



Environmental advice on the draft Carabooda District Structure Plan

prepared for the Western Australian
Planning Commission, under section 16 of the
Environmental Protection Act 1986

Environmental Protection Authority

April 2025

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This advice is provided to the Western Australian Planning Commission (WAPC) by the Environmental Protection Authority (EPA) under section 16 of the *Environmental Protection Act 1986* for the purpose of:

- identifying key environmental values of the draft Carabooda District Structure Plan (DSP) site
- advising what protection and enhancement of those environmental values is proposed for consistency with the EPA's objectives
- advising what additional environmental matters need to be considered at future planning stages.

This advice is intended for use by the WAPC, local government, government agencies, developers and the community to inform ongoing environmental planning for the Carabooda District Structure Plan site.

A handwritten signature in black ink, appearing to read 'Lee McIntosh', with a stylized, cursive script.

Lee McIntosh
Deputy Chair
Environmental Protection Authority

4 April 2025

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Executive Summary

Proposal subject to draft DSP: The draft Carabooda District Structure Plan (DSP) includes approximately 960 hectares (ha) of land bounded by Carabooda Road, Bush Forever Site (BFS) No 290/State Forest 65, Wesco, Karoborup and Gibbs Roads. The draft DSP proposes to provide approximately 9,200 residential dwellings accommodating a population of 23,000 people with district neighbourhood and local centres, high school and primary school sites and a conservation estate.

Purpose of EPA advice on draft DSP: The draft DSP has been proposed by Acumen Development Solutions (Acumen), acting for the Carabooda Landowners Group (CLG), and will now be considered for advertising by the Western Australian Planning Commission (WAPC).

The EPA has agreed to prepare environmental advice on the draft DSP at this early, formative stage of environmental planning in order to provide independent guidance on key site and cumulative environmental issues, and environmental protection needs.

Key environmental values of draft DSP site: The key values of the draft DSP site include¹:

- 334 ha of remnant vegetation, with 218 ha in good or better condition and 47 ha in excellent condition.
- 334 ha of moderate to high black cockatoo foraging habitat.
- 3 priority/threatened ecological communities (TECs): 45 ha Banksia Woodlands of the Swan Coastal Plain (SCP); 112 ha Tuart woodlands and forests of the SCP, and 12 ha Honeymyrtle shrublands on limestone ridges of the SCP.
- East-west ecological linkage comprised of primarily continuous vegetation with Bush Forever and national park areas, connected to a northern north-south ecological linkage.
- Patches of remnant native vegetation, that provide fauna habitat and 'stepping stones' for alternative pathways to habitat in adjacent areas (Bush Forever and national park).
- Occurrences of 5 conservation significant flora, and areas of regionally significant vegetation.
- Areas able to be restored and enhanced to improve the ecological functioning.
- No known cockatoo roosting sites or nesting trees², but potential for black cockatoo roosting and nesting habitat, with 11 confirmed roost sites in 6km of the DSP site and estimated 1,600 potential nesting trees on the site.

Proposed protection within/related to the draft District Structure Plan: The draft DSP (Figure 1) proposes the retention of approximately 234 ha remnant native vegetation within conservation estate areas, to retain significant flora and vegetation and fauna habitat environmental values. The conservation estate areas protect a significant proportion of the remnant native vegetation (70%), including some of the most significant elements of the key environmental values on the site.

Retention of most of the remnant native vegetation in an east-west ecological linkage is proposed to be included as part of the conservation estate through the centre of the DSP area linking BFS 290 to the east and BFS 383 to the west.

¹ Note all areas are approximate.

² Note there are survey limitations.

Enhancement of 30 ha degraded vegetation (12%) in the conservation estate is proposed to increase the ecological viability and environmental value of the conservation area(s).

A Conservation Management Fund established from seed capital from developers and sustained by ongoing ratepayer contributions is proposed to enable the conservation of remnant native vegetation and ongoing management of the conservation estate.

The conservation estate is proposed to be additional to the usual 10% contribution made to local Public Open Space (POS). The location of this POS will be identified at the Local Structure Plan stage and include land for active and passive open space.

Additional environmental protection recommended: The strategic planning stage for the Carabooda area affords an important opportunity for the environmental planning system to facilitate key housing and infrastructure needs at the same time as ensuring environmental protection. Planning considerations to provide a mix of built form and density can be used in response to environmental protections whilst ensuring population and housing projections are maintained.

The protections and enhancements within and related to the DSP as proposed by Acumen and the CLG, have significantly reduced the potential impact of the draft DSP on the environment, both on site and in a cumulative context. The EPA commends this approach.

Additional protections could be included which would further reduce the significance of impacts; the EPA recommends these protections be considered now and implemented in future stages of planning.

The EPA considers that the draft DSP and its implementation at future stages of planning should consider and incorporate environmental planning to incorporate the protection already proposed, and prioritise additional protection aligned with the following advice:

- Protection of Areas H, I, J (noting J proposed for Basic Raw Materials (BRM)), K, L and M on Figure 4. These are not currently proposed for retention but meet EPA criteria for regional significance. The EPA considers that these areas should be prioritised for retention as they provide very good and excellent quality vegetation and threatened fauna habitat.
- Additional protection of cockatoo foraging habitat. For Carnaby's cockatoo, there is 334 ha of moderate or better-quality foraging habitat on site; and although 217 ha (64%) is proposed to be retained, 118 ha (36%) remains proposed to be cleared. For Forest red-tailed black cockatoo, there is 223 ha of moderate or better-quality foraging habitat; 56 ha (25%) is proposed to be cleared. The amount of clearing is a likely to be a significant environmental impact, and as detailed in the [Referral guideline for 3 WA threatened black cockatoo species](#) (DAWE 2022) likely to require referral to the Commonwealth. Additional areas protected on site should be considered, particularly where areas are aligned with roosting, nesting, quality foraging habitat or other environmental values.
- For counter-balancing significant residual impacts, see EPA advice below on consideration of environmental offsets through a lens of prioritising on site protection, and enabling restoration and enhancement opportunities.
- Protection of any cockatoo roosting sites, and potential nesting trees with suitable hollows, found during on ground surveys.
- Maintaining ecological linkages through protection of consolidated areas of vegetation and viable ecological stepping stones (in addition to the proposed maintenance of the east-west ecological linkage).

- Inclusion of buffer areas to avoid and minimise adverse impacts to conservation estate areas and any key values retained in POS.
- Consider whether infrastructure (road) alignments can be located to reduce impacts to environmental values of conservation areas and black cockatoo habitat.
- Continuation of a holistic protection focus – prioritisation of identification and protection of areas which contain multiple key values.
- Protection of any additional key environmental values in conservation estate areas, where practicable, or otherwise in POS.

The EPA considers that, once additional protections are addressed through the draft DSP and future planning processes, development under the draft DSP is likely to be consistent with the EPA's environmental objectives.

Environmental offsets: The EPA advises that if the significance of residual impacts is reduced on site through the application of the mitigation hierarchy, this is likely to be preferable to provision of off-site offsets.

The EPA considers that, for environmental planning purposes:

- a) if on-site protection measures such as avoidance, management, restoration and enhancement are consistent with the quality and quantity of off-site offset requirements that would normally be determined through an offsets calculator, and
- b) if the on-site protection measures are consistent with the EPA's advice on offsets at regional scale (EPA 2024a),

this will likely be adequate to counter-balance residual on-site impacts.

Any off-site offsets which are proposed at future stage of planning should also consider the EPA's advice on offsets at regional scale.

Implementation of offsets through future planning processes is recommended, so the EPA can take the likely outcome and security of offsets into account in any future decision-making processes.

1 EPA advice: purpose, intended use and guidance for future environmental planning

Purpose: This advice is provided to the WAPC by the EPA under section 16 of the *Environmental Protection Act 1986* for the purpose of:

- Identifying key environmental values of the draft Carabooda District Structure Plan (DSP) site.
- Advising what protection and enhancement of those environmental values is proposed for consistency with the EPA's objectives.
- Advising what additional environmental matters need to be considered at future planning stages.

This advice is intended for use by the WAPC, local government, government agencies, developers and the community to inform ongoing environmental planning for the Carabooda DSP site.

Intended use: This advice is being provided at a preliminary planning stage outside of a formal statutory EPA process, to provide independent environmental guidance on key site environmental issues at an early formative stage in environmental planning. The EPA expects this advice to increase the certainty, efficiency and achievement of good environmental outcomes from the environmental planning process.

Proactive approach commended: The EPA acknowledges and commends the proactive approach taken by Acumen and the CLG to provide detailed and site-specific information on environmental values within the DSP site, including areas of priority and threatened ecological communities and habitat for species of black cockatoo. The provision of this detailed information early has facilitated an efficient review and assisted with providing EPA advice on specific environmental matters.

Advice on draft District Structure Plans: The EPA acknowledges that the level of environmental information provided for the draft Carabooda DSP may not be available for future draft DSPs; the EPA still intends to provide advice on those DSPs where practicable but notes the specificity of advice will be influenced by the information it has available.

Strategic environmental protection on the Swan Coastal Plain: The EPA's Strategic Plan 2023-26 includes development of an environmental protection framework for significant environmental assets such as the Swan Coastal Plain (SCP). The EPA considers that providing advice on draft DSPs on the SCP is consistent with this strategic plan objective, through enabling a focus on sub-regional areas within the SCP. The EPA expects DSP advice will be a key tool to ensure environmental protection in the SCP is comprehensive, adequate, and representative.

The EPA also notes achievement of this strategic plan objective will require identification of opportunities for enhancement of degraded areas, to enable restoration of areas with holistic environmental values. An offsets framework for the SCP which is consistent with the EPA's advice on offsets at a regional scale (2024a) would be an important policy mechanism to support this.

EPA guidance for future environmental planning on the Swan Coastal Plain: Outside of providing environmental advice on subregional areas of the SCP through section 16 advice,

and decision-making on schemes and scheme amendments, the EPA recommends the following be considered in preliminary planning stage outside of a formal statutory EPA process.

The EPA expects early consideration of this advice to increase the certainty, efficiency and achievement of good environmental outcomes from the environmental planning process:

- [Guidance for planning and development: Protection of naturally vegetated areas in urban and peri-urban areas](#) (EPA 2021b)
- [EPA Submission into DPLH Urban Greening Strategy](#) (EPA 2024b)
- [Considering environmental offsets at a regional scale](#) (EPA 2024a)
- [Carnaby's Cockatoo in Environmental Impact Assessment in the Perth and Peel Region](#) (EPA 2019)
- [Interim strategic advice - Perth and Peel @ 3.5 million: Environmental impacts, risks and remedies](#) (EPA 215)
- [Guidance Statement No. 33: Environmental Guidance for Planning and Development](#) (EPA 2008)
- [Guidance Statement No. 3: Separation Distances Between Industrial and Sensitive Land Uses](#) (EPA 2005).

