifestyles.

The future 52 Rural Residential lots will be well serviced by existing amenities in the Serpentine Townsite, which is planned to expand to include additional residential land and a neighbourhood activity centre.

The Hardy's Creek Main Drain has been reimagined as a green spine running centrally through the site, maximising accessibility of green space to all residents. The co-location of the Bridle Trail will encourage and promote active healthy living.

ITEM	DATA	STRUCTURE PLAN REF (SECTION NO.)
Total area covered by the Structure Plan	61.7872ha	1.2.2
MRS Primary Regional Reserve (South Western Highway)	1.8489ha	5.2.1
Area of each land use proposed:		
Rural Residential	52.8141ha	5.4.1
Public Open Space	0.8755ha	5.4.2
Road Reserves	4.0696ha	5.4.4
Drainage Reserve	1.5015ha	5.4.5
Estimated lot yield	52 lots	5.4.1

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Appendix B:	Environmental Assessment and Management Strategy (Emerge Associates)
Appendix C:	Concept Plan (RobertsDay)
Appendix D:	Landscape Masterplan (Plan/e Landscape Architects)
Appendix E:	Transport Impact Assessment (GTA Consultants)
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Appendix I:	Road Traffic Noise Assessment (Herring Storer)
Appendix J:	Arnold Road Structure Plan Map (RobertsDay)
Appendix K:	Site and Soil Evaluation Report (Emerge)

1.0 Structure Plan Area

This Structure Plan applies to Lots 487, 611 & 615 Arnold Road, Serpentine being the land contained within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map (refer Plan 1).

2.0 Operation

This Structure Plan comes into effect on the date on which it is approved by the Western Australian Planning Commission (WAPC) and is valid for a period of 10 years from that date, or another period determined by the WAPC in accordance with the *Planning and Development (Local Planning Scheme) Regulations 2015* Schedule 2 – Deemed Provisions.

The Structure Plan is to be given due regard when making decisions on the development and subdivision of land within the Structure Plan area.

3.0 Staging

The staging is anticipated to commence in the northern portion of the site, with access provided via Arnold Road. The staging is anticipated to progress in a southerly direction towards Maidstone View.

4.0 Subdivision and Development Requirements

4.1 Land Use Zones and Reserves

Land Use permissibility within the Structure Plan area shall be in accordance with the Plan 1 and corresponding Rural Living Zone No. 30 (RLA 30) contained within Appendix 4 of the Shire of Serpentine-Jarrahdale *Town Planning Scheme No. 2* (TPS2). Where there is a conflict between the Structure Plan and TPS2, the standards of TPS2 shall prevail to the extent of any inconsistency, in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015* Schedule 2 – Deemed Provisions.

4.2 Public Open Space and Drainage

Public Open Space (POS) is to be provided generally in accordance with Plan 1 and shall be ceded to the Crown and managed by the Shire of Serpentine-Jarrahdale in perpetuity.

4.3 Lot Size

No lot within the Structure Plan Area is to be less than 1.0 hectares in accordance with RLA 30 contained within Appendix 4 under the TPS2.

4.4 Building Envelopes

At the subdivision stage, building envelopes are to be appropriately positioned with regard to the requirements of the *Government Sewerage Policy*, bushfire management and noise mitigation requirements.

4.5 Movement Network

Road reserve widths are to be generally consistent with those identified on the Structure Plan Map (Plan1).

Implementation of the Structure Plan will require the upgrading of Arnold Road along its length abutting the Structure Plan area, including the appropriate intersection treatment with South Western Highway (to the specification of Main Roads Western Australia), imposed as condition(s) of subdivision approval issued by the Western Australian Planning Commission.

The construction of Maidstone View along its length abutting the Structure Plan area will also be required as a condition of subdivision approval, with the ultimate construction being to the specification of the Shire of Serpentine-Jarrahdale having regard to tree retention where possible.

4.6 Access Restrictions

The Structure Plan area abuts the current and future South Western Highway alignment. South Western Highway is reserved for Primary Regional Roads purpose in the Metropolitan Region Scheme.

At the subdivision stage, the Western Australian Planning Commission, on the advice of Main Roads Western Australia, may impose a covenant to be lodged on the certificate(s) of title of lots with a direct boundary to South Western Highway to prevent vehicular access.

5.0 Local Development Plan

Local Development Plans (LDPs) are to be prepared in accordance with Part 6 of the Planning and Development (Local Planning Schemes) Regulations 2015 Schedule 2 – Deemed Provisions. LDPs may be required as a condition of subdivision approval for lots comprising of the following site attributes:

- Lots affected by transport noise which exceeds the noise target as defined by the *State Planning Policy 5.4* in relation to South Western Highway, as identified by the Acoustic Report (refer Appendix I)

implementation

6.0 Other Requirements

6.1 Bushfire Management

This Structure Plan is supported by a Bushfire Management Plan (Appendix G) which has been prepared in accordance with *State Planning Policy 3.7 - Planning in Bushfire Prone Areas*.

Future applications for subdivision and/or development approval over the land will be required to be supported by an updated Bushfire Management Plan, addressing the bushfire protection criteria when lot layout is known. The updated bushfire management plan shall demonstrate that the proposed lots are capable of accommodating development that complies with the objectives of *State Planning Policy 3.7 - Planning in Bushfire Prone Areas*.

6.2 Noise

This Structure Plan is supported by a Transport Noise Assessment (Appendix I) which has been prepared in accordance with *State Planning Policy 5.4 - Road and Rail Noise*.

Future applications for subdivision and/or development approval over the land will be required to be supported by an updated Transport Noise Assessment when lot layout is known, demonstrating that the proposed lot are capable of accommodating development that appropriately meets the objectives of *State Planning Policy 5.4 - Road and Rail Noise*.

6.3 Site and Soil Evaluation

This Structure Plan is supported by a Site and Soil Evaluation (Appendix K) which has been prepared in accordance with Australian Standard 1547 On-site domestic wastewater management (AS/NZS 1547) and the requirements of the *Government Sewerage Policy*. Future applications for subdivision and/or development approval over the land will be required to be supported by an updated site and soil evaluation report when lot layout is known, demonstrating that the proposed lots are capable of accommodating on-site effluent disposal.

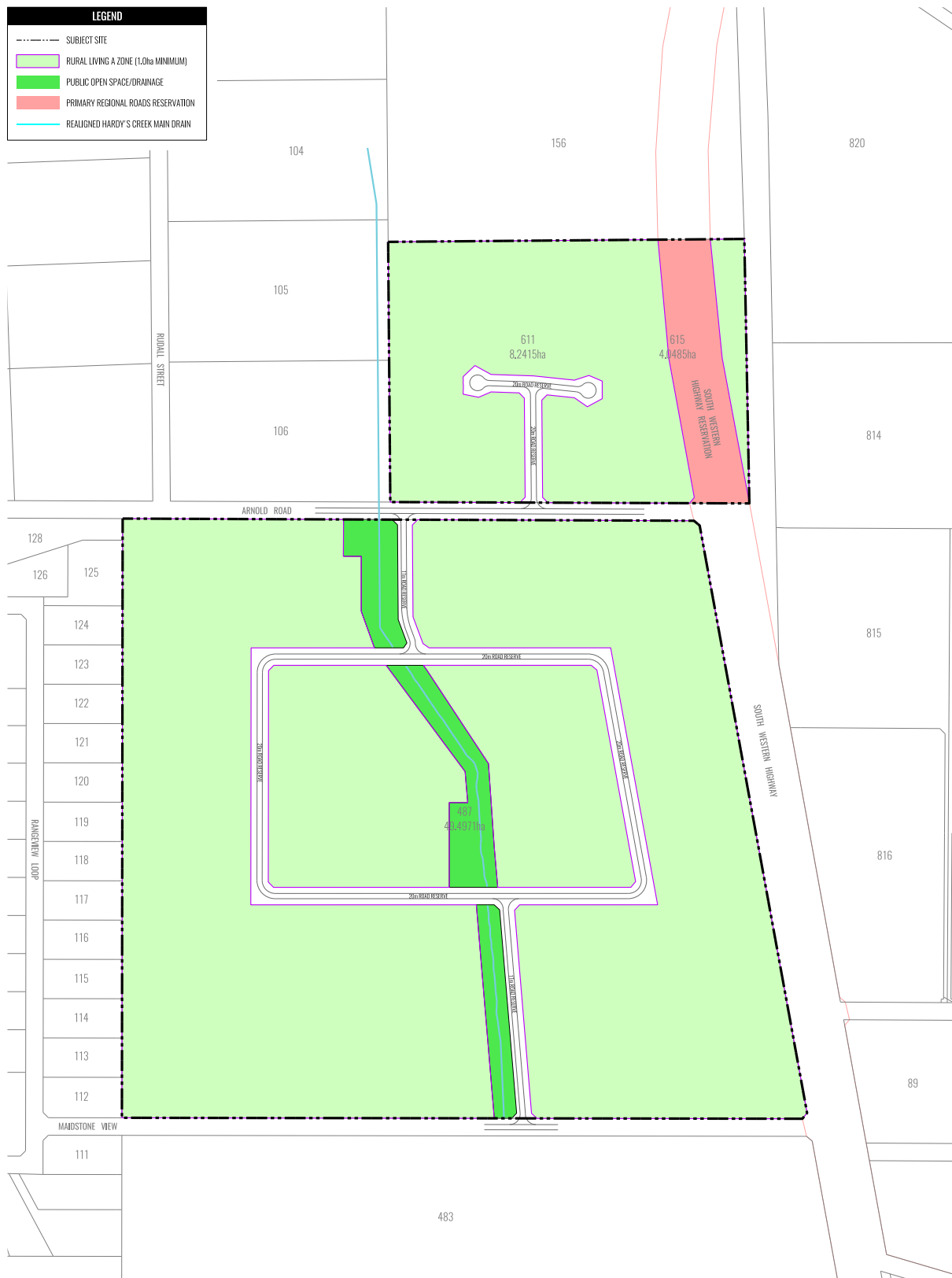
7.0 Additional Information

Prior to subdivision or development of land the Western Australian Planning Commission may require the following information be prepared, as applicable, at the relevant submission stage nominated in Table 1.

Table 1: Possible information required prior to subdivision or development approval

ADDITIONAL INFORMATION	APPROVAL STAGE	APPROVING AUTHORITY
Urban Water Management Plan	Subdivision	Shire of Serpentine-Jarrahdale
Local Development Plan	Condition of Subdivision	Shire of Serpentine-Jarrahdale
Bushfire Management Plan	Subdivision	WAPC, Shire of Serpentine-Jarrahdale
Site and Soil Evaluation	Subdivision	Shire of Serpentine-Jarrahdale, Department of Health
Noise Assessment	Subdivision	Main Roads WA, Shire of Serpentine-Jarrahdale
Landscape/Vegetation Management Plan	Condition of Subdivision Approval	Shire of Serpentine-Jarrahdale
Tree Retention Plan (for Construction of Maidstone View)	Condition of Subdivision Approval	Shire of Serpentine-Jarrahdale

Plan 1: Arnold Road Local Structure Plan Map



1.0 Introduction

1.1 Purpose

The Arnold Road Local Structure Plan (Structure Plan) has been prepared on behalf of MALF Corp Pty Ltd (the developers). The purpose of the Structure Plan is to guide the orderly and proper subdivision and development of Lots 487, 611 & 615 Arnold Road, Serpentine (subject site) for Rural Residential use.

The Structure Plan is prepared in accordance with the requirements of *Planning and Development (Local Planning Schemes) Regulations 2015* and the Western Australian Planning Commission (WAPC) Structure Plan Framework, with regard to the Shire of Serpentine-Jarrahdale *Town Planning Scheme No. 2* (TPS2) Appendix 4A – Rural Living Zone No. 30 (RLA30).

This Structure Plan creates a development that integrates into the existing Serpentine settlement pattern and captures the rural character of the area. This overarching principle will guide the design, planning and place making development efforts.

1.2 Land Description

1.2.1 Location

The Structure Plan area is located within the municipality of the Shire of Serpentine-Jarrahdale in the locality of Serpentine, which is approximately 50km south-east of central Perth and 7.5km south of Mundijong Town Centre (refer Figure 1).

The Structure Plan is generally bound by South Western Highway to the east, Karnup Road to the north, Rural Residential development to the west and broadacre grazing farmland to the south. South Western Highway connects the site regionally to Byford to the north and Pinjarra to the south. Karnup Road provides connection to Kwinana Freeway to the west. The site is located approximately 1.2km south-east of Serpentine train station which services the Australind rail line, providing public transport connection between Perth and Bunbury.

The site is within close proximity to the Serpentine Townsite which includes local and regional services and amenities which provide immediate benefit to future residents including: Serpentine Primary School, Clem Kentish Hall and Oval, Wellard Street Shops, Serpentine Horse and Pony Club, Serpentine Districts Gold Club and Serpentine Church of Christ.

The Serpentine Townsite is planned for expansion to include additional residential development and a neighbourhood activity centre located on Wellard Street between Lefroy Street and Richardson Road, within 1km of the site, equivalent to 15 minute walk (refer Figure 2).

1.2.2 Area and Land Use

The Structure Plan area encompasses 61.787 ha and comprising largely of open paddocks, reflective of its use for agricultural grazing activities (refer Figure 3). A scattering of trees are located within the Arnold Road road reserve and the Maidstone View unconstructed road reserve to the south. Arnold Road runs centrally east-west through the Structure Plan area and provides an unsealed road connection to South Western Highway.

An open drain, the Hardy's Creek Main Drain (HCMD), traverses north-south through the Structure Plan area south of Arnold Road.

1.2.3 Legal Description and Ownership

The Structure Plan area comprise three landholdings under single ownership, as summarised in Table 1.

