

NORTH-EAST BALDIVIS

DISTRICT STRUCTURE PLAN

PART TWO - EXPLANATORY SECTION

APRIL 2025



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1.0

INTRODUCTION AND PURPOSE

1.0 INTRODUCTION AND PURPOSE

This Part Two: Explanatory Report provides the background and supporting information that has informed preparation of the District Structure Plan Map and Part One: Implementation Section. It describes the influencing factors that have shaped the District Structure Plan (DSP) design and provides the rationale behind the matters to be addressed and implemented at subsequent planning stages. The Part Two summarises the suite of technical appendices that support the DSP, discussing the key findings and describing the DSP response to the sites context and characteristics.

The Part Two report is structured as follows:

Section 2 describes the land that comprises the DSP.

Section 3 summarises the key elements of the existing planning framework relevant to the DSP, demonstrating consistency between the proposed DSP and strategic planning for the sub-region.

Section 4 discusses the DSP area's characteristics in terms of physical and cultural features relevant to development of the land as proposed.

Section 5 comprehensively describes the various elements of the DSP and how it responds to site constraints, demonstrating suitable management responses and measures to be implemented at subsequent stages of planning.

Section 6 describes the infrastructure items that are expected to require shared funding through future Development Contribution Plans.



2.0

LAND DESCRIPTION

2.0 LAND DESCRIPTION

The DSP encompasses all the land east of the Kwinana Freeway identified as 'Urban Expansion' under the *Perth and Peel@3.5million – Planning Investigation Areas Update* (the PIA Update). The following sections provide a detailed description of the DSP area and its surrounds.

2.1 Location

The DSP area is located approximately:

- 34km south of the Perth CBD;
- 4.5km north-east of the Baldivis District Centre;
- 3km south-east of the Wellard Train Station;
- 10km east of the Rockingham Strategic Centre; and
- 8km from the Western Trade Coast (refer Figure 1 – Location Plan).

It directly abuts the Kwinana Freeway to the west, Mundijong Road to the south, the rail freight line to the north and rural land to the east. The existing rural land to the east and north-east is strategically identified as 'Urban Investigation' under the PIA Update. The PIA Update also identifies a 360-hectare area of 'Industrial Expansion' land to the south, on the opposite side of Mundijong Road.

The DSPs location directly abutting the intersection of the Kwinana Freeway and Mundijong Road provides direct and efficient access to the regional road network via an existing interchange. Its location directly abutting the established suburb of Wellard to the north and Baldivis to the west make it a logical and sequential extension of the urban front.

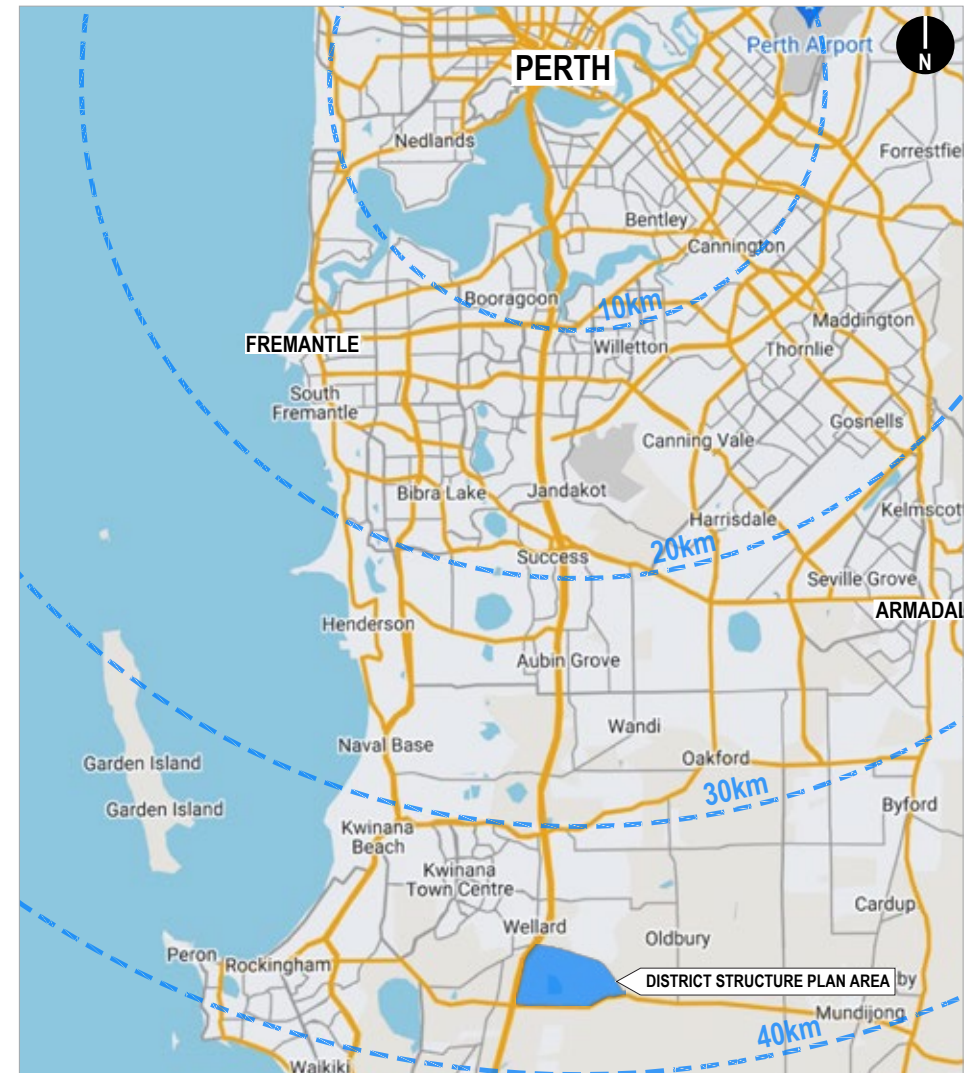


Figure 1 - Location Plan

Source: Snazzy Maps



2.2 Area and Land Use

The DSP is approximately 760 hectares in area. The majority of the site has been historically cleared of native vegetation with some limited areas remaining that consists mostly of isolated trees.

A site plan identifying the DSP area and its surrounds is Figure 2 – ‘Site Plan’.

The land is primarily used for a range of rural, special rural and recreational land uses. Key land uses of note include:

- Water ski park, jet boat sprint park and paintballing (lot 101).
- Livestock holding facility (lot 2).
- Tourism and aquaculture (lot 470).

Land uses external to the site that have been considered in the preparation of the DSP are discussed in further detail under sections 4.8.4 of this report. The management response to both internal and external land uses which may affect the timing to develop land for urban purposes is discussed at section 4.8.4 and 5.6.4.



Figure 2 - Site Plan

Source: Nearmap

Table 1: Land Ownership

Lot Number	Owner	Land Area (ha)	Plan	Volume / Folio
1 (NW)	OMAXE GROUP PTY LTD	6.6076	P038268	2226/688
2 (NW)	LLOYD, ROBERT KENNETH	11.9352	P038268	2226/689
3 (NW)	MICHEL, CHRISTOPHER JAMES MICHEL, HARALD RUDI	7.1999	P038268	2226/690
4	JABADO, GHASSAN AHMAD JABADO, MARIA	6.0070	P038268	2226/691
3 (N)	OMAXE GROUP PTY LTD	2.0234	D049236	1434/599
20	COMMISSIONER OF MAIN ROADS	0. 7869	D095616	2152/957
21	AUSTRALIA SUIDA INTERNATIONAL GROUP CO PTY LTD	8.4081	P024998	2214/515
22	SKEWES, CLINT EDWARD SKEWES, COLLEEN GWENDOLINE	9.1332	P024998	2214/516
23	ECKERSLEY, CRAIG DOUGLAS ECKERSLEY, JAN ALICE	8.2404	P024998	2214/517
24	SMITH, PAUL JOHN	8.2045	P024998	2214/518
2 (St Albans Rd)	4C CORPORATION PTY LTD	24.3238	D042118	553/70A
451	STOCKLAND MIAMI (QLD) PTY LIMITED	21.0509	P202741	1754/190
452	STOCKLAND MIAMI (QLD) PTY LIMITED	21.5028	P202741	1754/191
454	STOCKLAND MIAMI (QLD) PTY LIMITED	47.3745	P202741	1128/147
455	LORIAN NOMINEES PTY LTD	23.2457	P202741	1585/678
456	STOCKLAND MIAMI (QLD) PTY LIMITED	23.8912	P202741	594/96A
457	STOCKLAND MIAMI (QLD) PTY LIMITED	24.7532	P202741	594/97A

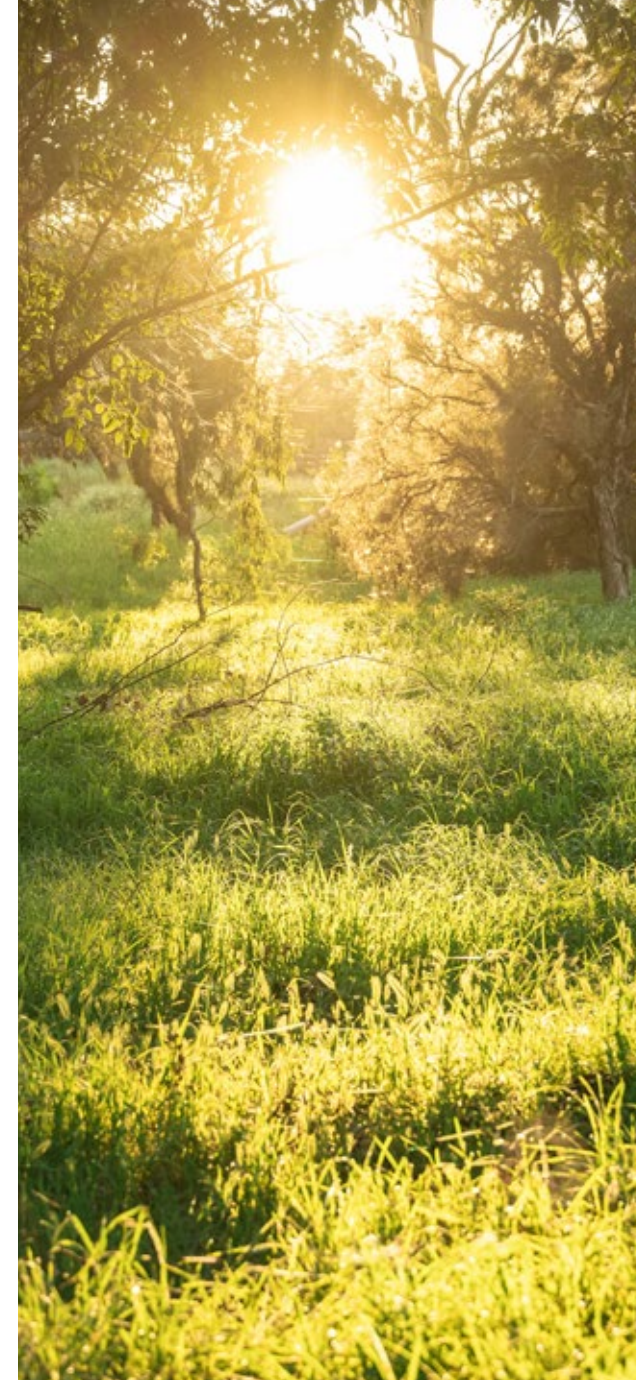
2.3 Legal Description and Ownership

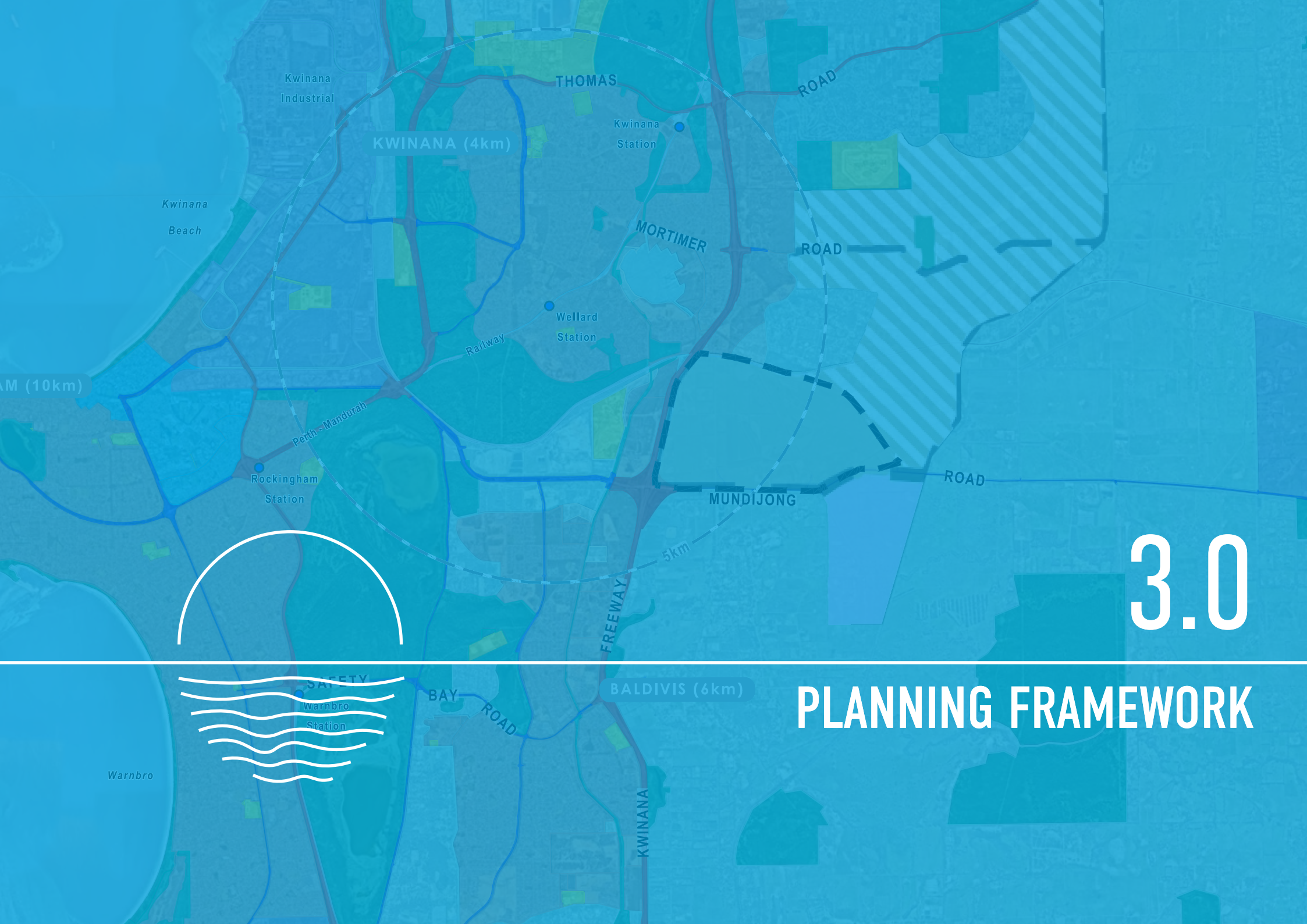
The DSP comprises 35 rural lots and two drainage reserve lots. The ownership structure of the DSP is outlined at Table 1.

Of the 35 lots identified at Table 1, Stockland as the proponent for the DSP, control 13 lots at 466.5 hectares or 62% of the total area. This makes Stockland the majority landowner and a logical proponent for the DSP, given its history as an established, national land developer.

Other landowners within the DSP representing approximately 5% of the total area have been working collaboratively with Stockland to progress the land for urban development. This represents 67% of the DSP owners actively working towards an urban outcome as proposed by the DSP.

Lot Number	Owner	Land Area (ha)	Plan	Volume / Folio
458	STOCKLAND MIAMI (QLD) PTY LIMITED	5.5588	P202741	1334/429
100	STOCKLAND MIAMI (QLD) PTY LIMITED	17.6897	D071358	1822/35
101	BONNEY CUSTODIAN PTY LTD	58.9792	D071216	1754/188
1 (SW)	CITY OF ROCKINGHAM	27.0834	D017410	1965/438
33	COMMISSIONER OF MAIN ROADS	0.5805	D095630	2151/255
1 (St Albans Rd)	GOSATTI, BRUNO	11.7897	D042118	1754/189
465	STOCKLAND MIAMI (QLD) PTY LIMITED	8.5121	P152853	599/2A
466	STOCKLAND MIAMI (QLD) PTY LIMITED	6.9987	P152853	599/1A
467	GOSATTI, MAVIS ANNE	12.0359	P202741	1585/677
468	EVERLAST INTERNATIONAL INVESTMENT PTY LTD	13.6445	P202741	392/104A
469	PREISSER, KYLIE PETA PREISSER, WOLFGANG MANFRED RUDOLF	14.2872	P202741	1578/365
470	ALDWICH HOLDINGS PTY LTD	37.3376	P202741	1578/364
46	STATE OF WESTERN AUSTRALIA	4.6834	P202741	LR3008/888
1261	STOCKLAND MIAMI (QLD) PTY LIMITED	5.0879	P152853	1128/150
1 (NE)	STOCKLAND MIAMI (QLD) PTY LIMITED	42.2688	P077728	2834/498
2 (E)	STOCKLAND MIAMI (QLD) PTY LIMITED	182.8807	P077728	2834/499
201	EXCELLAND CORP PTY LTD	38.2790	P036173	2225/115
806	TEISSIER, FRANCK PHILLIP	2.1324	P066160	2745/721





3.0

PLANNING FRAMEWORK

3.0 PLANNING FRAMEWORK

The *South Metropolitan Peel Sub-regional Planning Framework* (March 2018) ('the Framework') provides the strategic direction for managing growth and development within Perth's south-west corridor. The Framework and associated mapping spatially identify consolidated urban areas to accommodate population growth as well as locations for strategic employment land for approximately 27 years (up to 2050). Upon release of the Framework in 2018, the DSP area was classified as a 'Planning Investigation Area'. Planning Investigation Areas (PIAs) are described as areas requiring further planning investigation as part of the strategic reconsideration of land use in the sub-region to determine whether any changes to zoning should occur. The DSP was identified within the 'East of Kwinana and Pinjarra-Ravenswood' sectors with 17 'key considerations' to be investigated as part of further planning investigations.

The DPLH, with input from key State Government agencies such as the Department of Water and Environmental Regulation (DWER) and Main Roads WA, undertook the requisite investigations into the East of Kwinana PIA, culminating in a recommendation being presented to the Western Australian Planning Commission (WAPC) at the end of 2021. In September of 2022, the WAPC published the *Perth and Peel@3.5million Planning Investigation Area Update* (September 2022) (the PIA Update). The PIA Update provides strategic direction by the WAPC on the various PIAs identified by the Framework in 2018, including the East of Kwinana sector PIA.

A key outcome of the PIA Update is the WAPC's support for a change in land use of the DSP area from rural to 'Urban Expansion' – providing clear direction regarding the intended land use outcome for the area. The WAPC describes 'Urban Expansion' areas *"land suitable for urban development as previously identified in planning studies, or which represents the logical expansion of an existing urban area."*

The PIA Update (refer Figure 3) identified the remainder of the East of Kwinana sector, north of Mundijong Road as 'Urban Investigation' with the area south of Mundijong Road confirmed as 'Industrial Expansion'. Under the Framework, a DSP is identified as a suitable instrument to coordinate the planning of Urban Expansion areas, generally prior to region scheme rezonings. This DSP is therefore prepared to coordinate future planning processes and development outcomes consistent with the Framework and the PIA Update.

In addition to the standard information and documentation prepared as part of a DSP, the PIA Update identified 6 key considerations that are to be addressed through further detailed planning. The 6 key considerations, as well as a brief response is provided at Table 2 below.

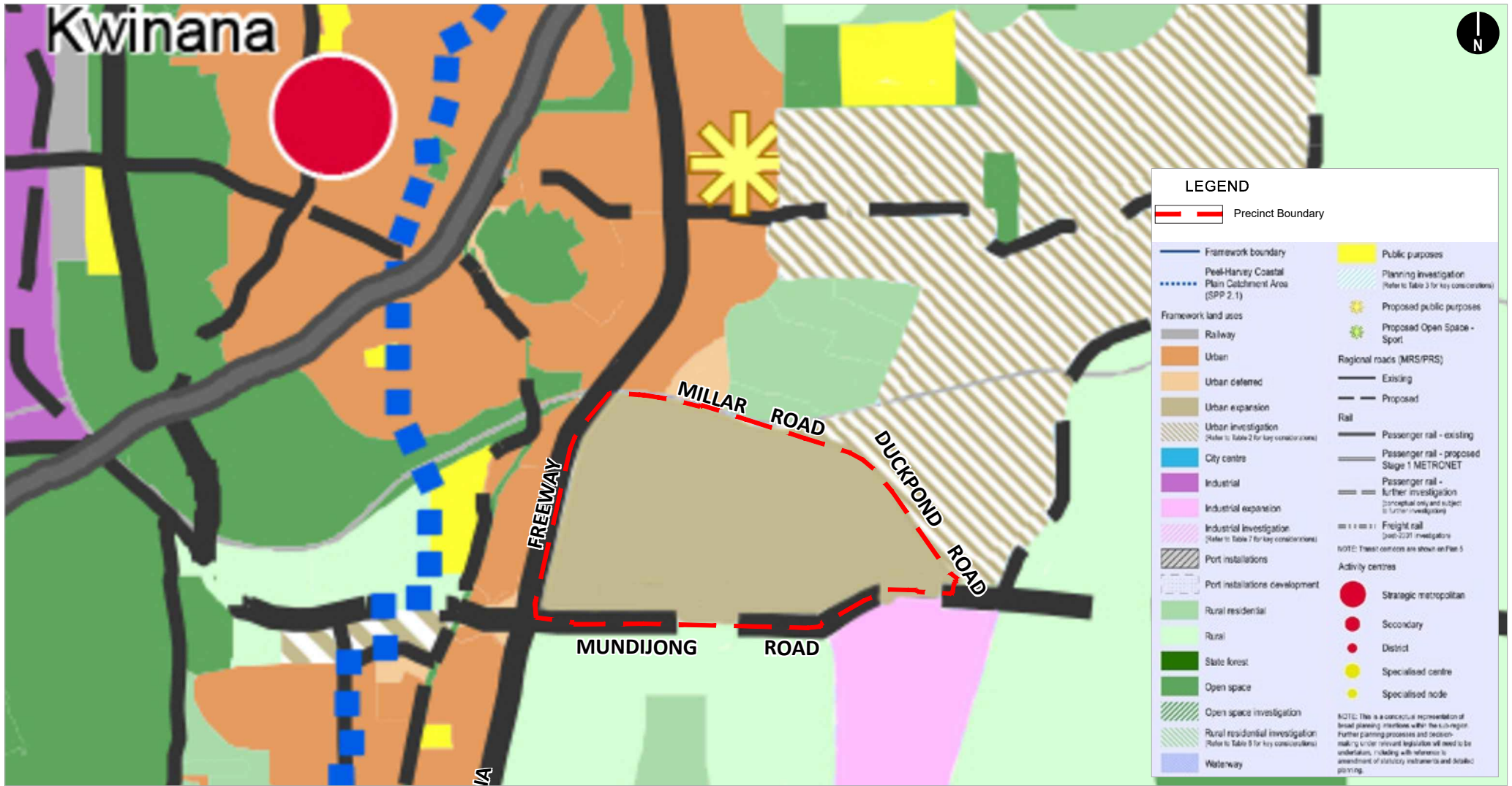


Figure 3 - Planning Investigation Area Update 2022

Source: WAPC

Table 2: East of Kwinana Urban Expansion Area – Key Considerations

Key Considerations	Comment	Relevant Section of DSP Report
Road transport infrastructure coordination and staging (at a regional and district level).	A comprehensive Traffic Impact Assessment has been prepared to inform the traffic planning for the DSP. The Traffic Impact Assessment identifies an internal road hierarchy and coordinates intersections with the external road network. Information on regional and district infrastructure is considered and addressed by the Traffic Impact Assessment and DSP.	5.4
Servicing infrastructure coordination and staging.	A detailed Engineering Servicing Report has been prepared to accompany the DSP, demonstrating that the land can be serviced by all necessary utility infrastructure. Further detailed discussions with servicing authorities regarding the implementation of the servicing strategy have commenced and are ongoing.	5.10
Protection of significant environmental values.	On site surveys and investigations have been conducted and are documented within the Environmental Assessment Report that supports the DSP. Informed by the Environmental Assessment Report, the DSP identifies the best quality, most intact environmental features for retention and protection within future local reserves. Notwithstanding, the DSP area is largely cleared of native vegetation in association with historical agricultural uses.	5.6
Land to be set aside for flooding and drainage.	The DSP is informed by a comprehensive District Water Management Strategy which reflects the outcomes of the Department of Water and Environmental Regulation's flood modelling for the area. Accordingly, the DSP sets aside adequate land for flood management and drainage and specifies the development and management responsibilities for these areas.	5.7
Sand fill required to provide separation to groundwater and flood level (including estimated volumes, resource locations and transport).	The Engineering Servicing Report provides an estimate of the fill volumes necessary to facilitate development of the site, including discussion on potential sources and locations. The earthwork strategy seeks to minimise the amount of fill required to develop the site.	5.10
Interface with the adjoining Urban Investigation area at North-East Baldivis.	The DSP provides a road interface with the adjoining 'Urban Investigation' area to the east, enabling future connections if necessary. Further, the DSP requires future local structure planning of the land adjoining the 'Urban Investigation' area to consider and respond to any planning of the WAPC that may have been completed over this area.	5.4

3.1 City of Rockingham Local Planning Strategy

At the time of drafting, the City of Rockingham's Local Planning Strategy is under preparation and is yet to be advertised. It is therefore anticipated that the Local Planning Strategy will identify the land as 'Urban Expansion' (or similar designation) consistent with the PIA Update and the position of the WAPC.

3.2 Zoning And Reservations

3.2.1 Metropolitan Region Scheme

The Metropolitan Region Scheme (MRS) is the statutory planning framework that zones and reserves land for the Perth Metropolitan Region.

The majority of the DSP is zoned 'Rural' under the MRS (refer Figure 4 – Metropolitan Region Scheme). Specific areas of the DSP are reserved under the MRS to accommodate future upgrades to transport infrastructure. These areas are described as follows:

- The land required for the upgrade of the Mundijong Road interchange with the Kwinana Freeway in the south-west corner of the DSP is reserved for the purpose of 'Primary Regional Roads'.
- The future alignments for the Telephone Lane and St Albans Road intersections with Mundijong Road are reserved for the purpose of 'Other Regional Roads'.

Outside of the DSP area, the land to the north-west on the opposite side of the rail freight line is zoned 'Urban' and 'Urban Deferred' (refer Figure 4). The rail freight line which bisects the urban land from the DSP area and abuts the western half of the northern DSP boundary is reserved for the purpose of 'Railways' under the MRS.

As outlined under the 'Future Processes' section of the Part 1 – Implementation Report, future amendments to the MRS will be required to implement the DSP.

3.2.2 City of Rockingham Local Planning Scheme No. 2

The DSP area is predominantly zoned 'Rural' under the City of Rockingham's Local Planning Scheme No. 2 (LPS 2) (refer Figure 5 – Local Planning Scheme 2). Nine lots in the north-west corner of the DSP, approximately 9% of the total area, are zoned 'Special Rural' under LPS 2.

The LPS 2 Map also identifies a linear 'Local Reserve' for the purpose of drainage on an east-west alignment between Telephone Lane and the western boundary of the DSP. As shown at Figure 5, this east-west drainage feature connects with the Peel Main Drain which sits between the western boundary of the DSP and the eastern boundary of the Kwinana Freeway. The Peel Main Drain, running parallel to the Kwinana Freeway is similarly reserved under LPS 2 for the purpose of drainage.

Future amendments to LPS 2 will be required to implement the DSP as outlined within the 'Future Processes' section of the Part 1 – Implementation Report.

3.2.3 City of Kwinana Local Planning Scheme No. 2

The northern DSP boundary abuts the City of Kwinana's southern jurisdictional boundary. Whilst no amendments to the City of Kwinana Local Planning Scheme No.2 (LPS 2) will be required to implement the DSP, the zoning of the adjoining land to the north is a relevant contextual consideration in the strategic identification of the DSP area as 'Urban Expansion'.

The land adjacent the north-western corner of the DSP and on the northern side of the rail freight line is zoned 'Development' under LPS 2 and accordingly, has been developed for residential purposes. Land within the 'Urban Deferred' zone of the MRS is zoned 'Cluster/Communal Rural Settlement' under LPS 2, with the land further east zoned 'Special Rural 15'.

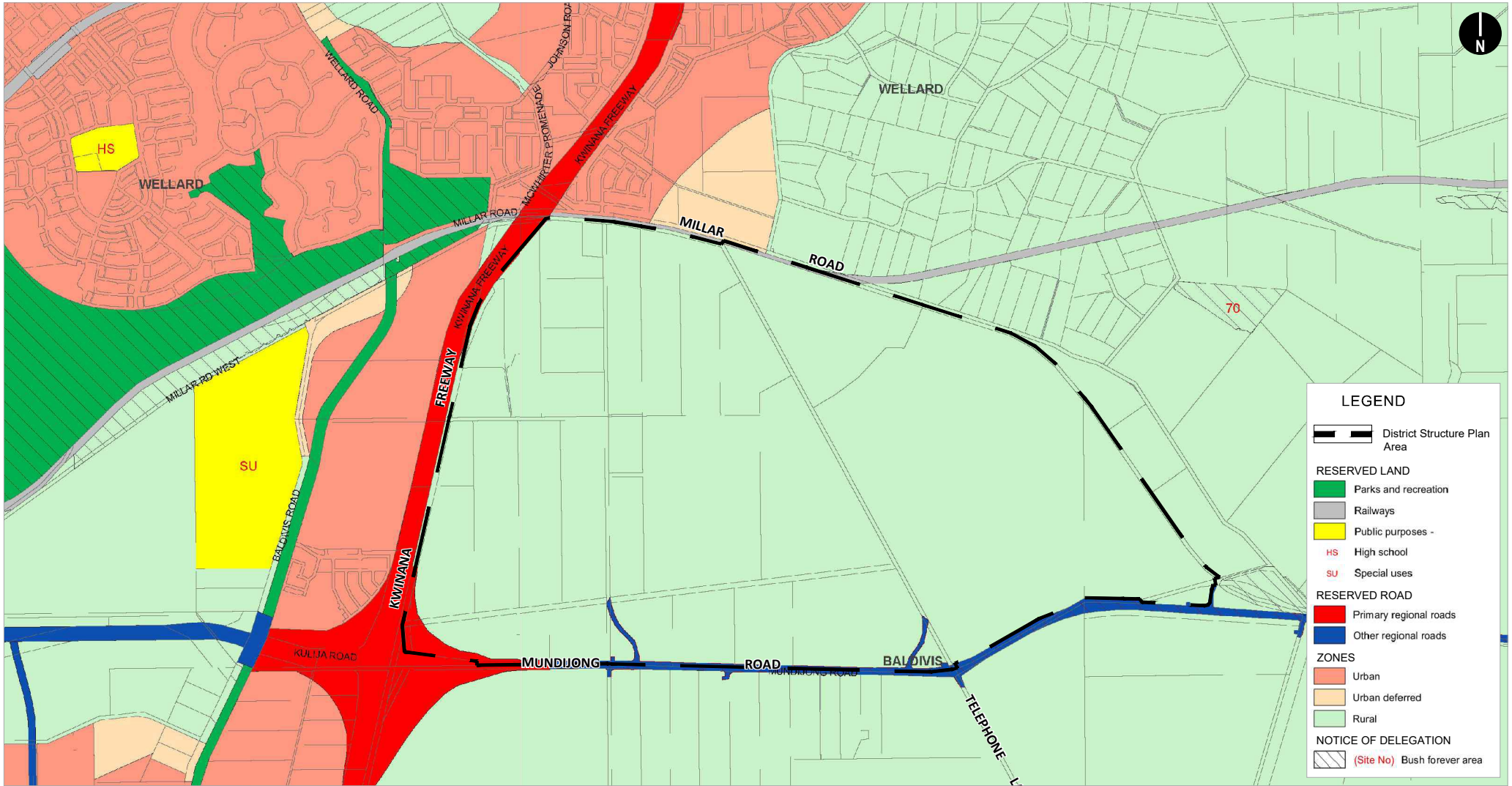


Figure 4 - Metropolitan Region Scheme Map

Source: WAPC

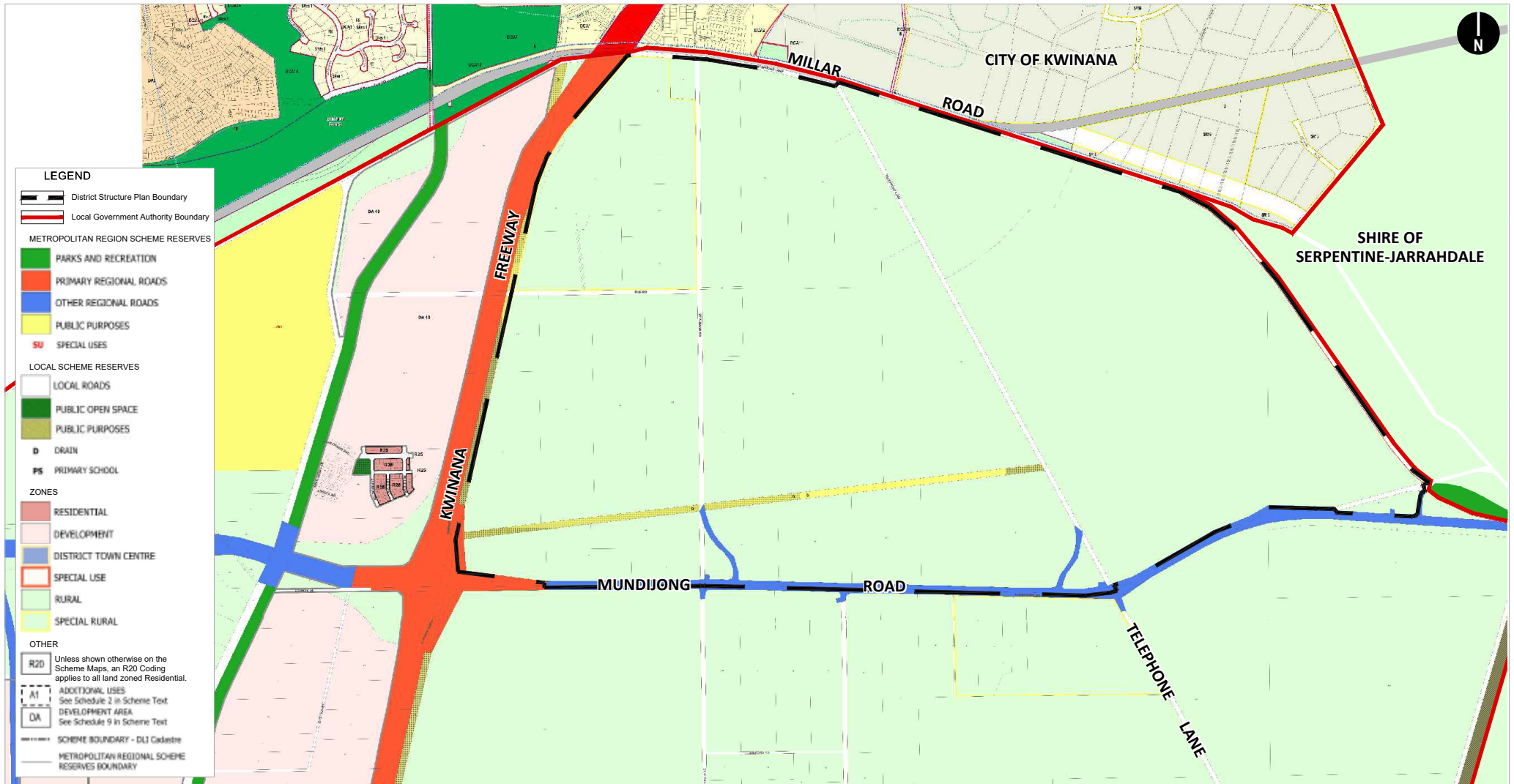


Figure 5 - Local Planning Scheme No. 2

Source: WAPC

3.2.4 Shire of Serpentine-Jarrahdale Town Planning Scheme No. 2

The eastern DSP boundary abuts the Shire of Serpentine-Jarrahdale's jurisdictional boundary. No amendments to the Shire's Town Planning Scheme No.2 are required to implement the DSP. The land within the Shire to the east of the DSP is zoned 'Rural'. A linear local reserve for the purpose of 'Public Open Space' runs parallel with the eastern DSP boundary which the DSP does not propose to alter.