2 Carabooda District Structure Plan: key environmental planning characteristics

The Carabooda DSP site comprises approximately 960 ha across 65 lots within the City of Wanneroo. It is located in the North-West corridor approximately 35 km north of Perth Central Business District (Figure 1). Most of the site is currently zoned 'Rural' under the Metropolitan Region Scheme (MRS) and 'Rural Resource' under the City of Wanneroo District Planning Scheme (DPS) No. 2. Two Water Corporation sites with the site are reserved for 'Public Purposes'.

The February 2025 draft DSP proposes to provide approximately 9,200 new dwellings to house approximately 23,000 people with services including district neighbourhood and local centres, high school and primary school sites and areas of open space.

The draft DSP (Figure 2) proposes the retention of approximately 234 ha (24% of the DSP area) of remnant native vegetation as conservation open space, mostly as an east-west corridor, to retain significant flora and vegetation, and fauna habitat environmental values. The proposed retention area includes approximately 9.5 ha of native vegetation on the Water Corporation sites.

The East-West corridor is part of an ecological linkage (Del Marco et al 2004) that runs through the centre of the DSP area linking Bush Forever Site (BFS) Site No.290 located to the east, within State Forest 65, and BFS No.383 to the west, within the Nowergup Nature Reserve and Nowergup National Park.

A Conservation Management Fund established from seed capital from developers and sustained by ongoing ratepayer contributions is proposed to enable the conservation of remnant native vegetation and ongoing management of the conservation estate.

The conservation estate is proposed to be additional to the usual 10% contribution made to local Public Open Space. The location of this POS will be confirmed at the local structure plan stage and include land for active and passive open space. Areas of remnant native vegetation and fauna habitat may also be retained in POS areas.

3 Advice on key environmental values

The EPA provides the following advice on:

- Identifying key environmental values of the Carabooda DSP site.
- Advising what protection and enhancement of those environmental values is proposed for consistency with the EPA's objectives.
- Advising what additional environmental matters need to be considered at future planning stages.

The EPA advice is structured on the basis of the environmental factors it usually considers for environmental impact assessment.

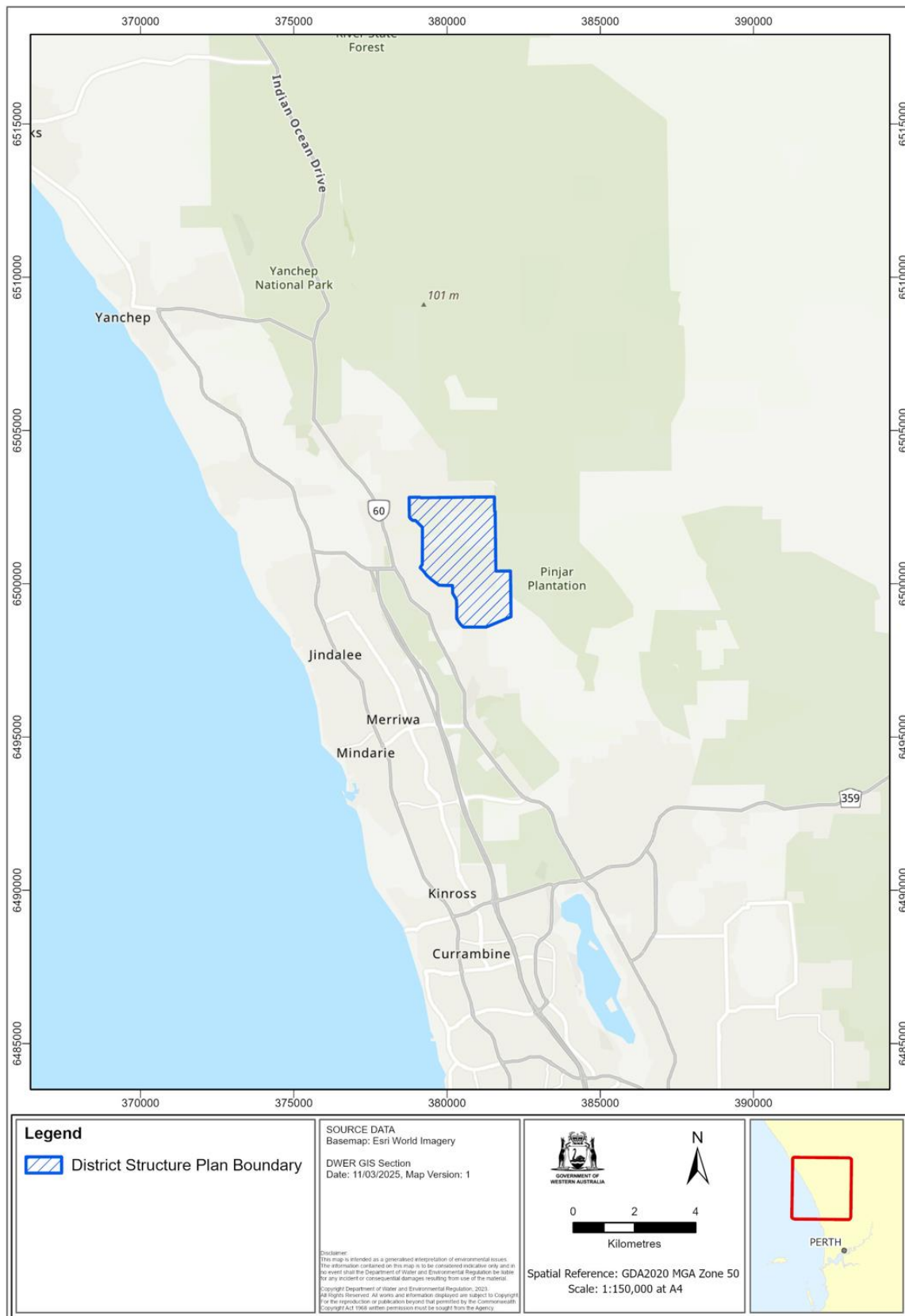


Figure 1 Carabooda DSP location

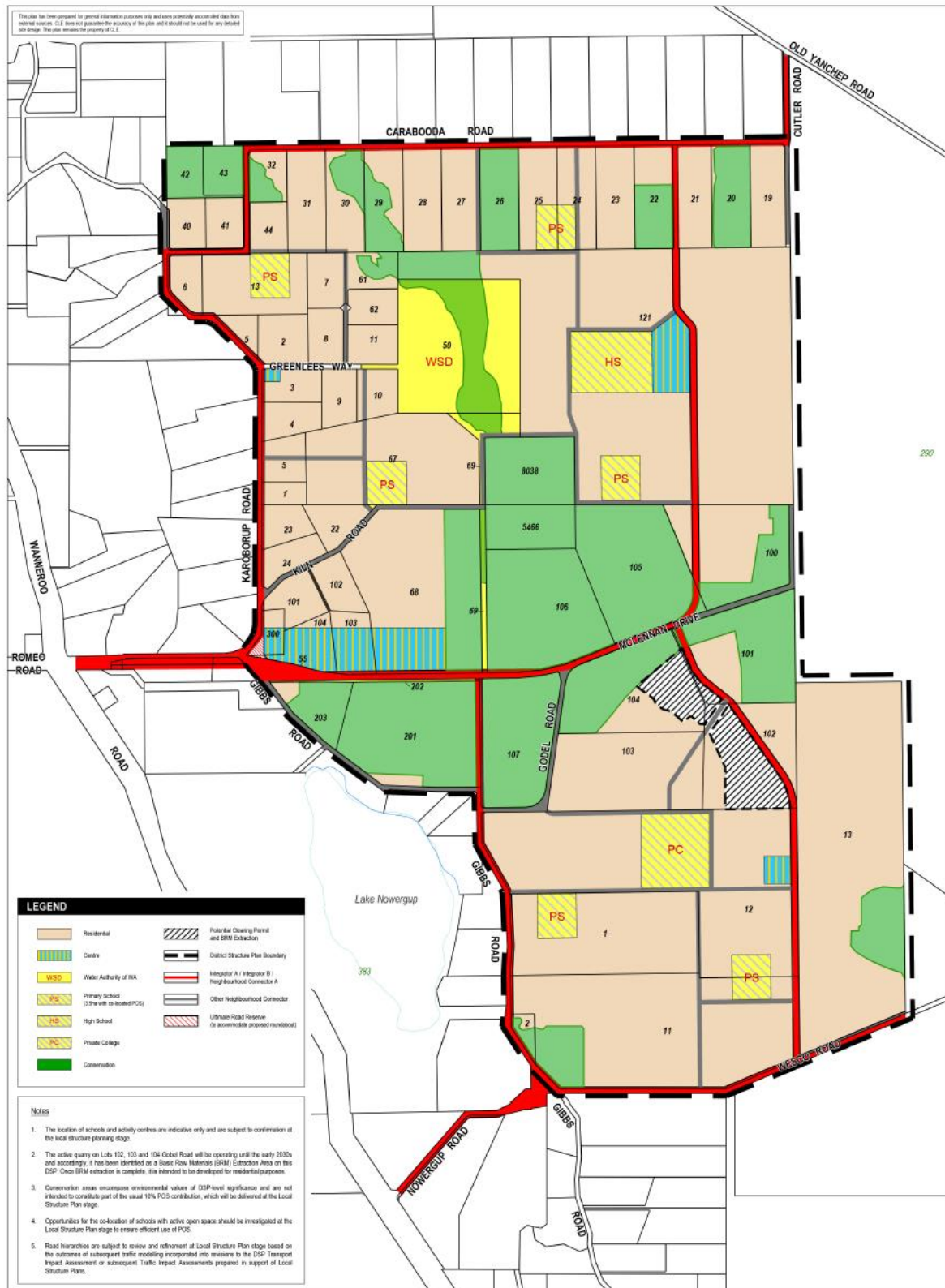


Figure 2 Carabooda DSP (CLE Town Planning and Design 2025)

4 Flora and vegetation

The EPA environmental objective for flora and vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016a).

Table 1 Flora and Vegetation key environmental values, and recommendations for future environmental planning³

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Remnant vegetation and conservation areas Key values: • 334 ha of remnant native vegetation. • 218 ha remnant native vegetation is in 'Good' or better condition. • Vegetation of regional significance, based on meeting two or three of the EPA's six criteria for regional significance. The draft DSP proposes retention of: • 234 ha (70%) of remnant native vegetation retained in conservation areas. • 162 ha (69%) of remnant native vegetation in 'Good' or better condition in conservation areas • Areas A, B, C, D, E and F (Figure 4) are regionally significant and are proposed to be retained in the conservation estate. The draft DSP proposes remnant vegetation and rehabilitated vegetation to be retained for conservation in a future Parks and Recreation reserve under the MRS.		118 ha (35%) remnant native vegetation is proposed to be cleared, including 60 ha (27%) of vegetation in good or better quality. Priority has been given to retention, protection and enhancement of key vegetation values, which the EPA considers appropriate and should continue. Priority has been given to location of development on cleared and degraded land, which the EPA considers appropriate and should continue. The EPA has considered the remnant native vegetation within the DSP area in the context of regional significance. All areas of remnant native vegetation meet two or three of the EPA's six criteria for regional significance. Remnant native vegetation has been mapped, based broadly on vegetation condition, as 'Areas', as displayed in Figure 4. Several areas are proposed to be retained; and specific advice on areas not proposed for retention in the draft DSP, is provided below. The extent and quality of vegetation which is proposed to be retained and enhanced on site is likely to be consistent with achievement of

³ Areas of vegetation are approximate and include vegetation on Water Corporation sites. Areas of vegetation clearing are for proposed urban and basic raw material extraction areas.

