Background Reporting

KARNUP DISTRICT STRUCTURE PLAN

Appendices.

Note: The three (3) scenario options referred to in this Report have been removed from this document. The scenarios were prepared to assist consideration and discussions with DPLH/WAPC and Agencies regarding mosquito risk, and were not intended to provide design solutions for the DSP area.

The visioning and design process, informed by stakeholder engagement and technical investigations, is subject to subsequent project phases.

To avoid confusion and misrepresentation of the scenarios in the early stages of this project, the scenario plans have been removed.

Appendix 2
Environmental Assessment

TECHNICAL MEMORANDUM

Preliminary Environmental Investigations and Advice
Karnup District Structure Plan

PROJECT NUMBER	EP23-049(02)	**DOC. NUMBER**	EP23-018(02)—006A SPL
PROJECT NAME	Karnup DSP	**CLIENT**	CDP
AUTHOR	Samuel Luckas	**REVIEWER**	Liesl Rohl
VERSION	A	**DATE**	31/10/2023

1. INTRODUCTION

1.1. Project background

A project team led by Creative Design & Planning (CDP) and comprising Emerge Associates (Emerge) was engaged by the City of Rockingham (CoR) to provide environmental advice to support the preparation of a District Structure Plan (DSP) for the Karnup area in the City of Rockingham.

This process includes the collaboration of numerous consultants working under CDP planning to determine the potential considerations and constraints for the Karnup DSP area. This advice relates to the environmental considerations and constraints.

1.2. Scope of work

In preparing this advice Emerge completed:

- A review of publicly available datasets and literature
- A partial site inspection in publicly available areas of the site
- Site inspections of private lots where landowners consented to the inspection (approx. 22% of DSP area)

Specifically, this document includes:

- Constraints and opportunities mapping for the various environmental, hydrology, bushfire, heritage, and mosquito management items that have relevance for the preparation of the DSP (including consideration of the landscape values and considerations) that can be gained from available/desktop information.
- Commentary explaining the various constraints and opportunities and how they will influence the preparation of the DSP.

In addition to this, Emerge has also been engaged to provide a specific detailed Environmental Assessment Report which will support the DSP and its review and finalisation and provide an environmental, hydrology, bushfire, heritage and mosquito management context for the consideration and preparation of future Local Structure Plans at the subsequent stage of planning.

The Environment Assessment Report will be a key supporting document for regional and local scheme amendments that are initiated in response to the finalisation of the DSP and subsequent referral(s) to the Environmental Protection Authority (EPA) pursuant to Section 48A of the *Environmental Protection Act 1986* (EP Act).

2. BACKGROUND

2.1. Summary of key environmental issues, opportunities, and constraints

The outcomes and findings of Emerge's assessment from available background information for the DSP area is documented in **Table 1**, which lists the environmental matters considered, outlines the relevance of each matter to the site, details spatial planning considerations and indicates the future relevant environmental approval requirements.

The key environmental issues, opportunities and constraints outlined below have been utilised to inform opportunities and constraints mapping and an initial concept plan prepared by CDP.

Table 1: Summary of key environmental information, planning/spatial considerations and approvals/management implications for the site

Environmental Factor	Relevance to site and summary of information	Spatial considerations as part of proposed concept plans.	Key approval and future management considerations
Topography	• See **Figure 2** • The topography of the site varies, with undulating elevation ranging to approximately 35 metres Australian height datum (AHD), and low points of 5m.	None.	None.

Soils and landforms	• See **Figure 2**
	• The site is found within the Spearwood dune formation.
	• The environmental geology of the site has been mapped by the Geological Survey of Western Australia (Gozzard 1986), and identifies the following within the site:
	  • Sand (S7) (7339). Majority of the site is categorised as Tamala sand a "flat to gently undulating sandplain with pale and yellow sand, medium to coarse- grained, sub angular to well-rounded quartz."
	  • Clayey Sand (Scp) (7397). Located in the south west area of the site, this unit is described as "black, fine to medium- grained quartz sand with clay matrix, variable organic matter of lacustrine origin".
	  • Peaty Clay (Cps) (7437, 7424, 7416, 7435, 7422, 7410, 7387, 7394, 7391, 7399, 7393, 7405). Several small pockets of areas found throughout the site are described as "dark, grey and black, soft variable organic content, some quartz sand in places, of lacustrine origin."
	  • Sand (S8) (7263) Located on the Eastern end of the site, unit is described as very light grey at surface, yellow at depth, fine to medium grained, sub-rounded quartz, moderately well sorted, of eolian origin."
	• Given the underlying ground primarily comprised of Tamala Sand/ Tamala Limestone with existing limestone quarry on site, there is a potential for Karst areas within the site. No Karst areas have been mapped within the site according to DMIRS, however, the mapping shows a karst area adjacent to the south west corner of the DSP. Geotechnical investigations, at the LSP stage of planning, can determine the presence of any Karst within this area.
		None.	Key approval and future management considerations will be determined through the DSP.
			
			Sandy soils typically have a high infiltration capacity.
			
			Small pockets of peaty clays (associated with wetland locations) will have low permeability.
			
			The presence of predominantly highly permeable sand across most of the DSP area means that rainfall infiltrates directly into the soil profile at source.
			
			The generally flat topography of the site also limits generation of surface runoff and further reinforcing that the surface runoff is contained within the DSP area.

Geo-heritage	• There are no significant geo-heritage features or formations within the site.	None.	None.
Acid Sulfate Soils (ASS)	• See **Figure 3** • Most of the site has been identified as having no risk of ASS occurring within 3 metres of the natural soil surface.	None.	ASS is only likely to be an issue requiring management where civil construction works extend below the seasonally dry soils (i.e. during the installation of deep sewer). Any future ASS considerations can be identified

Environmental Factor	Relevance to site and summary of information	Spatial considerations as part of proposed concept plans.	Key approval and future management considerations
	• A small area in the southwestern end of the site associated with the wetland has been identified as having a 'high to moderate' risk of ASS occurring within 3 metres of the natural soil surface. • Small pockets throughout the site are also categorised as having 'high to moderate risk' of ASS occurring with 3 meters of natural soil surface. • The western portion of the site is categorised as having 'moderate to low risk' of ASS occurring within 3 metres of the natural soil surface.		and suitably managed during the subdivision and development process.
Remnant vegetation and flora and vegetation values	• See **Figure 4** • The site contains four Vegetation complexes. A large portion of the site is within the Karrakatta vegetation complex, the northeastern side is within the Serpentine River complex, and the southeastern side is within the Yoongarillup complex. A small section of the site on the southwestern edge, is located within the Cottesloe complex. • The site is largely scattered with areas of native remnant vegetation, with a particular concentration in the mid eastern side, and the northwestern side. • Ongoing flora and vegetation survey in spring 2023 identified that vegetation within the site ranged from 'completely degraded' to 'excellent' condition. Detailed vegetation unit and condition mapping will be provided in the flora and vegetation report once survey and data analysis are completed. • Data gathered from the EPBC Protected matters search tool (DCCEEW 2023) identifies two Threatened Ecological Communities (TEC) known to occur within the area. These are: -Tuart woodlands (*Eucalyptus gomphocephala*) woodlands and Forests of the Swan Coastal Plain ecological community -Banksia woodlands of the swan coastal plain • Surveys currently being undertaken during spring 2023 have confirmed that these two TECs occur within the site. The extent of the TECs will be determined following completion of surveys and analysis of data. • Data gathered from the EPBC Protected matters search tool identifies two threatened flora species (both State and Commonwealth) known to occur within the surrounding area. These are: - *Drakaea elastica* - *Diuris drummondii* • The protected matters search tool report also identified many threatened flora species that 'may' or 'likely' occur.	Riparian and wetland vegetation may require retention. This has been accommodated in the DSP concept plans. Given TECs were identified in the DSP as being potentially present within the site, these will likely be required to be considered/ retained in POS (if the TEC is determined to be present within (Local) Structure Plan areas). Threatened flora and TEC vegetation will likely need to be retained, subject to EP/BC Acts and EPBC conditions.	Future flora and vegetation investigations will be required to support the development process. Limited on-site surveys have been undertaken as part of the DSP process over approximately 22% of the DSP area (where landowners provided consent). Further surveys will be required as part of the LSP process. TEC mapping by DBCA found that Tuart TECs are located throughout the site (as seen in **Figure 5**). The vegetation condition of the TEC as well as the scale and quality of the TEC throughout the site will be determined through the Emerge Associates survey for the DSP and further surveys as part of future LSP process. Banksia Woodlands of the Swan Coastal Plain TEC is listed by the Commonwealth DCCEEW and applies to a number of banksia woodland communities across the Swan Coastal Plain. A search of the protected matters search tool identified banksia woodland as likely occurring within the area. Current surveys for the DSP and future surveys as part of future LSP process will confirm location and condition of this TEC. A review of the Protected Matters Search Tool (DCCEEW), attached as **Appendix A**, identified several potential TECs and State PECs occurring within the site. Surveys will be required to determine the presence or absence of these and other significant flora.

Environmental Factor	Relevance to site and summary of information	Spatial considerations as part of proposed concept plans.	Key approval and future management considerations
	• As part of the spring 2023 survey, targeted searches for threatened and priority flora were undertaken within accessible lots. No threatened flora species, including *Drakaea elastica* and *Diuris drummondii,* were recorded. • Some priority flora species may have been recorded during the spring 2023 survey, with results subject to specimen identification and additional surveys. • Suitable habitat for threatened and priority flora species may occur within inaccessible lots within the site. Lots with potentially suitable habitat for threatened and priority flora will be identified within the flora and vegetation report and shown in associated maps.		
Local Biodiversity Strategy	• The current Natural Area conservation strategy (City of Rockingham 2017) shows areas of remnant vegetation within the site are potentially significant local natural areas. • It identifies a nature reserve directly adjacent, and partially running through the southwest area of the site as being under the DBCA management.	During the DSP process, areas of 'potentially significant natural areas' will be considered for retention.	To be determined through current flora and vegetation investigations, and the DSP planning process.
Environmentally Sensitive Area (ESA)	• See **Figure 6** • The western side of the site contains an area defined as an ESA (Environmentally Sensitive Area). This is a buffer associated with Anstey Swamp, as well as 17 wetlands located within the site, and Bush Forever site 278 (to be retained).	ESA may require consideration within the DSP.	Any clearing proposed within ESAs is not exempt from the requirement of a native vegetation clearing permit unless other statutory approvals exist (i.e. subdivision).
Fauna and fauna habitat	• Remnant vegetation within the site contains potential foraging, roosting and/or breeding habitat for the three Commonwealth and State protected black cockatoo species (Carnaby's, Baudin's and forest red-tailed black cockatoos). • The site area is subject to ecological surveys and further research is being undertaken as part of the DSP process. • Surveys undertaken by Emerge so far have recorded approximately 1,811 black cockatoo habitat trees, of which 111 may have hollows suitable for breeding by black cockatoos. Internal hollow inspection will be carried out within accessible lots to confirm habitat trees which support hollows suitable for breeding by black cockatoos. Where possible, black cockatoo habitat occurring within inaccessible lots will be mapped from publicly accessible land and adjacent properties. • Other conservation category fauna may occur within the site. Suitable habitat for conservation category fauna usually comprises areas of intact remnant native vegetation. The fauna report will detail conservation category fauna likely to occur and identify areas of suitable habitat within the site.	Retention of black cockatoo habitat in POS areas and private land where possible.	Management plans will be required for conservation areas within the DSP, identified within subsequent (Local) Structure Plans. A review of the Protected Matters Search Tool (DCCEEW), attached as **Appendix A**, identified several conservation category fauna occurring within the site. On site surveys for threatened flora species will be required to determine the presence or absence of these and other significant flora within (Local) Structure Plan areas. Further discussed in **Section 3.1**

Environmental Factor	Relevance to site and summary of information	Spatial considerations as part of proposed concept plans.	Key approval and future management considerations
Conservation reserves/ Bushfire	• See **Figure 6** • Two Bush Forever sites have been confirmed within the DSP area- BF 379 and BF 278. • Site contains two DBCA Legislated lands and waters (LLW) zones, one on the southwestern side associated with BF 379 (Wetland), and one LLW zone on the northeastern side. • The site contains an ESA to the west. • Ecological linkages 74, 76 and 81 run through the site.	Bush Forever sites to be retained and managed within the DSP. A bushfire assessment will inform the concept plan requirements for bushfire setbacks and spatial layout considerations including integrated road networks.	A management plan will be required for the two Bush Forever sites within the DSP. A Bushfire Management Plan will support the DSP and also future stages of planning. Ensure due regard for bushfire buffers and bushfire prone planning. Further discussed in **Section 3.6**
Wetlands	• See **Figure 7** • A series of wetlands have been identified within the site including: • Conservation Wetland (COW; UFI 6413, 6446, 6411, 6624, 6636, 6630.) • Resource Enhancement Wetland (REW; UFI 6429, 6634, 6548, 6641, 6638, 6626, 6625.) • Multiple Use Wetland (MUW; UFI 6428, 6426, 16051, 15848.) • As part of the 2023 surveys, an assessment of values within wetland features and applicable management category will be determined. This will be documented within the flora and vegetation report.	Conservation wetlands are protected with a 50 m buffer. This will be determined in the DSP. REWs are generally considered to require a 30m buffer from the wetland to development. This will be determined in the DSP. MUWs do not require specific conservation or protection measures.	Through the standard urban water management process, the hydrological characteristics of these wetlands (i.e. groundwater levels and surface water flows) can be suitably addressed. The DSP will determine the future approval and management considerations. Further discussed in **Section 3.7.1**
Hydrology	• <u>Surface hydrology</u> • DWER Water register mapping (DWER 2022b) • The site does not contain any significant drainage lines. A number of minor swamp perennial drainage lines have been identified throughout the site by DoW mapping. These correspond to the previously identified wetlands (see wetlands section). Some small earth dams have also been identified throughout the site. • The surrounding context of the site, however, identifies some significant drainage lines. Most notably Anstey Swamp to the west of the DSP area and Paganoni Swamp to the south of the DSP area. Across the Freeway to the east of	Spatial considerations will be considered subject to further hydrological assessment for the DSP. The conveyance of surface water and the management of groundwater levels, associated with the function of the minor drainage lines,	Approval and management considerations will be determined through further analysis of hydrology on the site and through the findings presented in the DSP. Further discussed in **Section 3.7**

Environmental Factor	Relevance to site and summary of information	Spatial considerations as part of proposed concept plans.	Key approval and future management considerations
	the DSP area is Lake Amarillo which displays a watercourse and major perennial lines. • Considering the surrounding context of the site is important in determining the potential for any surface water runoff that is generated. • A broader assessment of catchment runoff will be undertaken to clarify peak flow rates for major events. • The site is not located within the 100 year Average Recurrence Interval (ARI) floodplain development control area of the Swan River.	can be managed through the typical urban water management process and does not require specific spatial consideration, apart from the requirement to convey surface water and manage stormwater events within POS (through the provision of swales, bio-retention areas and flood storage areas).	
	• <u>Groundwater</u> • The Perth Groundwater Atlas (DoE 2004) identifies that the groundwater flow beneath the site is generally in a west to southwesterly direction. Based on the groundwater mapping, the minimum groundwater levels underlying the DSP area are approximately 3 m Below Ground Surface (BGS), while maximum groundwater levels measured to the north of the DSP area indicate a depth to groundwater of 3.3 m BGS.	High groundwater levels reduce the infiltration capacity of the stormwater detention basins making these areas larger.	
	• <u>Non-potable water supply</u> • A review of the Water Register (DWER 2023) indicates the groundwater area is fully allocated. • No existing groundwater licences are held across the site.	None.	Groundwater within the relevant groundwater sub-area is fully allocated.
	• <u>Public Drinking Water Source Area (PDWSA)</u> • The site is not situated in a PDWSA.(DWER 2022a)	None.	None.
Potential contamination	• A review of the Department of Environment Regulation *Contaminated Sites Database* indicates that most of the site is not registered as a contaminated site pursuant to the *Contaminated Sites Act 2003*, nor are other registered sites located nearby. • A very small pocket of 2263 Mandurah Rd, Karnup has been 'remediated for restrictive use'.	None.	None
Aboriginal heritage	• See **Figure 8** • Three Registered Aboriginal Heritage Sites have been identified within the eastern and southern sections of the site. Registered Aboriginal Site 3582	Spatial considerations may be required.	Due diligence process in accordance with the *Aboriginal Heritage Act 1972* (AH Act) and the *Aboriginal Heritage Due Diligence Guidelines* (DAA 2013).

Environmental Factor	Relevance to site and summary of information	Spatial considerations as part of proposed concept plans.	Key approval and future management considerations
	Serpentine River, Registered Aboriginal Site 37720 Karnup Station Scarred Tree, and Registered Aboriginal Site 3723 Stake Hill Burial (DPLH 2023).		Further discussed in **Section 3.2**
European heritage	• No registered heritage sites were identified within the site.	None.	None.
Mosquito Management	• The Karnup DSP area borders the Serpentine River, Anstey Swamp and Paganoni Swamp which provide habitat for mosquito breeding.	To be determined by MRAMP	Implications on landuse and development and associated management of mosquito breeding areas will be guided by the Mosquito Risk Assessment and Management Plan prepared by Rankine as part of the DSP process.
Land capability	• Given the physical characteristics of the site, the soil and groundwater conditions are expected to be largely conducive to deep sewered residential development.	None.	None.
Natural hazards	• Flooding • The eastern edge of the site borders a Floodplain development control area. This is found under the GHD Murray Floodplain Development strategy (2010) and derived from the extent of "1 in 100 (1%) AEP flooding." • The site is not located within the 100 year Average Recurrence Interval (ARI) floodplain of the Swan River.	None.	None
	• Bushfire See **Figure 9** • Office of Bushfire Risk Management, *Map of Bush Fire Prone Areas (Bushfire Prone Planning 2018)* • Bushfire Prone Area mapping has been prepared by the Office of Bushfire Risk Management. Bushfire Prone Areas are areas that may or are likely to be subject to bushfire attack, in accordance with *Australian Standard (AS) 3959-2009 Construction of buildings in bushfire prone areas*. A Bushfire Prone Area is applied to areas within 100 m of an 'Extreme' or 'Moderate' bushfire hazard. A number of Bushfire Prone Areas have been identified within the site and are associated with areas remnant riparian vegetation and the adjacent Bush Forever site.	The requirement for a spatial response within the LSP will be dependent upon a bushfire hazard being identified within the site, or within 100m of the site. As a worst case, 'Moderate' and 'Extreme' bushfire hazard that cannot be suitably managed may require an Asset Protection Zone (APZ) to be accommodated.	Consideration of bushfire risk will be required as part of future development within the site and will primarily be associated with areas identified as 'Bushfire Prone Areas'. Further discussed in **Section 3.6**
Visual amenity	• There will be no significant visual amenity issues posed by the proposed residential development of the site.	None.	None.

3. DEVELOPMENT CONTRAINTS AND RECOMMENDATIONS

Based on Emerge's review and the information outlined above, a number of environmental constraints and opportunities have been identified. The key environmental issues, opportunities and constraints identified in this advice will be considered in the preparation of the DSP, and future Scheme Amendments and future (Local) Structure Plans (LSP), subject to further refined investigations.

The following will need to be considered and demonstrated to support development.

3.1. Threatened flora, Threatened Ecological Communities (TEC) and Fauna Management

Flora, vegetation and fauna surveys are currently being undertaken within the DSP area. The results of these surveys will assist in refining key areas for environmental consideration and providing referral advice pursuant to both State and Commonwealth Environmental Protection Acts.

Two EPBC Act listed TECs: Banksia woodlands of the swan coastal plain and Tuart (*Eucalyptus gomphocephala*) Woodlands; and Forests of the Swan Coastal Plain ecological community), were identified as being potentially present within the site. Surveys currently being undertaken by Emerge during spring 2023 have confirmed that these two TECs occur within the DSP area. The extent of the TECs will be determined following completion of surveys and analysis of data.

Remnant vegetation within the site likely to contain potential foraging, roosting and/or breeding habitat for the three Commonwealth and State protected black cockatoo species (Carnaby's, Baudin's and Forest red-tailed black cockatoo). The site area is subject to ecological surveys to determine the extent of this, and as such may also need to be referred under the EPBC Act. Surveys to date have recorded extensive black cockatoo habitat, including at least 1,811 black cockatoo habitat trees of which 111 may support hollows suitable for breeding by black cockatoos. Internal hollow inspections of habitat trees within accessible lots will be undertaken to confirm whether hollows are suitable for breeding by black cockatoos. Black cockatoo habitat will be detailed in the Emerge fauna and targeted black cockatoo report, once surveys and data analysis are complete.

The threatened flora species *Drakaea elastica* and *Diuris drummondii* were not recorded within accessible lots during the spring 2023 survey by Emerge. These species may occur within inaccessible lots and future surveys would be required to confirm this. No other threatened flora species were recorded by Emerge within accessible lots. The presence or absence of priority flora species within accessible lots is yet to be confirmed and is subject to taxonomic identification of flora specimens. Suitable habitat for a range of priority flora species is likely to occur within inaccessible lots and may require future survey(s).

Future EPBC Act approvals are likely to require offsets and the preparation of annual compliance reporting (or formal communication with the DCCEEW) to demonstrate compliance with any approval conditions.

Referral requirements under the State EP Act may also be required.

Referral processes are undertaken in future development stages, and advice will be further refined following targeted on-site ecological surveys and investigations.

3.2. Aboriginal Heritage

In Western Australia, Aboriginal cultural heritage is currently managed pursuant to the *Aboriginal Cultural Heritage Act 2021* (ACH Act). DPLH maintains the Aboriginal Cultural Heritage Inquiry System (ACHIS) (DPLH 2023), which is a directory containing locations and information about Aboriginal Cultural Heritage (ACH) in the State. It is noted that this Act is in the process of being repealed but is still current at the time of writing this report.

A review of the ACHIS Directory indicates the site contains multiple heritage sites. These include:

- Registered Site 3582 'Serpentine River' in the Eastern portion of the site, described as having Ritual / Ceremonial; Creation / Dreaming Narrative significance and is associated with the adjacent Serpentine River.
- Lodged Site 3723 'Stake Hill Burial' in the Southern portion of the site identified as a burial ground.

Given the ACH Act will be repealed the following information is provided pursuant to the *Aboriginal Heritage Act 1972* (AH Act).

A search of the AHIS online database (DPLH 2018) pursuant to the AH Act, was undertaken and identified the same two sites.

Aboriginal Heritage Sites, whether known or unknown, are protected under Section 18 of the AH Act. Approval under Section 18 is required to impact or disturb any Registered Aboriginal heritage site.

Given the site contains heritage sites, any development or land use activities that are proposed will require a due diligence (DD) process in accordance with the requirements of the AH Act and the Aboriginal Heritage Due Diligence Guidelines (DAA 2013). This DD process aims to assess the risk of harm to ACH to enable a proponent to determine how to proceed in relation to the proposed activity.

Additionally in future planning stages, there may be a range of opportunities to incorporate the Aboriginal heritage values of the locality into future residential development across the site. For example, local indigenous heritage values could inform design elements such as road names, interpretative signage within POS areas, landscape designs and colour palettes, planting species lists and potential areas of revegetation. This can be explored further as part of the subdivision and detailed design process.

3.3. Contamination

Given the historic land uses within the site, most of the site is unlikely to pose any contamination risks, although the site is still subject to contamination investigations. A review of the Department of Water and Environment Regulation Contaminated Sites Database indicates that most of the site is not registered as a contaminated site pursuant to the *Contaminated Sites Act 2003*.

A very small pocket of remediated land exists to the west of the site at 2263 Mandurah Rd, Karnup. This does not mean that other portions of the site are not contaminated, particularly areas previously associated with excavation quarry or industrial land uses. As part of the development process, any future development will require a contaminated sites investigative process as necessary, to ensure a remediation process is undertaken, and to minimise any potential development constraints.

3.4. Noise Impacts

Given proximity to the Freeway on the eastern side of the DSP area; and the Perth - Mandurah passage rail line, consideration of noise impacts is required as part of the structure planning process.

This may result in the requirement for a spatial separation (setback) and/or acoustic and/or quiet house design in accordance with State Planning Policy 5.4 (SPP 5.4) Road and Rail Transport Noise and Freight considerations in Land Use Planning.

Herring Storer Acoustics has undertaken a review of the acoustic requirement for the Karnup Structure Plan in October 2023 and have advised the following:

The Perth – Mandurah passenger rail line runs close to a proportion of the western side of the structure plan. The southern part of the DSP is within the SPP 5.4 trigger distance and is part of a separate review. Future advice will depend on whether there are any noise sensitive premises in this area.

Kwinana Freeway will also trigger the requirements of SPP 5.4 assessment. This will only apply to the northern section of the DSP as the residence to the south existing and not subject to any change under DSP. There is already an existing wall along the boundary to the Freeway road reserve, in the south.

Noise walls and quiet housing design are likely acceptable response in this regard, but the details of cannot been confirmed at this point in time.

3.5. Mosquito Management

The Karnup DSP area borders the Serpentine River, Anstey Swamp and Paganoni Swamp, which provide potential habitat for mosquito breeding, and which may impact public health and amenity. A Mosquito Risk Assessment and Management Plan (MRAMP) has been prepared by Rankine Mosquito Management for the DSP area.

3.6. Bushfire

The majority of the DSP area is identified as being within a Fire Prone Area. A Bushfire Management Plan (BMP) will be prepared to support the DSP and subsequent planning and development processes, in accordance with State Planning Policy 3.7 *Planning in Bushfire Prone Areas and Guidelines.*

This will require consideration of the layout and design of subdivision, emergency access/egress and water supply for firefighting purposes. In addition, a BAL assessment is likely to be required to demonstrate that buildings are not exposed to an unacceptable level of radiant heat flux to a ‘vulnerable land use’ (i.e. BAL-12.5 is not exceeded).

3.7. Hydrology

Much of the DSP area contains soils that are classified as sands (S7 soil unit) which typically have a high infiltration capacity. There are also small pockets of peaty clays that are associated with wetland locations, and these are assumed to be of low permeability. The presence of predominantly highly permeable sand across much of the DSP area means that rainfall infiltrates directly into the soil

profile at the source. The generally flat topography of the site also limits generation of surface runoff, further reinforcing that the surface runoff is contained within the DSP area.

A review of floodplain risk mapping indicates that the DSP area is not subject to inundation or flooding. However, the wetlands located within the western portion of the DSP area are noted as being subject to inundation during periods of elevated rainfall.

Groundwater levels beneath the DSP area are variable with lower lying areas (towards the west of the site) having approximately 1 m of clearance to annual maximum groundwater levels (MGL) and higher elevation areas (towards the east of the site) having up to 30 m of clearance to MGL.

Groundwater flows beneath the site are inferred to be slow due to low gradients shown on DWER regional groundwater contours, specifically the Lower Serpentine Hydrological Study (2011). Based on these contours, groundwater is expected to enter the north of the site and then flow towards the southwest (Indian Ocean) and southeast (Serpentine River). Given the radial flow of groundwater and permeable site conditions it can be inferred that the site is a shallow groundwater recharge area.

The wetlands to the west and south of the DSP area are likely supported by this groundwater where it is close to the surface, while the Serpentine River to the east is likely fed by groundwater from the east and to a lesser extent from groundwater beneath the DSP area. Ensuring that these groundwater flows are not impacted by the development will be important in supporting these two important hydrological features.

There are a large number of groundwater users identified within the DSP area, with 60 groundwater licences located within the DSP area. The combined water allocation of all licences is 2,215,352 kL with individual allocation volumes ranging from 1,400 kL to 720,000 kL. The abstraction of this groundwater from the superficial aquifer has the potential to influence groundwater dependant ecosystems (GDE), such as the wetlands located within and in the vicinity of the DSP area.

This influence could see a rise in groundwater as the DSP area is developed, with reduced abstraction of groundwater and reduced evapotranspiration due to urbanisation. This can potentially influence GDE in the vicinity of the site and could potentially affect the extent of mosquito breeding habitat in nearby wetlands.

Historical land uses within the DSP area have been mainly agricultural (livestock agistment), horticultural (vineyard) with basic raw material extraction (sand quarrying) activities taking place currently and/or relatively recently. Some of these land uses are noted as having the potential to cause the export of nutrients into the local environment at downstream locations. This is a consideration as the DSP area is situated with the Peel-Harvey catchment which is identified as having elevated nutrient levels from historical land use activities.

As noted above, the pathway to transport nutrients from the DSP area to downstream locations are likely to be minimal or low gradient and so impacts to the most significant environment receptors, the Serpentine River and adjacent wetlands, is expected to be minimal. These historical land uses are not expected to continue as the site becomes developed and therefore nutrient sources (and therefore export) from the DSP area are expected to reduce over time.

3.7.1. Wetlands

Seventeen mapped wetlands occur within the site, these include Conservation (CCW), Resource enhancement (REW) and Multiple use (MUW) wetlands. The considerations including retention requirements differ for each category, with conservation wetlands being the highest prioritised wetland in terms of retention and conservation. The Department of Biodiversity, Conservation and Attractions (DBCA) has developed the Geomorphic Wetlands, Swan Coastal Plain dataset (DBCA 2023) in which geomorphic features are classified on landform shape and water permeance.

Each feature is assigned to one of three management categories which guides land use and conservation as described in **Table 2**.

Table 2: Geomorphic Wetlands of the Swan Coastal Plain management categories

Management category	Description of Wetland	Management Objectives
Conservation (CCW)	Supports high levels of attributes and functions.	Preserve wetland attributes and functions through reservation in national parks, crown reserves and state-owned land. Protection provided under environmental protection policies
Resource Enhancement (REW)	Partly modified but still supporting substantial functions and attributes.	Restore wetland through maintenance and enhancement of wetland functions and attributes. Protection via crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple Use (MUW)	Few wetland attributes but still provide important hydrological functions	Use, development and management considered in the context of water, town and environmental planning through land care.

The Geomorphic Wetlands, Swan Coastal Plain dataset (DBCA 2023) indicates that there are six CCW, seven REW and four MUW within the DSP area (See **Figure 7**). In addition, there are two large CCWs in the vicinity of the DSP area, Anstey Swamp to the west and Paganoni Swamp to the south. Spring 2023 surveys currently being undertaken by Emerge include an assessment of the geomorphic wetlands mapped within the site, to determine whether the current management category is appropriate. Once surveys and data analysis is complete, this will be documented in the associated report.

The Serpentine River Floodplain (associated with the Serpentine River) is located to the east across the Kwinana Freeway, which consists of CCWs, REWs and MUWs. Future developments should identify appropriate buffers between the wetlands and future land uses (if applicable) but will also need to consider potential impacts to these wetlands from nutrient transport, groundwater changes beneath the DSP area, and potential mosquito and midge breeding habitats.