3.3 State Planning Policies

The following state planning policies are relevant to the DSP and have informed its preparation:

- *State Planning Policy 2 - Environment and Natural Resources (SPP 2)*
- *State Planning Policy 2.1 – Peel-Harvey Coastal Plain Catchment (SPP 2.1)*
- *State Planning Policy 2.4 - Basic Raw Materials (SPP 2.4)*
- *State Planning Policy 2.5 - Rural Planning (SPP 2.5)*
- *State Planning Policy 2.9 - Water Resources (SPP 2.9)*
- *State Planning Policy 3.0 - Urban Growth and Settlement (SPP 3)*
- *State Planning Policy 3.6 – Infrastructure Contributions (SPP 3.6)*
- *State Planning Policy 3.7 - Planning in Bushfire Prone Areas (SPP 3.7)*
- *State Planning Policy 4.2 - Activity Centres (SPP 4.2)*
- *State Planning Policy 5.4 - Road and Rail Transport Noise and Freight Considerations in Land Use Planning (SPP 5.4)*
- *State Planning Policy 7 - Design of the Built Environment (SPP 7)*

3.3.1 Liveable Neighbourhoods

Whilst not technically a state planning policy, *Liveable Neighbourhoods* is an operational policy which serves as the primary tool for guiding the planning and design of greenfield areas. The principles and requirements of *Liveable Neighbourhoods* have informed the DSP, particularly with regards to the spatial distribution of non-residential land uses depicted on the DSP Map and establishment of the internal road hierarchy. *Liveable Neighbourhoods* (or equivalent policy positions of the WAPC in the future) will continue to guide subsequent planning processes specifically, the local structure plan and subdivision design stages.

3.4 Consultation

The following government agencies have been consulted in the preparation of this DSP:

- Department of Planning, Lands and Heritage.
- Department of Water and Environmental Regulation.
- Department of Biodiversity, Conservation and Attractions.
- Department of Transport.
- Department of Health.
- Public Transport Authority.
- Department of Education.
- Main Roads Western Australia.
- Water Corporation.
- City of Rockingham.

The DSP incorporates and responds to the information provided by the relevant government agencies as discussed in further detail under the relevant sections of this report.



4.0

EXISTING SITE CONDITIONS

4.0 EXISTING SITE CONDITIONS

4.1 Environmental Assets and Constraints

4.1.1 Flora and Vegetation

The majority of the site has been historically cleared with limited areas of native vegetation remaining. The site comprises predominantly cleared areas on flat pastoral land with scattered native and planted trees.

To determine the environmental values of the site, a broad scale vegetation assessment was undertaken in 2018 which was subsequently expanded in 2019. Full details regarding the outcomes of the survey work are provided within the Environmental Assessment Report (EAR) prepared by JBS&G in support of the DSP (refer Appendix 1).

The EAR identified the following key findings for the DSP area:

- The dominant vegetation type is scattered trees over weedy grassland.
- The majority of the DSP area (70%) is 'Completely Degraded'. The highest quality vegetation condition was assessed as 'Good' which only comprises 0.5% of the total DSP area.
- None of the surveyed vegetation was determined to be sufficiently in-tact so as to assign a vegetation community type. As such, none of the vegetation was determined to be conservation significant or represent any known Threatened Ecological Community (TEC) or Priority Ecological Community (PEC). Due to the lack of native vegetation and the highly degraded state of what vegetation remains, the EAR concludes that it is unlikely that any TECs or PECs listed on the Department of Biodiversity, Conservation and Attractions' (DBCAs) database as having been recorded in the regional area, occur on the site.

- There are no Environmentally Sensitive Areas within the DSP area – only adjacent and outside of the DSP boundary.
- No conservation significant species were recorded by the associated vegetation surveys.

The mapped vegetation condition for the site is shown at Figure 6 – 'Vegetation Condition' with Figure 7 – 'Vegetation Types' showing the vegetation types.

4.1.2 Fauna and Habitat

As outlined above, the majority of the DSP area is cleared of native vegetation and associated fauna habitat. A level 1 Fauna survey and Black Cockatoo habitat assessment was conducted by JBS&G in 2018 which was expanded in 2019. Detailed information regarding the findings of the fauna assessment is provided in the EAR (refer Appendix 1) and are summarised as follows:

- Four conservation species were recorded – the Glossy Ibis, White-bellied Sea-eagle, Forest Red-tailed Cockatoo and the Quenda. In addition to the recorded species, Baudin's Black Cockatoo and Carnaby's Black Cockatoo are considered likely to use the site.
- There is limited and low-quality Black Cockatoo foraging habitat available within the site. A total of 32.6 hectares was identified within the DSP area, with the majority being assessed as 'Poor' quality with some identified as 'Poor – Moderate' quality.
- 13 potential Black Cockatoo breeding trees were observed however, they did not contain hollows large enough to be considered breeding hollows.

The DSP response to the fauna habitat values within the site is outlined at section 5.6.1 below.



Figure 6 - Vegetation Condition

Source: JBS&G

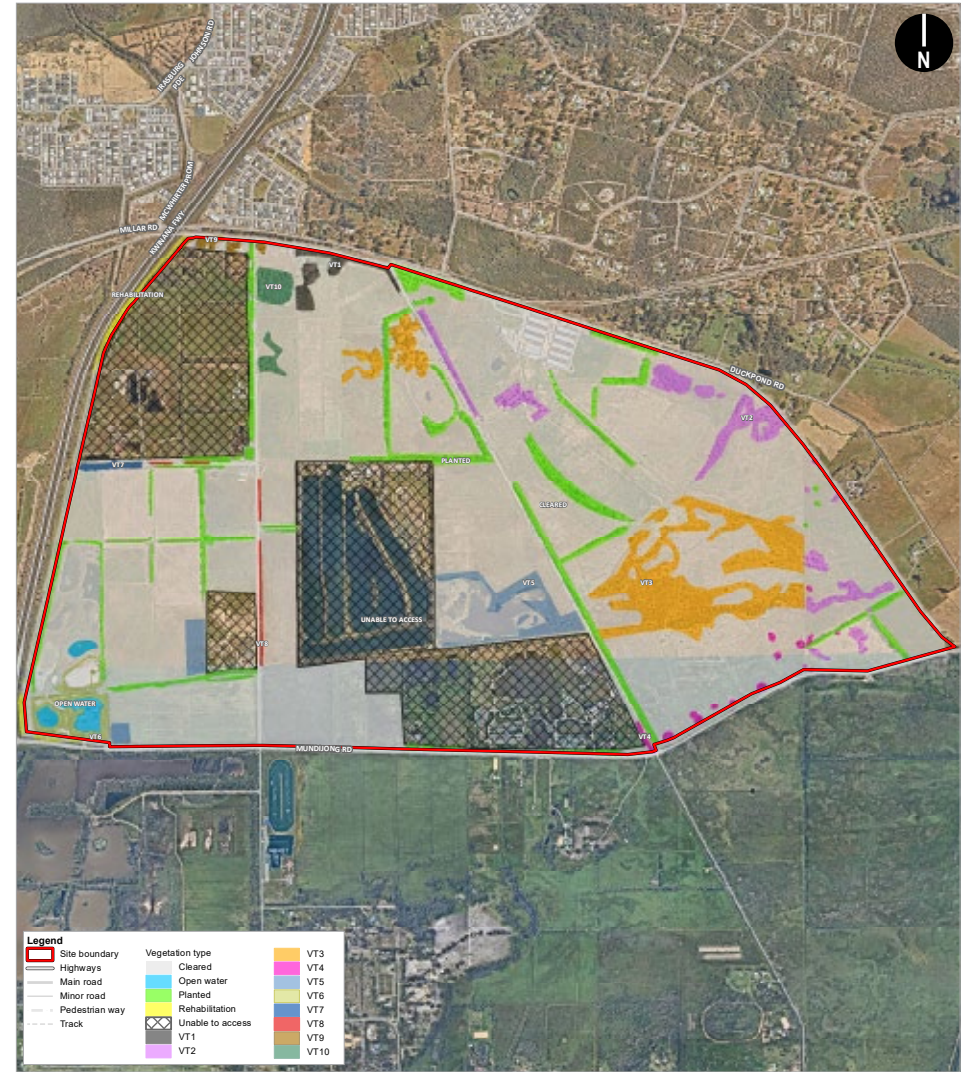


Figure 7 - Vegetation Types

Source: JBS&G



4.1.3 Environmental Approvals

Development of the DSP has been referred to the Federal Government's Department of Climate Change, Energy, the Environment and Water under the *Environment Protection and Biodiversity Act 1999* (EPBC Act). The referral was undertaken by Stockland in 2020 for their landholdings in relation to the potential impacts of development on Black Cockatoos. It was determined that the proposed clearing action in association with development of the DSP is not a 'controlled action', meaning that significant environmental impacts were not considered likely as a result of implementing the DSP.

4.1.4 Wetlands

The geomorphic wetland mapping for the Swan Coastal Plain (refer Figure 8 – Hydrology and Wetlands) identifies the DSP area as predominantly Multiple Use Wetland (MUW) (UFI 16021). The DSP area contains Resource Enhancement Wetlands (REWs) (UFIs 14646, 14647, 14665, 14666, and 14736) dispersed along the northern periphery of the DSP. The DSP proposes to retain and protect these REWs, as discussed under section 5.5.3 of this report.

A Conservation Category Wetland (CCW) (UFI 14780) is located outside of the DSP area and adjacent the south-east corner. The CCW is separated from the DSP by the Mundijong Road and Duckpond Road road reserves and does not directly interface with the DSP.

4.2 Landform and Soils

The DSP area is flat with no pronounced topographical features. The site slopes gradually from east to west from a high point in the north-east corner to a low-point in the south-west corner. The level difference between these two points is approximately 4 metres transitioning over a distance of 4.2 kilometres at a grade of approximately 0.1%.

With regard to site geology, the DSP area is located on the boundary of the Bassendean system but with the majority of the site within the Pinjarra Plain system. As such, the site is generally clay except for sand overlaying the southern boundary adjacent Mundijong Road and a pocket of sand in the north-east corner of the DSP.

4.2.1 Acid Sulphate Soils

The Department of Environment and Conservation’s Acid Sulphate Soils (ASS) Risk mapping indicates that the DSP area is classified as having a moderate to low risk of ASS occurring within 3m of the natural soil surface.

The Engineering Servicing Report (refer Appendix 2) that supports the DSP concludes that ASS is not a constraint to development within the DSP area.

4.2.2 Potential Contamination

Based on a review of the Contaminated Sites Database maintained by the Department of Water and Environmental Regulation (DWER), no sites listed as ‘contaminated – remediation required’ or ‘remediated for restricted use’ occur within the site, nor within 1 km.

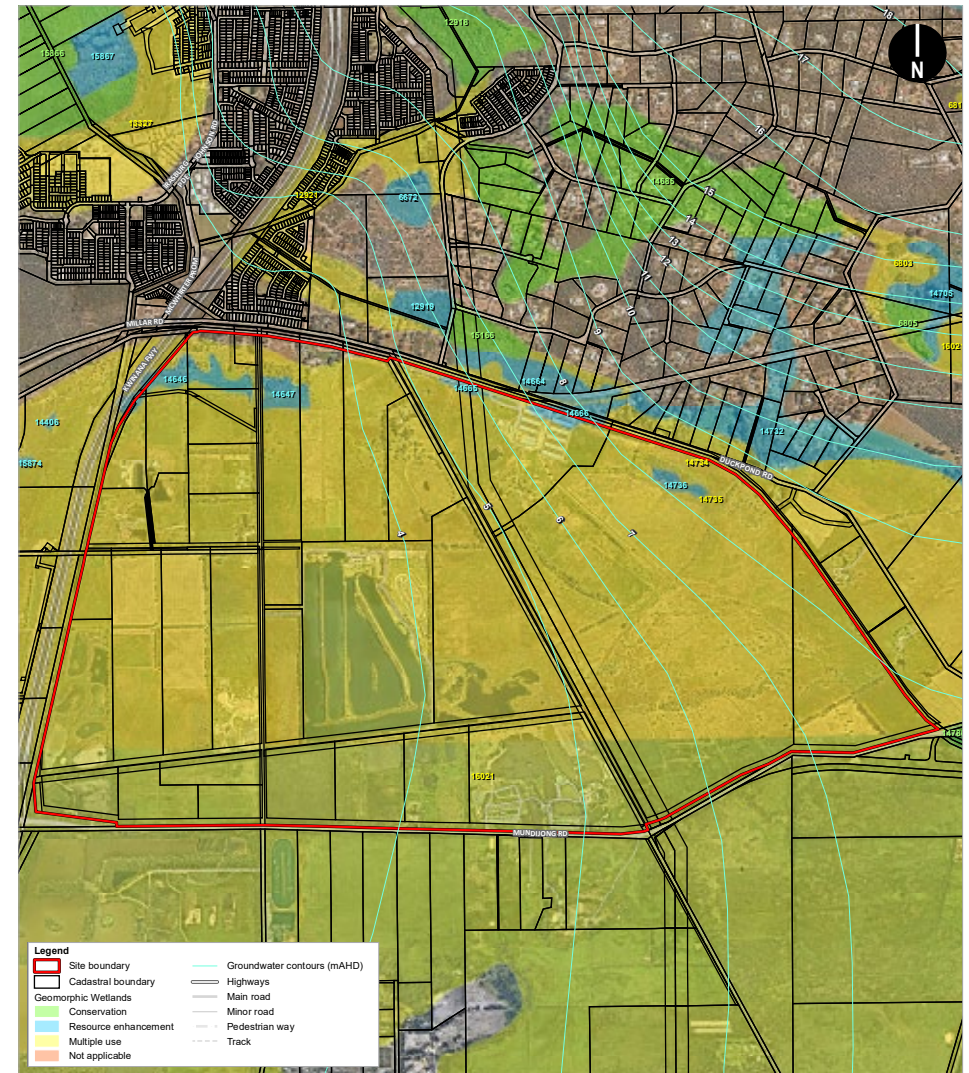


Figure 8 - Hydrology and Wetlands

Source: JBS&G

A Preliminary Site Investigation (PSI) conducted by Strategen in 2018 identified several potential pathways for contamination as a result of current and historic uses on the site. The PSI and subsequently the 2023 EAR (refer Appendix 1) recommend targeted assessments on a site-by-site basis to confirm the presence of potential risks to human health and the environment. These targeted assessments will be undertaken as part of future local structure plans.

[Historic and Existing Land Uses](#)

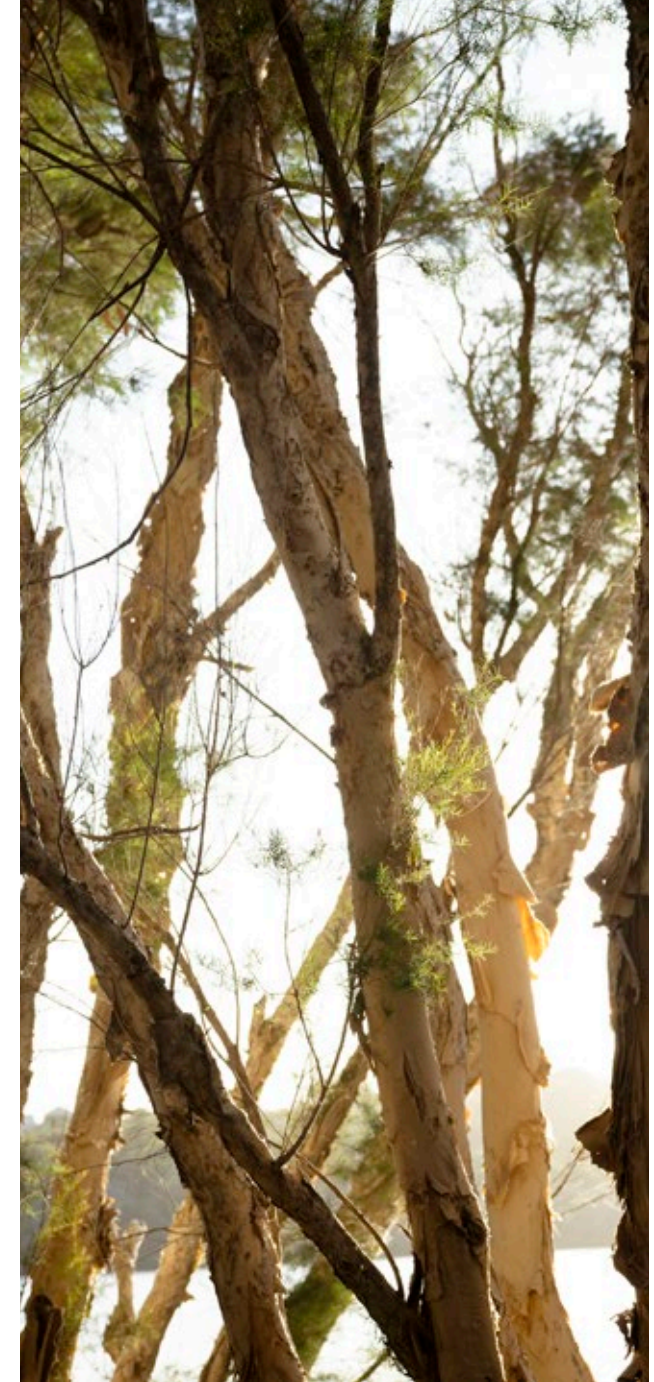
Based on DWERs 'Assessment and management of contaminated sites: Contaminated sites guidelines', historic and existing rural land uses (which occur across most of the site) are not identified as potentially contaminating land uses.

The PSI conducted by Strategen in 2018 identified a number of potentially contaminating land uses within the DSP area, specifically:

- Lot 1 and 2 on Plan 77728 (intensive agriculture, intensive sheep holding)
- Lot 3 on Plan 38268 (automotive repair)
- Lot 101 on Diagram 71358 (boat maintenance)
- Lot 451 and 452 on Plan 202741 (market gardens)
- Lot 1-4 on Plan 38268 (uncontrolled fill importation)

Other potentially contaminating activities that the PSI recommends be further considered at the local structure plan stage include:

- Asbestos disposal
- Chemical storage
- Livestock dips
- Fill importation
- Fuel storage facilities
- Uncontrolled landfill

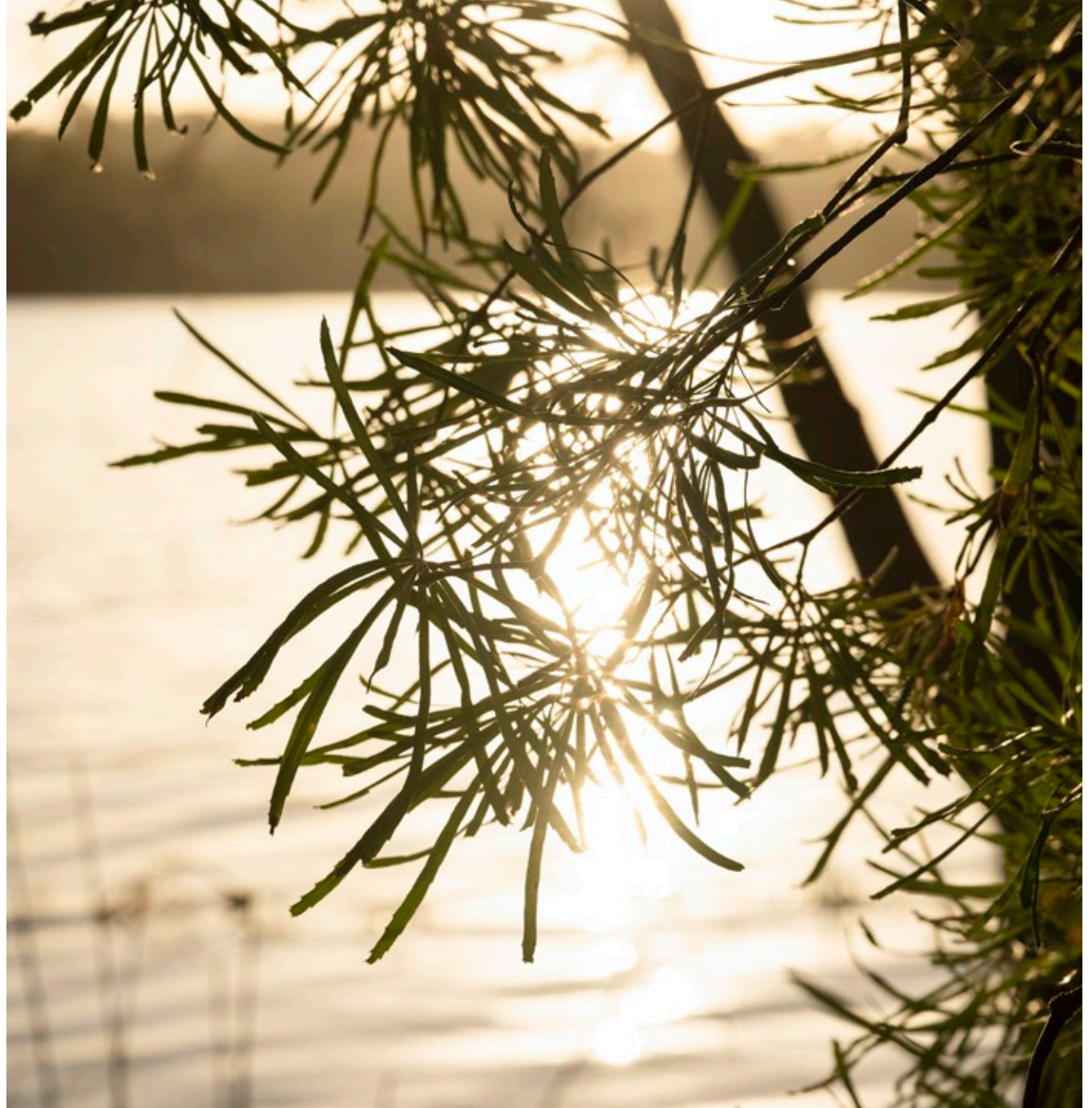


4.3 Groundwater and Surface Water

A District Water Management Strategy (DWMS) (refer Appendix 3) has been prepared by project hydrologist Pentium Water to inform and accompany the DSP. The DWMS comprehensively addresses key water management principles including water conservation, water quality, water quantity and groundwater management.

A key drainage characteristic specific to this site is the need to manage the risk of inundation in accordance with the findings of the Department of Water and Environmental Regulation's (DWER) *East of Kwinana flood modelling and drainage study and East of Kwinana and Pinjarra Ravenswood planning investigation areas – Flood risk management land capability assessment*.

The existing hydrological conditions as outlined in the DWMS are summarised below.



4.3.1 Existing Groundwater Conditions

The pre-development Average Annual Maximum Groundwater Level (AAMGL) and Maximum Groundwater Level (MGL) for the DSP area were calculated using a combination of groundwater data, drain AAMGL elevations and topography.

Twenty-eight bores located across the DSP area were monitored monthly from June 2018 to December 2020. Six DWER bores within the vicinity of the site provided a longer-term record for corrections.

Monitoring results indicate there is a perched system sitting on top of a clay layer across most of the site. The water level in the perched aquifer is shallow and intersects ground surface in some areas during winter months. The groundwater regional flow direction is towards the west and southwest and is assumed to be influenced by the invert of the Peel Main Drain.

The AAMGL ranges from approximately 3.8m to 8.0m AHD. At the lowest points, AAMGL levels are at the surface as depicted at Figure 9 – 'Depth to shallow bore AAMGL'.

Groundwater will be managed through the installation of a subsoil drainage system and importation of fill to provide clearance to roads and building pads. The DWMS approach to managing existing groundwater levels and avoiding the unnecessary importation of fill is outlined at section 5.7.1 of this report.

Pre-development groundwater modelling over two winter peaks will be required at the Local Water Management Strategy (LWMS) stage in association with future local structure plans.

Groundwater Quality

Analytical groundwater results were compiled between 2019 and 2020 informed by a groundwater monitoring program. Concentrations of ammonia, nitrate, total nitrogen (TN) and total phosphorous (TP) were recorded above their adopted assessment criteria across the network at both the shallow and deep bores. TN concentrations are assumed to be high due to the total kjeldahl nitrogen (TKN) concentration commonly associated with the farming and agricultural uses occurring within the DSP area.

Heavy metal concentrations recorded are respective of natural groundwater conditions. Elevated levels of E-Coli and Enterococci are assumed to be the result of current farming activities on site.

The higher concentrations of nutrients, metals and microbiological material occurred in the shallow bores as compared to the deeper aquifer. This is expected to be a result of the existing land use activities and the clay layers across the site. These clay layers are assumed to naturally attenuate infiltration into the deeper portion of the superficial aquifer, creating a natural barrier.

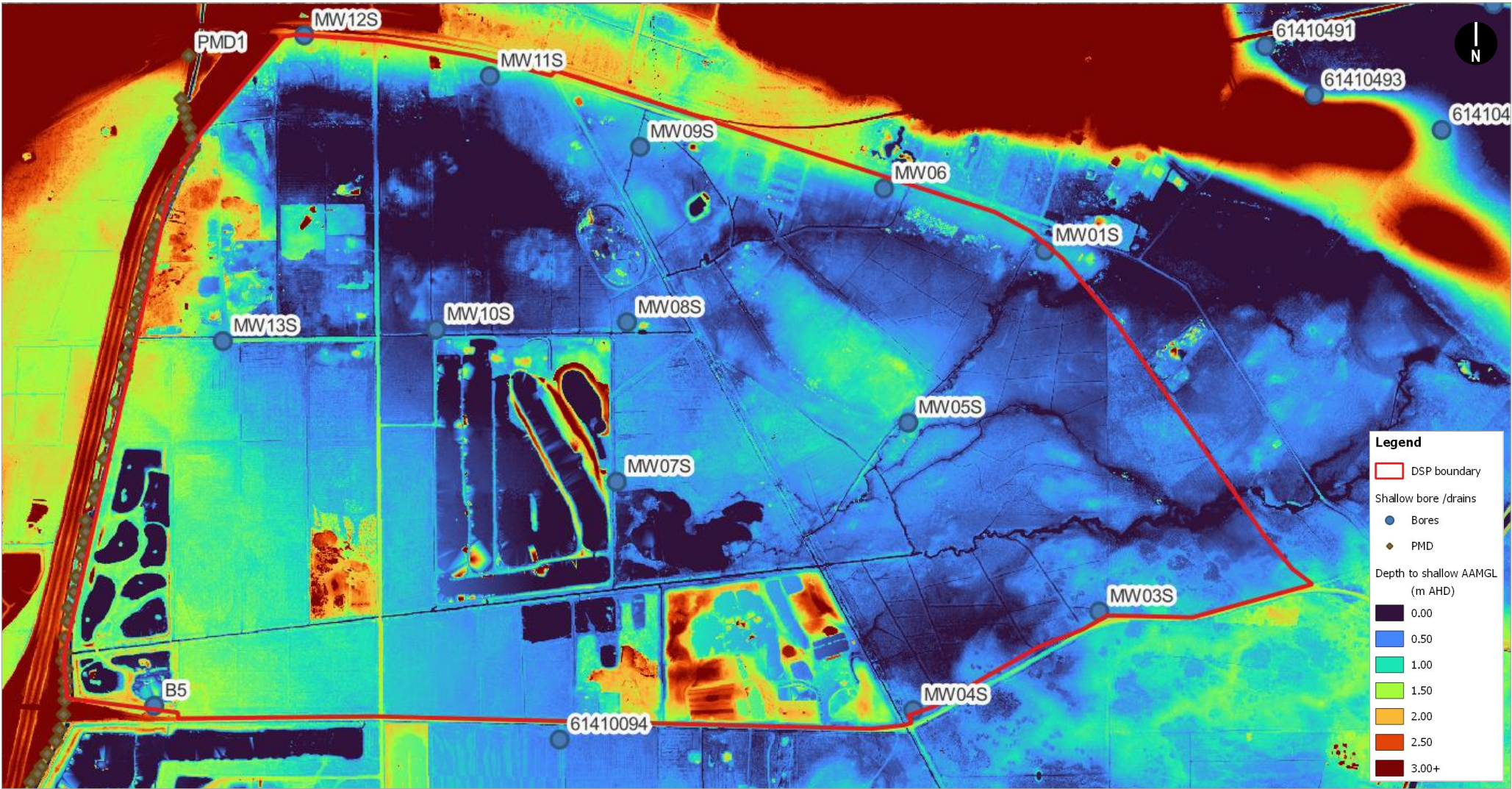


Figure 9 - Depth to shallow bore AAMGL

Source: Pentium Water

4.3.2 Existing Surface Water Conditions

The DSP area is within the Peel-Harvey Coastal Plain catchment and drains in a westerly direction via the Peel Main Drain to the Peel Inlet which is located approximately 30 km downstream of the site to the south-west. The Birrega Main Drain is located approximately 300 metres east of the DSP at its nearest point. The Birrega and Peel Main Drains were constructed to control groundwater and drain surface water from rural land.

Surface water within the site drains via a network of small agricultural drains that dissect the site as well as two Water Corporation drains that traverse the site in an east – west direction. Numerous culverts and small bridges have been installed along the drains within the site which have been surveyed as part of the site investigations. Figure 10 – ‘Watercourses’ depicts the existing surface water features within and surrounding the DSP.

A system of artificial lakes is at the centre of the DSP, comprising approximately 55 hectares and bound by the two aforementioned Water Corporation drains to the north and south. It is understood that the surface water can be diverted from the southern Water Corporation drain into the lake (under license) during periods of high-flow.

Inundation

As outlined above and within the DWMS, several flood studies relating to the site and broader region have been undertaken by DWER and the former Department of Water. The most recent and relevant studies to the preparation of the DSP are:

- *The East of Kwinana flood modelling and drainage study (DWER 2021);* and
- *The East of Kwinana and Pinjarra Ravenswood planning investigation areas – Flood risk management land capability assessment (DWER 2021).*

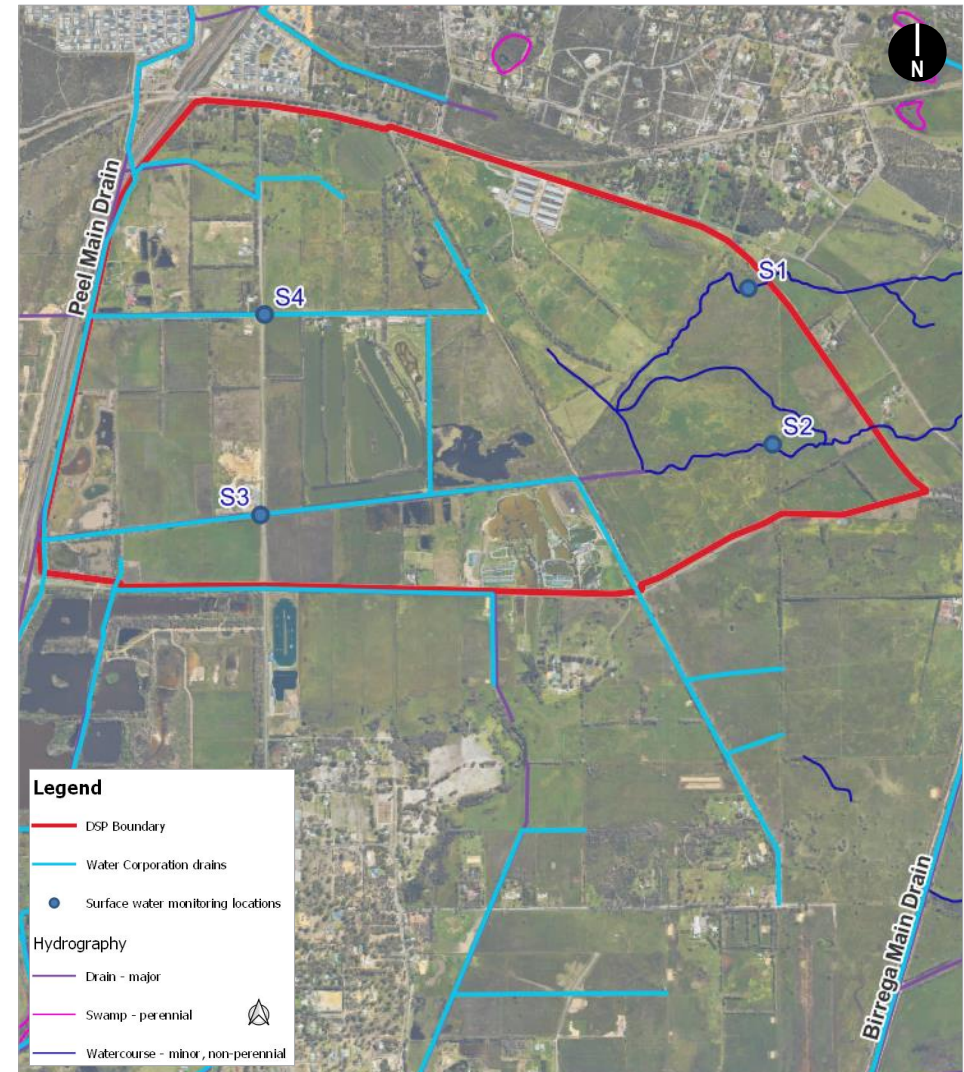


Figure 10 - Watercourses

Source: Pentium Water

These two (unpublished) reports were undertaken specifically to inform the Department of Planning Lands and Heritage’s investigations into the ‘East of Kwinana and Pinjarra Ravenswood’ Planning Investigation Area. The purpose of the flood modelling and drainage study was to understand the pre-development flood behaviour and how it would impact potential development scenarios. A key outcome of this work that has informed preparation of the DWMS and the spatial layout of the DSP is the base-case scenario that is to be adopted by future modelling. Under this base-case scenario, an uncontrolled failure of the spoil bank for its full-length on the eastern side of the Birrega Main Drain would occur, causing a rapid change in flooding behaviour following the east-west flow of the land.