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Ongoing management and enhancement: At future stages of planning, there is proposed preparation of: • vegetation management plan to guide retention, protection and rehabilitation • conservation management plan for Threatened Ecological Communities (TEC) • restoration plan for restorative planting of approximately 30 ha on areas which are degraded within the 234 ha conservation estate. See Figures 3 and 4 for remnant native vegetation condition and draft DSP conservation areas and recommendation areas respectively.		comprehensive, adequate and representative native vegetation protection in DSP site. However, the EPA considers this is the maximum likely to be able to be cleared on-site and still be consistent with EPA objectives, and further conservation areas should be identified, with priority given to retention of the key values identified in this advice. This will ensure cumulative impacts and effects such as climate change and a drying climate, and other potential development in the region do not undermine the environmental protection on site. The EPA notes the draft DSP will facilitate a new urban precinct providing residential land in the North-West corridor and create a new community that will benefit from the environmental values being retained. Strategic planning provides the opportunity for urban development; residential, commercial/community services and infrastructure needs, to be considered holistically with protection of environmental values. It is at this strategic planning stage that planning considerations can provide a mix of built form and density to ensure population and housing projections are maintained whilst protecting significant environmental values in situ. Local Planning Scheme amendments/structure plans should include requirements for retention of proposed and additional remnant native vegetation and, preparation and implementation of management plans.
Excellent condition vegetation Key value: 47 ha of remnant native vegetation in 'Excellent' condition (Figure 3). 35 ha (74%) proposed for retention in conservation areas.		Approximately 12 ha (26%) of excellent condition vegetation is proposed to be cleared. The EPA considers this is the maximum likely to be able to be cleared on-site and still be consistent with EPA objectives, and recommends retention of all additional excellent condition vegetation that remains in

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
See Figures 3 and 4 for remnant native vegetation condition and draft DSP conservation areas and EPA additional conservation recommendation areas respectively.		viable patches, with adequate buffer areas provided to minimise indirect impacts. The EPA provides the following advice for consideration of additional retention and conservation areas in future planning: • Small and isolated areas (not in close proximity to other conservation areas) are less likely to be sustainable. Priority should be given to larger areas and areas that are located near to other conservation areas. There is no “minimum” area that needs protection, but all other things being equal, larger areas are usually preferred to smaller areas. • Areas which are irregularly shaped or have longer boundaries are difficult to successfully manage for conservation purposes. Priority should be given to regular shaped areas, and areas which minimise boundary effects. Areas which are part of ecological linkages are more likely to support ecological functioning. Priority should be given to ensuring a north-south vegetation corridor, and enhancing the east-west vegetation linkage.
Three Priority/Threatened Ecological (PEC/TEC) Communities Key values: Banksia Woodland of the SCP, Tuart Woodlands and Forests of SCP, Honey-myrtle shrublands on limestone ridges of the SCP Retention of: • 39 ha (87%) of Banksia Woodland of the SCP (Banksia Woodlands) with 24 ha in ‘Very Good’ to ‘Excellent’ Condition.		The area of Banksia Woodlands proposed for clearing is 6 ha (13%). The area of Tuart Woodlands proposed for clearing is 28 ha (26%). No clearing of Honey-myrtle is proposed. The EPA notes this includes occurrences of the TEC on the Water Corporation sites. Protection of all or significant proportions of key values as proposed is consistent with EPA objectives.

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
84 ha (74%) of Tuart Woodlands and Forests of SCP (Tuart Woodlands) with 34 ha in 'Good' or Better Condition. 12.09 ha (100%) of Honeymyrtle shrublands on limestone ridges of the SCP (FCT 26a). See Figure 5: Conservation significant ecological communities within the site.		The amount of clearing of Banksia and Tuart Woodlands is likely significant and meet Commonwealth referral condition thresholds (DOEE 2016, 2019). Additional protection, particularly of Tuart and Banksia Woodlands is recommended where consistent with EPA's advice on other key values, such as protecting more excellent quality vegetation, creating more ecological linkages, or protecting more areas of regional environmental significance. Future planning processes should ensure that ongoing protection of these communities on site is enabled by ensuring they are protected in viable patches and have ongoing and appropriate protection and management i.e. fencing, buffers, hard edges.
Conservation significant flora species Key values: 5 conservation significant flora species present in DSP area: <i>Eucalyptus argutifolia</i> <i>Pimelea calcicola</i> <i>Stylidium maritimum</i> <i>Eucalyptus foecunda</i> subsp. <i>Foecunda</i> <i>Melaleuca</i> sp. Wanneroo (presence in DSP site confirmed by WA Herbarium) The draft DSP includes retention of: - All 6 individuals of Yanchep mallee (<i>Eucalyptus argutifolia</i>) protected within the conservation estate area. 1 of 2 identified populations of <i>Pimelea calcicole</i> protected in conservation estate. - The population of <i>Stylidium maritimum</i> protected in conservation estate. See Figure 6 for Conservation significant flora within the site.		There are likely to be impacts to identified priority flora species within potential BRM extraction area: - population of <i>Pimelea calcicola</i> (P3). - plants <i>Eucalyptus foecunda</i> subsp. <i>foecunda</i> (P4). The EPA considers these may be the maximum likely to be able to be cleared on-site and still be consistent with EPA objectives. Additional protection is recommended where consistent with EPA's advice on other key values, such as protecting more excellent quality vegetation, creating more ecological linkages, or protecting more areas of regional environmental significance. Noting occurrences of <i>Melaleuca</i> sp. Wanneroo within the DSP site is not yet available on public datasets and was not identified through survey for DSP, retention of and/or impacts to <i>Melaleuca</i> sp. Wanneroo have not been identified. The EPA consider occurrence(s) of <i>Melaleuca</i> sp. Wanneroo should be prioritised for retention, consistent with Ministerial Statement 1207.

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Ecological linkages and stepping stones Key value: An east-west ecological linkage runs through the central area of the DSP site linking BFS 290 to the east, and BFS 383 to the west, which are within the Nowergup Nature Reserve and Nowergup National Park. The draft DSP includes retention of: • The east-west ecological linkage and retention of vegetation as a northern north-south link, (Area A in Figure 4) which creates a large conservation area of approximately 190 ha. • Areas B, C, D, E, F and G as conservation. See Figures 2 and 4 for draft DSP conservation areas.		Remnant vegetation within the DSP site contributes to Regional Ecological Linkage No.8 (del Marco et al.2004). The retention of the east-west ecological linkage, with proposed northern north – south corridor, as a large consolidated conservation area, and Areas B, C, D, E, F and G, which provide stepping stones, is consistent with EPA objectives. The northern north-south corridor includes vegetation on Water Corporation sites, is also important and the EPA considers additional protections should be included to ensure this corridor is retained and enhanced. The addition of Areas J, K, L and M to the conservation estate would also provide additional protections, and ‘stepping stones’ assisting with maintaining biological diversity and movement throughout the broader landscape. The EPA notes the conservation area will be fragmented by existing and proposed roads. The EPA advises roads in conservation areas reduces habitat connectivity and environmental values including loss of genetic diversity, long-term viability and increases edge effects (weeds, fire, human disturbance, feral animals). The EPA recommends road location be reviewed; it considers it is at this strategic level of planning where infrastructure (road) alignments can be located to reduce impacts to environmental values of conservation areas.
Potential for restoration The draft DSP proposes a restoration plan at subsequent stages of planning for restorative planting of approximately 30 ha of		Restorative planting of conservation areas provides onsite environmental benefits and is supported by the EPA where consistent with its advice on offsets at a regional scale.

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
vegetation identified as 'Degraded' and 'Completely Degraded' within conservation estate areas.		Restoration is also part of the mitigation hierarchy and can reduce the significant residual impacts on site and the need to consider off-site environmental protections in order to offset (counterbalance) on site impacts. Implementation of restoration planting should consider the timing of the environmental benefit i.e. for black cockatoo foraging, the time lag between foraging habitat clearing, planting, and maturation of foraging species. Local Planning Scheme amendments/structure plans should provide additional information on proposed restorative planting and include requirements for preparation and implementation of management plans to meet specific, time related environmental outcomes.
Area specific advice (For areas shown in Figure 4) Areas A – G are proposed for retention, the EPA advises these meet EPA criteria for regional significance and conservation of them is consistent with EPA objectives. Areas H, I, J, K, L and M, which are not proposed for retention, also meet EPA criteria for regional significance. The EPA considers that these areas should be prioritised for retention, with consideration of other key environmental values. Area M is connected to Area F (Area F is proposed as a conservation area and contains Tuart Woodlands in 'Good' to 'Excellent' condition). Area M contains vegetation identified as high value for Carnaby's cockatoo foraging and potential breeding habitat. Whilst not identified in the FCT analysis, the vegetation also potentially meets the Commonwealth key diagnostic criteria for the Honey myrtle shrublands on limestone ridges of the SCP TEC. Further analysis and interpretation should be undertaken to inform TEC occurrences. The insert in Figure 4 identifies black cockatoo habitat that could also provide a minor corridor/linkage to Nowergup Lake. Retention of additional vegetation will increase the long-term viability of the conservation area and result in greater avoidance of impacts to high value Carnaby's foraging habitat and potential breeding habitat.		

Key environmental values	Protection and enhancement currently proposed in draft DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Area H - located relatively close to Area A in the north of the DSP site, Area H contains approximately 0.7 ha of vegetation type <i>Banksia sessillis</i> in 'Very Good' condition. Area H is also identified as high value foraging habitat for Carnaby's cockatoo. The completely degraded area (lot boundary / firebreaks) between Areas A and H provides an opportunity for revegetation to further minimise the impacts of vegetation and habitat clearing in the DSP site. Area I – an irregular shaped remnant of approximately 1 ha in 'Very Good' condition. Area I and an adjacent remnant are located on Lot 13 and, via roadside assessment, identified as high value Carnaby's cockatoo foraging habitat; large trees were not inspected. Area I is in very close proximity to a black cockatoo roost site. Future planning should be informed by survey for black cockatoo and consider retention of black cockatoo habitat values. Area K – approximately 9 ha of remnant native vegetation dominated by <i>Banksia sessillis</i> in 'Good' and 'Very Good' condition. Similar to Area M, this vegetation also potentially meets the Commonwealth key diagnostic criteria for the Honeymyrtle shrublands on limestone ridges of the SCP TEC and further analysis and interpretation should be undertaken to inform TEC occurrences. Area K is also mostly high-quality foraging habitat for Carnaby's cockatoo. Retention of this habitat would provide additional avoidance and reduce the requirement for future off-site offsets. Area L – this remnant native vegetation of approximately 3.5 ha is also dominated by <i>Banksia sessillis</i> in 'Very Good' condition and provides high quality Carnaby's foraging habitat. A recent roadside inspection identified a <i>Xanthorrhoea</i> sp.; potentially an unidentified morphologically distinct taxon co-occurring with <i>Xanthorrhoea preissii</i>. The vegetation also potentially meets the Commonwealth key diagnostic criteria for the Honeymyrtle shrublands on limestone ridges of the SCP. The EPA recommends that further investigation/analysis is completed to confirm the unidentified species and potential TEC occurrence to assist in informing if Area L should be retained within the conservation estate.		

