Appendix A

Review of Previous Studies – Aurora Environmental 2021

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3 December 2021

Anthony Sutton
Executive Director, EPA Services
Locked Bag 10
Joondalup WA 6919

Attention: Renee Blandin (renee.blandin@dwer.wa.gov.au)

RE: REQUEST FOR MORE INFORMATION: SCHEME AMENDMENT: TOWN PLANNING SCHEME NO 3 AMENDMENT 149 – LOCATION: PORTION OF SPRINGDALE BEACH ESTATE

Thank you for your letter dated 23 September 2021 (Ref: TPS3/SA 149; CMS18010) in which you request additional information in relation to the referral of Town Planning Scheme No 3 Amendment 149 – Location: Portion Of Springdale Beach Estate under section 48A of the *Environmental Protection Act 1986*. The letter is included as Attachment 1.

The EPA Service Unit is concerned that Amendment 149 has the potential to impact on the environmental values of the area, notably Wilson Inlet and its foreshore, which abuts the amendment area.

In responding to the request for information, the proponent has considered the Wilson Inlet Management Strategy 2013 – 2022 and other documentation which has been prepared and approved which applies to Springdale Beach Estate. We are confident that our response reflects:

- Consistency with the key strategic objectives of the strategy for nutrient input into the Wilson Inlet; and
- That there will be maintenance of predevelopment flows and management of water quality to mitigate impact to the foreshore areas and Wilson Inlet.

We can confirm that an Urban Water Management Plan (UWMP) will be prepared for the amendment area which will tie in with the previous UWMP and other sections of the Springdale Beach Estate subdivision.

In this response, we have also examined the amendment area in light of the requirements of the Government Sewerage Policy (2019) and Draft State Planning Policy 2.9 Water Management Planning (2021).

The response is included in Attachment 2.

If you have any queries regarding this response, please contact the undersigned on 0447 446 343 or melanie.price@auroraenvironmental.com.au.

For and on behalf of Aurora Environmental

Melanie Price

Principal Environmental Scientist (Director)

Attachments

1. DWER letter
2. Response
3. Steep slopes in Foreshore Reserve
4. Site and Soil Evaluation - Government Sewerage Policy (2019)
5. Basic Fauna Assessment

APPENDIX 1

DWER LETTER REQUESTING ADDITIONAL INFORMATION

Government of **Western Australia**
Department of **Water and Environmental Regulation**

Your Ref: *TPS3/SA149*
Our Ref: *CMS18010*
Enquiries: *Renee Blandin, 6364 6786*
Email: *renee.blandin@dwer.wa.gov.au*

Craig Pursey
Manager Sustainable Development
Shire of Denmark
PO Box 183
DENMARK WA 6333

Email: craig.pursey@denmark.wa.gov.au

Dear Mr Pursey

MORE INFORMATION REQUEST
SCHEME AMENDMENT: TOWN PLANNING SCHEME NO.3 AMENDMENT 149
LOCATION: PORTION OF SPRINGDALE BEACH ESTATE

Thank you for your referral received 19 May 2021 in relation to the above scheme amendment. The information you have provided is insufficient to enable the Environmental Protection Authority (EPA) to comply with section 48A of the *Environmental Protection Act 1986* (EP Act) in relation to the proposed scheme and consequently does not constitute a valid referral under section 81 of the *Planning and Development Act 2005* (PD Act).

Further information in relation to Amendment 149 sought by the EPA from the Department of Water and Environmental Regulation (DWER) South Coast Region has informed this request for more information.

EPA Services is concerned Amendment 149 has the potential to impact potentially significant environmental values, and that the existing scheme provisions are not sufficient to identify these values or protect and manage potential significant impacts. Accordingly, the following information is requested:

Inland Waters
The amendment area is located on the Wilson Inlet, a sensitive aquatic environment. It is recommended the *Wilson Inlet Management Strategy 2013-2022* (the Strategy) be considered in the context of the amendment. Further information is requested as to how the amendment:

- is consistent with the key Strategy objectives for nutrient input into the Wilson Inlet,
- will manage maintenance of predevelopment flows and maintenance or improvement of water quality to mitigate impact to downstream foreshore areas and the Wilson Inlet.

It is recommended the amendment demonstrate that the *Springdale Beach Estate Urban Water Management Plan 2014* will be updated to reflect the proposed land use. Consistency of the amendment with current policy should be considered including the *Government Sewerage Policy 2019* (GSP) and *State Planning Policy 2.9 Water Resources*.

Protection of the foreshore environment is important to the management of Wilson Inlet. DWER's Operational Policy 4.3 *Identifying and establishing waterway foreshore areas* (2013) recommends foreshore reserve includes steep banks to protect foreshore areas that are vulnerable to erosion. EPA Services note the indicative concept plan in the amendment report proposes an additional 1.1 ha of foreshore reserve within the area proposed to be rezoned to Special Residential, however this may not entirely capture the foreshore banks.

Increased access to the Springdale Beach Foreshore from future development may result in erosion of the foreshore banks and the spread of dieback. Construction associated with potential future development has the potential to cause erosion downstream.

Information is requested as to demonstrate that an appropriate foreshore width has been provided, and to explain how the amendment will ensure the foreshore area within the proposed area for rezoning will be retained and protected from the impacts of future development. Scheme provisions or modified zoning/reservation may be considered. It is requested that a map is provided showing the proposed foreshore reserve and zoning boundaries overlaying an aerial with topographic contours.

The *Springdale Beach Estate Foreshore Management Plan* (FMP) was prepared in 2014 for the existing subdivision area to the north of the amendment area, consistent with Western Australian Planning Commission subdivision conditions. Further information is requested as to how the amendment will ensure the FMP is updated to reflect the proposed land use associated with the amendment and is consistent with the *Wilson Inlet Foreshore Reserves Management Plan* (Shire of Denmark 2008). The Shire may consider replacing existing TPS 3 provision iv) i) in Appendix XIV S Res 6. iv) i) with a contemporary version of existing TPS 3 Condition 10 in T9 Appendix XIII.

It is noted onsite effluent disposal is proposed within the amendment area. The provided *Preliminary Assessment of Proposed Scheme Amendment Springdale Beach Tourist Zone Site Denmark* (Land Assessment 2018) outlines that most of the site has a fair to low capability for onsite sewage disposal due to a low ability of the soils to retain nutrients against drainage losses to Wilson Inlet and the presence of restrictive clay and hardpan/rock layers. It is also stated that avoidance of onsite effluent disposal may be required around test pit (TP) 12a and TP 12b. Only one TP (10a) appears to meet the GSP requirements for soil characteristics (permeability and nutrient retention) suitable for onsite effluent disposal.