Based on the above scenario, a local scale model was developed by DWER for the DSP area and surrounds, referred to by the modelling as ‘North East Baldivis north of Mundijong Road’. Flood plain mapping and land capability were undertaken as part of this model using the ‘spoil bank failure scenario’ described above. This was assumed to occur in a 1% Annual Exceedance Probability rainfall event. Under this scenario, 55% of the precinct (which includes the DSP plus the land between the DSP’s eastern boundary and the Birrega Main Drain) could be developed with the remaining 45% of land needed for flood protection and management. The modelled flood extent and depth of surface water is shown at Figure 11 – ‘DWER Flood Modelling Over DSP’.

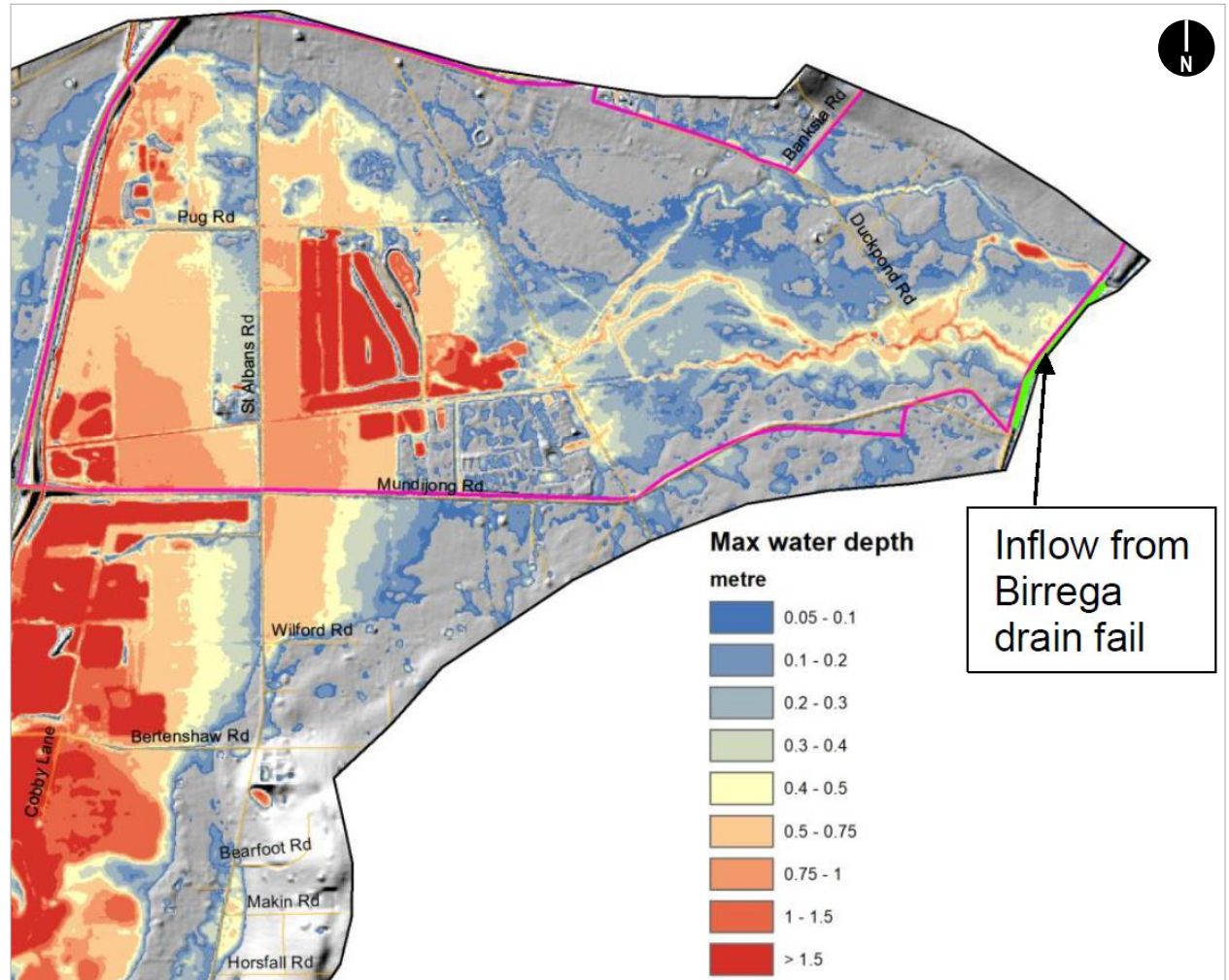


Figure 11 - DWER Flood Modelling Over DSP (pre-development scenario)

Source: Pentium Water

The DWMS contains further discussion on the modelling approach and the use of a complete spoil bank failure scenario as a ‘base-case’ assumption, outlining opportunities for further refinements and improvements to flood management strategies. For the purpose of the DSP, the underlying assumption is that 45% of the land is needed to manage the potential risks of inundation and this is reflected in the proposed DSP Map. Any further refinements and improvements to the flood management approach may be implemented at the future local structure planning stage for minor changes, or via an amendment to the DSP and DWMS for major changes.

[Surface Water Quality](#)

A surface water monitoring program has been undertaken and involved monitoring water levels and water quality at four locations along major creeks and drains within the site. Full results of the monitoring are provided in the DWMS and are summarised as follows:

- Concentrations of potential hydrogen (pH) are close to neutral conditions.
- Median concentrations of total dissolved solids (TDS) indicate freshwater conditions.
- Concentration of ammonia, TKN, nitrite, nitrate, TN and TP were recorded above the laboratory limit of reporting (LOR).
- Concentrations of arsenic, chromium, copper, nickel and zinc were recorded above the laboratory LOR.
- Elevated levels of E-Coli and Enterococci were detected.

The nutrient, heavy metal and pathogen concentrations recorded and summarised above are expected to be attributed to natural conditions or as a result of the current land use which consists predominantly of agricultural activities.

[Peel Harvey Coastal Plain Catchment](#)

The DSP is located within the Peel-Harvey Coastal Plain catchment. Accordingly, the Environmental Protection Authority’s *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992* (the EPP) and *State Planning Policy No. 2.1 – Peel-Harvey coastal plain catchment* (SPP 2.1) apply. The EPP provides environmental quality objectives to be achieved and maintained for total phosphorus loads within the catchment area.

Relevant objectives of SPP 2.1 are to:

- Improve the social, economic, ecological, aesthetic and recreational potential of the Peel-Harvey Coastal Plain Catchment.
- To ensure that changes to land use within the catchment are controlled so as to avoid and minimise environmental damage.
- Balance environmental protection with the economic viability of the primary sector.
- Prevent land uses likely to result in excessive nutrient export into the drainage system.

Other relevant policy framework provisions include a requirement to connect to a reticulated sewer service, protection of remnant vegetation and replanting to assist reduce nutrient flow into the Peel Harvey estuary.

The DSP response to water quality and other environmental considerations is discussed at section 5.6.1 below.

4.4 Bushfire Hazard

The site is currently identified as a ‘bushfire prone area’ under the *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM). The identification of a site within a declared bushfire prone area necessitates further assessment of the bushfire risk and suitability of the proposed development to be undertaken in accordance with *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines).

A Bushfire Management Plan (BMP) has been prepared by JBS&G to accompany the DSP in response to the bushfire prone designation of the site (refer Appendix 4). The BMP specifically addresses the information requirements of clause 6.3 of SPP 3.7 in accordance with the Guidelines.

A Bushfire Hazard Level (BHL) assessment of vegetation within and surrounding the site was undertaken as part of the BMP. The BHL indicates that the site contains, and is bound by, a combination of ‘Low’, ‘Moderate’ and ‘Extreme’ bushfire hazard level vegetation due to the extent of forest, scrub and grassland vegetation retained throughout the locality (refer Figure 12 - BHL Assessment).

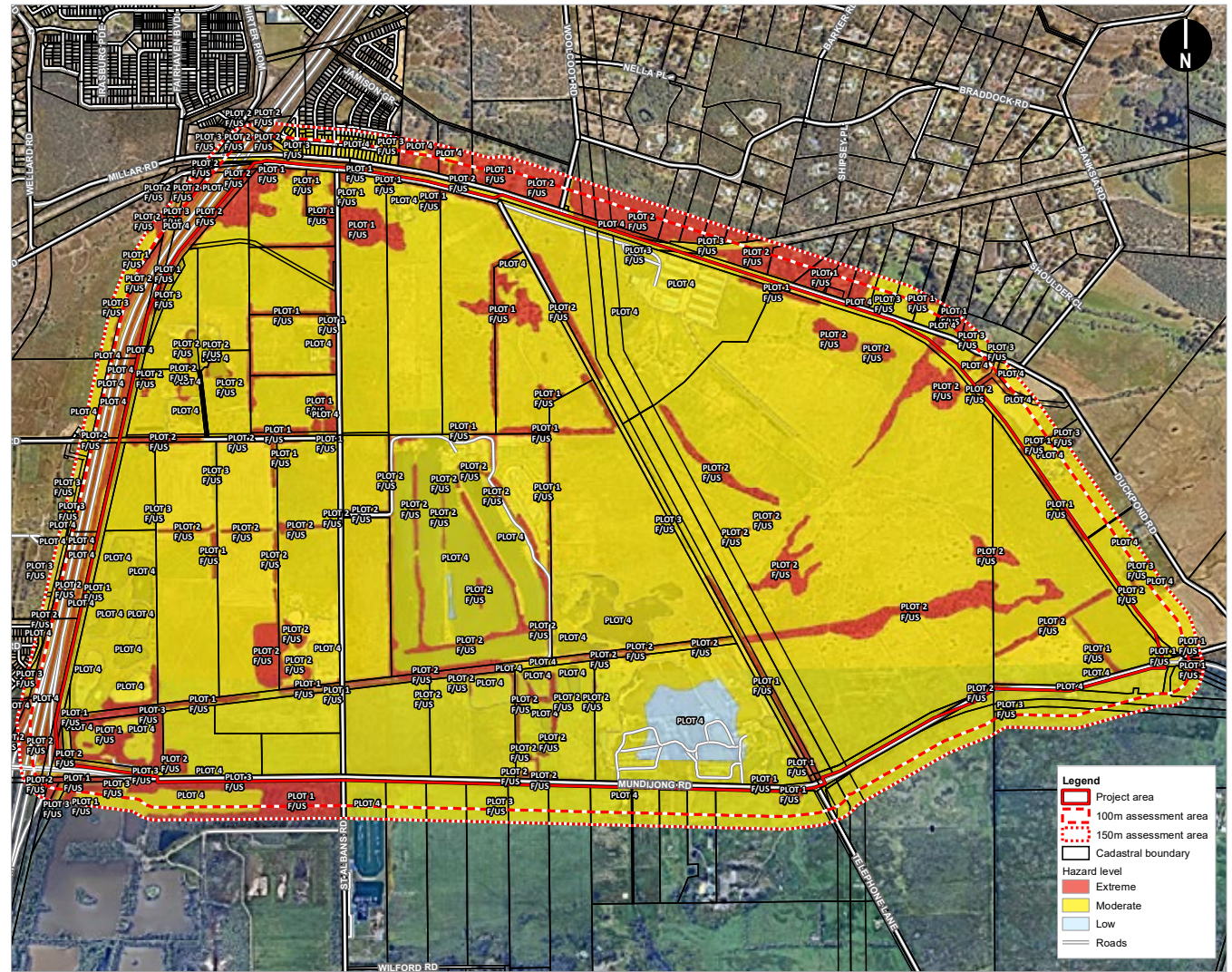


Figure 12 - BHL Assessment

Source: JBS&G

A proportionate breakdown of the three BHL levels across the DSP is as follows:

- Low - 1.4%
- Moderate - 88.3%
- Extreme - 10.3%

The high percentage of 'Moderate' BHL within the site is representative of the predominant grassland hazards, which are readily manageable from a bushfire risk and development compliance perspective, indicating that the site conditions are conducive to urban development.

The DSP response to bushfire management is discussed in further detail under section 5.6.3 of this report.

4.5 Mosquitos

The EAR (refer Appendix 1) identifies a potential risk of mosquitos to human health for future residents of the DSP. This is based on a review of other structure plans for residential areas within proximity and an assessment of potential mosquito breeding habitat in and around the DSP. As part of the EAR, the project environmental consultant undertook a 'Mosquito Risk Assessment', concluding that mosquito's do not pose an undue risk to human health for future DSP residents and that the potential risk can be managed via standard response measures.

Further detail regarding the management response to the potential risk of mosquito's is provided in the EAR and outlined under section 5.6.1 below.

4.6 Heritage

4.6.1 Aboriginal Heritage

A desktop assessment undertaken by the project environmental consultant as part of the EAR did not identify any registered Aboriginal Heritage Sites or other heritage places within the DSP. Urban development as proposed is therefore unlikely to impact on matters of Aboriginal heritage significance. Further detail regarding Aboriginal heritage is provided in the EAR (refer Appendix 1).

Landowners are required to fulfill their obligations under the *Aboriginal Cultural Heritage Act 2021* regardless of the findings of the desktop investigations undertaken in the EAR.

4.6.2 European Heritage

A desktop assessment undertaken by the project environmental consultant as part of the EAR did not identify any European cultural heritage places within or adjacent the DSP area.

Further detail regarding European heritage is provided in the EAR (refer Appendix 1).

4.7 Noise

4.7.1 Road and Rail Noise

The DSP area is bound by the Kwinana Freeway on its western boundary, Mundijong Road on its southern boundary and a freight rail line on its northern boundary. In accordance with the WAPC's *State Planning Policy 5.4 'Road and Rail Noise'* (SPP 5.4), the Freeway, Mundijong Road and the freight rail line are required to be assessed against the policy requirements.

A Transportation Noise Assessment has been prepared by acoustic consultants Llyod George in accordance with SPP 5.4 and is appended to the DSP (refer Appendix 5). The Noise Assessment demonstrates that potential noise constraints from road and rail corridors in proximity to the DSP boundaries can be suitably managed.

The predicted noise levels for road and rail have been assessed against SPP 5.4 and where exceedances are predicted, the Noise Assessment makes recommendations on possible noise amelioration options to achieve compliance with SPP 5.4. The DSP response to potential noise constraints is discussed in further detail under section 5.6.4 of this report.

4.7.2 Other Potential Noise Sources

[Bonney's Water Ski Park and West Coast Jet Sprint Boat](#)

The central lakes within the DSP currently accommodate recreational uses that emit noise and therefore have the potential to impact the amenity of sensitive land uses. Specifically, Bonney's Water Ski Park involves motorised watercraft operating on the lake and the West Coast Jet Sprint Boat racing involves jet boat racing on the circuit in the north-east corner of lot 101. Whilst the noise is sporadic and limited to certain periods, it exceeds the prescribed levels and therefore warrants a specific response.

Noise from the jet sprint boat racing is significantly higher than noise from the water ski boats. Whilst water ski boats could coexist within an urban setting subject to noise management measures, the jet sprint boat racing generates noise that is not practicable to manage. Given this potential constraint, it is intended that the jet sprint boat racing will have ceased prior to the first residents establishing within the DSP.



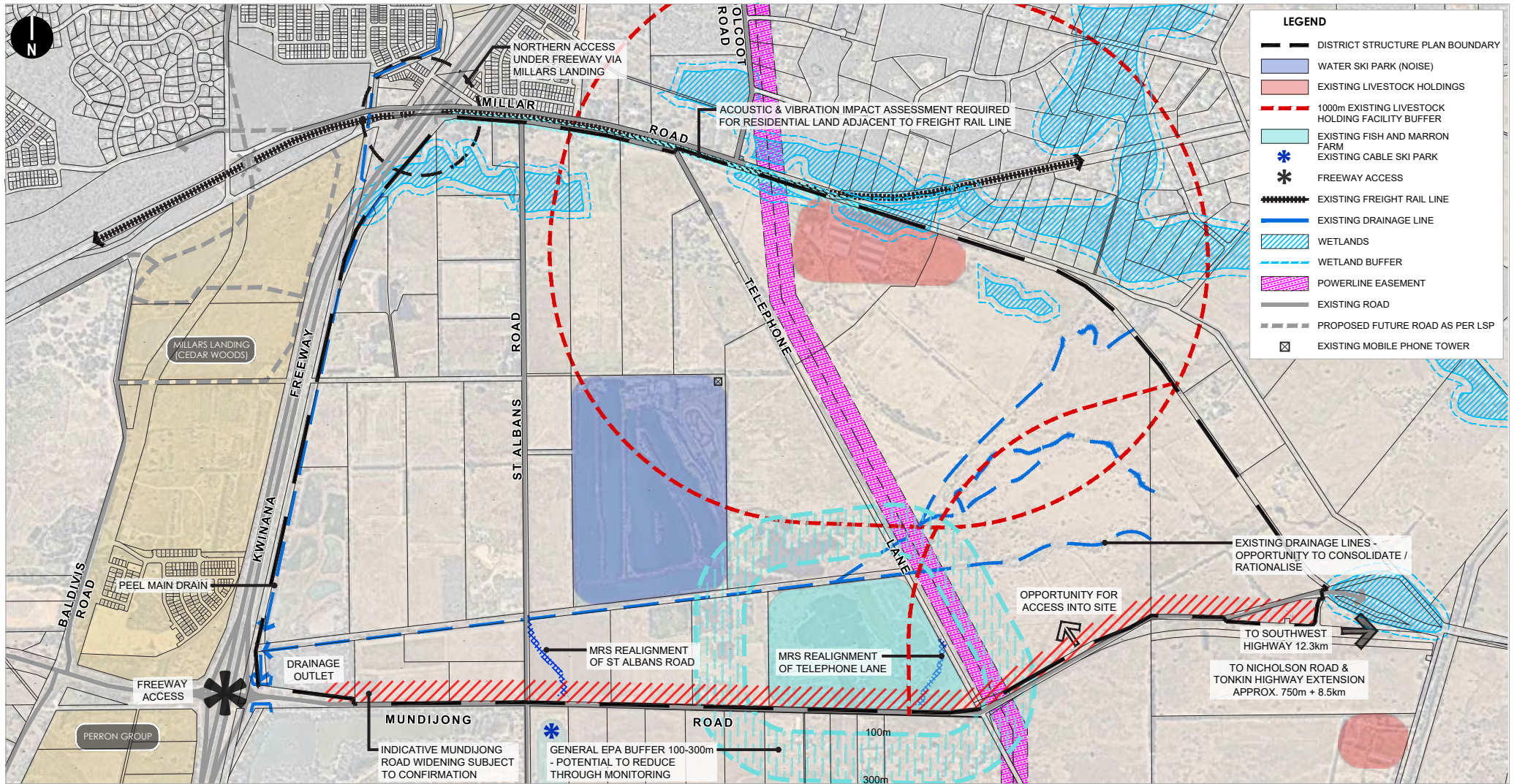


Figure 13 - Context and Constraints Plan

Source: Nearmap

4.8 Context and Constraints Analysis

The context and constraints analysis for the DSP is illustrated at Figure 13 – ‘Context and Constraints Plan’ with the key aspects summarised under the following headings.

4.8.1 Transport and Access

[Kwinana Freeway](#)

As a key Primary Regional Road directly abutting the western boundary of the DSP, the Kwinana Freeway will provide excellent north-south connectivity for traffic to and from the DSP. Access to the Freeway is via a signalised interchange at Mundijong Road, facilitating safe and efficient access. Immediate access to the Kwinana Freeway is a significant opportunity for the DSP, providing access to the regional road network without the need for significant upgrades or provision of additional infrastructure items.

Further discussion regarding access and movement on the regional road network is provided at section 5.4 of this report.

[Mundijong Road](#)

Mundijong Road currently exists as a single carriageway, rural-standard road however, a 40-metre-wide ‘Other Regional Road’ reservation under the MRS exists to accommodate future upgrades and widening. Mundijong Road provides an excellent east-west connection for DSP traffic, complemented by the north-south connectivity afforded by the Kwinana Freeway. Mundijong Road directly connects the DSP with the Kwinana Freeway to the west and South West Highway to the east. Further west, Mundijong Road provides a connection to key employment land within the Western Trade Coast and Rockingham Regional Centre.

Mundijong Road will also provide access to longer-term upgrades to the regional road network in an easterly direction, specifically Tonkin Highway and the future extension of Nicholson Road. The ultimate standard of Mundijong Road is yet to be confirmed and is subject to future planning by Main Roads WA (MRWA) and the WAPC. The future investigations and planning for Mundijong Road will confirm its intended role and function as an east-west connection for the sub-region, allowing an ultimate road reserve width and cross section to be determined.

[Wellard Train Station](#)

The DSP is located approximately 2.7 kms south-east of the Wellard Train Station ‘as the crow flies’. This relative proximity to an existing passenger rail station provides opportunities for future DSP residents to commute via alternative and sustainable methods of transport. The passenger rail line connects with employment centres to the north of the DSP including Perth CBD, Cockburn Central and Murdoch with southbound services connecting to Rockingham and Mandurah.

4.8.2 Multiple Use Corridors

The multiple use corridors that are set aside to manage the potential risk of inundation will be free of drainage encumbrance, except during the 1% Annual Exceedance Probability rainfall event. Whilst the need to fulfill a flood mitigation role precludes built form development, the multiple use areas provide a unique opportunity to connect the DSP via a path network within landscaped environs. They also provide an opportunity to achieve a nature positive outcome beyond the standard planting approach for greenfield communities. The treatment of these areas therefore has the potential to deliver social and environmental benefits which are discussed in further detail at section 5.2 of this report.

4.8.3 Jobs and Employment

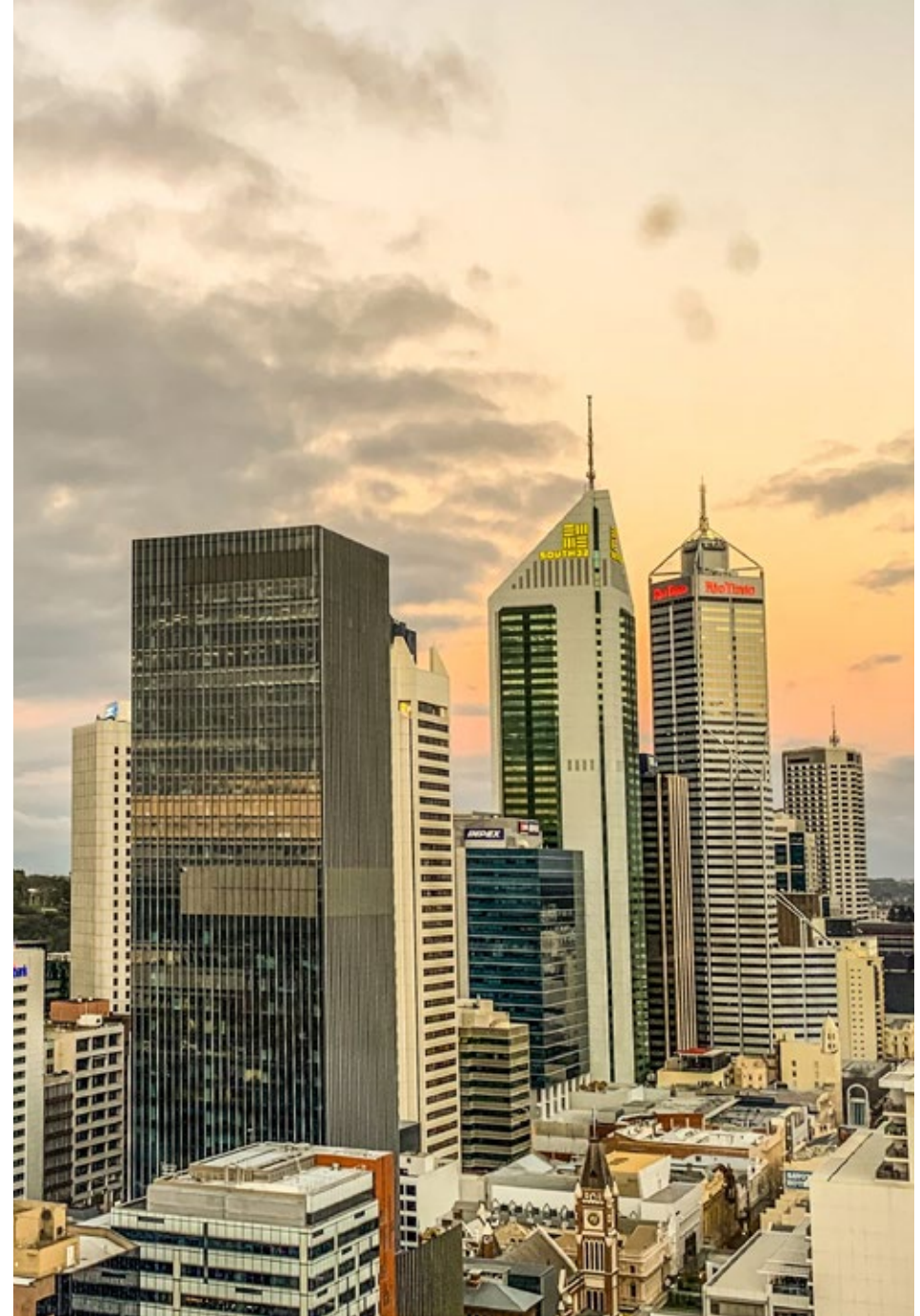
The DSP area is strategically located within proximity of a broad range of existing and planned employment nodes within the south-west corridor including:

- Latitude 32 (approximately 10 km from site);
- Kwinana Industrial (approximately 9 km from site);
- East Rockingham Industrial (approximately 7 km from site)
- The Australian Marine Complex and Naval Base (approximately 14 km from site)
- Murdoch Health and University Precinct (approximately 22 km from site);
- West Mundijong (approximately 7km from site);
- Rockingham City Centre (approximately 10km from site);
- Cockburn Centre (approximately 16 km from site);
- Jandakot Airport Precinct (approximately 20 km from site); and
- Westport Outer Harbour (exact location uncertain but likely within 15km).

Cumulatively between the Local Governments of Rockingham, Kwinana and Serpentine-Jarrahdale, there existed 66,800 jobs in proximity of the DSP based on 2021 census data.

A Land Economic Report (refer Appendix 6) prepared by Pracsys supports the DSP, confirming that the DSP will have access to approximately 32,200 to 53,200 future jobs generated over the next 10 to 20 years by employment centres outside of the DSP. This is an addition to the curated employment strategy that has been developed by Pracsys specifically for this DSP and the typical population-driven employment for new suburbs.

Further discussion on employment opportunities for future DSP residents is discussed at section 5.9.4 of this report.



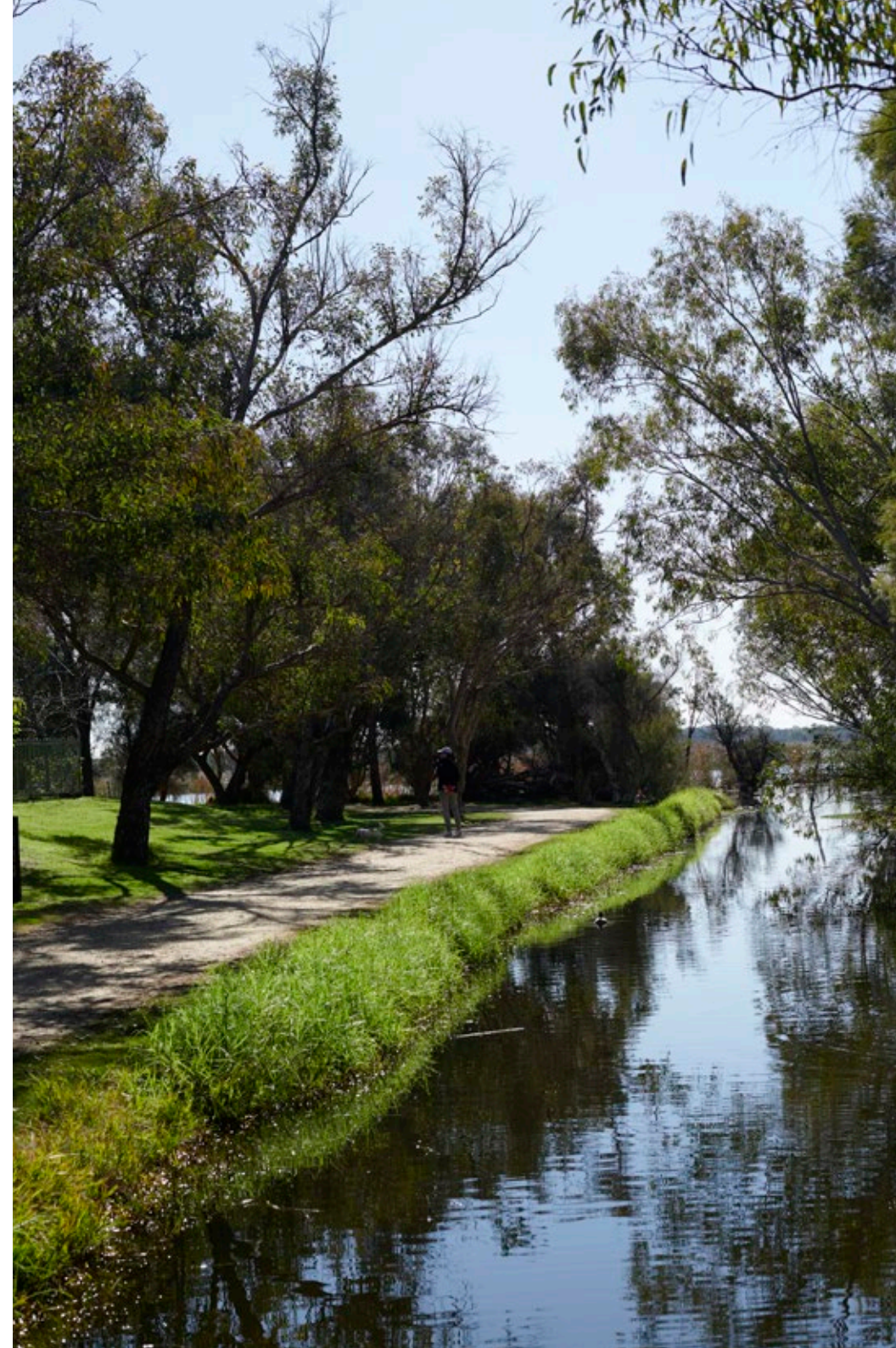
4.8.4 Potential Land Use Conflict

[Livestock Holding Facilities](#)

One livestock holding facility within, and one outside the DSP area, have potential buffer implications for urban development and the associated establishment of sensitive land uses. EPA Guidance Statement No. 3 '*Separation Distances between Industrial and Sensitive Land Uses*' recommends a generic separation distance of 1,000 metres between holding sheds and sensitive land uses.

A livestock holding facility is located on lot 1 within the DSP and abutting the northern boundary. The holding facility is surrounded by an established 1km land use buffer as evidenced by the land held within the 'Urban Deferred' zone to the north (refer Figure 4 – MRS). The proponent for the DSP, Stockland, own lot 1 and lease the livestock holding facility to the current operators. Given the anticipated staging from the south-west corner of the DSP, a 1km buffer around the facility and within the DSP area would not constrain the initial stages of development within LSP1. As staged development progresses to a point where sensitive land uses are proposed to occur within the buffer, Stockland - as owners of lot 1, will coordinate the cessation of the facility to enable urban development.

A livestock holding facility is located to the south and outside of the DSP area at lot 1099, No. 40 Wilkinson Road, Baldvis. The license for this facility also extends to lots 301, 806 and 807 Wilkinson Road, Baldvis. A 1km buffer from this land would encroach over a small area in the south-east corner of the DSP. As the facility is owned and operated by others, it is possible that the facility may continue to operate whilst development of the DSP progresses. Further investigations will be required at the rezoning or 'lifting of Urban deferment' stage for the south-east corner of the DSP to assess the potential odour impact from the holding facility. Depending on the outcomes of these investigations, a land use buffer may be required to provide a suitable separation distance between the holding facility and sensitive land uses. Based on generic recommended separation distances outlined above, any such buffer would likely only impact the south-eastern extent of the DSP as shown at Figure 13 – Context and Constraints Plan.



[Golden Pond Fish and Marron Farm](#)

The Golden Pond Fish and Marron Farm is located within the DSP area at lot 470. Lot 470 is located on the southern boundary of the DSP at the western intersection of Telephone Lane and Mundijong Road. EPA Guidance Statement No. 3 '*Separation Distances between Industrial and Sensitive Land Uses*' recommends a generic separation distance of 100-300m between aquaculture operations and sensitive land uses to address potential odour impacts. Lot 470 also contains short-term accommodation, a function centre and restaurant, suggesting that any potential odour emanating from the aquaculture activities are low and do not unduly impact amenity.

Further investigations will be required at the rezoning or 'lifting of Urban deferment' stage for the land within 300m of the aquaculture operations on lot 470 to assess the potential odour impact. Depending on the outcomes of these investigations, a land use buffer may be required to provide a suitable separation distance between aquaculture operations and sensitive land uses.

[Telecommunications Tower](#)

A telecommunications tower ('the phone tower') is located in the north-east corner of the existing Ski Park on lot 101. Whilst the phone tower could be retained in its current location indefinitely, it is likely that an alternative location will be investigated once urban development commences within proximity. Relocation of the phone tower to an area that minimises the potential visual impact on adjoining sensitive land uses and facilitates co-location with buildings or other structures will be investigated as part of the local structure planning for the land around the phone tower. The phone tower is expected to remain in its current location until encroaching residential development renders its relocation desirable.

[Powerline Easements](#)

An existing powerline easement bisects the DSP on a north-south alignment, generally running parallel to the unconstructed portion of Telephone Lane. No development, other than landscaping and drainage, is planned to occur within the powerline easement and the land is set aside for the purposes of the easement. Urban development can coexist within proximity to powerline easements, as evidenced by the developed urban land to the north of the DSP.

To assist mitigate the potential visual impacts of the powerlines, the DSP proposes a 100 metre wide buffer to either side of the powerline easement that will be planted and developed to fulfill a flood storage function.

ST ALBANS ROAD



5.0

DISTRICT STRUCTURE PLAN

5.0 DISTRICT STRUCTURE PLAN

The DSP area encompasses the entire 'Urban Expansion' area identified by the PIA Update. The DSP area is a logical land parcel to progress urban development over, based on the following:

- Mundijong Road is an 'Other Regional Road' reserve under the MRS and forms a logical southern boundary.
- The rail freight line is a physical barrier to integrating with the land to the north and forms a logical northern boundary.
- The DSP area is confined within the City of Rockingham's jurisdictional boundaries however, immediately north of the DSP is the City of Kwinana and immediately east is the Shire of Serpentine-Jarrahdale. Containing a DSP within a single local government area will alleviate potentially complex assessment and administration of the DSP and simplify planning processes at the local level such as local planning scheme amendments and local structure plans.
- At 760 hectares, the DSP is an appropriate size that enables a coordinated planning approach without extending to areas that may require the resolution of unrelated issues, such as fragmentation. The proposed DSP area is approximately one high school catchment and is a manageable size that still provides for economies of scale.



Vision and Objectives

The DSP seeks to create a master planned community that responds to the environmental, hydrological and locational attributes of the land. A key feature at the core of the DSP vision is a network of multiple use corridors anchored by a central lakes system at the heart of the site. Whilst necessary to manage the hydrological characteristics of the land, the corridors and central lakes provide a unique opportunity to create a master planned community connected by nature and a movement network that encourages and fosters residents to embrace more sustainable transport methods and interact with their environment. A nature-positive outcome is targeted for these areas, improving water quality and biodiversity within the DSP.