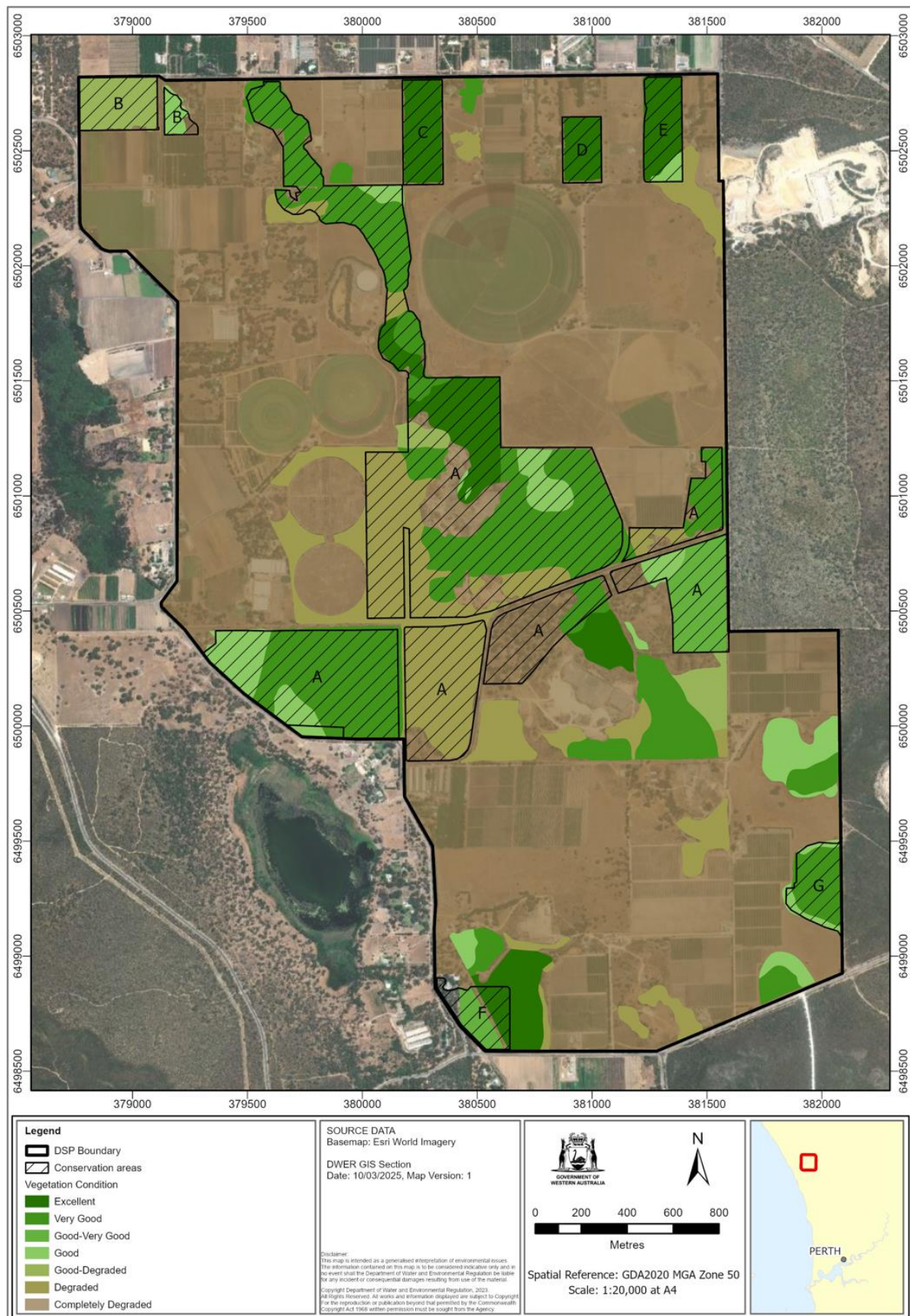


Figure 3 Remnant native vegetation condition and conservation areas

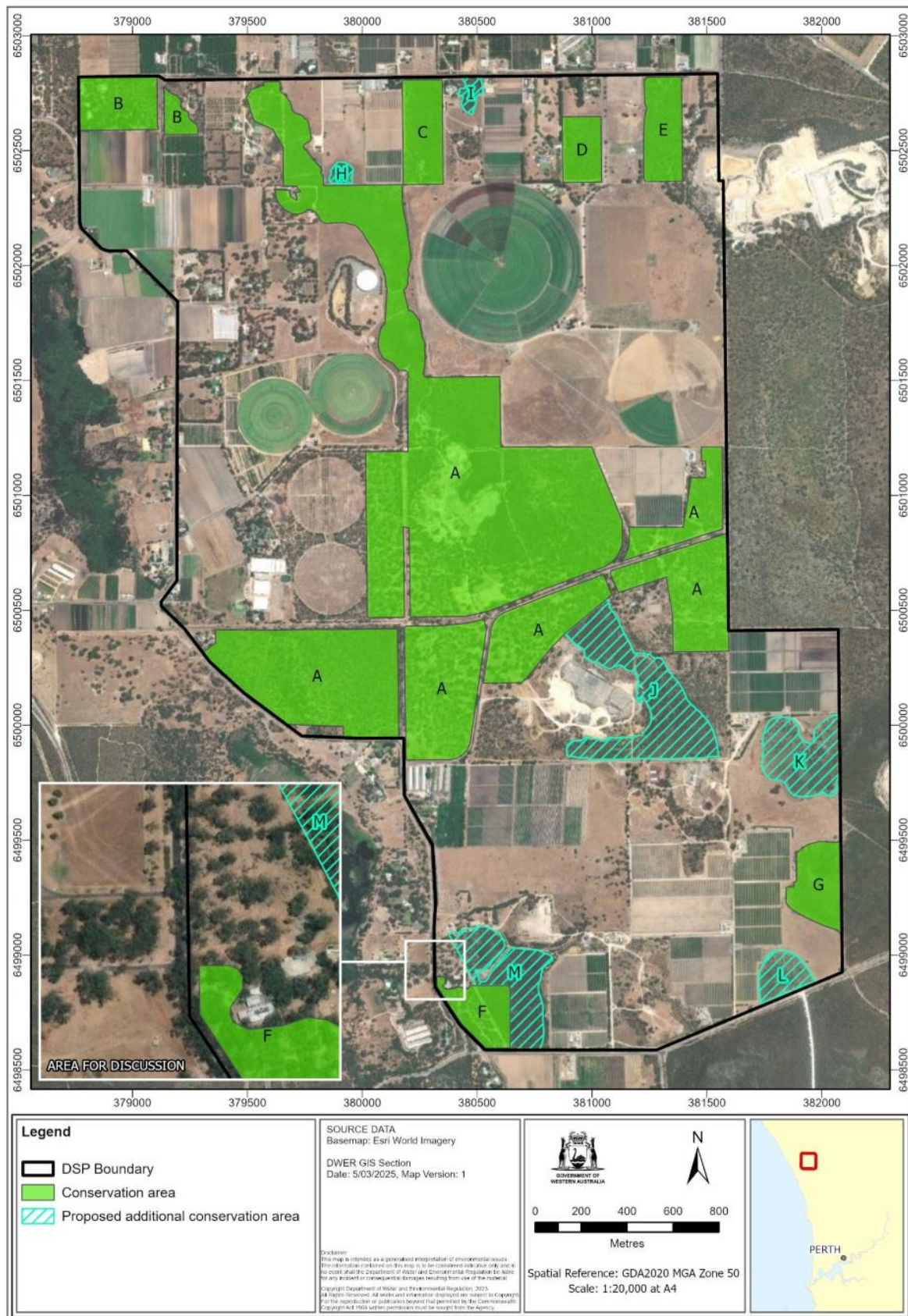


Figure 4 Draft DSP Conservation areas and EPA additional conservation recommendation areas