Total nutrient inputs for the two land use scenarios shown in Table 10 of the *Springdale Beach Development Indicative Nutrient Inputs, Special-Residential compared with Tourism Development* (Land Assessment 2020) report are comparable and do not strongly support an argument that a Special Residential land use will result in lower nutrient inputs than a tourism land use. It is also noted that in Table 3 a land use scenario is assumed of 'no clearing apart from house pad'. Much of the northern portion of the site is already cleared and may result in the development of gardens and livestock grazing is also not prohibited by the scheme, both of which may result in further nutrient application than assumed.

Further information is requested to demonstrate:

- the capability of the amendment area for onsite effluent disposal;
- how the amendment will be consistent with the requirements of GSP including for 1.5m separation of system discharge points to impermeable layers, use of Alternate Treatment Units with secondary treatment systems, determination of disposal field area, and requirements under Schedule 2;
- how the amendment will be consistent with the *Wilson Inlet Management Strategy* in relation to the nutrient output of onsite effluent disposal.

Contemporary scheme provisions may be considered. It would also be useful to provide the estimated nutrient load/kg/ha/year for each proposed dwelling.

Terrestrial Fauna; Flora and Vegetation
The amendment area contains Jarrah/Marri woodland. This vegetation is potential habitat for the Critically Endangered Western Ringtail Possum and threatened species of black cockatoo. The *Flora and Fauna Assessment 2006* provided with the referral may not reflect the current habitat or presence/absence of threatened species within the amendment area.

Further information is requested to demonstrate how the amendment will identify, protect, and manage terrestrial fauna values and impact to habitat. Scheme provisions or scheme map modifications may be considered; alternatively an updated fauna survey consistent with EPA technical guidance may be provided.

Social Surroundings; Terrestrial Fauna
EPA Services note that LPS 3 Appendix 10 T9 Condition for the current Tourist zoning of the amendment area contains Condition 22 regarding light spill. Further information is requested to demonstrate how the amendment will ensure that future development manages light spill that may have an impact on visual amenity and Terrestrial Fauna.

Summary
It is requested the Shire provide the above information to demonstrate how the environmental values associated with the amendment will be protected and managed by the scheme amendment. The Shire may also consider updating scheme provisions associated with the amendment to be consistent with contemporary policy and current government agency names where relevant.

It is suggested that following consultation with EPA Services the Shire take any proposed modifications the Amendment 149 text and maps to Council for formal adoption, and then provide the updated Amendment 149 to the EPA.

Your response should be sent by email to registrar@dwer.wa.gov.au addressed to the Executive Director EPA Services and marked for the attention of Renee Blandin; or by post to EPA Services, Department of Water and Environmental Regulation, Locked Bag 10, Joondalup DC, Western Australia 6919. EPA Services requests you provide the additional information by **25 October 2021**.

Please note that the EPA may require additional information from the Shire and other relevant agencies after it has reviewed the requested information.

Upon receipt of sufficient information, as required by section 81 of the PD Act, the EPA will comply with section 48A of the EP Act and advise you accordingly.

If you would like to discuss the information requirements in this letter or would like to arrange a meeting, please contact Renee Blandin on 6364 6786.

Yours sincerely

A. Sutton

Anthony Sutton
EXECUTIVE DIRECTOR
EPA SERVICES

23 September 2021

ATTACHMENT 2

RESPONSE

Attachment 2: Response to DWER Request for Additional Information

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
General Update provisions to reflect values and protect or manage potential significant impacts		The existing provisions are adequate for the area being rezoned.
Inland Waters The amendment area is located on the Wilson Inlet, a sensitive aquatic environment. It is recommended the *Wilson Inlet Management Strategy 2013-2022* (the Strategy) be considered in the context of the amendment. Further information is requested as to how the amendment: • is consistent with the key Strategy objectives for nutrient input into the Wilson Inlet, • will manage maintenance of predevelopment flows and maintenance or improvement of water quality to mitigate impact to downstream foreshore areas and the Wilson Inlet. It is recommended the amendment demonstrate that the *Springdale Beach Estate Urban Water Management Plan 2014* will be updated to reflect the proposed land use. Consistency of the amendment with current policy should be considered including the *Government Sewerage Policy 2019* (GSP) and *State Planning Policy 2.9 Water Resources.*	**Inland Waters:** To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.	The Wilson Inlet Management Strategy recommends that adjacent land use and development near the inlet be carefully managed and planned, especially for management of impacts on terrestrial and aquatic flora and fauna, water quality (nutrients and sediment loads) and the alteration of natural drainage systems. A key recommendation was to maintain vegetation buffer zones around the extent of the Inlet's foreshore, with a recommended 50 m vegetated buffer above the high water mark. The Strategy also states that planning for future infrastructure needs to carefully consider all uses of the Inlet including both human and environmental. Strategies and actions regarding development and infrastructure within and adjacent to the Denmark Foreshore Reserves have been outlined in the *Wilson Inlet Foreshore Reserves Management Plan* (City of Albany and Shire of Denmark) and in the draft Denmark Local Town Planning Strategy (2012). The planning for the Springdale Beach Estate has prepared the following plans to ensure that the social, cultural and environmental values of the Wilson Inlet are protected: • Opus, 2006: Flora and Fauna Assessment Location 1935 South Coast Highway Denmark WA. Prepared for LWP Property Group. • Opus, 2007: Site Suitability for Onsite Effluent Disposal – Location 1935 South Coast Highway (Tourist Site). Prepared for LWP Property Group. • Opus, 2014: Foreshore management Plan – Springdale Beach Estate, Denmark. Prepared for LWP Denmark Pty Ltd. • Opus, 2014: Urban Water Management Plan – Springdale Beach Estate Denmark – Lot 9000 South Coast Highway Denmark. Prepared for LWP Denmark Pty Ltd.

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
		• Tree Survey Lot 9007 'Tourist Lot' Beaufortia Gardens Springdale Beach Denmark to identify introduced tree species vs local native species. • FirePlan WA, 2015: Fire management Plan – Springdale Beach Estate – Lot 9000 South Coast Highway, Shire of Denmark. • Biodiverse Solutions, 2017: BAL Contour Plan and Bushfire Management Statement. • Land Assessment Pty Ltd, 2018: Preliminary Assessment of Proposed Scheme Amendment Springdale Beach Tourist Zone Site, Denmark. • MP Rogers and Associates, 2020: Coastal Vulnerability Assessment. • Land Assessment Pty Ltd, 2020: Indicative Nutrient Inputs, Special Residential compared with Tourism Development. All these documents contribute on on-ground outcomes that will protect the values of Wilson Inlet and reduce the risks associated with development (e.g. stormwater management, nutrient/ sediment management and sustainable access to the Inlet foreshore. Of particular significance in terms of managing the risks associated with development adjacent to Wilson's Inlet is the preparation, adoption and implementation of the 2014 Urban Water Management Plan which outlines how post development stormwater flows will be attenuated to pre-development levels, with management of water quality for the most frequent 15 mm rainfall events (which make up 95% of stormwater quantity). There is a treatment train in the Springdale Beach Estate which comprises large lot sizes for management of water on each lot (including assimilation capacity of onsite effluent disposal), vegetation and riffles in swales in road reserves to retain sediments and nutrients, rock riffle drop structures to prevent erosion, staging basins and a terminal basin incorporated into POS adjacent to the southern terminus of Beaufortia Gardens Road. Significant effort has been invested in planning and implementation to ensure that water quality entering the Wilson Inlet is high.
Foreshore Environment Protection of the foreshore environment is important to the management of Wilson Inlet.		The foreshore reserve is proposed to be augmented through the rezoning of the Tourist area to Rural Residential with an additional 1.2 ha to be ceded. The foreshore reserve has been significantly enlarged through the subdivision process, with a further 1.2 ha of foreshore reserve proposed to be ceded to