Table 2: Lot Details

LOT NUMBER	DEPOSITED PLAN	CERTIFICATE OF TITLE		OWNERSHIP
		VOLUME	FOLIO	
487	257513	2628	398	Constantino Joseph John Spagnolo
611	127974	1381	751	
615	127264	1379	997	

1.3 Project Team

The following multi-disciplinary project team have been engaged to progress the preparation of the Structure Plan:

Table 3: Project Team

DISCIPLINE	CONSULTANT
Project Manager	Cuttone Property Group
Traffic and Transport	GTA Consultants
Site and Soil	Douglas Partners
Servicing and Infrastructure	Pritchard Francis
Environmental	Emerge Associates
Bushfire	Emerge Associates
Landscape Architect	Plan/e Landscape Architects
Hydrology	RPS
Acoustic	Herring Storer
Planning + Urban Design	RobertsDay (until 30.06.20)

Figure 1: Regional Location Plan

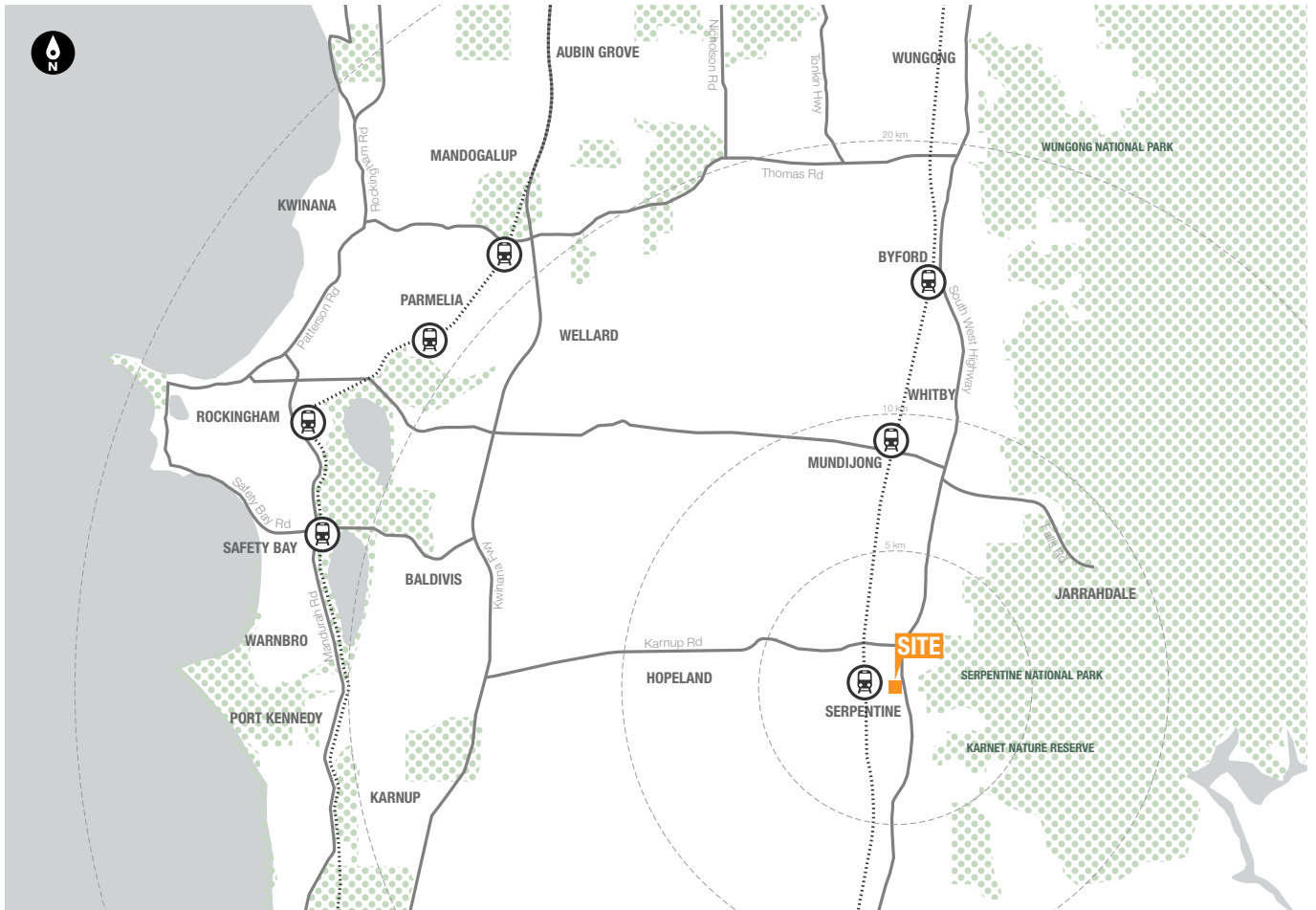
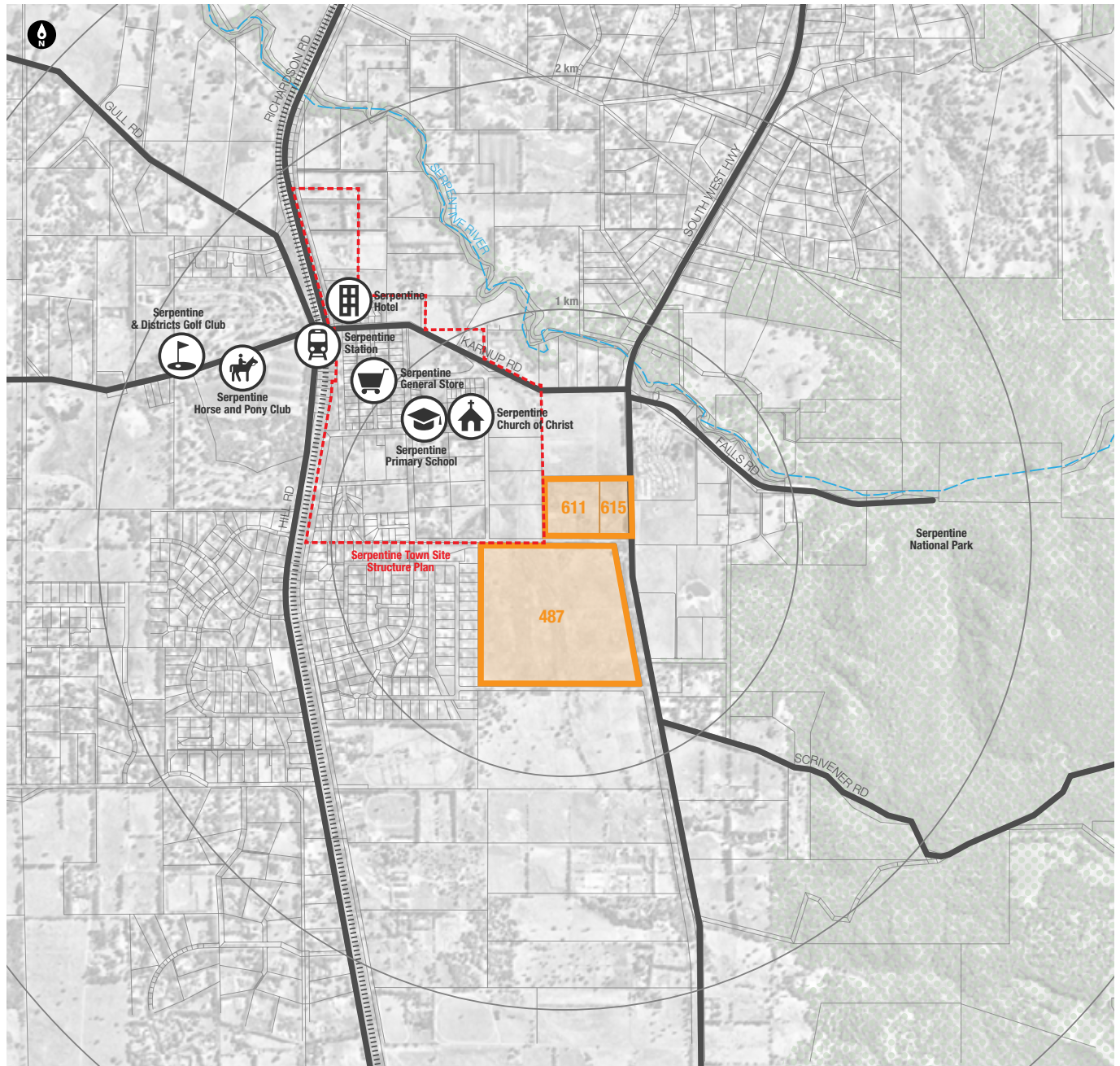
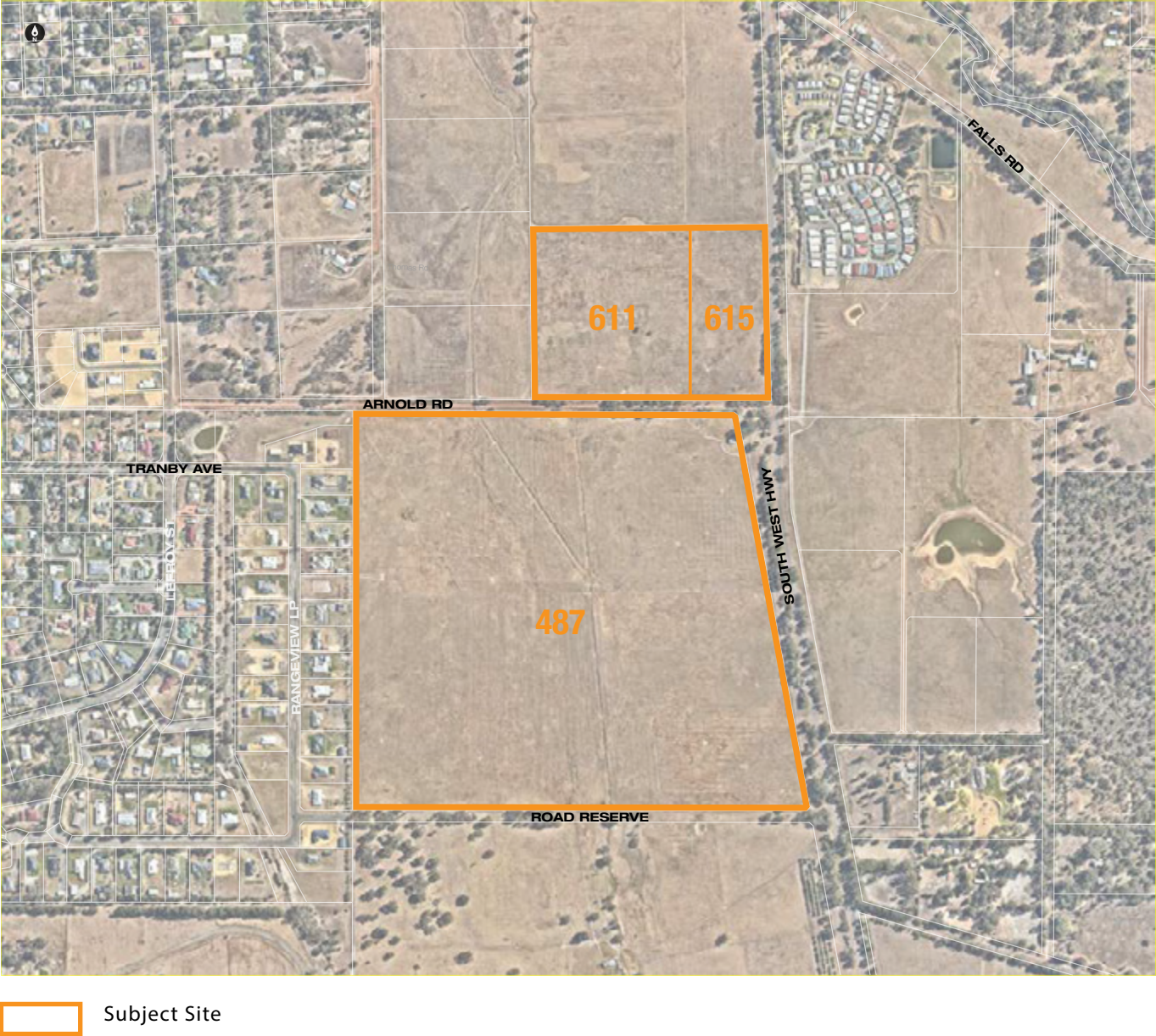


Figure 2: Location Plan



 Subject Site

Figure 3: Site Plan



2.0 Planning Framework

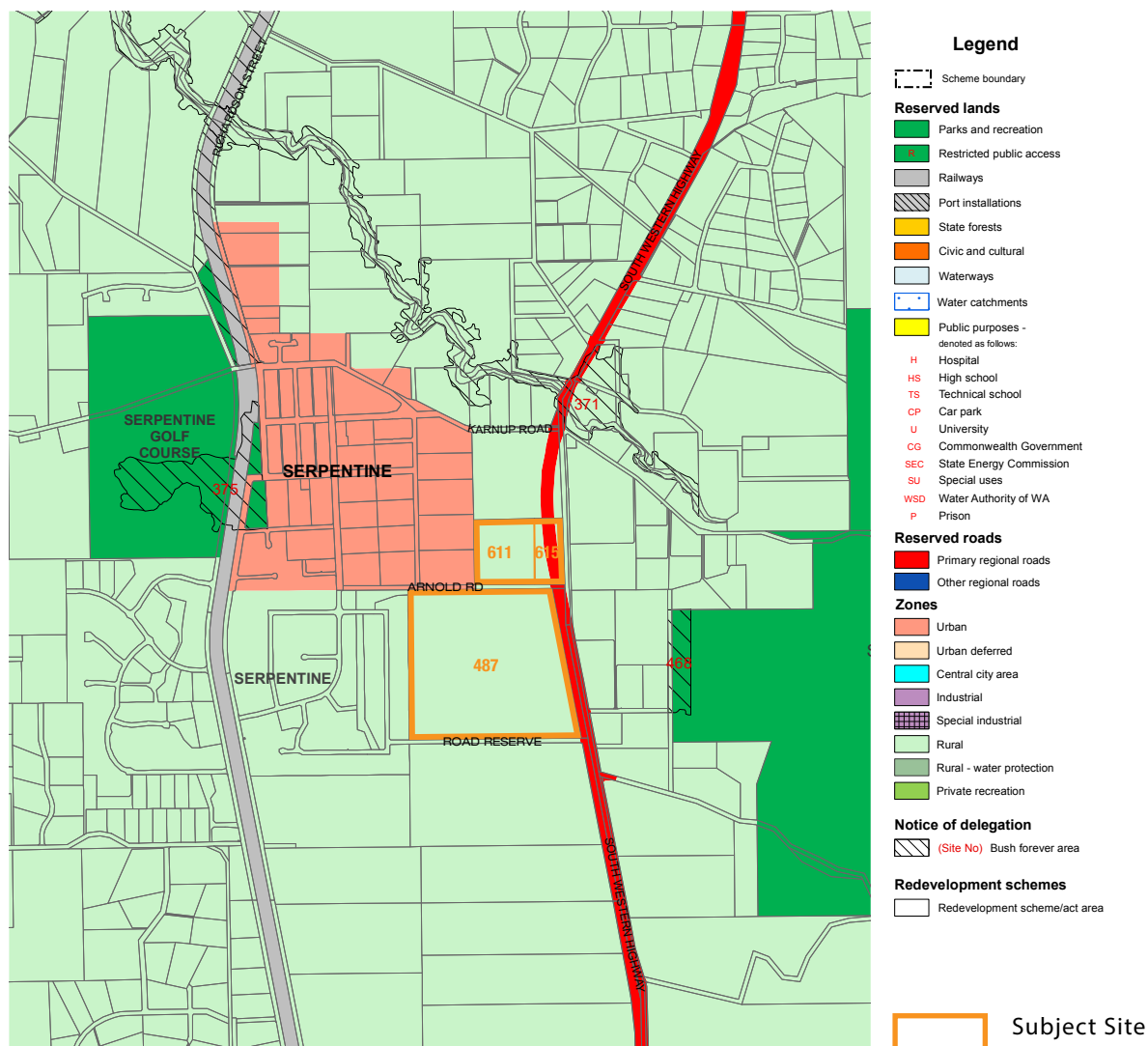
2.1 Zoning and Reservations

2.1.1 Metropolitan Region Scheme

The Structure Plan area is predominantly zoned 'Rural' under the *Metropolitan Region Scheme* (MRS) as shown in Figure 4. A portion of the site, north of Arnold Road, includes land reserved 'Primary Regional Road' under the MRS for the purpose of South Western Highway realignment. The balance of the site, south of Arnold Road, directly abuts South Western Highway.