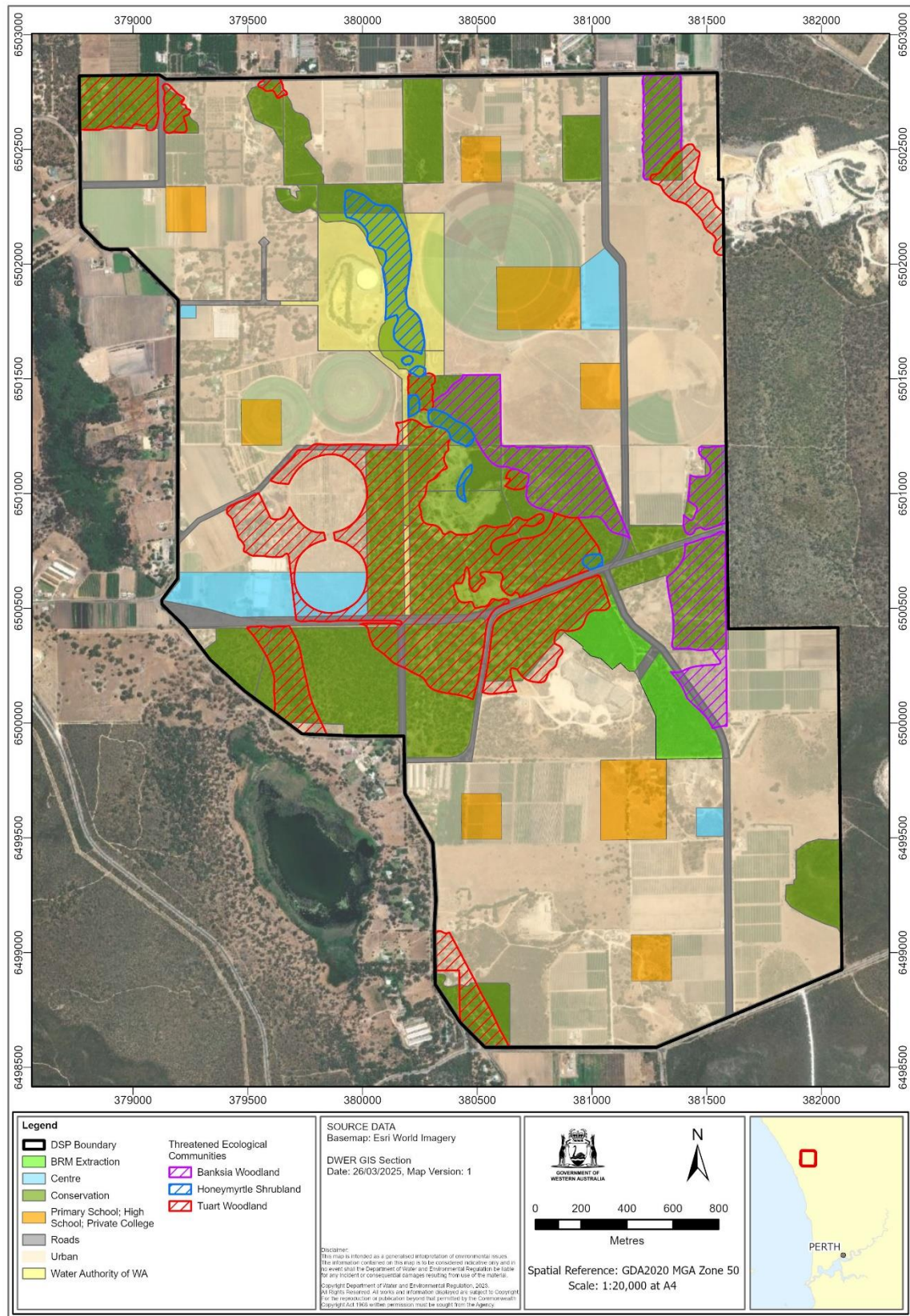


Figure 5 Conservation significant ecological communities within the site

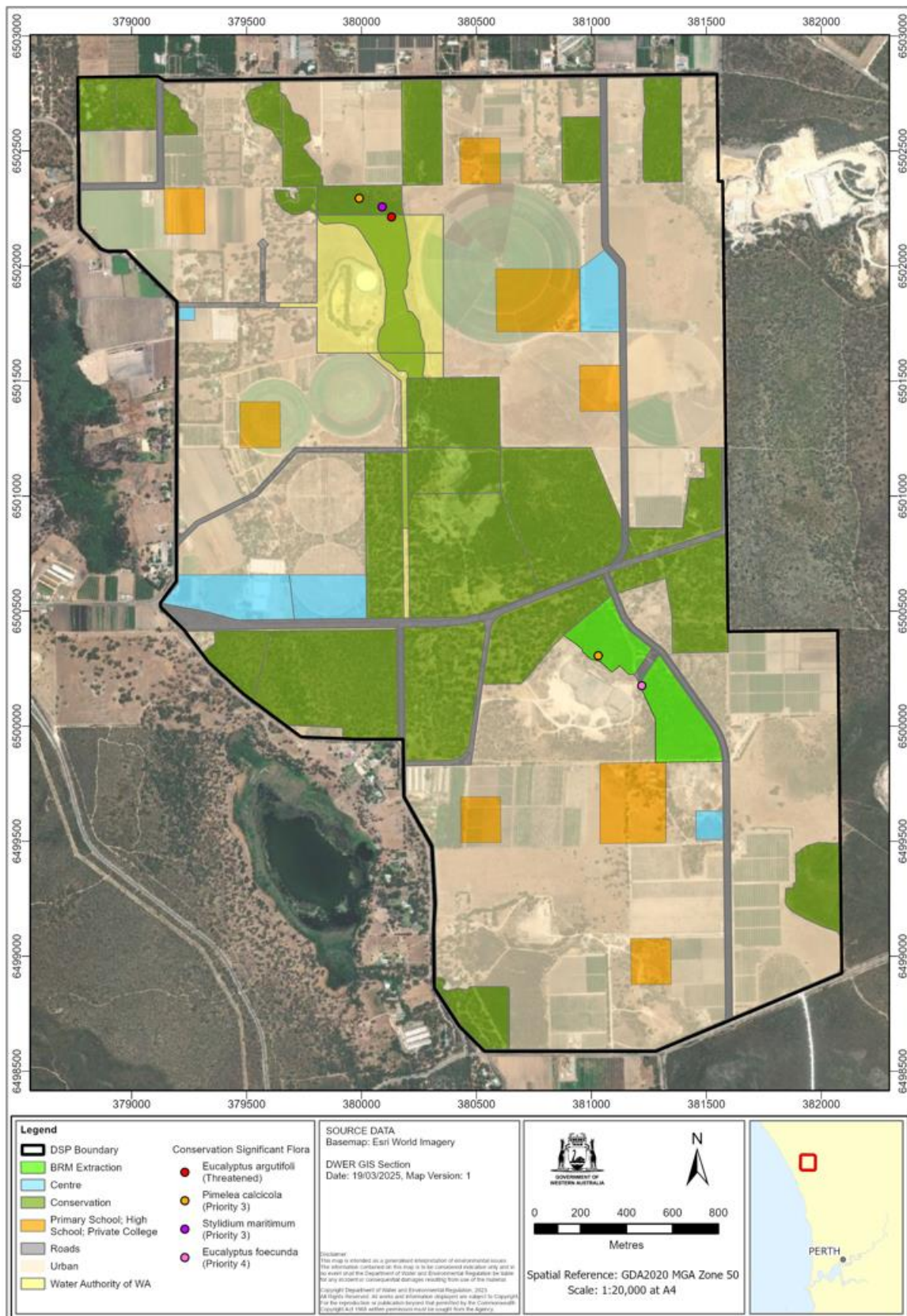


Figure 6 Conservation significant flora within the site

Cumulative and strategic environmental planning considerations: Due to the strategic nature of the draft DSP, the EPA's cumulative impact considerations is high level.

The DSP site is within the North-West Sub-regional Planning Framework corridor (WAPC 2018a). The corridor is dominated by extensive urban development with areas still to be developed for urban purposes. The existing and proposed urban development has resulted in the clearing of vegetation that would likely have been representative of Banksia Woodlands and Tuart Woodlands.

The EPA has considered clearing as a result of:

- EPBC 2017/7872 for urban development at East Eglinton: clearing of no more than 41.29 ha and retention of minimum 8 ha of Banksia Woodland clearing of up to 79 ha of cbc habitat.
- Alkimos Desalination Plant – disturbance of up to 1.7 ha of Banksia Woodlands and 1.16 ha of Tuart Woodland.
- Yanchep rail extension part 2 – Eglinton to Yanchep – clearing/disturbance of 8.8 ha of Banksia Woodlands and 56.3 ha of Carnaby's cockatoo foraging habitat.
- East Wanneroo DSP - proposes the development of more than 8000 ha of land. It will potentially impact 255 ha of Banksia Woodlands and 33 ha of Tuart Woodlands.

The EPA advises that the proposed retention of 39 ha (87%) of the mapped extent of Banksia Woodlands and 84 ha (74%) of Tuart Woodlands in proposed conservation areas in the draft DSP limits the incremental loss of these PEC/TECs.

The EPA notes impact to conservation significant flora species in the draft DSP area have been limited, and with retention of *Melaleuca* sp. Wanneroo, the cumulative impacts to significant flora are unlikely to be inconsistent with EPA's objectives.

The EPA considers that, in the context of the significance of the environmental values at risk, the impacts of the draft DSP and the proposed conservation estate area can be appropriately managed to provide for an environmental outcome that is consistent with the EPA's objective.

The EPA notes the current MRS and local scheme zoning of land in the DSP site allows land uses which, if implemented, may negatively impact environmental values i.e. BRM extraction. The EPA advises that development in proposed conservation areas of the DSP that impact environmental values may reduce consistency with the EPA's objectives.

Additional information required for future environmental planning of DSP: The EPA advises the flora and vegetation survey reports do not meet all requirements of the EPA technical guides for survey (EPA 2016b, 2016d, 2020). Consultation with DBCA regarding consistency with the technical guide for the FCT analysis and definition of threatened ecological communities is recommended. Review and additional survey and analysis may be necessary to ensure remnant native vegetation does not contain conservation significant flora or is representative of PEC/TECs. The EPA advises this should be undertaken in consultation with DWER and DBCA prior to local planning scheme amendment/local structure planning stage to inform environmental planning outcomes and the EPA's consideration of planning scheme referrals.

5 Terrestrial Fauna

The EPA environmental objective for flora and vegetation is to *protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016c).

Table 2 Terrestrial fauna key environmental values and recommendations for future environmental planning⁴.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Key value: Black cockatoo foraging habitat The entire DSP site provides black cockatoo habitat ranging from low quality; predominately cleared with scattered trees, to areas of high and higher quality foraging habitat. 334 ha is of moderate or better-quality foraging habitat for Carnaby's Cockatoo. 223 ha is of moderate or better-quality foraging habitat for Forest Red-tailed Black-cockatoo (FRTBC). The draft DSP proposes retention of: 233 ha of black cockatoo foraging habitat (comprising cleared areas with scattered trees to higher quality) with: 215 ha, being 64% of the total moderate or better quality foraging habitat for Carnaby's Black Cockatoo 166 ha, being 75% of the total moderate and moderate to high quality foraging habitat for FRTBC. The draft DSP proposes at future stages of planning preparation of a restorative planting program within conservation areas of approximately 30 ha.		118 ha (35%) of Carnaby's cockatoo foraging habitat of moderate to high quality with 54 ha (40%) in higher quality to be cleared. 57 ha (25%) of FRTBC foraging habitat in moderate and moderate to high quality to be cleared. Consistent with past Ministerial decisions under the EP Act and EPBC Act, and the Referral guideline for 3 WA threatened black cockatoo species (DAWE 2022), the EPA considers this is likely to be a significant impact and recommends additional foraging habitat, should be prioritised for retention through DSP or, at Local Planning Scheme amendment/structure planning stage. As noted in Table 1, it is at the strategic planning stage that planning considerations can provide a mix of built form and density to ensure population and housing projections are maintained whilst protecting significant environmental values in situ. See also the cumulative and strategic environmental planning considerations below.