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
DWER's Operational Policy 4.3 *Identifying and establishing waterway foreshore areas* (2013) recommends foreshore reserve includes steep banks to protect foreshore areas that are vulnerable to erosion. EPA Services note the indicative concept plan in the amendment report proposes an additional 1.1 ha of foreshore reserve within the area proposed to be rezoned to Special Residential, however this may not entirely capture the foreshore banks.		create a vegetated and managed area adjacent to Wilsons Inlet (188 m at the western boundary, 144 m at the eastern boundary and a minimum of 106 m in between. Attachment 3 shows that the steepest slopes have been incorporated into the foreshore reserve.
Foreshore Reserve – Access and Steep Slopes Increased access to the Springdale Beach Foreshore from future development may result in erosion of the foreshore banks and the spread of dieback. Construction associated with potential future development has the potential to cause erosion downstream. Information is requested as to demonstrate that an appropriate foreshore width has been provided, and to explain how the amendment will ensure the foreshore area within the proposed area for rezoning will be retained and protected from the impacts of future development. Scheme provisions or modified zoning/reservation may be considered. It is requested that a map is provided showing the proposed foreshore reserve and zoning boundaries overlaying an aerial with topographic contours.		A foreshore management plan has been adopted for the Springdale Beach Foreshore Reserve (Opus, 2014b): Foreshore management Plan – Springdale Beach Estate, Denmark. Prepared for LWP Denmark Pty Ltd. The plan has been approved by DWER and the Shire of Denmark, is consistent with the Wilson Inlet Foreshore Reserves Management Plan 2008 and incorporates actions and strategies to protect the ecology of the area. The plan also considers cultural features and advises on appropriate passive recreation activities. There is not likely to be increased access to Springdale Beach if the Tourist area is zoned Rural Residential because instead of 30 units of tourist accommodation, a restaurant and shops, there will now be 17 residences. This means that the foreshore will be mostly visited by local people rather than a large number of visitors. The foreshore management plan outlines that access will be managed via: • Provision of a car park adjacent to the foreshore reserve. • Access ways are appropriate for pedestrian and emergency access. • Signs interpreting the area have been installed. The current management plan has considered erosion control by closing informal access points and retaining low risk access tracks. There is no access provided in particularly steep areas.

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
		Construction in the residential development area will be subject to Shire of Denmark requirements to prevent erosion and sediment transportation. The management of the additional areas to be ceded can be addressed in either an addendum to the existing foreshore management plan (an updated action table and implementation diagram). Additional scheme provisions are not considered to be the most practical way to ensure ongoing sustainable management of the foreshore reserve. Proposed foreshore boundaries have been overlaid with aerial photography and topography to show that the steep slopes have been captured in the foreshore extension (Attachment 3).
Foreshore Management Plan The *Springdale Beach Estate Foreshore Management Plan* (FMP) was prepared in 2014 for the existing subdivision area to the north of the amendment area, consistent with Western Australian Planning Commission subdivision conditions. Further information is requested as to how the amendment will ensure the FMP is updated to reflect the proposed land use associated with the amendment and is consistent with the *Wilson Inlet Foreshore Reserves Management Plan* (Shire of Denmark 2008). The Shire may consider replacing existing TPS 3 provision iv) i) in Appendix XIV S Res 6. iv) i) with a contemporary version of existing TPS 3 Condition 10 in T9 Appendix XIII.		As noted above, we suggest that the Foreshore Management Plan is updated via an addendum which will comprise a map showing opportunities and constraints, and treatments integrating with existing foreshore reserve and surrounding areas. This could be a condition of subdivision. (Noting that clauses in DWER query are: Existing TPS 3 provision iv) i) in Appendix XIV S Res 6. iv) i): i) Council may request the Commission to impose a condition at the time of Subdivision for the preparation of Foreshore Management Plan/s based on the requirements of the Subdivision Guide Plan. 10. A Foreshore Management Plan shall be prepared to the satisfaction of Council and the Waters and Rivers Commission to assess and manage the relationship and impacts on the foreshore.)
On Site Effluent Disposal It is noted onsite effluent disposal is proposed within the amendment area. The provided *Preliminary Assessment of Proposed Scheme Amendment Springdale Beach Tourist Zone*		Soil requirements are a starting point to determine the capability of the land to support onsite effluent disposal generally (e.g. for primary/ septic tank systems). The GSP (2019) states that areas with constraints might be addressed through installation of secondary treatment units and units which remove nutrients. In addition, where appropriate, sand pads for irrigation areas can be used. This is a

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
Site Denmark (Land Assessment 2018) outlines that most of the site has a fair to low capability for onsite sewage disposal due to a low ability of the soils to retain nutrients against drainage losses to Wilson Inlet and the presence of restrictive clay and hardpan/rock layers. It is also stated that avoidance of onsite effluent disposal may be required around test pit (TP) 12a and TP 12b. Only one TP (10a) appears to meet the GSP requirements for soil characteristics (permeability and nutrient retention) suitable for onsite effluent disposal.		valid approach to address land capability issues (unless there are extreme constraints that cannot be managed). A summary of GSP requirements and its application to the site is included in Attachment 4.
Nutrient Inputs Total nutrient inputs for the two land use scenarios shown in Table 10 of the *Springdale Beach Development Indicative Nutrient Inputs, Special-Residential compared with Tourism Development* (Land Assessment 2020) report are comparable and do not strongly support an argument that a Special Residential land use will result in lower nutrient inputs than a tourism land use. It is also noted that in Table 3 a land use scenario is assumed of 'no clearing apart from house pad'. Much of the northern portion of the site is already cleared and may result in the development of gardens and livestock grazing is also not prohibited by the scheme, both of which may result in further nutrient application than assumed.		Nutrient inputs are significantly diminished through use of secondary treatment units with nutrient removal and are recommended in the GSP (2019) and Draft State Planning Policy 2.9 Planning for Water Policy (2021). As stated above, the site has been assessed in terms of GSP (2019). The results are included in Attachment 4.