Land to the north-west is zoned 'Urban' identified as part of the future Serpentine Townsite. Land to the north and south and more broadly surrounding the Structure Plan area is similarly zoned 'Rural'.

Figure 4: Metropolitan Region Scheme Map



part two explanatory

2.1.2 Town Planning Scheme No. 2

The subject site was rezoned from 'Rural' to 'Rural Living A' through Scheme Amendment No. 193 (gazetted 29 January 2019) to TPS2 refer Figure 5.

Land to the north and south is zoned 'Rural'. Land to the north-west (north of Arnold Road) is zoned 'Urban Development' and is identified within the draft *Serpentine Townsite Local Structure Plan*. Land to the south-west (south of Arnold Road) is similarly zoned 'Rural Living A' and has been developed for Rural Residential uses with lot sizes ranging from 4,000m².

Under TPS2 the objective of the 'Rural Living A' zone is to cater for rural residential development on a range of lots between 4,000m² to 1 hectare.

Clause 5.12 of TPS2 requires the subdivision and development of land identified in the 'Rural Living A' zone to be undertaken in accordance with conditions contained within Appendix 4A. Appendix 4A identifies the Structure Plan area as Rural Living A No. 30 (RLA30) subject to the following provisions:

1. Within the Rural Living A zone, the following land uses are permitted or are permitted at the discretion of the Council –

Permitted (P):

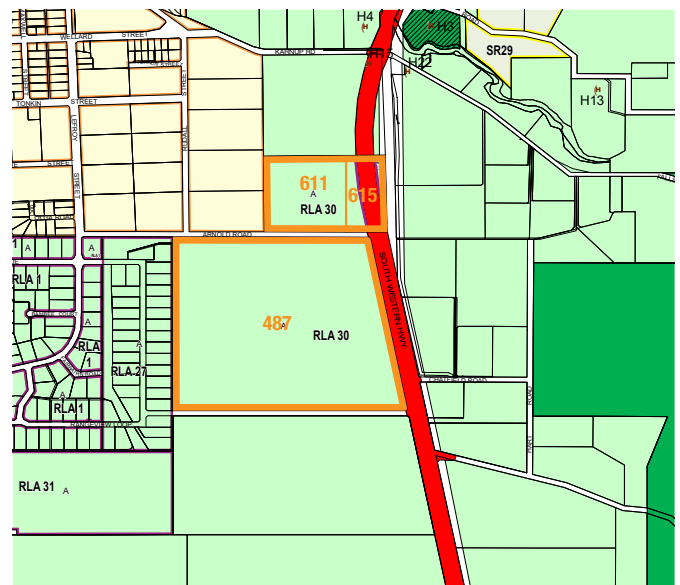
- Single House
- Public Recreation
- Public Utility

Discretionary (AA):

- Ancillary Accommodation
 - Home Occupation
 - Home Business
2. Lot sizes shall not be less than 1 hectare.
 3. A structure plan shall be prepared to guide subdivision and development of the land.

The Structure Plan has been prepared in accordance with Part 4 of the *Planning and Development (Local Planning Schemes) Regulations 2015* Schedule 2 – Deemed Provisions and Appendix 4A of TPS2 which requires a Structure Plan to be prepared before any future subdivision or development is to be undertaken.

Figure 5: Shire of Serpentine-Jarrahdale TPS No. 2 Map



Subject Site

LOCAL SCHEME ZONES

	Commercial
	Conservation
	Farmlet
	Residential
	Rural
	Rural Groundwater Protection
	Rural Living A
	Rural Living B
	Showroom/Warehouse
	Special Residential
	Special Rural

2.2 Strategic Planning Framework

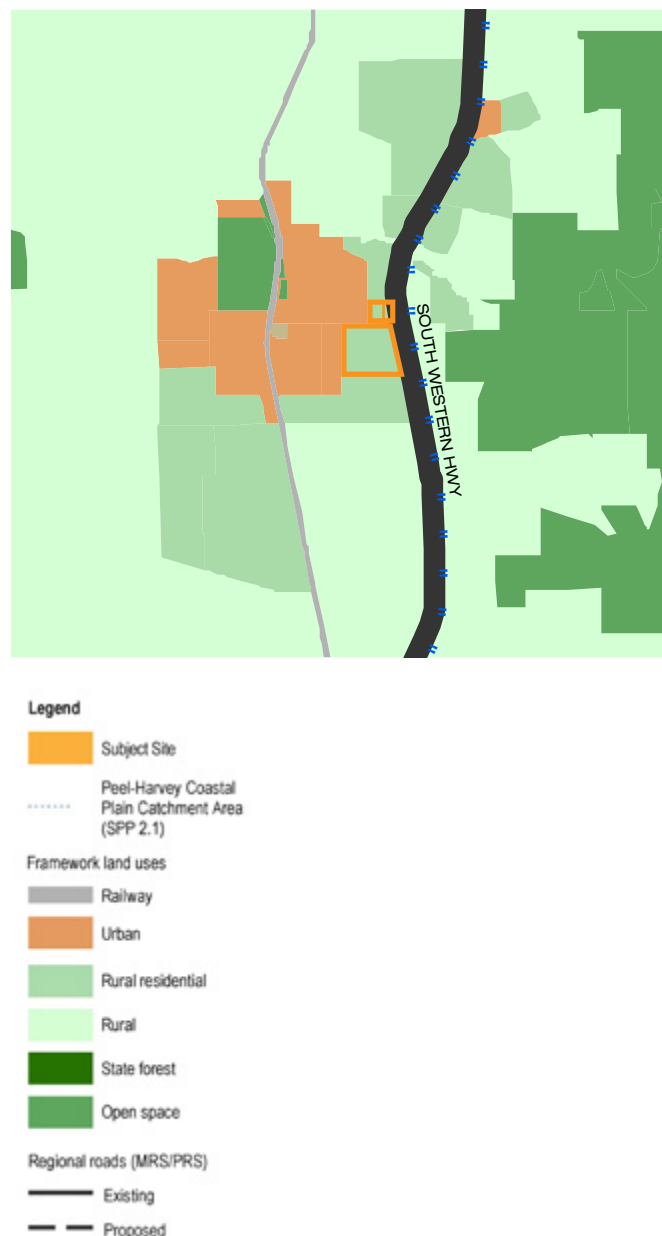
2.2.1 Perth and Peel @ 3.5 million

Perth and Peel @ 3.5 million is the highest-level strategic planning document which establishes a vision for the future expansion of Perth Metropolitan and Peel Regions, which is projected to grow to a population of 3.5 million, with a total 800,000 new dwellings to be provided by 2050. In order to achieve this expected growth without impacting on our way of life, natural environment and physical infrastructure the State advocate for a 'Connected City' model which seeks to provide 47% of all new dwellings (380,000 dwellings) within existing infill areas by setting housing targets for each Sub Region.

The Structure Plan area is located within the *South Metropolitan Sub Regional Framework*, which has a housing target of 302,180 dwellings to be provided by 2050, of which the Shire of Serpentine-Jarrahdale will contribute 35,800 new dwellings. The Structure Plan area is identified in the Sub Regional Framework as 'Rural Residential', being areas that provides alternative lifestyle and housing opportunities as transition between urban and rural areas, refer Figure 6.

The realignment of South Western Highway is identified in the Sub Regional Framework as likely to be required in the long term as part of the ultimate upgrade of Tonkin Highway with grade-separated interchanges.

Figure 6: Perth and Peel @ 3.5 million



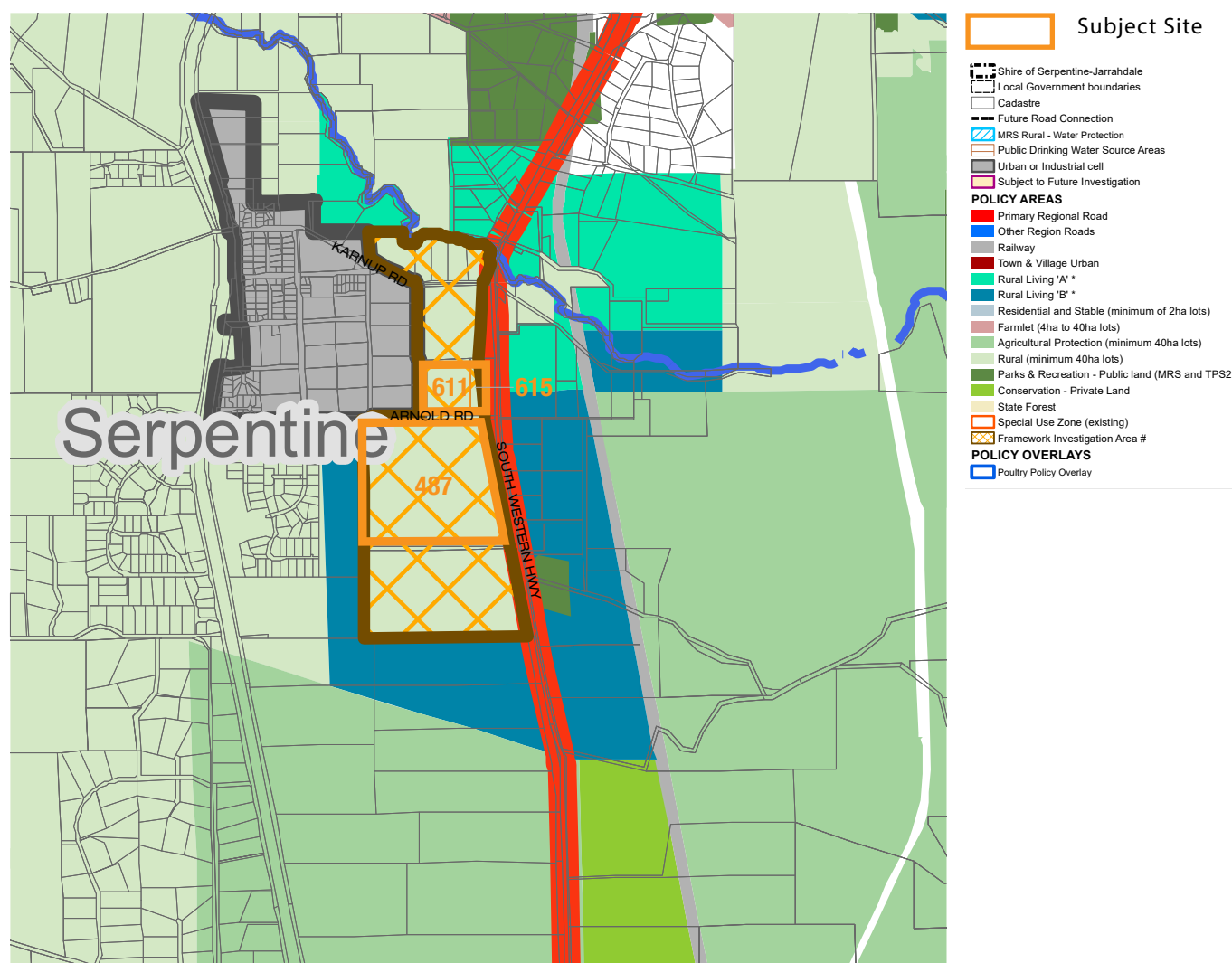
2.3 Shire of Serpentine-Jarrahdale Rural Strategy (Review 2013)

The Shire's Rural Strategy was initially adopted in 1994 and underwent review in 2013. The Rural Strategy provides a link between the local planning framework and the South Metropolitan Sub-Regional Framework to guide forward planning within the Shire for the next 5-10 years.

The subject site is identified within the Rural Strategy Review as 'Framework Investigation Area' (refer Figure 7), being land identified as 'Rural Residential' within the Sub-Regional Framework which requires further detailed planning. The Strategy requires amendments to TPS2 prior to supporting Rural Living development. Subsequent to the Strategy Review, the application area was rezoned from 'Rural' to 'Rural Living A' through Scheme Amendment No. 193, gazetted 29 January 2019.

'Rural Living' development is identified within the Strategy as a mechanism to contribute towards the Shire's housing target of 35,800 new dwellings by 2050 while maintaining the rural character and landscape that is of key significance to the identity of the Shire.

Figure 7: Rural Strategy Review Map



2.4 Draft Planning Framework

2.4.1 Shire of Serpentine-Jarrahdale Draft Local Planning Strategy

The Shire has prepared a draft *Local Planning Strategy* which is intended to supersede the Shire's existing Rural Strategy Review, providing a 10 year vision for planning and development.