4. CONCLUSIONS AND RECOMMENDATIONS

Environmental considerations and constraints for the DSP area will be further supported in future design and structure planning processes with refined technical investigations to be undertaken by Emerge. The key outcomes of the environmental investigations to date are:

- Two EPBC Act listed TECs occur within the site; *Banksia woodlands of the swan coastal plain* and *Tuart* (*Eucalyptus gomphocephala*) *Woodlands and Forests of the Swan Coastal Plain* ecological community).
- Foraging, roosting and breeding habitat for the three Commonwealth and State protected black cockatoo species (Carnaby's, Baudin's and Forest red-tailed black cockatoo) occurs within the site. Up to 1,811 black cockatoo habitat trees (breeding habitat) have been recorded within accessible and inaccessible lots (of which 111 have hollows potentially suitable for breeding by black cockatoos).
- Flora, vegetation and fauna surveys are currently being undertaken. These surveys will assist in refining key areas for environmental consideration and providing referral advice pursuant to both State and Commonwealth Environmental Protection Acts. This is important in establishing an avoidance of impacts to MNES at a DSP level.
- A review of the ACHIS Directory indicates the site contains three heritage sites. An Aboriginal Heritage assessment will be undertaken as part of the Environment Assessment Report.
- A Bushfire Management Plan (BMP) will be required to support the DSP, in accordance with State Planning Policy 3.7 *Planning in Bushfire Prone Areas and Guidelines*. Future BMPs will also be required to support structure planning, subdivision stages and development.
- The Geomorphic Wetlands, Swan Coastal Plain dataset (DBCA 2023) indicates that there are six CCW, seven REW and four MUW within the DSP area. The wetlands located to the west are noted as being subject to inundation during periods of elevated rainfall. A Wetland Assessment will be undertaken as part of the DSP process to determine quality and value of these wetlands and specify the wetland boundaries.
- A floodplain has been identified to the east of the DSP area and is associated with the Serpentine River.
- A District Water Management Strategy (DWMS) is required and will be provided to support the hydrological considerations of the DSP.

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Western Australian Planning Commission (WAPC) 2010, Metropolitan Region Scheme, Perth.

Figures

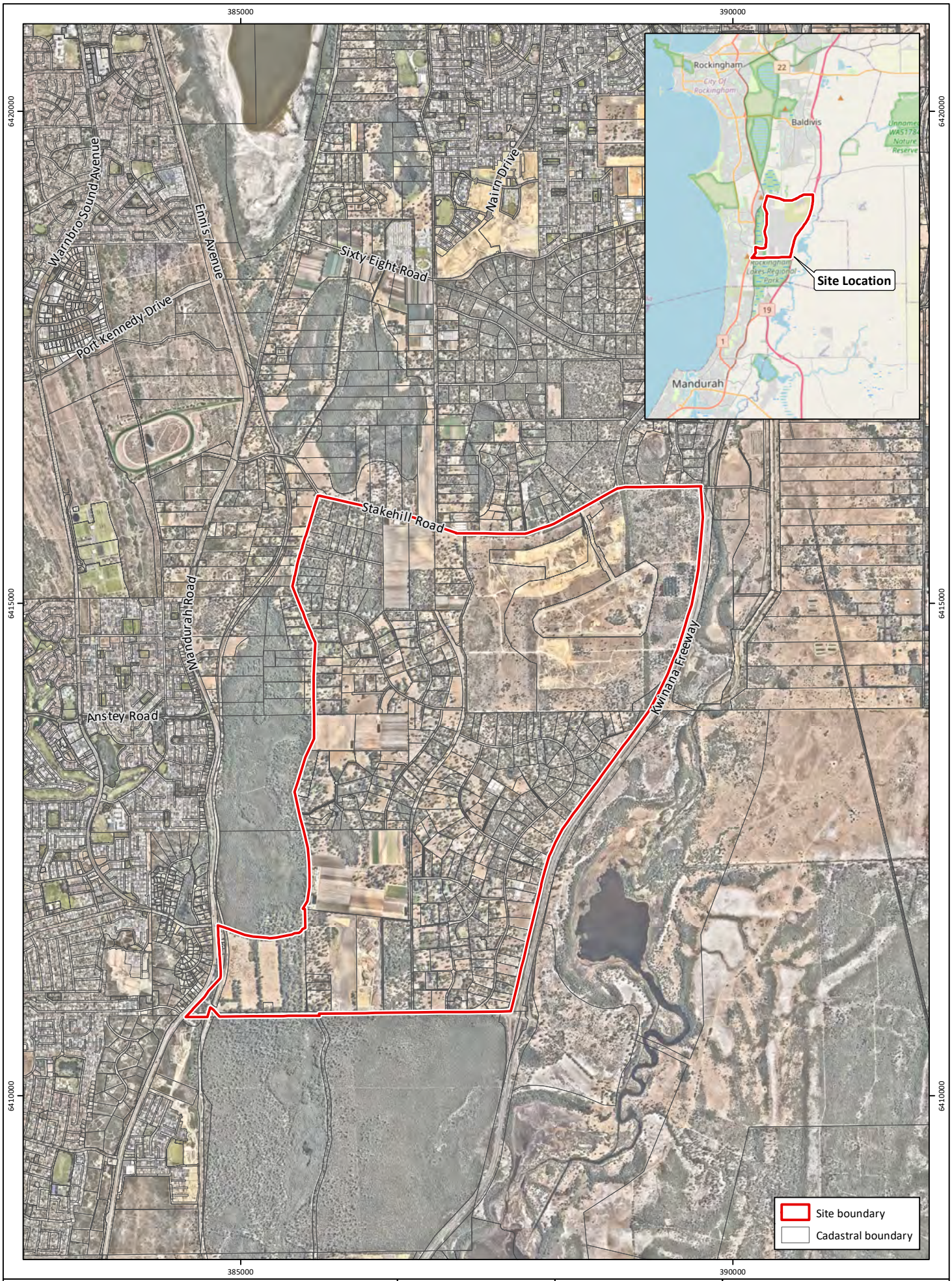

Figure 1: Site Location

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number:
EP23-018(02)--F01

Drawn:	WJC
Date:	13/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

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Meters

Scale: 1:50,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

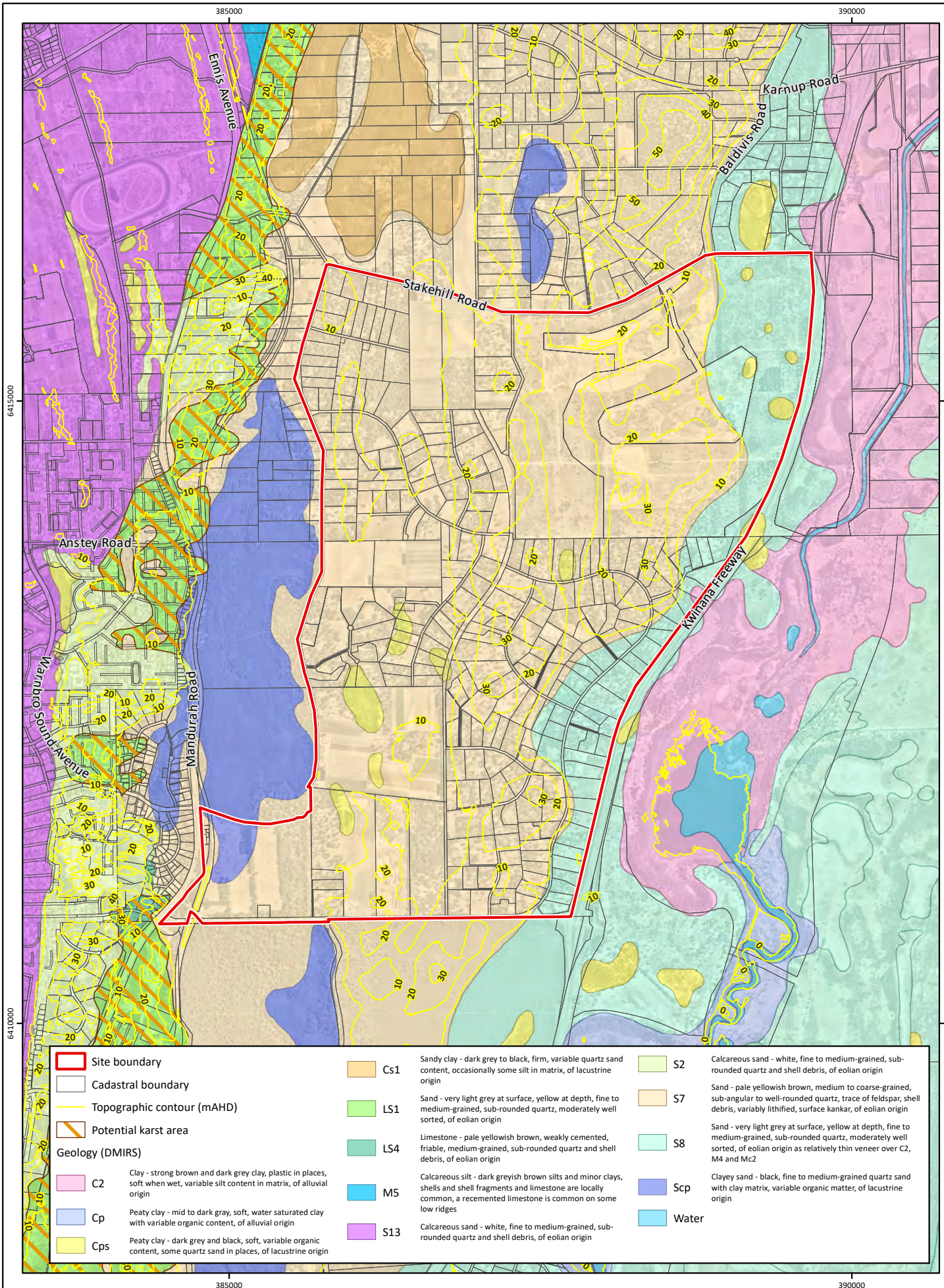

Figure 2: Topography and Soils

Project: Preliminary Environmental Advice
Karnup District Structure Plan
Client: City of Rockingham

Plan Number:
EP23-018(02)--F02a

Drawn:	GAR
Date:	31/10/2023
Checked:	SPL
Approved:	JDH
Date:	31/10/2023

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Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

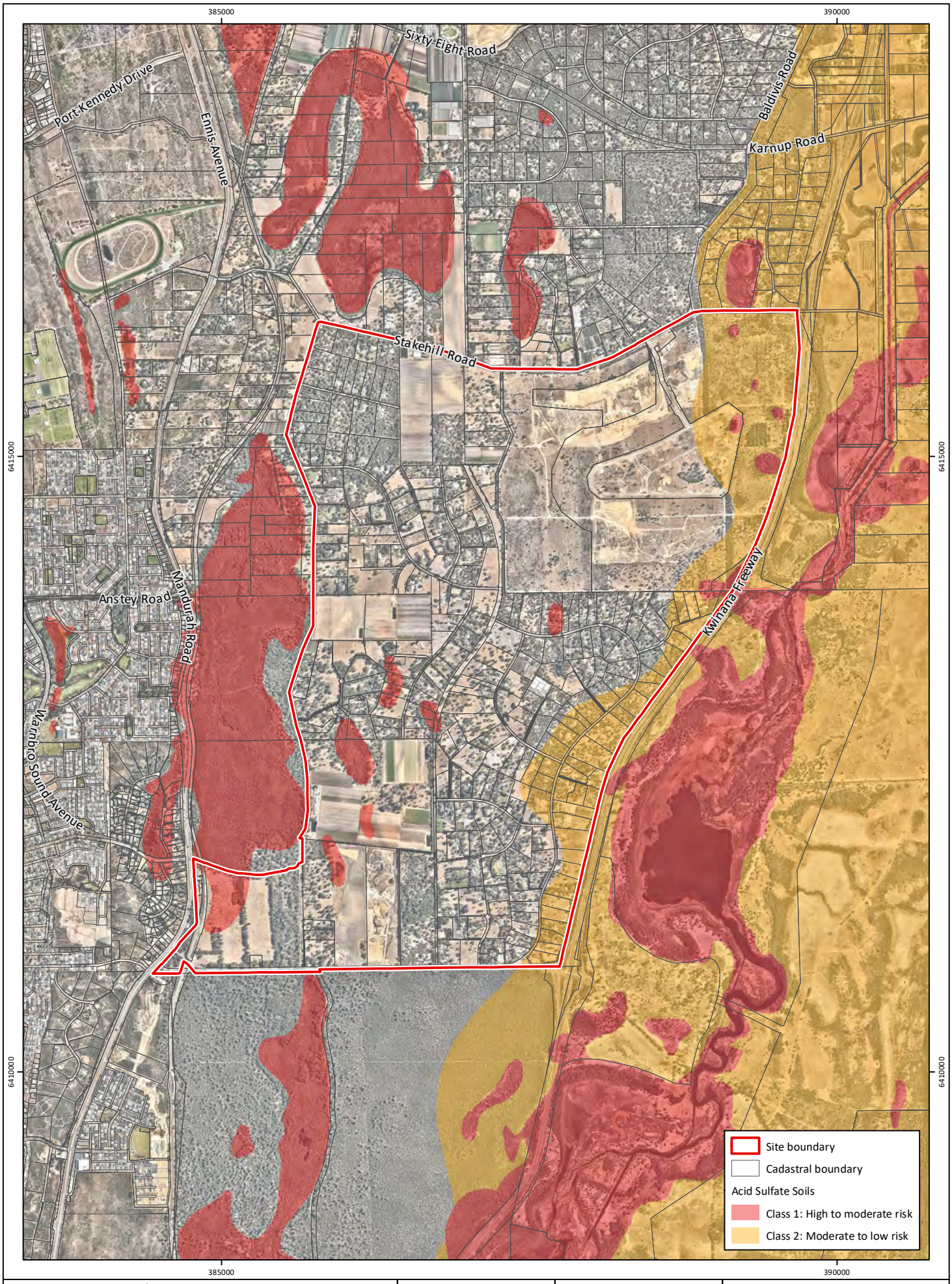

Figure 3: Acid Sulfate Soils

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number:
EP23-018(02)--F03

Drawn:	WJC
Date:	13/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

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Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

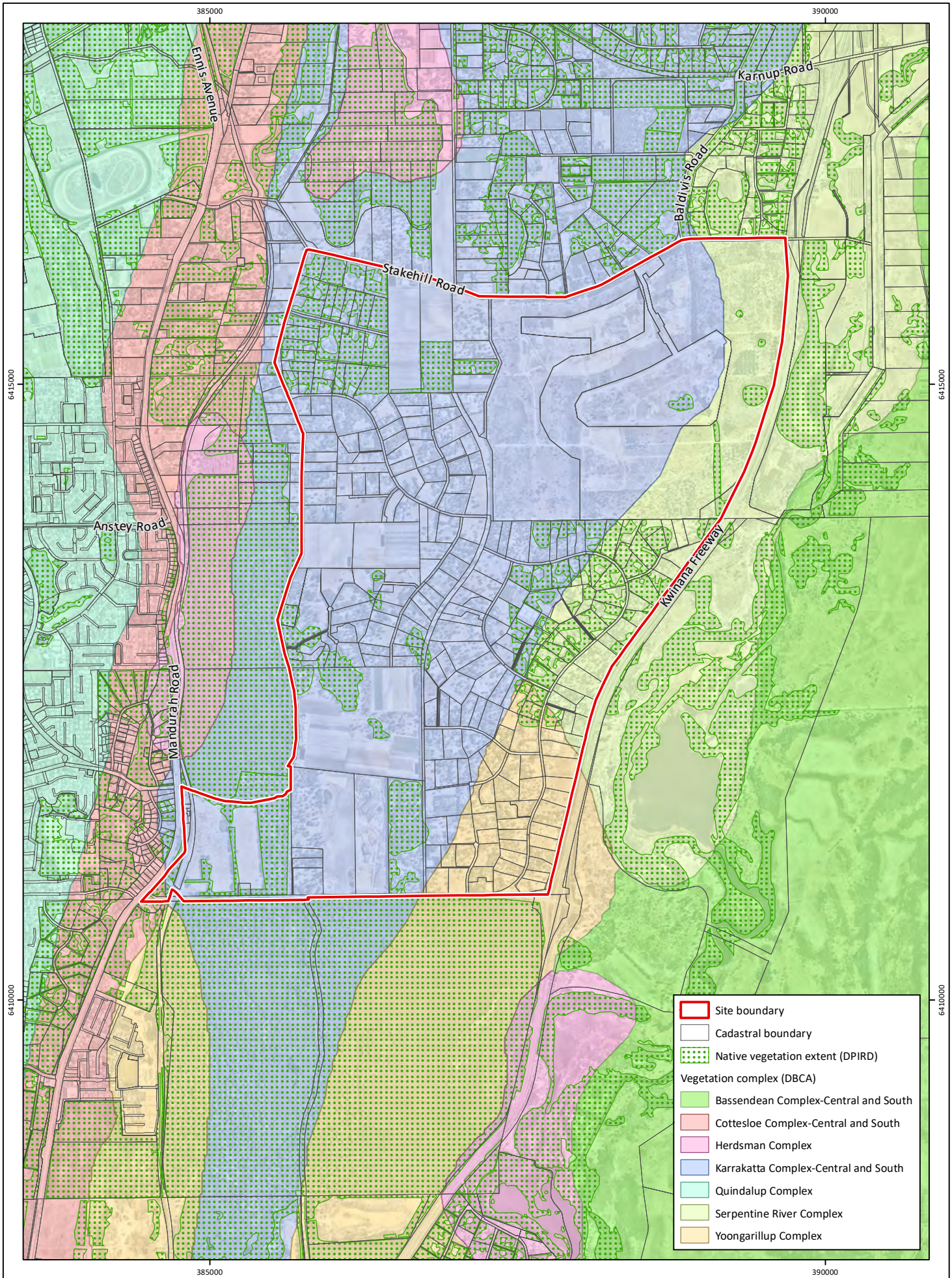

Figure 4: Remnant Vegetation/Flora

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number:
EP23-018(02)--F04

Drawn:	WJC
Date:	13/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

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Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

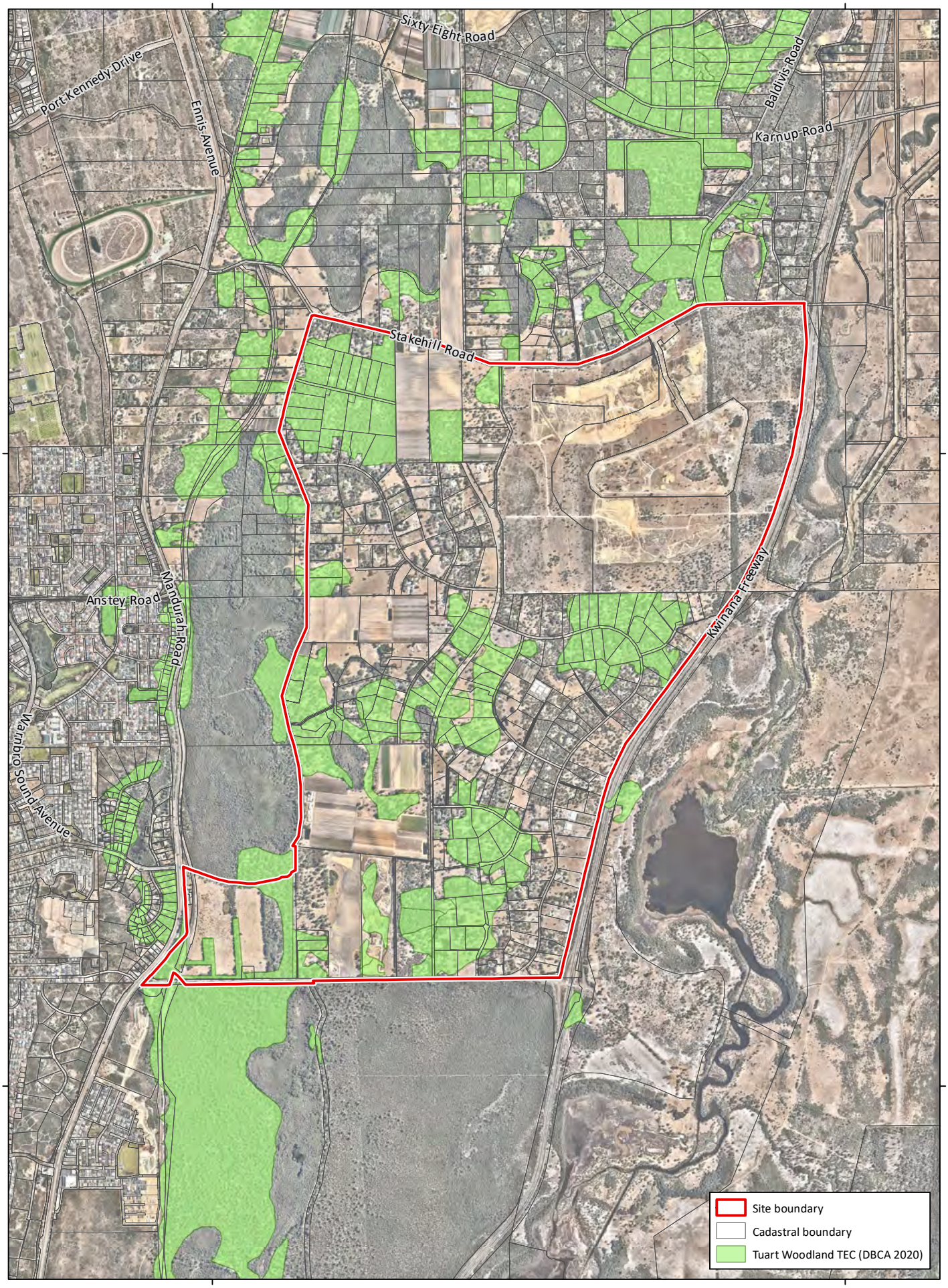

Figure 5: Conservation Significant Flora and Vegetation

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number:
EP23-018(02)--F05

Drawn:	WJC
Date:	13/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

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Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

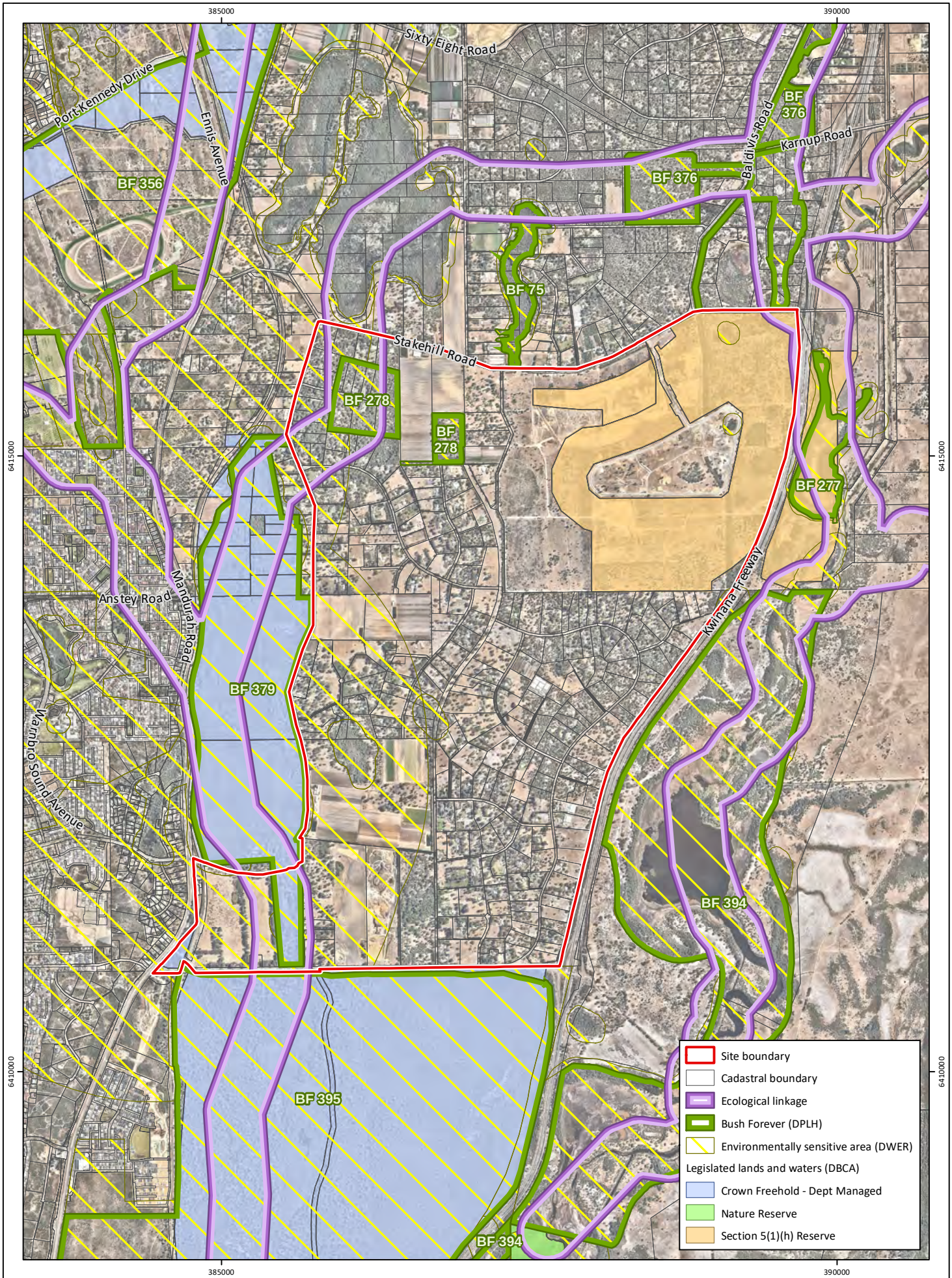

Figure 6: Environmental Areas

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number: EP23-018(02)--F06

Drawn:	WJC
Date:	13/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

N

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Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

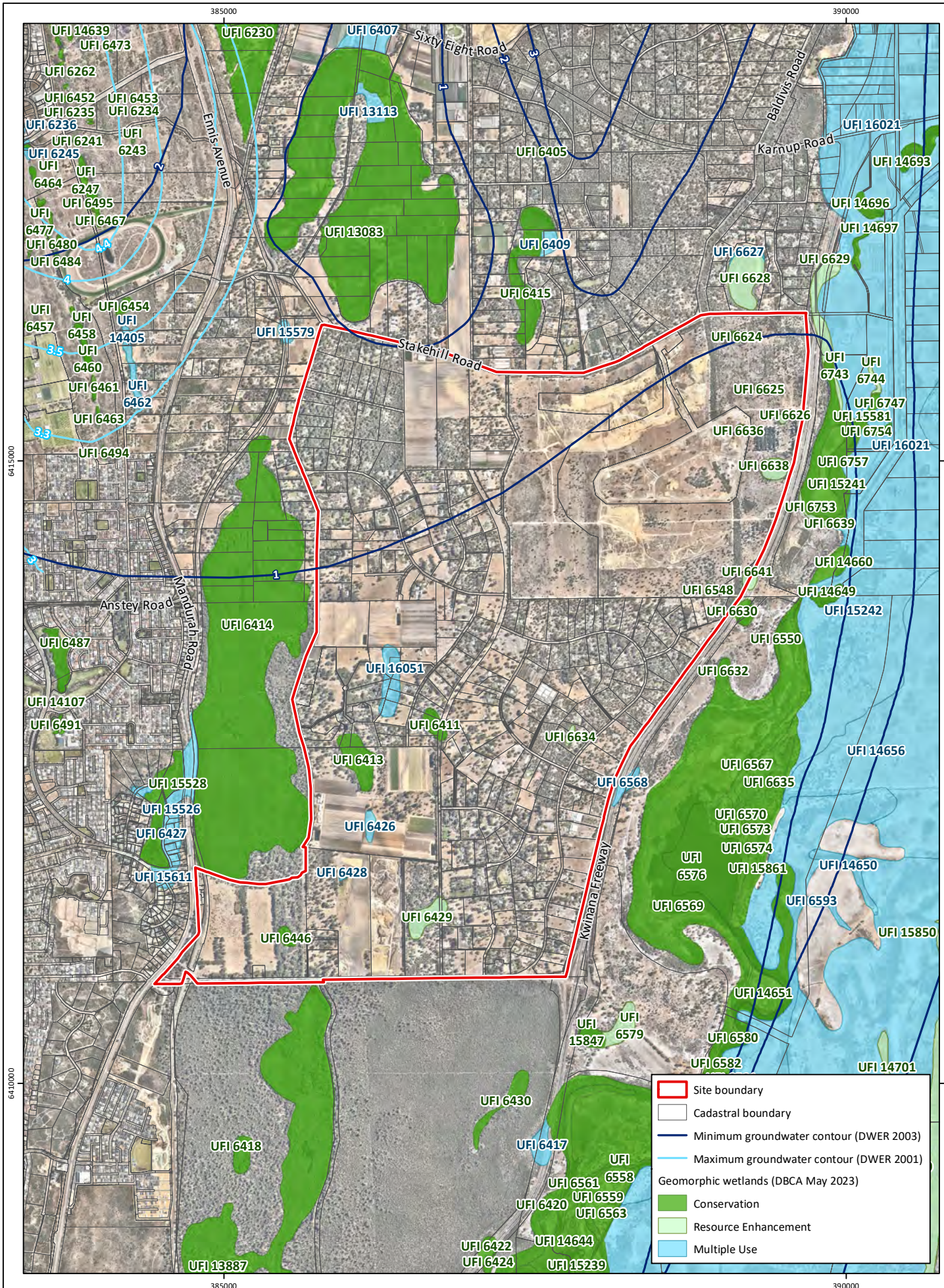

Figure 7: Wetlands and Hydrography

Project:	Preliminary Environmental Advice Karnup District Structure Plan
Client:	City of Rockingham

Plan Number:
EP23-018(02)--F07

Drawn:	WJC
Date:	13/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

N

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Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