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
Government Sewerage Policy Further information is requested to demonstrate: • The capability of the amendment area for onsite effluent disposal; • How the amendment will be consistent with the requirements of GSP including for 1.5m separation of system discharge points to impermeable layers, use of Alternate Treatment Units with secondary treatment systems, determination of disposal field area, and requirements under Schedule 2; • How the amendment will be consistent with the *Wilson Inlet Management Strategy* in relation to the nutrient output of onsite effluent disposal. • Contemporary scheme provisions may be considered. It would also be useful to provide the estimated nutrient load/kg/ha/year for each proposed dwelling.		Results of the Site and Soil Evaluation against criteria outlined in the GSP (2019) are included in Attachment 4. When compared to the GSP criteria, the following applies: • Groundwater was not found during winter testing conditions to a depth of 200 cm below ground level. • Four of the test pits had evidence of clay or hard pan layers which would require either a sand pad or identification of an alternative area suitable for irrigation of treated wastewater. Overall, the eastern half of Amendment area is relatively unconstrained for on-site effluent disposal if secondary treatment units with nutrient removal are utilised. Looking at the test pit characteristics in detail, seven of the 12 test pits (TP10a, TP10b, TP11a, TP11b, TP11c, TP11d and TP12c) meet the criteria for separation to groundwater of 1.5 m with no confining layer present within 1.5 m BGL. Results from four of the 12 test pits (10c, 10d, 12a and 12b) indicated that the locations are hindered by a hardpan or clay layer, creating an effective duplex soil. One test pit (TP12d) is now included in the foreshore reserve. In order to resolve this issue, we propose that the following apply: • Acknowledgement that these lots will need to incorporate a sand pad for irrigation (e.g. 1 m for area containing TP12a, 40 cm for TP10c and TP10d); or • Investigate conditions in other parts of each lot to see if impermeable layers are either deeper or not present. Land application and wastewater volumes are also discussed in Attachment 4. **Nutrients Generated by Households** Secondary treatment systems with nutrient removal are required to treat waste water so that the there are phosphorus and nitrogen concentrations of less than 1mg/L and 10mg/L respectively. If a household is generating 900 L/day, this equates to 0.33 kg phosphorus per year and 3.3 kg of nitrogen per year. If 17 lots are created, this equates to 5.1 kg phosphorus per year and 56.1

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
		kg nitrogen/ year for the 17 lots. For the total Amendment area of 9.4 ha, this equates to 0.5 kg phosphorus/ ha/ year and 5.96 kg nitrogen/ ha/year **Wilson Inlet Management Strategy** Development around Wilson Inlet is increasing and careful planning is needed to manage nutrient input and sediment loads and prevent erosion. Partly this will be achieved through the retention of a minimum 50 m buffer of vegetation around the Inlet. Other strategies include the reduction of nutrient input through management of stormwater and use of appropriate on-site effluent disposal systems in non-sewer reticulation areas.
Terrestrial Fauna; Flora and Vegetation The amendment area contains Jarrah/Marri woodland. This vegetation is potential habitat for the Critically Endangered Western Ringtail Possum and threatened species of black cockatoo. The *Flora and Fauna Assessment 2006* provided with the referral may not reflect the current habitat or presence/absence of threatened species within the amendment area. Further information is requested to demonstrate how the amendment will identify, protect, and manage terrestrial fauna values and impact to habitat. Scheme provisions or scheme map modifications may be considered; alternatively an updated fauna survey consistent with EPA technical guidance may be provided.	**Flora and Vegetation:** To protect flora and vegetation so that biological diversity and ecological integrity are maintained. **Terrestrial Fauna:** To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	A Flora and Fauna Assessment was carried out for the Springdale Beach area in 2006 by Opus. To augment and update the report to ensure that it addresses EPA Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (2020) the following has been undertaken (Attachment 5): • Desktop review of up to date information; • Western Ringtail Possum - Daytime search for dreys and scats, evening spotlighting; • Cockatoos: Identification of foraging and roosting and potential habitat trees; and • Analysis of trees retained vs ones to be removed in the Amendment area. All very good to excellent quality vegetation is incorporated into the Foreshore Reserve, other than a 2,000m^2 area in proposed Lot 13 which will be retained. Clearing of approximately 3000m^2 of Marri and Peppermint woodland in degraded condition will be required to establish the road reserve. Seven large Marri trees which meet the criteria of habitat trees for the three species of threatened Black Cockatoo will be retained in proposed Lots 9, 10 and 12. Single peppermint trees (no understory) will be retained in proposed Lots 4, 5, 6, 7, 9, 10 and 12 (pending bushfire protection requirements).
Social Surroundings; Terrestrial Fauna	**Social Surroundings:** To protect social	Shrouded lighting for street lights will be implemented (suggest as condition of subdivision).

REQUEST FOR ADDITIONAL INFORMATION	EPA OBJECTIVES	RESPONSE
EPA Services note that LPS 3 Appendix 10 T9 Condition for the current Tourist zoning of the amendment area contains Condition 22 regarding light spill. Further information is requested to demonstrate how the amendment will ensure that future development manages light spill that may have an impact on visual amenity and Terrestrial Fauna.	surroundings from significant harm. **Terrestrial Fauna:** To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	

References

Ayton Baesjou (2019) Tree Survey Lot 9007 'Tourist Lot' Beaufortia Gardens Springdale Beach Denmark to identify introduced tree species vs local native species.

Biodiverse Solutions (2017) BAL Contour Plan and Bushfire Management Statement.

FirePlan WA (2015) Fire management Plan – Springdale Beach Estate – Lot 9000 South Coast Highway, Shire of Denmark.

Land Assessment Pty Ltd (2018) Preliminary Assessment of Proposed Scheme Amendment Springdale Beach Tourist Zone Site, Denmark.

Land Assessment Pty Ltd (2020) Indicative Nutrient Inputs, Special Residential compared with Tourism Development.

MP Rogers and Associates (2020) Coastal Vulnerability Assessment.

Opus (2006) Flora and Fauna Assessment Location 1935 South Coast Highway Denmark WA. Prepared for LWP Property Group.

Opus, (2007) Site Suitability for Onsite Effluent Disposal – Location 1935 South Coast Highway (Tourist Site). Prepared for LWP Property Group.