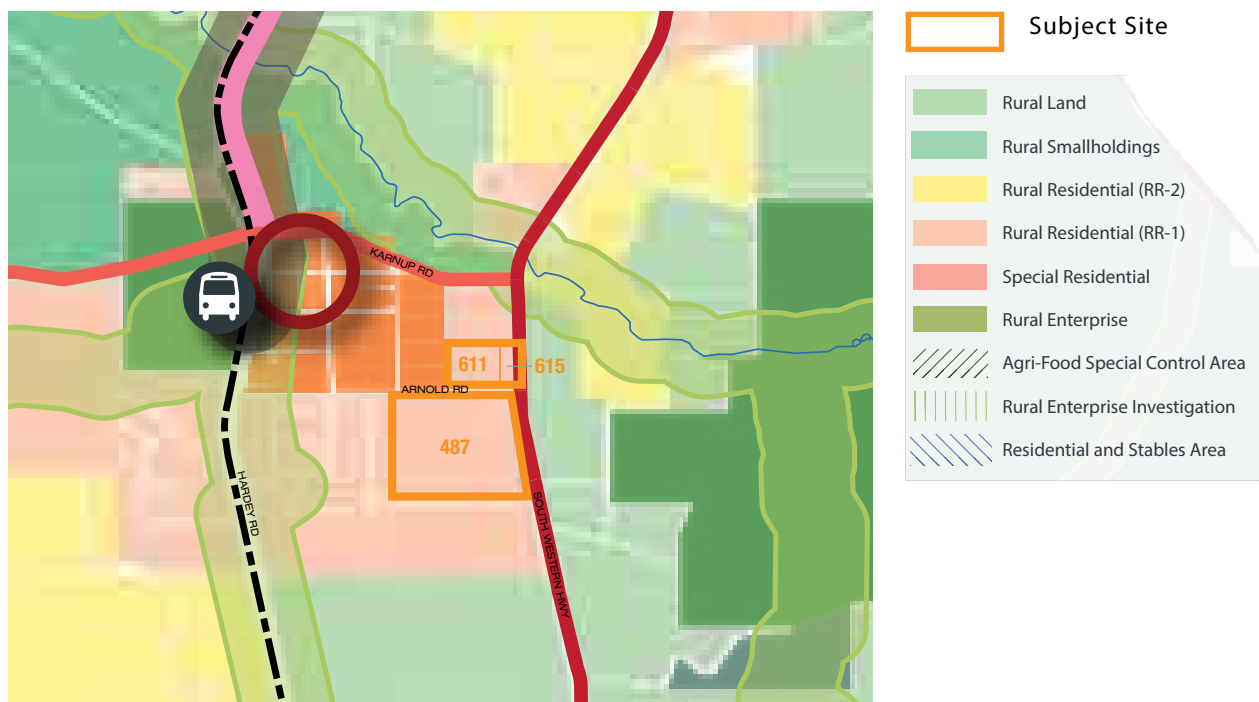
The Structure Plan area is identified within the draft Strategy as 'Rural Residential' with a density code of 'RR-1' which permits development to minimum lot size of 1 hectare (refer Figure 8). 'Rural Residential' falls under the umbrella term 'Rural Living' which is defined under the Strategy as providing residential development in a rural lifestyle context, with lots generally ranging between 4,000m² and 4ha depending on location criteria.

The objectives of 'Rural Residential' include:

- Provide for Rural Residential development in appropriate, well-located areas;
- Prevent the 'sprawl' of Rural Residential areas into rural areas;
- Preserve and enhance the existing rural character of Rural Residential properties;
- Accommodate a range of lifestyles and enable choice;
- Ensure Rural Residential developments are sensitive to environmental values; and
- Protect the Byford Trotting Complex and aim to minimise land use conflicts.

The Structure Plan forms part of a wider area identified as 'Rural Residential' framing the future Serpentine Townsite. This provides a logical urban development frontier to transition between existing larger rural zoned lots, to intermediate scale development, around the periphery of the Serpentine Townsite which will provide for expanded residential development.

Figure 8: Draft Local Planning Strategy Map



2.4.2 Draft Serpentine Townsite Local Structure Plan

The Shire of Serpentine-Jarrahdale with the Department of Planning, Lands and Heritage (DPLH) have prepared a draft Local Structure Plan for the Serpentine Townsite (Townsite SP), located to the north-west of the subject site, proposing a neighbourhood activity centre and community centre at Wellard Street, surrounded by residential development at densities of R10 and R5.

The Townsite SP is relevant to this Structure Plan as it includes Lots 102-106 Rudall Street, which are under the same ownership as this Structure Plan, accommodating Hardy's Creek Main Drain (HCMD) downstream from this Structure Plan.

The Structure Plan proposes the realignment of the HCMD which also forms part of the Serpentine Townsite SP. The proposed realignment is supported by technical modelling previously provided for earlier proposals for its realignment and provides for increased efficiency of lot and road design and conveyance of water. The alignment of the HCMD within the Serpentine Townsite SP area will be considered by the Western Australian Planning Commission in its determination of the Serpentine Townsite SP.

An Addendum to the Local Water Management Strategy (LWMS) has been prepared to support the drain alignment (refer Appendix F).

2.5 Planning Policies

The following State Government policies are considered relevant and applicable to the Structure Plan area:

- *SPP 2.1 Peel Harvey Coastal Plain Catchment*
- *SPP 2.5 Rural Planning*
- *SPP 2.9 Water Resources*
- *SPP 3.7 Planning in Bushfire Prone Areas*
- *SPP 5.4 Road and Rail Noise*
- *Liveable Neighbourhoods*
- *Government Sewerage Policy*

A number of Local Planning Policies have been taken into account as part of the Structure Plan design, these include:

- *LPP 2.4 Water Sensitive Design*
- *LPP 4.7 Placement of Fill in Non-Urban Areas*
- *LPP 4.13 Revegetation Policy*
- *LPP 4.16 Landscape and Vegetation Policy*

2.5.1 State Planning Policy 2.1 Peel-Harvey Coastal Plain Catchment

The policy applies to all development within Catchment of the Peel-Harvey Estuarine System that lies on the Swan Coastal Plain, this includes land within the Shire of Serpentine-Jarrahdale west of the Darling Scarp. SPP 2.1 seeks to minimise the export of nutrients (primarily phosphorous) from land use and development within the catchment to the drainage network.

SPP 2.1 specifies policy provisions relating to wastewater treatment in rural residential areas, requiring rural residential lots over 4,000m² in area to only use conventional on-site effluent disposal if a range of site factors can be achieved and environmental acceptability can be demonstrated to the Environmental Protection Authority (EPA).

An Addendum to the Local Water Management Strategy (LWMS) and a Geo-technical report have been prepared to support the design of the Structure Plan (refer Appendix F and Appendix A).

2.5.2 State Planning Policy 2.5 Rural Planning

This policy provides guidance to minimise land use conflicts and promote sustainable rural settlement adjacent to existing urban areas. The policy also outlines the need to manage environmental, landscape and water resource assets in rural areas. This policy applies to the Structure Plan area being zoned 'Rural' under the MRS and zoned for 'Rural Living' under TPS2.

The policy defines Rural Living as lots with land area between 1 hectare to 40 hectares, which provide for a range of housing and lifestyle opportunities.

This Structure Plan is consistent with the policy being land that is identified as Rural Living in the Sub-Regional Planning Framework, the Shire's Rural Strategy and TPS2 and is subject to the development standards in TPS2.

2.5.3 State Planning Policy 2.9 – Water Resources

This policy provides guidance on achieving an integrated approach to land use and water management planning, which will ensure the protection of important water resources and facilitate development in an environmentally sound manner.

An Addendum to the Local Water Management Strategy (LWMS) has been prepared to support the design of the Structure Plan (refer Appendix F).

2.5.4 State Planning Policy 5.4 – Road and Rail Noise

The purpose of this policy is to minimise the adverse impact of road and rail noise on noise sensitive land use and development within specified trigger distances of strategic freight and major traffic routes.

South Western Highway is identified under the policy as a 'Strategic Freight and Major Traffic Route' (red road) with a trigger distance of 300m measured from the road carriageway edge. The policy therefore requires development within this trigger distance to require the preparation of a noise management plan to determine the actual noise levels and demonstrate the proposal can mitigate the impacts of noise through attenuation measures.

A Road Traffic Noise Impact Assessment has been prepared, in accordance with SPP 5.4 to support the design of the Structure Plan (refer Appendix I).

2.5.5 Liveable Neighbourhoods

Liveable Neighbourhoods (LN) is an operational policy used to guide the design and assessment of structure plans and subdivision applications in greenfield areas and larger infill sites.

Objectives of particular relevance to this Structure Plan include:

- To ensure a site-responsive approach to urban development that supports and enhances the context in which it is located, strengthens local character and identity, integrates with its context and promotes a sense of community;
- To provide a safe, convenient and legible movement network, and to provide attractive streetscapes;
- To ensure that urban development lots have a suitable level of amenity, services and access;
- To provide a network of well-distributed parks and recreation areas that offer a variety of safe, appropriate and attractive public open spaces;
- To integrate appropriate water management measures in an efficient urban structure and range of parkland types.

LN is a performance-based code where the requirements of LN may be satisfied in a number of ways. LN aims to balance the maintenance of acceptable standards and meeting strategic vision, with encouraging greater innovation in response to market needs.

Although LN caters for urban developments and this Structure Plan is for rural living lots (not urban), it is considered that the Structure Plan achieves the objectives of LN by providing lots consistent with the rural character of the area, within a connected and walkable design, structured around high quality public open space.

2.5.6 Government Sewerage Policy

The Government Sewerage Policy requires all subdivision and development to be connected to reticulated sewerage, unless it is exempted from this requirement under the Policy. In sewerage sensitive areas, the Policy only exempts residential subdivision proposals from requiring connection to reticulated sewerage where lots are greater than 1 hectare in area and it can be demonstrated that lots are capable of achieving the minimum site requirements specified by the Policy.

This Structure Plan is consistent with the policy requirements, proposing lots with a minimum area of 1 hectare to be serviced by non-reticulated private effluent treatment systems. Further details are included in the LWMS, with an Addendum prepared to support the design of the Structure Plan (refer Appendix F) and also in the Geo-technical Report (refer Appendix A) and in the Site and Soil Evaluation (Appendix K) which demonstrate that the site will be developed to be consistent with the approach and requirements detailed in the Policy.

2.6 Pre-lodgment consultation

Table 4: Details of consultation

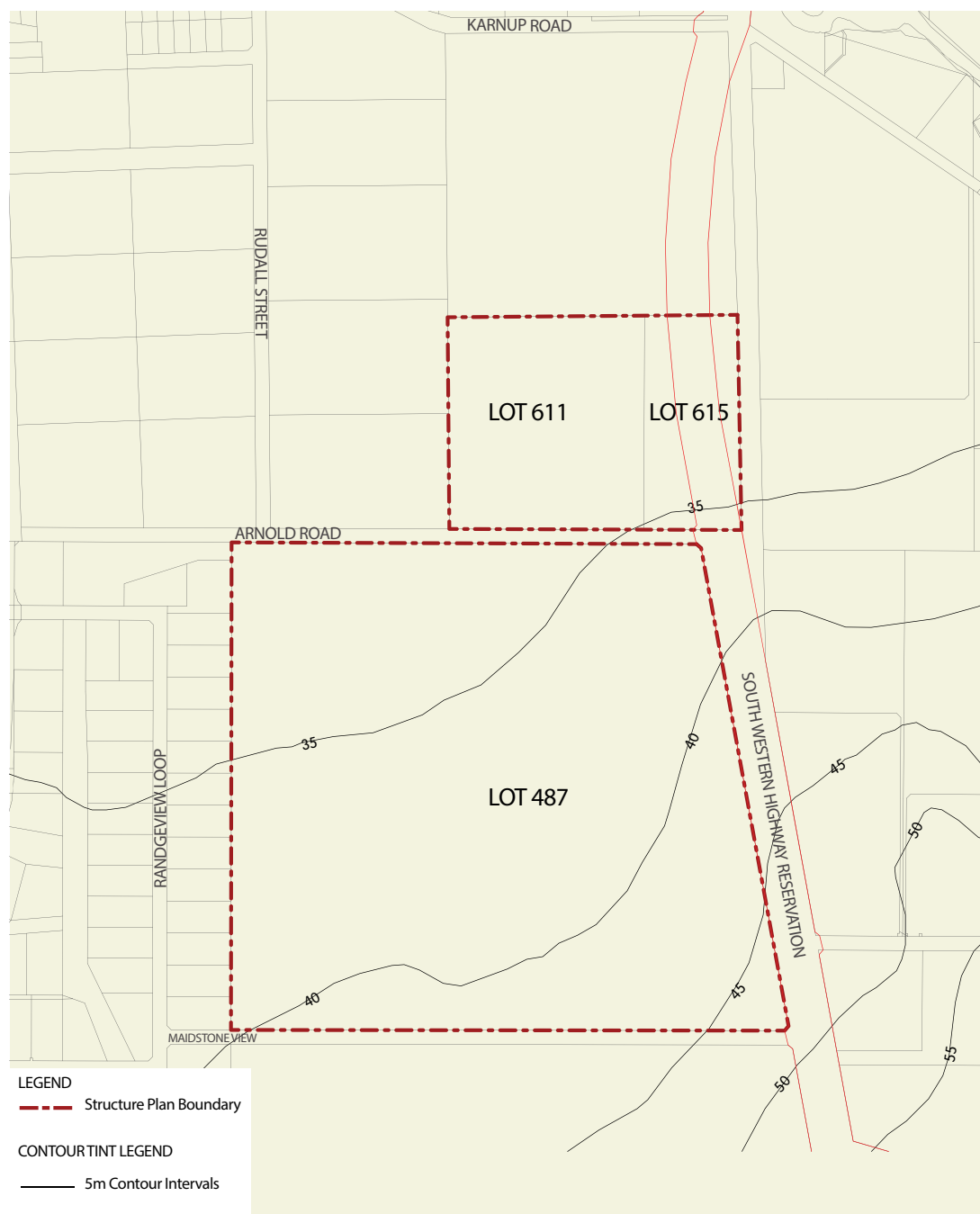
DATE	ATTENDANCE	POINTS OF DISCUSSION
15.11.2019	Shire of Serpentine - Jarrahdale Technical Advisory Group	The following was discussed: • Presentation of Concept Plan and design parameters; • Realignment of HCMD; • Engineering summary; and • Statutory planning process.
20.02.20	Shire of Serpentine - Jarrahdale Development Unit Committee	The following was discussed: • Presentation of Concept Plan (updated); • Technical reporting required to support the Structure Plan; • Confirm HCMD to be ceded to the Shire as POS and maintained in perpetuity; • Cul-de-sac of road north of Arnold Road; and • Timing of the Serpentine Townsite SP. The outcome of this meeting was general support for the road cross sections and widths proposed.