⁴ Areas are approximate.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
See Figures 7 and 8 for Black Cockatoo foraging habitat and DSP conservation areas.		Areas H, K, L and M (Figure 4) and as discussed in Table 1, provide high quality foraging habitat for Carnaby's cockatoo and additional areas of moderate to high quality FRTBC foraging habitat (Figure 8) should be prioritised for retention. Identification of additional retention areas should consider proximity to proposed retention areas, roosting and nesting sites, maintenance of any known flight paths, and other environmental values. Additional on-site protection; such as avoidance, management, restoration and enhancement, can reduce the calculation of residual impacts and the need for off-site offsets. Where onsite protection measures are consistent with the EPA's advice on offsets at a regional scale (EPA 2024a) and offsets calculator outputs, this may adequately counterbalance residual impacts onsite impacts for environmental planning purposes. Restoration and enhancement of degraded habitat, whether on site or off site, should be prioritised for protection of black cockatoos on the SCP at subregional and regional levels.
Key value: Black cockatoo roosts - No roost sites confirmed in the DSP site, but two are in very close proximity. 11 confirmed roost sites for Carnaby's cockatoo and FRTBC (1 joint) within 6km of the DSP site. Not all landholdings were surveyed due to site access constraints.		The EPA advises the high number of roost sites within the sub-region means the foraging habitat on site is of high value. It is also possible there may be roost sites on the DSP site itself. Protection of any roost sites on site is likely needed to be consistent with EPA objectives. The EPA provides the following advice for consideration at future stages of planning:

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
The draft DSP proposes that at future stages of planning eucalypt trees suitable for roosting, particularly near water sources outside of the conservation areas, will be investigated for retention.		• Survey of potential black cockatoo roost sites should be of native and non-native tree species and occur prior to local structure planning. • Establish appropriate buffers and management for roost sites identified for retention outside of conservation areas. Roost site(s) within conservation areas should also have appropriate buffers to adjacent development. • Existing water sources (troughs etc) should be retained and where not possible, should be, prior to removal of existing, replaced in a nearby safe and accessible location.
Key value: Black cockatoo breeding trees • No confirmed nesting sites in DSP area. Closest confirmed nesting site approximately 10km. • 1,598 potential nesting trees identified with DBH greater than or equal to 50cm. Not all landholdings were surveyed due to site access constraints. The draft DSP proposes: • 997 potential nesting trees with DBH greater than or equal to 50cm to be retained in conservation areas; six with suitable hollows and chew marks and 75 with suitable hollows no chew marks. • Retention of additional trees with suitable hollows outside the conservation areas will be investigated for retention in future stages of planning.		Approximately 600 (37%) potential nesting trees may be impacted, noting this number may be higher as not all areas have been surveyed. Given the high number of roost sites within the sub-region, the high value of the foraging habitat, and the cumulative impacts on cockatoo species in the region, avoidance and protection of these trees should be prioritised. Protection of trees with suitable hollows is likely needed to be consistent with EPA objectives. Additional on-site protection and management may reduce the calculation of residual impacts and the need for off-site offsets. Where onsite protection measures are consistent with the EPA's advice on offsets at a regional scale (EPA 2024a) and offsets calculator outputs, this may adequately counterbalance residual onsite impacts for environmental planning purposes.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
		The EPA advises: • For areas not subject to survey, identify potential nesting trees prior to local structure planning. • Establish appropriate buffers for potential nesting trees identified for retention outside of conservation areas. • Potential nesting trees within conservation areas should also have appropriate buffers to adjacent development.
Conservation significant terrestrial fauna vertebrate and invertebrate fauna. Key values: Eight vertebrate species listed under <i>Biodiversity Conservation Act 2016</i> (BC Act) and <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act), six Priority species and five invertebrate species of conservation significance are likely to be present in DSP site: • Fork-tailed Swift (<i>Apus pacificus</i>) • Glossy ibis (<i>Plegadis falcinellus</i>) • Peregrine falcon (<i>Falco peregrinus</i>) • Forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>) • Baudin's black cockatoo (<i>Zanda baudinii</i>) • Carnaby's black cockatoo (<i>Zanda latirostris</i>) • Chuditch (<i>Dasyurus geoffroii</i>) • South-western brush-tailed phascogale (<i>Phascogale tapoatafa wambenger</i>). Survey for significant fauna, other than black cockatoo, was a desktop assessment and site inspection.		The presence of conservation significant terrestrial vertebrate, other than species of black cockatoo, and invertebrate species has not yet been determined. Retention of 70% of the remnant native vegetation in the DSP site with 80% of this in consolidated areas retaining and creating ecological linkages will likely contribute to terrestrial fauna values being maintained. Detailed terrestrial fauna survey is required to ensure conservation significant fauna species habitat is retained and enable appropriate management actions and planning to be undertaken at subsequent stages of planning. Protection of significant fauna habitat on site, if found during survey, is likely needed to be consistent with EPA objectives. As discussed for flora and vegetation (Table 1) terrestrial fauna diversity and abundance will likely be decreased through the existing and proposed roads within conservation areas. Species of black cockatoo are at particular risk of

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
The draft DSP proposes: • Retention of 234 ha of remnant native vegetation that provides habitat for terrestrial fauna species. • Retention of the east-west ecological linkage and retention of vegetation as a northern north-south linkage creates a large conservation area of approximately 190 ha shown in Figure 4.		vehicle strike as they are slow to take off. The EPA considers it is at this strategic level of planning where infrastructure (road) alignments can be located to reduce impacts to environmental values of conservation areas. Fit for purpose fauna surveys, including invertebrate fauna, are recommended to inform the appropriate placement of roads and fauna mitigation to ensure impacts are avoided where possible. The EPA also advises that where infrastructure cannot be avoided in conservation areas, fauna mitigation measures should be provided (reduced speeds, signage, fencing, and specialist fauna management i.e. fauna underpasses) in areas of high fauna values.