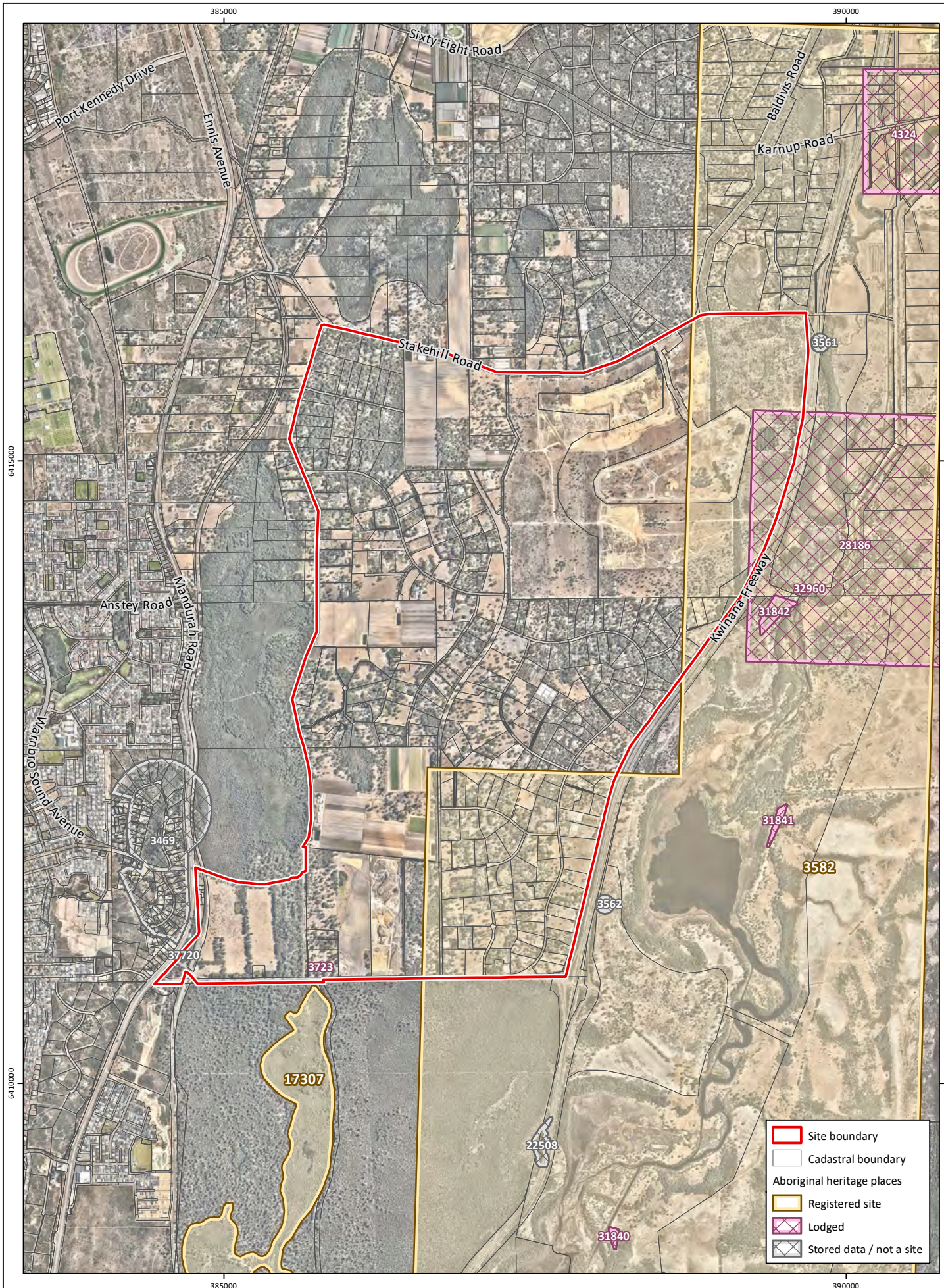

Figure 8: Aboriginal Heritage

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number: EP23-018(02)--F08

Drawn:	GAR
Date:	14/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

N

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Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

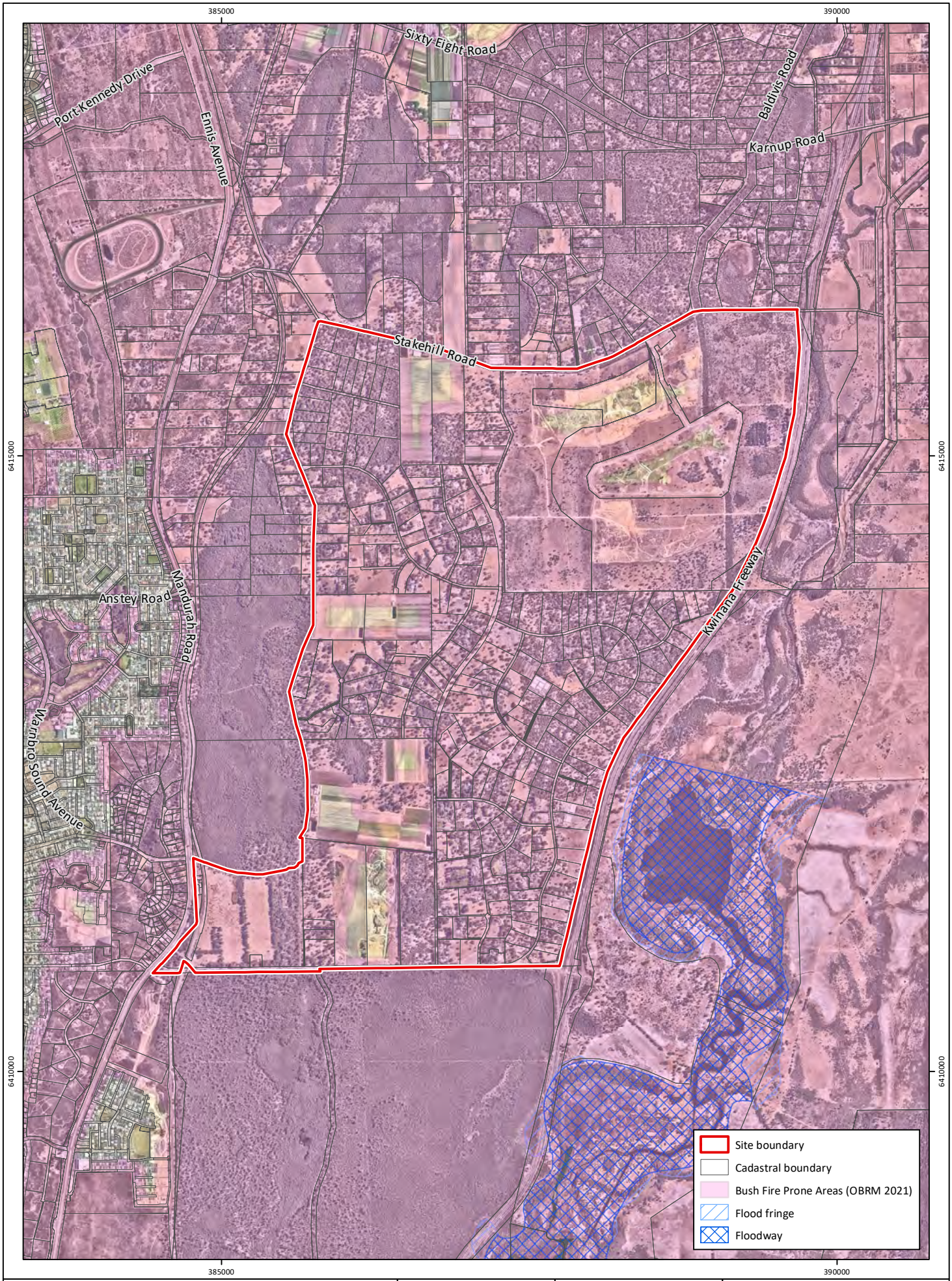

Figure 9: Natural Hazards

Project: Preliminary Environmental Advice
Karnup District Structure Plan

Client: City of Rockingham

Plan Number:
EP23-018(02)--F09

Drawn:	GAR
Date:	14/04/2023
Checked:	SPL
Approved:	JDH
Date:	18/08/2023

N

0 500 1,000
Metres

Scale: 1:40,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

Appendix A

Protected Matters Search Tool 2023 (DCCEEW)

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Oct-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	28
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	15
Key Ecological Features (Marine):	None
Biologically Important Areas:	1
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Becher point wetlands	Within 10km of Ramsar site	In feature area
Peel-yalgorup system	10 - 20km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area	In feature area
Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known to occur within area	In buffer area only
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Calyptorhynchus banksii naso](#) Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Leipoa ocellata](#) Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Limosa lapponica menzbieri](#) Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In feature area
[Zanda baudinii listed as Calyptorhynchus baudinii](#) Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Species or species habitat likely to occur within area	In feature area
[Zanda latirostris listed as Calyptorhynchus latirostris](#) Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
[Bettongia penicillata ogilbyi](#) Woylie [66844]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
OTHER			
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In feature area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area	In feature area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eucalyptus x balanites			
Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area	In feature area
Synaphea sp. Fairbridge Farm (D.Papenfus 696)			
Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Synaphea sp. Serpentine (G.R.Brand 103)			
[86879]	Critically Endangered	Species or species habitat may occur within area	In feature area
SHARK			
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In buffer area only
Sterna dougallii			
Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Migratory Marine Species			
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [50644]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thinornis cucullatus as Thinornis rubricollis			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Construction of New Perth Bunbury Highway project	2005/2193	Controlled Action	Post-Approval	In feature area
Sand Mining	2010/5522	Controlled Action	Completed	In feature area
Not controlled action				
'Looping 10' gas transmission pipeline from Kwinana to Hopelands	2005/2212	Not Controlled Action	Completed	In feature area
Construction of Secret Harbour High School	2004/1489	Not Controlled Action	Completed	In feature area
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Karnup Sand Mining Project, Stakehill Road, Baldivis, WA	2015/7533	Not Controlled Action	Completed	In feature area
Kennedy Park Estate Residential Development	2003/1044	Not Controlled Action	Completed	In feature area
Montessori School Lot 11 and 700 Karnup Rd, Karnup, WA	2017/8034	Not Controlled Action	Completed	In buffer area only
Urban development, Lot 805 Mandurah Road, Karnup, WA	2015/7481	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Multipurpose development stage 1 within 340ha	2004/1913	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
Lot 877 Stakehill Road, Karnup	2021/8887	Referral Decision	Completed	In feature area

Biologically Important Areas			
Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Sterna dougallii			
Roseate Tern [817]	Foraging	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix 3
Acoustic Assessment

EMAIL TRANSMITTAL

REF:	31712-1-23081
TO:	CDP
ATTENTION:	Justin Hansen
ADDRESS:	JustinH@cdpaus.com.au
FROM:	Tim Reynolds
DATE:	13 October 2023
SUBJECT:	**KARNUP STRUCTURE PLAN ACOUSTIC REQUIREMENTS**

Justin,

As requested, we have reviewed the acoustic requirements for the Karnup Structure Plan.

There are 2 aspects to the acoustics, they being :

1. Noise received at noise sensitive premises transportation (Rail and Road) relating to State Planning Policy 5.4; and

2. Noise emissions from commercial premises for compliance with the Environmental Protection (Noise) Regulations 1997.

STATE PLANNING POLICY 5.4

There are 2 components considered under SPP5.4, they being noise associated with :

- Rail; and
- Road.

For this Structure plan, the Perth – Mandurah passenger rail line runs close to a proportion of the western side of the structure plan. However, as shown below, the land within the structure plan area in the northern section is outside the trigger distance. However, the southern section is adjacent to the railway line.

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

NORTHERN SECTION

SOUTHERN SECTION

Legend

- Strategic freight or major traffic route
- Metropolitan passenger railway
- Strategic freight or major traffic route trigger
- Metropolitan passenger railway trigger
- Cadastre

Based on the above, nothing should be required for the passenger rail for the northern section.

The southern section is within the trigger distance. However, is part of a separate review, thus whether anything is required will depend on whether there are any noise sensitive premises in this area.

With regards to road traffic noise, the area runs along the edge of the Kwinana Freeway, thus as shown below is within the trigger distance.

We note that only the northern section is shown, and would be subject to an SPP 5.4 assessment, as the residence to the south are existing and not subject to any change under the Structure Plan.

With regards to the "southern Residences", we note that there is already an existing wall along the boundary to the Freeway road reserve, which we believe would have been part of the extension of the Freeway. Thus, as the zoning for these residence does not change, they are not subject to an SPP 5.4 assessment.

FYI – Photo of start of wall to Freeway (as per street view) is shown below.

Again the south western section is within the trigger distance for Mandurah Road, However, whether anything is required, depends on the inclusion of noise sensitive premises, as SPP 5.4 only relates to residence and noise sensitive premises (ie schools/ child care centre etc). This will be determined as the Structure Plan is developed.

Based on the above, only considering the northern section. The height of the barrier to the Freeway and the Quiet House Requirements will be determined as part of the acoustic study.

COMMERCIAL – ENVIROMENTAL PROTECTION (NOISE) REGULATIONS 1997

This involves undertaking a review of commercial areas (local centres etc) with regards to the Regulations to provide an overview / guidance of the commercial and residences interface.

Yours faithfully,
For **HERRING STORER ACOUSTICS**

Tim Reynolds

Appendix 4
Retail and Employment

pracsys.

CDP Town Planning

Karnup DSP - Initial Overview

OCTOBER 2023

1 INTRODUCTION

Pracsys is part of the project team developing the Karnup District Structure Plan for the City of Rockingham.

This document supports the background report and provides a short, high level technical note about matters to be considered in preparation of the DSP.

This document includes relevant information relating to:

- Demographics
- Employment
- Population projections for the DSP area
- Relevant provision standards for community and recreational infrastructure, school sites, activity centres
- Employment capacity consideration

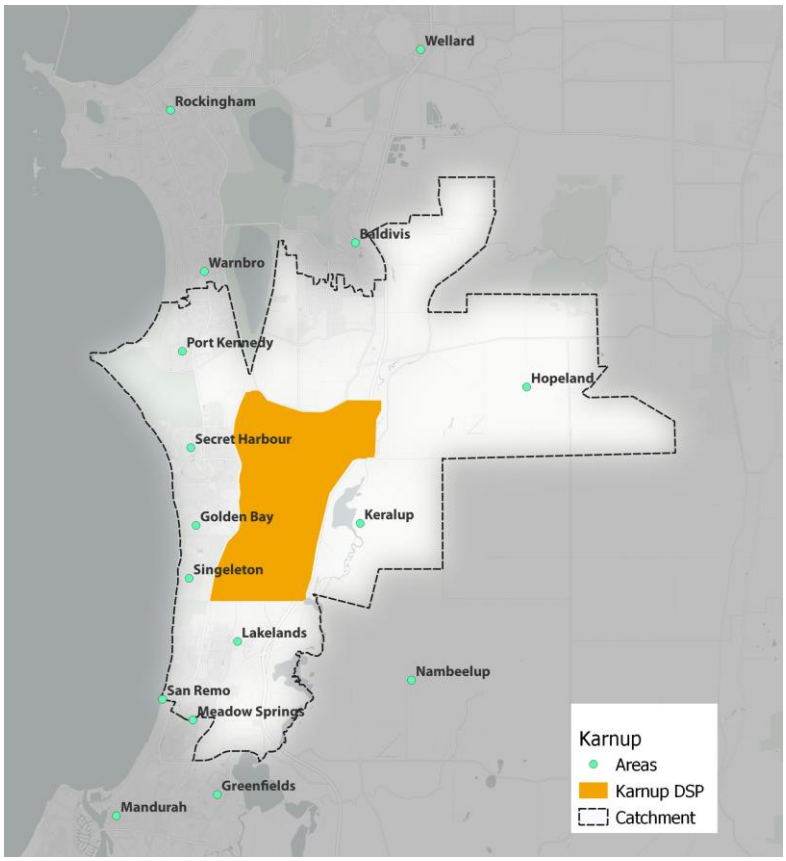
High level implications for Karnup in response to these have been included through the sections.

1.1 Context

Study Area

Karnup is an outer Perth suburb, located in the City of Rockingham within the South-metro sub-region. A 5km Catchment) has been set for the initial understanding of the current population. This primarily includes the Southern section of the Rockingham Local Government Area (LGA) up to Baldivis, and parts of the Northern section of the Mandurah LGA. A wider catchment will be used for floorspace modelling to account for the wider City of Rockingham activity centre hierarchy.

Figure 1.Karnup Analysis Catchment Map



Source: Pracsys 2023

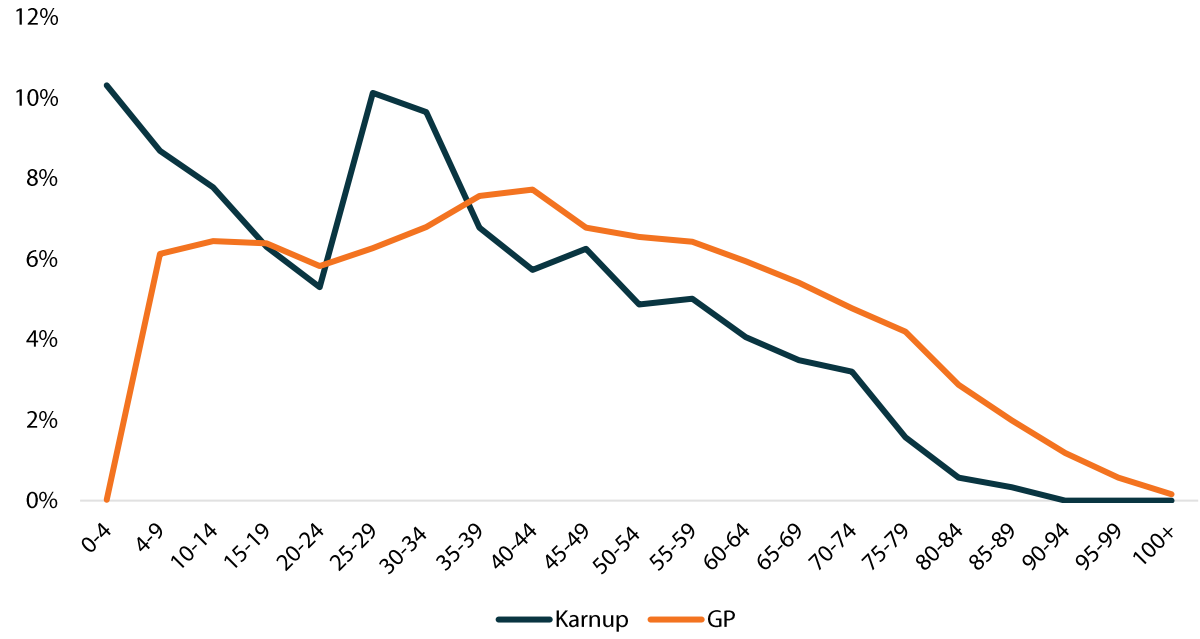
Note: the shape of the Analysis Catchment is based on ABS Spatial Areas that sometimes extend beyond the 5km catchment.

Population Summary

Age Profile

The demographic analysis indicates the Analysis Catchment has a high proportion of young families, with the Karnup area, having a high proportion of persons aged 0-9 and 20-40 compared to the Greater Perth (GP) Area (Figure 2).

Figure 2. Age Profile of RSMC Analysis Catchment and Selected Benchmarks



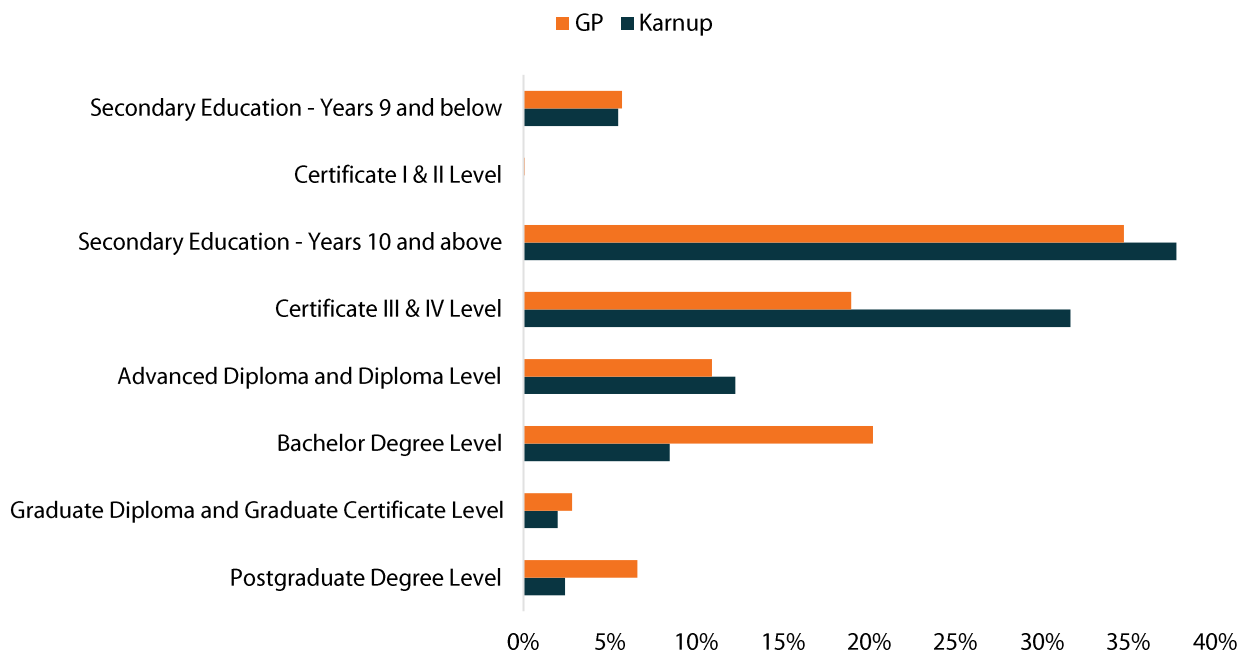
Source: ABS Census 2021, Pracsys 2023

This population breakdown indicates the City of Rockingham may need to address the goods and service needs of young families when designing and planning activity centres in Karnup. This could include providing suitable amenities such as playgrounds within viewing distance of cafes and restaurants. Additionally, the significant expected increase in dwellings for the City of Rockingham will further attract young families and activity centres designed around new dwellings should plan for this demographic.

Education profile

There is a relatively high proportion of persons with Certificate III & IV as their highest level of educational attainment (Figure 3). This indicates that a large portion of residents work in trades, with many likely supporting the construction industry due to the high rates of residential growth. People who work in trades tend to spend more on food and beverage, and entertainment uses; incorporating these types of uses into centres can support this segment while also providing multi-purpose visits for other segments.

Figure 3. Education Profile

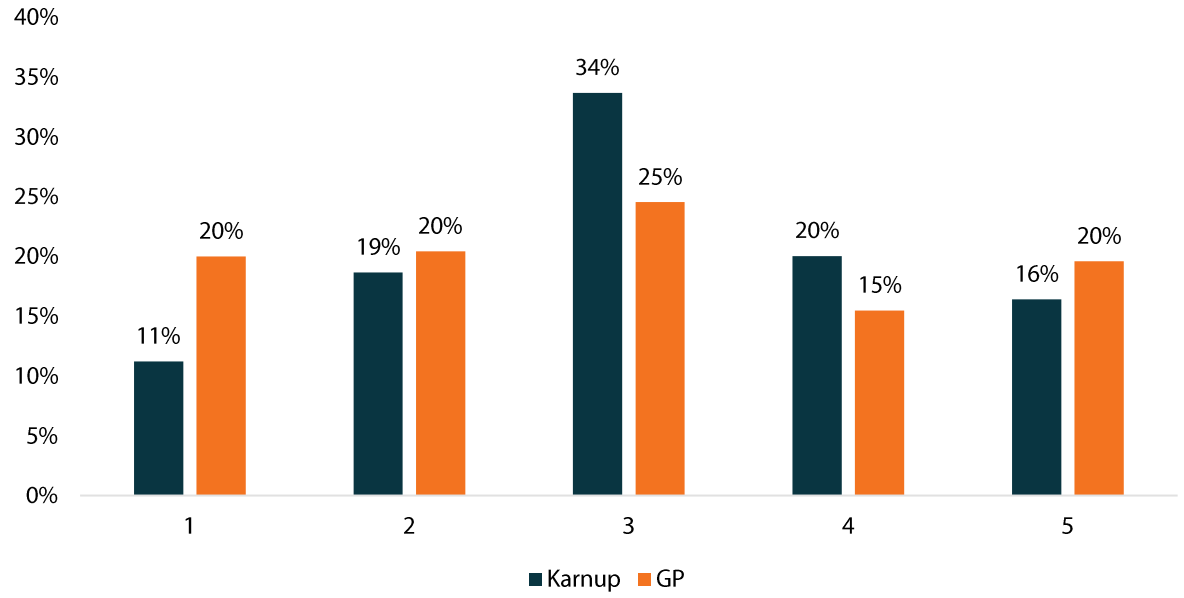


Source: ABS Census 2021, Pracsys 2023

Socioeconomic Profile

The Analysis Catchment has a lower proportion of high-income earners than the Greater Perth area, with only 16% of households within the top income quintile compared to 20% for Greater Perth (Figure 4). A lower proportion of persons within the highest income quintile indicates that residents are likely to spend a greater portion of their income on convenience retail and accordingly, will spend less on comparison items. The area also has a lower proportion of the lowest income households, with only 11% compared to 20% in Greater Perth. This may indicate the current residents are primarily younger middle to higher income households. There could be a shift in income levels as Westport develops and attracts more strategic and knowledge-intensive employment to the sub-region.

Figure 4. Household Income Profile

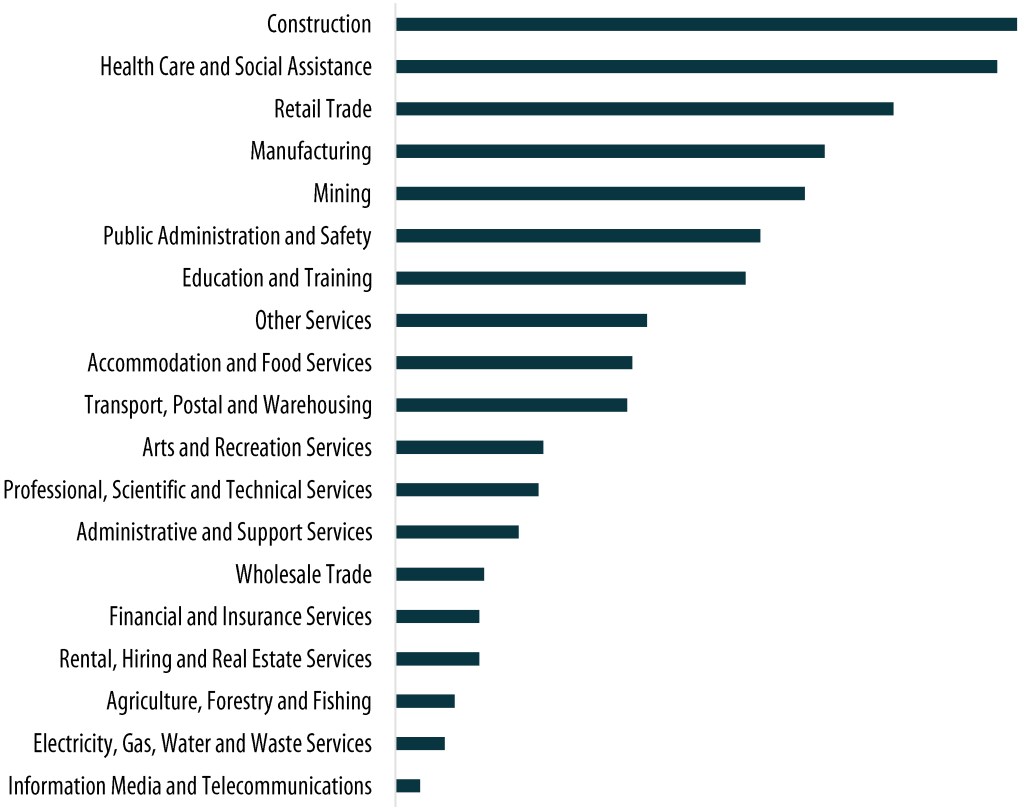


Source: ABS Census 2021, Pracsys 2023

Employment Summary

The top employing industries at the Australian and New Zealand Standard Industry Classification (ANZSIC) Level 1 include Construction, Health Care, Retail Trade and Manufacturing (Figure 5). These industries broadly align with population driven needs, and the proximity of Karnup to ongoing urban development. Demand for employment in Secondary Education is expected to grow quicker than the population as children age throughout the Analysis Catchment, similarly, demand for Aged Care services is expected to grow as the population ages. The development of Westport at the Western Trade Coast industrial area is likely to drive employment growth in defence, manufacturing, renewables and other strategic sectors. This is likely to influence the catchment by absorbing available land in the Western Trade Coast and pushing less strategic (but still potentially strategic) uses to other employment centres.

Figure 5. Top Employing Industries within the Analysis Catchment



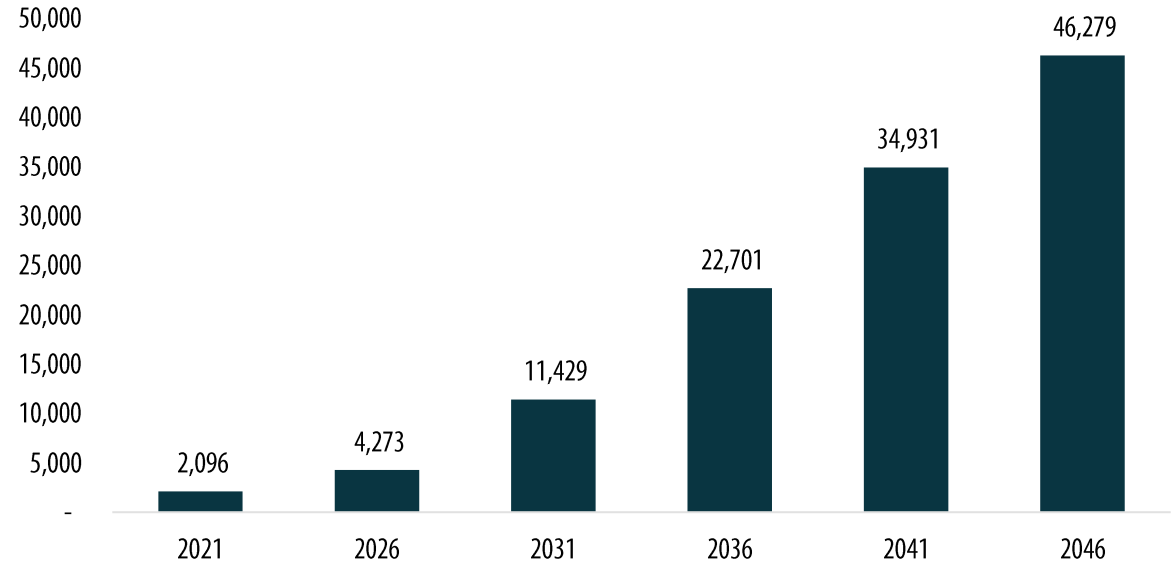
Source: ABS Census 2021, Pracsys 2023

Forecast.id population / dwellings

High population growth is expected within Karnup, with 44,183 additional residents expected from 2021 till 2046 or an average of 1,767 new residents per annum. Expressed as dwellings this equates to 14,799 new dwellings or an average of 565 dwellings per annum. The largest periods of absolute residential growth will occur between 2031-2036 will 11,272 new residents and 2036-2041 with 12,230 new residents. The immense growth from 2031 may indicate the need for the district and at least one neighbourhood centre to be completed by this point, to ensure there is sufficient amenity for existing residents, and for the new residents arriving in the immediate future (See Section 2.2 for future detail). These growth estimates are derived from 2023 forecast Id[1] data for the Karnup – Keralup region; Keralup dwellings have been excluded in the forecasts presented (Figure 6).

[1] https://forecast.id.com.au/rockingham/residential-development?WebID=150

Figure 6. Karnup Population Forecasts



Source: Forecast.id 2023, Pracsys 2023

2 AREAS FOR CONSIDERATION

This section summarises the initial assessment of activity centres and other employment centres required to meet the needs of the future Karnup population. A summary of employment capacity is provided based on previous studies and the State Planning Framework. The analysis assumes the best case in terms of future development potential and will be refined based on studies being undertaken to support the DSP.

2.1 Schools Sites

WA's Operational Policy 2.4 Planning for school sites provides guidelines for when to consider sites for new schools, sets criteria for the selection of sites, includes requirements for the design and location of school sites and outlines the development contribution methodology for government primary schools. This policy is designed to be used during the preparation of structure plans (district, local and precinct) and subdivisions where residential development is proposed, and development applications in close proximity to school sites (Figure 7).