3.0 Site conditions and constraints

3.1 Landform and Soils

The site has a gentle slope ranging from RL 32m AHD in the north-western portion of the site and rising to levels of approximately RL 46m AHD in the south-eastern portion of the site (refer Figure 10), with the remainder of the site sloping at 4% or less.

Figure 9: Site topography



A Geotechnical Report was prepared by Douglas Partners (refer Appendix A) to investigate the soil conditions underlying the site. The sub-surface condition in the western part of the site comprises sandy clay of the Guildford Formation. The eastern part of the site is shown to be underlain by gravelly sandy clay of colluvial origin with lenses of silt, gravel and quartz sand.

The Department of Water and Environmental Regulation (DWER) Acid Sulfate Soil Risk Map identifies that the site has 'Moderate' to 'Low' risk of Acid Sulfate Soils (ASS) occurring within 3m of natural soil surface. Development of the subject land is expected to have little extraction or dewatering; therefore, ASS can be appropriately managed.

The site can achieve a general classification of "Class S" in accordance with AS2870-2011. A portion of the site near the north-eastern boundary will be required to fill up to 800mm within the building envelopes to achieve the same "Class S" classification.

Douglas Partners conclude that from a geotechnical standpoint, the land is physically capable of development as proposed.

3.2 Heritage

A desktop search indicates Aboriginal Heritage site 3582 is registered affecting land north of Arnold Road. The spatial boundary of site 3582 is defined by a 2km square surrounding the length of the Serpentine River. The boundaries of the registered sites are ambiguous to protect the listed sites; however, the listing directly relates to the mythical qualities of the Serpentine River. As this Structure Plan does not intersect with the Serpentine River, it is considered that there is no impact to the registered heritage site. Scheme Amendment 193 which rezoned the land from 'Rural' to 'Rural Living' confirmed the actual boundary of site 3582 does not impinge on the subject land.

There are no state or local European heritage listings that directly affect the subject site.

3.3 Ground Water and Surface Water

3.3.1 Groundwater

The subject site is located in the Serpentine 3 sub-area of the Serpentine Groundwater Management Area. The superficial aquifer is located at a depth of 15m below surface level. The superficial aquifer is underlain by the Leederville Formation, Cattamarra Coal Measures and Yarragadee Formation. The superficial aquifer will provide the most likely source for non-potable water supply.

As part of Douglas Partners geo-technical report (refer Appendix A), groundwater was observed in one testing pit at a depth of 2.3m (RL 38.6m AHD). It is considered that this water is perched infiltration water resulting from recent rains. It is possible that perched groundwater may occur generally across the site on low permeability layers, as is typical in Guildford Formation.

This supports the LWMS prepared by Bayley Environmental (2016) which identified that the groundwater occurs at shallow depths throughout the site. The groundwater regime in the Serpentine area is complex, due to the low and variable permeability of the soils. Variability of groundwater levels across the site indicates that considerable perching of groundwater occurs on low-permeability clay layers. It is therefore assumed in the LWMS that groundwater levels will be at or near the ground surface over most the site during wet winters.

The LWMS confirms that the shallow depth to groundwater can be resolved through a combination of filling, drainage and use of high-performance effluent disposal systems.

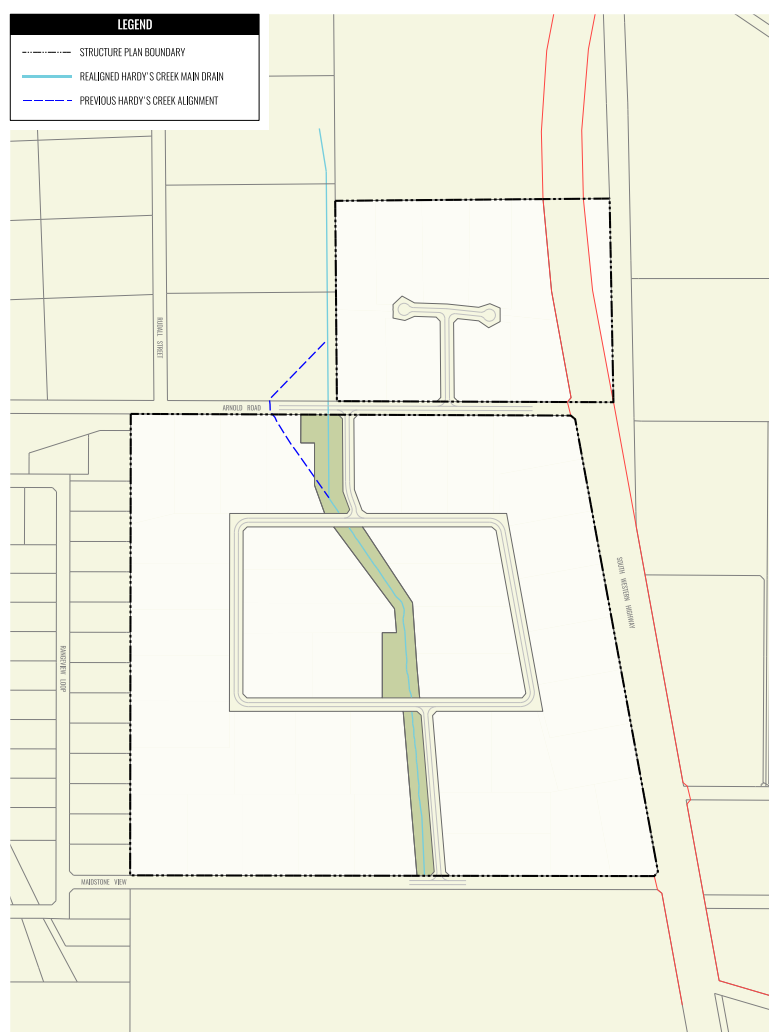
3.3.2 Hardy Creek Main Drain

The subject site is drained by the Hardy's Creek Main Drain (HCMD) which flows from the Darling Scarp in a northerly direction, traversing the site before adjoining the Serpentine River, approximately 940m to the north-west. The HCMD follows an existing low point in the landscape. The drain consists of an eroded channel approximately 0.5m-1.0m deep and ranging from 2.0m to 10m wide with a narrow, flat, sandy bottom. The banks are partly stabilised by existing pasture grasses. This drain is seasonal, with flowing water in winter and dry in summer.

Due to the location of culverts on either side of Arnold Road the HCMD deviates significantly, creating an irregular triangle shape (refer Figure 11). In order to improve efficiency of lot and road design, and the conveyance of water, it is proposed to straighten the drainage alignment by relocating the culverts on Arnold Road approximately 80m east. Straightening the HCMD will reduce the overall length of the drain and provide improved accessibility, which will assist in the Shire's on-going management and maintenance. It will also provide for improved public open space design and usability. Please refer to Sections 4.1 and 4.2 for further detail.

To support the Structure Plan design and realignment of the HCMD an Addendum to the Local Water Management Strategy (LWMS) has been provided, refer to Part 4.5 of this report and Appendix F.

Figure 10: Hardy Creek Main Drain alignment



3.4 Existing Environmental Assessment

An Environmental Assessment and Management Strategy has been prepared by Emerge Associates (refer Appendix B), which outlines the environmental features, attributes and values of the site.

Emerge's assessment of the site identifies the following key attributes of the site:

- Given the sites historic clearing and associated agricultural land uses, flora and vegetation within the site has been significantly modified, with the site identified as Parkland Cleared in a 'Completely Degraded' condition;
- No threatened ecological communities (TEC's) were identified within the site, nor are likely to occur based on the degraded nature of the vegetation;
- There is a scattering of trees and shrubs on the site, which contain a small stand of native Marri trees, spread over a 0.358ha area;
- A total of seven (7) trees were recorded in the site, of which none were observed to contain hollows suitable for nesting black cockatoos;
- No fauna species of conservation significance were recorded within the site during the field survey;
- The site contains only a very limited number of trees that could provide potential roosting habitat for black cockatoos;
- There was no evidence of Black Cockatoo roosting on the site; and
- It is not considered that the site provides important foraging habitat, given its small extent and presence of extensive areas of higher quality foraging habitat outside of the site, within the Darling Scarp.

Given the sites identification as Parkland Cleared in a 'Completely Degraded' condition, the site does not support a high level of biodiversity.

3.5 Existing Movement Networks

A Transport Impact Assessment, prepared by GTA Consultants (refer Appendix E), identified the following characteristics of the existing movement network.

South Western Highway runs north-south along the eastern boundary of the Structure Plan area and is identified as a 'Primary Regional Road' under the MRS. Main Roads Western Australia (MRWA) has indicated long term plans for the realignment of South Western Highway, as these works are currently unplanned and unfunded there is no timeframe for the delivery of this upgrade.

Arnold Road runs through the centre of the Structure Plan providing connection between South Western Highway to the east and Lefroy Street to the west. Arnold Road is an Access Street with a gravel unsealed road with 6.0m-6.5m carriageway. Connection to South Western Highway is provided via an uncontrolled T-intersection.

Given the predominantly rural nature of the area there is limited existing cycle and pedestrian infrastructure.

Serpentine Train Station, which services the Australind Line is located approximately 1.9km north west of the site which provides connection between Perth and Bunbury. There are no other public transport facilities in the area.

4.0 Design

The site conditions highlight opportunities and constraints that the Structure Plan design needs to respond to, these include:

- Straightening HCMD to align with the draft Townsite SP;
- Land is predominantly cleared resulting from broadacre grazing;
- Interface with South Western Highway;
- Arnold Road connection to South Western Highway; and
- Site with limited topographical difference.

The following section provides a response to these considerations.

4.1 Concept Plan

A Concept Plan has been prepared to support the Structure Plan and provide a greater degree of certainty on the future pattern of subdivision and development (refer Figure 11). The Concept Plan is subject to detailed refinement at the subdivision stage (refer Appendix C).

The Concept Plan design is the product of the convergence of locational and landform features of the site with the objective to providing a design that integrates with the existing settlement pattern and captures and enhances the rural character of the area.

The Concept Plan has been predicated on the following objectives:

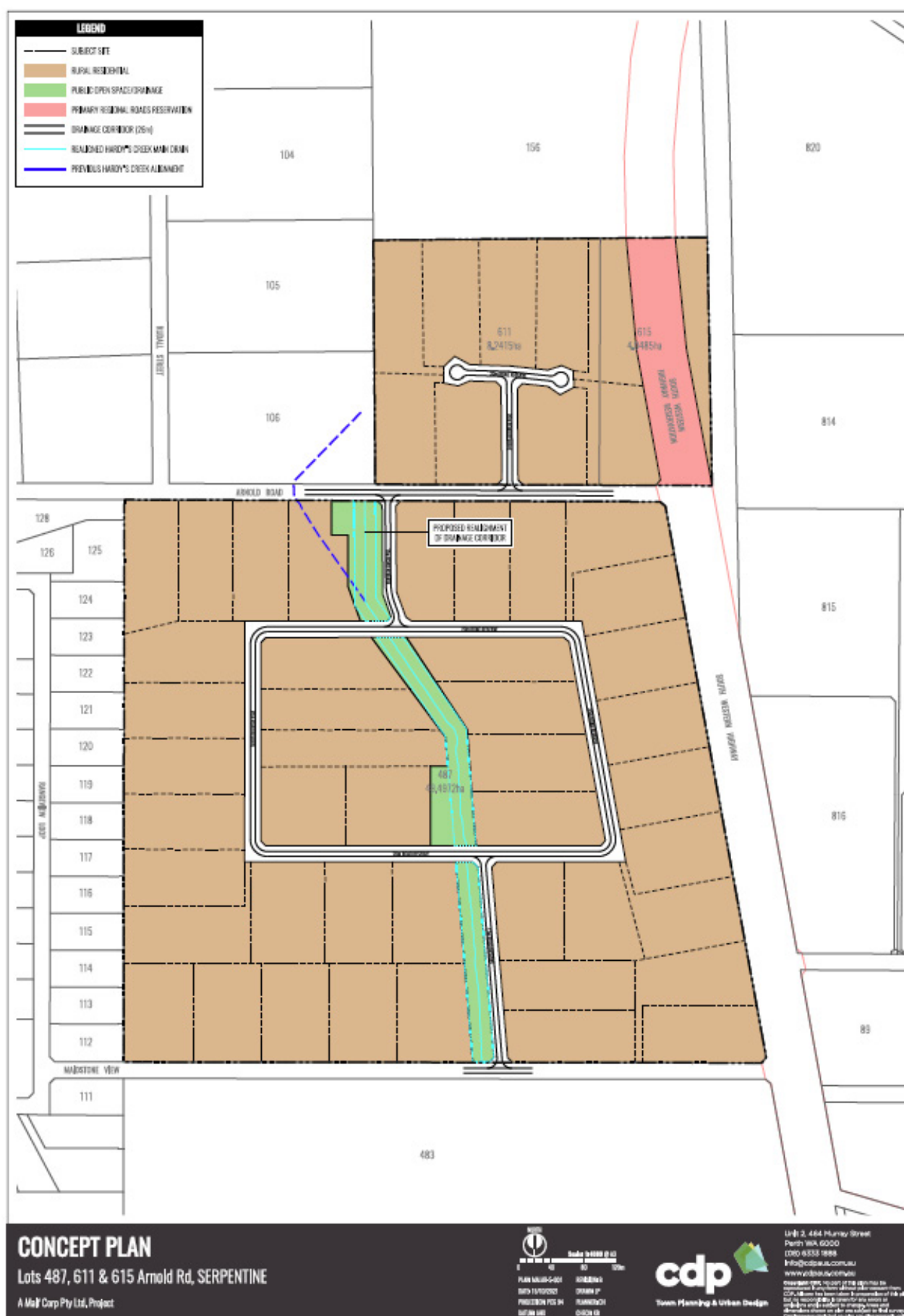
- Utilising HCMD as the focal point for social interaction and active living;
- Co-locating roads into the Structure Plan with HCMD to maximise landscape entry statement and surveillance;
- Internal roads orientated to provide direct views to and along HCMD;
- Lots fronting streets to increase passive visual surveillance;
- Internal roads designed to avoid “blind spots” with road bends providing longer lines of sight in opposite directions;

- Streets designed to emulate rural character to encourage low traffic speeds and provides safe shared space for pedestrians and cyclists;
- Bridle path co-located with HCMD to connect with the regional trail network;
- HCMD designed into a green spine connecting through the site to the future expansion of the Serpentine Townsite; and
- HCMD centrally located to maximise accessibility to all lots.