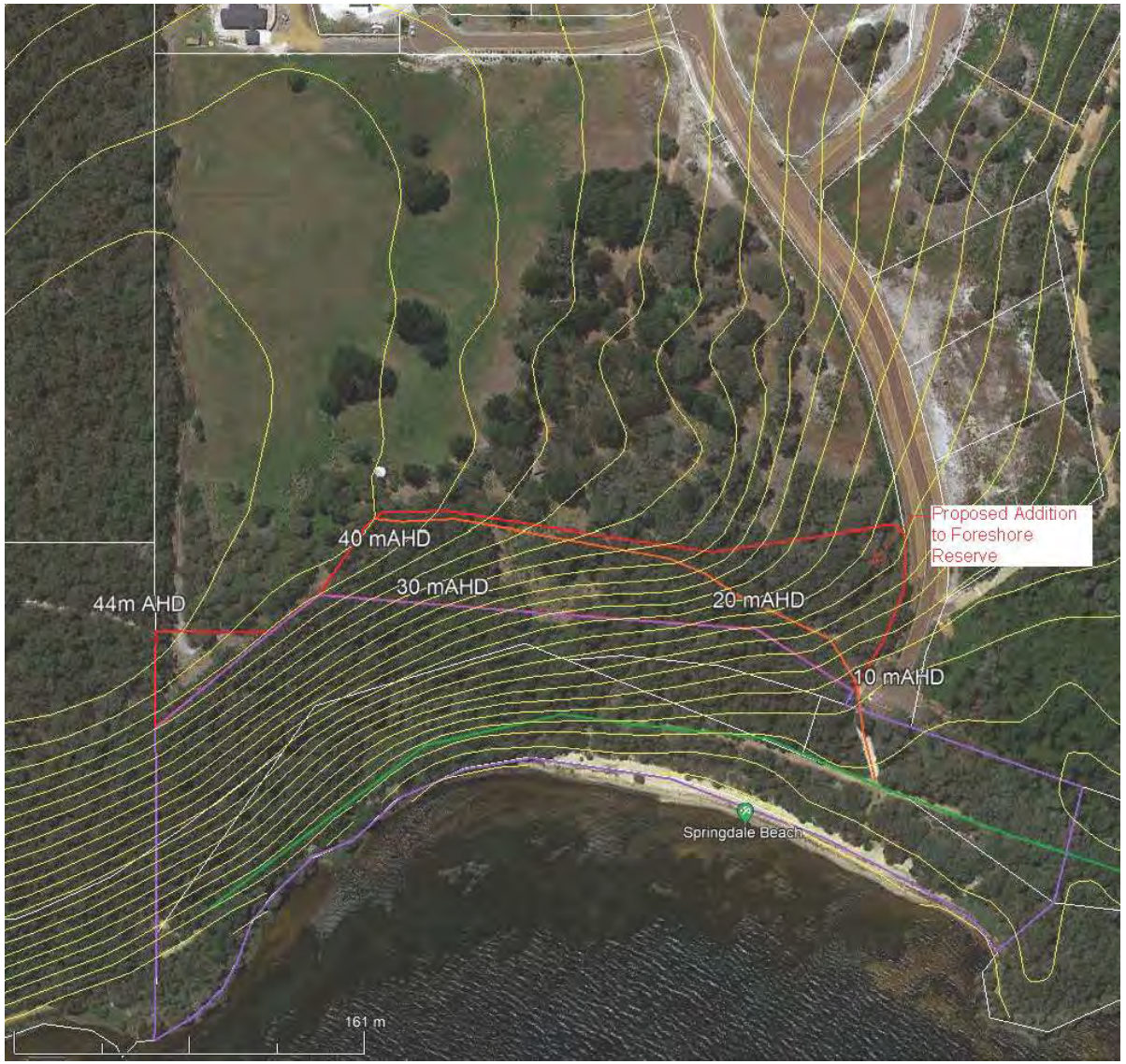
Opus (2014a) Foreshore management Plan – Springdale Beach Estate, Denmark. Prepared for LWP Denmark Pty Ltd.

Opus (2014b) Urban Water Management Plan – Springdale Beach Estate Denmark – Lot 9000 South Coast Highway Denmark. Prepared for LWP Denmark Pty Ltd.

ATTACHMENT 3

STEEP SLOPES IN FORESHORE RESERVE

Map showing that steep slopes have been captured in the proposed foreshore reserve



ATTACHMENT 4

SITE AND SOIL EVALUATION - GOVERNMENT SEWERAGE POLICY (2019)

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T 0447446343

ANALYSIS OF AMENDMENT AREA 149 – SITE AND SOIL EVALUATION AND ASSESSMENT, LOT 9008 BEAUFORTIA GARDENS, SPRINGDALE BEACH ESTATE, SHIRE OF DENMARK

Prepared For:	LWP Group Pty Ltd PO Box 7568 Cloisters Square PERTH GPO WA 6850
Report Number:	AA2020/057
Report Version:	V1
Report Date:	3 December 2021

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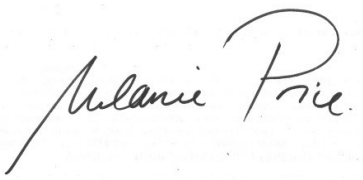
QUALITY ASSURANCE

Aurora Environmental has implemented a comprehensive range of quality control measures on all aspects of the company's operation.

An internal quality review process has been applied to each project task undertaken by us. Each document is carefully reviewed and signed off by senior members of the consultancy team prior to issue to the client.

Document No: LWP2021-003_ENV_002_mp_V1.docx

Report No: AA2020/057

Author:	Melanie Price Associate Environmental Scientist		3 December 2021	
		Signature	Date	
Reviewed by:	Paul Zuvela Manager - Environmental Impact Assessment		3 December 2021	
		Signature	Date	

DISTRIBUTION

FORM	REPORT FILE NAME	REPORT STATUS	DATE	PREPARED FOR	INITIALS
PDF	LWP2021-003_ENV_003_mp_V1.docx	V1	3 December 2021	LWP Group Pty Ltd	MP

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FIGURES IN TEXT

TABLES IN TEXT

ATTACHMENTS

APPENDICES

LIST OF ABBREVIATIONS AND GLOSSARY

ATU	Aerobic Treatment Unit
AS/NZS	Australian Standards/New Zealand Standards
BGL	Below ground level
Cfu	Coliform forming unit
DLR	Design Loading Rates
DIR	Design Irrigation Rate
DOH	Department of Health
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
Effluent	The liquid discharged from a wastewater treatment unit
Floodplain	The extend of flooding in an area in a one percent (1 in 100) Annual Exceedance Probability flood event for a particular waterway, which includes the floodway and flood fringe areas.
Groundwater	The area of an aquifer in which all pores and fractures are saturated with water. Also known as water in the phreatic zone.
GSP	Government Sewerage Policy 2019
Ha	Hectare
K_{SAT}	Coefficient of permeability
L	Litre
Land Application Area (LAA)	The unencumbered plan area to which treated sewage from an on-site sewage system is distributed for further in-soil treatment and absorption or evaporation. This area is restricted to the distribution of treated sewage.
Land Application System (Las)	The system used to apply effluent from a wastewater treatment unit into or onto the soil for further in-soil treatment and absorption or evaporation
LG	Local Government
M	Metre
On – site wastewater system	A wastewater treatment and disposal or reuse system that receives treats and applies wastewater to a land application area located within the boundaries of the freehold lot or survey strata within which wastewater was generated.
PRI	Phosphorus Retention Index