Figure 7. School Site Thresholds

Type	Threshold
Primary School	One school site for every 1,500 dwellings
Secondary Schools	One School Site for every four to five government primary schools.

Source: WAPC 2022

WA Planning Commission school thresholds have been applied to forecast id population forecasts; a total of 11 primary schools and 3 high schools could be demanded by 2046. It should be noted that the number of schools may be reduced by providing larger schools to create efficiencies in the delivery of education services (Figure 8).

Figure 8. Karnup School Provision

School	2021	2026	2031	2036	2041	2046
Primary	0	0	3	5	8	11
High School	0	0	0	1	2	3

Source: Pracsys 2023

2.2 Activity Centre Considerations

The State Planning Policy 4.2 (SPP 4.2) provides guidelines for "*the preparation and assessment of planning instruments and certain subdivision and development applications that relate to activity centres within the Metropolitan (Perth), Peel and Greater Bunbury Region Scheme areas.*" Under this policy a precinct structure plan is to be prepared for strategic, secondary, district and specialised activity centres. Planning instruments

and subdivision and development applications are to be consistent with the activity centre's classification in the activity centre hierarchy and the roles and characteristics of that classification. The activity centre hierarchy provides for certainty and maintains level of service to the community in accordance with the objectives of this policy. Perth and Peel @ 3.5 Million strategy (2018) has indicated that Karnup, within the South Metropolitan sub-region, will include the following.

- A District Centre
- Specialised Urban Node that will provide for a range of regional public facilities which may include education, health, and other future ancillary uses.
- 50ha regional sporting facility
- A future railway station along the Mandurah Railway line

Please note that SPP 4.2 does not provide guidelines on floorspace requirements for Shop/retail for different types of activity centres. However, based on industry knowledge of activity centres in the Greater Perth area, neighbourhood centres usually have between 2,500m^2 and 9,999m^2 of Shop/retail floorspace and District Centres between 10,000m^2 and 20,000m^2 Shop/retail floorspace (they can be larger than 20,000m^2 in some instances, such as Baldivis Town Centre). The scale of shop/retail floorspace will be tested through gravity modelling in developing the needs assessment.

As for non-retail floorspace, this is less dependent on local population and is more influenced by other non-population related drivers. Benchmarking of expected similar centres will be used to estimate non-retail floorspace uses.

Activity Centre Hierarchy

SPP 4.2 provides thresholds for future population to determine the type and number of activity centres within an area, the role, and characteristics of these centres. The population thresholds for District, Neighbourhood and local centres are provided below (Figure 9)

Figure 9. Activity Centre Thresholds

Centre Type	Minimum Population	Maximum Population
District	20,000	50,000
Neighbourhood	2,000	15,000
Local	N/A	N/A

Source: DPLH 2023

Centre provision between 2021 and 2046 have been calculated based on Karnup population forecasts by Forecast.id. By 2036, Karnup will have achieved the minimum population to require its District Centre. Regarding neighbourhood centres, by 2046 Karnup will require a minimum of three neighbourhood centres (Figure 10). Three local centres have been included to provide walkable / proximate access for most urban / urban expansion areas in the DCP.

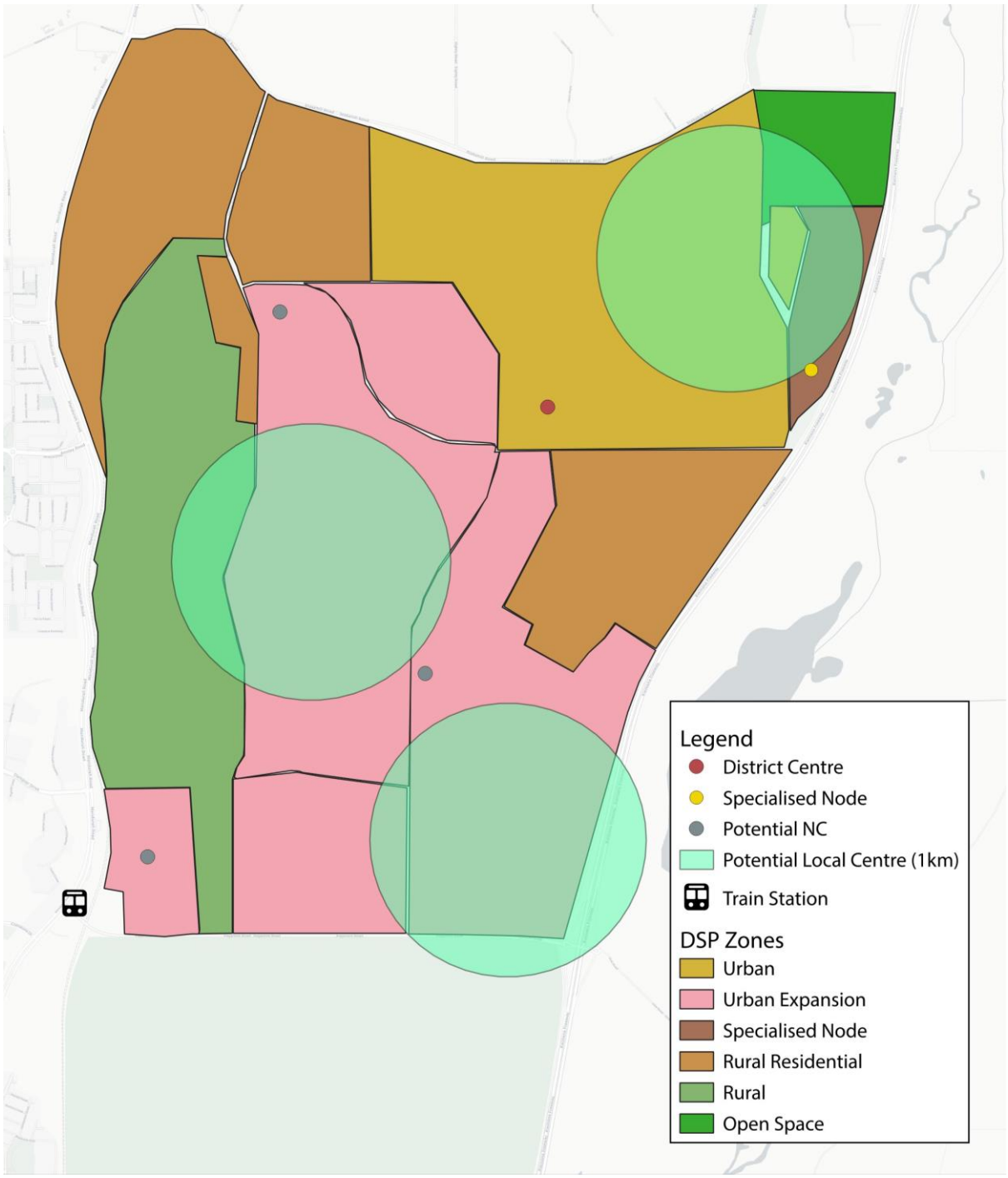
Suggested hypothetical locations for the neighbourhood and local centres have been provided, based upon proximity to transport nodes and future residents. Local centre locations have been indicated using a 1km radius circle to indicate the general area that would indicate potential walkable catchments (Figure 11).

Figure 10. Karnup Activity Centre Provision

Type	2021	2026	2031	2036	2041	2046
District	0	0	0	1	1	1
Neighbourhood – Min	1.10	2.25	6.01	11.94	18.37	24.33
Neighbourhood – Max	0.15	0.30	0.80	1.59	2.45	3.24

Source: Pracsys 2023

Figure 11. Activity Centre Map



Source: Pracsys 2023

2.3 Employment Considerations

The Southern Metropolitan Peel Sub-Regional Planning Framework provides Employment Self-Sufficiency (ESS) targets for the region. ESS represents the jobs available in a sub-region compared to the labour force of the sub-region. An ESS of 100% means that a sub-region has an equal number of jobs and labour force. The assessment has estimated the employment supportable at the City's Activity Centres based on population growth. The Southern Metropolitan Peel ESS target for 2050 is 74% with the Western section (which includes the City of Rockingham) having a target of 83%. The City of Rockingham's ESS in 2016 was approximately 50%, indicating that Rockingham supports jobs to the equivalent of half its total labour force. This analysis has used the sub-regional average ESS of 74% to assess additional employment requirements.

Employment estimates from the Rockingham Employment Study for non-activity centre employment have been combined with activity centre estimates to approximate the additional employment required to achieve an ESS target of 74%.

2.4 Implications for Karnup

The 2020 Rockingham Employment Study considered the potential employment requirements of the City with projections based on population growth and other development opportunities. The employment Study identified, Karnup (Core) and Karnup (South) as future employment areas. Importantly, the study identified the need for employment uses to be developed within a 100ha specialised node (Figure 11) to achieve adequate ESS within the region. It is important to note that this report discussed the node at 100 ha, however this area has been reduced to 33 ha through more detailed planning. A separate, secondary employment node adjacent the corner of Paganini and Kwinana Freeway is being investigated to meet the 100 ha total.

The study discussed how this specialised node could be developed. The significant regional population, distance from alternate employment locations and access to Freeway indicates that a business park could be viable in the long term. The study proposes two potential uses for the specialised region. Either a general and light industrial estate, indicating a capacity for around 10,000 – 12,000 jobs, or a business park that could provide 18,000 jobs if it achieved the density of mature Perth inner area industrial estates and business parks or 22,000 if like the Sydney Norwest Business Park.

Employment was projected to 2050 in the employment study and was estimated at 2041 in the 2022 City of Rockingham Needs Assessment for the purpose of understanding implications for additional employment requirements within the current Local Planning Framework outlook (

Figure **12**). By 2041 the Karnup core specialised employment zone is expected to generate 8,621 full time equivalent employment opportunities to assist the City in meeting its additional employment needs.

Figure 12. Employment Study - Future Employment Land Estimates

Future Employment Land	Employment Adjusted to 2041 (jobs)
Karnup (Core)	8,621
Karnup (South)	8,552

Source: Pracsys 2021

Further investigation has identified two other primary uses for the specialised / employment nodes. The 33 ha specialised node is currently being investigated for use as a health campus and Tafe facility. These uses are expected to consume the majority of the developable area and would provide critical services to support the significant planned population growth in a location that is highly accessible to other surrounding areas given its close proximity to the freeway. These uses will also have a positive impact for the DSP and wider area by contributing to the employment targets with knowledge intensive employment that provides higher wages. The secondary location is currently being investigated as a light industry/bulk retail area, which aligns with the uses investigated in the employment study.

2.5 Key Findings and Recommendations

Below is a summary of the key insights and recommendations discussed within this technical note.

Demographics & Population Projections:

- Karnup has a significant number of young families; notably, high proportions of individuals aged 0-9 and 20-40.
- A considerable increase in dwellings is projected, indicating an influx of young families, necessitating planning for suitable amenities such as playgrounds within viewing distance of cafes and restaurants

Education Profile:

- There is a high proportion of residents with Certificates III & IV, suggesting a workforce skilled in trades, potentially linked to local construction industry growth.
- The local economy may benefit from greater entertainment and food and beverage facilities due to the spending habits of the trades workforce

Socioeconomic Profile:

- Karnup has a lower proportion of high-income earners compared to Greater Perth, implying a focus on convenience retail over luxury or comparison goods
- Income dynamics may shift with the development of Westport, potentially attracting higher-income roles and impacting local spending patterns

Employment Summary:

- Construction, Health Care, Retail Trade, and Manufacturing are the top employing industries

- The high concentration of families with children and an aging population are expected to support increases in demand for Secondary Education and Aged Care services
- Population growth and the development of Westport will support growth in the Construction industry
- Westport at the Western Trade Coast industrial area is likely to drive employment growth in defence, manufacturing, renewables and other strategic sectors. This is likely to influence the catchment by absorbing available land in the Western Trade Coast and pushing less strategic (but still potentially strategic) uses to other employment centres

Population/Dwelling Forecasts:

- Population growth in Karnup is expected to be significant, with a forecast of 44,183 additional residents by 2046
- The peak residential growth is anticipated between 2031-2041, highlighting the need for timely development of district and neighbourhood centres

Educational Facility Considerations:

- WA's Operational Policy 2.4 stipulates guidelines for selecting and designing school sites and the number needed based on population forecasts. By 2046, Karnup may need 11 primary and 3 high schools

Activity Centre Considerations:

- State Planning Policy 4.2 (SPP 4.2) sets out planning guidelines for activity centres based on their hierarchy and associated population thresholds. Karnup is expected to require a District Centre by 2036 and at least three neighbourhood centres by 2046
- Non-retail floorspace in activity centres is influenced by factors other than local population

Employment Considerations:

- The Southern Metropolitan Peel Sub-Regional Planning Framework has set a target Employment Self-Sufficiency (ESS) of 74% by 2050 for the region, with the City of Rockingham aiming for 83%.
- The 2020 Rockingham Employment Study identified Karnup as a key future employment area and proposed a specialised node which could be a business park or industrial estate, potentially providing between 10,000 to 22,000 jobs depending on development.
- By 2041, the Karnup core specialised node is anticipated to generate 8,621 full-time equivalent jobs
- Current investigations are focused on developing a 33 ha specialised node including a potential health campus and TAFE facility, and a secondary area for light industry/bulk retail which aligns with the employment study's investigations of up to 100ha of employment land

Appendix 5
Transport Planning

Technical Note: No 1 **Date:** 13/10/2023
Project No: t22.301
Project: Karnup District Structure Plan
Subject: Investigation of traffic matters to be considered

1 Introduction and background

The process of preparing a District Structure Plan (DSP) for Karnup involves several phases including the preparation of the Background Report, which is the first phase of the project and will influence or guide the developments and land uses within the DSP area.

This technical note is prepared to assist with preparation of the Background Report and provides a high-level assessment to establish traffic matters than needs to be considered during the first phase of the study.

A generic opportunity/constraints plan has also been prepared by CDP Town Planning and Urban Design to illustrate general 'neighbourhoods' within the proposed KDSP. **Appendix A** illustrates the opportunity/constraints plan.

For the purpose of this high-level assessment, Transcore utilised its strategic transport model developed historically for this area. The model was updated to reflect the land use and road network details as per the opportunity/constraints plan. The outputs of the strategic transport modelling were used to establish traffic matters than need to be considered during the first phase of the study.

2 Proposed land uses

For the purpose of the high-level assessment, the proposed land uses shown in the opportunity/constraints plan (Option B) was coded into the strategic transport model. For the north-east corner of the KDSP area, the Concept Plan prepared by DevWA for Lots 2, 3 and 4 Harvey Road, Lot 7 Eighty Road, Lot 100 and Lot 128 and Lot 101 (R37090) and Lot 200 (R37090) and Lot 1340 (R38575) Stake hill Road was used. A copy of the DevWA Concept Plan is provided in **Appendix B**.

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Email: admin@transcore.net.au
Transcore Pty Ltd ACN 094 951 318 ABN 19 094 951 318

www.transcore.net.au
www.linkedin.com/company/transcore/
instagram: @transcoreaustralia

Accordingly, the following land uses were coded in the strategic transport model for the proposed KDSP:

- Approximately, 20,000 residential dwellings;
- Approximately, 25,000 m^2 GFA of retail/ commercial;
- Approximately 13 schools and about 7,000 students; and,
- A hospital/ medical precinct.

3 Trip generation and distribution

The residential daily traffic generation rate used for the KDSP area for this assessment is 8 vehicle trips per day (vpd) per dwelling, which corresponds to peak hour trip generation rate of 0.8 recommended in the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Development (2006).

The anticipated 20,000 dwellings of the KDSP area will therefore generate approximately 160,000vpd.

The trips rate for the retail/commercial and hospital land uses were sourced from RTA NSW guidelines. Traffic attraction due to the proposed retail/ commercial and the hospital is estimated to be about 19,500vpd and 6,000vpd respectively.

For the proposed primary school sites the trip rate used is 1.0vph per student for school peak periods (typically 8-9am and 3-4pm) and 2vpd per student overall. The trip rate was sourced from WAPC guidelines. For this assessment the Education Department's standard 540 student primary school design has been assumed, so this primary school sites are estimated to attract traffic flows of 14,000vpd.

The distribution of these trips is determined by the traffic model in proportion to the location of trip productions and attractors for work trips, education trips and other trips (shopping, social, recreational, etc.) among all the land uses in the traffic model.

4 Traffic projections

Figure 1 illustrates the projected traffic volumes on the key roads within the KDSP area after full development of the KDSP beyond 2041. The traffic projections are preliminary and reflecting the proposed land uses suggested in the generic opportunity/constraints plan.

Figure 1 also shows the suggested road hierarchy of the key internal and external roads. In this figure:

- Integrator A roads would have 4 lanes and can accommodate traffic flows of up to 35,000vpd.

- Integrator B Roads would have 2 lanes and can accommodate traffic flows of up to 15,000vpd.

Based on the traffic modelling and analysis undertaken, it has been determined that the proposed Dampier Road, which will serve as an east-west connection between Nairn Drive and Mandurah Road, is estimated to accommodate traffic volumes ranging from 10,000vpd to 16,000vpd.

If Dampier Road is not constructed, it is anticipated that a significant portion of the traffic that would have otherwise used Dampier Road will be redirected to Paganoni Road. Currently, Paganoni Road carries approximately 10,397vpd just east of Mandurah Road, with approximately 15% heavy vehicles. Considering the potential increase in traffic volumes, whether Dampier Road is built or not, it would

be necessary to upgrade Paganoni Road to four lanes in order to accommodate the future traffic demand.

5 Traffic matters to be considered

Paganoni Road serves as the shortest east-west route between Kwinana Freeway and Mandurah Road in this locality, making it an attractive route for regional traffic.

Based on the traffic modelling and analysis undertaken it is evident that Paganoni Road would need to be upgraded to four lanes in near future. Therefore, any progression of the KDSP from the south would be subject to upgrading of Paganoni Road. However, widening Paganoni Road from the east poses challenges due to the presence of an existing railway bridge over Paganoni Road, situated east of Mandurah Road.

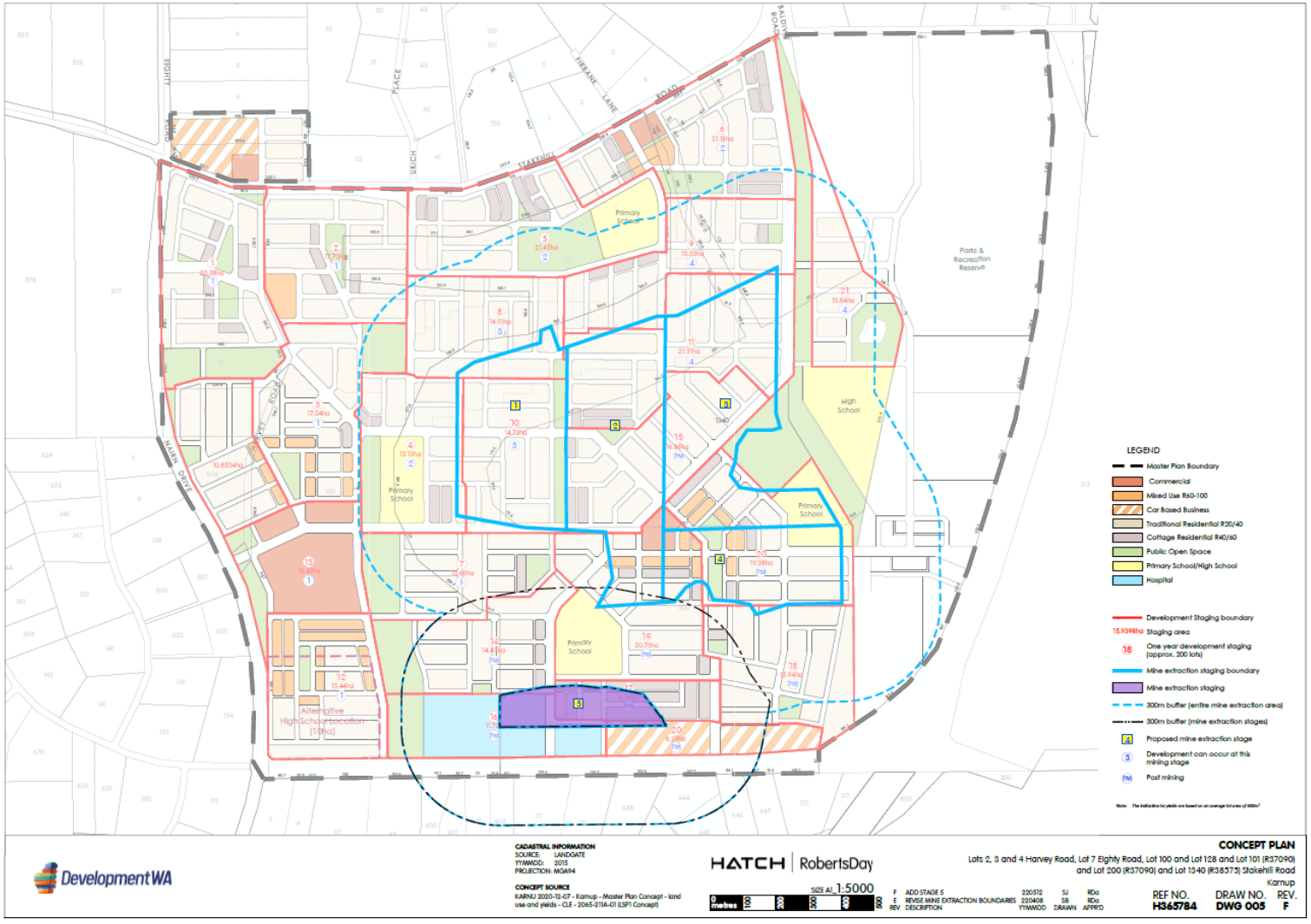
The connection of Dampier Road to Mandurah Road is also constrained by the existence of a nearby railway in close proximity to Mandurah Road.

APPENDIX A

CONCEPT LAND USE PLANS

APPENDIX B

PROPOSED CONCEPT PLAN FOR:
Lots 2, 3 and 4 Harvey Road, Lot 7 Eighty Road, Lot 100 and Lot 128 and Lot 101 (R37090) and Lot 200 (R37090) and Lot 1340 (R38575) Stakehill Road


LEGEND
Master Plan Boundary
Commercial
Mixed Use R60-100
Car Based Business
Traditional Residential R20/40
Cottage Residential R40/60
Public Open Space
Primary School/High School
Hospital
Development Staging boundary
Staging area
One year development staging (approx. 200 lots)
Mine extraction staging boundary
Mine extraction staging
300m buffer (entire mine extraction area)
300m buffer (mine extraction stages)
Proposed mine extraction stage
Development can occur at this mining stage
Post mining
DevelopmentWA
CADASTRAL INFORMATION
SOURCE: LANDGATE
YYMMDD: 2015
PROJECTION: MGA94
CONCEPT SOURCE
KARNU 2020-12-07 - Karnup - Master Plan Concept - land use and yields - CLE - 2065-211A-01 (LSP1 Concept)
HATCH | RobertsDay
SIZE A1 1:5000
0 metres 100 200 300 400 500
F ADD STAGE 5 220512 SJ RDa
E REVISE MINE EXTRACTION BOUNDARIES 220408 SB RDa
REV DESCRIPTION YYMMDD DRAWN APPR'D
CONCEPT PLAN
Lots 2, 3 and 4 Harvey Road, Lot 7 Eighty Road, Lot 100 and Lot 128 and Lot 101 (R37090) and Lot 200 (R37090) and Lot 1340 (R38575) Stakehill Road
Karnup
REF NO. H365784
DRAW NO. DWG 005
REV. F
DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

Appendix 6
Service Infrastructure

SERVICING REPORT

Karnup District Structure Plan

JDS222158 November 2023

Prepared for:

City of Rockingham

JDSi
CONSULTING ENGINEERS

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Figures

DOCUMENT REVIEW				
Revision	**Date Issued**	**Issue Type**	**Written By**	**Approved By**
Rev A	30.10.23	Draft for Review	RR	CE
Rev B	07.11..23	Draft for Review	RR	CE

1 Executive Summary

JDSi Consulting Engineers has been engaged by CDP Town Planning & Urban Design (CDP) to assess the Engineering constraints and opportunities associated with the proposed development of the Karnup District Structure Plan (DSP) development area (the Development Area) for the City of Rockingham (The City).

The Development Area is bounded by Stakehill Road to the North, Kwinana Fwy to the East, Paganoni Road to the South and Fletcher Road to the West, and is situated approximately 57km south of Perth CBD within City of Rockingham.

This report addresses the civil and services engineering elements relating to the proposed Development Area. It is specifically targeted at the external land development and service authority requirements to facilitate the proposed development.

This report does not address the internal building services or built form development requirements.

As further detailed in the report there are several recommendations for further action in order to progress the Development, with regards to the civil infrastructure requirements. These are summarised below:

- Confirm the desired Development yield and masterplan layout to better inform servicing requirements and any relocation requirements.
- Review and updated (if required) District Water Management Strategy prepared by GHD (March 2014) to inform the future development of the site.
- Undertake Noise Impact Assessment of abutting Kwinana Freeway to determine if any noise mitigation measures need to be considered.
- Undertake vegetation and heritage survey to identify any areas of significance.
- Complete a detailed Traffic Impact Assessment and commence consultation with Local Authority and MRWA to confirm potential road upgrades or road networks / hierarchies including but not limited to bus routes etc.
- Confirm final Water Corporation planning with regards to water supply and sewerage reticulation for the Development.
- Confirm Western Power network capacity / planning through the mechanism of feasibility study (or preapplication enquiry).
- Commence negotiations with communications providers to confirm options for communications supply to the site.
- Commence negotiations with ATCO (or similar) to confirm options for extension of gas reticulation to the site.

The above summary of recommendations is not exhaustive as there will be numerous actions required to achieve an approved design that meets industry and regulatory requirements for quality, price, sustainability and safety.

2 Key Objectives

The key objectives of this report are to:

- Summarise any existing infrastructure assets within the vicinity of the Development Area
- Advise on infrastructure requirements for the planned development including but not limited to:
    - Summarise Water Corporation's requirements for sewer and water reticulation and supply to the site.
    - Summarise Western Power's requirements for electrical reticulation and supply to the site.
    - Summarise servicing and supply requirement for telecommunication and gas reticulation to the site.
- Summarise requirements for the design and construction of new public roads proposed as part of the Development.
- Provide commentary on any potential major infrastructure upgrades required to accommodate the proposed Development.
- Summarise key engineering and servicing constraints and opportunities associated with the proposed Development.

3 Introduction

The Development Area is located approximately 57km south of Perth CBD within City of Rockingham and covers approximately 1625 ha in area.

Based on preliminary information provided by CDP, the City and relevant Authorities, the Development Area is likely to include establishment of rural residential Developments, urban residential Developments, activity centres, passenger rail/station – proposed Stage 1 METRONET, proposed regional roads and POS. This report has been based on a Revision D Karnup District Structure Plan layout provided by City of Rockingham and CDP's Karnup Base Plan, as included in ***Appendix A***, which consists of the following yields:

- 17,000 dwellings
- 47.313ha for Uncreditable Open Space
- 88.920ha for Primary School. District Activity Centre
- 107.25ha for Public Open Space
- 637.064ha for Net Residential Area
- 1624.694ha of Total Area

This report covers the engineering infrastructure requirements to support the proposed development. The engineering review have considered earthworks, roadworks, stormwater drainage, wastewater, potable water and utility services with a particular emphasis on the existing service capacity and the potential infrastructure upgrades required to support the proposed Development.

The report has been based on a desktop study of existing services information, aerial imagery, preliminary advice from the various service authorities, industry standards and policies and JDSi's in-house experience related to other Developments in the area. The information provided is subject to change as Development progresses and future planning / ongoing development in the area.

4 Study Area

The Development Area is bounded by Stakehill Road to the North, Kwinana Freeway to the East, Paganoni Road to the South and Fletcher Road to the West, and is situated approximately 57km south of Perth CBD within City of Rockingham. A current aerial image of the Site is depicted in Figure 1: Site Location below.

The Development site covers an area of approximately 1625 hectares of which approximately 1200 hectares is privately owned and approximately 425 hectares owned by State of Western Australia and Western Austral Land Authority, with a planned total Development projected lot yield in the order of 17,000 lots. The subject area has been zoned mainly 'Urban' and 'Rural Residential' under the Karnup District Structure Plan provided by City of Rockingham and it is proposed the site will be developed for residential purposes with the aim of delivering an estate that achieves housing density aligned with the WAPC for the region.

This study undertaken has been based on a desktop study of existing services information and aerial imagery.

Figure 1: Site Location (MNG, 2023)

4.1 Topography

The Development Area is an irregular shaped parcel of land covering an area of approximately 1625 hectares. Based on available information, the surface elevations across the site range from about RL 5m AHD in the western and eastern portion of the site climbing to approximately RL 34m AHD along the central part of the site. High and low points occur throughout of the subject site as shown in Figure 2.

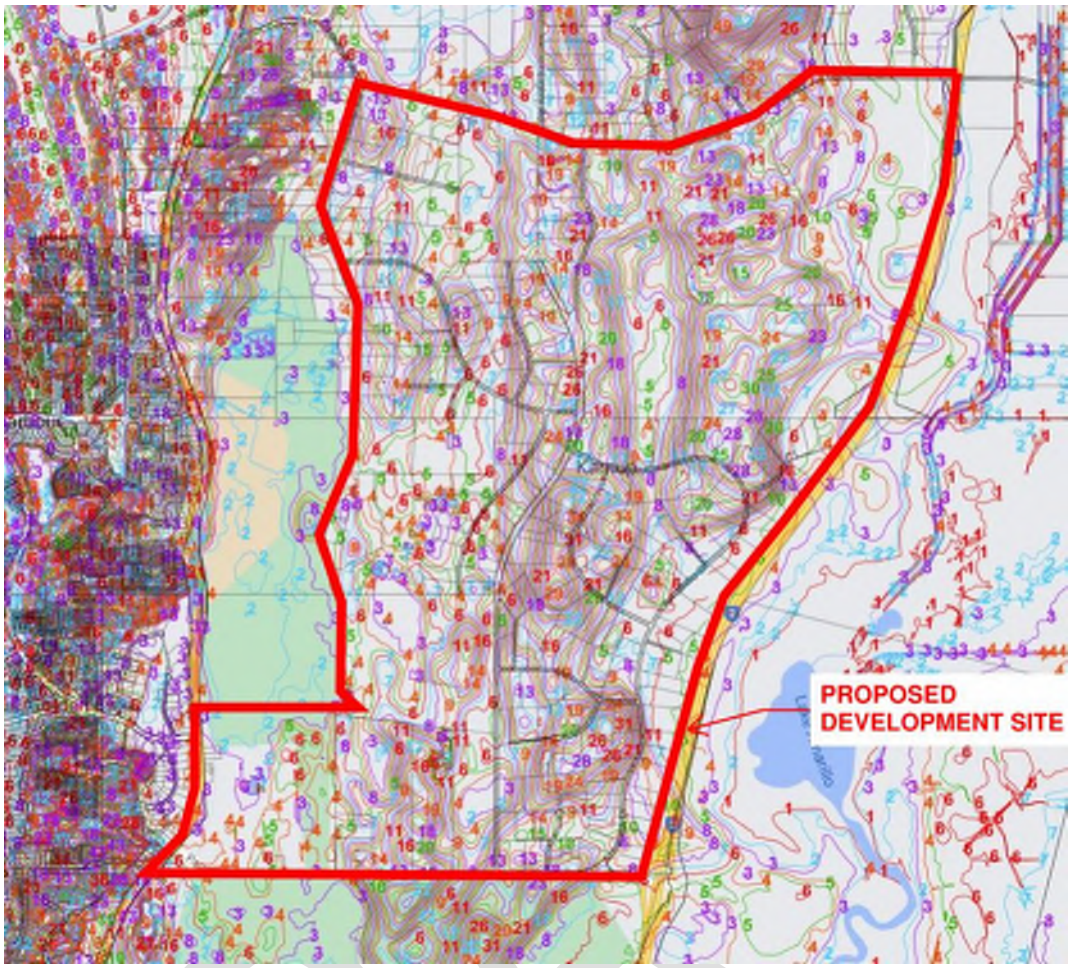


Figure 2: Site Topography (Water Corporation EsiNET Data 2023)

4.2 Groundwater

The Development Area falls outside of the data area depicted on the Perth Groundwater Mapping provided by the Department of Water and Environmental Regulation (DWER).