In response to the above objectives the Structure Plan embraces the relatively flat topography, which provides equitable views to the Darling Range. This picturesque backdrop enhances the sense of place and rural amenity of the area. The street network has been designed in an east-west orientation to preserve these important views.

HCMD has been reimagined as a green spine running centrally through the site, maximising accessibility of green space to all residents. The pockets of Public Open Space will provide different experiences along the HCMD. These areas also provide for statement entries into the Structure Plan and areas of respite off the Bridle Trail. The co-location of the Bridle Trail will encourage alternative modes of travel to local services within the Serpentine Townsite.

Figure 11: Concept Plan

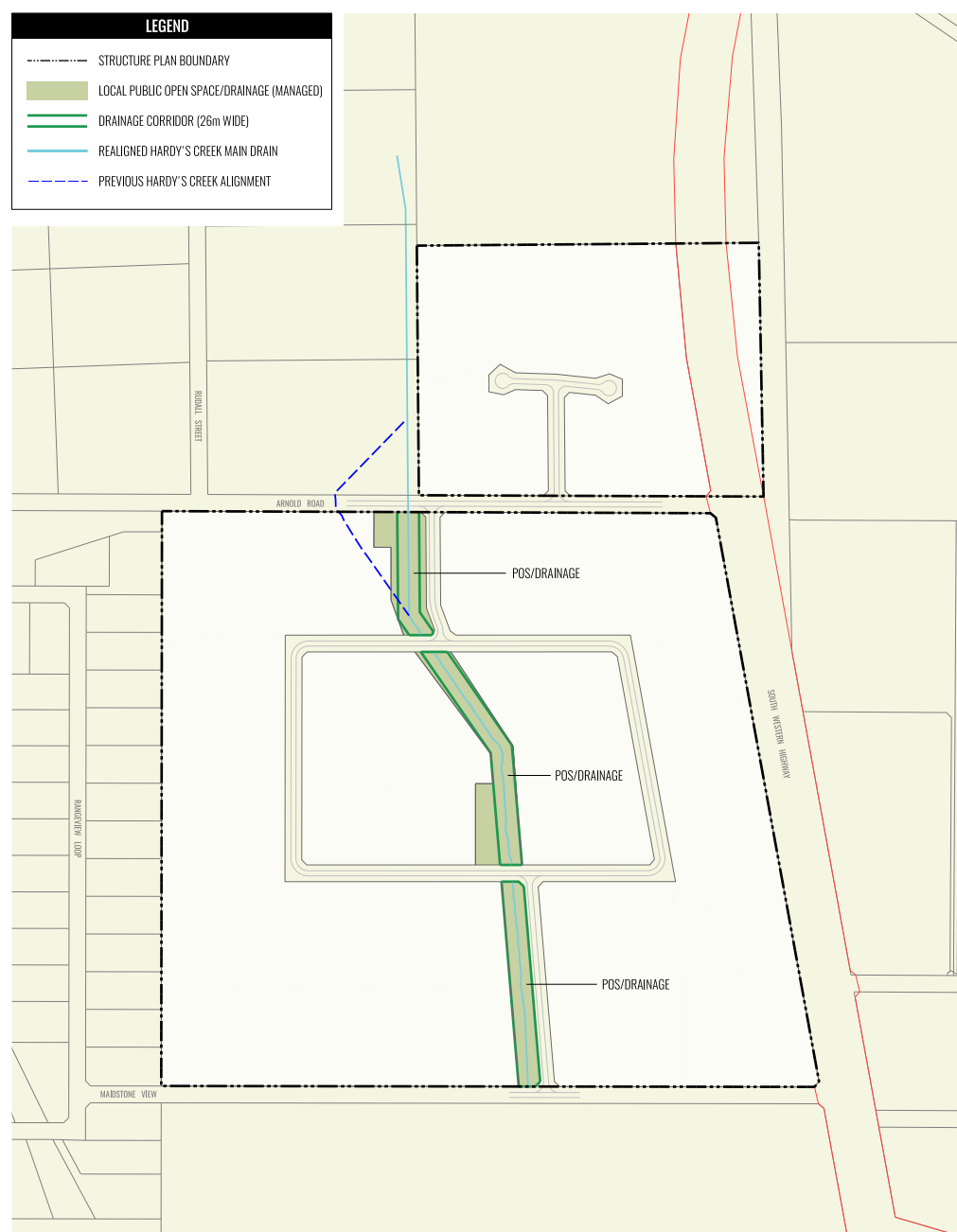


4.2 Landscaping & Revegetation Strategy

A total 2.37ha of Public Open Space (POS) is proposed (refer Figure 13) within the site which will serve a number of functions including:

- The provision of active and passive recreation;
- Incorporation of the HCMD; and
- Treatment and flood detention of stormwater runoff prior to discharge from the site.

Figure 12: Public Open Space Network



A Landscape and Revegetation Strategy has been prepared (refer Appendix D) by Plan/e Landscape Architects to coordinate attractive and functional landscaping that is sympathetic to the rural character of the area, whilst addressing the necessary environmental and bushfire management requirements.

There are four defining landscape features, the HCMD, two nodes of Public Open Space (POS), street tree planting and lot planting.

The HCMD will be revegetated into a central green spine, providing a north-south link from the site to the future Serpentine Townsite expansion. The drain will be reshaped with logs and boulders to moderate water flow, assisting in erosion control, and provide variable environments for user interest. Planting within the HCMD will comprise of low native grasses and sedges, with scattering of native trees, not exceeding 10% canopy cover at maturity to comply with bushfire management criteria. Proposed plant species are derived from the Shire's recommended species list, which are adapted to the soil type. Low understorey planting will also assist with passive surveillance with the green spine to meet the Crime Prevention Through Environmental Design (CPTED) Principles.

A 4.0m wide bridle path will be co-located with the HCMD which will connect to the regional trail network. This path will consist of constructed compact road base to retain the rural aesthetics.

Two pocket parks are proposed as entry statements to the Structure Plan, these are located adjoining the HCMD and key north-south roads. These areas will provide respite areas along the bridle trail for horses and their riders, as well as an area for passive recreation for pedestrian and cyclists. In keeping with the rural character these areas will include seating consisting of logs and boulders. Compacted road base paving and open mulch areas will provide areas for horses to be tied up. Soft planting with low native grasses and groundcovers and scattering of trees will frame the spaces.

The streetscapes will enhance the rural character of the area with roads to be un-kerbed with 1.2m wide sealed shoulders. Street trees will be planted spaced with informal spacing with an understorey of low-growing native grasses and groundcover.

All lots will be planted with endemic tree species to achieve 3% canopy coverage. Tree planting will be scattered and generally concentrated towards the perimeter of lots, especially along rear boundaries, to assist in providing screening and visual containment. The scattered tree planting will meet Asset Protection Zone (AZP) standards, pursuant to bushfire management requirements.

The landscape and Revegetation strategy ensures compliance with the fire management requirements (to achieve BAL 12.5) and provides low maintenance for the management of the Shire of Serpentine-Jarrahdale in perpetuity.

4.3 Healthy Active Design

A Health Impact Assessment has been prepared based on the *Heart Foundations Blueprint for an Active Australia* criteria. This policy provide guidance on creating spaces and places that promote walking, cycling and recreational physical activity for people of all ages.

Table 5: Health Impact Assessment

ELEMENT	POLICY RECOMMENDATIONS	DESIGN RESPONSE
Mixed land use	Provide local access to shops, schools, parks and services	The site is well serviced with existing local amenities which provide immediate benefit to residents including Serpentine Primary School, Clem Kentish Hall and Oval, Wellard Street Shops, Serpentine Horse and Pony Club, Serpentine Districts Gold Club and Serpentine Church of Christ. A neighbourhood centre is planned along Wellard Street between Lefroy Street and Richardson Road within 1km of the site, equivalent to 15 minute walk.
Medium-high densities	Increase density around activity centres and public transport hubs to encourage public transport access, walking and cycling	This Structure Plan is underpinned by a Rural Living A zone framing the periphery of the Serpentine Townsite expansion providing an intermediate scale of the development transitioning to surrounding Rural zoned land. The Structure Plan provides for an alternative lifestyle and housing choice which will support the planned neighbourhood centre and provide a logical frontier to urban development. This provides a diversity of lot sizes and densities across the Region, supporting the objectives of the Shire's Rural Strategy and draft Local Planning Strategy.
Urban design	Design neighbourhoods with high levels of street connectivity, diverse lot sizes and dwelling types, access to amenities and increased natural surveillance	The Structure Plan has been designed to maximise connectivity through the site with the HCMD centrally located for community focus and providing equal accessibility to all lots. A 4.0m Bridle Trail will be co-located along the length of HCMD to encourage horse riding, walking and cycling. Two pocket parks are proposed at the entry to the Structure Plan co-located with HCMD to provide areas of passive recreation and maximise visual surveillance.

ELEMENT	POLICY RECOMMENDATIONS	DESIGN RESPONSE
Community facilities	Careful siting of key community facilities to create walkable communities – locate schools, public transport interchanges, shops, services and retirement housing centrally in the heart of communities within connected street networks with low traffic volumes	Access to the Serpentine Town Centre is within a 15 minute walk along Arnold Road and Lefroy Street. Local Streets have been designed to emulate rural character to encourage low traffic speeds and provides safe shared space for pedestrians and cyclists.
Personal safety	Enhance natural surveillance of streets and public open space from adjacent houses and businesses	Houses will be oriented to the street with habitable rooms providing passive surveillance. In addition, internal roads have been designed to avoid “blind spots” with road bends providing two longer lines of sight in opposite directions. Road connections into the site are co-located with the main drain alignment and internal roads orientated to provide direct views to and along the main drain.
Street design	Create streets for people, prioritising access for pedestrians, cyclists and public transport over private vehicles. Good street design creates conditions for active travel including wide footpaths, safe crossings, cycle paths, seating, lighting, street trees for shade and visual amenity, and reduction of traffic speeds	Local streets are intended to emulate a more rural residential design with road designs taking on a more shared space function. Given low traffic volumes and road alignments that discourage speeding, pedestrians and cyclists will be able to comfortably share the road space as links to broader destinations.
Speed limit	Advocate for a 30km/hr speed limit for residential streets and in peak pedestrian areas, such as shopping precincts, schools and community facilities	Local streets are designed to avoid longer stretches of straight sections with a number of stopping points and bends to slow traffic speeds. These areas are also spatially aligned to key main drain entry statements and landscape features that will encourage drivers to slow down and observe.

ELEMENT	POLICY RECOMMENDATIONS	DESIGN RESPONSE
Public open space	Provide access to a hierarchy of high-quality functional public open space suitable for multiple user groups across the life course; design to enhance safety (natural surveillance from adjacent houses and business) and provide amenities to meet the needs of different user groups	The Structure Plan proposes large 1.0 hectare minimum Rural Residential lifestyle lots. It is acknowledged that the nature of this type of development provides sufficient private open space with no requirement for larger Public Open Spaces. The HCMD, whilst having a stormwater drainage function has also been designed as an important Public Open Space link. A 4.0m wide bridle path will form part of the regional trail network. This path will consist of constructed compact road base to retain the rural aesthetics. Two pocket parks are proposed as entry statements to the Structure Plan, these areas will provide respite for horses and their riders, as well as an area for passive recreation for pedestrians and cyclists.
Housing diversity	Provide dwelling choices, through a range of housing and occupancy types, to meet the needs of a diverse community throughout members' life stages.	The proposed 1.0 hectare lot sizes will contribute to the broader mix of dwelling and lifestyle choices within the immediate area. The Serpentine Town site is comprised of single dwellings on lots that range from 800m² to 2.0ha. More recent development to the immediate west has seen the development of residential lots between 2,000m² and 4,000m² in area. The proposed 1.0 hectare lot sizes are viewed as an attractive proposition to a market that is looking for a slightly larger lot size offering. Smaller, more urban lots will be provided within the Serpentine Townsite. These will add to the dwelling diversity in the locality.
Healthy food	Consider the planning and design of food environments, retail and promotion; production space, community engagement (e.g. links with education), transport infrastructure and availability of and access to healthy food outlets.	The Rural Residential nature of the Structure Plan and the broader district provides many opportunities for local food production and a supply of healthy food options. Studies have shown that lots as small as 1,500m ² can be designed to accommodate a dwelling and generate sufficient fresh food to support a family of two adults and two children. Larger 1.0 hectare lots are able to support small scale food production operations and provide a unique lifestyle choice.
Building design	Buildings that incorporate opportunities for physical activity, within the building and as part of an active travel trip (e.g. start/end of journey facilities).	Individual housing designs will be considered at a later date and are subject to individual purchaser preferences. All houses will be designed in accordance with the Building Codes of Australia.

ELEMENT	POLICY RECOMMENDATIONS	DESIGN RESPONSE
Sense of place	Create spaces that acknowledge culture, history, environment, encourage use, activity and are destinations and focal points for community activity.	The incorporation of and improvements to the HCMD will reinforce the use of the landscape as an open grazing area and it's central location will promote activity supported by the bridle trail. The prominent position of the Darling Range contributes to a strong sense of place for the Serpentine Community. Given the flat nature of the local topography, the site enjoys broad views of the Darling Range. Local streets have been aligned, where possible, in an east-west orientation to preserve these important views from the public realm.

4.4 Proposed Movement Network

In support of the Structure Plan a Transport Impact Assessment has been prepared by GTA Consultants (refer Appendix E) outlining the existing transport condition, adequacy of the proposed road network and the anticipated impact of the proposed development on the surrounding road network.