A job curation strategy that maximises the opportunities afforded by the land’s proximity to the Western Trade Coast and future industrial areas underpins the spatial depiction of employment land as shown on the DSP Map. The employment vision for the DSP in relation to this employment land is to deliver jobs at a rate two to three times higher than ‘business as usual’ population-driven employment and at a job density four times higher than standard industrial land delivery through a ‘curated business strategy’. The curated business strategy will target the growth of small trade-related businesses within a contained precinct as part of the first stage of development. The co-location of small businesses is designed to enable the shared use of business infrastructure, resource pooling and network sharing. The strategy ultimately seeks to graduate businesses from the precinct into larger spaces, also within the DSP. Whilst the future DSP population will provide a resident workforce for future industrial expansion and growth in the locality, the complementary jobs strategy seeks to diversify jobs and create local opportunities for businesses to grow close to future construction projects.

The Concept Masterplan (refer Figure 14) illustrates the project vision described above.

Project Vision:



ECONOMIC PROSPERITY

Make a positive contribution to the local & regional economy



HOUSING CONTINUUM

Deliver housing for the full spectrum of needs



DECARBONISATION

Reduce greenhouse gas emissions



NATURE & CLIMATE RESILIENCE

Enhance natural capital & respond to a warming climate



Figure 14 - Concept Masterplan

Source: Nearmap

5.1 Land Use

Consistent with its identification as an 'Urban Expansion' area under the PIA Update, the DSP – as a strategic-level document - will coordinate and inform future statutory planning processes towards facilitating an urban outcome. The DSP area is planned to deliver approximately 6,000 dwellings at a range of densities to accommodate future population growth within the south-west corridor. The strategic location of the DSP enables creation of these new homes in a location with exceptional access to employment opportunities and transport infrastructure.

Whilst the DSP predominantly identifies land to deliver housing opportunities, employment land within the DSP is a critical component of the vision for an integrated urban environment that provides commercial opportunities for non-residential land uses that leverage the sites' strategic location and the sub-regions demographic profile.

The DSP is characterised by 340 hectares of 'Multiple Use ('Flood Storage') and wetlands, which comprises approximately 45% of the total area. This represents the total area required to be set aside to manage the risks of inundation in accordance with the outcomes of DWER's *East of Kwinana flood modelling and drainage study* (DWER 2021). Whilst development for buildings and structures is not possible due to its flood management function, the fact that the land will be free from drainage encumbrance at all times except for the 1% Annual Exceedance Probability rainfall event provides an opportunity for the land to fulfill a broader community benefit including social and environmental objectives.

In addition to the employment and multiple use land unique to this DSP, the DSP coordinates the spatial distribution of non-residential land uses necessary to accommodate a future residential community such as activity centres, schools and open space. The DSP also identifies and responds to high-level environmental features that are to be retained and protected as part of subsequent planning processes.



A summary table of the various land uses identified by the DSP is provided at Table 3.

Table 3: Land Use Summary

Item	Data
Total area covered by structure plan	760 ha
Approximate area of each land use proposed	
Residential	335 ha
Neighbourhood centre	10 ha
Local Centre	2 ha
Employment	22 ha
Powerline Easement	26 ha
District Open Space (within Multiple Use)	5 ha
Local Reserves (Conservation)	30 ha
Local Reserves (POS)	16 ha
Multiple Use (Flood Storage)	260 ha (303 ha including DOS, POS & Powerline Easement)
Road Widening (PPR & ORR)	12 ha
Other (roads and schools)	42 ha
Total estimated lot yield	6,000
Estimated residential site density	26 dwellings per site hectare
Estimated population	18,000 @ 3 people per household
Number of primary schools	4
Number of secondary schools	1
Estimated commercial floor space	10,000m ² - 11,500m ² net lettable area



The following key considerations have informed the design of the DSP Map:



The need to set aside sufficient land to manage potential inundation of the site during a 1% Annual Exceedance Probability rainfall event.



The location of the DSP east of the Freeway and separated from the urban front by transport corridors, necessitating the need to provide district-level infrastructure without reliance on access to adjoining, established neighbourhoods.



An integrated drainage and earthworks strategy that seeks to minimise the amount of fill necessary to accommodate development whilst protecting properties and infrastructure from the risk of flooding.



A vision to provide employment land and business opportunities beyond standard population-driven employment of a type that can integrate with sensitive land uses and leverage the strategic location of the land.



The distribution of primary schools throughout the DSP area, reflecting the neighbourhood structures and matching the anticipated staging of the DSP.



The protection and retention of the highest quality environmental features.



Efficient access to the Kwinana Freeway via Mundijong Road that will accommodate the majority of traffic movements to and from the DSP area.



The natural east to west surface drainage of the land towards the Peel Main Drain on the western boundary.



A water management strategy that will coordinate staged development of the land without affecting upstream or downstream hydrological characteristics or increasing the risk of flooding for existing properties within the DSP area.



A central lake system that provides a source of amenity capable of enhancing commercial, community and private residential land uses to the benefit of residents and the community.



A Neighbourhood Centre that enables it to be established relatively early, meeting the daily and weekly shopping needs of residents.



A vision to encourage active and sustainable movement by providing a path network throughout the multiple use corridors that links residents with key destinations. The movement network will be set in natural environs, free from vehicle conflict.

The proceeding sections discuss the DSPs design rationale in further detail based on the individual components that collectively define the plan. The DSP is rationalised into four local structure plan areas based on the ownership structure, anticipated staging and timing.

5.2 Multiple Use Corridor Development & Management

As outlined above, the 'Multiple Use (Flood Storage)' areas (MUCs) depicted on the DSP Map are designed to serve a primary drainage function in the 1% AEP rainfall event. Whilst drainage and flood storage are their primary function and reason for their inclusion in the DSP, the remote and infrequent nature of the rainfall event they are designed to accommodate means that they will be unencumbered by drainage in all but the most extreme scenario i.e. they will be dry for 99% of the time. This presents a unique opportunity for these areas to be planted and landscaped to integrate with the surrounding urban development, to the benefit of the future community and the environment. Once developed and implemented in accordance with the DWMS and DSP, the MUCs will require a degree of management and maintenance to ensure they do not have a detrimental impact on the adjoining residential land. As the MUCs are in addition to the standard public open space requirements of Liveable Neighbourhoods, a considered management response is required that provides for their ongoing management and maintenance.

5.2.1 Purpose

The purpose of this Multiple Use Corridor Development and Management section of the DSP (the MUC Strategy) is to:

- Establish high-level principles to guide the future development and management of the MUCs;
- Provide guidance on the types of land uses and development that may occur within the MUCs;
- Provide a framework for the preparation and assessment of more detailed planning processes including local structure plans, subdivision and development applications.
- Confirm the requisite information and matters to be addressed as part of the abovementioned planning processes; and
- Confirm roles and responsibilities in the development and ongoing management of the MUCs under a scenario whereby the MUCs are ceded free of cost into public ownership.

5.2.2 Vision

The DSP's vision is for the multiple use corridors to be transformative spaces that turn limitations into opportunities, inspiring a reimagining of the urban environment, promoting sustainable and healthy living while enhancing visual amenity. Development of the multiple use corridors will seek to create vibrant, nature-positive green spaces that seamlessly integrate with the community and surrounding urban environment. The corridors will be revegetated, fostering a harmonious coexistence between nature and the community.

An opportunity exists to co-design these corridors in collaboration with First Nations people, honouring their cultural heritage and incorporating their invaluable management principles into the planning and management of these spaces. The objective in this regard is to create a space that respects and celebrates the Traditional Owners.

Table 4: Multiple Use Corridors – Guiding Principles

Principle	Objective
Integration	Multiple-use corridors should seamlessly integrate into the existing community fabric, creating a cohesive and interconnected environment.
Nature-Positive Approach	The corridors should be revegetated to enhance biodiversity, promoting a positive impact on the natural environment.
Interactive and Accessible Design	The corridors should be designed to encourage active transport, recreational activities, and community engagement, ensuring accessibility for all.
First Nations Collaboration	The design process should explore opportunities to collaborate with First Nations, honouring their cultural heritage and incorporating their invaluable management principles.
Sustainability and Thriving Community	Development should seek to create a sustainable and thriving community where the wellbeing of residents and the natural environment are equally prioritised.
Transformative Spaces	The corridors should challenge conventional limitations and inspire innovative approaches to urban planning, turning constraints into opportunities.
Promoting Healthy Living	The corridors should promote sustainable and healthy living practices among residents, encouraging an active and vibrant lifestyle.

5.2.3 Design, Development and Management Outcomes

The MUC Strategy is premised upon the MUC areas being transferred into public ownership after they have been developed and maintained by the proponent for the initial establishment period. Implementation of the MUCs, including all plantings and embellishments, are the responsibility of the proponent, given that the need for the MUCs as flood storage areas is triggered by the urbanisation of the land.

After the initial establishment period, the MUCs are to be ceded free of cost into public ownership, without any payment or compensation from the Crown. Given the MUCs regional flood management function, the preference of the Department of Water and Environmental Regulation and the Local Government is for these areas to be in public ownership and not rely upon private entities to undertake the periodic maintenance necessary for their upkeep.

As per the outcomes of DWERs flood modelling, the MUCs cannot be developed for urban purposes and need to be set lower than the surrounding urban land which will be filled to a freeboard height above the modelled flood levels. Whilst the MUCs cannot accommodate buildings, a unique opportunity exists for the land to be used for recreation, movement and to enhance the natural amenity of the site in a way that will not compromise its primary drainage function. The multiple use and landscaping of these areas is a fundamental component of the DSP and will contribute to the creation of a master planned community that achieves a nature-positive outcome.

An underlying hydrological principle informing the distribution and alignment of the MUCs is the need to convey surface water in a westerly direction from preexisting, defined points where it enters the DSP at the eastern boundary and exits at an outflow point towards the western boundary. Once entering the DSP, surface water under the 1% AEP event is required to be retained and slowed within the site, meaning that not all the storage areas need to be linear and can instead be larger consolidated areas that abut the main east-west corridors.

The different sizes and roles of these areas provides opportunities to collocate public open space within the MUCs. A landscape concept plan has been prepared to illustrate the proposal to locate POS reserves within the MUCs, as discussed in further detail below.

District and Local Open Space within Multiple Use (Flood Storage) Area

These specific areas of open space identified on the DSP Map are situated within the designated flood storage areas and will be developed at a finished level whereby they will only be inundated in a 1% AEP rainfall event. These areas will be elevated higher than the invert of the drainage corridor but lower than the adjoining urban land or school site (as the case may be). As the open space would only accommodate stormwater in the 1% AEP event, they are eligible for a full POS credit in accordance with the Liveable Neighbourhoods calculation methodology.

These areas will be developed and function in the same manner as any other area of POS and form part of the mandatory 10% minimum POS contribution. Accordingly, it is expected that they will ultimately be managed by the Local Government post-development and following a standard two-year maintenance period by the developer. More detailed landscape concept designs will be required as part of future local structure plans that include open space within these areas.

Linear Corridors

The linear corridors are necessary to convey stormwater in a westerly direction across the DSP area and retain surface water to match pre-development outflow volumes. As such, these areas will be defined corridors, however given their width, they will be capable of accommodating path networks and replanted nature complexes.

Development of these corridors is a development responsibility and the detailed design will need to be documented as part of the subdivisional earthworks drawings.

The linear corridors are proposed to be developed as follows, as illustrated by the 'Landscape Concept Plan' at Figure 19:

- A central drainage invert (living stream) will convey water in an east-west direction and accommodate the most frequent rainfall events (small, 1 Exceedance per Year (EY) events).
- A continuous path network that comprises a principal shared path as the primary piece of movement infrastructure, accompanied by a network of nature trails for recreational walking.
- Planting of the corridors to achieve a 'nature positive' outcome, as discussed in detail below.
- A potential mountain bike park or other active uses for community recreation and enjoyment, subject to Local Government agreement and management. These uses are not fundamental to the operation of the DSP but are an opportunity to enhance accessibility to community infrastructure for future residents.

Indicative cross-sections illustrating the interface between the 'Multiple Use (Flood Storage)' areas and the adjoining land is provided within the 'Landscape Strategy' (refer Appendix 8) and inserted below.

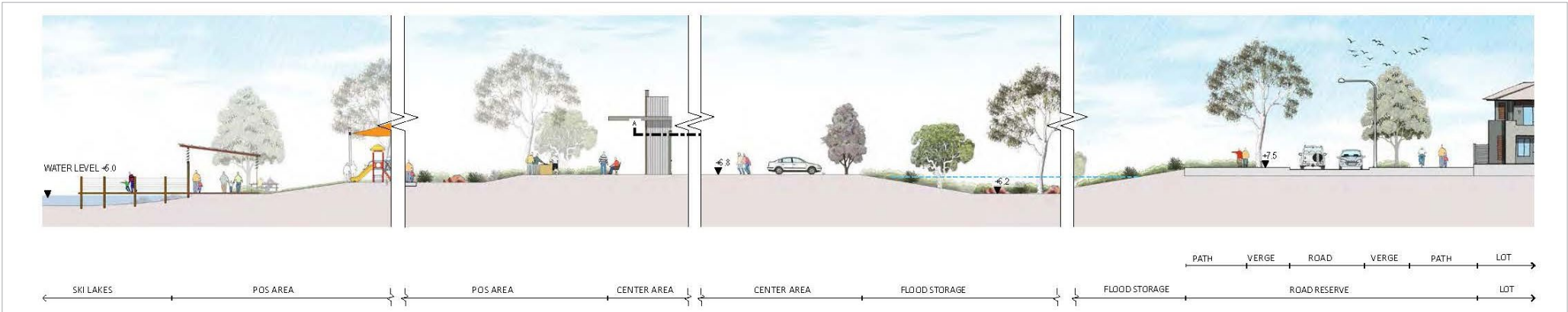


Figure 15 - Indicative Cross-section - Central Lakes and Local Centre

Source: Emerge Associates

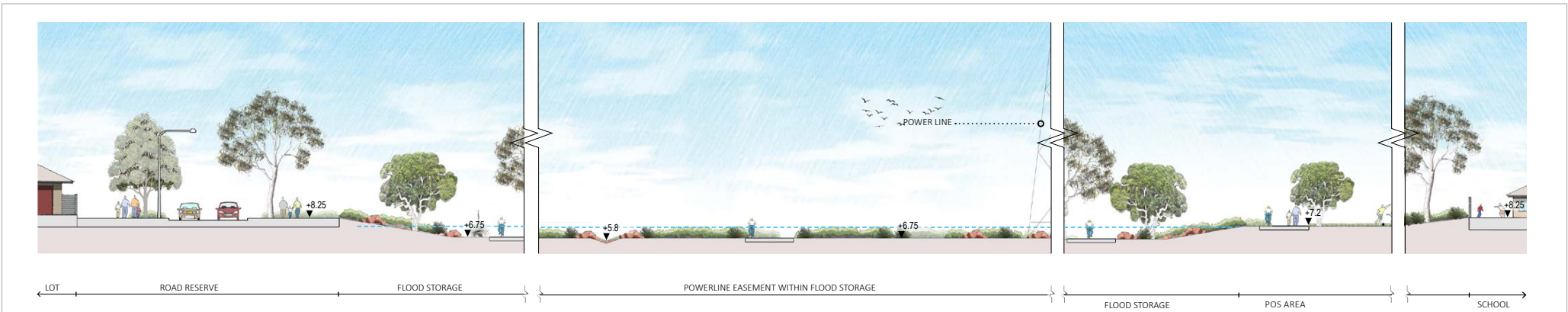


Figure 16 - Indicative Cross-section - Powerline Easement

Source: Emerge Associates

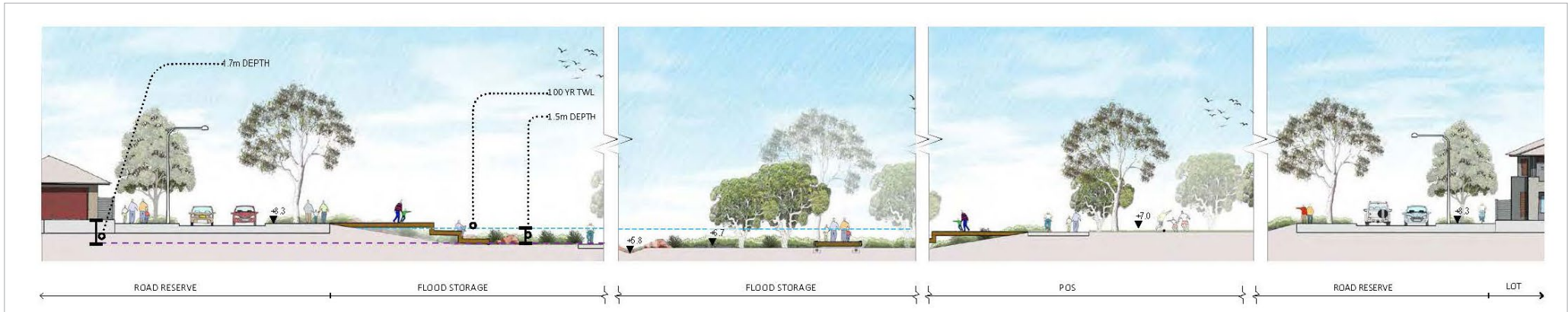


Figure 17 - Indicative Cross-section - Typical POS within Corridor

Source: Emerge Associates

Management Responsibilities

The MUCs will be developed by the proponent at the time subdivisional works are undertaken and as part of the approved earthworks design. Development will include all elements within the MUCs as outlined in Table 5 below which will be triggered by subdivision of the urban land. Once developed and after the initial establishment and maintenance period, the MUCs will be ceded free of cost into public ownership.

Table 5 sets out the various elements of the MUCs, their role and function and the entity responsible for their development, maintenance and management.

Table 5: MUC Elements - Development and Management Responsibilities

MUC Element	Development Responsibility	Management/Maintenance Responsibility	Comments
Living Stream	Developer/ Landowner	Local Government following first 2-year establishment and maintenance period by developer.	The MUCs will contain drainage infrastructure in the form of living streams to manage more frequent rainfall events. This drainage infrastructure typically exists within public open space or roadside drainage swales and is managed by the Local Government. As this constitutes a standard local government responsibility, it is intended that the living streams will be managed by the Local Government, to be spatially defined at the local structure plan and subdivision stages. These details are to be confirmed as part of the MUC Management Plans prepared as a condition of subdivision approval.
Small event treatment/ biofiltration areas	Developer/ Landowner	Local Government following first 2-year establishment and maintenance period by developer.	The DWMS proposes to treat and infiltrate small rainfall event (i.e. first 15mm) runoff from road reserves and lots with stormwater connections as close to source as possible within road reserves, POS or flood corridors. These biofiltration areas will be managed by the local government as per standard practice and as part of the development drainage network. Where located in POS or the MUCs, the location and design shall make them practically accessible for ease of maintenance. As these areas constitute a standard local government responsibility, it is intended that they will be managed by the Local Government, to be spatially defined at the local structure plan and subdivision stages. These details are to be confirmed as part of the MUC Management Plans prepared as a condition of subdivision approval.
Public Open Space	Developer/ Landowner	Local Government following first 2-year establishment and maintenance period by developer.	Public Open Space within the MUCs will be developed and managed in accordance with <i>Liveable Neighborhoods</i> as per standard practice. The distribution and location of POS areas will be confirmed at the local structure plan stage.
Roads	Developer/ Landowner	Local Government	Roads that traverse the MUCs will be ceded as local reserves and managed by the local government as part of the overall road network consistent with standard practice. The roads will be set above the 1% AEP flood level and will not be inundated in the design event.
Culverts	Developer/ Landowner	Local Government	Culverts underneath road crossings will be required to convey drainage and flood waters in a westerly direction as indicatively shown at Figures 20 and 30 of the DSP. The culverts will be located within the same local reserves as the roads under which they sit, making the local government a logical maintenance authority.
Flood bunds	Developer/ Landowner	Government	A series of flood bunds is proposed throughout the MUCs to assist fulfill their flood storage function. The bunds are indicatively shown at Figure 30 of the DSP and discussed under Section 5.7.2 'Stormwater Management'. Once constructed, the bunds are not expected to require regular maintenance however, they will be documented within the MUC Management Plans as regional flood management items to be managed by the government management body.

MUC Element	Development Responsibility	Management/Maintenance Responsibility	Comments
Paths	Developer/ Landowner	Local Government	<p>Developers / landowners will be responsible for the development of path networks within the MUCs and connecting them to the broader subdivision movement network. The paths would sit within the broader MUCs which will be transferred into public ownership after the initial establishment and maintenance period.</p> <p>The path network is viewed as a significant opportunity towards achieving a unique and sustainable movement strategy that once constructed, would be maintained by the Local Government. It is however, not essential to the development of the DSP and can therefore be omitted should the Local Government not agree to maintain the infrastructure.</p>
Powerline Easement	Developer/ Landowner	Government	<p>There are restrictions on development, land use and planting heights under powerlines which will need to be considered when developing and establishing the MUCs. Planting under the powerline easements will be managed as part of the broader MUC area.</p>
Central Lakes	Developer/ Landowner	Landowner/Lessee	<p>At present, water quality within the lakes is artificially maintained to enable its current use for ski boat recreation. As these uses can coexist within an urban context as proposed, it is intended that the lakes will remain in private ownership and be used for a commercial purpose. Under the DSP and associated DWMS, the lakes cannot be developed and are required to maintain their drainage function in perpetuity.</p>
Wetlands	Developer/ Landowner	Local Government	<p>Wetlands will be ceded as local reserves in accordance with standard practice. Any buffers, rehabilitation or establishment requirements will be detailed at the local structure plan and subdivision stages.</p>
Balance of MUCs	Developer / Landowner	Government - with potential interim management by Developer / Landowner	<p>The balance of the MUCs outside of the specific elements outlined above will be established as 'nature positive planting'. The planting will be intended to regenerate and improve the ecosystem and habitat as compared to existing site conditions.</p> <p>The objectives of the nature positive response are outlined as follows, with specific metrics to be developed at the local structure plan stage:</p> <ul style="list-style-type: none"> • Restore native vegetation and habitat to provide a substantial net gain on current ecological values. • Create habitat for key local fauna species, targeting black cockatoos. • Recreate a diversity of habitat types. • Provide good habitat connectivity throughout the site. • Improve the quality of water exported from the site to the Peel-Harvey Estuary. <p>At first stage development, there is the potential that a government agency may not have been confirmed to manage the MUCs in perpetuity. To account for this interim scenario, the MUCs can be temporarily managed by the Developer / Landowner. This process would be as follows:</p> <ol style="list-style-type: none"> 1. The MUCs are identified as local reserves on the plan of subdivision. 2. The developer / proponent develops and establishes the MUCs i.e. develops the MUCs to the ultimate standard. This would be followed by the typical 2-year management period; 3. In the absence of a government entity being confirmed to manage the MUCs, they would remain on the balance title with the management / maintenance obligations resting with the proponent / developer in accordance with the requirements of a Management Plan. 4. Once the government management body is confirmed, the MUC land is then ceded to the Crown, free of cost, with management and maintenance continuing to occur in accordance with the Management Plan.

MUC Element	Development Responsibility	Management/Maintenance Responsibility	Comments
Other uses	Private Entity	Private Entity	<p>Once the land is transferred into public ownership, there is the ability for the Crown or the Managing Authority to grant leases to third parties. Construction of permanent buildings or structures would not be permitted in accordance with the land's primary drainage function however, this does not encumber the use of the land for certain purposes.</p> <p>Examples of potential entities / uses that may have an interest in leasing the land include:</p> <ul style="list-style-type: none"> • Research bodies • Education providers • Traditional owners • Greening / rewilding education • Seed banking • Native plant nurseries • Renewable energy provider • Environmental offsets • Tourism

The below Concept Masterplan (refer Figure 18) provides a visual representation of the various components within the MUCs described in Table 5 above i.e. living stream, paths, roads, POS, lakes etc), depicting one potential implementation scenario. The plan is intended to provide an illustrative guide to supplement Table 5 rather than a firm delivery proposal.

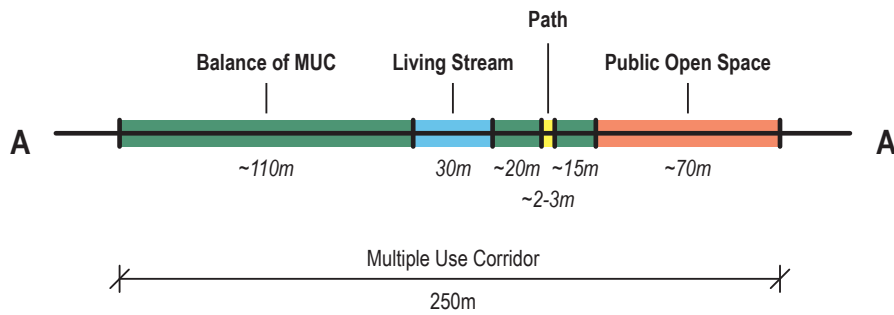






Figure 18 - Concept Masterplan

Source: Nearmap

The following sections provide an indicative visual representation of the 'MUC elements' specified within Table 5.

Multiple Use Corridor Section A-A



MUC Element	Development Responsibility	Management / Maintenance Responsibility
 Balance of MUC	Developer / Landowner	Government
 Living Stream	Developer / Landowner	Local Government (following 2-year establishment period)
 Public Open Space	Developer / Landowner	Local Government (following 2-year establishment period)
 Path	Developer / Landowner	Local Government

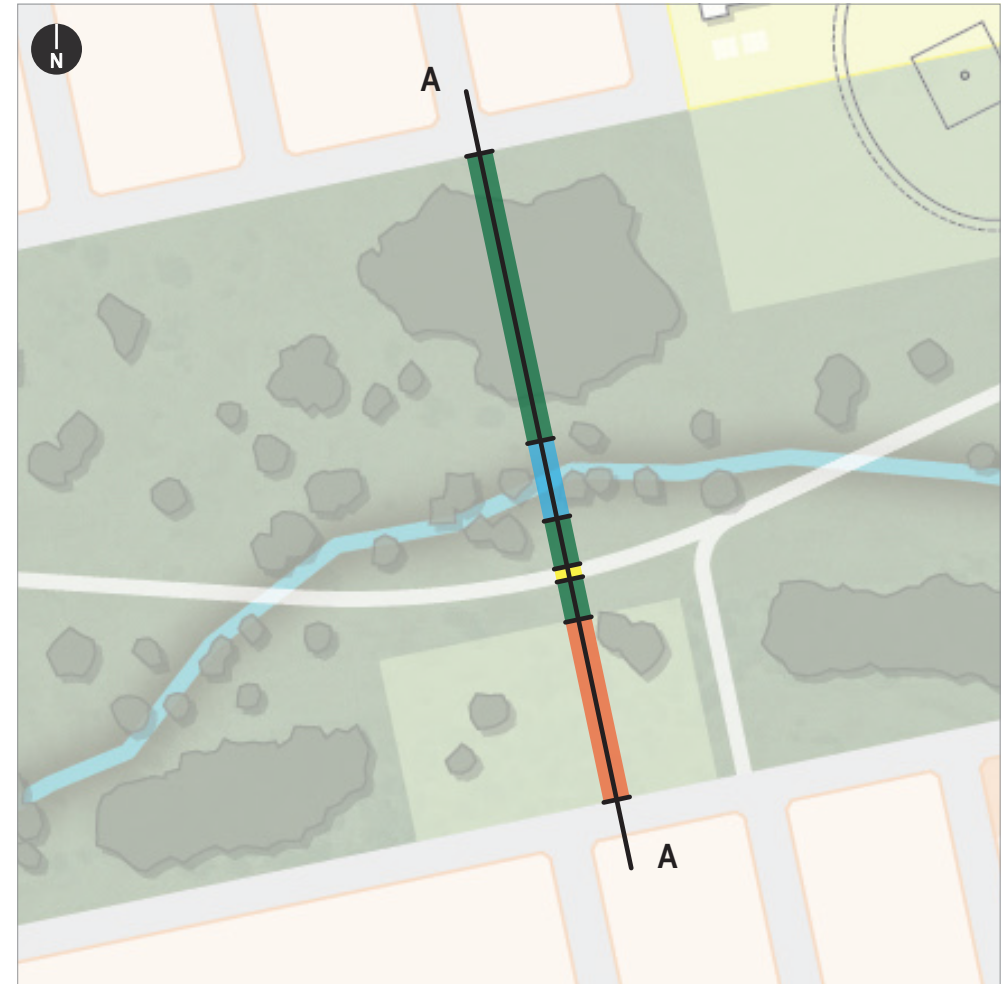
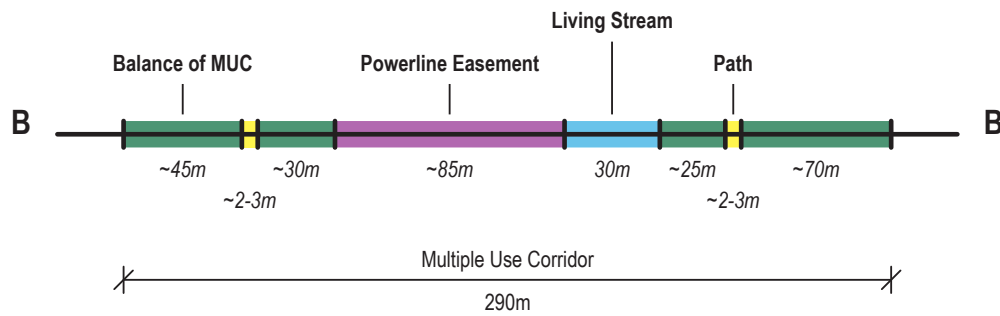


Figure 19 - Multiple Use Corridor Section A-A (Plan)

Multiple Use Corridor Section B-B



MUC Element	Development Responsibility	Management / Maintenance Responsibility
Balance of MUC	Developer / Landowner	Government
Living Stream	Developer / Landowner	Local Government (following 2-year establishment period)
Path	Developer / Landowner	Local Government
Powerline Easement	Developer / Landowner	Government
Road	Developer / Landowner	Local Government
Culvert	Developer / Landowner	Local Government



Figure 20 - Multiple Use Corridor Section B-B (Plan)

5.2.4 Tenure

The MUCs will be transferred into public ownership after the initial establishment and maintenance stage. Management Orders may then be granted to a government agency (State or Local) with conditions regarding the land's management. Where no Management Order is granted, the Crown would also have the ability to lease the land to third parties. Where a management order is granted, the managing body may have the ability to lease the land where permitted by the Management Order.

The following table sets as the land tenure arrangements for the various components of the MUCs.

Table 6: MUC Elements - Tenure

MUC Element	Tenure Arrangement	Comment
Living Stream	Local Government reserve	Ceded as a local reserve once developed and established by the developer / subdivider. The Management Order over these areas would be granted to the Local Government for management as part of the local drainage network.
Public Open Space	Local Government reserve	Ceded as a local reserve once developed and established by the developer / subdivider. The Management Order over these areas would be granted to the Local Government for management as part of the local drainage network.
Paths	Local Government reserve	Paths to be detailed and developed as subdivisional works and then maintained by the Local Government.
Powerline Easement	Local reserve	The Management Order over this area would be granted to the government agency managing the balance of the MUCs.
Central lakes	Private Ownership	Intended to be managed by the lessee utilising the lakes for private recreational purposes.
Wetlands	Local Government reserves	Wetlands will be ceded and managed by the Local Government.
Balance of the MUCs	Local reserves	Ceded as a local reserve once developed and established by the developer / subdivider. The Management Order over these areas would be granted to a government agency.
Other Uses	Local reserves	Managing bodies may have the power to lease parts of the MUCs to third parties for uses that do not prejudice the flood storage function of the MUCs. Where no managing authority exists, power to lease will lie with the Crown.



5.2.5 Future Planning Process

The following table sets out the information and reporting requirements and key matters to be addressed at subsequent planning stages. This part of the MUC Strategy is to be read in conjunction with the Part 1 – Implementation Report of the DSP.

Table 7: Future Planning Processes

Planning Process	Information Requirements	Matters to be Addressed
Local Structure Plans	Local Water Management Strategy	<ul style="list-style-type: none"> • Staged development of the DSP in accordance with the DWMS as per clauses 4.0 and 5.0 of the Part 1 – Implementation Section. • Geotechnical investigations, including the MUCs. • Stormwater and groundwater management controls based on the earthworks model. • Engineering fill levels. • Confirm discharge points and peak flow rates. • Demonstrate consistency with the design principles, earthworks and drainage design established as part of any preceding structure plans/LWMSs and integrate with established urban development, where it exists.
	LSP Map	<ul style="list-style-type: none"> • LSP Map to spatially identify suitable local reserves for the MUCs. Local reserves are anticipated as follows: <ul style="list-style-type: none"> - 'Public Open Space' reserves for the District Open Space and Local Open Space collocated within the MUCs and biofiltration areas. - 'Environmental Conservation' reserves for wetlands. - 'Drain' reserves for the living streams. - 'Local Road' reserves for road crossings and associated culverts. - 'Special Purpose Reserve' for the balance of the MUCs containing planted vegetation, bunds, paths and the powerline easement. • 'Special Use Zone' for the central lakes.
	Part 1 – Implementation Section	<ul style="list-style-type: none"> • Establish objectives for the 'Special Use Zone' which will apply to the central lakes. • Provide a list of land uses that are permitted or capable of approval within the 'Special Use Zone' over the central lakes. Uses are to be compatible with the primary flood storage function of the MUCs and shall not prejudice this function. • Establish development controls that generally preclude any structures or buildings within the Special Use Zone and identify any exceptions where lightweight structures may be considered. • Establish the purpose and objectives for the 'Special Purpose Reserve'. • Establish any additional land uses that may be permitted within the 'Special Purpose Reserve' and any associated conditions, as per clause 15 of the 'Model provisions for local planning schemes.' • Identify management plans and technical reports that are required to accompany subdivision proposals. • Establish a requirement for a 'per lot' contribution at subdivision clearance stage to fund the ongoing management and maintenance of the 'Special Purpose Reserve' by a government agency.
	Landscape plan	<ul style="list-style-type: none"> • Provide details of species, densities and locations for planting within the MUCs.
Subdivision	Tenure	<ul style="list-style-type: none"> • Identify local reserves in accordance with the principles established by this MUC Strategy and the preceding structure plan.