Primary treatment	The separation of suspended material from sewage in septic tanks, primary settling chambers, or other structures (including those which may be used to treat trade waste) before discharge to either a land application area or secondary treatment process. (For example, septic tanks with leach drains).
Priority Areas	The Priority 1, 2, 3 and 3* areas assigned by the Department of Water and Environmental Regulation to guide land use and management decisions.
Public Drinking Water Source Area (PDWSA)	Underground water pollution control areas, catchment areas and water reserves that are constituted under the Metropolitan Water Supply, Sewerage, and Drainage Act 1909 or the Country Areas Water Supply Act 1947.
Reticulated Sewerage	A network of sewers and associated wastewater treatment plant managed by a sewerage service provider.
Secondary treatment	Microbiological digestion and physical settling and filtering processes and decomposition of sewage constituents following primary treatment
Secondary treatment system	A sewage treatment system which produces treated sewage of secondary standard equal to or less than, i.e. 20 mg/L of Biochemical Oxygen Demand (BOD), 30 mg/L of Total suspended solids (TSS) and 10 cfu/100 mL of Escherichia (E) coli (for example, an aerobic treatment unit).
Sewage	Any kind of sewage, faecal matter or urine, and any waste composed wholly or in part of liquid
SSE	Sewage sensitive area
SSE	Site and soil evaluation: An assessment of all relevant constraints and the risks to public health and the environment of an on-site sewage system in accordance with AS/NZS 1547 On-site domestic wastewater management.
SPP 2.9	State Planning Policy 2.9 – Water Resources
Trade waste	Any wastewater, discharged from a business or industry, aside from that which comes from staff amenities or office facilities.
WAPC	The Western Australian Planning Commission
Wastewater	Is consistent to the definition of “sewage”, and does not include stormwater, surface water or ground water of a type that is ordinarily drained from land as part of the provision of a drainage service. This includes trade waste.
Water resources	Includes watercourses, waterways and their estuaries, inlets and floodplains, wetlands, groundwater, surface water, stormwater, and drainage. A water resource includes all aspects of the water resource, including water, organisms and other components and ecosystems that contribute to the physical condition and ecological health of the water resource.
WHPZ	Well Head Protection Zone
WWTP	Wastewater treatment plant

1 ASSESSMENT SUMMARY

Aurora Environmental has undertaken a Site and Soil Evaluation (SSE) for Lot 9008 Beaufortia Gardens, Springdale Beach Estate (the Amendment area) to assess suitability for onsite wastewater management and to recommend the type of onsite wastewater system for the proposed 17 lot subdivision. Matters relating to land capability and previous land capability assessments were considered in the context of requirements of the *Government Sewerage Policy 2019* (GSP; Government of Western Australia, 2019) and the Draft State Planning Policy (SPP) 2.9 Planning for Water.

The requirements of the GSP for the amendment area can be met. Key points are:

- All separation requirements can be met.
- Testing information from Opus (2007) is considered adequate to record maximum winter groundwater levels and soil types.
- Winter groundwater levels were greater than 1.5 m below ground level, as required in a sewage sensitive area.
- The eastern portion of the amendment area may experience perched water on duplex soils during wetter months. These areas may require sand pads to achieve adequate separation. Alternatively, additional testing by new landowners may assist in identifying areas with adequate clearance (depending on where they propose to locate dwellings within the building envelope).

Installation of secondary treatment units with nutrient removal capacity are recommended due to the proximity to Wilson Inlet (sewage sensitive area).

2 SUBJECT LAND DESCRIPTION

2.1 SUBJECT LAND DESCRIPTION

The amendment area comprises 53.5525 ha and is part of the Springdale Beach Estate Figure 1. The Amendment area abuts the Wilson Inlet foreshore.

The Amendment area comprises pasture in the north western section and native and planted vegetation in the south east section.