Based on the modelling undertaken by GTA Consultants, the following conclusions were made:

- The Structure Plan area will generate 408 vehicle trips per day and 41 trips in the peak hour;
- The road network accords with LN guidelines and will suitably accommodate future traffic generated within the Structure Plan area; and
- The predicted traffic volumes will have an acceptable impact on the roads in the vicinity of the Structure Plan.

The Structure Plan area is serviced by two roads, Arnold Road to the north and the future extension of Maidstone View to the south, which is currently an unmade road reserve. Traffic distribution from the Structure Plan area is anticipated to:

- Arnold Road west: 40%
- Maidstone View west: 10%
- South Western Highway north: 40%
- South Western Highway south: 10%

It is assumed that 50% of trips will be to/from the Serpentine Townsite to the west of the structure plan, with the remaining 50% of trips being distributed to South Western Highway in the east.

Given the low volume rural road environment all internal intersections within the Structure Plan are proposed to be controlled T-intersections.

4.4.1 Arnold Road

Arnold Road already provides a connection to South Western Highway in the form of a priority controlled T-intersection.

Arnold Road is proposed to be upgraded to a sealed two-lane single carriageway. Upgrades also include the intersection of South Western Highway and Arnold Road consisting of an auxiliary right turn lane and a basic left turn lane onto South Western Highway. This will enable southbound vehicles to safely overtake a stationary vehicle turning right into Arnold Road. This intersection treatment is consistent with the Transport Impact Assessment prepared by OPUS International Consultants endorsed by MRWA, as part of Scheme Amendment 193.

The upgrade of this intersection will likely attract a portion of residential traffic from the existing developments to the west. The modelling demonstrates that there is sufficient capacity in the network to cater for this additional traffic.

4.4.2 Maidstone View

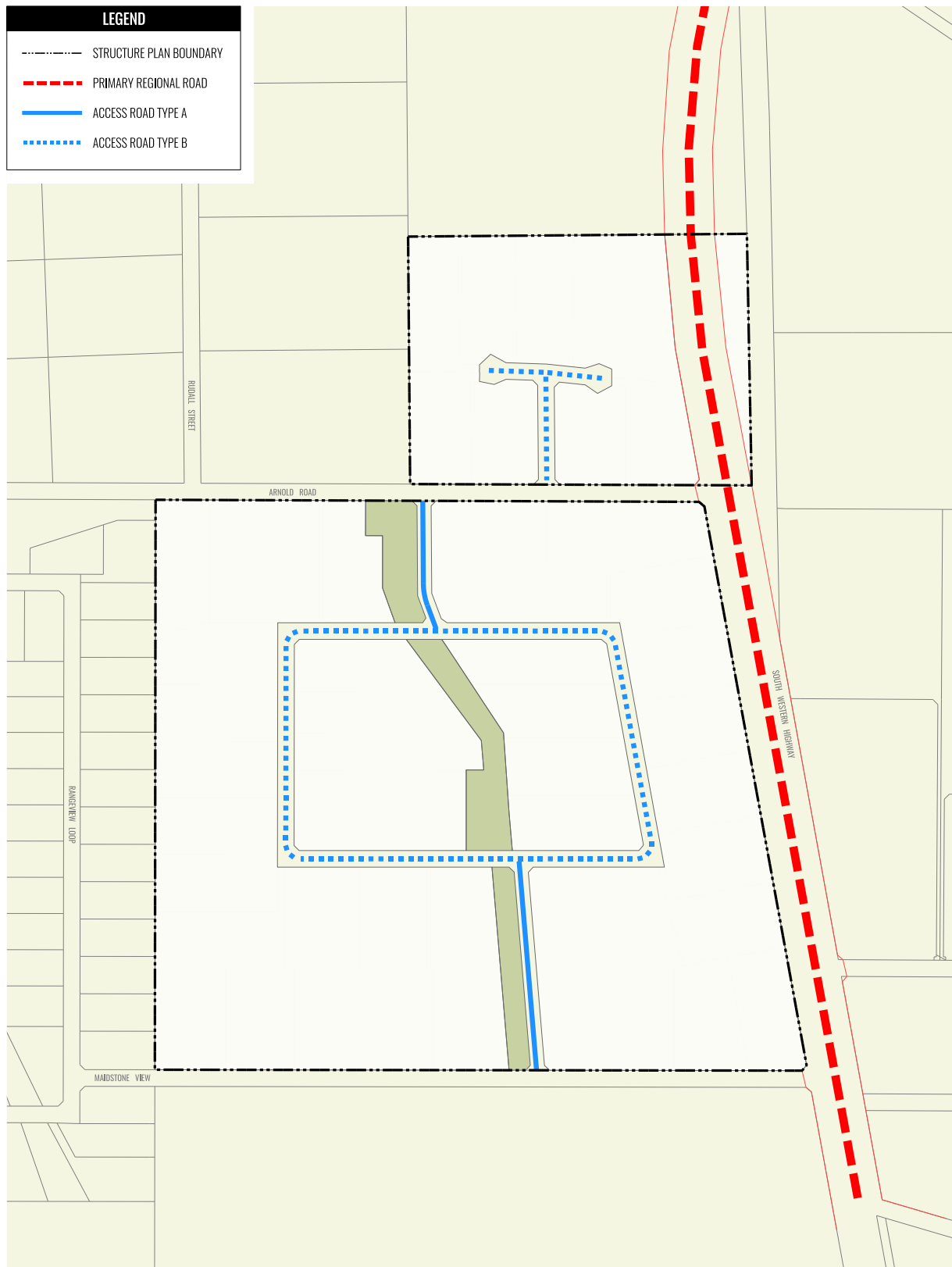
Maidstone View is not proposed to connect through to South Western Highway, therefore no external through traffic has been modelled to this road. The projected traffic count anticipated for 2031 is expected to consist solely of development traffic.

This road will be constructed as a rural road. Where possible existing trees are to be retained subject to full feature survey, arboricultural assessment and detailed civil and landscape design at subdivision stage.

4.4.3 Access Streets

The structure plan comprises largely of local Access Streets due to its rural residential nature, in accordance with Liveable Neighbourhoods which allows up to 3,000 vehicles per day (refer Figure 14). The street network in the proposed Structure Plan operates within acceptable limits with spare capacity.

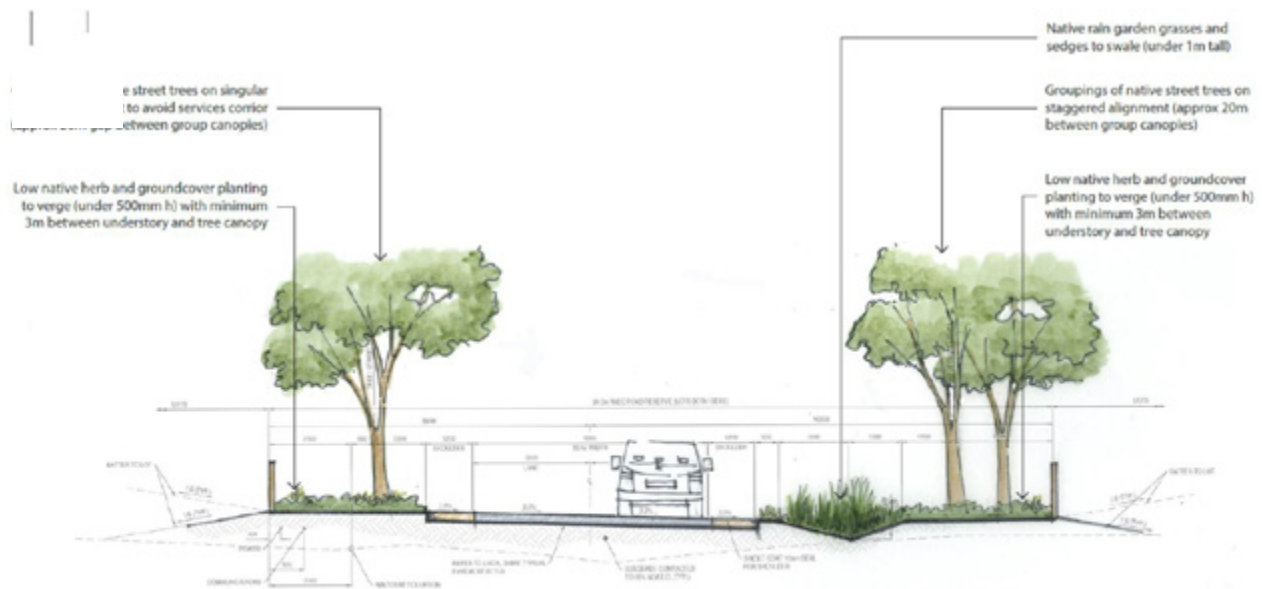
Figure 13: Road Network



part two explanatory

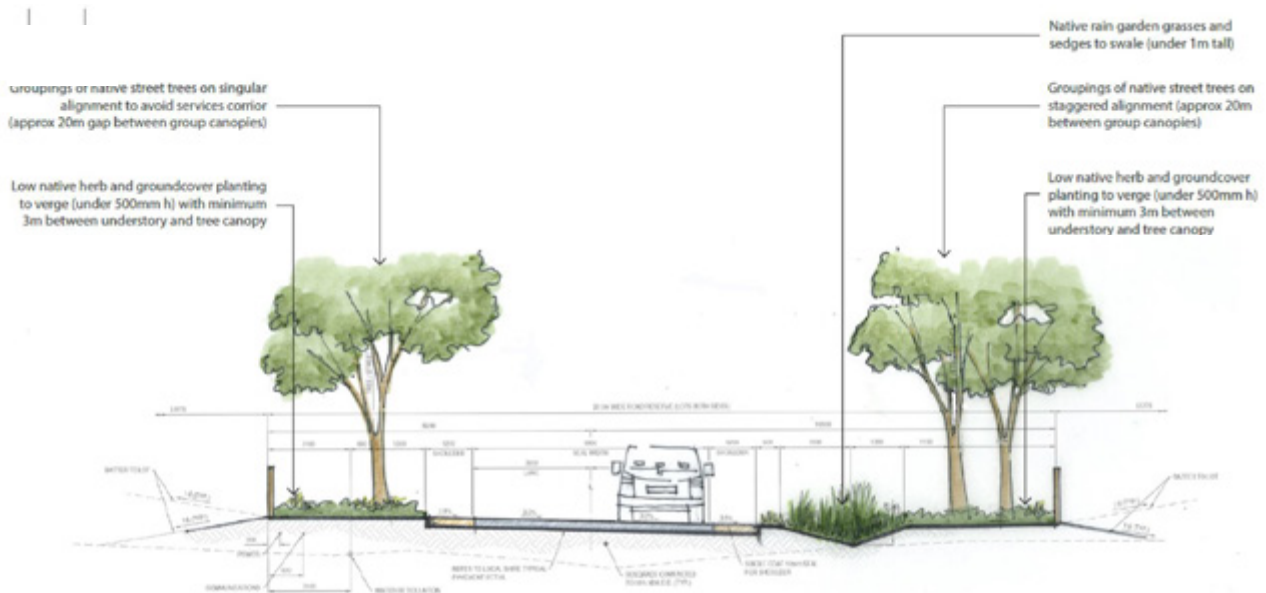
The road cross section (refer Figure 15) will consist of a 20m wide road reserve comprising of a 6.0m trafficable carriageway with 1.2m wide shoulders. These roads will be designed with one-way cross fall for drainage discharging into a roadside swale. For access to individual lots required to cross over the roadside swale, a pipe will be installed under the crossover to provide uninterrupted drainage flows.

Figure 14: Typical Access Street Cross Section (20m wide)



It was agreed with the Shire of Serpentine-Jarrahdale and DWER that roads interfacing with the HCMD will discharge towards a treatment area before discharging directly into the main drain (see Appendix I of Addendum to the LWMS contained at Appendix F). These north-south roads will therefore be constructed with a 17m wide road reserve (refer Figure 16).

Figure 15: Typical Access Street Cross Section (17m wide)

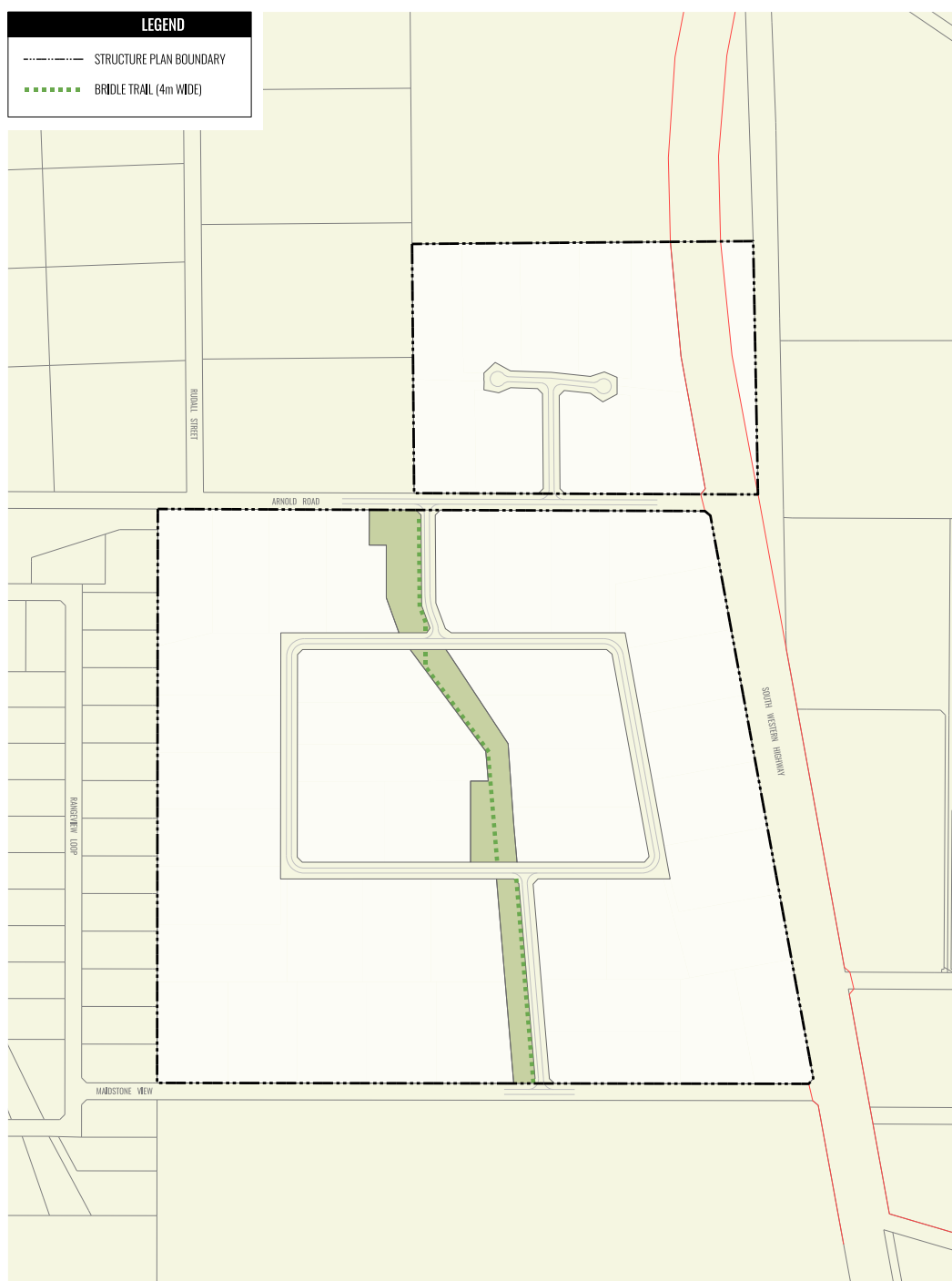


4.4.4 Path Network

The Structure Plan proposes to include a 4.0m wide bridle trail (refer Figure 17) for the length of HCMD.