However, GHD have prepared a District Water Management Strategy (GHD, March 2014) for the City that covers the Development Area which provides commentary on the groundwater levels and locality and is summarised below.

The Development Area falls within the Rockingham-Stakehill proclaimed groundwater area, within the Churcher (East), Karnup (East) and Stakehill confined sub areas of which the Department of Water maintains a regional bore network within the Rockingham-Stakehill groundwater area to monitor water levels and water quality and is responsible for implementation of water allocation decisions and regulation of water use based on annual licensed and unlicensed volumes for the Karnup and Churcher groundwater management areas. This is implemented by measures outlined in the Rockingham-Stakehill groundwater management plan (DoW 2008a) identifies the objectives and allocation limit decisions for the study area.

The maximum groundwater levels recorded (Feb 2013) in the monitoring bores varied between 2.31 mAHD and 6.91 mAHD. Accounting for the variation in topography across the Development Area the depth to maximum recorded groundwater level varied between 1.38 m below ground level (BGL) to the west of the Development Area, and 12.31m BGL in the centre of the Development Area.

There are a limited number of groundwater monitoring bores within the Development Area as such, it is recommended that additional bores be installed and monitored to greater understand the groundwater levels and fluctuations to guide future development and ground water separation.

In addition, it is recommended that District Water Management Strategy prepared by GHD (March 2014) be revisited and updated if required to confirm groundwater modelling to inform the proposed development.

Based on the data available, it is likely that the low lying areas will require placement of clean imported fill and sub surface drainage to maintain a minimum of 1.2m separation between the finished surface levels and the groundwater and installation of services in this area will likely require dewatering.

4.3 Geological Conditions

The 1:50,000 scale Environmental Geology sheet "Rockingham" indicates that the near surface geology, in its undisturbed natural state, comprises Sand derived from Tamala Limestone (Tamala Sand, S7) covering majority of the site. This unit is described as "pale yellowish brown, fine to coarse grained, subangular quartz trace feldspar, moderately sorted, of residual origin".

The eastern portion of the site is overlain by Bassendean Sand (Qpd). The Bassendean Sand is being described as "very light grey at surface, yellow at depth, fine r medium-grained, subrounded quartz, moderately well sorted, of eolian origin."

Small, isolated parts mainly located on the eastern portion of the proposed Development is overlain with Peaty Clay (Cps) described as "dark grey and black, soft, variable organic content, some quartz sand in places, of lacustrine origin."

A small area of Clayey Sand (Scp) described as "black, fine to medium grained quartz sand with clay matrix, variable organic matter, of lacustrine origin" can be found at the south east part of the Development adjacent to Mandurah Road. Refer Figure 3: Geological Context below.

It is recommended that a site-specific geotechnical investigation be carried out to further inform the civil and structural design for the proposed Development. This report should include, as a minimum, testing to confirm:

- Existing Soil Characteristics (PSD, Atterberg Limits, MMDD, soil profile)
- Pavement Design Parameters (CBP, Swell %)
- Bearing Capacities
- Site preparation and compaction recommendations
- Subsurface conditions (karst features such as cavities or loose zones)

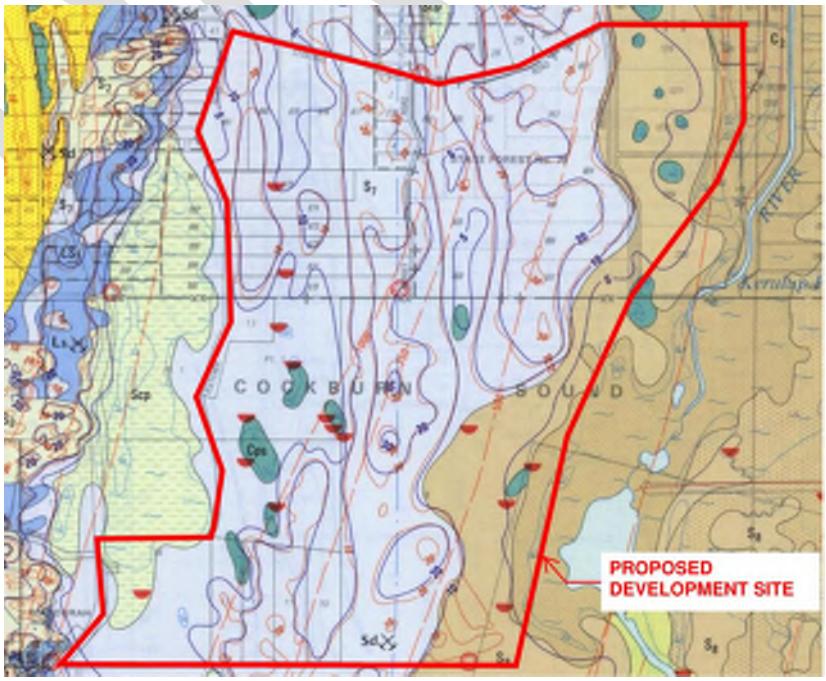


Figure 3: Geological Context

4.4 Acid Sulphate Soils

Acid Sulfate Soils (ASS) are soils containing naturally occurring, fine-grained metal sulfides typically pyrite (FeS2), formed under saturated, anoxic/reducing conditions. They generally occur in Quaternary (1.8 Ma – Present) marine or estuarine sediments, predominantly confined to coastal lowlands (elevations generally below 5 m AHD). Within these sediments, the majority of soils that present an environmental risk are generally confined to Holocene aged material (<10 000 years). Where these materials have oxidised, they commonly have a mottled appearance (orange and yellow discolouration) due to the presence of oxidised iron minerals. Although soils described represent typical conditions where ASS occur, in Western Australia these materials have been identified in other soil types such as leached sands and silts.

The iron sulfides in ASS react with oxygen when the soil is exposed to air through excavations or via lowering of the water table. Iron compounds and sulfuric acid are then created along with other substances, including heavy metals. All excavation works and dewatering in ASS must be carefully managed to avoid any potential damage to surrounding land and water ways.

Acid Sulfate Soil mapping compiled by Department of Water and Environmental Regulations (DWER) indicates having mostly no known risk of Acid Sulfate Soils (ASS) occurring within 3m of natural soil surface or low to moderate risk of Acid Sulfate Soils (ASS) located in the eastern portion of the site adjacent to Kwinana Freeway. However, there are few small pockets which have a high to moderate risk of Acid Sulfate Soils (ASS) occurring within 3m of natural soil surface. Refer Figure 4: ASS Risk Map (DWER Data).

Investigation of the occurrence of acid Sulfate soils should be included in geotechnical and environmental investigations to identify and areas requiring remediation.

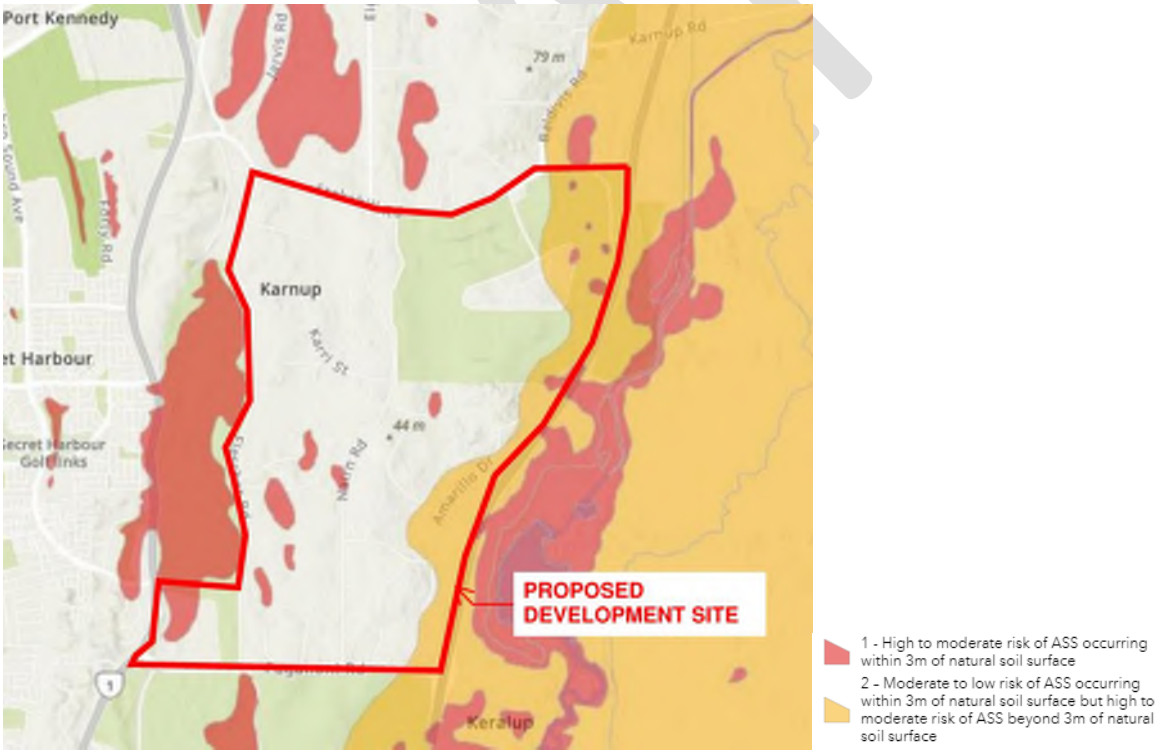


Figure 4: ASS Risk Map (DWER Data)

4.5 Wetlands

The Development Area is bounded by a number of Wetlands / water bodies which belong to the Stakehill Suite of wetlands which are a series of local sump lands in interdunal swales of the Spearwood dune system. The Stakehill Suite of wetlands have been identified as having high ecological function due to the variety of habitats and their importance to fauna, with particular significance for waterbirds (GHD 2014). Refer to Figure 3 below

Figure 5: Surrounding Wetlands (MNG Maps 2023)

4.6 Road & Rail Noise

The Development Area abuts the Kwinana Freeway to the east and Mandurah Road to the west. The Department of Planning, Lands and Heritage (DPLH) under the State Planning Policy 5.4 – Rail & Noise has identified that parts of the Development Area are impacted by these significant transport corridors. Refer to Figure 4 below.

As such, development of land within this buffer may need noise mitigation design and construction measures implemented.

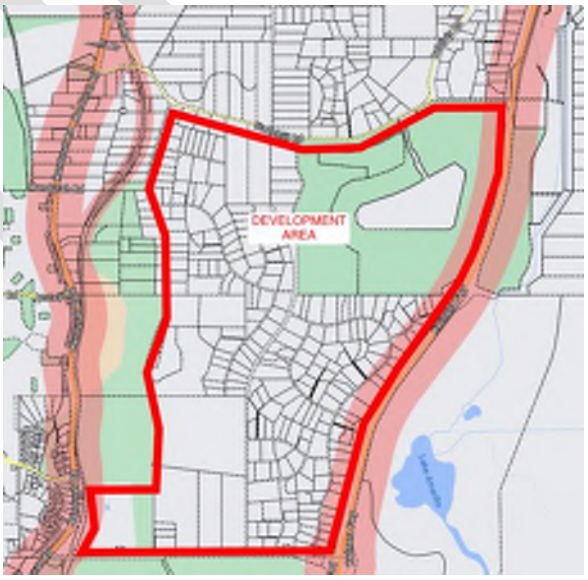


Figure 6: Road & Rail Noise Impacted Land (MNG 2023)

Herring Storer Acoustics have reviewed the requirements for the Development Area in their Technical Memorandum dated 13 October 2023 which noted the following key acoustic aspects to consider:

- Noise received at noise sensitive premises transportation (Rail and Road) relating to State Planning Policy 5.4; and,
- Noise emissions from commercial premises for compliance with the Environmental Protection (Noise) Regulations 1997.

Herring Storer Acoustics Technical Memorandum notes that part of the Development Area fall within the "trigger" distances and may require an acoustic assessment depending on whether there will be any noise sensitive premises / uses in these areas. This will need to be reviewed / considered as the District Structure Plan is developed as to land uses permitted in these areas.

A copy of Herring Storer Acoustics Technical Memorandum is attached hereto as ***Appendix E.***

5 Earthworks and Demolition

5.1 Demolition & Clearing

Prior to Development works commencing any redundant infrastructure, fencing, scrap material or rubbish located on the site will need to be removed and disposed of to an approved tipping location. Any demolition works will require permits approval by the Local Authority. It is recommended these works are performed by a licensed demolition contractor.

Some developable portion of the site may require demolition of existing residential building, which need to be demolished to accordance residential Development. Prior to any demolition on site, it is recommended that a Hazardous Materials Assessment be undertaken by a suitably qualified and experienced consultant. The assessment will identify materials which will require special management to reduce the exposure to works, nearby occupiers, the general public and also allow contractors to more accurately price the demolition works.

All vegetation marked for clearing will also be removed from the site. Any areas of protected vegetation shall be clearly marked, and physical controls implemented to restrict access by construction machinery.

However, retention and protection of heritage and significant trees and landscape features shall be prioritised throughout the project.

It is recommended that if there is any vegetation to be protected / retained, a suitably qualified arborist be engaged to assess and provide commentary on the required tree protection methodologies / zones.

5.2 Contamination

Based on the data available on the Department of Water and Environmental Regulations (DWER) Contaminated Sites Database there are no known / registered contaminated sites within the development area.

However, there appears to have been mining activities undertaken in the northeast corner of the site as such, may require remediation prior to any development.

5.3 Bulk Earthworks

All earthworks will need to be undertaken in accordance with recommendations from a detailed Geotechnical Investigation and AS3798 *'Guidelines on earthworks for commercial and residential Developments'*. Based on the Karnup District Structure Pan layout for the site relatively large volumes of earthworks are anticipated. Subject to further assessment a balanced cut to fill should be the aim of the earthworks strategy to minimise import or exportation of material from site.

The earthworks levels will also be constrained by the following:

- Detailed Geotechnical Investigation and recommendations.
- The requirement to contain stormwater drainage onsite and applicable levels for this to be achieved. This is subject to further advice provided by the hydrologist and will be verified during preliminary design.

- Drainage outfall levels for the stormwater pit and pipe drainage system (up to and including the 1 in 5 year ARI). This is subject to further advice provided by the hydrologist and will be verified during detailed design.
- The invert level of the existing gravity sewer mains that the Development will discharge into. This invert and Development layout will be verified during detailed design.
- Neatly tying into the existing levels of the adjacent lots, Kwinana Freeway, Stakehill Road, Paganoni Road and Fletcher Road.
- Rationalisation of any required retaining walls.
- Consideration of Contamination
- Retention of significant trees and vegetation. Further studies are recommended to identify any key areas.
- Tying in with the existing key topographical features. Further studies are recommended to identify any key areas.

5.4 Environmental Consideration

Due to the historical commercial use of the site contamination of in-situ soils should be a consideration of any future Development. JDSi recommend that this is included an environmental investigation for the proposed Development to better understand the risk.

6 Roadworks

The Development site is bounded by existing Stakehill Road to the north, Fletcher Road to the west, Paganoni Road to the south and Kwinana Freeway to the west. Existing roads adjacent to the site are owned and maintained by the City of Rockingham and as such all works on and abutting the public roads will be subject to their approval.

The Development includes the construction of a network of internal access roads and junctions with existing external road network. The internal residential and commercial road network will most likely be via an extension to Dampier Drive, also via a connection from Stakehill Road, Paganoni Road and proposed extension of regional Henderson Road to the west.

Intersections, sweeps/corners, and roundabouts will be designed for vehicle turning movements defined in AUSTROADS design guidelines. The Development's internal road network will consist of urban style roads being kerbed, asphalted and drained. Engineering road design and pavement design will need to cater for possible heavy traffic conditions/restricted access vehicles and to be in accordance with the City of Rockingham standards and guidelines as well as Liveable Neighbourhoods provided by Department of Planning, Lands and Heritage WA. The road design layout will also be based on the approved district structure plan.

As part of any Development and requirements under WAPC subdivision approval, the portion of roads fronting a new Development typically require upgrading to provide suitable access and egress. This will be confirmed with City of Rockingham at the planning stage of the design.

On-street parking facilities may potentially be required within the Development, depending on proposed land uses and whether the parking will be accommodated within lots. The requirement for and network of footpaths within the proposed Development will need to be confirmed with City of Rockingham.

In all cases the road cross sections will be designed to cater for utility services on standard verge alignments and appropriate stormwater management strategies.

As part of the planning process, it is recommended that detailed traffic studies be undertaken, and consultation commences with the City of Rockingham and MRWA to confirm all required road upgrades.

7 Stormwater Management

Urban Water Management (UWM) and Water Sensitive Design is now a key part of any development process incorporating principles of integrating water and land use planning, considering all water sources in water planning, integrating water use and natural water processes and a total catchment integration of natural resource use and management (Ref. Stormwater Management Manual for Western Australia, DOW, April 2004 the State Water Strategy 2003 and the State Water Plan 2007).

Stormwater drainage management is a major component of an overall UWM strategy for which achievement of the principals of the plan may be facilitated through the application of Water Sensitive Urban Design (WSUD) techniques during planning, design and construction of urban development projects. Objectives of WSUD include but are not limited to the following:

- Detention of stormwater rather than rapid conveyance to maintain pre Development flows for quantity management;
- Use of vegetation for filtering purposes and nutrient stripping for quality management;
- Use of stormwater to conserve potable water; and
- Water efficient landscaping.
- Protection of wetlands and waterways from the impacts of urban runoff; and
- Protection of infrastructure and assets from flooding and inundation.

The stormwater drainage from the development will need to be designed and constructed in accordance with City of Rockingham design guidelines and DWER water sensitive urban design guidelines.

As the City of Rockingham will ultimately own and maintain all stormwater infrastructure the design and construction work will need to be undertaken in accordance with their guidelines and standards, as well as the Local Government Guidelines for Subdivisional Development (IPWEA), noting City of Rockingham may typically require:

- Maintain pre-Development peak flow rates from the site;
- Retain 10% AEP rainfall within Lots;
- Habitable floor levels at least 0.5 m above the 1% AEP flood level of the urban drainage system;
- Habitable floor levels at least 0.3 m above the 1% AEP flood level within road reserve;
- The stormwater drainage design demonstrates that the land is capable of managing stormwater for all events up to the 1% AEP event;
- Rainfall up to and including the 10% AEP will be retained within the lots using basins and/or underground storage;
- Roadside swales will be designed to cater for flows up to 10% AEP rainfall events, while greater than 10% AEP flow will be conveyed via overland flow through the road network, and via open channels running along the northern and southern boundary of the subject site;
- Controls used to improve stormwater quality will be included within roadside swales, open channels and stormwater retention systems on lots such as planting of specific vegetation and possible utilisation of an amended soil profile to assist in nutrient retention and breakdown;
- The use of native vegetation where practicable, minimal fertiliser application and soil amendment in major drainage areas will assist with the management of groundwater and surface water quality.
- Commercial Developments
  - 1% AEP event to retained on site.
  - Pipework in adjoining streets to accommodate 10% AEP event.
- Residential Developments
  - 10% AEP event to retained on site.
  - Pipework in adjoining streets to accommodate 20% AEP event.

There is a potential for mosquito breeding due to the wetlands / water bodies present in the area. Adequate consideration shall be made in the planning of drainge systems to reduce excessive mosquito breeding, such as a provision of semi-aquatic or aquatic vegetation planned along the water source to remove nutrients, piping as much of the stormwater network as possible, treatment of open drains to reduce the risk and minimising the stormwater runoff retention time in basins (i.e. minimise standing water). The final solution will need to be confirmed with authorities responsible to control mosquito breeding in the area.

A District Water Management Strategy (DWMS) has been prepared by GHD which encompasses the Development Area (GHD 2014) and provides further recommendations for Stormwater Quantity Management (in addition to the above) to further guide the proposed development of the DSP.

As development progresses within the Development Area, the developers will need to prepare Urban Water Management Plans (UWMP) to guide their individual developments, it is recommended that the GHD DWMS be reviewed and updated (if required) and that the DSP be structured so that these UWMP's are prepared in accordance with the DWMS to ensure the Stormwater Management Strategy as a whole is consistent to achieved the best Water Sensitive Design Outcome.

7.1 Water Quality Management

The maximisation of the quality of recharge water through the adoption of 'Best Management Practices', promotes the disposal of runoff via water pollution control facilities. This includes vegetated swales and basins, detention storages, underground storage and gross pollutant traps and the implementation of non-structural source controls such as urban design, community education, low fertiliser landscaping regimes and the like.

8 Groundwater Management

The key objectives for groundwater management are:

- Protection of infrastructure and assets from flooding and inundation by high seasonal groundwater levels, perching and/or soil moisture.
- Protection of groundwater dependent ecosystems from the impacts of urban runoff.
- Managing and minimising changes in groundwater levels and groundwater quality following development/redevelopment.

A Groundwater Management Strategy should be developed for the Development Area to ensure that separation to groundwater is maintained, and abutting groundwater dependent ecosystems are not adversely impacted by the development of the Development Area.

A District Water Management Strategy (DWMS) has been prepared by GHD which encompasses the Development Area (GHD 2014) and provides further recommendations for Groundwater Management to further guide the proposed development of the DSP. It is recommended that the GHD DWMS be reviewed and updated (if required).

9 Sewer Reticulation

The Water Corporation (WC) owns and maintains the sewerage reticulation system in the vicinity of the Site. Any connection into this system will need to be designed, approved and constructed in accordance with standard WC requirements and guidelines including the Developers Manual, and Design and Construction Requirements for Gravity Sewer DN150 to SN600 (DS50).

This report does not any internal plumbing works on the Site will need to meet the requirements of AS3500 'Plumbing and drainage' as documented by the Building Services consultant.

To provide a sewer reticulation to the Development, suitably qualified consultants will be required to design the proposed sewer reticulation network and submit to WC for approval. Applicable headworks charges will need to be paid by the Developer and these will be determined by WC at time of application.

JDSi approached WC June 2023 to obtain planning information with regards to the Development. The WC advised that the Development is located within the current conceptual wastewater planning scheme (refer to ***Appendix B***) and indicates that the Development area falls within several pump station catchments however there are no pump stations established within these catchments. As per the conceptual plan provided by WC, Baldivis South Main Sewer is proposed as an outlet that is planned to head north and discharge into the Magenta Crescent Wastewater Pump Station (WWPS). It should be noted that Baldivis South Main sewer is not incorporated in WC's 5-year Capital Invested Program and is not expected to be constructed for at least 10 years. Given that the Baldivis South Main Sewer is not scheduled to be constructed within next 10 years, it is necessary to determine alternative outlet which will depend on the staging plans.

As advised by WC the proposed pump stations and associated pressure mains and collection sewers (headworks assets) are not scheduled on our 5-year Capital Investment Program. These headworks assets will be required to be constructed as part of the subdivision process and a requirement of routes of 20 metres wide (in form of road reserves) for the headworks mains.

There is presently no wastewater infrastructure in or close to the proposed site. It is anticipated that the Development Area will be serviced via DN150 up to DN600 gravity sewer networks and will discharge via pressure mains to a nearest existing waste water discharge manholes or discharge into the Magenta

Crescent Wastewater Pump Station (WWPS) as suggested by WC. JDSi determined two alternatives of sewer discharge outside of the WC suggested the Magenta Cr Waste Water Pump Station (WWPS):

- The southern portion of the Development could be discharged via proposed sewer pressure main to an existing discharge manhole located in Warnbro Sound Avenue approximately 2000m to the west of Paganoni Road; and
- The north portion could be discharged via proposed sewer pressure main to a discharge manhole located in Sixty Eight Road approximately 3000m to the north of the subject site.

It is also anticipated 11 new wastewater pump stations within the subject site will need to be constructed to enable servicing the site. Refer to Figure 5 – Proposed Wastewater connections.

The Development Area is proposed to be serviced by the East Rockingham Wastewater Treatment Plan (WWTP) located on Chesterfield Road, East Rockingham however, there is no conveyance system between the Development Area and the WWTP.

The WC have advised that the above infrastructure is not currently scheduled in their 5 year Capital Investment Program the works may need to be delivered as part of a Development Constructed Works Agreement where the works are pre-funded by the Developers.

Further negotiation with WC will be required to establish agreed connection points for the proposed Development.

The current conceptual planning and pump station catchments provided by the WC will need to be reviewed when future staging, development and future topography is understood. Decisions on the staging and timing of the planned headworks assets will be essentially based on the staging of the future subdivisions and growth of the area.

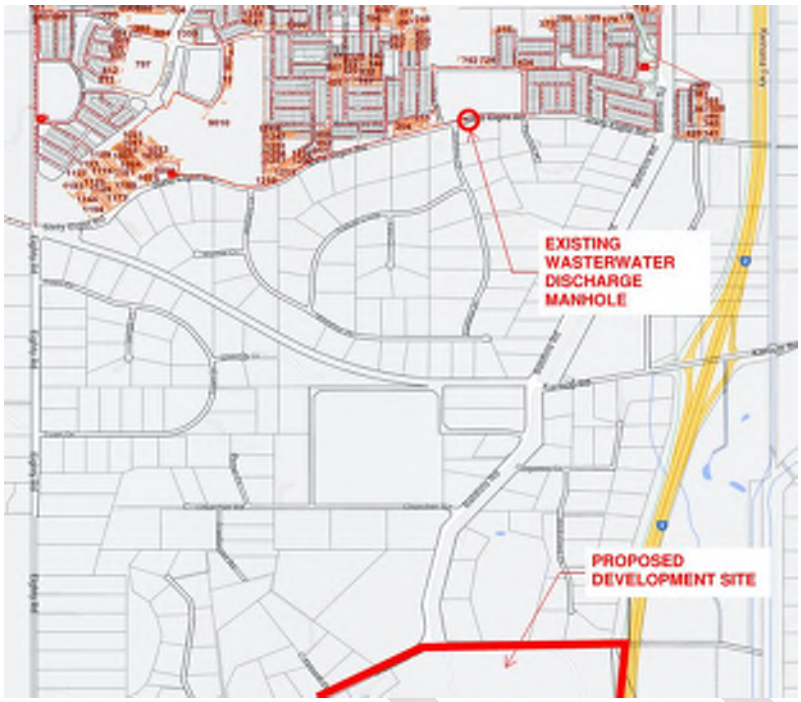


Figure 7: Proposed Wastewater connections (Esinet 2023)

10 Water Reticulation

The Water Corporation (WC) owns and maintains the potable water reticulation system in the vicinity of the Site. Any connection into this system will need to be designed, approved and constructed in accordance with standard WC requirements and guidelines including Developers Manual, and the Design and Construction Requirements for Water Reticulation Systems (DS63).

To provide a potable water supply to the Development, suitably qualified consultant will be required to design the proposed water reticulation network and submit to WC for approval. Applicable headworks charges will need to be paid by the Developer and these will be determined by WC at the time of application.

Based on WC data, availability of reticulated water of sufficient capacity to serve the proposed area is lacking. Therefore, to meet the future demand of the Development and surrounding region, construction of several headworks size water mains is essential as part of the subdivision process. Information obtained from WC necessitate the routes for headworks main to be 20 meters wide and the routes should be in the form of road reserves which will provide enough space for maintenance and potential future expansion for water mains. The current planning may need to be reviewed when future demands and staging is provided. Decisions on the staging and timing of the planned headworks mains will be essentially based on the staging of the future subdivisions and growth of the area. WC also noted that the construction of these main is not currently scheduled in their 5 year Capital Investment Program.

WC has provided preliminary planning advice indicating that DN300 PVC (Polyvinyl chloride) up to DN900 PVC water reticulation main is required in the subdivisions shown in ***Appendix C***.

The water supply to the proposed Development will likely be likely achieved via extensions and connection of the existing water reticulation network around the Development which consists of, Refer to Figure 6 - Water Corporation Karnup Waster Concept Planning.

- A proposed DN300P-12 main extension approximately 1000m long connecting to existing DN600 steel main located in Crystaluna Drive west of the subject area;
- A proposed DN700 water main extension approximately 4000m long connecting to existing DN600 steel main located in Warnbro Sound Avenue west of the subject area;

- A proposed DN375/400 water main extension approximately 4500m long connecting to existing DN600 steel main located in 4.5km north of the subject area;
- A proposed DN600 water main extension approximately 3200m long extending from Baldivis Road north of the subject area.
- Construction of 2 x 30ML Water Tanks just north of Stakehill Road (refer concept plan provided in Appendix C).

All water main extensions required for the Development site will be laid within the existing and proposed road reserves, on the correct alignment and in accordance with the Utility Providers Code of Practice and WC Standards.

WC have advised that the above infrastructure is not currently scheduled in their 5 year Capital Investment Program the works may need to be delivered as part of a Development Constructed Works Agreement where the works are pre-funded by the Developers.

At the time of this report, to adequately serve the water needs of the proposed Development it is recommended to review the planning and staging and accordingly align the headworks main with the subdivision stages of the Development area.