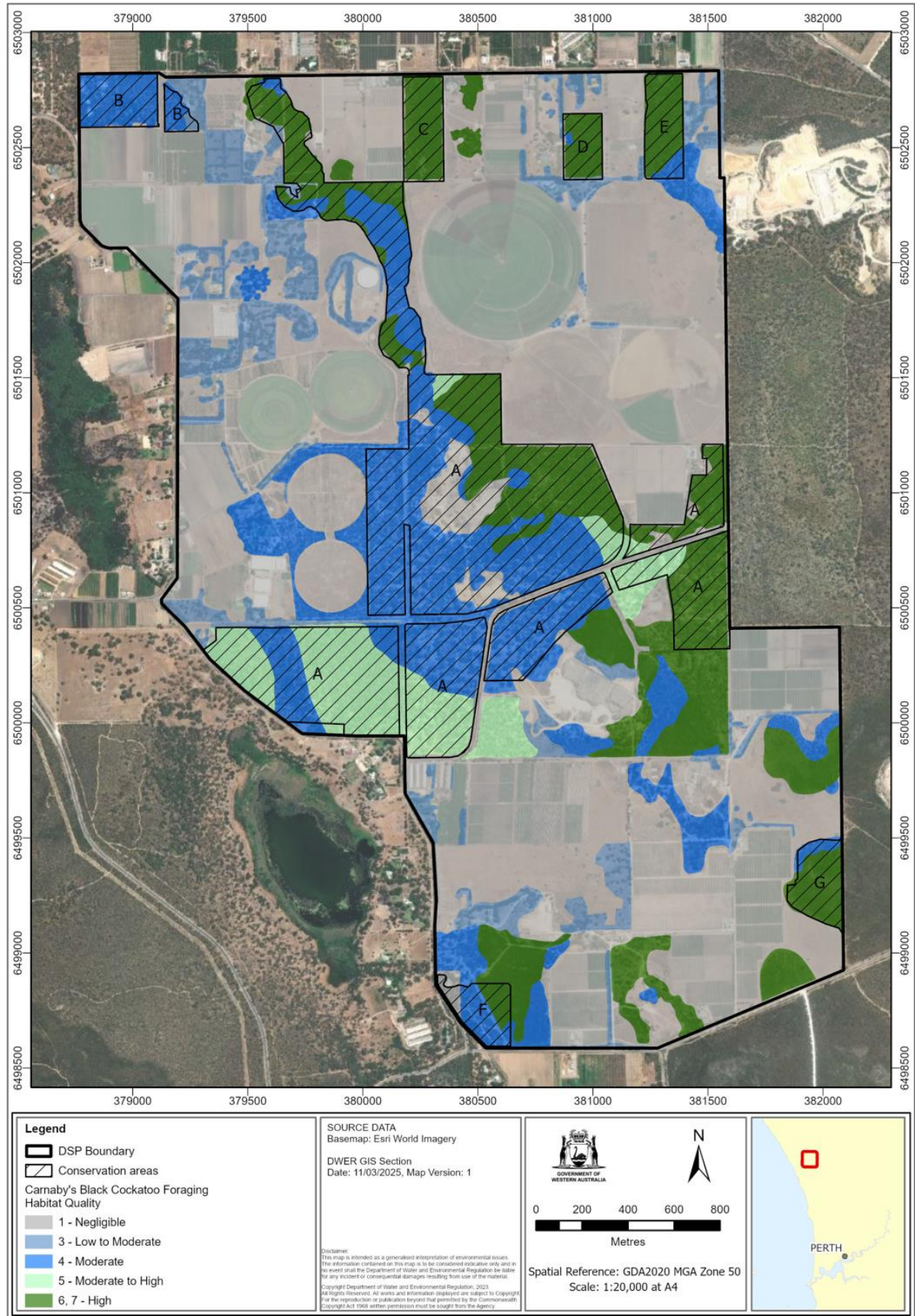


Figure 7 Carnaby's black cockatoo foraging habitat

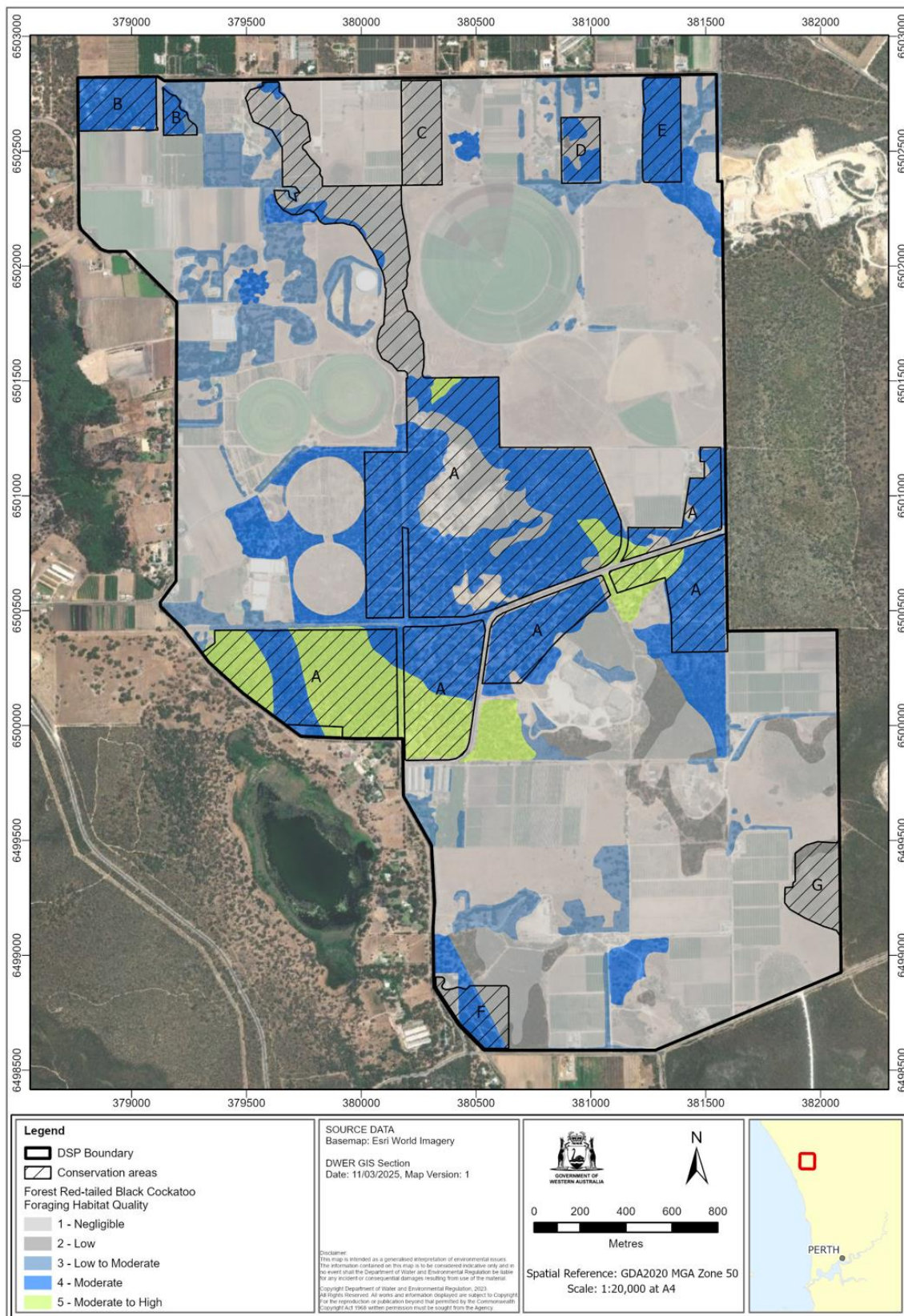


Figure 8 Forest Red-tail Black Cockatoo foraging habitat

Cumulative and strategic environmental planning considerations: Due to the strategic nature of the draft DSP, the EPA's cumulative impact considerations is high level and has focussed on Carnaby's cockatoo, noting Carnaby's cockatoo and FRTBC habitat does overlap.

The EPA considers that the continued threat to conservation significant fauna and, in particular species of black cockatoo, due to historical, present and future clearing of habitat in the Perth and Peel area of the SCP poses a significant threat to achievement of the EPA's objectives for terrestrial fauna.

The EPA notes that at this early stage of planning process detailed survey for conservation significant fauna that may inhabit the area is not available. Species such as the Chuditch and South-western brush-tailed phascogale that may be present have large home ranges and specific habitat requirements including tree hollows; clearing and habitat fragmentation are key threatening processes to these (and most) conservation significant fauna.

The DSP site is within the North-West Corridor Sub-regional Planning Framework (WAPC 2018) corridor dominated by relatively recent extensive urban development. Whilst not quantified, large areas of black cockatoo, mainly Carnaby's cockatoo habitat, has been cleared.

The EPA has considered clearing as a result of:

- EPBC 2017/7872 for urban development at East Eglinton: clearing of up to 79 ha of Carnaby's cockatoo foraging habitat.
- Alkimos Desalination Plant – clearing of up to 52 ha of high quality Carnaby's foraging habitat.
- Yanchep rail extension part 1 – Butler to Eglinton – clearing of 48.2 hectares of Carnaby's cockatoo foraging habitat.
- Yanchep rail extension part 2 – Eglinton to Yanchep – clearing of up to 56.3 ha of Carnaby's cockatoo foraging habitat.
- East Wanneroo DSP - potential impact to 285 ha of black cockatoo habitat.

Historical clearing combined with ongoing threats of further habitat clearing, disease, mortality and climate change, pose a cumulative risk to Carnaby's cockatoo. Carnaby's cockatoo utilise different habitats over a temporal and spatial scale to meet their ecological needs. Impacts to Carnaby's cockatoo should be considered in a landscape context of ecological values of the habitat, proximity to roosts, habitat connectivity, other foraging and water supplies (EPA 2019). Adding to impacts, the recent hot summers and low rainfall has resulted in reduced flowering of native plant foraging species leading to increased numbers of Carnaby's cockatoo facing starvation and reduced breeding success.

The Northern SCP is well known to support important flocks of Carnaby's cockatoo, including the largest recorded roosts at the Gnangara-Pinjar Pine Plantation area (EPA 2019). The DSP site forms part of the habitat mosaic for black cockatoo flocks in this area. Murdoch University have tracked Carnaby's cockatoo moving between large roosts at Pinjar to the Carabooda area (Murdoch University, 2018). The DSP and future planning should take into account Carnaby's cockatoo movement and ecological requirements in the Northern SCP.

The DSP site provides black cockatoo habitat ranging from low quality; predominately cleared with scattered trees, to areas of high and higher quality foraging habitat. Whilst this report has focused on the 334 ha of moderate to higher quality foraging, the EPA notes recent decisions on appeals by the Minister for Environment advising that all remaining

foraging habitat on the SCP is critical to the survival of black cockatoo species, regardless of quality.

The retention of foraging habitat has been demonstrated to be critical to support roosting and nesting sites for black cockatoos.

The EPA notes approximately two thirds of the moderate to higher quality foraging habitat (depending on the species) is proposed to be retained. The proposed clearing of one third (118 ha), including 55 ha high quality habitat in an important population area is likely to be a significant environmental impact under the EP Act. The EPA also advises the [Referral guideline for 3 WA threatened black cockatoo species](#) (DAWE 2022) advises the loss of greater than 1 ha of high or 10 ha of low quality foraging habitat is likely to require referral.

The EPA considers the best way to conserve Carnaby's cockatoo is to retain foraging habitat in situ. Additional areas protected on site should be considered, particularly where areas are aligned with roosting, nesting or other environmental values.

Offsets environmental planning considerations: Significant residual impacts which remain to black cockatoo habitat are usually likely to require offsets to be counterbalanced. The EPA considers environmental planning should consider environmental offsets through the following lens, rather than the strict application of a quantitative off-site environmental offsets calculator designed for individual proposal assessment.

The EPA advises that if the significance of residual impacts is reduced on site through the application of the mitigation hierarchy and protections focussing on on-site avoidance, management, restoration and enhancement, this is likely to be preferable to provision of off-site offsets.

The EPA considers that if on site protection measures such as avoidance, management, restoration and enhancement are consistent with the quality and quantity of off-site offset requirements that would normally be determined through an offsets calculator, and if the on-site protection measures are consistent with the EPA's advice on offsets at regional scale (EPA 2024a), this will likely be adequate to counter-balance residual on-site impacts.

Any off-site offsets which are proposed should also give consideration to the EPA's advice on offsets at regional scale.

The guiding values in EPA's advice on offsets at regional scale include prioritising restoration, regional scale management (beyond the site), addressing threatening processes, maintenance and creation of ecological linkages creating and managing environmental areas to be resilient, and consideration of the benefit to other values including heritage and community.

Implementation of offsets through future planning processes is recommended, so the EPA can take the likely outcome and security of offsets into account in any future decision-making processes. The EPA considers that the likely impacts of the draft DSP could be consistent with the EPA's objective if consideration is given to additional protection and offsets consistent with the advice above.

Additional information required for future environmental planning of DSP: In addition to specific protection recommendations and advice provided in Table 2, the EPA advises that future stages of planning should be informed by further information and survey for vertebrate, including species of black cockatoo, and invertebrate (SRE) fauna to ensure conservation significant species are identified so that future stages of environmental planning can respond accordingly.

6 Inland waters

The environmental objective for inland waters is *to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected* (EPA 2018).

Table 3 Inland waters key environmental values and recommendations for future environmental planning.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Key value: There are no wetlands or water courses within the DSP site. There are several wetlands located outside of the DSP site, but within 2km including Nowergup Lake (UFI 8021) a Conservation Category Wetland (CCW) located 200m to the west. Other wetlands include Resource Enhancement Wetlands Carabooda Lake (UFI 8009), UFI 8017 and 8020, Camel Swamp (UFI 2938), Neerabup Lake (UFI 8019) and Multiple Use Wetland (UFI 8018).		The EPA considers that the environmental outcome is likely to be consistent with EPA objectives. The EPA advises that the hydrogeological system is complex, however, environmental outcomes consistent with EPA objectives are likely to be able to be achieved through future environmental planning processes. Future stages of planning shall ensure there are no adverse impacts to the hydrological (water quality and quantity) and ecological functions of adjacent wetlands and include appropriate setbacks and management strategies to protect nearby wetlands, particularly Nowergup Lake. The EPA considers the requirements of <i>Draft State Planning Policy 2.9 Planning for Water</i> (WAPC 2021a) and <i>Better Urban Water Management</i> (WAPC 2018) can manage and mitigate the potential impacts to inland waters.
Depth to groundwater ranges from 8m in the southwest to 59m on the eastern boundary.		The EPA notes the District Water Management Strategy (DWMS) advises that based on the clearance to groundwater, it is not expected that groundwater management measures within the DSP will be needed.
A small portion of the site (0.3%) on the northern boundary is mapped as having high to moderate risk of acid sulphate soils (ASS) occurring within 3m of natural soil surface. There is a risk of mobilisation of ASS through predicted rise of groundwater levels.		Mobilisation of ASS has the potential to impact environmental values. The EPA notes that DWMS advises that ASS investigations will be undertaken to inform later stages of planning.

Additional information required for future environmental planning of DSP: The EPA advises that future stages of planning should be informed by:

- Investigation into the presence and extent of ASS should be undertaken at subsequent stages of planning and development, in accordance with *Identification and investigation of acid sulfate soils and acidic landscapes* (DER 2015a). Subsequent measures to minimise the risk of ASS disturbance should be identified in accordance with the results of the investigation and *Treatment and management of soil and water in acid sulfate soil landscapes* (DER 2015b).
- Draft *State Planning Policy 2.9 Planning for Water* (WAPC 2021a) and *Better Urban Water Management* (WAPC 2018).

7 Social surroundings

The environmental objective for social surroundings is *to protect social surrounds from significant harm* (EPA 2023b).

Table 4 Social surroundings key environmental values and recommendations for future environmental planning.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Aboriginal heritage sites There are no registered Aboriginal Heritage sites located within the DSP site. There is one registered Aboriginal heritage site of mythological significance associated with Nowergup Lake (Place ID 17450) located approximately 200m west of the DSP site. Another registered Aboriginal heritage site associated with Lake Neerabup (Place ID 3315) located 700 m to the south.		The EPA considers that the environmental outcome is likely to be consistent with EPA objectives. No impacts are likely to Aboriginal heritage.
European heritage The Lime Kilns – Spiers (Place no. 14299) is a Category 2 heritage site under the City of Wanneroo's Heritage List, and another Lime Kiln site (Wanneroo, Place no. 18338) is located adjacent to the site boundary but is not listed The draft DSP proposes that the Lime Kilns - Spiers heritage site will be retained within the proposed conservation area.		No impacts likely to listed European heritage. Potential future listings can be considered as part of future planning processes.
Dust and noise The DSP site and surrounding area is dominated by rural/horticulture and basic raw material extraction activities. The continued operation of these activities as urban development occurs in stages via subdivision is likely to occur. Future sensitive receptors may therefore be subjected to issues such as vibration, noise, odour and dust.		The EPA's <i>Environmental Protection Guidance Statement No.3: Separation Distances between Industrial and Sensitive Land Uses</i> (2005) should be considered as part of all planning decisions where existing business operations may impact proposed land uses in terms of amenity.