The central location of the bridle trail will encourage and promote healthy active living for all future landowners, particularly given the rural roads and limited traffic within the development.

Figure 16: Path Network



4.5 Stormwater Management

An addendum has been prepared by RPS to the original Local Water Management Strategy (LWMS) prepared by Bayley Environmental Services (LWMS Addendum). The LWMS was endorsed by the Department of Water and Environmental Regulation (DWER) in 2016 as part of a Scheme Amendment to rezone the site from 'Rural' to 'Rural Living A'.

The land downstream from the Structure Plan area, north of Arnold Road, is located within the Serpentine Townsite Local Structure Plan (Townsite SP). An LWMS was prepared by GHD to support the Townsite SP in February 2013. A technical addendum to this LWMS was prepared by Coterra Environmental as part of a submission to realign the HCMD east between Arnold Road and Karnup Road. A letter from the Shire approving this addendum was issued in April 2017. In addition, this submission was supported by the WAPC, as outlined in Section 2.4.3 of this Structure Plan.

Based on the support of the realignment of the HCMD, Coterra undertook further modelling in 2019 to support further realignment of the HCMD either side of Arnold Road, effectively straightening the drainage channel.

The LWMS Addendum has been prepared to support the Structure Plan design which varies from the original LWMS, in the following ways:

- The Structure Plan seeks approval for 52 Rural Residential lots with minimum lot area of 1 hectare, whereas the LWMS addressed 115 lots of an average lot area of 0.44ha;
- Updated road network, in light of the larger lot sizes; and
- Straightening the HCMD drainage channel by relocating a portion of the HCMD either side of Arnold Road approximately 80m to the east.

The LWMS Addendum confirms these changes result in a reduction of the total impervious area, and peak discharge rates from the site into the HCMD will therefore be less than the peak flow rates presented in the previous modelling report.

The LWMS Addendum also provides that runoff in minor storm events can be effectively managed within lots and

a flood storage volume will be adequately provided in the HCMD. Bioretention treatment of the first 15mm of runoff will be provided in linear swales located within a buffer strip adjacent to the HCMD as agreed between the shire and DWER (see appendix I of the LWMS Addendum).

Further water management details will also be provided at detailed design stage and documented in future Urban Water Management Plan(s) to support subdivision application.

4.6 Bushfire Hazard

The Structure Plan area is identified as a Bush Fire Prone Area under the state-wide Map of Bush Fire Prone Areas as such a Bushfire Management Plan (BMP), has been prepared by Emerge Associates (refer Appendix G). This BMP has been prepared in accordance with the *State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP3.7)*, the *Guidelines for Planning in Bushfire Prone Areas and Australian Standard 3959-2009 Construction of buildings in bushfire prone areas (AS 3959)*.

The purpose of the BMP is to assess bushfire hazards and demonstrate that the threat posed by identified hazards can be appropriately mitigated and managed. A Bushfire Attack Level (BAL) assessment was undertaken reviewing the classification and condition of vegetation within 150m of the site.

A post development scenario has been assumed in which the majority of vegetation within has been removed or is managed in a 'low threat' standard. The exception being the HCMD corridor which will be revegetated, with two area of Public Open Space (POS).

The land to the west (north of Arnold Road), which forms part of the Serpentine Townsite Structure Plan, will be managed by the landowners (being under the same ownership) to a 'low threat' standard.

The outcome of the BMP indicates that all future habitable buildings can be sited within the proposed development so that BAL-29 or less can be achieved. Whilst some lots within the site are subject to BAL rating exceeding BAL-29 due to the grassland vegetation located external to the site and within the HCMD, the proposed lots are of adequate size so future habitable dwellings need not exceed a rating of BAL-29.

4.7 Services and Infrastructure

An Engineering Services Report has been prepared by Pritchard Francis (refer Appendix H). This report outlines that the land is capable of being service by essential services and provides information to support this.

4.7.1 Stormwater Drainage

All 20m wide roads will be designed with one-way cross fall for drainage, discharging into a roadside swale. Where crossovers are required over the swales to provide access to lots, a 375mm pipe will be installed under the crossover to provide uninterrupted drainage flows. Roads directly abutting the HCMD, which run north- south will be constructed with one-way cross fall and stormwater runoff will discharge accross treatment areas before discharging into the main drain, as agreed with the Shire and DWER.

All internal lot drainage will be contained on site.

4.7.2 Sewer

All lots will require private effluent treatment systems to be installed by individual lot owners, as no piped gravity system exists. A Geotechnical Report prepared by Douglas Partners (refer Appendix A) confirms that the use of on-site effluent disposal and treatment systems are acceptable. This is further justified in the Site and Soil Evaluation Report prepared by Emerge (refer Appendix K).

In order for effluent systems to operate efficiently, the building envelopes may be required to be filled with sand to provide sufficient clearance above the surface level.

4.7.3 Water

There is an existing potable water supply system servicing the existing development to the west of the site which will be extended to service the Structure Plan area. This network consists of 150mm water main in Range View Loop and Lefroy Street that will be extended east.

4.7.4 Power

The existing Western Power distribution in the vicinity of the site comprises of a 22kV aerial High Voltage and underground Low Voltage network.

The aerial High Voltage is located along the eastern side of South Western Highway running in a north-south direction. The next closest High Voltage network is 800m north-west. The closest underground Low Voltage network is located on the northern verge of Maidstone View which originates from a pad mounted transformer located 280m west.

The capacity of the local zone substation can be determined from Western Power's public Network Capacity Mapping Tool. Currently there is less than 5MVA capacity in the substation. Within the next 10 years this is expected to stay the same, suggesting that Western Power does not have scheduled/planned upgrades for the area.

In order to service the proposed 52 rural residential lots, at Western Power's standard 5kVA per lot allocation, the total load will be 265kVA and there is no load currently allocated to the lots. Based on the estimated load for the site and proximity of the existing Western Power network, the development will likely require new Western Power underground infrastructure to be installed.

The estimated demand for the site being less than 500kVA will not have a significant impact on the remaining capacity in the network and does not warrant the project being responsible for contributing towards the costs of upgrade at the zone substation to create additional capacity.

Spare capacity in the adjacent High Voltage network can only be confirmed via an application to Western Power.

High Voltage feeders can supply a switchgear located within the development servicing a 315kVA transformer which will supply power to the lots. Discussion with Western Power are required to determine whether alternative High Voltage connection arrangements are possible.

Western Power will neither reserve capacity nor guarantee supply until a request is made at the time of subdivision.

4.7.5 Gas

There is no natural gas network in the area and no supply will be provided for this development.

4.7.6 Telecommunications

Telstra's existing network is currently adjacent to Arnold Road and South Western Highway with Serpentine Exchange located 1,500m north-west. There is access to this existing fixed line telecommunications infrastructure.

NBN can service the development with broadband, given their existing network has coverage in this area.

4.8 Acoustic

A Road Traffic Noise Impact Assessment has been prepared by Herring Storer Acoustics (refer Appendix I) to address the potential noise impacts from traffic noise generated from South Western Highway with the current road alignment, and proposed future alignment.

The objectives of *State Planning Policy 5.4 Road and Rail Noise* (SPP 5.4) are to achieve:

- Indoor noise levels specified for noise sensitive areas (e.g. bedrooms and living rooms of house and school classrooms); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot.

The assessment of lots within 300m of South Western Highway indicates that without any noise amelioration, noise received at the residences in the future would exceed the 'Noise Target' as outlined in SPP 5.4 by up to 7 dB(A) during the night time.

For residential development, the possible amelioration options that are normally considered are:

1. Noise bunds and/or barriers;
2. 'Quiet House' design applied to the first row of residences.

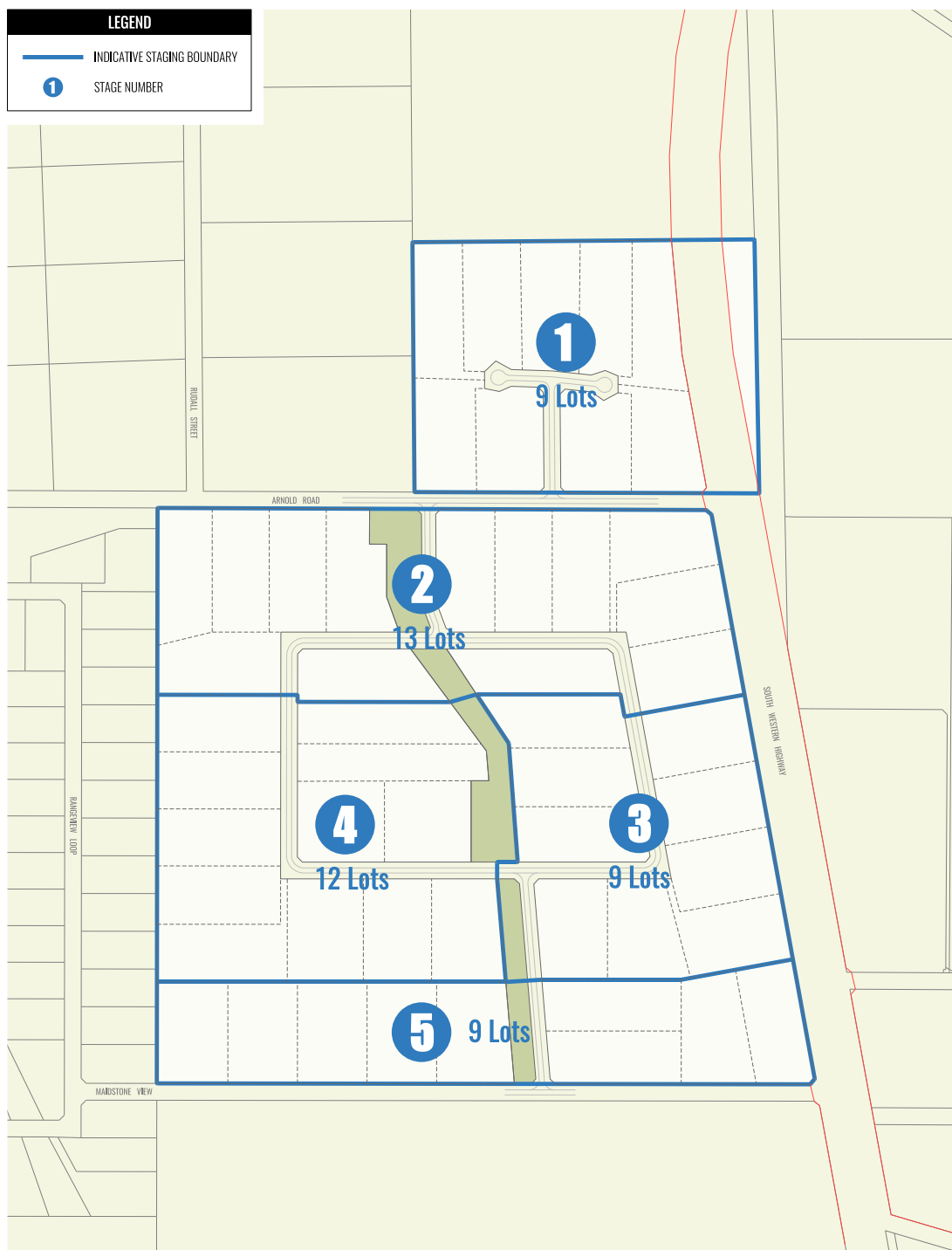
A noise wall or bund is considered excessive for rural residential development. As the lots are proposed to be minimum 1 hectare in area there is sufficient space to have the building envelopes setback within the lots. This setback provides sufficient distance to reduce noise levels to a point where Quiet House Design, in the form of Package A to Package B would allow the internal noise criteria to be met.

All lots that are identified as being affected will require notifications on titles as per SPP 5.4.

4.9 Indicative Staging

It is proposed that staging will commence from the northern portion of the site, with access provided via Arnold Road. The staging will progress in a southerly direction towards Maidstone View (refer Figure 18).

Figure 17: Indicative Staging Plan



5.0 Conclusion

The Arnold Road Local Structure Plan will facilitate the development of Rural Living lots, complimented by the high quality revegetated Hardy's Creek Main Drain and interconnected road network. The design is consistent with strategic planning context that is applicable to the Serpentine locality.

The Structure Plan has been designed to capture and enhance the rural character of the area. This principle will continue to guide future detail design and development efforts through the subdivision process.

Future residents will be well serviced by existing amenities within the Serpentine Townsite, which is planned to expand to include additional residential land and a neighbourhood activity centre, a 15 minute walk from the Structure Plan.

The Structure Plan appropriately responds to State planning framework, being identified as Rural Residential to frame and provide an intermediate scale of development between the Serpentine Townsite and surrounding Rural zoned land.