Planning Process	Information Requirements	Matters to be Addressed
	MUC Management Plan	<ul style="list-style-type: none"> As a condition of subdivision approval, prepare a Management Plan that establishes a framework for the ongoing management of the MUCs based on the agreed government management body. The Management Plan will specify the requirement to maintain the MUCs to fulfill their primary drainage function. Specific matters that will foreseeably require management such as litter and weeds are to be addressed. The MUC Management Plan should also reference any other management plans, such as Bushfire Management Plans and include management measures and responsibilities where relevant. Identify any ongoing compliance reporting requirements.
	Levels	<ul style="list-style-type: none"> Provide indicative levels to demonstrate integration of the development footprint and the MUCS. Detailed designs are to be provided as a condition of subdivision approval as the per the below.
	Engineering drawings prepared as a condition of subdivision	<ul style="list-style-type: none"> Detail the design levels, batters, drainage inverts, bunding and culvert locations for the MUCs. Detail integration of MUC levels with the adjoining urban land.
	Landscape Drawings	<ul style="list-style-type: none"> Detailed landscape drawings to be prepared for the MUCs in consultation with the government management body to ensure acceptability from a management perspective.
	Management Funding	<ul style="list-style-type: none"> Impose a condition requiring a per lot contribution to fund the ongoing management of the MUCs by a government agency. This will be coordinated via preparation of a legal deed which landowners will need to enter into, and which will require the funds to be spent by the management body on the management of the MUCs.
Development Applications	Land Use	<ul style="list-style-type: none"> Any proposal for development or use within the MUCs will require development approval from the Local Government. As the land will be in public ownership, any land use will need to be consistent with the purpose of the reserve and be subject to lease agreements between the management body or the Crown. Land use within the 'Special Use Zone' over the central lakes is to be assessed in accordance with the provisions of the applicable local structure plan.
	Development	<ul style="list-style-type: none"> Development is to be assessed in accordance with the development standards detailed within the local structure plan. No permanent buildings or structures are permitted within the MUCs. This restriction is necessary to protect property and ensure that the flood storage function of the MUCs is not compromised. Lightweight structures may be considered at the discretion of the Local Government and if provided for by the local structure plan.
	Conditions	<ul style="list-style-type: none"> Conditions will be imposed on development approvals to provide an enforceable mechanism to ensure the ongoing management and maintenance of the MUCs and that the flood storage function is protected.
	Compliance	<ul style="list-style-type: none"> Any works, development, use or alteration of levels within the MUCs that is not in accordance with an approved development application will constitute unauthorised works and therefore be subject to compliance/enforcement action and/or prosecution by the Local Government.

5.3 Residential

The distribution of residential density and the housing strategy for the DSP are discussed in detail below. The DSP is structured into four local structure plan areas which form the basis for individual neighbourhoods within the DSP.

Whilst density coding will be established at the local structure planning stages, it is envisaged that R-Code ranges will be implemented across the DSP area in accordance with part 10.4 of the WAPCs 'Structure Plan Framework'. In accordance with the 'Structure Plan Framework', the following R-Code ranges are expected to be implemented at the local structure plan stage:

- R25 – R40 will be applied as the default R-Code range across the DSP area. Local structure plans will then establish locational criteria as to where the higher density codes within this range (R30 and R40) may be applied.
- An R25 – R60 R-Code range will be applied within 400m of the Neighbourhood Centre and 200m of the Local Centre. Higher density codes within this range (above R40) are expected to occur mostly within 200m of the activity centres. Additional locations for this R-Code range may be identified as part of the local structure plan process.

Table 8 of the Framework outlines a minimum average density target of 15 dwellings per gross hectare of urban zoned land which equates to 26 dwellings per site hectare. These density targets should be considered in determining the appropriate R-Code ranges at local structure plan stage and inform subsequent subdivision processes.

The R-Code range and locational criteria confirmed at the local structure plan stage should also aim to deliver a range of housing typologies to achieve housing diversity and affordability options within the local structure plan areas. Density ranges/targets to be established at local structure plan stage should also respond to changes in WAPC positions as well as advances in building technology and construction methodology.



5.3.1 Local Structure Plan 1

It is expected that R-Code ranges of R25 – R40 and R25 – R60 will be applied to the Local Structure Plan 1 area. Locational criteria for coordinating densities at the local structure plan stage should be informed by the following principles:

- An R25 – R60 R-Code range within 400m of the Neighbourhood Centre in accordance with SPP 4.2;
- An R25 – R60 R-Code range within 250m of the employment land; and
- Higher densities within the R25 - R40 base R-Code range in close proximity to the central lake, public transport routes and schools. Land directly opposite the ‘Multiple Use (Flood Storage)’ areas may also be appropriate for higher densities within this range where development and landscaping of these areas offers visual amenity and opportunities for passive recreation.

Opportunities for innovative housing that integrates with the employment land may be investigated at the local structure plan stage where compatible.

5.3.2 Local Structure Plan 2

It is expected that R-Code ranges of R25 – R40 and R25 – R60 will be applied to the Local Structure Plan 2 area. Locational criteria for coordinating densities at the local structure plan stage should be informed by the following principles:

- An R25 – R60 R-Code range within 200m of the Local Centre in accordance with SPP 4.2; and
- Higher densities within the R25 – R40 base R-Code range near the central lake, public transport routes, schools and areas of natural amenity. Land directly opposite the Multiple Use (Flood Storage) areas may also be appropriate for higher densities within this range where development and landscaping of these areas offers visual amenity and opportunities for passive recreation.

5.3.3 Local Structure Plan 3

It is expected that R-Code ranges of R25 – R40 and R25 – R60 will be applied to the Local Structure Plan 3 area. Locational criteria for coordinating densities at the local structure plan stage should be informed by the following principles:

- An R25 – R60 R-Code range within 250m of the employment land; and
- Higher densities within the R25 – R40 R-Code range in close proximity to public transport routes, schools and areas of natural amenity. Land directly opposite the Multiple Use (Flood Storage) areas may also be appropriate for higher densities within this range where development and landscaping of these areas offers visual amenity and opportunities for passive recreation.

5.3.4 Local Structure Plan 4

It is expected that an R-Code range of R25 – R40 will be applied to the Local Structure Plan 4 area. Locational criteria for coordinating densities at the local structure plan stage should focus on higher densities near public transport routes.

Land directly opposite the multiple use areas may also be appropriate for higher densities within this range where development and landscaping of these areas offers visual amenity and opportunities for passive recreation.

5.4 Movement Network

In accordance with the WAPC's 'Transport Impact Assessment Guidelines', a Traffic Impact Assessment (TIA) has been prepared by PJA in support of the DSP (refer Appendix 7). The TIA provides a summary of the existing transport network, identifies necessary upgrades to roads and intersections and assigns a road hierarchy for the DSP based on detailed traffic modelling.

The following sections provide a summary of the key findings from the TIA as well as key matters to be considered and implemented at subsequent stages of planning.

5.4.1 Existing Road Network

[Kwinana Freeway](#)

Abutting the western boundary of the DSP, the Kwinana Freeway is a dual carriageway national highway with four lanes (two in each direction) providing free-flowing north-south movement from the Perth CBD in the north to Forrest Highway in the south. The DSP's immediate proximity to this key piece of transport infrastructure provides immediate access to the regional road network and the connectivity it affords. Future infrastructure planning identifies widening of the Kwinana Freeway to eight lanes (four in each direction) however at the time of drafting, this upgrade is unfunded. As such, the TIA has assumed six lanes (three in each direction) adjoining the DSP, with further widening only serving to improve traffic flows.

Access to the Kwinana Freeway is via an existing, signalised interchange at Mundijong Road.

[Mundijong Road](#)

Mundijong Road abuts the southern boundary of the DSP and is classified as a 'Regional Distributor' under MRWA's Functional Road Hierarchy. Mundijong Road sits within an 'Other Regional Road Reserve' of the MRS and is under the control of the WAPC. Mundijong Road serves the primary east-west connection in proximity of the site, connecting with South West Highway to the east and the Kwinana Freeway to the west.

[Telephone Lane](#)

Telephone Lane currently exists in two sections:

1. The section abutting the northern boundary of the DSP as a constructed road reserve running in an east-west direction. This northern section is constructed as a two-lane, rural road and passes under the Kwinana Freeway heading in an westerly direction; and
2. The unmade road reserve on a north-south alignment bisecting the DSP between the rail freight line to the north and Mundijong Road to the south.

Telephone Lane is an important road for the DSP as it provides for east-west movement at the northern end of the site and has an intersection with Mundijong Road at the southern end. An 'Other Regional Road' reserve on the northern side of Mundijong Road at the southern end of Telephone Lane plans to stagger the current four-way intersection where the unconstructed section of Telephone Lane currently connects with a constructed section south of Mundijong Road.

[St Albans Road](#)

Constructed as a single carriageway, two-lane rural road, St Albans Road provides a key north-south connection between Telephone Lane to the north and Mundijong Road to the south. As a constructed road reserve that intersects with Mundijong Road, St Albans Road provides an excellent opportunity to accommodate access to the first stage of development, subject to the requisite upgrades as discussed below.

[Duckpond Road](#)

Duckpond Road sits outside the eastern boundary of the DSP and exists as a single carriageway, two lane rural road on a north-south alignment. Duckpond Road intersects with Mundijong Road beyond the eastern boundary of the DSP. This intersection may require reconfiguration by others, based on the future realignment of Mundijong Road in this location.

Whilst not providing access through the DSP area, the unmade northern section of Duckpond Road can be connected through to Telephone Lane as part of the DSP to facilitate a permeable road network around the DSP.

5.4.2 Proposed Road Network

The TIA is based on detailed traffic modelling that was developed by PJA to inform the road planning for the DSP. In developing the traffic model, the following inputs/assumptions were used:

- An estimated 6,000 residential dwellings at ultimate development. Morning peak hour trip generation rates of 0.20 inbound and 0.60 outbound trips was used. For evening peak trips, 0.50 inbound and 0.30 outbound trips was used.

- An estimated 39,600m² of gross floor area split between the Neighbourhood Centre and Local Centre. Morning peak hour trip generation rates of 1.20 inbound and 0.30 outbound trips was used. For evening peak trips, 0.60 inbound and 0.60 outbound trips was used.
- 107,000m² of gross floor area of commercial space between the two employment precincts fronting Mundijong Road. Morning peak hour trip generation rates of 0.44 inbound and 0.108 outbound trips was used. For evening peak trips, 0.11 inbound and 0.432 outbound trips was used.
- An estimated 540 students per primary school and 1,400 students for the high school. As per the WAPC's TIA Guidelines, two trips per student per day were assumed for the school sites.

Using the abovementioned trip generation assumptions, Vissim modelling was undertaken to distribute the traffic on the network of internal roads, with road hierarchies assigned based on the forecast traffic volumes in accordance with *Liveable Neighbourhoods*. The TIA has considered and informed the intersections of these internal roads with the external road network, specifically Mundijong Road on the southern boundary and Telephone Lane (east - west section) on the northern boundary.

Estimated traffic volumes on the external network of higher order roads are based on ROM data which is a State Government strategic modelling tool. The TIA converted the ROM data to peak hour flows and incorporated it into the DSP modelling. The TIA assumed a revised scenario for one element of the ROM in relation to the traffic being generated from the future industrial land south of Mundijong Road. Specifically, the ROM modelled approximately 76,000 vehicles per day as using Mundijong Road from the industrial land to the south. For context, this is higher than current 2023 volumes on the Kwinana Freeway, at 67,000 vehicles per day.

Given the course nature of the ROM strategic model and high-level assumptions required at this DSP stage, subsequent local structure planning processes should be adaptive to consider and respond to refinements in the traffic modelling as development progresses over time. Further traffic investigations are therefore required at the local structure plan stage to refine the movement network to achieve an optimum result that reflects contemporary travel behaviour (work from home), aligns with the objective of encouraging sustainable travel methods (walking, cycling, public transport) and supports good urban design outcomes.

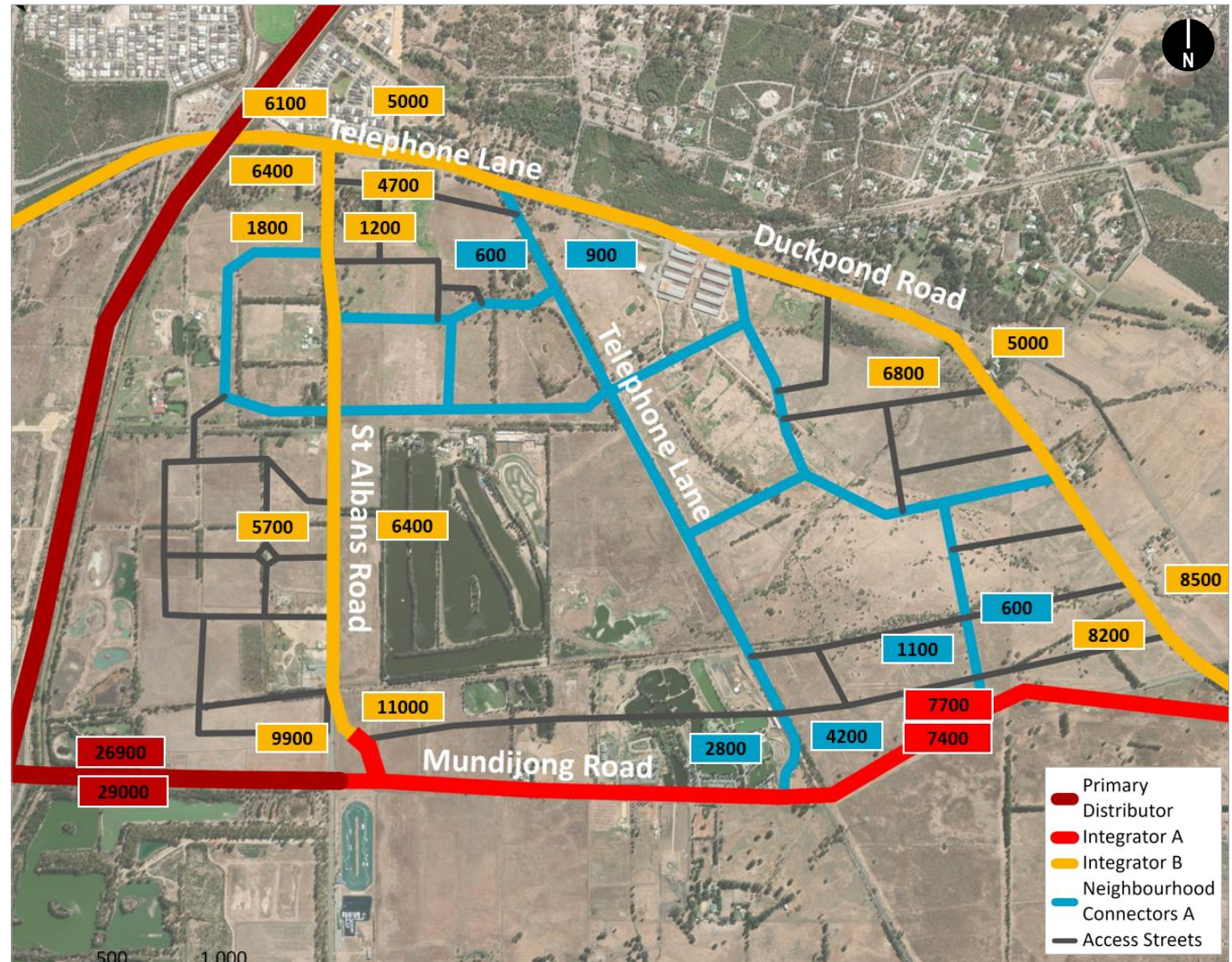


Figure 21 - Proposed Road Hierarchy

Source: PJA

[Internal Road Network](#)

Informed by the traffic modelling and anticipated traffic volumes, the TIA assigns an appropriate road hierarchy consistent with *Liveable Neighbourhoods* standard road classifications. In accordance with standard practice, the DSP Map identifies the general alignment of higher-order roads, being neighbourhood connector roads and above.

The proposed road hierarchy for the DSP is shown at Figure 21 – ‘Proposed Road Hierarchy’. Table 8 identifies existing and planned DSP roads as well as the requisite upgrades.

The location of local roads (access streets) will be confirmed by the TIA's prepared in support of the respective local structure plans, informed by the road hierarchy depicted on the DSP Map.

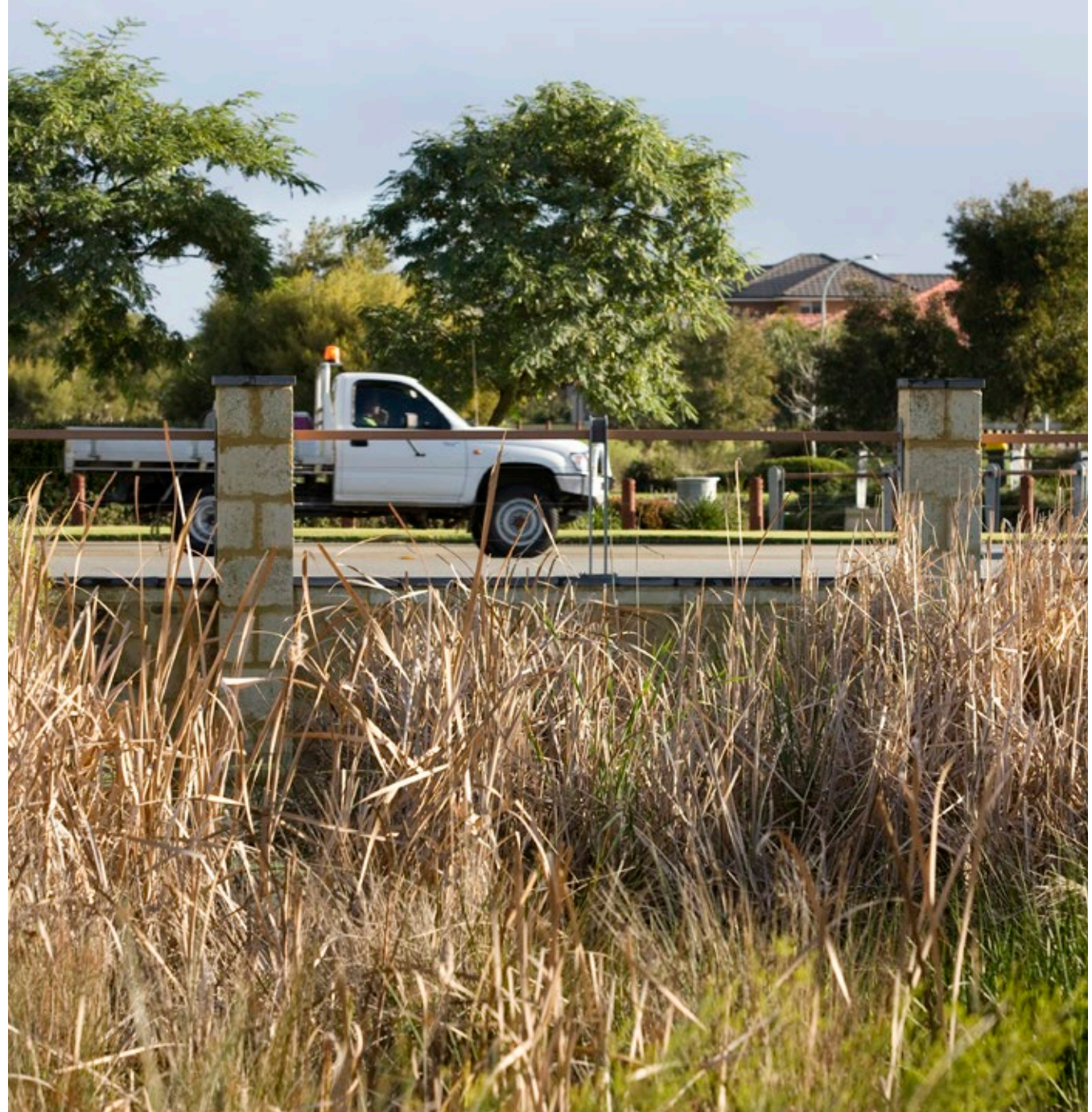


Table 8: Internal Road Network

Road	DSP Road Hierarchy	Current Road Standard	Comments
Telephone Lane abutting the northern and eastern DSP boundaries.	Integrator Arterial B	Single carriageway, two lane, rural road. 20-metre-wide road reserve	Road reserve may require widening to the south however, the road will be single sided meaning that a full Integrator B cross section will not be required. The ability to widen Telephone Lane under the Freeway is limited by the existing bridge span. Based on the estimated traffic volumes of 12,500 vehicles per day in this location, 2 lanes in each direction will be sufficient.
St Albans Road (southern intersection, through the Neighborhood Centre)	Integrator Arterial A - centres	Single carriageway, two lane, rural road. 20-metre-wide road reserve	The southern, realigned portion of St Albans Road that bisects the Neighbourhood Center will require widening to approximately 35.6m to accommodate an Integrator A - centres cross section in accordance with <i>Liveable Neighbourhoods</i> .
St Albans Road	Integrator Arterial B	Single carriageway, two lane, rural road. 20-metre-wide road reserve	The balance of St Albans Road north of the Neighbourhood Center will require widening to approximately 29.2m in accordance with <i>Liveable Neighbourhoods</i> . Construction of the interim St Albans Road connection to Mundijong Road is discussed in further detail below.
Neighbourhood Connector roads	Neighbourhood Connector A or B	N/A	Neighbourhood Connectors are required to facilitate internal movement via a permeable network of roads. These will require the establishment of new road reserves and will be refined at the local structure planning stage.
Access Street, bisecting the high school and DOS and connecting into the Neighbourhood Center at its western terminus.	Access Street	N/A	The DSP indicatively shows one local road (access street). Whilst the anticipated traffic volumes are not high enough to classify this road as a higher order road, it is an important east-west connection and so is depicted on the DSP Map.



[Refinement of Road Hierarchy](#)

Further refinements to the road hierarchy will be required as part of local structure planning and as staged development progresses. The volume and distribution of traffic modelled by the DSP is based on the best information available at the time however, as development proceeds and travel behaviour is established, subsequent traffic assessments will be informed by actual demand, behavioural factors and the associated traffic distribution. Any changes required to the road hierarchy will need to be demonstrated by subsequent TIAs at the local structure plan stage.

[Internal Intersections](#)

Further analysis will be undertaken at the local structure planning stages to confirm internal intersection treatments. This will be based on any potential modifications to the road network or additional information that arises as a result of the more detailed traffic investigations.

[External Road Network](#)

Table 6 below identifies the key external roads that will accommodate DSP traffic. The table identifies the current road standard, the ultimate standard and then the standard necessary to accommodate DSP traffic. Differentiating between the standard of road necessary to service DSP development traffic and the ultimate standard necessary to accommodate regional traffic movements generated by others is necessary to confirm the upgrades required as a result of the DSP. Separating DSP development traffic from regional traffic is consistent with the established principle of 'need and nexus' whereby infrastructure upgrades triggered by regional traffic demand is required to be funded by others.

Table 9: External Road Network

Road	Current Standard and Volumes	DSP Standard	Ultimate Standard	Comments
Mundijong Road (West of St Albans Road)	Single carriageway, two lane, rural road. 20m road reserve (ceded) with approx. 20m widening on northern side. Current volumes are 6,786 vehicles per day.	Integrator A – boulevard, four lanes (two in each direction).	Four or six lanes. To be determined based on broader traffic modelling and confirmation of Mundijong Road’s role in the movement network by the State Government as part of future infrastructure planning.	DSP development traffic is estimated to generate 19,600 vehicles per day (vpd). When added to existing traffic volumes, this equates to 26,400 vpd necessitating upgrading of this section of Mundijong Road. The existing 40m-wide ‘Other Regional Road’ (ORR) reserve may be sufficient to accommodate these upgrades however, additional widening can be accommodated to the north if required. Any further upgrades to Mundijong Road triggered by external traffic in association with the broader role and function of Mundijong Road as determined by MRWA and the WAPC will be the responsibility of others. To accommodate potential widening of Mundijong Road to an ultimate standard in the future, the DSP identifies a ‘Potential Primary Regional Road’ extending 88 metres from the northern edge of the existing carriageway. This is based on the advice of MRWA and is intended to preserve land that may be needed for the widening of Mundijong Road, should it be deemed necessary in the future.
Mundijong Road (St Albans Road to Telephone Lane)	Single carriageway, two lane, rural road. 20-metre-wide road reserve (ceded) with approx. 20m widening on northern side. Current volumes are 6,786 vehicles per day.	Integrator B – outside centres, two lanes (one in each direction).	Four or six lanes. To be determined based on broader traffic modelling and confirmation of Mundijong Road’s role in the movement network by the State Government as part of future infrastructure planning.	DSP development traffic is estimated to generate 8,200 vehicles per day (vpd). When added to existing traffic volumes, this equates to 15,000 vpd necessitating upgrading of this section of Mundijong Road. The existing 40m-wide ORR reserve will be sufficient to accommodate the necessary upgrade. Any further upgrades to Mundijong Road triggered by external traffic in association with the broader role and function of Mundijong Road as determined by MRWA and the WAPC will be the responsibility of others. To accommodate potential widening of Mundijong Road to an ultimate standard in the future, the DSP identifies a ‘Potential Primary Regional Road’ extending 88 metres from the northern edge of the existing carriageway. This is based on the advice of MRWA and is intended to preserve land that may be needed for the widening of Mundijong Road, should it be deemed necessary in the future.

Road	Current Standard and Volumes	DSP Standard	Ultimate Standard	Comments
Mundijong Road (Telephone Lane to eastern DSP boundary)	Single carriageway, two lane, rural road. 20-metre-wide road reserve (ceded) with approx. 20m widening on northern side. Current volumes are 6,786 vehicles per day.	Integrator B – outside centres, two lanes (one in each direction).	Four or six lanes. To be determined based on broader traffic modelling and confirmation of Mundijong Road's role in the movement network by the State Government as part of future infrastructure planning.	DSP development traffic is estimated to generate 2,300 vehicles per day (vpd). When added to existing traffic volumes, this equates to 9,000 vpd which may necessitate upgrades to this section of Mundijong Road. The current standard has the potential to accommodate up to 15,000 vpd. The existing 40m-wide ORR reserve will be sufficient to accommodate any necessary upgrades. Any further upgrades to Mundijong Road triggered by external traffic in association with the broader role and function of Mundijong Road as determined by MRWA and the WAPC will be the responsibility of others. To accommodate potential widening of Mundijong Road to an ultimate standard in the future, the DSP identifies a 'Potential Primary Regional Road' extending 88 metres from the northern edge of the existing carriageway. This is based on the advice of MRWA and is intended to preserve land that may be needed for the widening of Mundijong Road, should it be deemed necessary in the future.
Mundijong Road (East of the DSP)	Single carriageway, two lane, rural road. 20-metre-wide road reserve (ceded) with approx. 20m widening on northern side. Current volumes are 6,786 vehicles per day.	Integrator B – outside centres, two lanes (one in each direction).	Four or six lanes. To be determined based on broader traffic modelling and confirmation of Mundijong Road's role in the movement network by the State Government as part of future infrastructure planning.	DSP development traffic is estimated to generate 9,300 vehicles per day (vpd). When added to existing traffic volumes, this equates to 16,000 VPD necessitating upgrading of this section of Mundijong Road at some point in the future. The current standard has the potential to accommodate up to 15,000 vpd. The existing 40m-wide ORR reserve will be sufficient to accommodate the necessary upgrade. Any further upgrades to Mundijong Road triggered by external traffic in association with the broader role and function of Mundijong Road as determined by MRWA and the WAPC will be the responsibility of others. To accommodate potential widening of Mundijong Road to an ultimate standard in the future, the DSP identifies a 'Potential Primary Regional Road' extending 88 metres from the northern edge of the existing carriageway. This is based on the advice of MRWA and is intended to preserve land that may be needed for the widening of Mundijong Road, should it be deemed necessary in the future.

Figure 22 'Daily DSP Traffic Volumes' and Figure 23 'Daily Background Traffic Volumes' below depict the development traffic generated by the DSP and the external traffic volumes to 2051 respectively.

Connectivity to Wellard Train Station is a significant advantage for the DSP towards encouraging sustainable travel behaviour and reducing the reliance on private vehicles. Access by road to Wellard Train Station from the DSP is currently facilitated by Wellard Road which intersects with Telephone Lane south of the rail freight line. Existing access to the intersection of Wellard Road and Telephone Lane from the DSP is provided as follows:

- Via Telephone Lane at the northern boundary of the DSP, heading in a westerly direction and under the Kwinana Freeway; or
- Via Mundijong Road at the southern boundary of the DSP, heading in a westerly direction over the Kwinana Freeway and then north along Baldivis Road.

Connection to Wellard Station relies on the external network of roads and intersections and is a key objective in the broader accessibility planning for the DSP. Retention of both connections to Wellard Station is therefore the preferred scenario for the DSP however, these are outside of the DSP and therefore subject to broader infrastructure planning by others. These potential scenarios are discussed in further detail under the 'External Intersections' heading below.

Eastern connectivity to South West Highway and the future Tonkin Highway extension will be facilitated by Mundijong Road. The current standard of Mundijong Road can accommodate the initial stages of east-bound DSP traffic until it is upgraded as part of other planned development and upgrades. This includes:

- The development of the West Mundijong Industrial Precinct and requirements of Development Control Area No.2 of the Shire of Serpentine-Jarrahdale Town Planning Scheme No.2 and the associated upgrade of Mundijong Road between Kargotich Road and the Tonkin Highway reservation;
- The growth and expansion of the Mundijong Townsite/Whitby urban area in accordance with the Shire of Serpentine-Jarrahdale's draft 'Mundijong District Structure Plan'; and
- Mundijong Road's intended function as a strategic east-west connection between the south-west and south-east corridors.

Connectivity to the north has not been assumed in the TIA traffic modelling due to:

- The physical barrier imposed by the rail freight line on the northern boundary.
- The inability for Woolcoat Road - as ceded and constructed north of the rail freight line - to accommodate additional, unplanned traffic volumes.
- The potential for a connection to encourage traffic from the north through the DSP and onto Mundijong Road.
- The intuitive distribution of DSP development traffic based on destination assumptions, which does not anticipate DSP traffic needing to connect north into Wellard and east of the Freeway. DSP traffic is anticipated to head west and to a lesser degree, east on Mundijong Road.

Notwithstanding the above, the WAPC resolved to modify the DSP to require that a future potential crossing to the north over the rail freight line should be investigated at the local structure planning stage. These investigations will need to be undertaken in collaboration with MRWA and DPLH to confirm whether a crossing is possible and feasible. Should it be determined that a crossing can and should be provided, the location, alignment and funding of the crossing is to be documented and resolved as part of the local structure plan.

[External Intersections](#)

The DSP proposes four intersections with Mundijong Road as follows:

- A full movement, signal controlled intersection at St Albans Road. Ultimate planning is for this intersection to be staggered and avoid a four-way intersection with the section of St Albans Road south of Mundijong Road. This involves the northern intersection shifting approximately 170 metres east of its current alignment.
- A full movement, signal controlled intersection at Telephone Lane. Ultimate planning is for this intersection to be staggered and avoid a four-way intersection with the section of Telephone Lane south of Mundijong Road. This involves the northern intersection shifting approximately 175 metres west of its current alignment.
- A full movement, signalised intersection at the eastern boundary of the DSP. Ultimate planning is for this intersection to connect with Mundijong Road on its ultimate alignment. Prior to Mundijong Road being realigned to the south based on the current MRS ORR reserve, an interim intersection with the current Mundijong Road alignment may be considered. This matter is to be resolved at the local structure plan stage, supported by a TIA.
- A left in/left out intersection at the mid-point of LSP3.

Intersections that are outside of the DSP but will support the movement network and have informed the assumptions within the TIA are outlined below.

[Kwinana Freeway / Mundijong Road](#)

For the purpose of the TIA and the associated modelling horizon of 2051, this intersection has been assumed to be upgraded to a partial cloverleaf, fully grade separated interchange.

[Baldivis Road / Kulija Road](#)

The TIA assumes that the intersection of Baldivis Road and Kulija Road west of the Kwinana Freeway will be removed in association with the upgrades to the Kwinana Freeway and Mundijong Road interchange.

[Telephone Lane / Wellard Road](#)

The TIA assumes that an at-grade crossing of the rail freight line at Wellard Road to the west of the Kwinana Freeway will remain. Whilst plans to grade separate the north-south crossing of the rail freight line have been anecdotally discussed, the project funding, timing and responsibilities have not been committed. As such, the DSP assumes that a connection in this location will remain.