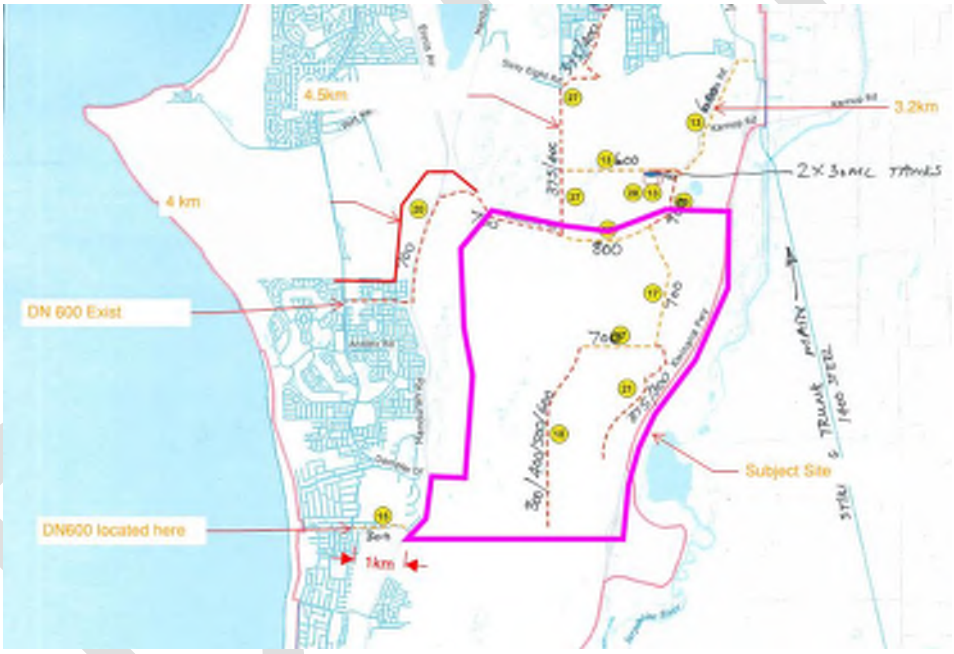


Figure 8: Water Corporation Karnup Water Concept Planning

11 Power Supply

Western Power (WP) owns and operates all electrical supply network assets within the Development area and therefore all new electrical supply equipment and cables will need to be installed in accordance with WP, WAER (West Australian Electrical Requirements), AS3000 specifications and Standards.

The following advice is based on JDSi desktop studies and support information obtained from the WP NCMT (Network Capacity Mapping Tool) online database.

Meadow Spring Zone Substation is the current substation servicing the vicinities of the proposed Development. NCMT has the zone substation feeder available for the area has a forecasted to have 10 to 15MVA available for connection for 2025. Actual capacity and network conditions to be confirmed by WP at time of connection.

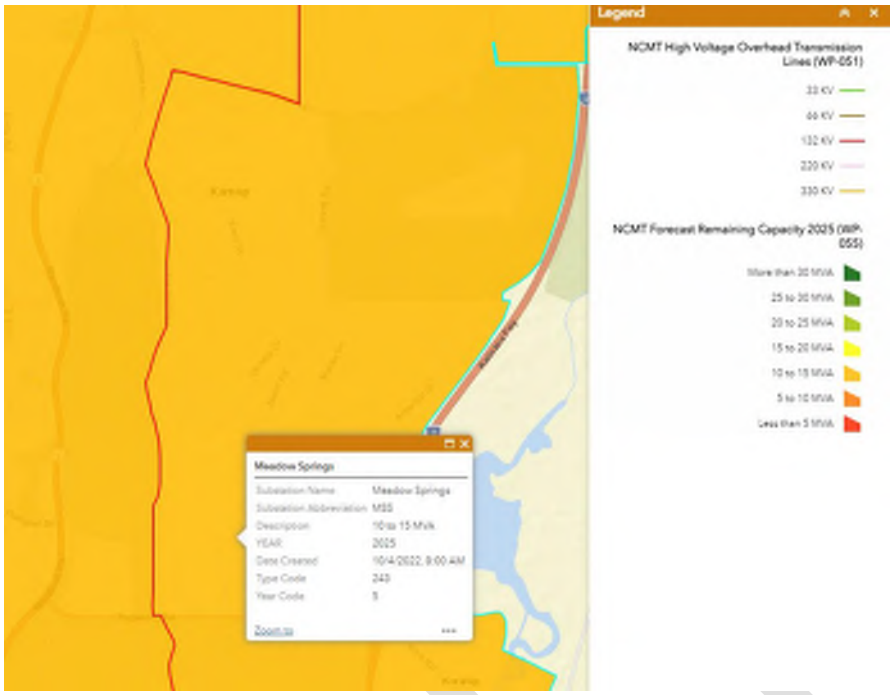


Figure 9: Western Power Network Capacity Mapping Tool

Existing overhead Transmission lines are present surrounding the Development along a portion of Stakehill Road, then Fletcher Road through to Paganoni Road.

Existing Distribution HV infrastructure is also present through the Development, primarily overhead power along Stakehill and Fletcher Roads and underground along Paganoni Road.

The total load for the ultimate Development has been estimated to be 87MVA and has been calculated using WP's recommended DADMD. The estimated loads are summarised below.

Load Type	Volume	Load Allowance	kVA Allocated
Residential	16988 lots	4.7kVA/lot	79,844 kVA
Rural residential	72 lots	5kVA/lot	360 kVA
Primary School	1 site	250kVA	250 kVA
High School	1 site	500kVA	500 kVA
Commercial	20 ha	200kVA/ha	4,000 kVA
Public Open Space	50(assumed) lots	30kvA/lot	1,500 kVA
District Open Space	1 site	500kVA	500 kVA
		Total	**86,954 kVA**

Given the estimated proposed load for the Development. it is highly suggested that WP is engaged to undertake high-level planning and transmission assessment as early as possible to advise if the Development may require any power network augmentation to sufficiently supply the proposed site.

Based on the load of 87MVA, it is estimated that approximately one hundred and forty (140) Transformers and one hundred and twenty (120) switchgears will be required. Additionally, a substantial amount of HV cables to create a power network will be needed to sustain the Development as required by WP.

Any existing WP overhead lines within or adjacent to the Development will be required to be undergrounded / removed to satisfy WAPC requirements.

Please note WP cannot reserve network capacity therefore the above advice is current as at the date of this report. Once the Development planning has been finalised it is recommended a Feasibility Study (or Pre-application) request is submitted to WP to better inform WP of the Proposed Development and their plans for the network in this area.

12 Gas

ATCO Gas owns and maintains all gas reticulation systems in the area. Dial Before You Dig (DBYD) information for this area is not available. It is likely that this will be insufficient to service the proposed Development.

The developer may be required to fund new works or the upgrading of existing works. ATCO Gas headworks are assessed on a case by case basis and may be required however until their assessment is completed an amount is unknown. ATCO Gas identifies opportunities to co-contribute or to fully meet the cost of extending natural gas infrastructure to new subdivisions.

Reticulated gas is not considered to be an essential service and as such is generally not required as a condition of Development. If the Developer wishes to connect to reticulated gas an extension to the nearest high-pressure main will be required. For commercial Developments the cost of gas reticulation is typically borne by the Developer, however financial agreements can be arranged if gas usage is expected to be high.

13 Telecommunications

JDSi received a formal planning advice from NBN Co and it is summarised below. Refer Figure 7 – NBN Co Planning Advice below.

- The proposed Development is outside the existing NBN fixed line network footprint and it is currently serviced by fixed wireless and satellite.
- It has been suggested by NBN Co that extension to existing FTTP approximately 7km away at the intersection of Mandurah Road with Paganini Road and would most likely incur backhaul charges (subject to confirmation of lot count) to service this Development with Fibre to the Premises (FTTP) services with capacity to cater for residential grade connections. Further negotiations with the provider to extend the network will be required.

General communication services for the Development will consist of the installation of a standard pit and pipe network in accordance with NBN Co guidelines and standards. The conduit and pit system is required to be funded by the Developer with NBN Co funding the provision of installing fibre infrastructure and backhaul to the Development.

The current design practice for road reserves, pavement and verge provisions will make adequate allowance for services including broadband in accordance with the agreed Utilities Service Providers handbook.

All communication assets within the Development will remain in the ownership of the provider and easements will need to be granted in favour of the service provider.

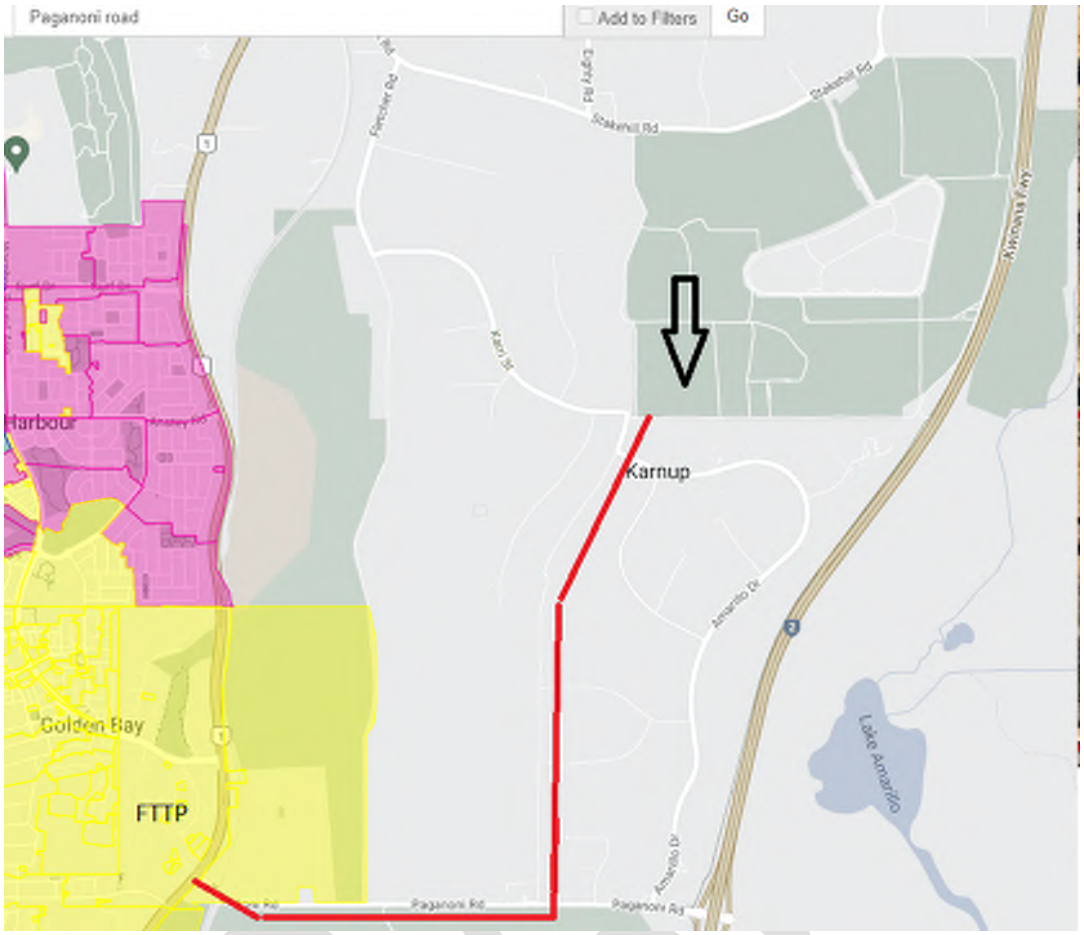


Figure 10: NBN Co Planning Advice

14 Disclaimer

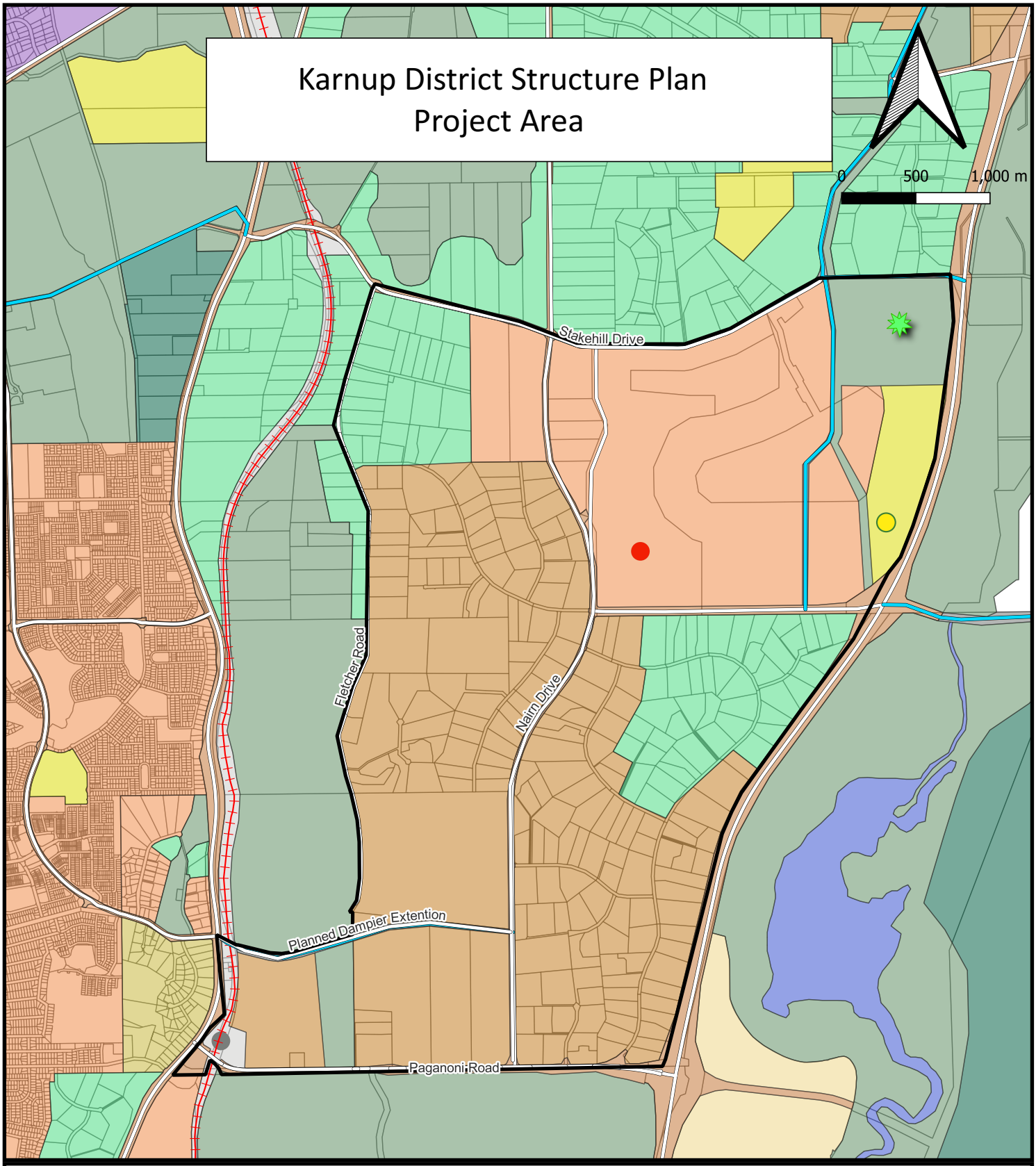
JDSi have undertaken this assessment based on a desktop study and subsequently assumptions have been made which, if incorrect, have potential to change the assessment and/or recommendations. Major cost implications exist through factors which cannot be assured at this time including upgrading and provision of utility services, WAPC conditions of Development, Local Authority Scheme Requirements, ground conditions, timing of adjacent Developments, etc.

While JDSi has taken all care in the preparation of the likely Development requirements and has noted key assumptions, JDSi accepts no responsibility for the accuracy of this report and provides it only as an indicative summary of engineering requirements.

If any further information is required or should you wish to clarify any issue, please contact our office.

APPENDIX A
KARNUP DISTRICT STRUCTURE PLAN

Karnup District Structure Plan
Project Area



city of Rockingham
where the coast comes to life

Drawn: Don Saw
Approved: Sally Birkhead
Revision: D
Date: 03 March 2023

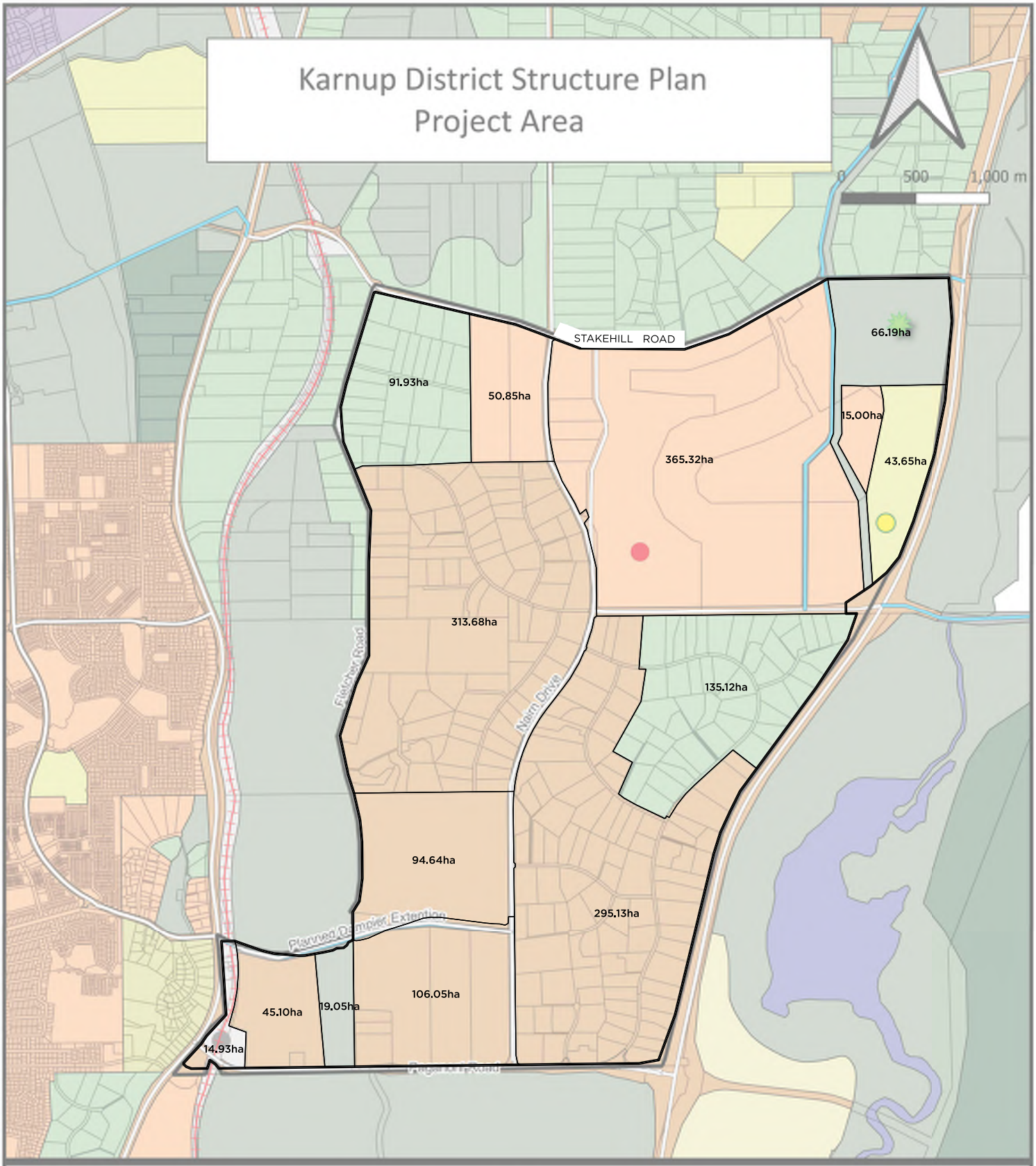
Proposed Karnup District Structure Plan Boundary

Perth and Peel @ 3.5 Million Framework Activity Centres
- District
- Specialised node

Public Purposes
- Passenger rail/ station - existing
- Passenger rail/ station - proposed Stage 1 METRONET
- Proposed Open Space - Sport

Road Rail
- Existing Regional Roads
- Proposed Regional Roads
- Passenger Rail Line - Existing

Existing/Proposed Landuse
- Existing Regional Roads
- Industrial
- Open Space
- Planning investigation
- Proposed Regional Roads
- Public purposes
- Railway
- Rural
- Rural residential
- Urban
- Urban deferred
- Urban expansion
- Urban investigation
- Waterway



city of Rockingham
where the coast comes to life

Drawn: Don Saw
Approved: Sally Birkhead
Revision: D
Date: 03 March 2023

Proposed Karnup District Structure Plan Boundary (1656.66ha)

Perth and Peel @ 3.5 Million Framework Activity Centres
- District
- Specialised node

Public Purposes
- Passenger rail/ station - existing
- Passenger rail/ station - proposed Stage 1 METRONET
- Proposed Open Space - Sport

Road Rail
- Existing Regional Roads
- Proposed Regional Roads
- Passenger Rail Line - Existing

Existing/Proposed Landuse
- Existing Regional Roads
- Industrial
- Open Space
- Planning investigation
- Proposed Regional Roads
- Public purposes
- Railway
- Rural
- Rural residential
- Urban
- Urban deferred
- Urban expansion
- Urban investigation
- Waterway

Karnup District Structure Plan

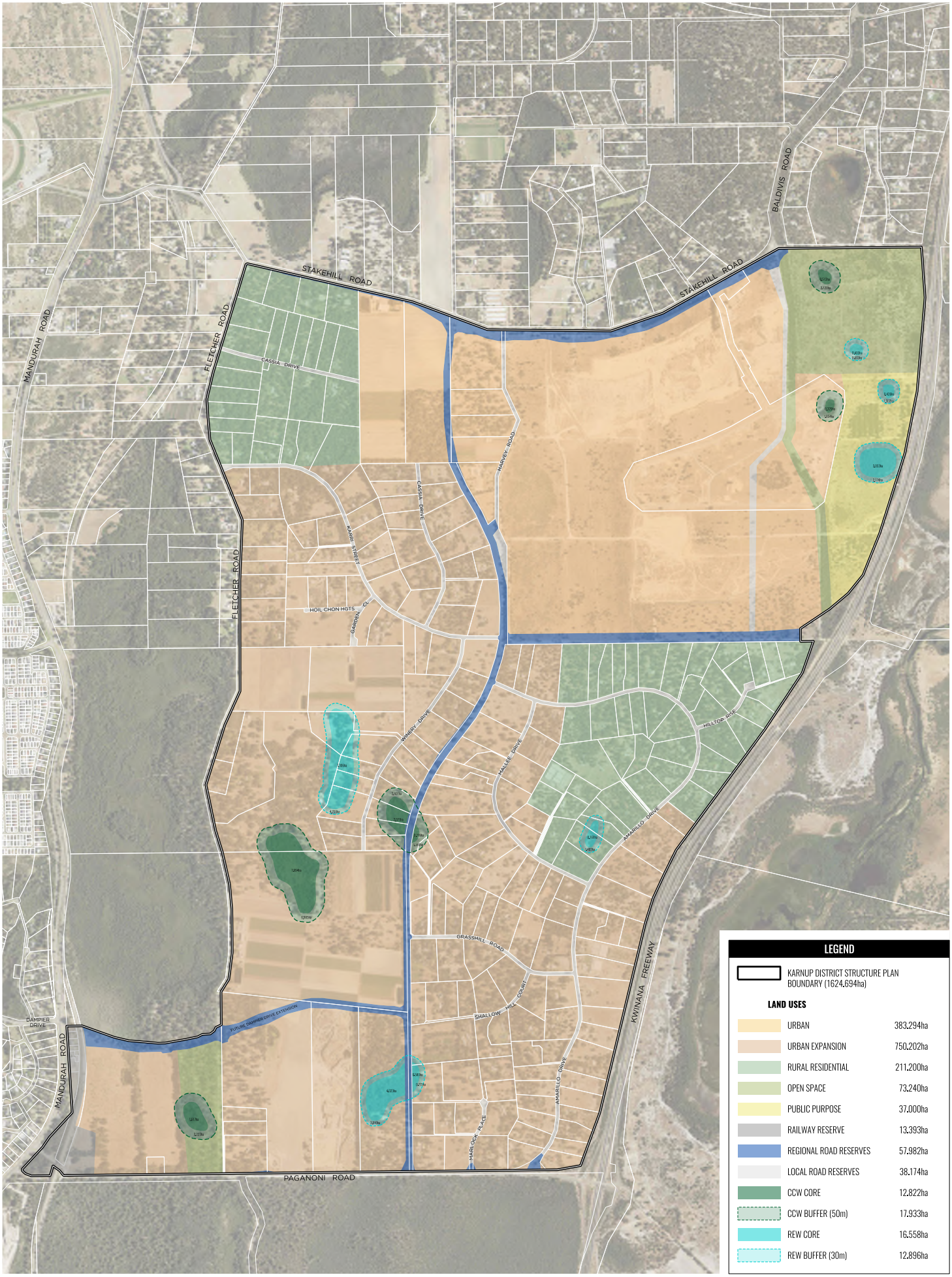
Development Schedule (ROCKA-1-001)

10-May-23

GROSS SITE AREA (hectares)				**1624.694**
Minus Deductions (MRS ZONES)				
Reserved land		Parks and Recreation	73.240	
		Railways	13.393	
Reserved Roads		Other regional roads	51.130	
Public Purpose		Special Use - Specialist Node	37.000	
Reserve		High School	30.000	
Zones		Rural	211.200	
Total Non Urban Areas				**415.963**
Gross Urban Zone Area (ha)				**1208.7310**
Less Uncreditable Open Space				
		Environmental Protection Policy - Core Conservation Category Wetlands	12.822	
		Environmental Protection Policy - Conservation Category Wetland Buffers	17.933	
		Environmental Protection Policy - Core Resource Enhancement Wetland	16.558	
		Surplus Restricted Open Space	0.000	
Total Uncreditable Open Space				**47.313**
Net Urban Zone (NUZ) Area (ha)				**1161.418**
Deductions				
		Primary School	48.000	
		Child Care Sites	3.000	
		Medical Centres	1.200	
		Local Activity Centre	6.000	
		District Activity Centre	20.000	
		Bioretention Basin (First 15mm)	10.72	
Total Deductions				**88.920**
Gross Subdivisible Area (GSA)				**1072.4980**
Public Open Space Contribution			**10%**	**107.2498**
2%		*Maximum Percentage of Restricted Public Open Space Permitted*	21.4500	
8%		*Minimum Percentage of Unrestricted Public Open Space to be provided*	85.800	
Minimum Public Open Space Contribution Required				**107.250**

Net Residential Area & Projected Yields

Net Subdivisible Area					965.25
Roads	34.0%				328.18
				Net Residential Area (ha)	**637.064**
Projected Average Lot Size (m2)		366	375	350	
Projected Lot Yield		**17406**	**16988**	**18201**	



LEGEND

KARNUP DISTRICT STRUCTURE PLAN BOUNDARY (1624.694ha)

LAND USES

URBAN	383.294ha
URBAN EXPANSION	750.202ha
RURAL RESIDENTIAL	211.200ha
OPEN SPACE	73.240ha
PUBLIC PURPOSE	37.000ha
RAILWAY RESERVE	13.393ha
REGIONAL ROAD RESERVES	57.982ha
LOCAL ROAD RESERVES	38.174ha
CCW CORE	12.822ha
CCW BUFFER (50m)	17.933ha
REW CORE	16.558ha
REW BUFFER (30m)	12.896ha

BASE PLAN

KARNUP

A City of Rockingham Project

DRAFT

NORTH

Scale: 1:20 000 @ A3

0 200 400 600m

PLAN: ROCKA-1-001 REVISION:
DATE: 10/05/2023 DRAWN: JP
PROJECTION: MGA 50 PLANNER: CM
DATUM: AHD CHECK: JH

cdp
Town Planning & Urban Design

Unit 2, 464 Murray Street
Perth WA 6000
(08) 6333 1888
info@cdpaus.com.au
www.cdpaus.com.au

APPENDIX B
WASTEWATER CONCEPTUAL PLANNING

385,000 386,000 387,000 388,000 389,000 390,000

6,417,000 6,416,000 6,415,000 6,414,000 6,413,000 6,412,000 6,411,000 6,410,000

COORDINATE SYSTEM: GDA 1994 MGA ZONE 50 VERTICAL DATUM: AHD

Closest Sewer Located on Sixty Eight Road ~ 3km

2 x WWPS - WC Ref GC30 & NA87

KARNUP P.S. D
PUMP STN. 'D - 194'
REDUCTION '140 - 156'
SEWER DESIGN FLOW - 8.6 L/s
LONG TERM PUMP RATE - 11.4 L/s

'62 - 194'
SDF - 0.7 L/s

'121 - 194'
SDF - 3.0 L/s

KARNUP P.S. A
PUMP STN. 'A - 194'
REDUCTION '140 - 156'
SEWER DESIGN FLOW - 41.3 L/s
LONG TERM PUMP RATE - 97.1 L/s

'83 - 194'
SDF - 15.0 L/s

'96 - 194'
SDF - 9.5 L/s

'95 - 194'
SDF - 7.0 L/s

'36 - 194'
SDF - 6.6 L/s

'50 - 194'
SDF - 2.4 L/s

'65 - 194'
SDF - 5.5 L/s

'123 - 194'
SDF - 6.8 L/s

KARNUP P.S. E
PUMP STN. 'E - 194'
REDUCTION '104 - 194'
SEWER DESIGN FLOW - 6.4 L/s
LONG TERM PUMP RATE - 8.6 L/s

'39 - 194'
SDF - 6.4 L/s

'34 - 194'
SDF - 5.4 L/s

'33 - 194'
SDF - 7.7 L/s

'93 - 194'
SDF - 3.8 L/s

'127 - 194'
SDF - 6.4 L/s

KARNUP P.S. M
PUMP STN. 'M - 194'
REDUCTION '84 - 194'
SEWER DESIGN FLOW - 28.2 L/s
LONG TERM PUMP RATE - 41.9 L/s

'41 - 194'
SDF - 6.3 L/s

KARNUP P.S. N
PUMP STN. 'N - 194'
REDUCTION '72 - 194'
SEWER DESIGN FLOW - 6.3 L/s
LONG TERM PUMP RATE - 8.4 L/s

'46 - 194'
SDF - 5.0 L/s

'80 - 194'
SDF - 7.2 L/s

KARNUP P.S. O
PUMP STN. 'O - 194'
REDUCTION '84 - 194'
SEWER DESIGN FLOW - 9.5 L/s
LONG TERM PUMP RATE - 12.7 L/s

'27 - 194'
SDF - 3.1 L/s

KARNUP P.S. F
PUMP STN. 'F - 194'
REDUCTION '140 - 156'
SEWER DESIGN FLOW - 80.0 L/s
LONG TERM PUMP RATE - 193.7 L/s

'31 - 194'
SDF - 12.4 L/s

'45 - 194'
SDF - 9.0 L/s

'44 - 194'
SDF - 2.0 L/s

'79 - 194'
SDF - 2.4 L/s

'32 - 194'
SDF - 10.7 L/s

'30 - 194'
SDF - 6.9 L/s

'3 - 194'
SDF - 1.9 L/s

'21 - 194'
SDF - 6.1 L/s

KARNUP P.S. L
PUMP STN. 'L - 194'
REDUCTION '24 - 194'
SEWER DESIGN FLOW - 20.4 L/s
LONG TERM PUMP RATE - 27.1 L/s

'16 - 194'
SDF - 6.0 L/s

'24 - 194'
SDF - 8.7 L/s

'17 - 194'
SDF - 9.3 L/s

'12 - 194'
SDF - 4.6 L/s

'2 - 194'
SDF - 2.8 L/s

'22 - 194'
SDF - 7.8 L/s

'1 - 194'
SDF - 2.0 L/s

'8 - 194'
SDF - 1.4 L/s

KARNUP P.S. I
PUMP STN. 'I - 194'
REDUCTION '24 - 194'
SEWER DESIGN FLOW - 13.9 L/s
LONG TERM PUMP RATE - 18.6 L/s

'4 - 194'
SDF - 5.6 L/s

'3 - 194'
SDF - 4.3 L/s

'14 - 194'
SDF - 15.0 L/s

'7 - 194'
SDF - 5.6 L/s

KARNUP P.S. J
PUMP STN. 'J - 194'
REDUCTION '24 - 194'
SEWER DESIGN FLOW - 14.6 L/s
LONG TERM PUMP RATE - 19.5 L/s

KARNUP P.S. K
PUMP STN. 'K - 194'
REDUCTION '24 - 194'
SEWER DESIGN FLOW - 13.0 L/s
LONG TERM PUMP RATE - 36.1 L/s

'048 - 194'
SDF - 2.7 L/s

'046 - 194'
SDF - 5.5 L/s

PUMP STN. 'X - 194'
REDUCTION '14 - 194'
SEWER DESIGN FLOW - 18.8 L/s
LONG TERM PUMP RATE - 25.1 L/s

'0454 - 194'
SDF - 5.5 L/s

PEELHURST SD183

AMARILLO NORTH SD195

sewer pressure main

closest gravity sewer - intersection of Dampier & Warnbro Sound Ave

0 200 400 600 800 1,000 Metres

DATE	REVISION DESCRIPTION	DRN	APPD
Nov 2015	Changed Landuse plan, removed inlet nodes from Amarillo North and South, changed sewer district boundary, added pumpstation catchment 'X'	L. Gabriel	T. Zheng

This planning is conceptual only. Major changes are likely when the final District Structure Plan and yields are agreed on.