8 Subterranean fauna

The EPA environmental objective for subterranean fauna is *to protect subterranean fauna so that biological diversity and ecological integrity are maintained* (EPA 2016e).

Table 5 Subterranean fauna key environmental values and recommendations for future environmental planning.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
High karst risk in the south-western corner and north-western covering approximately 4% of the total site area, likely abundant karst features including caves, dolines and swallows. Medium karst risk on the western side covering approximately 18% of the total site area. Subterranean fauna exists in these areas and alongside with geotechnical risk. There has been limited investigation to date and no protection has been proposed at this stage.		Environmental values for subterranean fauna that may be impacted by implementation of the draft DSP may be significant but: • are likely to be localised • are likely to be concurrent with geotechnical risks which need to be mitigated for non-environmental reasons • are likely to be able to be avoided or mitigated if found. The EPA expects future stages of environmental planning to consider avoidance and mitigation of risks to subterranean fauna.

Additional information required for future environmental planning of DSP: The EPA advises that future stages of planning should be informed by investigations and survey consistent with:

- Karst assessment and management requirements for planning proposals as outlined in *Local Planning Policy 4.13 Caves and Karstic Features* (City of Wanneroo 2022).
- *Environmental Factor Guideline – Subterranean Fauna* (EPA 2016e) and *Technical guidance – Subterranean fauna surveys for environmental impact assessment* (EPA 2021a) or any subsequent editions.

9 Terrestrial environmental quality

The environmental objective for terrestrial environmental quality is *to maintain the quality of land and soils so that environmental values are protected* (EPA 2016f).

Table 6 Terrestrial environmental quality key environmental values and recommendations for future environmental planning.

Key environmental values	Protection and enhancement currently proposed in DSP	Consistency of residual impacts with EPA objectives, and additional protection recommended for inclusion in future environmental planning
Contamination on site The Contaminated Sites register indicates there are no registered contaminated sites located within the DSP. Buildings and sheds across the site may contain asbestos material and contamination from the use and storage of fertiliser, pesticides and herbicides may have resulted in contamination.		The EPA considers that the environmental outcome is likely to be consistent with EPA objectives. Preliminary site investigation for contamination will be undertaken at the local structure planning stage. The EPA considers risks can be managed at future planning consistent with requirements of the <i>Contaminated Sites Act 2003</i> and <i>Contaminated Sites Regulations 2006</i>.
Groundwater flows affected by surrounding contaminated sites Immediately southeast of the DSP site there is a registered contaminated site (ID 74304), which is classified as remediated for restricted use. Groundwater beneath the site has been identified to have been historically contaminated with nutrients, metals and per- and poly-fluoroalkyl substances (PFAS) from previous use as a biosolids storage facility. As groundwater flows in a westerly direction, contamination from this site is not considered to pose a risk to the site.		Risks unlikely to be significant or inconsistent with EPA objective

10 References

- 360 environmental / SLR 2023, *Alkimos Seawater Desalination Plant Project Pipeline Survey – Vegetation Community Type Assessment*. Perth, WA
- Bamford Consulting Ecologist 2025, *Level 1 Fauna and Targeted Black Cockatoo Assessment*, Bamford Consulting Ecologist, Unpublished
- City of Wanneroo 2022, *Local Planning Policy 4.13 Caves and Karstic Features*
- CLE 2025, *Carabooda District Structure Plan Part 1 and Part 2*, CLE Town Planning + Design, Unpublished.
- Cossill and Webley 2024, *Carabooda Urban Precinct District Structure Plan Engineering Servicing Report*, Cossill and Webley, Unpublished.
- DAWE 2022, *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo*, Department of Agriculture, Water and the Environment, Canberra, February
- Del Marco, A., Taylor, R., Clarke, K., Savage, K., Cullity, J. and Miles, C. (2004). *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*. Western Australian Local Government Association and Perth Biodiversity Project, Perth.
- Department of Environment Regulation (DER) 2015a, *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes*, Department of Environment Regulation, Perth WA.
- DER 2015b, *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes*, Department of Environment Regulation, Perth WA.
- Douglas Partners 2023, *Carabooda Urban Precinct, District Structure Plan Pre-Lodgement Advice - Report on Desktop Geotechnical Study*, Douglas Partners, Perth WA.
- EPA 2005, *Environmental Protection Guidance Statement No.3: Separation Distances between Industrial and Sensitive Land Uses*, Environmental Protection Authority, Perth, WA.
- EPA 2008, *Guidance Statement No. 33: Environmental Guidance for Planning and Development*, Environmental Protection Authority, Perth, WA.
- EPA 2015, *Interim strategic advice – Perth and Peel @ 3.5 million: Environmental impacts, risks and remedies*, Environmental Protection Authority, Perth, WA.
- EPA 2016a, *Environmental factor guideline – Flora and vegetation*, Environmental Protection Authority, Perth, WA.
- EPA 2016b, *Technical guidance – Flora and vegetation surveys for environmental impact assessment*, Environmental Protection Authority, Perth, WA.
- EPA 2016c, *Environmental factor guideline – Terrestrial fauna*, Environmental Protection Authority, Perth, WA.
- EPA 2016d, *Technical guidance – Sampling of short-range endemic invertebrate fauna*, Environmental Protection Authority, Perth, WA.
- EPA 2016e, *Environmental factor guideline – Subterranean Fauna*, Environmental Protection Authority, Perth, WA. EPA 2016, *Environmental Factor Guideline: Terrestrial Environmental Quality*, EPA, Western Australia

EPA 2016f, *Environmental Factor Guideline: Terrestrial Environmental Quality*, Environmental Protection Authority, Western Australia

EPA 2018, *Environmental factor guideline – Inland waters*, Environmental Protection Authority, Perth, WA.

EPA 2019, *Carnaby's Cockatoo in Environmental Impact Assessment in the Perth and Peel Region*. Advice under s16(j) of the Environmental Protection Act 1986. Environmental Protection Authority, Perth.

EPA 2020, *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Environmental Protection Authority, Perth.

EPA 2021a, *Technical guidance – Subterranean fauna surveys for environmental impact assessment*, Environmental Protection Authority, Perth, WA.

EPA 2021b, *Guidance for planning and development: Protection of naturally vegetated areas in urban and peri-urban areas*, EPA, WA.

EPA 2023a, *Strategic Plan 2023-24*, Environmental Protection Authority, Perth, WA.

EPA 2023b, *Environmental Factor Guideline: Social Surroundings*, EPA, Western Australia.

EPA 2024a, *Public Advice: Considering environmental offsets at a regional scale*, Environmental Protection Authority, WA.

EPA 2024b, EPA Submission into DPLH Urban Greening Strategy, Environmental Protection Authority, WA. JBS&G 2023, Carabooda Environmental Assessment Report, Unpublished report for CLE. Rev 1.

Murdoch University 2018, Shephard, J.M. & Warren, K.S. 2018. The potential role of the Forest Product Commission's midwest pine plantations as a food resource for Carnaby's cockatoo: a concept study using GPS and satellite tracking data (Unpublished Report). School of Veterinary and Life Sciences, Murdoch University.

Pentium 2025, *District Water Management Strategy Carabooda Urban Precinct*, Pentium Water, Unpublished.

PGV Environmental 2023, *Carabooda Rezoning Project: Flora and vegetation survey*. Unpublished report for JBS&G. Version 2.

PGV Environmental 2025, *Carabooda Rezoning Project: Flora and vegetation survey*. Unpublished report for Western Environmental. Version 4.

Plantecology Consulting 2024, *Plantecology FCT Analysis*. Unpublished report for PGV Environmental.

WAPC 2018a, *North-West Sub-regional Planning Framework*, Western Australian Planning Commission, Perth WA

WAPC 2018b, *Better Urban Water Management*, Western Australian Planning Commission, Perth WA

WAPC 2021a, *Draft State Planning Policy 2.9 Planning for Water*, Western Australian Planning Commission, Perth WA

WAPC 2021b, *East Wanneroo District Structure Plan*, Western Australian Planning Commission, Perth WA

Western Environmental 2025, *Carabooda District Structure Plan Environmental Assessment Report*, Unpublished

11 Appendix: Background information

Context for this EPA advice

In providing this environmental advice on the draft DSP, the EPA has relied on the DSP Part 1 and Part 2 (CLE, 2025) and technical appendices (listed in references). Key context about the information available to inform the EPA's advice is summarised below.

The EPA's environmental advice is informed by the environmental reports and surveys together with other information it has sought. Whilst the EPA has conducted some of its own investigations it has not undertaken field survey work, reviewed and analysed historical survey and database information and has not extensively consulted with technical experts.

The EPA understands the Department of Biodiversity, Conservation and Attractions and Department of Water and Environment Regulation (DWER) attended Technical Advisory Group meetings held by Department of Planning, Lands and Heritage (DPLH) and that DWER EPA Services Directorate participated in site visits and held meetings with Acumen Development Solutions and environmental consultants.

This advice is provided under section 16 of the EP Act and does not constitute a formal assessment, decision or approval by the EPA, or pre-determine any future statutory deliberations. There is no right of appeal against a section 16 advice.

Information available to inform EPA advice

Flora and Vegetation

The Carabooda District Structure Plan (DSP) was originally supported by an Environmental Assessment Report (EAR) (JBSG 2023) which included a desktop assessment to inform on the environment features of the site, outcomes of ecological site visit(s) by a senior ecologist, recommendations to address identified knowledge gaps and technical surveys. A Flora and Vegetation Survey by PVG (2023) for the core (660 ha) DSP area was also provided.

Plantecology (November 2024) undertook a statistical analysis of quadrat data to determine presence of floristic community types (FCT) that may be representative of Threatened and Priority Ecological Communities.

PVG (2025) supplemented its 2023 survey report, undertaking survey across the balance of the 960 ha DSP site.

Western Environmental (2025) also prepared an EAR to support lodgement of the DSP to the WAPC and any future MRS Amendment requests, and subsequent referrals to the EPA.

Terrestrial Fauna

The Level 1 Fauna and Targeted Black Cockatoo Assessment (Bamford Consulting Ecologist Consulting Ecologist, 2025) presents the results of the desktop review, site inspection and targeted black-cockatoo assessment for the DSP site. Most of the DSP area was visited on multiple occasions from May to October 2024. The EPA notes that potential impacts and avoidance measures for terrestrial fauna, other than species of black cockatoo, have not been discussed and quantified and some lots were not surveyed due to no site access, therefore direct observations were limited in these areas.