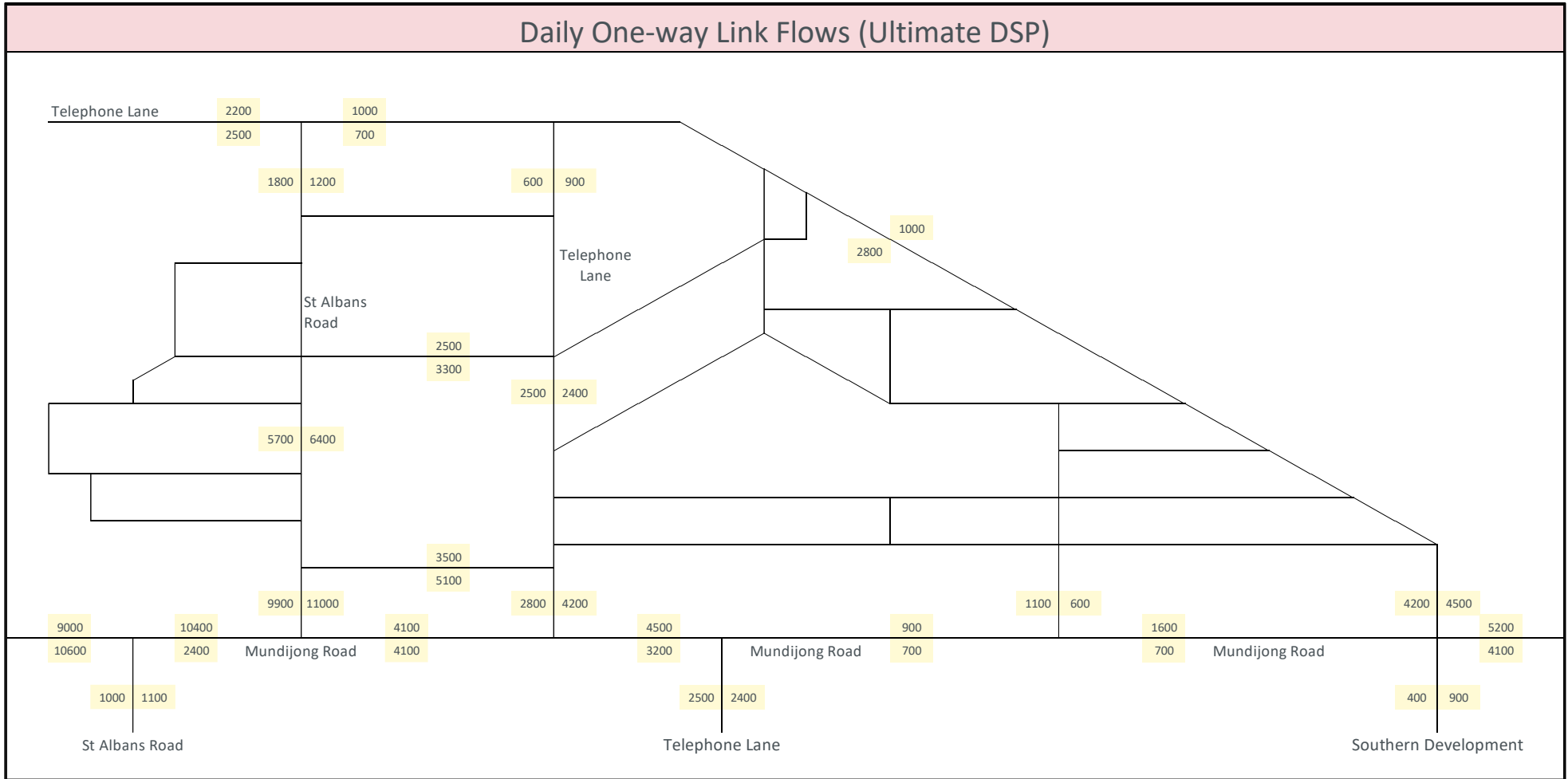


Figure 5-20: Daily Estimated Traffic Volumes – Ultimate DSP Traffic Only

Figure 22 - Daily DSP Traffic Volumes

Source: PJA

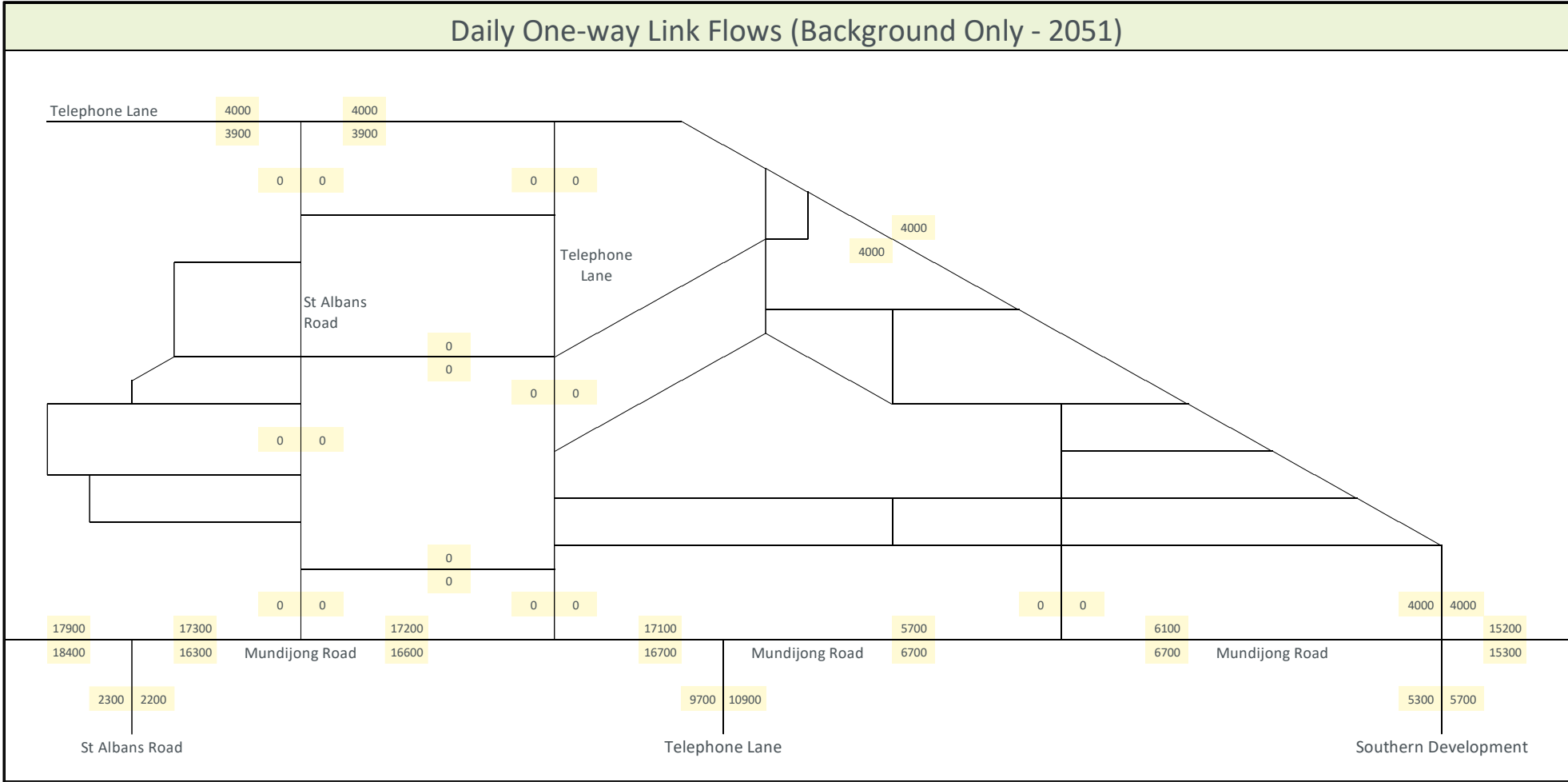


Figure 5-21: Daily Estimated Traffic Volumes – Background Traffic Only

Figure 23 - Daily Background Traffic Volumes

Source: PJA

5.4.3 Pedestrians, Cyclists and Public Transport

Pedestrian and Cycling Facilities

Internal Network

The internal network of roads and paths will be confirmed at the more detailed local structure planning stage, informed by the following principles established by the DSP:

- Integrator arterial roads are to have footpaths on both sides of the street with on-street cycle lanes provided.
- District level pedestrian/cycle network to be aligned with integrator roads as shown on the DSP Map, connecting with the existing path network at Telephone Lane to the north and the planned path network along Mundijong Road.
- Neighbourhood connector roads are to have footpaths or shared paths on both sides of the street, depending on whether on-street cycling facilities are provided.
- Access streets are to have footpaths or shared paths on one side of the street.
- A safe and efficient network of shared paths and crossing facilities is to be provided for residents to access key trip attractors such as school sites and activity centers as well as linkages across integrator and neighbourhood connector roads.



Multiple Use Corridors

As outlined above, approximately 45% of the DSP area is set aside for 'Multiple Use (Flood Storage)'. Whilst these areas will be at a lower level than the adjoining urban development due to their flood management function, the fact that they will not be inundated except for during a 1% AEP event means that they can be used for complementary purposes, such as the movement of people through the DSP.

The DSP's natural surface water characteristics involve water flowing across the site in a westerly direction, resulting in logical east-west links through the DSP. This provides a unique opportunity to establish a network of walking and cycling infrastructure within a safe, natural environment free from motorised vehicles. A dedicated path network in the corridors is proposed and would be in addition to the typical path network within road reserves as per *Liveable Neighbourhoods*, underpinned by the following visionary principles:

- A horizontal and vertical alignment within the Multiple Use areas that provides interest and enhances the experience of pedestrians and cyclists.
- A path networked nestled within a natural environmental of green spaces that provides shade and a cooler environment.

- A movement network that is insulated from high-speed vehicles with only minimal interaction with the road network and only where unavoidable. In these instances, pedestrian and cyclist movements are to be given priority.
- An intuitive connection between key destinations within the DSP that encourages sustainable movement.
- Linkages between the various areas of POS within the corridors that creates an overall experience, encouraging activity, movement and surveillance within these areas.

An indicative path network through the multiple use area is shown at Figure 24 – 'Multiple Use Corridor Movement Network'.





Figure 24 - Multiple Use Corridor Movement Network

Source: Nearmap



External Network

As referenced above, a connection to the external path network exists at Telephone Lane in the northern corner of the DSP. This existing infrastructure is constructed to a high standard and connects to a principal shared path (PSP) which runs parallel to the Kwinana Freeway's western boundary. This PSP enables connectivity from the DSP area west of the Freeway into the established suburb of Wellard and to Wellard Train Station beyond. As outlined in the TIA (refer Appendix 7), good capacity exists for bicycle parking at Wellard Train Station, making it an attractive method of transport for commuting to and from the station.

[Public Transport](#)

As with all undeveloped greenfield areas, no Public Transport Authority (PTA) bus routes currently service the DSP area. Public bus services will be provided in the future and once a critical mass of population warrants.

Wellard Train Station is a key destination for bus services given its proximity to the DSP area and the ability to provide first stage residents with access to passenger rail services. As such, there is an opportunity for proponents of the initial stages of development to provide private bus feeder services to Wellard Train Station and potentially other key destinations. The Neighbourhood Centre or the western Employment Precinct could accommodate a bus node whereby private bus services collect and drop off passengers before travelling along St Albans Road. Stops along St Albans Road would mean that most land within Stage 1 would be within an 800 metre catchment of a bus stop. The private services would only operate during peak periods and until public services are extended. Further detail regarding a private bus feeder service for LSP1 is to be provided as part of the local structure plan.

Local structure plans are to ensure that suitable road reserve widths are provided to enable public bus services to operate.

5.5 Open Space

As a strategic document, the DSP takes a high-level approach to the identification of open space and does not identify and coordinate all future reserves and POS areas that will be delivered towards satisfying the minimum 10% POS requirement under *Liveable Neighbourhoods*. The DSP would normally only identify regional and district areas of open space however, the location of neighbourhood parks within the 'Multiple Use (Flood Storage)' areas is a fundamental component of the DSP. As such, the DSP Map spatially depicts some local reserves for public open space where they are proposed to be co-located within the 'Multiple Use (Flood Storage)' areas.

The key areas of open space depicted on the DSP are summarised as follows:

- A network of multiple use corridors in government ownership to fulfill a primary drainage function but also to enhance the natural environment and create a pedestrian and cyclist movement network.
- District Open Space co-located with the high school site.
- A central lake in private ownership offering natural amenity as well as opportunities for recreational activities.
- Local playing fields co-located with three of the primary school sites.
- Local and neighbourhood parks located within the 'Multiple Use (Flood Storage)' areas distributed throughout the DSP.
- Local reserves to accommodate the retention, management and protection of three resource enhancement wetlands.

Additional neighbourhood and local parks will be confirmed at the subsequent local structure planning stages.

The following headings provide a detailed discussion on the local reserves and other open space areas identified on the DSP Map as well as future processes for ensuring an adequate supply of POS for the DSP area.



5.5.1 Multiple Use Corridors (Flood Storage) - Design and Development Outcomes

As outlined above, the DSP is required to set aside approximately 45% of the total land area (approximately 340 hectares) to manage the potential risks of inundation. This is in accordance with the outcomes of DWER's flood modelling and drainage study which informed the outcomes of the PIA Update and subsequent identification of the DSP area as 'Urban Expansion'. In order to fulfill its drainage function, the land cannot be developed for urban purposes and needs to be set lower than the surrounding developable land. Whilst the 'Multiple Use (Flood Storage)' areas cannot accommodate buildings, a unique opportunity exists for the land to be used for recreation, movement and enhance the natural amenity of the site in a way that will not compromise its primary drainage function. The multiple use and landscaping of these areas is a fundamental component of the DSP and will contribute to the creation of a master planned community that achieves a nature-positive outcome.

As this land will be dry 99% of the time, use of the land for passive recreational purposes is proposed under a public ownership scenario. Whilst all 'Multiple Use (Flood Storage)' areas fulfill a drainage function under the Birrega Main Drain 'spoil bank failure scenario' discussed above, some areas will be developed differently to others and will therefore be capable of being used for different purposes. This is due to the need to convey stormwater in a westerly direction as it enters the DSP from preexisting, defined points on the eastern boundary to an outflow point on the western boundary. Stormwater is required to be retained and slowed within the site, meaning that not all storage areas need to be linear and instead can be larger consolidated areas that abut the main east-west corridors. The different sizes and roles of these areas provides differing opportunities for recreational and movement purposes.

An overall landscape concept plan depicting the distribution of the local POS reserves within the ‘Multiple Use (Flood Storage)’ areas is included at Figure 25 Landscape Concept Plan below, with further discussion regarding the landscape strategy provided at Appendix 8, Landscape Strategy.

[District and Local Open Space within Multiple Use \(Flood Storage\) Area](#)

These specific areas of open space identified on the DSP Map are situated within the designated flood storage areas and will be developed at a finished level whereby they will only be inundated in a 1% AEP rainfall event. These areas will be elevated higher than the invert of the drainage corridor but lower than the adjoining urban land or school site (as the case may be). As the open space would only accommodate stormwater in the 1% AEP event, they are eligible for a full POS credit in accordance with the *Liveable Neighbourhoods* calculation methodology. With regard to the DOS, only the playing fields would be inundated in the 1% AEP event with any associated buildings such as sporting pavilions and club rooms being developed at the same finished level as the adjoining urban land.

These areas will be developed and function in the same manner as any other area of POS and form part of the mandatory 10% minimum POS contribution. Accordingly, it is expected that they will ultimately be managed by the Local Government post-development and following a standard two-year maintenance period by the developer. More detailed landscape concept designs will be required as part of future local structure plans that include open space within these areas.





Figure 25 - Landscape Concept Plan
 Source: Emerge Associates

5.5.2 District Open Space

The DSP identifies an area of District Open Space (DOS) to service the active sporting and recreational needs of the community. The DOS is intended to provide for organised and formal sporting activities for the entire DSP area. The term 'district open space' is used to ensure consistency with the terminology used in *Liveable Neighbourhoods* and the associated hierarchy of open space established by the WAPC's operational policy for the design of new communities. Within the context of the City of Rockingham's *Community Infrastructure Plan (2022/2023)*, the DSP area would constitute a 'neighbourhood level' catchment (10,000 – 25,000 people) based on the estimated 6,000 dwellings and population of 18,000 residents. Neighbourhood catchments generally have a radius of one to three hectares and are defined by urban barriers such as major roads.

The City's *Community Infrastructure Plan* requires an area of public open space of one to five hectares. Accordingly, a five-hectare area of district open space is proposed co-located with the high school. The 'Social Infrastructure Summary' (refer Appendix 9) that accompanies the DSP suggests that a slightly larger, sub-district sized open space may be required to ensure a more liveable and sustainable community than standard benchmarks. This matter is to be further investigated and confirmed at the local structure planning stage.

As per the City's *Community Infrastructure Plan*, the DOS should be designed to accommodate localised sport and recreation. At five hectares the DOS can accommodate a full-size AFL oval as well other neighbourhood-level sporting infrastructure such as hard courts, a sporting pavilion to support local sporting clubs, community facilities and car parking. Whilst the DOS is notionally shown at five hectares, the exact size and configuration will need to be confirmed at the local structure plan stage in collaboration with the City of Rockingham.



The DOS is collocated with a combined high school site to allow for joint use of the open space and playing fields. This will assist to strengthen the DOS's role as a community focal point and maximise opportunities for its ongoing usage. It will also assist to minimise turfed areas and by effect, the amount of water required to irrigate playing fields. A co-located DOS and high school will also share the management burden of the playing fields between the City of Rockingham and Department of Education, allowing for the more efficient management of community infrastructure.

The delivery and funding of the DOS is discussed in further detail at section 6 of this report where it is assumed that the DOS development costs will be funded through a future DCP.



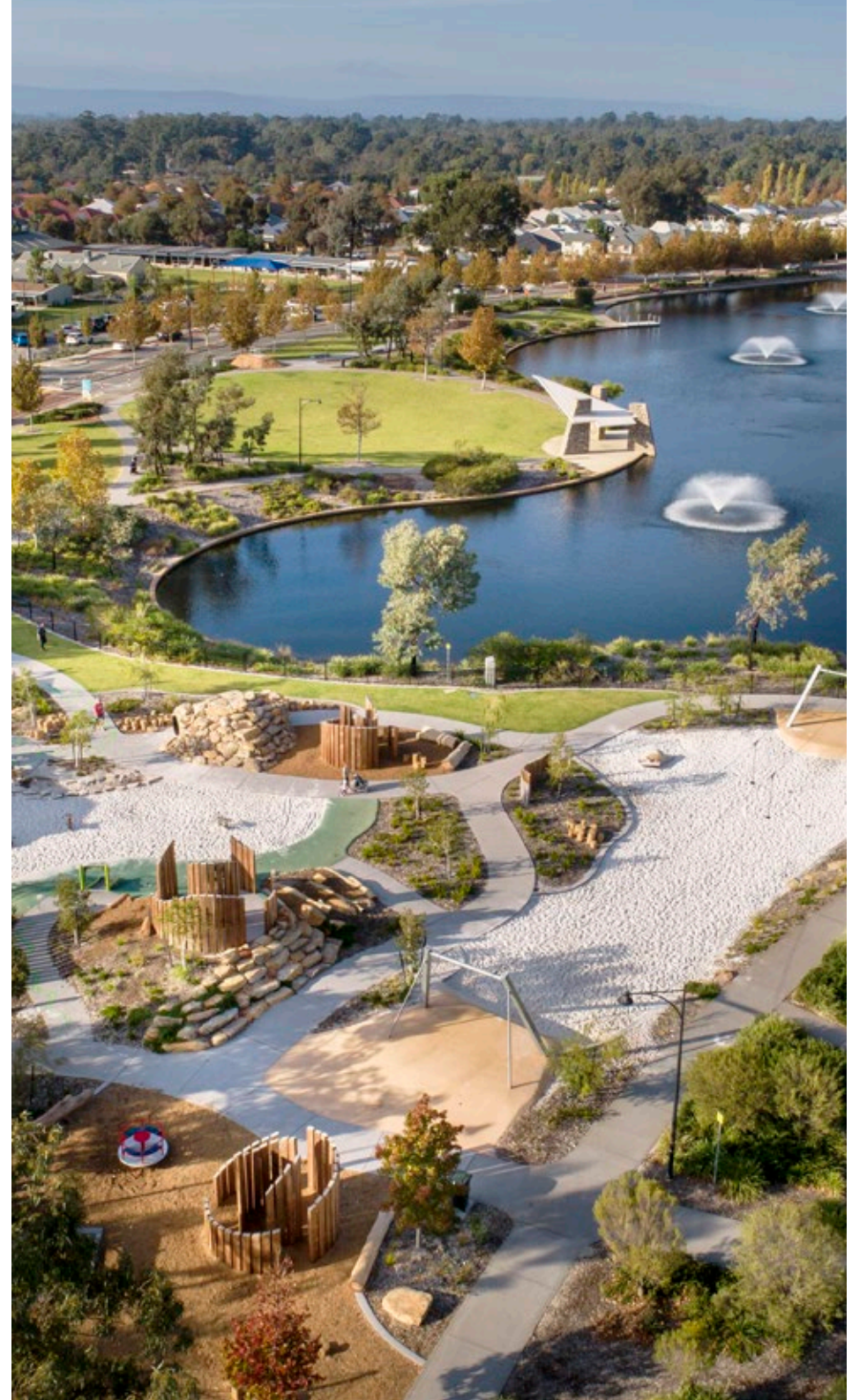
5.5.3 Local Reserves – Conservation

The DSP Map depicts future local reserves that coincide with known environmental features. Specifically, the DSP identifies three resource enhancement wetlands for retention and protection within future local reserves. The exact areas and the associated buffers will be determined through the local structure planning process however, the DSP provides a commitment to retain these features. Future local structure plans should provide indicative cross sections to demonstrate that these environmental features are integrated within the urban form, which should also be considered at the civil construction stage as part of the earthworks design.

The EAR which accompanies the DSP did not identify any further environmental features for retention at this high-level DSP stage however, future local structure plans and their associated environmental assessments provide further opportunities and processes to confirm additional environmental features for retention if necessary.

5.5.4 Neighbourhood and Local Parks

As outlined above, given the strategic role of the DSP, only neighbourhood and local parks that are proposed within the 'multiple use (flood corridors)' areas are shown on the DSP. This is because the ability to locate POS areas within the corridors is a fundamental consideration for the DSP to achieve the most efficient use of developable land. Additional neighbourhood and local parks will be identified and coordinated through subsequent local structure planning processes. The distribution and amount of POS will be in accordance with *Liveable Neighbourhoods* with each local structure plan responsible for demonstrating the minimum 10% POS requirement through the preparation of POS schedules.



5.6 Environmental Management

5.6.1 Response to Environmental Values

The EAR prepared by JBS&G (refer Appendix 1) provides a detailed assessment of the environmental values within the DSP and outlines the environmental response to the retention, protection and management of these values. The EAR demonstrates that all environmental features and attributes can be appropriately managed through the coordinated development of the DSP for urban purposes.

A range of site-specific technical investigations has been undertaken to determine the environmental values of the site and their relative significance. This informed the design of the DSP Map, which includes provision of three local reserves for conservation purposes – two in the north-west corner and one in the north-east corner of the DSP. The north-western reserves contain two resource enhancement wetlands (UFI #14646 and UFI # 14647) with the north-eastern reserve containing one resource enhancement wetland (UFI # 14736). The retention of these wetlands responds to their environmental values and provides an opportunity to strengthen their attributes through rehabilitation and management measures implemented as part of urban development.

The extensive flood storage areas depicted on the DSP Map will also provide an opportunity to retain some vegetation types such as *Melaleuca rhaphiophylla* (swamp paperbark) and *Eucalyptus rudis* (flooded gum) as depicted at Figure 26 – Native Vegetation Retention Opportunities. Retention of this vegetation will need to be balanced with the changes in site levels needed to manage the risks of inundation. Opportunities to retain some areas of black cockatoo foraging habitat will also be explored where possible within the flood storage areas.

Whilst implementation of the DSP will require some clearing of native vegetation, the EAR concludes that all direct, indirect and cumulative impacts to flora vegetation are considered minor at a local and regional scale. Similarly, the direct, indirect or cumulative impact to black cockatoo foraging and potential breeding habitat as a result of urban development is not considered significant given the limited low-quality foraging habitat available within the site in addition to an absence of trees with hollows suitable for breeding.

Implementation of the 'nature positive' strategy outlined at section 5.5.2 above aims to improve biodiversity by restoring native vegetation and creating new habitat for key local fauna species. When combined with the anticipated improvement in water quality on the site due to the change in land use, implementation of the DSP is expected to achieve a positive environmental outcome.

Given its strategic role and function, the DSP does not identify reserves over all environmental values within the site. Only values determined to be of high relative environmental significance have been identified for protection. Further opportunities to accommodate additional environmental values at a local level will be investigated at the local structure planning stage.

[Mosquitos](#)

The 'Mosquito Risk Assessment' which forms part of the EAR (refer Appendix 1) outlines a range of management strategies to address the potential risk of mosquitos to human health. Mosquito Management Plans are expected to be required at subdivision approval stage in line with the mitigation strategies outlined in the EAR.

Several existing potential breeding habitat areas within the DSP will be removed as part of development however some, such as retained wetlands and the central lakes will need to be managed.

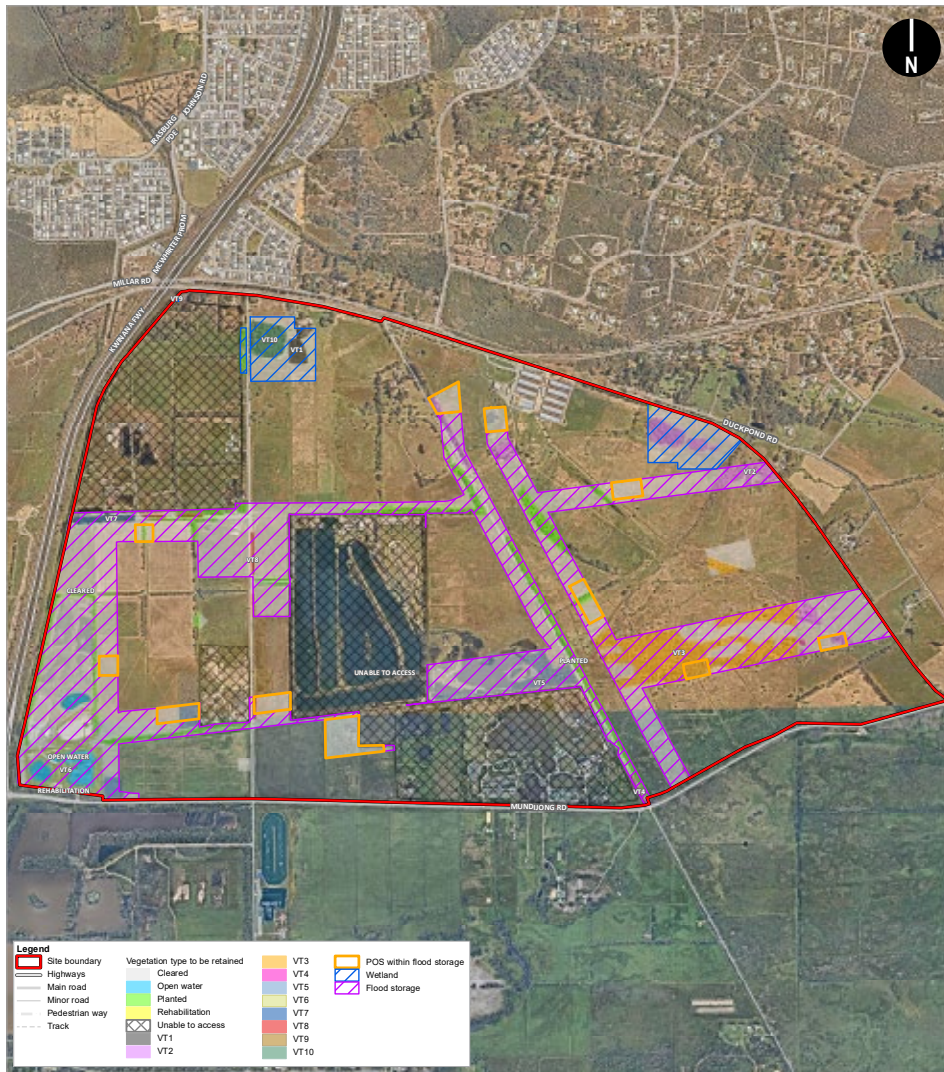


Figure 26 - Native Vegetation Retention

Source: JBS&G

The key response strategies to managing the risk of mosquitos are summarised as follows:

- **Physical** – this involves removal of mosquito breeding habitat or distancing of residents from potential mosquito breeding habitat.
- **Chemical** – this involves the application of insecticide to kill mosquito's and their larvae.
- **Cultural** – this involves human education regarding the health risks of mosquitos and protection measures that may be implemented to protect humans and buildings.

The responsibilities will lie with the development proponents during construction phase to manage mosquitos in accordance with an approved Mosquito Management Plan. Post-development and after residents are established, it will be the Local Government's responsibility to manage mosquitos through the chemical treatment of breeding habitat as currently occurs across the metro area.

Nutrient Loads

The DSP is located within the Peel-Harvey Coastal Plain Catchment and as such, development of the land as proposed should not result in additional nutrient loads entering the Peel-Harvey estuarine system. As outlined in the EAR, development of the land for urban purposes is expected to result in a significant reduction in total nitrogen and total phosphorous loads within the site as compared to the pre-development scenario.

The change in land use proposed by the DSP will enable the following in accordance with the objectives of SPP 2.1:

- Best practice urban water management.
- Management of legacy nutrients associated with past land uses.

- The ability to ensure that nutrient runoff does not increase.
- Implement measures to reduce nutrient export into the catchment.

Specific measures to be implemented at the development stage to achieve the above outcomes are:

- All lots will be connected to a reticulated sewerage system.
- Consideration of the net effect development may have on the nutrient load discharging from the catchment into the Peel-Harvey estuary.
- Retention and rehabilitation of remnant vegetation where possible, particularly along watercourses.
- Detention and retention of drainage to be maximised within the site.
- POS soils to be treated with nutrient retentive soil amendment if phosphorus retention capability is low.

5.6.2 Future Investigations and Management Plans

Site specific flora and fauna surveys will be required at the local structure plan stage to further investigate and define potential environmental constraints and establish any further management strategies that may be necessary.

Where the abovementioned further investigations identify any specific fauna management measures as being required (such as a 'Kangaroo Management Plan'), proponents are to liaise with the DBCA and the local government at the appropriate stage of planning to ensure that fauna management is suitably considered and ultimately managed under a local government-approved management plan.

5.6.3 Bushfire

The Bushfire Management Plan that accompanies the DSP (refer Appendix 4) confirms that the majority of the site will be modified to a low threat state in association with urban development. This will involve existing areas of classified vegetation being converted to non-vegetated areas or areas of low threat vegetation, such as managed parklands within public open space. Future assessments will be undertaken as part more detailed planning processes (local structure plan and subdivision) to ensure that all proposed habitable development will be located on land with a 'Low' or 'Moderate' BHL that can sufficiently deliver BAL-29 or lower. At the strategic level, the BMP that accompanies the DSP demonstrates that there are no fundamental issues in demonstrating bushfire compliance at these future stages.

As a large proportion of the site will comprise a combination of POS, flood storage and/or retained wetlands, confirmation of low threat landscape treatments, non-low threat landscape treatments and potential revegetation throughout these areas will need to be considered in the bushfire planning for future detailed stages, particularly where these areas interface directly with residential development. The potential bushfire risk posed by these areas can be appropriately managed in an urban context, primarily through the strategic location and provision of road reserves and managed public open space adjacent these hazards. This will provide appropriate separation between the bushfire hazards and residential land uses and will be addressed in detail through the future local structure plan design process.

The proposed DSP and accompanying BMP demonstrate compliance with the acceptable solutions for each of the Bushfire Compliance Criteria outlined in the Guidelines for strategic planning proposal, as follows:

- **Location:** the proposed DSP design enables future dwellings to be located within areas that will be subject to a low or moderate bushfire hazard and can achieve a BAL rating of BAL-29 or below.
- **Siting and Design:** the site is sufficiently sized to accommodate future development that would enable a BAL rating of BAL-29 or less to be satisfied.
- **Vehicular Access:** The surrounding public road network offers multiple vehicular access opportunities to suitable destinations in accordance with the Guidelines, including Telephone Lane to the north and Mundijong Road to the south. As development will progress in stages, temporary measures such as Emergency Access Ways (EAWs) may be proposed at subdivision stage to deliver compliant access outcomes. A key recommendation of the BMP regarding access is that the DSP make provision for the future extension of Duckpond Road through to Telephone Lane to resolve a pre-existing issue whereby Duckpond Road terminates in a cul de sac. The connection of Duckpond Road to Telephone Lane will have broader benefits and improve connectivity in the locality thereby improving legibility and movement in the case of a bushfire emergency.
- **Water:** the site is proposed to be serviced with a permanent and reticulated water supply, which will service future onsite firefighting requirements.

Based on the above, the DSP demonstrates that potential bushfire hazards and the associated bushfire risks can be readily managed through standard bushfire management measures. These measures will be incorporated into the local planning framework to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.

5.6.4 Noise

A Transportation Noise Assessment (refer Appendix 5) has been prepared in support of the DSP due to the northern, eastern and southern portions being located within the trigger distance of SPP 5.4. The Noise Assessment also assesses noise emissions from existing land use activities within the DSP boundary that are a known source of noise.

The predicted noise levels for road and rail are assessed against SPP 5.4 and where exceedances are predicted, recommendations are made on noise mitigation measures to achieve compliance with the policy requirements.

Compliance with noise levels in relation to land use activities is more complex and is discussed in further detail below.

The recommendations of the Noise Assessment are intended to guide the preparation of future, more detailed acoustic assessments that will support and guide local structure planning and subdivision design.

[Kwinana Freeway and Mundijong Road](#)

The DSP Transportation Noise Assessment undertook a screening assessment in accordance with the SPP 5.4 Guidelines to determine the likely noise levels on the land adjacent the Kwinana Freeway and Mundijong Road. The screening assessment identified that the forecast noise levels abutting both the Freeway and Mundijong Road would exceed the 'Noise Limits' prescribed under SPP 5.4 (refer Figure 27 – Exposure Levels for Transport Noise').

The quiet house packages depicted at Figure 27 are indicative only and are subject to refinement at the local structure plan and subdivision stages. As part of these future processes, potential noise impacts will need to be assessed and considered based on the infrastructure planning at the time and respond to any planned road widening, such as the the widening of Mundijong Road.

The majority of noise-affected land adjacent the Freeway comprises non-sensitive land uses (flood storage), thereby assisting to minimise the extent of land potentially impacted by noise. A small portion of residential land within LSP4 may be subject to quiet house package A or B, subject to confirmation at the local structure planning stage when actual noise levels are expected to be less once they are quantified on site in these specific locations.

The DSP proposes a high proportion of non-residential land uses abutting Mundijong Road, assisting to minimise the extent of sensitive land uses potentially impacted by noise. Notwithstanding, there are some areas of residential land that will likely be affected by noise and are therefore expected to require noise attenuation measures to be implemented and /or a responsive site design.

Where sensitive land uses (residential and schools) are confirmed to be impacted by noise from the Freeway and Mundijong Road at the local structure planning stage, standard mitigation measures to achieve compliance with the SPP 5.4 requirements such as noise walls, quiet house design and notifications on titles are recommended.

[Rail Freight Line](#)

Similar to the assessment of road noise, the Transportation Noise Assessment undertook a screening assessment in accordance with the SPP 5.4 Guidelines to determine the likely noise levels on the land adjacent the rail freight line. The screening assessment identified that the forecast noise levels abutting the rail freight line would exceed the 'Noise Limits' prescribed under SPP 5.4. Specifically, the Noise Assessment depicts land abutting the northern boundary adjacent the rail freight line as requiring quiet house packages A, B or C to satisfy the requirements of SPP 5.4 (refer Figure 27 – Exposure Levels for Transport Noise'). A noise wall or similar physical barrier is also recommended to assist attenuate noise in this location.

The Noise Assessment also recommends further investigations at the local structure planning stage into the potential impacts of vibration from the rail freight line, suggesting that notifications on title will likely be required.

[Water Ski Park](#)

The Noise Assessment identified that noise contours from the water ski park activities were relatively contained however, as the use operates on a Sunday the most stringent noise levels were assigned. Notwithstanding, the Noise Assessment concluded that the water ski park activities could coexist with residential development as proposed by the DSP, subject to quiet house packages being implemented in accordance with Figure 28 – 'Noise Mitigation for Water Ski Park' (below).

Subject to the future intent of the landowner of the central lakes (lot 101) the water ski park activities may cease operating at the time urban development commences and before first residents establish within LSP1. This will be confirmed as part of the local structure plan for LSP1.

[Jet Sprint Boat Racing](#)

Unlike the water ski park activities outlined above, noise levels from the Jet Sprint Boat racing are such that the use is unable to coexist with residential development as proposed by the DSP. The use is therefore required to cease prior to first residents establishing within LSP 1.