FILE: \\Svntjt1-38\infrstpln\active\SpatialSystems\Projects\GABRIEL0_Karnup\mxd\Karnup_SD194_Overall.mxd

LEGEND

- Existing Access Chamber
- Proposed Access Chamber
- Existing Vacuum Chamber
- Proposed Vacuum Chamber
- Existing Pump Station
- Proposed Pump Station
- Existing Gravity Sewer
- Proposed Gravity Sewer
- Existing Vacuum Sewer
- Proposed Vacuum Sewer
- Existing Pressure Main
- Proposed Pressure Main
- Node Catchment
- PS and Sewer Catchments
- Sewer District / WWTP Catchment
- Existing Sewered Areas
- Sewered By Private PS
- Parks and Public Open Space
- Bush Forever
- Floodway / Flood Fringe
- Flood Plain
- Cut / Fill

NOTATION

SEWER DISTRICT NUMBER
CATCHMENT NODE
CATCHMENT '7001 - 121'
R15 - 108.4 @75% (W)
'R' CODE ZONING
GROSS AREA (ha)
% OF LAND DEVELOPMENT
(W) - WET CONDITIONS
(D) - DRY CONDITIONS

SHEET INDEX

KARNUP SD194

N

AQUA No. 9229563
AQUA VERSION V2

WATER CORPORATION

ISSUED WITH THE AUTHORITY OF THE MANAGER INFRASTRUCTURE PLANNING BRANCH

629 NEWCASTLE STREET, LEEDERVILLE 6007
WESTERN AUSTRALIA.

TELEPHONE (08) 9420 2420, FAX (08) 9420 3179

WASTEWATER SCHEME PLANNING SERIES

KARNUP - SD194

CONCEPTUAL PLANNING
LONG TERM SCHEME

PLANNING BY	COMPILED BY	ACCEPTED BY	
R. APPOLONI	R. APPOLONI	T. ZHENG	
SCALE 1:10,000	FULL REVIEW JUNE 2009	FILE NO. JT1 2007 02784 V01	A1

Christopher Elms

From: Kevin Purcher <Kevin.Purcher@watercorporation.com.au>
Sent: Tuesday, 24 October 2023 10:46 AM
To: Christopher Elms
Cc: Bimu Gurung; Romana Rees
Subject: RE: SF0009674 Stage 2 - RE: Stakehill Road Karnup

Hi Chris

The existing wastewater treatment facilities (or Resource Recovery Facility) that the proposed area is planned to discharge into is the East Rockingham WWTP (Chesterfield Road, East Rockingham). There should be no issue with capacity of the WWTP when the future development takes place. But please note the whole conveyance system from Karnup to East Rockingham is not in place and the planned works are not scheduled on our 5-year Capital Investment Program.

Should you have any queries please do not hesitate to contact us.

Kind Regards

Kevin Purcher
Snr Plnr - Land Use Planning
Development Services

E Kevin.Purcher@watercorporation.com.au
T (08) 9420 2385

From: Christopher Elms <Chris.Elms@jdsi.com.au>
Sent: Monday, 16 October 2023 8:59 AM
To: Land Planning <LandPlanning@watercorporation.com.au>
Cc: Bimu Gurung <bimu.gurung@jdsi.com.au>; Romana Rees <Romana.Rees@jdsi.com.au>
Subject: SF0009674 Stage 2 - RE: Stakehill Road Karnup

Hi Kevin,
With reference to the below correspondence, would you please confirm location and capacity of existing waste water treatment facilities (or Resource Recovery Facility) which the site falls within?
Kind regards,

Chris Elms
Senior Civil Engineer

M: 0432 731 998
P: 08 9227 0595
F: 08 9227 8617

Level 1
432 Murray Street
Perth WA 6000

PO Box 7483
Cloisters Square PO WA 6850

www.jdsi.com.au

From: Land Planning <LandPlanning@watercorporation.com.au>
Sent: Wednesday, 7 June 2023 12:29 PM
To: Bimu Gurung <bimu.gurung@jdsi.com.au>
Subject: Stakehill Road Karnup

Hi Bimu

Thank you for your query regarding the above area and we offer the following information.

Reticulated water of a sufficient capacity to serve the proposed area is currently not available. Current planning (see plan attached) indicates that the future development will require several headworks size water mains to be constructed. The headworks mains may be required to be constructed as part of the subdivision process of this or the surrounding area. Routes of 20 metres wide for the headworks mains will also be required. The routes should be in the form of a road reserves. The current planning may need to be reviewed when future demands and staging is provided. Decisions on the staging and timing of the planned headworks mains will be essentially based on the staging of the future subdivisions and growth of the area. These headworks sized water mains are not scheduled on our 5-year Capital Investment Program.

Current conceptual wastewater planning (see plan attached) indicates that the subject area falls within several pump station catchments. There are no pump stations within these catchments. The outlet is the proposed Baldivis South Main Sewer that is planned to head north and discharge into the Magenta Cr WWPS. The Baldivis South Main Sewer is not on our 5-year Capital Investment Program and is unlikely to be constructed for at least 10 years so an alternative outlet will need to be determined when staging plans are agreed to.

The proposed pump stations and associated pressure mains and collection sewers (headworks assets) are not scheduled on our 5-year Capital Investment Program. These headworks assets will be required to be constructed as part of the subdivision process. Routes of 20 metres wide for the headworks mains will also be required. The routes should be in the form of a road reserves. The current conceptual planning and pump station catchments may need to be reviewed when future staging, development and future topography is understood. Decisions on the staging and timing of the planned headworks assets will be essentially based on the staging of the future subdivisions and growth of the area.

No part of the plans attached can be included in any report or documentation produced. They are provided as information only to help draft the District Structure Plan (DSP). It is recommended that the preparation of the DSP also include a servicing strategy and a staging and development sequencing plan to inform landowners and to guide decisions for further urban rezoning and local structure planning. Please note the Water Corporation's Capital Investment Program is not able to follow haphazard, non-frontal or remote development proposals so it is recommended that the staging commences in the north and moves south.

A north east portion of the subject area falls within Mundijong Drainage District, a rural drainage system. Developments within this catchment are required to contain the flows from a one in one-hundred-year storm event on site. Discharge to Water Corporation drains must be compensated to pre-development levels. This area could be prone to future flooding. To determine the flood level the developer should contact the Department of Water and Environmental Regulations. A Water Management Plan needs to be undertaken to support the future structure plan.

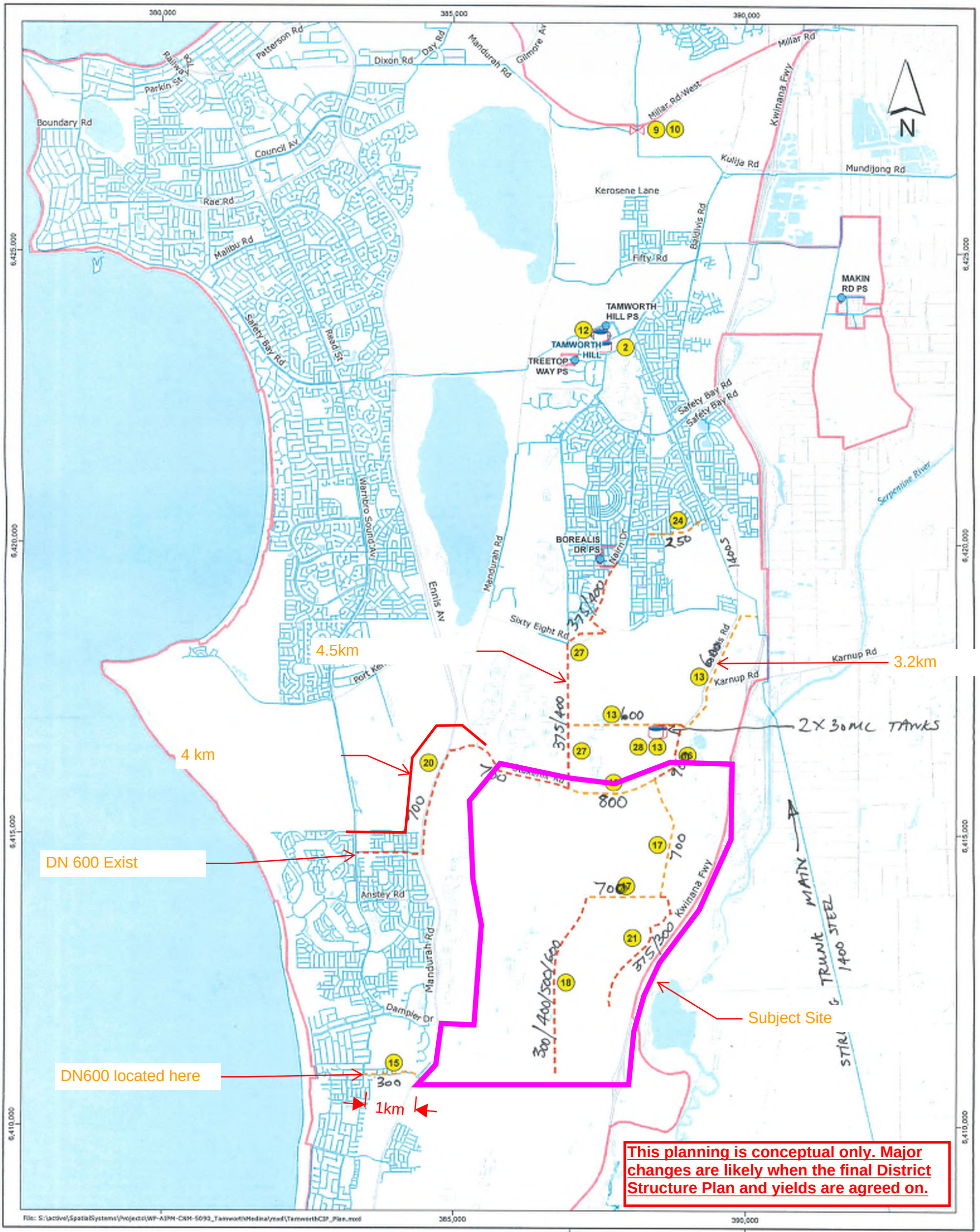
The information provided above is subject to review and may change. If the proposal has not proceeded within the next 12 months, please contact us to confirm that this information is still valid.
Should you have any queries or require further clarification on any of the above issues, please do not hesitate to contact us.
Regards

Kevin Purcher
Snr Plnr - Land Planning
Development Services

E Kevin.Purcher@watercorporation.com.au
T (08) 9420 2385

Water Corporation acknowledges the Traditional Owners throughout Western Australia and their continuing connection to the land, water and community. We pay our respects to all members of the Aboriginal communities and their cultures and to Elders past, present and emerging.

APPENDIX C
WATER CONCEPTUAL PLANNING



LEGEND

- WaterSystemOperationalBoundaries
- Existing Tank
- Existing Elevated Tank
- Existing Reservoir
- Existing Pump Station
- Existing Treatment Plant
- Existing Water Main

CIP Planned Assets

- Tank/Reservoir
- Valve
- Distribution Main
- 1 Reference No

1:60,000 at A3

0 500 1000 1500 2000

Metres

Coordinate System: GDA 1994 MGA Zone 50
Vertical Datum: AHD

AUTHOR: CROFTS30	DATE: 28/11/2016
BRANCH: IP8 - SPATIAL SYSTEMS	

WATER CORPORATION

Tamworth CIP Plan

Figure 7.1

APPENDIX D
NBN CO PLANNING CORRESPONDENCE

Christopher Elms

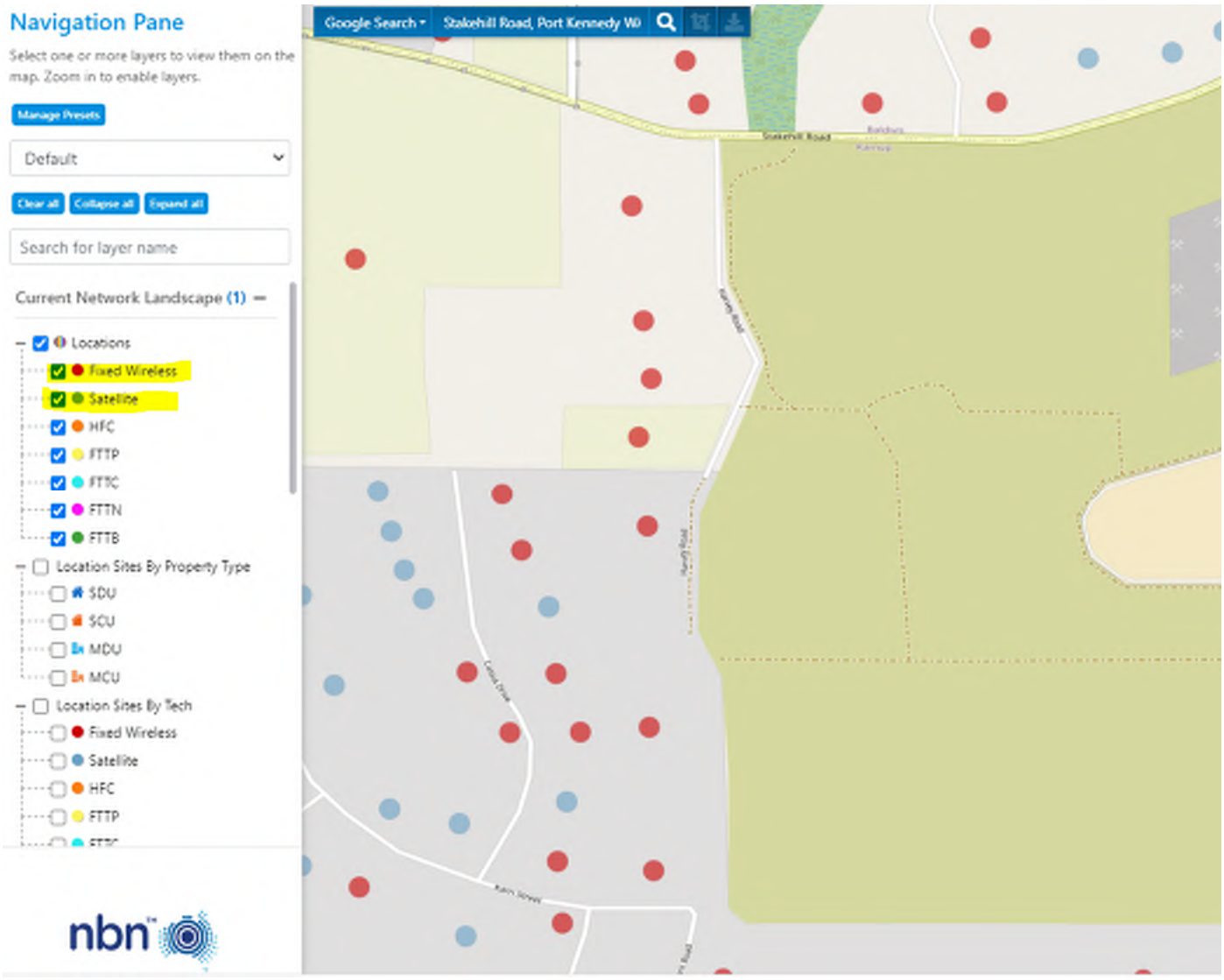
From: Ian McCulloch <ianmcculloch@nbnco.com.au>
Sent: Tuesday, 13 June 2023 4:36 PM
To: Christopher Elms; Brian O'Keefe
Cc: Gillian Murphy; Bimu Gurung; Steven Foley
Subject: RE: JDS212158 - Karnup District Structure Plan - NBN infrastructure planning / requirements request [Commercial - Anyone] [Filed 11 Sep 2023 09:11]

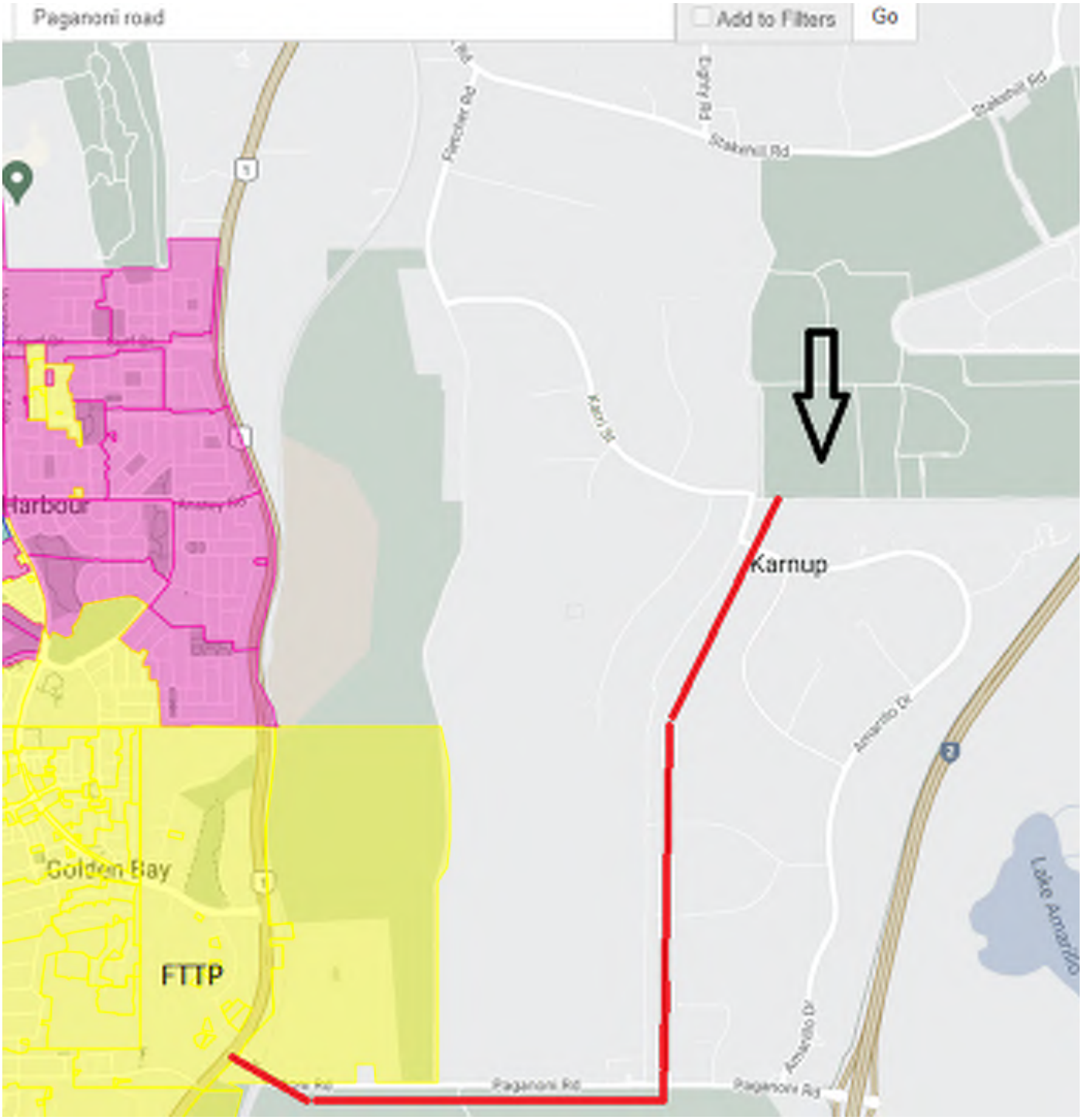
Categories: Filed by Mail Manager

HI Christopher

This area looks to be located outside the fibre footprint and serviced by fixed wireless & Satellite.
There is however a FTTP area around > 7km away , so **nbn** may consider deploying fibre depending on the size of these development but likely to be backhaul charges involved.

I have included Brian O'Keefe who is the account manager, who may be able to discuss these charges.





Kind Regards

Ian McCulloch
Senior Deployment Specialist - WA
nbn New Developments | Demand Deployment | NPD
M +61 437 479 257 | **E** ianmcculloch@nbnco.com.au

From: Christopher Elms <Chris.Elms@jdsi.com.au>
Sent: Tuesday, June 13, 2023 9:04 AM
To: Ian McCulloch <ianmcculloch@nbnco.com.au>
Cc: Gillian Murphy <gillianmurphy@nbnco.com.au>; Bimu Gurung <bimu.gurung@jdsi.com.au>; Steven Foley <steven.foley@jdsi.com.au>
Subject: [External] JDS212158 - Karnup District Structure Plan - NBN infrastructure planning / requirements request

EXTERNAL SENDER – Be cautious opening Links and Attachments
Hi Ian,

We are working with the City of Rockingham (and a number of consultants) on the proposed Karnup District Structure Plan for the area of land south of Stakehill Road, Karnup within the City of Rockingham.

See attached Project Plans.

Would you please provide information about availability of an existing service to facilitate the development of the area?

If you require any further information, please let me know.

Regards,

Chris Elms
Senior Civil Engineer

M: 0432 731 998
P: 08 9227 0595
F: 08 9227 8617

Level 1
432 Murray Street
Perth WA 6000

PO Box 7483
Cloisters Square PO WA 6850

JDSi CONSULTING ENGINEERS

www.jdsi.com.au

APPENDIX E
HERRING STORER ACOUSTICS TECHNICAL MEMORANDUM

EMAIL TRANSMITTAL

REF:	31712-1-23081
TO:	CDP
ATTENTION:	Justin Hansen
ADDRESS:	JustinH@cdpaus.com.au
FROM:	Tim Reynolds
DATE:	13 October 2023
SUBJECT:	**KARNUP STRUCTURE PLAN ACOUSTIC REQUIREMENTS**

Justin,

As requested, we have reviewed the acoustic requirements for the Karnup Structure Plan.

There are 2 aspects to the acoustics, they being :

1. Noise received at noise sensitive premises transportation (Rail and Road) relating to State Planning Policy 5.4; and

2. Noise emissions from commercial premises for compliance with the Environmental Protection (Noise) Regulations 1997.

STATE PLANNING POLICY 5.4

There are 2 components considered under SPP5.4, they being noise associated with :

- Rail; and
- Road.

For this Structure plan, the Perth – Mandurah passenger rail line runs close to a proportion of the western side of the structure plan. However, as shown below, the land within the structure plan area in the northern section is outside the trigger distance. However, the southern section is adjacent to the railway line.

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

NORTHERN SECTION

SOUTHERN SECTION

Legend

- Strategic freight or major traffic route
- Metropolitan passenger railway
- Strategic freight or major traffic route trigger
- Metropolitan passenger railway trigger
- Cadastre

Based on the above, nothing should be required for the passenger rail for the northern section.

The southern section is within the trigger distance. However, is part of a separate review, thus whether anything is required will depend on whether there are any noise sensitive premises in this area.

With regards to road traffic noise, the area runs along the edge of the Kwinana Freeway, thus as shown below is within the trigger distance.

We note that only the northern section is shown, and would be subject to an SPP 5.4 assessment, as the residence to the south are existing and not subject to any change under the Structure Plan.

With regards to the "southern Residences", we note that there is already an existing wall along the boundary to the Freeway road reserve, which we believe would have been part of the extension of the Freeway. Thus, as the zoning for these residence does not change, they are not subject to an SPP 5.4 assessment.

FYI – Photo of start of wall to Freeway (as per street view) is shown below.

Again the south western section is within the trigger distance for Mandurah Road, However, whether anything is required, depends on the inclusion of noise sensitive premises, as SPP 5.4 only relates to residence and noise sensitive premises (ie schools/ child care centre etc). This will be determined as the Structure Plan is developed.

Based on the above, only considering the northern section. The height of the barrier to the Freeway and the Quiet House Requirements will be determined as part of the acoustic study.

COMMERCIAL – ENVIROMENTAL PROTECTION (NOISE) REGULATIONS 1997

This involves undertaking a review of commercial areas (local centres etc) with regards to the Regulations to provide an overview / guidance of the commercial and residences interface.

Yours faithfully,
For **HERRING STORER ACOUSTICS**

Tim Reynolds

Appendix 7

Community Stakeholder and Engagement Plan

Karnup District Structure Plan

COMMUNITY AND STAKEHOLDER ENGAGEMENT PLAN

November 2023

Contents

1 Introduction

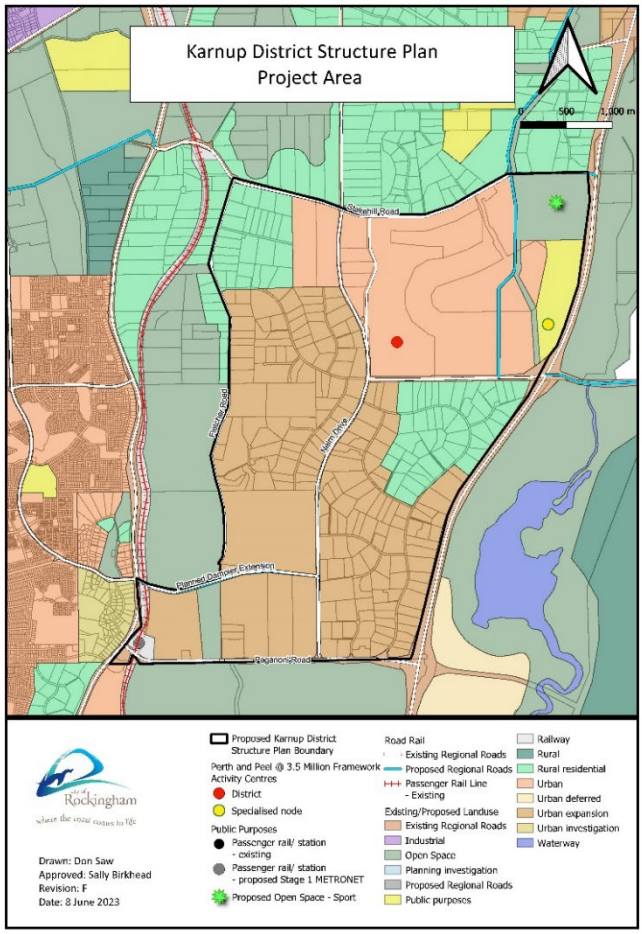
1.1 Document Purpose

This Community and Stakeholder Engagement Plan (CSEP) has been developed to support the preparation of the Karnup District Structure Plan (KDSP) ('The Project'), providing the necessary guidelines and procedures for managing community and stakeholder engagement and communications for the project.

The CSEP is a practical tool describing the processes by which the Project will manage communications and stakeholder relationships throughout the project and describes the philosophy that underpins the Project Team's genuine commitment to positive and proactive community relations.

1.2 Project Overview

The Perth and Peel @ 3.5 million frameworks and associated South Metropolitan Peel Sub-regional Planning Framework (the Framework) have confirmed the intended footprint for urban expansion within Karnup. The Framework requires the preparation of a District Structure Plan (DSP) to guide future development within the area, and the City of Rockingham ('the City') has engaged a Project Team to prepare it.



The KDSP area is an approximately 2000ha land parcel, extending from Stakehill Road in the north to Paganoni Road in the south, Mandurah Road/Fletcher Road to the west, Baldivis Road and Kwinana Freeway to the east.

It includes land already zoned 'Urban Deferred' and owned by DevelopmentWA on the southern side of Stakehill Road. The area comprises a large proportion of fragmented landholdings. The balance land is predominantly zoned 'Rural' and 'Special Rural'.

Once the KDSP has been prepared, advertised for public comment and adopted by the City, it will be considered and approved by the Western Australian Planning Commission (WAPC).

Following approval of the KDSP, the land will be subject to Metropolitan Region Scheme (MRS) and Local Planning Scheme Amendments, Structure Plans and other processes prior to subdivision. These processes could take up to 10 years (or more) to complete.

1.3 Timeframe

Preparing the KDSP is expected to take up to three years. The Project's anticipated key milestones (subject to change) are:

Table 1 – Project Phases and Timing

Milestone	Delivery
Project Commencement	Q1 2023
Phase 1: Preparation of the Background Report and Mosquito Risk Assessment and Management Plan (MRAMP)	Q4 2023

Phase 2: Community Consultation and Preparation of Community Outcomes and Vision Report	Q1 2024
Phase 3: Preparation of Draft District Structure Plan	Q4 2024
Phase 4: Community Consultation of Draft District Structure Plan	Q3 2025
Phase 5: Preparation of Final District Structure Plan (Present to Council and Lodgment to WAPC)	Q2 2026
Project Completion	Q3 2026

1.4 Engagement Objectives

The engagement objectives must comply with the City of Rockingham Community Engagement policy and include:

- Stakeholders are informed about the Project
- Stakeholders can provide input into the Project
- Stakeholder input is used in the Project to inform decision-making
- Adverse impacts on stakeholders follow ALARP (‘*as low as reasonably practical*’) principles.

1.5 Previous Stakeholder Engagement

Engagement conducted by the City since the project commenced in early 2023 includes:

- Project page created on the City’s website
- Initial FAQs prepared and available on the project page
- Mailout to landowners within the KDSP area and 800m surrounding KDSP
- Mailout to landowners and engagement regarding environmental inspection of properties
- Invitation to register to Rock Port to stay up-to-date with updates as the project progresses
- Inclusion of a link on the City’s website to enable any questions about the project to be asked
- Inclusion of the Project Lead’s contact details and phone number for any queries on the project
- Media release and inclusion of the Project in the City Chronicle
- Elected members Briefing Session held November 2023 to provide an update on the Project, following engagement of Project Team by Council in February 2023.
- Environmental Advisory Committee briefing held November 2023 to provide update on project
- Initial engagement with a range of external Government stakeholders including DPLH, METRONET, DoT, DoH (mosquitoes), DoE (schools)
- Engagement with major landowners and their consultant teams.