Level of constraint: Nil

Mitigation: None required

FIGURE 1: LOCATION

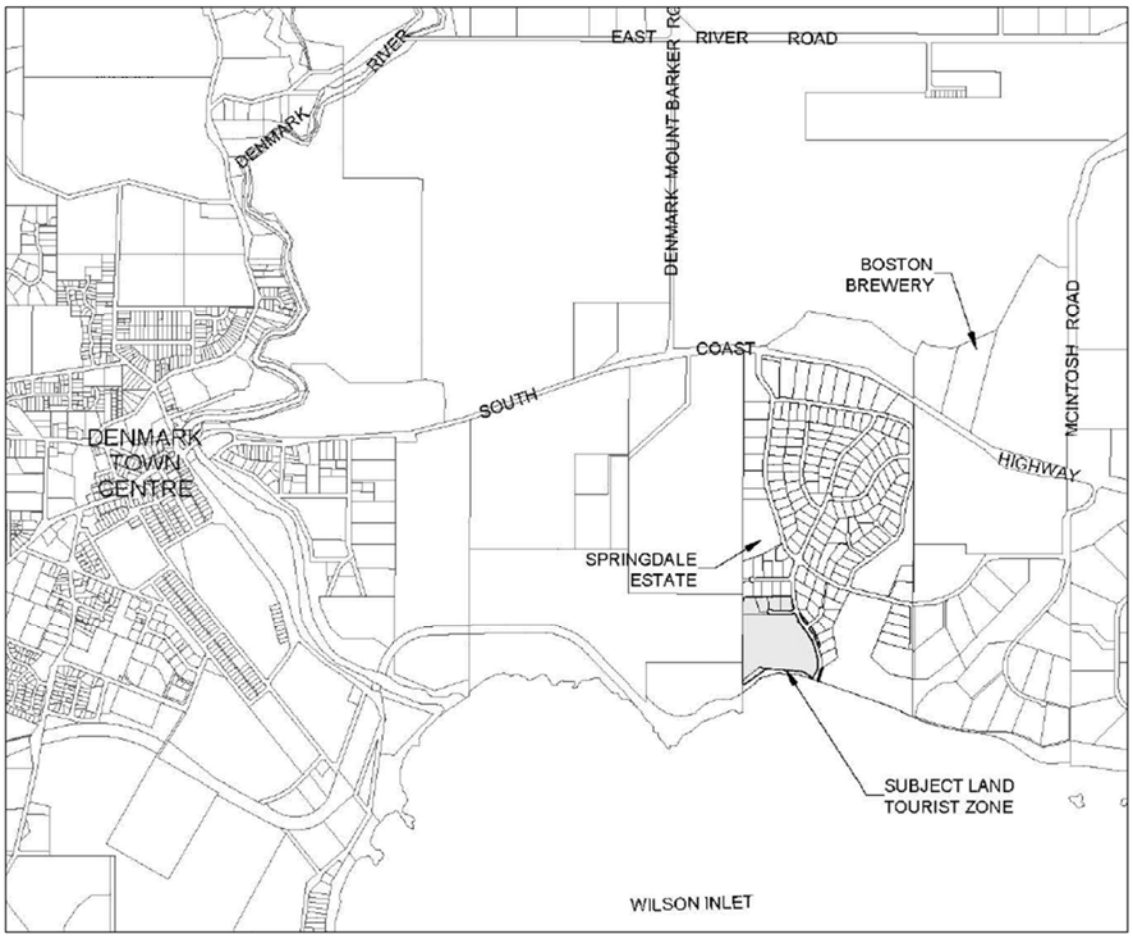
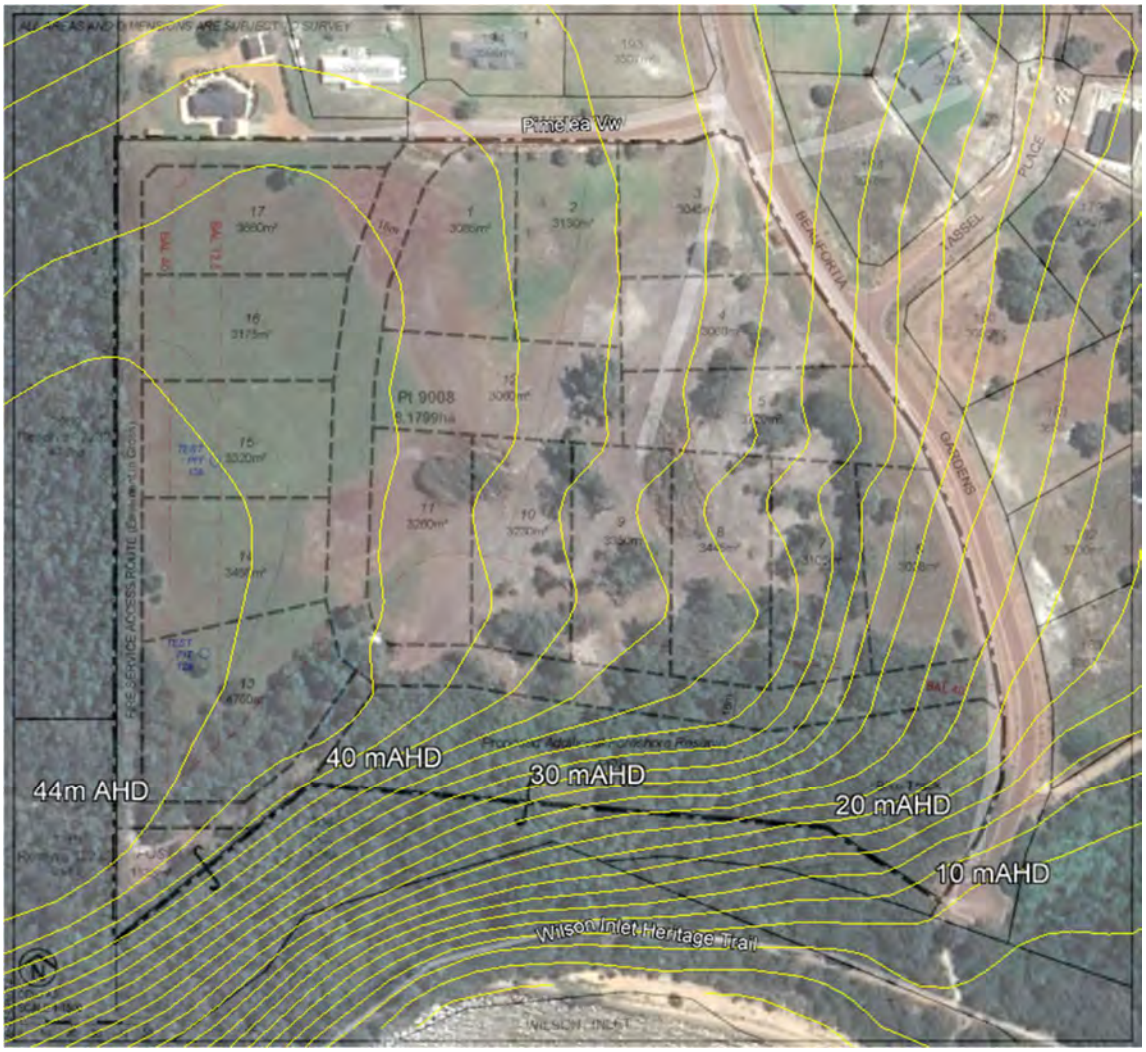


FIGURE 2: SUBDIVISION GUIDE PLAN

Source: Indicative Concept Plan (Ayton Baesjou Planning).

FIGURE 3: AERIAL PHOTOGRAPH AND TOPOGRAPHY



2.2 SURROUNDING LAND USES:

Land to the north comprises special residential areas with lot sizes of approximately 0.3 to 0.5 ha. The area to the east comprises a valley (water gaining), native vegetation in Public Open Space (POS) and foreshore reserve. The area immediately to the west comprises crown reserve 12232 (native vegetation).

Level of constraint: Nil

Mitigation: None required

2.3 TOPOGRAPHY AND SLOPES

The highest point of the Amendment area is in on the mid western boundary at approximately 46 mAHD (Figure 3). The land slopes down the eastern boundary and southern boundary with a low point of approximately 8 mAHD in the south eastern corner.

The steepest slopes are associated with proposed Lot 7 (18% grade, 1:6 slope). However, there are areas on the lot which are significantly flatter with 10% grade(1:10 slope). Most of the amendment area is gently sloping (less than 8%; 1:12 slope).

2.4 CLIMATE

The Denmark area has a Mediterranean climate, characterised by warm, dry summers and cool, wet winters. The long-term mean annual rainfall is 1037.4 mm [1]). Most of the rain falls between May and September (Table 1).