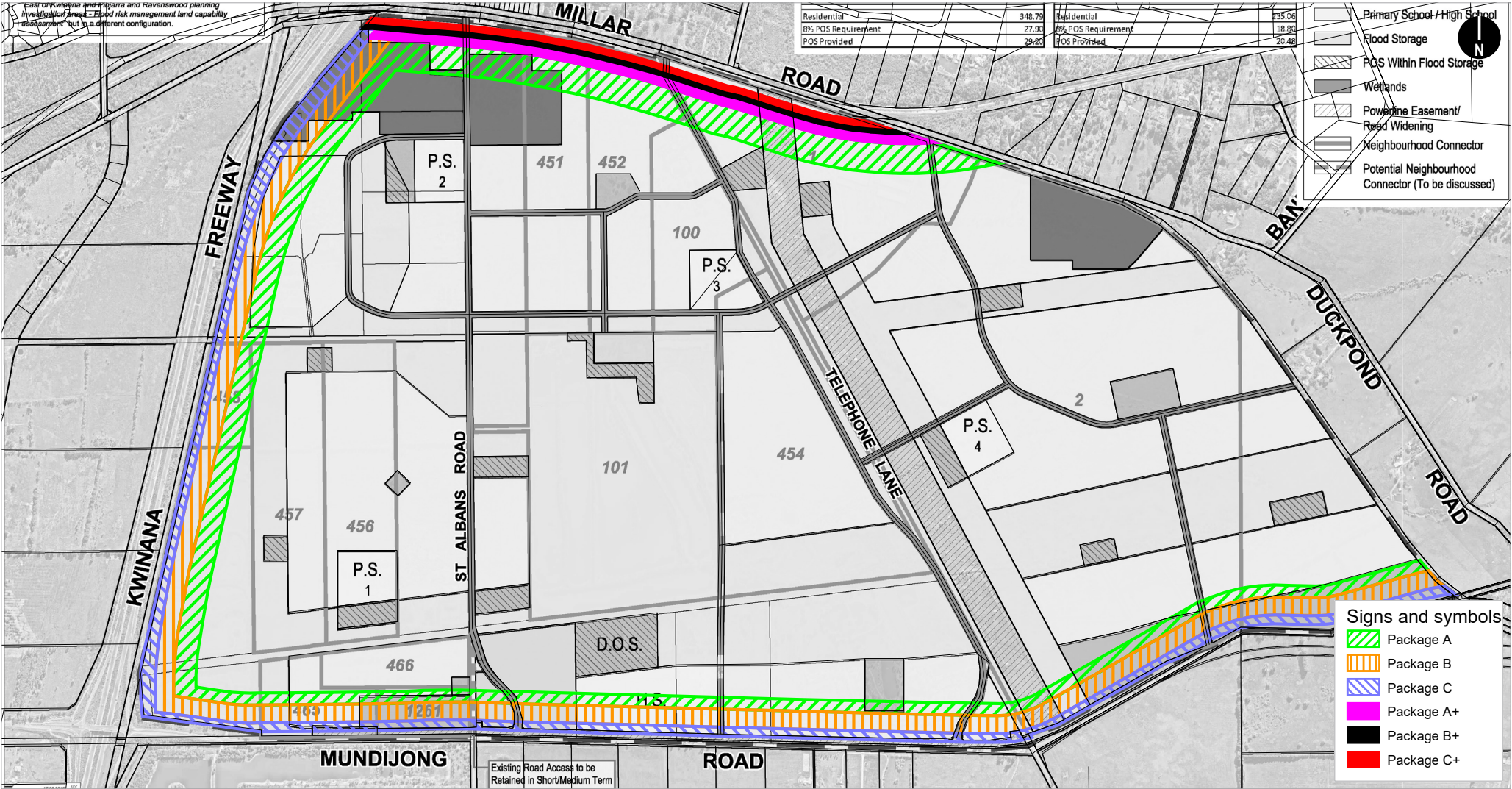


Figure 27 - Exposure Levels for Transport Noise

Source: Lyod George

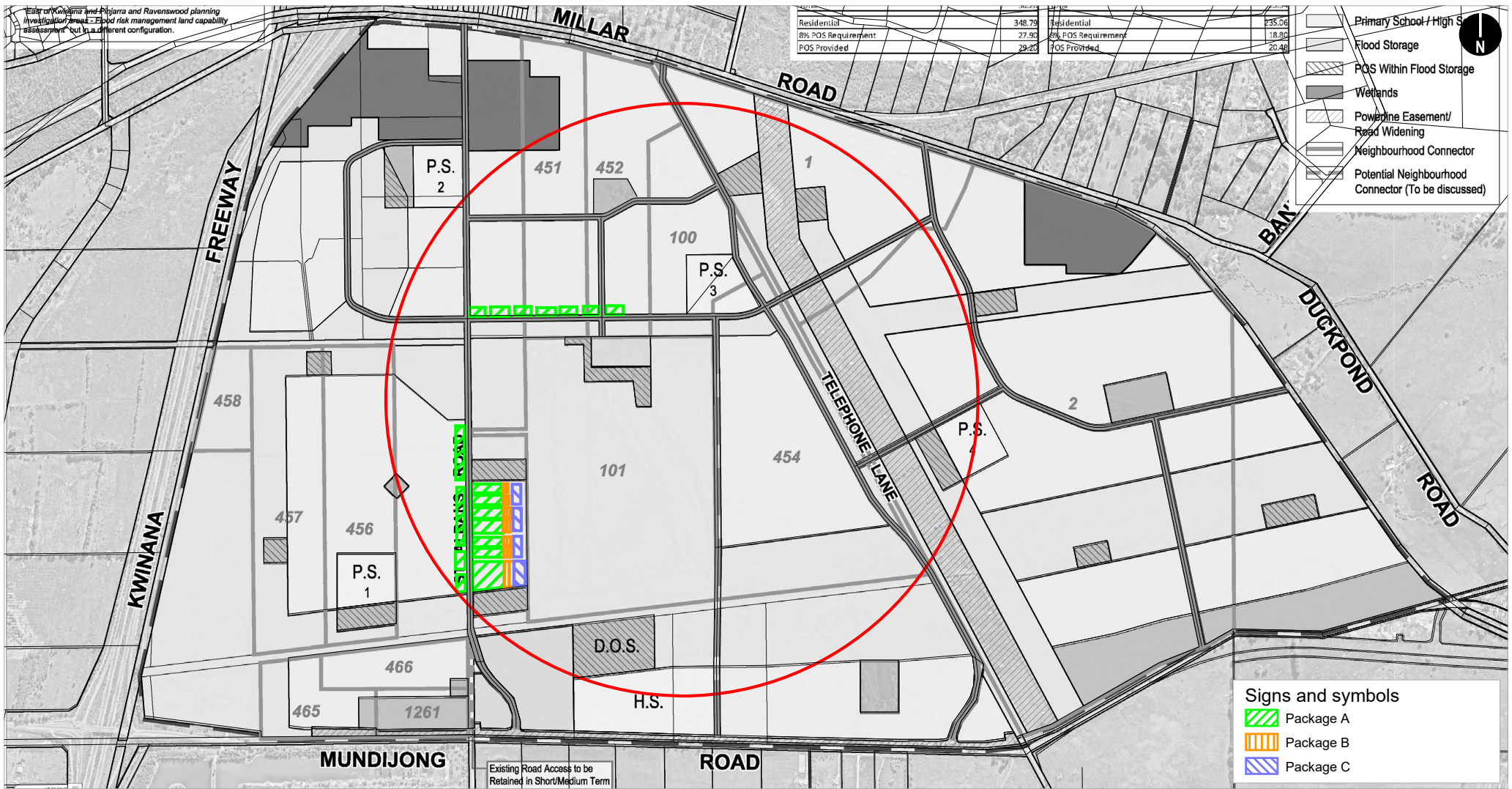


Figure 28 - Noise Mitigation for Water Ski Park

Source: Lyod George

5.7 Water Management

Stormwater and groundwater management strategies for the DSP are detailed in the accompanying DWMS (refer Appendix 3) in accordance with best practice drainage and nutrient management. Preparation of the DWMS was guided by the following documents:

- *Better Urban Water Management* (WAPC 2008);
- *Water Resource Considerations when Controlling Groundwater Levels* (DoW 2013);
- *Stormwater Management manual for Western Australia* (DoW 2004-2007);
- *Decision process for stormwater management in Western Australia* (DWER 2017);
- *The East of Kwinana flood modelling and drainage study* (DWER 2021, unpublished); and
- *The East of Kwinana and Pinjarra Ravenswood planning investigation areas – Flood risk management land capability assessment* (DWER 2021, unpublished).

The principles and objectives shown in Table 10 have been adopted for the DSP based on the above.

Table 10: DWMS Principles and Objectives

Key Element	Principles	Objectives
Water Conservation	<ul style="list-style-type: none"> • No potable water should be used outside of homes and buildings with the use of water to be as efficient as possible. 	<ul style="list-style-type: none"> • Meet the State Water Plan (Government of WA 2007) water consumption target of 100 kL/person/yr, including not more than 40-60 kL/person/yr scheme water. • Irrigation of public spaces to be by groundwater or an alternate water supply scheme.
Water Quantity	<ul style="list-style-type: none"> • Maintain the pre-development hydrologic regime and meet the ecological requirements of the receiving environment. • Protection of property and infrastructure by the safe conveyance of excessive run-off from extreme events. Protection of property and infrastructure within the DSP Area as well as downstream so there is a need to consider the impact of peak discharge from the study area. 	<ul style="list-style-type: none"> • Maintain ecological flows into important wetlands and water dependent ecosystems. • Design stormwater management systems to provide serviceability, amenity and road safety during minor rainfall events. • Maintain the 1% annual exceedance probability (AEP) pre-development flood regime (flood level, peak flow rates and storage volumes). • Safely convey run-off from extreme events up to the 1% AEP event and ensure that the flood channel capacity of the receiving waterway is not exceeded by retaining or detaining the run-off from storm events where appropriate. • Protect people and property from flooding by constructing building habitable floor levels with appropriate minimum clearances above the 1% AEP flood level.
Water Quality	<ul style="list-style-type: none"> • Maintain surface water quality at pre-development levels and, if possible, improve the quality of the water leaving the development area to maintain and restore ecological systems in the sub-catchment in which the development is located. 	<ul style="list-style-type: none"> • Manage – retain and/or detain and treat (if required) – stormwater run-off from constructed impervious surfaces generated by the first 15 mm of rainfall at source as much as practical.
Groundwater Management	<ul style="list-style-type: none"> • Protect buildings and other infrastructure by providing adequate separation from maximum groundwater levels. • Maintain groundwater quality at pre-development levels and, if possible, improve the quality of water leaving the development area to maintain and restore ecological systems in the sub-catchment in which the development is located. 	<ul style="list-style-type: none"> • Set the Controlled Groundwater Level (CGL) according to Department of Water and Environmental Regulation (DWER) guidelines and at a level to protect groundwater dependant ecosystems and infrastructure. The preliminary design should be provided at local structure plan scale to protect specific environmental values and after the results of more detailed groundwater monitoring information is available. • Subsoil drainage to be laid at or above the CGL. • Nutrient export from the site will not be increased.



5.7.1 Groundwater Management

The DWMS outlines a strategy to control groundwater levels which would otherwise be expected to rise as a result of the increased infiltration which typically occurs with urban development. Groundwater rise is proposed to be managed through the installation of a subsoil drainage system to be installed beneath road reserves and areas of public open space. Fill will be imported to provide clearance from the controlled groundwater level to roads and building pads as required.

The level at which these subsoil drains are installed – the Controlled Groundwater Level – will be set at the LWMS stage according to the Department of Water’s ‘Water resources considerations when controlling groundwater levels in urban development’ (2013). As specified by the Department of Water, the CGL will be set with regard to:

- A free-flowing drainage outlet;
- Infrastructure protection;
- Groundwater quality and treatment of subsoil drainage discharge;
- Protection of water dependent ecosystems (WDEs); and
- Catchment and nearby land use constraints.

Groundwater quality will be managed by treating the first 15 mm of rainfall runoff from impervious areas prior to infiltration. As outlined in the DWMS, based on other examples of urban areas that have been developed in the locality on land previously used for rural / agricultural purposes, the subsoil drainage water quality is expected to improve significantly compared to pre-development water quality.

5.7.2 Stormwater Management

The DWMS proposes to effectively manage stormwater quantity and quality generated from minor and major events by incorporating best practice water sensitive urban design (WSUD) principles. These include:

- Protection of natural systems.
- Integration of stormwater treatment into the landscape to maximise the visual and recreational amenity of the development.
- Protection of water quality.
- Maintain peak flows to pre-development rates if discharging offsite.
- Enhancing the natural amenity of the development.

Table 11 summarises the DWMS design criteria for the management of stormwater.

Table 11: Stormwater Management Design Criteria

Event	Objective	Criteria
Small (1 EY)	<ul style="list-style-type: none"> • Maintain the pre-development hydrological regime and manage water quality. 	<ul style="list-style-type: none"> • Manage – retain and/or detain and treat (if required) – stormwater run-off from constructed impervious surfaces generated by the first 15 mm of rainfall at-source as much as practical.
Minor (20% or 10% AEP)	<ul style="list-style-type: none"> • Maintain serviceability of roads and pedestrian areas. 	<ul style="list-style-type: none"> • Provide piped drainage system capacity for the critical 20% AEP event in residential areas and 10% AEP in commercial areas or maintain appropriate maximum gutter flow widths where overland flow is proposed in place of piped conveyance.
Major (1% AEP)	<ul style="list-style-type: none"> • Manage catchment flooding. • Prevent building and critical infrastructure flooding. 	<ul style="list-style-type: none"> • Maintain the pre-development 1% AEP flood regime by maintaining the floodplain storage volume and flow rates downstream of the site. • Habitable floor levels to be at least 0.3m above the 1% AEP flood level of the urban drainage system and road reserve. • Habitable floor levels at least 0.5m above the 1% AEP flood level of the regional flood regime (i.e. the flood corridors through the site).

[Small Stormwater Events](#)

Stormwater runoff from small rainfall events (first 15 mm) is proposed to occur as close to source and as high in the catchment as possible. This is important given that these events account for approximately 99% of all stormwater run-off and the majority of pollutants from road and roof surfaces. The objective is to maintain or improve the pre-development hydrologic regime.

Road runoff will be treated within bioretention areas which could be delivered via roadside or median swales/raingardens, tree pits or swales and/or basins within either POS or the flood corridors. Runoff from roofs on individual lots will be contained on site via soakwells or other suitable measures. Where conditions do not permit on site lot detention due to the soil classification, lots will be provided with direct connections into the piped drainage network within the adjoining road reserve. Direct lot connection will also likely be required for lots less than 300m² in area.

Where direct lot connections are required, sufficient stormwater treatment and detention capacity will need to be provided downstream in the same manner as road runoff outlined above, with the first 15mm being treated and retained. Direct lot connections as outlined above can be readily accommodated within the DSP due to the abundance of land within the flood corridors set aside to manage the risks of flooding – a unique opportunity for this DSP.

[Minor Stormwater Events](#)

Minor stormwater events (20% AEP) will be conveyed to POS and/or flood corridors via a pit-and-pipe drainage system designed to accommodate the minor event whilst maintaining trafficability of pedestrian and vehicle areas.

[Major Stormwater Events \(not including spoil bank failure scenario\)](#)

Safe conveyance of runoff from extreme events up to the 1% AEP event is a key focus of the DWMS with the objective of protecting people and property as well as providing adequate flood detention storage so as to not impact flow rates, flow volumes and flood levels downstream. The DSP is located within the Mundijong Drainage District which drains into the Peel-Harvey Estuary. Under normal circumstances, development within this catchment would be required to restrict discharge rates into the Peel Main Drain to 4.5 litres per second per hectare for a major stormwater event. This criteria is easily satisfied to the extent that it is rendered irrelevant. This is due to the quantum of land set aside to manage a potential failure of the spoil bank on the western side of the Birrega Main Drain, a far greater water storage requirement than a typical 1% AEP event. On this basis, designing for the potential spoil bank failure is the critical criteria and is discussed in further detail below.

[Flood Management \(spoil bank failure scenario\)](#)

As outlined above, flooding associated with the regional catchment is a key factor informing the drainage design for the DSP. Specifically, a potential breakout from the Birrega Main Drain to the east of the DSP area due to a potential failure of the spoil bank has been identified by DWER as the base-case modelling scenario for the land. Under this scenario, large volumes of surface water would enter the DSP from the east.

Accordingly, the DWMS modelling and response to flood management is based on an assumption that approximately 45% of the DSP area would be required to manage the potential risks of flooding in an urban context. The post-development spoil bank failure scenario and associated flood management within the DSP is illustrated at Figure 29 'Post-development 1% AEP (spoil bank failure scenario) flood map' below.

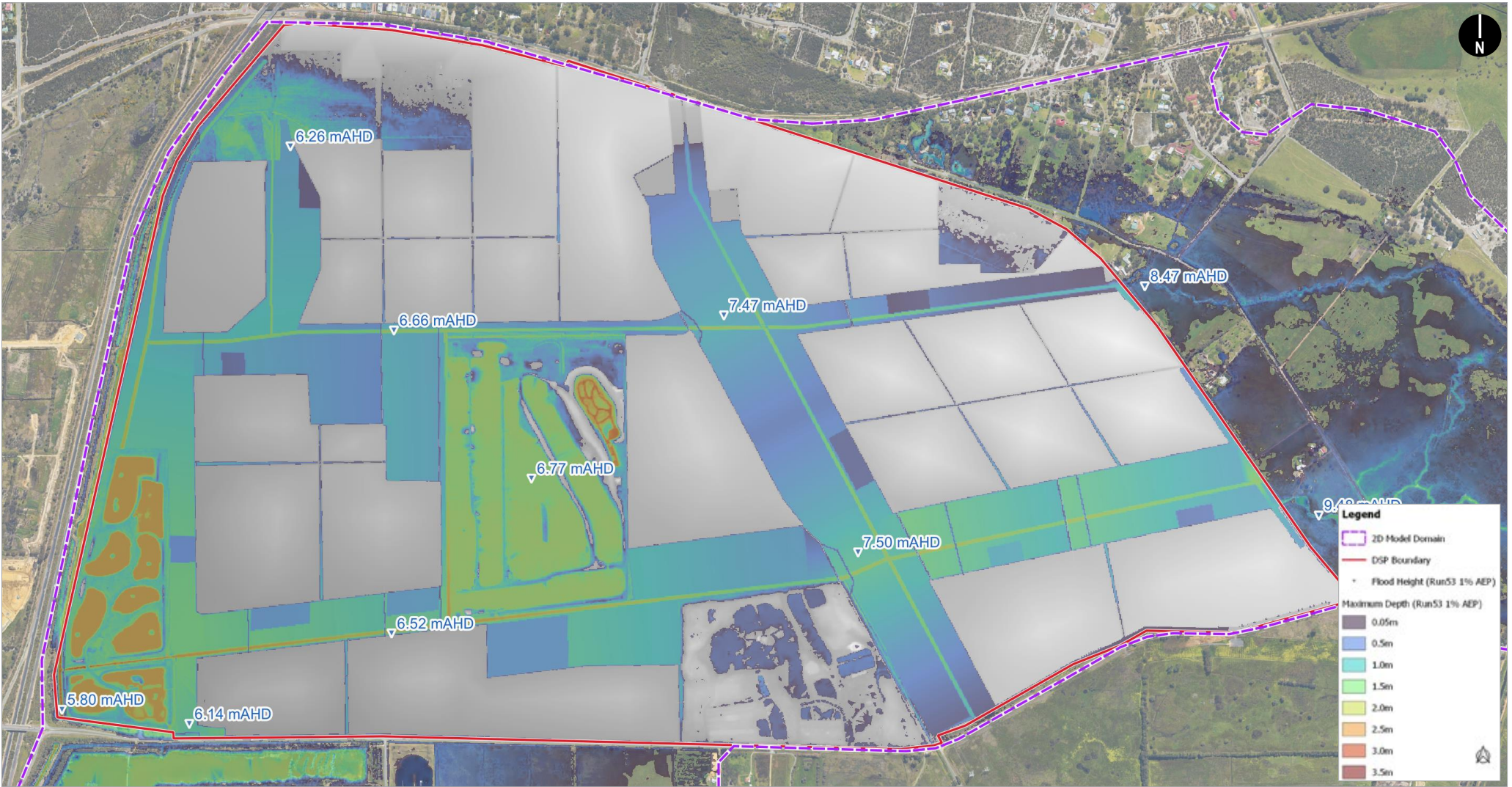


Figure 29 - Post-development 1% AEP (spoil bank failure scenario) flood map

Source: Pentium Water

The flood modelling approach is discussed and documented in detail within the DWMS (refer Appendix 3), confirming the spatial requirements for flood corridors within the DSP and verifying that the proposed flood mitigation design effectively maintains pre-development conditions in terms of peak flow rates, discharge volumes as well as up and down stream flood levels.

The modelling and spatial design of the DSP was an iterative process which considered earthworks levels provided by the project engineer. The final layout and distribution of the flood corridors shown on the DSP was informed by the following principles:

- Approximately 45% of the DSP area to be set aside for flood management in line with the recommendations of DWER's reporting. This total area comprises the land depicted as 'Multiple Use (Flood Storage)' on the DSP Map and existing wetlands.
- The alignment of flood corridors to coincide with existing flow paths and storage areas within the DSP.
- The equitable distribution of the flood storage areas across landholdings so that no one landowner is disproportionately impacted by flood storage. This means that approximately 45% of most landowner's holdings are required to be set aside for flood management.

Whilst the DSP Map depicts spatial areas required to manage the potential risks of inundation, the configuration and boundaries will be reviewed and optimised as part of future local structure plans and local water management strategies in accordance with the principles and overarching framework established by the DWMS.

In order to match the pre-development site conditions, the DWMS's iterative modelling approach and testing confirmed that hydraulic controls within the flood corridors would be necessary in addition to simply providing land for conveyance. To replicate the pre-development floodplain dynamics and maintain the floodplain dynamics downstream (and outside of the DSP area), physical features that can trap additional storage and enable the slower release of flood waters from the site would be required. Physical features that are proposed to be provided in a post-development scenario to slow the release of water from the DSP to match pre-existing conditions include:

- Road crossings and embankments raised above the top of water levels with culverts sized to ensure that no water flows over the roads.
- Cascading weirs across the flood corridor with crest heights below the top of water level to enable peak flows to overtop whilst still holding back a significant volume of water.
- A bund along the Peel Main Drain to increase the flood storage heights in the western portion of the DSP by approximately 0.4m.

Figure 30 'Concept design for flood corridor hydraulic controls' provides a visual representation of the abovementioned hydraulic controls to slow the release of flood waters from the site to match the pre-development scenario.

[Flood Management Staging](#)

The coordination of drainage infrastructure, specifically the delivery of the 'Multiple Use (Flood Storage)' areas as staged development progresses is an important consideration for the DSP. As the flood storage corridors will not be constructed all at once or by a single proponent, the DWMS seeks to establish a framework that can be applied as part of subsequent Local Water Management Strategies (LWMS).

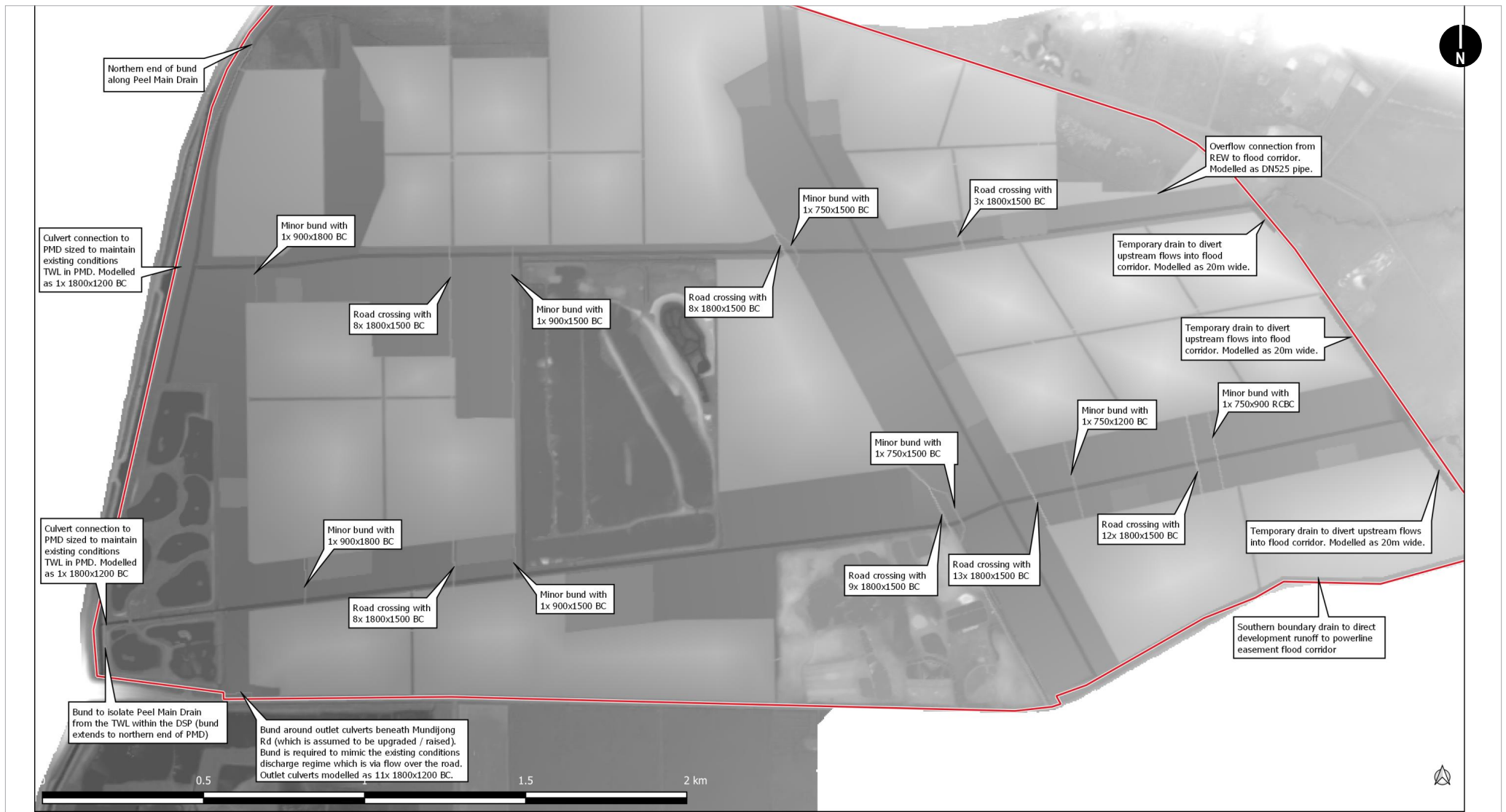


Figure 30 - Concept design for flood corridor hydraulic controls

Source: Pentium Water

The guiding principle established by the DWMS in this regard is to provide an equivalent volume of flood detention storage compared to existing conditions. As staged development progresses and the land is filled above the flood levels, the natural storage area will decrease. To offset this loss of storage volume, the DSP establishes a management strategy of developing physical structures (i.e. bunds and culverts) to increase storage depths within the corridors. Some of these structures may be interim measures to manage flood volumes until subsequent stages are developed and additional flood storage infrastructure is provided.

Based on the anticipated development staging of the DSP (outlined at clause 5.1 of the Part 1), the DWMS establishes a range of key matters that are required to be addressed as part of future LWMSs, consistent with the DWMS and DSP. Under this scenario, development is planned to commence in LSP1 in the south-west corner of the DSP and then proceed in an easterly direction. In hydrology terms, development would commence at the point 'downstream' and then progressively move 'upstream' which enables the effective staged delivery of flood storage infrastructure.

The need to manage the risk of inundation at all stages of development is critical and as such, specific response measures for each local structure plan (LSP1 – LSP4) is outlined within the Part 1 report (clause 5.1). This will ensure that staged coordination and delivery of flood management infrastructure is at the forefront of future planning processes and is suitably addressed.

[Development of Flood Corridors](#)

The primary function of land depicted as 'Multiple Use (Flood Storage)' on the DSP Map is to manage the risks of flooding under the spoil bank failure scenario. Whilst this scenario has been adopted as the base-case scenario in accordance with DWER's modelling, it is a scenario that may never occur. Should the spoil bank function as intended and not catastrophically fail in the 1% AEP event, the significant land area set aside to manage this potential event will not be inundated i.e. most of the flood storage area will be dry for 99% of the time and would only be inundated should the spoil bank fail.

Based on the above, the flood corridors present an opportunity to accommodate landscaping and biodiversity outcomes that can coexist with the flood storage areas. The limiting factor is the fact that land use and development of the flood corridors must preserve the primary function of the land by not impeding the flow of water from east to west under the spoil bank failure scenario. Whilst this requirement precludes the development of buildings and structures, other improvements can be developed, such as landscaping and paths, without impeding flood waters.

[5.7.3 Non-potable Water for Irrigation](#)

The DWMS estimates a total irrigation demand of 206,323 kilolitres per year (kL/yr) for the DSP area. Based on the existing groundwater licenses which are anticipated to become available as urban development progresses and a groundwater license request currently lodged with DWER, the total irrigation demand for the DSP can be fulfilled. The groundwater license request would involve a 50,000 kL/yr allocation being available for the first stages of development, with subsequent allocations becoming available as the staged development of the DSP progresses.

5.8 Education and Community Facilities

5.8.1 High School

The DSP identifies one high school to serve the estimated 6,000 households within the DSP. The provision of a high school is consistent with the ratio of one secondary school for every four to five primary schools as outlined by the WAPC's *Operational Policy 2.4 – Planning for school sites* (OP 2.4). The requirement for a high school site has also been confirmed with the Department of Education (DoE).

The siting of the proposed high school has been determined by the DoE as its preferred location, being close to the centre of the DSP.

The high school is proposed to be co-located with the District Open Space to allow for shared use of the active sporting facilities which will include playing fields and hard courts. Co-location of the high school and DOS is an important consideration for the DSP as it minimises demand for non-potable water for irrigation and enables the more efficient use of land by avoiding the need to reserve additional land that could otherwise be used for housing. Lastly, it assists to reduce ongoing maintenance costs by preventing a situation whereby both the DoE and City of Rockingham need to individually maintain their own separate playing fields.

Based on the collocation of the high school with the DOS, the DSP Map depicts an 8 hectare school site in accordance OP 2.4.



Whilst a government high school is planned for the future DSP residents, other non-government secondary schools in proximity include:

- The Kings College (2km).
- Peter Carnley Community School (3km).
- Tranby College (6km).
- Court Grammar School (10.6km).

5.8.2 Primary Schools

The DSP identifies four primary schools, the locations of which will be refined and confirmed at the local structure planning stage. The location of the primary schools is generally informed by the following principles:

- Distributed evenly through the DSP area to service 400m catchments.
- Co-located with local open space that is sited within the 'Multiple Use (Flood Storage)' areas to enable the most efficient use of urban land.
- Frontage to a neighbourhood connector roads.
- The potential to accommodate road frontages to at least three sides.
- Allowing for the timely delivery of school sites to match the staged delivery of the DSP.

Prior to the development of the first primary school within the DSP area, residents within the early stages can be accommodated by the existing primary schools within the established areas of Baldivis and Wellard to the west of the Kwinana Freeway.

The location and distribution of primary schools is described under the following headings.

[Local Structure Plan 1](#)

Local Structure Plan 1 will be the first stage of the DSP and as such, this primary school is expected to be the first school delivered by the DoE. The school is depicted at 3.5 hectares in area due to the proposal to co-locate it with an area of local open space.

Whilst the school is notionally shown abutting an integrator arterial road, access will be obtained from a lower order neighbourhood connector road or access street. The school's indicative location can accommodate a road frontage to at least three sides which will be demonstrated at the detailed design stage.

[Local Structure Plan 2](#)

The primary school within Local Structure Plan 2 is expected to be the second primary school delivered in the DSP area, subject to development staging. It is expected to service the LSP 2 area north of the central lakes as well as the entire LSP 4 area. The school is depicted at 4.0 hectares in area.

Whilst the school is notionally shown abutting an integrator arterial road, access will be obtained from a lower order neighbourhood connector road or access street. The school's indicative location can accommodate a road frontage to at least three sides which will be demonstrated at the detailed design stage.

[Local Structure Plan 3](#)

Local Structure Plan 3 contains two primary schools distributed evenly to minimise overlapping catchments. Based on the anticipated development staging, the more southern school is expected to be delivered ahead of the northern school, making them the third and fourth primary schools respectively within the DSP.

Both primary schools are co-located with local open space that is sited within the ‘Multiple Use (Flood Storage)’ areas to ensure the efficient use of land. Both schools are notionally shown abutting neighbourhood connectors roads and are capable of accommodating a road frontage to at least three sides.

5.8.3 Community Facilities

The DSP is supported by a Social Infrastructure Summary (SIS) (refer Appendix 9) that determines the type and number of future community facilities that will be necessary to service the projected population of the DSP in accordance with the City of Rockingham’s ‘Community Infrastructure Plan’. Based on the forecast population numbers, demographic profile and accessibility to existing and planned community infrastructure outside the DSP, the SIS recommends a mix of sub-district and neighbourhood level facilities as outlined within Table 12, ‘Proposed North-east Baldvis DSP Community Facilities’ below.



Table 12: Proposed North-East Baldivis DSP Community Facilities

Facility	Indicative Location	Comment
Sub-District Open Space (6 – 10 hectares)	North of the central lake and collocated with the high school	Refer to section 5.5.2 above for a detailed description on the role and function of the DOS.
Indoor Recreation Centre (2 – 4 courts)	Located with District Open Space or Neighbourhood Centre	<ul style="list-style-type: none"> • The leisure centre may also include health consultation, professional suites and meeting rooms. • May be located within the DOS as part of a consolidated active sporting hub, or with the Neighbourhood Centre, subject to confirmation as part of LSP2.
Multipurpose Hard Courts (6 – 12 courts)	Located within the District Open Space	<ul style="list-style-type: none"> • Will allow for potential shared use with the high school. • Strengthens the role of the DOS as a key node for active sporting activities. • Will enhance place activation during evening hours.
Outdoor Recreation Space	Co-located with District Open Space	<ul style="list-style-type: none"> • This space will be a multipurpose outdoor area for unstructured sport and recreation.
Community Centre	Located with Local Centre	<ul style="list-style-type: none"> • Will reinforce the Local Centres role as a community focal point and expand range of services and amenities for visitors. • Will promote multipurpose trips. • May be combined with a café use or similar to encourage community interaction in a high amenity location overlooking the lake.



The SIS also assesses the provision of regional and district-level community infrastructure outside of the DSP, both existing and planned within both the City of Rockingham and the City of Kwinana.

As demonstrated in Table 13, there is sufficient infrastructure at the regional and district level to accommodate the future population of the DSP area.

Table 13: Regional and District Community Infrastructure

Facility	Description	Location
Regional		
Lark Hill Sportsplex	Multi-purpose sporting facility	Port Kennedy, approximately 13km
District		
Baldivis Sports Complex	District open space with Indoor Recreation Complex	Baldivis, approximately 7km
Rockingham Aquatic Centre	50m and 25m-long pools and aquatic playground	Rockingham, approximately 8km
Aqua Jetty	Indoor aquatic centre and health club	Warnbro, approximately 9.5km
Mike Barnett Sports Complex	7 x indoor courts with facilities	Rockingham, approximately 9km
Rockingham arts Centre	Gallery and studio space with multi-use rooms	Rockingham, approximately 10km
Emergency Services		
Kwinana Police Station	Police Station	Parmelia, approximately 5km
Rockingham Police Station	Police Station	Rockingham, approximately 9km
Mundijong Police Station	Police Station	Mundijong, approximately 9.5km
Rockingham Fire and Rescue Service	Fire Station	Rockingham, approximately 7km
Kwinana Fire Station	Fire Station	Kwinana Town Centre, approximately 4km
Mundijong Fire Station	Fire Station	Mundijong, approximately 9.5km
Health Services		
Rockingham General Hospital	Public Hospital	Rockingham, approximately 6.5km
Fiona Stanley Hospital	Public Hospital	Murdoch, approximately 23km
Waikiki Private Hospital	Private Hospital	Waikiki, approximately 7.5km



5.9 Activity Centres and Employment

Access to employment opportunities, services and amenities are key considerations in identifying land for future urban purposes where sustainable communities can establish and thrive. By virtue of the DSP's location and proximity to existing and future employment areas, residents will have access to a broad range of employment opportunities outside of the DSP area within a reasonable commuting distance. Within the DSP and in addition to typical population-driven employment i.e. shopping centres, the DSP proposes a curated jobs strategy that seeks to attract small businesses to establish within a consolidated location that fosters and encourages the sharing of pooled resources to maximise efficiencies and remove potential barriers to small business start-ups. This curated employment strategy is detailed within the 'Land Economics Report' prepared by Pracsys (refer Appendix 6) and is summarised under section 5.9.4 below.