2 Community and Stakeholder Engagement

This section provides a broad overview of the CSEP's scope, purpose, philosophy, applicable standards, processes, interface and relationship to other project management plans.

2.1 Scope of the Community and Stakeholder Engagement Plan

The CSEP is an essential project management tool that outlines the processes for effective, efficient, and timely communication and engagement by the Project Team, while complying with all the contractual, corporate, and regulatory systems requirements.

The plan:

- Aligns with international engagement standards and Australian Common Law requirements and the City of Rockingham Community Engagement policy.
- Describes the strategy, approach, and tools for identifying, engaging with and informing all stakeholders with an interest in the project.
- Outlines the roles and responsibilities of the Project Team and their interactions with the City.
- Identifies the process for managing stakeholder enquiries including the timely resolution of actions and issues.
- Outlines the process to address stakeholder enquiries and complaints promptly and effectively.
- Identifies the process for community and stakeholder input to influence decision making.
- Identifies and prioritises stakeholder interests.

This CSEP is a dynamic document and will be reviewed regularly to reflect the changing social environment, issues and opportunities as they emerge. Messages and activities detailed in the plan will need to be adjusted to reflect any change in the engagement context, to ensure the key consultation objectives are achieved.

2.2 Applicable Standards, Policies and Guidelines

This section lists the applicable external standards, policies and guidelines that the plan must be consistent with. The following policies and guidelines are applicable to all the notices to be issued to all Stakeholders.

All employees, officers and subcontractors are required to comply with the Privacy Act as amended by the Privacy Amendment (Private Sector) Act. The Privacy Act does not apply to the City's operations or databases.

The following standards and guidelines are also applicable to this plan:

- International Association of Public Participation (IAP2) Quality Assurance Standard
- City of Rockingham Style Manual 6.0
- City of Rockingham Community Engagement Policy

To ensure consistency in messaging, the City initiated broadcast communications including industry publications, webpages, social media posts etc, should be provided to the Project Communications Team prior to their publication.

2.3 Relationship to the City of Rockingham

The Project Team will work collaboratively with the City to understand how the proposed development may impact the existing community and stakeholder and their expectations of the Project outcomes.

The City's Project Manager for the KDSP is Sally Birkhead, Strategic Planning Consultant, who is the City's first point of contact for this project.

The MPC and representatives from the City, along with the project's Lead Consultant, CDP, will regularly meet to proactively identify and implement engagement opportunities. The MPC will provide timely and approved information to the City for distribution using its communications channels.

Table 2: Key Functions and Accountabilities

Function	CoR	Project
Government relationship management		
Liaise with key WA Government stakeholders, including the Premier and relevant Ministers (where required)	✓	
Manage responses to Councillor correspondence and communications	✓	
Engage with government entities on development and design related issues	✓	✓
Stakeholder and community relationship management		
Engagement with key stakeholders on development and design related matters	✓	✓
Primary contact for all community and stakeholder relationships	✓	✓
Manage and respond to all community enquiries and complaints	✓	✓
Draft and implement CSEP		✓
Communications		
Management and application of communications and project branding guidelines	✓	
Approve communications prepared by the MPC	✓	
Provide approved templates for use by the MPC	✓	
Prepare and distribute information to stakeholders and communities	✓	
Provide content for social and digital media channels		✓
Manage social and digital media channels	✓	
Media relations and issues management		
Develop and implement media protocols	✓	
Develop media opportunities and promotional program	✓	
Monitor, manage and respond to media enquiries and issues	✓	
Strategy and continuous improvement		
Progress reporting to the City		✓
Management and mitigation of day-to-day risks and opportunities related to the Project	✓	✓

2.4 Context, Risk and Opportunities

This section captures the Project's social and political context.

2.4.1 Community Profile

The Project area is highly fragmented and dominated by Rural and Special Rural land, interspersed with rural focused businesses. A demographic profile of Karnup is provided below, from Census 2021.

Table 3: Community Profile Overview

Suburb	Pop	Med Age	Occupied Dwellings	Detached Houses	Renting	Med Week Family Income
Karnup	2,096	30	717	662	131	$2,192

Table 4: Community Profile by Age

Service age group (years)	Number	Percentage
Children (0 to 17)	649	30.8
Tertiary education and independence (18 to 24)	158	7.5
Young workforce (25 to 35)	413	19.6
Parents and homebuilders (35 to 49)	395	18.7
Older workers and pre-retirees (50 to 59)	207	9.8
Empty nesters and retirees (60 to 69)	158	7.5
Seniors (70 to 84)	113	5.4
Elderly (85 and over)	15	0.7
Total	**2,108**	**100.0**

The area has a low concentration of families from non-English speaking backgrounds. Non-English speaking households account for less than 6.6% which is low compared to the State which has an average of 21.2% non-English speaking households.

The population is relatively stable, with only 16.6% of the population moving within 12 months, increasing to 45.7% every five years. This suggests there is a higher likelihood that community awareness of conversations pre 2019 is low, and there is likely to be a core small group of longer-term residents that share the areas' collective memory.

The Socio-Economic Indexes for Areas (SEIFA) is a product developed by the ABS that ranks areas in Australia according to relative socio-economic advantage and disadvantage. The indexes are based on information from the five-yearly Census. SEIFA 2016 is based on Census 2016 data, and consists of four indexes, each focusing on a different aspect of socio-economic advantage and disadvantage. Two indexes have been used to inform the delivery of project communications.

The Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) summarises variables that indicate either relative advantage or disadvantage. This index ranks areas on a continuum (1-10) from most disadvantaged to most advantaged. An area with a high score on this index has a relatively high incidence of advantage and a relatively low incidence of disadvantage.

In 2016 (when the latest data was collated), Karnup households experience higher levels of advantage. Higher levels of advantage can translate into a highly motivated community (with high expectations of engagement) with a sense of entitlement and a desire to protect financial assets.

Table 5: IRSAD Score

Suburb	Index Score
Karnup	7

The Index of Education and Occupation (IEO) summarises variables relating to the educational and occupational aspects of relative socio-economic advantage and disadvantage. This index focuses on the skills of the people in an area, both formal qualifications and the skills required to perform different occupations. A low score (1) indicates that an area has a high proportion of people without qualifications, without jobs, and/or with low skilled jobs. A high score (10) indicates many people with high qualifications and/or highly skilled jobs.

Karnup has a higher proportion of people without jobs, that lack qualifications and/or don't have access to skilled employment. This suggests the community has relatively high incomes drawn from lower skilled occupations. While the community will have some understanding of the development potential, they may struggle to understand complexity, be more willing to follow charismatic local leaders and be more likely to have access to multiple information sources and rely on information from untrustworthy sources such as social media posts.

Table 6: IEO Score

Suburb	Index Score
Karnup	4

2.4.2 Communication Opportunities

Communication and consultation offers valuable opportunities including:

- Increasing awareness of stakeholder issues and concerns across the Project Team to reduce the likelihood and severity of development impacts.
- Facilitating collaboration to generate innovative ideas that enhance the development outcomes.
- Harnessing expertise and diverse opinions to optimise social and environmental decision-making.
- Demonstrating transparency and compliance with standards and requirements.
- Encouraging knowledge-sharing and skills transfer across organisations, interest groups and technical disciplines.
- Maintaining and enhancing the image and reputation of the City.

2.4.3 Project Engagement Parameters

This plan clearly articulates the Project's non-negotiables and negotiables that can be influenced by stakeholders. As a minimum, stakeholders will be engaged at the "Involve" level of the IAP2 Public Participation Spectrum when discussing negotiables.

The negotiables identified in Table 2 will be confirmed with the relevant stakeholder groups prior to finalisation of this CSEP. Non-negotiables either relate to mandatory standards or were determined by the City at the time of contract tendering.

Table 7: Negotiables and Non-Negotiables

Area	Negotiable	Non-Negotiable
Community engagement methods and evaluation	✓	
Local Road connections, locations and treatments	✓	
Shared paths and footpaths	✓	
Sustainability including environmental offsets	✓	
The use and extent of Development Contributions for Service and Community Infrastructure, and potentially mosquito control	✓	
Mosquito control and management outcomes	✓	
Budget		✓
Program		✓
Regulation (including approvals)		✓
Noise / amenity / screening walls (location and design)		✓
Engineering and design standards (including planning policies)		✓
Environmental assessments and approvals		✓
Location of the primary road reserves and the proposed infrastructure to be constructed within the reserve		✓
Urban and landscape design		✓

2.5 Potential Key Issues and Communication Risks

Whilst engagement and communications to date has not raised any significant negative public or community feedback, the following issues and associated communications risks have been identified.

Table 8: Key Issues and Communications Risks

Key Issue/s	Communication Risk	Design Mitigation and management Strategy	Residual Risk
Satisfaction with the level of public consultation and involvement in decision-making	Insufficient or inadequate information leads to misunderstanding among stakeholders.	Prepare tactical communication plans to support the Project that will have the potential for greater stakeholder impact.	Stakeholders receive information they consider not relevant to them.
	Information is not widely understood or accessible.	Use plain English and pictures. Provide information on the Project webpage. Use mail drops to landowners within the Project area. Use a feedback survey with a published link to measure the level of understanding and engagement.	Stakeholders contact the Project Team for information and clarifications.
	Consultation is not sufficiently representative or inclusive.	Review the comprehensiveness of stakeholder mapping and continue to add stakeholders to the stakeholder register throughout the Project – encouraging stakeholders and community to register for project updates.	Minor stakeholders are not identified.
	Unresolved concerns escalate in the media, legal or political arenas damaging the reputation of the Project and City.	Establish internal project process to identify contentious issues early and implement management strategies. Advise the Project Team and the City at the earliest opportunities and coordinate response should issues arise.	Stakeholder lodges complaints with elected members, State Ministers or the media.
	Reduced public confidence damages the reputation of the Project and the City.	Establish internal project process to identify contentious issues early and implement management strategies. Advise the City at the earliest opportunity and coordinate responses should issues arise.	Stakeholder lodges complaints with elected members of the City.
	Stakeholders are unable to contact the City.	Use consistent contacts on all materials. Create comprehensive project FAQs for the City webpage.	Stakeholders bypass the City and contact the Project Team directly.
Residents have limited understanding of the Project taking them by surprise.	Residents express concern regarding the Project's scope and early engagement.	Early and comprehensive engagement with residents in and adjacent to the development area to ensure understanding and manage expectations.	Stakeholders lodge complaints with the City.

Key Issue/s	Communication Risk	Design Mitigation and management Strategy	Residual Risk
Department of Health assessment regarding mosquito risk creates fear in the community.	Consultation is overtaken by concern about public health impact by mosquito borne diseases, and the potential impact it may have on development within the area.	Early and comprehensive engagement around mosquito risk and controls.	Local media runs a fear campaign.
Developer interests swamp consultation process.	Diversity of stakeholders are not captured.	Create multiple engagement and feedback methods and promote engagement opportunities to stakeholders.	Some stakeholders opt not to participate in engagement process.
Stakeholders are impacted negatively by design options/outcomes, and there is no ability to consider alternative design options leading to a poor social outcome.	Community outrage and impact on project reputation.	Early identification and management of design issues raised by stakeholders, including the exploration of alternative design options.	Stakeholders lodge complaints with elected members of the City.
Native animals and plants – clearing, landscaping and revegetation.	Community campaign against proposed tree removal in development area.	Early identification of locations where significant vegetation is located, to inform the design process. Conversations with stakeholders to consider their concerns and alternate outcomes. Include information about landscaping outcomes. Early engagement with adjacent residents regarding clearing extents. Identify clearing offset opportunities (where appropriate).	Process/approvals delayed whilst issues are resolved.
Expectations and promises to the Traditional Owners are not kept.	Traditional Owners speak out against the project.	• Engage with Traditional Owners via established Aboriginal Advisory Group. • Use engagement methods that are culturally appropriate and tailored to the engagement needs of Traditional Owners.	Traditional Owners do not engage with the project.

3 Stakeholders and Issues

3.1 Identification and Prioritisation

The CSEP defines the strategies tailored to meet the specific needs and communications preferences of each of the Project's stakeholder groups, including stakeholders with special needs, such as Culturally and Linguistically Diverse groups and people with disabilities.

A four-step methodology will be employed to design the engagement process. This involves:

i) Identifying stakeholders who are impacted, or who have the potential to positively or negatively impact the project. Recording what each group expects from the project as well as their level of interest and influence. A variety of mechanisms will be used to gather this information, including desktop research, media review, and conversations with primary stakeholders such as the City, business and community groups.

ii) Profiling and prioritising key stakeholders based on an assessment of their influence, proximity and urgency.

iii) Targeted and tactical communications strategies will be developed in response to complex stakeholder needs. This will help tailor appropriate messages and define who, what, when and how the messages will be delivered for greatest impact. Activities will be designed to align expectations of stakeholders with the proposed works.

iv) Communications activities will be integrated with the project schedule to ensure timely delivery of information and reported at project review meetings.

As the project moves through different phases, stakeholder relationships will be reviewed regularly to reflect the changing needs and attitudes towards the project.

Stakeholder trend analysis from stakeholder feedback and database records will provide a mechanism for measuring the effectiveness and fine tuning of the engagement strategy over time.

3.2 Stakeholder Groups and Management

There are many stakeholders with an interest in the project. Broadly, they are categorised into the following groups, which include, but are not limited to the stakeholders listed below.

Stakeholders will be managed across three categories - primary, secondary and remote. Stakeholders will be allocated to an engagement category (based on the IAP2 Engagement Spectrum) at the commencement of the project and may shift categories during the project.

Each engagement category reflects a different level of engagement and resourcing:

- Primary / High stakeholder participation – Engagement approach "Participate"
- Secondary / Medium stakeholder participation - Engagement approach "Consult"
- Remote / Low stakeholder participation - Engagement approach "Inform"

Regardless of the engagement category, all stakeholders will have the opportunity to engage with the project through multiple communication methods.

Table 9: Stakeholder Map

Stakeholder	Influence	Interest	Interest	Spectrum	Resourcing
City of Rockingham (including staff and elected members)	Affected by & can affect	Community impacts Delivery of land supply in accordance with Planning Framework Tree and vegetation clearing Local road network and connections Mosquito management (public health and development outcomes) Reputation	Primary	Empower	Most
Project Team	Affected by & can affect	On budget Completion of project on schedule Reputation Quality	Primary	Empower	Most
Residents (inside KDSP)	Affected by	Development implications and implications for individual landholdings Impact on amenity Lower environmental / aesthetic values Tree and vegetation clearing Traffic flow, road network and connections Property values Impact on rates	Primary	Involve	Most
Businesses (inside KDSP)	Affected by	Security and safety Lower environmental / aesthetic values Tree clearing Road network and traffic flows Property values Impact on rates	Primary	Involve	More
Environment Advisory Committee / local environment groups	Affected by	Environment Protection of trees, plants and animals Vegetation clearing Mosquito impact and management Wetland management Habitat preservation	Primary	Involve	More
Traditional Owners	Affected by	Non-European Heritage Environment	Secondary	Inform	Less
Media (Sound Telegraph)	Affected by & can affect	Community impacts Community conflict Property values Vegetation removal Community amenity	Secondary	Inform	Less
Residents (outside KDSP)	Affected by	Security and safety Rural amenity Lower environmental / aesthetic values Tree clearing Traffic network, volume and management Property values	Secondary	Inform	Less

3.3 Key Messages

The CSEP includes key messages relating to the project, which should be incorporated consistently throughout the campaign in all printed materials and comments made by the project and its representatives to stakeholders. The messages will be continuously evaluated, and if necessary, expanded and/or fine-tuned to address changing community perceptions and concerns.

Given the potential impact of this project, the distribution or use of these messages should also be assessed against the political or community sensitivities at the time of use.

Table 10: Key Messages

Type	Message
Background	• The Perth and Peel @ 3.5 Million strategy and the associated South Metropolitan Peel Sub-regional Planning Framework ('Planning Framework') has identified Karnup as an Urban Expansion area. • The area has been identified for Urban expansion for approximately 40 years. • The Framework identifies a number of key land uses within KDSP including: o a new District Centre; o a Specialised Node as a strategic site for longer-term public uses, centrally located between Rockingham-Kwinana and Mandurah-Pinjarra, and providing for a range of regional public facilities which may include education, health and other future ancillary uses; o a 50ha Regional Sporting Facility site; o the Karnup Transit Precinct including a future railway station and transit orientated development on the Mandurah Railway Line, supported by a network of High Priority Transit Corridors and High Frequency Transit Corridors that will provide public transport connections between activity centres, population catchments, rail stations and local bus services; and o various changes to the regional transport hierarchy. • The Planning Framework requires the City to prepare a DSP, for the approval of the State Government, in advance of rezoning and subdivision within the area. • The City is committed to progressing preparation of the KDSP. In February 2023, Council appointed a Project Team, led by CDP to undertake the necessary technical investigations, and to prepare the DSP, in close liaison with the City. • The Project Team includes town planners, urban designers, civil engineers, traffic engineers, hydrologists, retail economists, environmental scientists, landscape architects, bushfire consultants, and community engagement specialists.
District Structure Plan Area	• The KDSP is approximately 2000ha in land area, extending from Stakehill Road in the north to Paganoni Road in the south, and from Mandurah Road/Fletcher Road to the west, to Baldivis Road and Kwinana Freeway to the east. • It includes land already zoned 'Urban Deferred' and owned by DevelopmentWA on the southern side of Stakehill Road. The area comprises a large proportion of fragmented landholdings. The balance land is predominantly zoned 'Rural' and 'Special Rural'.
Environmental	• Identification of trees and other vegetation, particularly habitat trees, is a key requirement of the technical investigations which will inform preparation of the DSP. This work will include a Black Cockatoo Habitat Assessment. Consistent with the City's sustainability framework, significant trees and other vegetation will be identified, and wherever possible, included within areas of open space, or within road reserves. These areas provide the best chance of protecting existing vegetation.

Type	Message
	• Preparation of the Planning Framework included consideration of environmental values at a strategic level, and resulted in several areas being excluded from the 'Urban Expansion' area. This includes two areas of land within the DSP area from consideration for urban development. • Depending on the outcome of technical investigations undertaken to inform the DSP, the extent of the 'Urban' zone for future rezoning under the MRS may also change.
Mosquitos	• The study area borders the Serpentine River, where there are large tracts of saltmarsh providing mosquito breeding habitat, and Anstey Swamp and Paganoni Swamp which may also provide mosquito habitat. Consultants are currently preparing a Mosquito Risk Assessment and Management Plan (MRAMP) to understand the impact and extent of mosquitos affecting the area. • The MRAMP will identify recommendations for the DSP to reduce exposure by future residents (and other occupants of the area) to offsite mosquito breeding, and to manage possible disease risk and nuisance. • Following consideration of the outcomes by the Council and State Government, the implications of mosquitos on future urban development will be able to be understood and the project will either proceed based on the agreed scope, or pause until such time as the implications are understood and a path forward is identified.

4 Communication Design

The MPC will prepare and distribute a range of targeted communications sufficient to secure stakeholder awareness, understanding and informed dialogue with stakeholders. The information will focus on notifying affected stakeholders about the Project, recording project progress, communicating progress, and encouraging stakeholder feedback.

All communications will include information about access to additional information and project contacts, including the information line number and website address.

4.1 Communications Information and Engagement Tools

The table below outlines the community information materials and forums to be employed by the Project Team in communicating with stakeholders and the community.

Table 11: Communication Tools

Email Updates via Rock Port	The City will distribute email updates regarding the project via Rock Port. The ability to register to receive emails will be available to all stakeholders.
Project Update	Project updates (newsletters) will be drafted by the Project Team and be approved by the City for distribution. The update will be printed and distributed to residents and businesses within the KDSP area and adjacent areas (where applicable) and will be available for download as a low-resolution PDF from the City's webpage.
Direct Mail	Direct mail will be limited to formal correspondence from the City to a specific landowner. Direct mail will not be used for broadcast messages.
Fact Sheets and FAQ's	A suite of fact sheets will be created explaining key aspects of design and development. FAQs on the City's website will be updated/maintained through the life of the project.
Door Knocks	The Project Team will conduct door knocks, where required, for highly impacted landowners through the KDSP process.
Workshops	The Project Team will conduct workshops as required to provide opportunities to present and discuss ideas and resulting concepts / plans, whilst enabling all participants to have the opportunity to actively engage in the process.
Community Listening Post	A Community Listening Post tool will be utilised if through the engagement process if it is identified that a larger cohort of the community needs to be engaged and informed about the project. It provides an opportunity to provide project information in a more informal setting and can be taken out into the community as a 'Pop Up'.
Online Surveys	Online surveys of key stakeholders may be undertaken during the Project to understand concerns and aspirations.
Social Media	The MPC will provide content to the City's Communications Team for their consideration and use on their social media channels. The Project Team will also hold regular virtual meetings with City representatives to provide updates on emerging issues and project progress.
Website	The City will maintain its easy to navigate project webpage for the duration of the Project. This webpage will assist in disseminating information and facilitate community feedback and participation on general and specific project issues. The Project Team will regularly provide approved content to the City to load to the webpage.
Newspaper	Notice of engagement opportunities may be included in local newspapers if communicating with a broader audience is required.
Presentations / Briefings	The Project Team will coordinate responses to invitations to present at local engagement sessions or when attending meetings with stakeholders. A register of meetings will be maintained by the Project Team.

Project Information Line	The Project Team will use the City's contact details as a "project information line". The City's telephone number will be included on all public information and will be supported by FAQs developed by the Project.
Councillor Engagement Session	The City will conduct Councillor Engagement Sessions as required to inform and involve Councillors in the KDSP process. The Project Team will provide information to be included in these sessions.

4.2 Elected Members

The Project will immediately advise the City if any enquiry from an elected member and will not initiate contact with elected members. Elected members are internal stakeholders managed by the City staff.

4.3 Communications Action Plan

The following Communications Action Plan remains a 'live' document which will be adjusted as necessary through the DSP process. Timeframes are indicative and will be updated periodically.

Table 12: Communications Action Plan

Activity	Purpose	Target Stakeholders	Timing
Phase 1: Stakeholder Engagement Preparation – Round 1 (Consultation on the Background Report)			
Circulate Community and Stakeholder and Engagement Plan for approval.	• Identify gaps in stakeholder matrix and/or proposed activities to engage with stakeholders.	Project Team / the City	Q3 2023
Conduct opportunities and constraints analysis, including finalising project parameters.	• Identify project negotiables (project elements that stakeholders/community can influence through their feedback and input) and non-negotiables.	Project Team	Q4 2023
Develop communications tools and materials including: • Project update • Update FAQs on City's website • Fact Sheets • Briefing/presentation • Online survey (if required) • Engagement opportunities (web, newspaper, social media, letter)	• Key messages to consistently support ongoing engagement and communications about the Project status, scope and process. • Monitor stakeholder sentiment and establish channel for collecting information that can be reported through the Consultation Outcomes Report.	Project Team / the City	Q4 2023
Review community enquiry handling process and register	• Ensure clarity on the appropriate process for stakeholders to make enquiries and for Project Team to respond appropriately.	Project Team / the City	Q4 2023
Review stakeholder database process and register	• Ensure clarity on the appropriate process and responsibilities for recordkeeping of stakeholder database.	Project Team / the City	Q4 2023
Councillor Engagement Session AND Environmental Advisory Committee briefing	• Provide briefing on status of project	The City	Q4 2023

Phase 2: Stakeholder Engagement Implementation - Round 1 (Consultation on the Background Report)			
Brief Local MLA	CoR staff to: • Provide overview of upcoming engagement process and seek initial feedback on planning and design considerations. • Test and validate assumptions about existing social risks and identify emerging issues or concerns. • Build advocacy / support for the Project. • Explore potential gaps in stakeholder matrix. • A 'no-surprises' approach. • Identify any missing communication channels to promote broader engagement.	Hon. Paul Papalia CSC, MLA, Member for Warnbro Hon. Reece Whitby MLA, Member for Baldivis (Note: Karnup is in Warnbro electorate, however, adjacent to and has relationship to Baldivis electorate)	Feb 2024
Brief Rockingham Elected Members		City of Rockingham Elected Members	November 2023 February 2024
Letter to landowners within KDSP area and 800m surrounding	• Provide brief Project Update • Provide opportunity for optimal engagement with priority/most impacted stakeholders. • Encourage participation in upcoming workshops.	Landowners within KDSP area and 800m surrounding.	February 2024
Advertising for upcoming community engagement opportunities: • Website – Rock Port • Mailout • Social Media – City of Rockingham Facebook • Newspaper – Sound Telegraph	• Provide an opportunity for optimal engagement with a broad audience.	ALL	February 2024 (After briefing MP)
Meeting with Aboriginal Advisory Group	• Provide overview of the engagement process and seek initial feedback on planning and design considerations. • Identify preferences for ongoing engagement. •	Aboriginal Advisory Group	Feb 2024
Online Survey	• Survey link to be circulated at workshops. • Provide an opportunity for those who are unable to attend workshops and still want to contribute.	ALL	March 2024

Key Stakeholder Group Workshop 1	• Provide overview of the engagement process and seek initial feedback on planning and design considerations. • Test and validate assumptions about the Project and identify emerging issues or concerns. • Build advocacy / support for the Project. • Explore potential gaps in stakeholder matrix. • A 'no-surprises' approach.	To be confirmed	March 2024
Key Stakeholder Group Workshop 2		To be confirmed	March 2024
Community Listening Post *(existing community event or other high foot traffic area)*	• Introduce the Project to the broader community. • Identify engagement preferences. • Build database. • Advertise community workshops.	ALL	February 2024
Community Workshop 1	• Provide overview of the engagement process and seek initial feedback on planning and design considerations. • Test and validate assumptions about project and identify emerging issues or concerns. • Build advocacy / support for the project. • A 'no-surprises' approach.	ALL	March 2024 (between 9am and 5pm on a weekday or weekend)
Community Workshop 2		ALL	March 2024 (after 6pm on a weekday or weekend)
Close the loop with stakeholders based on the first round of stakeholder engagement	• Provide a summary of engagement to date. • Manage stakeholder expectations on their role as part of any further engagement activities and how they will be kept updated as the project progresses.	ALL	March 2024
Community Outcomes Report	• Supporting document for the development of draft KDSP.	Project Team	April 2024
Draft Community Outcomes and Vision Report	• Supporting document for the development of draft KDSP.	Project Team / the City	May 2024
Second Draft Community Outcomes and Vision Report	• Supporting document for the development of draft KDSP.	Project Team / the City	June 2024
Present Community Outcomes and Vision Report to the Environmental Advisory Committee	• Opportunity for EAC to provide feedback.	Environmental Advisory Committee	June 2024
Present Community Outcomes and Vision Report to the City Council at a Councillor Engagement Session	• Council to resolve to adopt Report.	City of Rockingham Council	July 2024

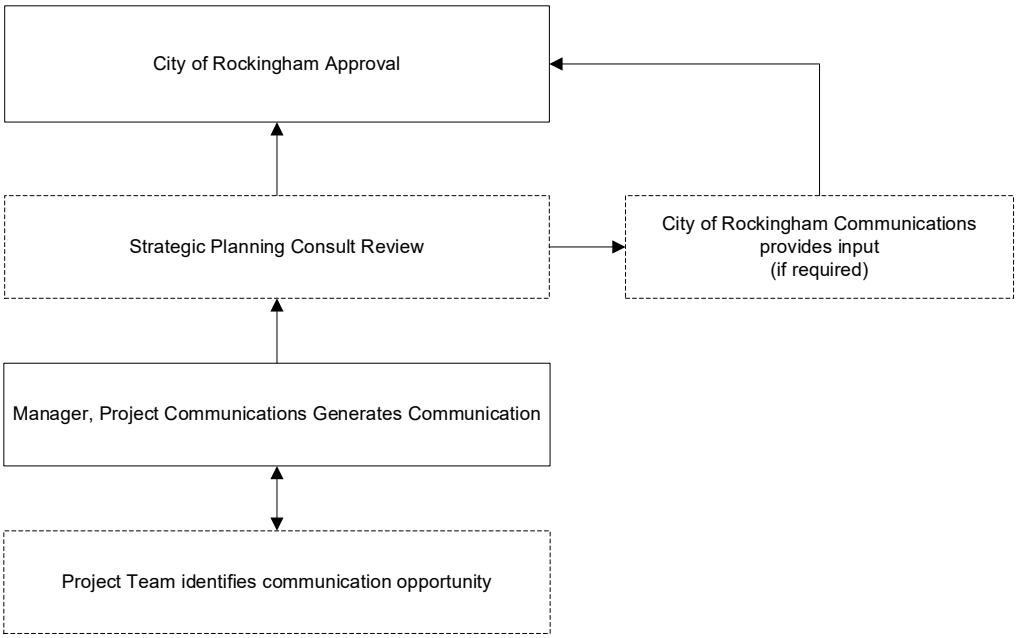
Workshop DSP Concepts with City and DPLH	• Opportunity for City and DPLH to provide feedback on concepts.	The City and DPLH	Sep 2024
Finalise Community Outcomes and Vision Report	• What's next / timeframes	ALL	Sep 2024
Preparation of Draft District Structure Plan			
Phase 3: Stakeholder Engagement Preparation – Round 2 (Draft DSP)			
Develop communications tools and materials including: • Project update • FAQs • Briefing/presentation • Advertising engagement opportunities (web, newspaper, social media, letter)	• Key messages to consistently support ongoing engagement and communications about the project status, scope and process. • Use Rock Port to support timely and consistent information to stakeholders. • Monitor stakeholder sentiment and establish channel for collecting information that can be reported through the Consultation Outcomes Report.	Project Team / the City	Q2 2025
Phase 4: Stakeholder Engagement Implementation - Round 2 (Consultation of Draft DSP)			
Council Engagement Session	• Present second draft of DSP to Council for feedback.	City of Rockingham Council	Q2 2025
Advertising Draft KDSP	• Stakeholders and community can provide feedback on the draft via the City's form for collecting feedback.	ALL	Q3 2025
Key Stakeholder Workshop	• Present Draft KSDP. • Opportunity for key stakeholders to provide feedback and ask questions.	To be confirmed	Q3 2025
Community Information Forum	• Stakeholders and community members can 'drop-in' at a time that suits them and ask questions of the Project Team. If they would like to provide feedback on the draft, they will be encouraged to do so via the City's form for collecting feedback.	ALL	Q3 2025
Consultation Outcomes Report First Draft	• Supporting document for the development of final KDSP.	ALL	Q4 2025
Finalise Consultation Outcomes Report	• Supporting document for the development of final KDSP.	ALL	Q1 2026
Councillor Engagement Session / Workshop	• Present Draft KSDP. • Opportunity for key stakeholders to provide feedback and ask questions.	City of Rockingham Council	Q1 2026
Preparation of Final District Structure Plan (Present to Council and Lodgement to WAPC)			
Close the loop with stakeholders	• Provide a project wrap-up.	ALL	Q2 2026

5 Communications Process & Approvals

5.1 Approval Process

To expedite the approvals process, the MPC will create opportunities for collaboration in the communications design process with representatives from the City.

5.2 Process Map 1: Approvals



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