In addition to the aforementioned employment land to accommodate the curated jobs strategy, the DSP proposes two activity centres of differing scales that will serve as consolidated locations for retail, commercial, entertainment and community land uses. Guided by a 'Retail Needs Assessment' (included within Appendix 6), the DSP plans for a neighbourhood centre fronting Mundijong Road with excellent exposure and access from the major east-west road. A local centre is also planned central to the DSP and adjoining an area of POS that integrates with the central lakes. Both activity centres are planned to fulfill a specific role and function consistent with the activity centre hierarchy principles established by the WAPC's State Planning Policy 4.2 – Activity Centres (SPP 4.2)

5.9.1 Access to Existing Retail Facilities

From the first stage of development, the DSP area will have access to a range of established activity centres to provide for daily, weekly and incidental shopping needs. These existing facilities are described as follows:

- **Spudshed Baldivis** is a neighbourhood centre located approximately 3.2km west of the DSP area. The Centre accommodates a supermarket, childcare centre and complementary retail uses that include a pharmacy and cafe. Prior to delivery of an activity centre within the DSP area, the Spudshed Neighbourhood Centre is expected to accommodate the daily shopping needs of first stage residents.
- The **Baldivis District Centre** is located approximately 5km south making it accessible to the DSP area. The Baldivis District Centre comprises approximately 30,000m² of shop-retail floorspace and is planned to accommodate a second stage expansion in the future. The Centre is anchored by three supermarkets and a discount department store. Baldivis District Centre is anticipated to serve the daily and weekly shopping needs of future DSP residents, depending on travel behaviour.
- **Kwinana Secondary Centre** is located approximately 4km north-west of the DSP area and accommodates supermarket and discount department store retailers, providing an additional option for future residents daily and weekly shopping needs.
- The **Rockingham Strategic Metropolitan Centre** is located approximately 8.5 km west of the DSP area and includes the Rockingham shopping center well as some bulky goods retailers. To the north of the main shopping centre is the Dixon Road light industrial precinct as well as the Challenger commercial precinct, accommodating bulky goods retailers and car showrooms. Rockingham provides a wide range of services that will accommodate less-frequent shopping needs for future DSP residents.

5.9.2 Neighbourhood Centre

The DSP is supported by a Retail Needs Assessment (RNA) undertaken to determine the demand for retail floorspace generated by the estimated population of the future community. The RNA considers the likely expenditure of the future population, population trends and the socio-demographic profile within the region over time. Implementing a retail gravity model, the RNA determined that a neighbourhood centre of approximately 10,000m² of shop-retail floorspace will be required to service the DSP population at full development. This is based on an estimated total number of dwellings of 6,000 and future residents' access to established and developing higher order centres. SPP 4.2 describes neighbourhood centres as *"important community focal points that help to provide for the main daily to weekly household shopping and community needs."* Consistent with the outcomes of the RNA and the activity centre hierarchy established by SPP 4.2, the DSP proposes a suitably sized site to accommodate an activity centre to service the estimated future population for North-east Baldivis.

[Size and Composition](#)

Development of the Neighbourhood Centre will likely be staged to match the extent of retail services with population demand. As more lots are developed and the population grows within the DSP area, subsequent stages of the Centre will be developed to ensure that the quantum of retail offerings aligns with the population and associated consumer demand.

Assuming residential development commences in 2025, the RNA determined that the first stage of the Neighbourhood Centre could be developed at approximately 4,000m² of shop/retail floorspace in 2028, supported by its good exposure and access to Mundijong Road and co-location with the employment land. The first stage development is expected to include a supermarket with supporting commercial uses and specialty stores.



The timing for the expansion of the second stage of the Neighbourhood Centre will be determined by population growth and subsequent retail needs assessments. Should the local centre within LSP2 be developed before the second stage expansion of the Neighbourhood Centre, the second stage may be viable in 2034.

Ultimately, the Neighbourhood Centre is planned to expand to 10,000m² and service its local catchment. The expansion is likely to accommodate a small format discount department store, food and beverage offerings and additional specialty floor space.

Location

The Neighbourhood Centre is proposed abutting the intersection of Mundijong Road and St Albans Road at one of the key entry points to the DSP. Several factors informed the proposed location of the Neighbourhood Centre which are summarised as follows:

- Mundijong Road is the main east-west arterial road and is the major road providing access to the DSP. Locating the Neighbourhood Centre on Mundijong Road provides it with the highest level of exposure to passing trade, thereby enhancing its viability in the short-term. It will enable the first stage of the Centre to be delivered on a larger scale, sooner.

- The location at the intersection of Mundijong Road and St Albans Road is highly accessible, with most DSP residents travelling past the Centre as part of their daily travel patterns. This minimises the need for standalone trips with daily and weekly shopping trips incorporated into residents' travel behaviour.
- The proposed location of the Neighbourhood Centre abutting the LSP 1 boundary enables it to be delivered relatively early in the overall development life cycle of the DSP to match the consumer demand of the population as it establishes and grows.
- Following the high exposure and ease of access attributes of the location, it is proposed to collocate the Neighbourhood Centre with the employment land along Mundijong Road to create a broader activity centre precinct that includes employment-generating land uses beyond the normal shopping centres. Collocating these land uses will enhance convenient access to services and amenities and potential opportunities for synergies in business activities. The workers associated with employment land will generate additional retail demand for the Centre.
- The proposed Neighbourhood Centre will have an interface with the central lakes – one of the key amenity features of the DSP. Subject to further detailed design and site planning, it is envisaged that the Centre will accommodate a food and beverage precinct that orientates towards the lake, maximising opportunities for natural vistas and integration with adjoining open space.

Provision is made for a small portion of the Centre to be located on the opposite side of the ultimate alignment for St Albans Road. It is envisaged that the estimated 10,000m² of shop-retail floorspace will be delivered to the east of this ultimate alignment, with the smaller portion of the Centre west of the intersection capable of accommodating complementary land uses. At this DSP stage, the proponent is keen to explore opportunities for educational and training type uses in this location that will have natural synergies with the employment land to the west. For example, the 'Tradie HQ' hypothesis described in the Land Economics Report (refer Appendix 6) could benefit from being in immediate proximity of the training facilities for apprentices and vice versa. It could also accommodate other complementary non-retail uses such as allied health and childcare services. Whilst part of the overall Neighbourhood Centre, a suitable zoning under LPS 2 will be confirmed at the local structure plan stage once land use outcomes have been further investigated.

[Future Processes](#)

More detailed planning regarding the Neighbourhood Centre will be required at the local structure planning stage. The local structure plan is expected to address matters such as:

- Refine the composition and distribution of the Neighbourhood Centre i.e. land use typologies either side of the St Albans Road and Mundijong Road intersection.
- Coordinate access to and from the road network.
- Confirm any other uses that are planned to occur within the Centre such as community facilities.
- Address any relevant provisions of *State Planning Policy 4.2 – Activity Centers*.
- Potentially require more detailed planning to coordinate development of the Neighbourhood Centre through a future Local Development Plan.

5.9.3 Local Centre

The RNA (included within Appendix 6) confirms that a small local centre at circa 1,500m² of shop-retail floorspace will be viable in 2029 based on estimated construction commencement and population projections.

Located centrally within the DSP, the local centre is planned to enhance future residents access to daily shopping needs and community facilities within a walkable catchment. The Local Centre is surrounded by open space and planned as a community hub that integrates with landscaped active and passive open space. The natural vistas and elevation above the central lake will provide opportunities for café uses where residents can sit and enjoy the surrounding natural environs. Combined with community infrastructure (discussed in further detail at section 5.8.3 above), the Local Centre will be a central hub for the community, encouraging interaction and fostering a sense of place and local identity.

[Future Processes](#)

The local structure plan containing the Local Centre is to be supported by a further Retail Needs Assessment that will consider and address the retail environment at the time and recommend any changes to the size and composition of the Centre, if necessary.

5.9.4 Employment

An overarching strategy of the WAPCs *Perth and Peel@ 3.5 million* suite of documents is to “create employment opportunities that utilise local labour-force skills to increase employment self-sufficiency by attracting business that match the populations that live in the various sub-regions.” This reduces the need to travel and the demand on transport infrastructure and enhances people’s quality of life by reducing commute times.

Based on 2008 data, ‘*Directions 2031 and beyond*’ (2010) identified an employment self-sufficiency level for the south-west sub-region of 60%. This was predicted to increase to 70% by the year 2031. In 2018, the Framework anticipated that the future economy and employment in the sub-region would focus on manufacturing, construction, retail, healthcare and social assistance. Growth sector opportunities were also identified, including education, training, public administration, safety and tourism. The Framework expected that employment self-sufficiency in the south-west sector would increase from 65% to 83%. To improve employment self-sufficiency, the Framework states that employment growth (i.e. the types of jobs) should better align with the sub-region’s labour force and demographic profile.

A Land Economics Report (LER) (refer Appendix 6) was prepared to support the DSP by estimating the number of jobs that are expected to be generated within the DSP area as well as employment opportunities outside of the DSP. In this regard, employment opportunities for future DSP residents will exist within three categories:

1. Population-driven employment such as schools and shopping centres.
2. Jobs and economic activity that will be generated by the targeted business curation strategy that is unique to this DSP and will be delivered within the ‘Employment’ land on the DSP Map.
3. Existing and future employment centres that will be accessible to future residents, are within proximity and which align with the anticipated demographic profile of future DSP residents.

The LER demonstrates that through the curated business strategy, the DSP will achieve a job density greater than that of typical commercial land. Further, residents will have excellent access to jobs in the locality resulting in a high degree of employment self-sufficiency. Figure 31 'North-East Baldivis Total Employment Breakdown' depicts the forecast number of jobs that will be created within the DSP and the adjoining 'Industrial Expansion' area south of Mundijong Road.

The employment opportunities for the DSP as outlined in the LER are summarised in the following sections.

[Local Employment Opportunities \(population-driven\)](#)

Development of the Activity Centres and schools as proposed by this DSP will contribute to employment opportunities both directly and indirectly. It is expected to create jobs during the construction phases as well as ongoing jobs once completed. Based on the forecast size of the Neighbourhood and Local Centres and the number of schools proposed by the DSP, the LER forecasts the following types and numbers of local jobs:

- 425 education-related jobs (schools and childcare);
- 150 service and convenience-related jobs; and
- 13 direct and 62 indirect jobs generated by construction activities during development of the project.



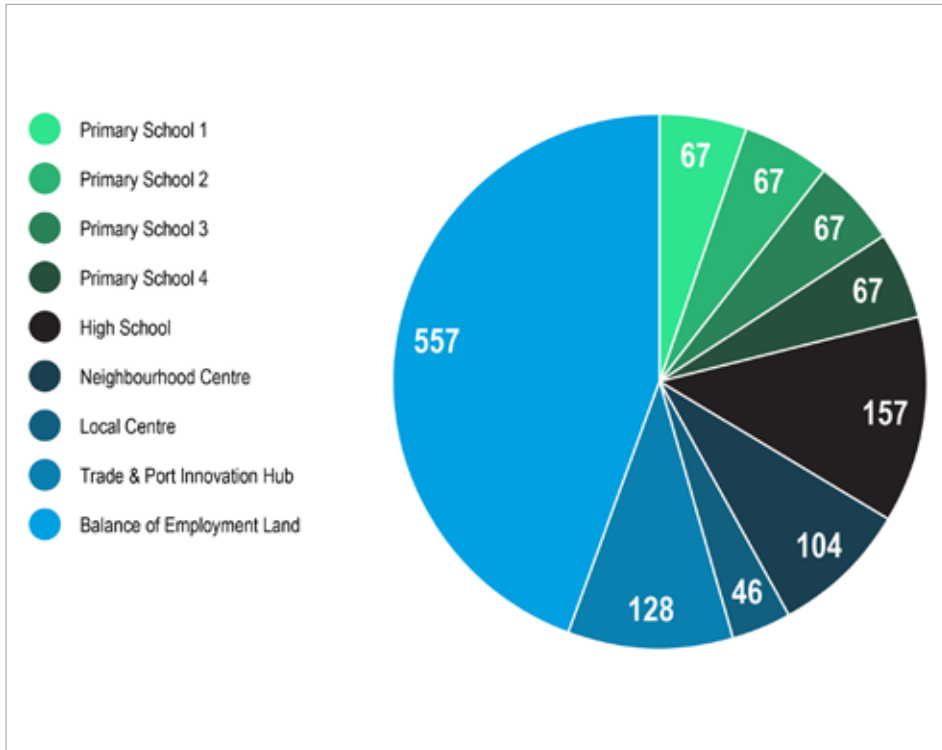


Figure 31 - North-East Baldivis Total Employment Breakdown

Source: Pracsys



[Employment Opportunities within the Sub-region](#)

The DSP is strategically located within 20km of existing and future employment land in the form of specialised and heavy industrial areas as well as general industrial precincts. Based on 2021 census data, the employment profile for the Rockingham and Kwinana areas is outlined in Table 14.

Table 14: 2021 Employment Numbers (Source: ABS 2021)

Rank	Industry (Anzic Level 1)	Employment
1	Health Care and Social Assistance	11,033
2	Construction	8,474
3	Retail Trade	8,081
4	Public Administration and Safety	6,886
5	Education and Training	6,690
6	Mining	6,527
7	Manufacturing	6,510
8	Accommodation and Food Services	5,090
9	Transport, Postal and Warehousing	3,802
10	Professional , Scientific and Technical Services	3,626

Cumulatively within proximity of the DSP area, existing jobs as at 2021 were as follows:

- City of Rockingham - 40,847 jobs (source: .idcommunity)
- City of Kwinana -18,399 jobs (source: REMPLAN)
- Shire of Serpentine Jarrahdale - 7,543 jobs (source: .idcommunity)

Existing and future employment land that will provide opportunities for future DSP residents that aligns with anticipated skills and training are summarised in Table 15, Employment Opportunities.

Other industrial employment activities within 20km of the DSP are identified at Figure 32, Employment Land.

The continued growth of the Rockingham City Centre is expected to further generate employment opportunities into the future.

Table 15: Employment Opportunities (Source: Pracsys 2023)

Employment Area	Estimates Jobs	Summary
Western Trade Coast (WTC)	15,000	The WTC includes the Kwinana Industrial Area, Rockingham Industry Zone Australian Maritime Complex and Latitude 32. It is a key focus of the State Governments 'Diversify WA' strategy and would also benefit from future potential commitments from the Federal Government to undertake naval maintenance. The delivery of Westport will further unlock opportunities for industrial development and technological innovation.
Peel Business Park	14,000 – 33,000	The Peel Business Park is earmarked as an agri-precinct that will provide food processing and manufacturing services for the Peel Food Zone.
Mundijong Industrial Area and Intermodal Terminal	3,200	This strategic industrial will have access to both road and rail infrastructure and is earmarked as a potential intermodal terminal and key access point between the south of the State and the WTC.

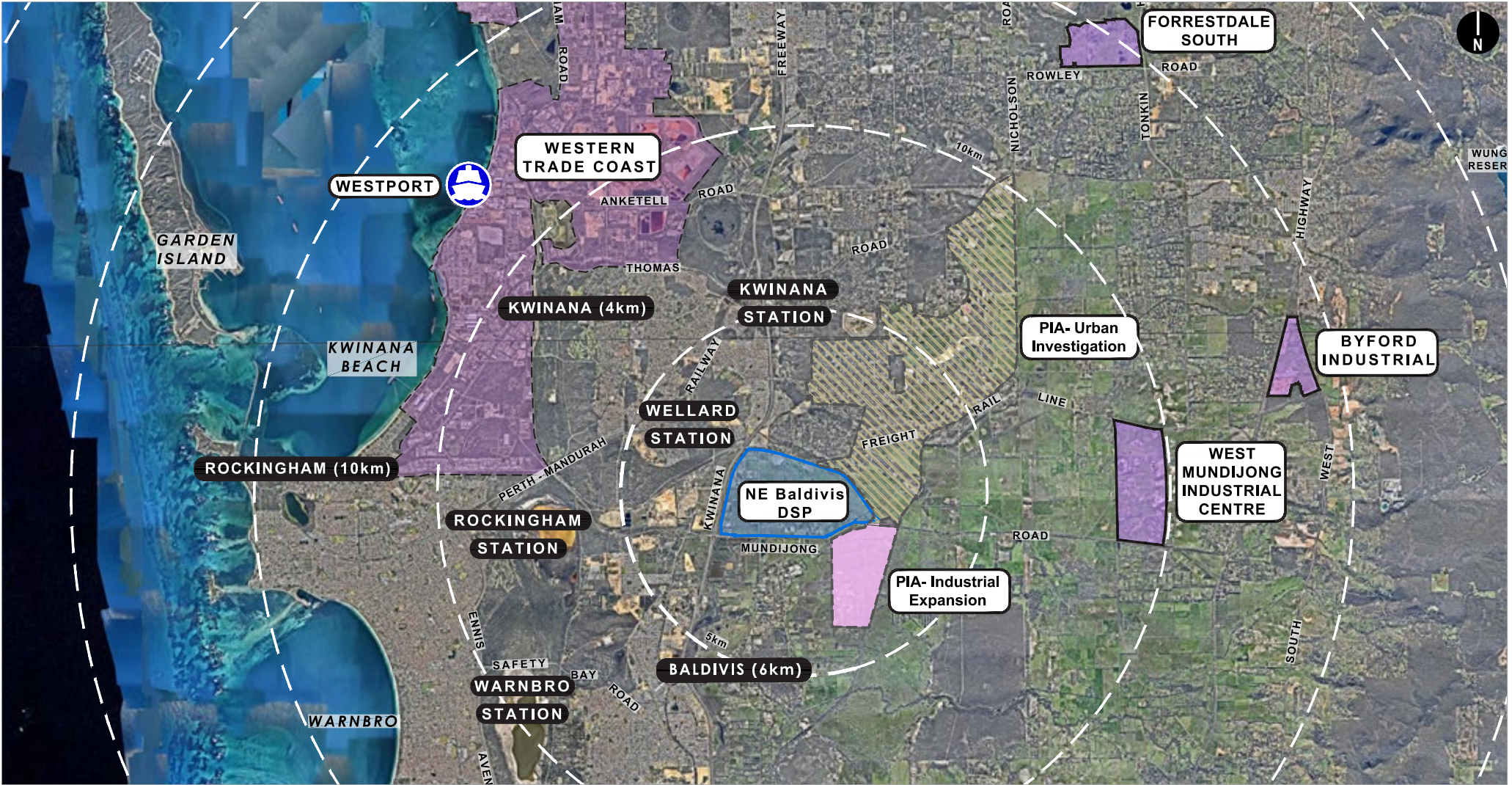


Figure 32 - Employment Land

Source: Nearmap

Proposed Curated Jobs-Attraction Strategy

Guided by the LER, the DSP proposes a curated jobs attraction strategy (the Strategy) to diversify local jobs, grow small businesses and stimulate development of valuable employment land to achieve a jobs density greater than typical employment or industrial land. The Strategy involves implementation of a business incubation model, targeting trade-related businesses. The land identified to accommodate the Strategy comprises 4 hectares of 'Employment' land within the first stage of development (LSP1) and a further 17.5 hectares to be developed as a second stage expansion within LSP3.

The Strategy will involve Stockland, as the DSP proponent and landowner of the majority of the 'Employment' land, partnering with a co-working business incubator space provider (nominally 'Tradie HQ') to establish facilities and services. The facilities and services will facilitate small trade businesses to transition and grow from home-based operations into a shared space which also includes specific features such as storage/ laydown areas and workshops. The shared services and infrastructure proposed by the Strategy provides a unique opportunity to grow small business by minimising investment in upfront capital and significantly reducing overhead costs. Benefits to small business from the Strategy include:

- Knowledge sharing across all aspects of trade business establishment and operation.
- Formation of business networks that enable small businesses to pool resources and bid on larger projects that they otherwise could not have managed in isolation.
- Sourcing and shared training of apprentices and workers from local labour hire and training providers.
- Procuring materials and supplies in bulk, increasing purchasing power and enabling economies of scale.
- Regular podcasts to educate and support growing business trade.

The Strategy is superior to the typical delivery of employment land whereby the land is zoned and then subdivided and sold to suit businesses attracted by land availability. This traditional approach often results in a fragmented and inefficient spatial distribution of land uses. It lacks the coordination and management to deliver supply chain agglomerations that benefit from proximity to one another. By contrast, the Strategy seeks to generate efficiencies by concentrating similar and complementary businesses that yield higher employment densities, delivering higher-quality jobs sooner and makes more efficient use of the valuable developable land within the DSP. The key success indicator for the Strategy will be the formation of more efficient and orderly supply chains, the establishment of more new businesses and more highly skilled jobs.

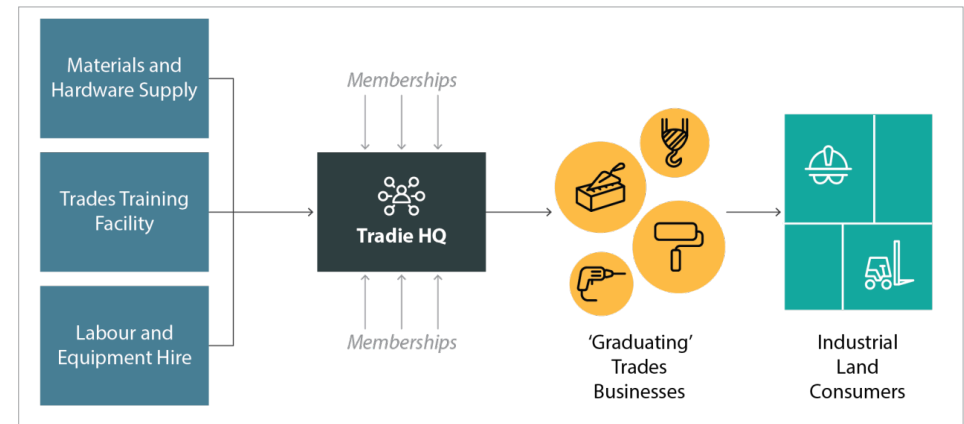


Figure 33 - Trades Business Incubator Process

Source: Prascys

Once established and operating within the trade business incubator, business will be supported and encouraged to grow over time, eventually expanding and outgrowing the incubator hub into the employment and/or industrial land to the east along Mundijong Road. The curated incubation model proposed by the Strategy will ultimately 'graduate' businesses and skilled workers, fostering economic prosperity in the sub-region. The full cycle of business establishment, expansion and relocation is a core component of the Strategy, and is designed to function as follows:

1. Small businesses establish in the 'Tradie HQ' business incubation hub.
2. The businesses grow and expand, improving their business acumen and enhancing skills through shared knowledge, resources and collaboration. This will ultimately lead to a larger source of work.
3. Once businesses have grown to medium to large businesses or when additional space is required, the businesses will 'graduate' to a larger premises to accommodate them and their future growth aspirations.
4. Land will be available in proximity to the incubation hub, approximately 2.5 km east along Mundijong Road, within the DSP's LSP3 'Employment' land. This will enable established business contacts and networks to remain in place whilst providing space for expansion. Depending on timing and the nature of the business, opportunities for general industrial uses and additional space may be available south of Mundijong Road, within the 'Industrial Expansion' area.

The Strategy is expected to yield an employment density of 32 jobs per hectare, far greater than the typical zoning approach for industrial land, which on average yields a job density of 8 jobs per hectare. In total, the LER forecasts that the Strategy will deliver approximately 685 jobs in addition to the 575 jobs creating by typical population-driven employment. In addition to the economic benefits, the Strategy will have social and environmental benefits by providing employment close to where people live, reducing commute times and travel distances.

The DSPs location and context are ideally suited to implement the Strategy based on the following factors:

- The DSPs location close to the urban front and associated proximity to future land and housing construction projects.
- The relative proximity to the future Westport location, providing access to long-term construction contracts associated with the port construction activities.
- The natural displacement of businesses that will occur within the Western Trade Coast over time. As competition for the limited heavy industrial land increases values, it will cause businesses that can relocate to lower-value land to do so. The DSP is advantageously located close to the Kwinana Freeway and the WTC (relatively speaking) to accommodate certain displaced businesses that are compatible and can coexist within an urban context.
- The high exposure, convenient access afforded to the designated 'Employment' land fronting Mundijong Road and the interchange with the Kwinana Freeway.
- The forecast population growth within the sub-region which will require more trade businesses for maintenance services.

[Potential for Maritime Training Hub](#)

In association with, and complementary to the Strategy outlined above, the DSPs proximity to Westport (future) was further analysed by the LER to identify further opportunities to stimulate economic activity and fulfill a potential gap in future skills and training. The notion of a Maritime Training Hub, collocated with the trade-business incubator hub and Neighbourhood Centre was identified as a potential option for further investigation. This would be in the form of training and education services tailored towards workers with technical qualifications for onshore and offshore work associated with the Port's maritime and heavy industry labour requirements. In addition to the initial training, the hub would provide certification services necessary to maintain accreditations and permits. This could possibly extend to a purpose-built maritime simulation facility, subject to further investigation.

5.10 Infrastructure Coordination, Servicing and Staging

Infrastructure coordination, servicing provision and staging for the DSP is addressed by the Engineering Servicing Report, prepared by Cossill & Webley (refer Appendix 2). The Engineering Servicing Report (ESR) confirms that the DSP can be serviced with the necessary utility infrastructure and outlines the earthworks and drainage strategy to be further detailed at the subsequent planning stages.

5.10.1 Water Supply

The ESR confirms that the DSP is capable of being serviced with a reticulated water supply. The potential to extend the DN250 water main located at the intersection of Bertenshaw Road and St Albans Road is being investigated by the project engineer. The ESR acknowledges that extensive upgrades to the network may be required, depending on development timing and Water Corporation capacity at the time. Alternatively, a water supply could be provided via a new water distribution main extended off the Tamworth Reservoir Gravity scheme under the Kwinana Freeway. This will be confirmed once a full water planning study has been undertaken. It is anticipated that the developer will be required to prefund the design and construction with Water Corporation recouping the funds in accordance with the scheduled funding as per their program.

5.10.2 Wastewater

A desktop study was undertaken by the project engineers as part of the ESR to determine the likely wastewater servicing requirements for the site. The completion of the East Rockingham Wastewater Treatment Plant (the WWTP) has expanded the sewer capacity within Baldivis and is capable of accommodating flows from the DSP. On this basis, wastewater will be discharged from the DSP in a westerly direct towards the WWTP.

Preliminary wastewater planning for the DSP in accordance with the Water Corporation's design standards indicates that a Type 180 pump station will likely be required, supplemented by a smaller Type 40 pump station, likely situated in the south-east corner of the DSP. Wastewater would then be discharged off site via a pressure main to a future Type 180 Main Transfer wastewater pump station in Kerosene Lane. Opportunities to refine the strategy and minimise the requisite wastewater infrastructure will be explored with the Water Corporation as the planning progresses.



More detailed wastewater concept planning will be commenced by the Water Corporation once the DSP is finalised and the development footprint and development levels have been confirmed. Once this planning has been completed, it is expected that onsite wastewater pump stations and pressure mains will be included in the Water Corporation's Capital Works Program. Development timing will then determine whether the works will be funded by the Water Corporation or will require prefunding.

5.10.3 Power

The forecast networks capacity will likely be exceeded by the DSP's power requirements. It is likely that a high voltage feeder will be required at some point during the life of the DSP's implementation, which would most likely be extended from the nearest substation in Medina near the intersection of Thomas Road and Abercrombie Road.

5.10.4 Telecommunications

It is expected that the DSP will be serviced via an extension of the NBN network however, developers of new residential estates have the option to pay NBN or an alternate service provider for provision of a high-speed broadband network. Under both scenarios, the developer will install pit and pipe infrastructure that can accommodate a future high speed broadband network.

5.10.5 Gas

Reticulated gas is not proposed to be connected to the DSP in accordance with Stockland's national sustainability targets.

5.10.6 Siteworks and Earthworks

The site is flat and low-lying and therefore necessitates the importation of fill to enable development. Fill is required to achieve both clearance to groundwater and freeboard heights above the 1% AEP rainfall event. The overall earthworks strategy is to minimise the amount of fill wherever possible whilst ensuring drainage, roadworks and sewer reticulation requirements are met. Under this strategy, the fill depth across the DSP is estimated at between approximately 1.0m and 2.0m which is typical of most developments in the Perth metropolitan area. Where feasible, some cut to fill will be undertaken within the site to minimise imported fill requirements.

There are large untapped and developed sources of fill material in the Karnup and Baldivis areas, placing them within an economical transport distance of the DSP. Quarry industry representatives have confirmed that these sand quarries have magnitudes more fill material than what is estimated to be required to facilitate development of the DSP as proposed. These quarries are currently in use with material being transported to locations further than the DSP at market competitive rates. This demonstrates that fill can be sourced and transported to the DSP at a cost per unit that is comparable with other developing land in Baldivis.

Consistent with the drainage strategy outlined in the DWMS, the earthworks strategy proposes to create multiple use corridors to serve a flood storage and flood conveyance purpose.

In support of the progression of planning over the DSP area, a preliminary earthworks plan has been prepared as part of the ESR to provide an indication of the conceptual design levels to be refined as part of future stages of planning.

5.10.7 Staging

Stage 1 development of the DSP is expected to commence within the area identified as 'LSP 1' on the DSP Map. Local structure plan areas 1 to 4 have been numbered in order of anticipated staging, with Stage 1 having access to the external road network and the extension of utility services. Staging would then move into LSP 2 in a northerly then easterly direction. An additional development front could be opened within LSP 3 given its access to Mundijong Road. This will be confirmed and coordinated through the subsequent local structure plan process.

Key factors that have determined the proposed staging approach include:

- Access to the existing regional road network;
- Access to the orderly extension of service infrastructure;
- The hydrological characteristics of the land and the impacts of development (and associated earthworks) on the floodplain characteristics of the site; and
- The provision of social and community infrastructure and its timely delivery to match population growth.

Flood Protection

The underlying principle of the flood management strategy outlined in the DWMS is to provide an equivalent volume of flood detention as exists at the pre-development stage. As the site is developed and filled, the natural storage will decrease meaning that post-development flood mitigation measures are needed to increase the flood storage depth to maintain the pre-development flood storage volume. As development of the DSP will be staged, it will be necessary for the progressive and cumulative impacts of development to be managed through future local structure plans and LWMSs in accordance with the DSP and DWMS. These requirements are elevated to the Part 1 - Implementation Section, given the importance of the matter and need to coordinate flood protection at future stages of planning.



6.0

DEVELOPMENT CONTRIBUTIONS

6.0 DEVELOPMENT CONTRIBUTIONS

A Development Contribution Plan will be required to fund local development and community infrastructure and key items of district infrastructure. Local infrastructure will be confirmed at the local structure plan stage once the appropriate level of detail exists. Development Contribution Plans will be established through amendments to LPS 2, consistent with *State Planning Policy 3.6 – Infrastructure Contributions*.

As the proponent for the DSP, Stockland intend to pre-fund the necessary development and community infrastructure required to service the first stages of development within Stockland-controlled land. Where shared funding is identified as necessary, pre-funded infrastructure would be treated as works in kind or a DCP credit, with Stockland to be reimbursed through future landowner contributions via a Development Contribution Plan. This principle would also apply to any other landowners who pre-fund shared infrastructure that benefits other landowners within the DSP. This approach avoids any onus on the local government to pre-fund infrastructure prior to a DCP being in place.

Mundijong Road

As outlined above and in the TIA which accompanies the DSP, Mundijong Road is required to be upgraded to an urban standard. Based on existing traffic volumes plus DSP development traffic, an 'Integrator A' standard of road is required for the section west of St Albans Road. An 'Integrator B' road will be required for the section east of St Albans Road and up to the eastern DSP boundary. The current 20m road reserve plus the additional 20m wide Other Regional Road reservation to the north is expected to be sufficient to accommodate the standard of road necessary to accommodate DSP traffic. The local structure plan for LSP1 should confirm whether additional road widening is required to accommodate the Integrator A section of road.

Mundijong Road is expected to be a 'district-level' infrastructure item funded through a future DCP. As a district-level infrastructure item, all lots within the DSP area would contribute to DCP costs, including:

- Land necessary for road widening.
- Earthworks, pavement and drainage to an urban standard.

The upgrading of Mundijong Road may be staged under an interim/ultimate scenario. DCP contributions would be based on the ultimate standard of road necessary to accommodate DSP traffic.

Based on the proposed staging approach, it is anticipated that only the section of Mundijong Road west of the St Albans Road would be upgraded initially and to an interim standard to accommodate the primary west-bound movement along Mundijong Road for first stage traffic. The eastern sections of Mundijong Road would be upgraded as and when required.

Telephone Lane (east-west alignment)

The section of Telephone Lane west of St Albans Road will require upgrading to an urban standard, 'likely an Integrator Arterial B' classification under *Liveable Neighbourhoods*. It is expected to accommodate traffic from the entire DSP area due to its role providing a connection into Wellard and as such, will be funded by all lots within the DSP.

The section of Telephone Lane east of St Albans Road that extends along the northern and eastern DSP boundary to Mundijong Road in the south-east corner (identified as an Integrator B road on the DSP Map) will serve a local function. Only lots that require this section of Telephone Lane will be responsible for its upgrading and as such, it is anticipated to be funded as a local infrastructure item (not district infrastructure) in accordance with the principles of need and nexus.

[Roads and Intersections](#)

Any shared funding and associated cost apportionment methodology that may be required to upgrade and establish roads and intersections within the DSP will be informed by future traffic modelling at the local structure plan stage. This is expected to include the integrator arterial and neighbourhood connector roads depicted on the DSP Map and the associated intersections.

[Potential Rail Line Crossing](#)

The WAPC resolved that the DSP be modified to include a requirement to investigate the potential for a road crossing of the rail freight line to the north. This would involve an elevated crossing from the DSP into the suburb of Wellard and would be required to cross Telephone Lane, the rail freight line and Millar Road, connecting into the established road network outside the DSP boundary. The DSP Map has been modified to show a general location where a crossing may be considered and is to be investigated as part of LSP2. Should it be confirmed that a crossing is feasible and desirable, partial funding of the crossing will be subject to the DCP. Cost apportionment will consider and address its broader connectivity role in acknowledgement that the crossing will also accommodate traffic from the north and will not exclusively service DSP traffic.

[District Open Space](#)

As a district-level community infrastructure item, there is the need for shared funding of the DOS development costs through a future DCP. The land component of the DOS is not expected to be included as a DCP item as it will be eligible for a full public open space credit in accordance with *Liveable Neighborhoods'* calculation methodology. The land area for the DOS will therefore count towards the 10% public open space requirement as a standard requirement of subdivision.

Based on the above, only the development costs for the DOS are expected to be funded through the DCP, consistent with *State Planning Policy 3.6 – Infrastructure Contributions*.

[Neighbourhood and Local Parks](#)

Depending on the ownership structure at the local structure planning stages and the calculation of POS credits in accordance with *Liveable Neighbourhoods*, a DCP may be required for funding neighbourhood and local POS where it is clear that one or more landowners are disproportionately contributing to the 10% POS requirement. Any necessary DCPs at the local level will be prepared in accordance with *State Planning Policy 3.6 – Infrastructure Contributions*.

Where neighbourhood and local parks are situated within the 'Multiple Use (Flood Storage)' areas, DCP contributions should be sought for development costs only and should not include the land component.

[Community Infrastructure](#)

The Social Infrastructure Summary (refer Appendix 9) identifies the need for one sub-district community centre, one sub-district indoor recreation centre and six – twelve multipurpose hard courts to service the future DSP population. It is expected that funding of these facilities will be via a local DCP prepared in accordance with *State Planning Policy 3.6 – Infrastructure Contributions*.