Level of constraint: Nil

Mitigation: None required

TABLE 1: RAINFALL: MEAN AND MEDIAN FOR DENMARK BY MONTH (MM)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	30.1	25.6	34.4	80.3	133.6	143.9	169.8	137.9	102.9	93.8	58.2	27	1037.4
Median	20	20.3	27.8	75.4	115.1	126.9	165.9	139.1	94.5	88.6	49.8	19	1071.3
2020	47.7	22	53.4	48.2	159.3	145.2	148.2	217.2	138.3				

Source: Bureau of Meteorology (2021). http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_display_type=dataDGraph&p_stn_num=009531&p_nccObsCode=136&p_month=13&p_startYear=2021

2.5 EVAPORATION

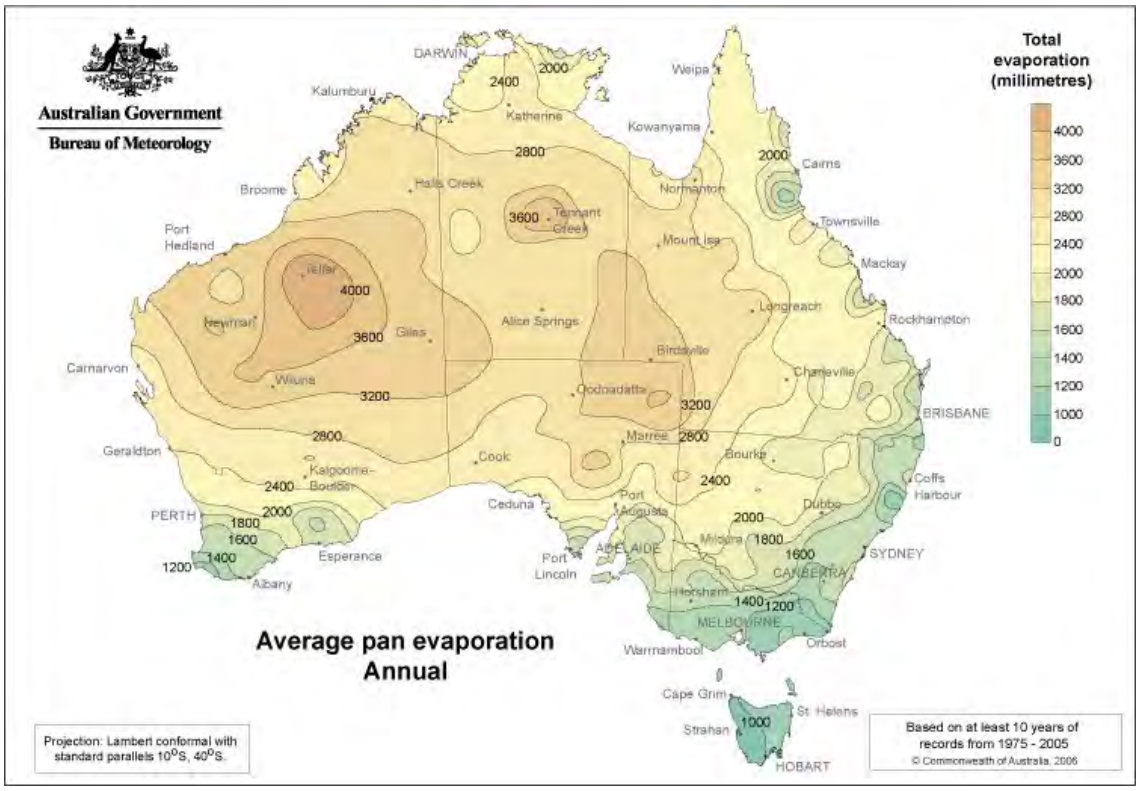
Annual average evaporation for Denmark is approximately 1400 mm so annual evaporation exceeds rainfall (BOM, 2021[2]). Rainfall exceeds evaporation for approximately 6 months a year.

Level of constraint: Nil.

[1] http://www.bom.gov.au/climate/averages/tables/cw_009500_All.shtml
[2] http://www.bom.gov.au/watl/evaporation/

Mitigation: Other site factors (e.g. soil permeability) mean that 6 months of low evaporation is not a significant constraint.

FIGURE 4: AVERAGE ANNUAL PAN EVAPORATION



Source: BOM (2021) http://www.bom.gov.au/watl/evaporation/

FIGURE 5: NUMBER OF MONTHS DURING WHICH RAINFALL EXCEEDS EVAPORATION

Rainfall exceeds evaporation for approximately 6 months per year for Denmark)

2.6 SOILS

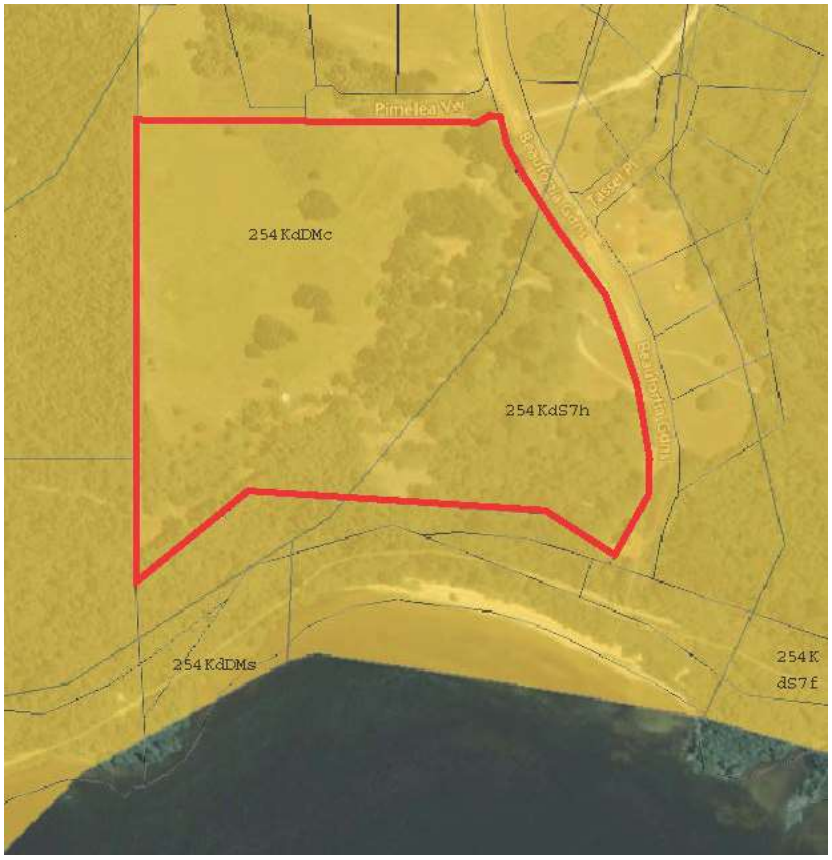
Soils represented in the Amendment area include:

- 'Dempster crest phase - Kentdale' (254KdDMc): Sands and laterite on elongate crests. 10-30% of map unit has a high to extreme phosphorus export risk. Overall the soil unit has a 'moderate' risk of phosphorus export (Landgate, 2021: Soil landscape land quality – Phosphorus Export Risk (DPIRD-010)).
- 'Minor Valley Slope' (254KdS7h): Slopes of broad valleys in sedimentary rocks; 30 m relief; smooth slopes. Deep sands and iron podzols on slopes; Podzols and yellow duplex soils on floors. 30-50% of map unit has a high to extreme phosphorus export risk. Overall the soil unit has a 'moderate' risk of phosphorus export (Landgate, 2021: Soil landscape land quality – Phosphorus Export Risk (DPIRD-010)).

Level of Constraint: Moderate constraint as in some places, soils are shallow and duplex, potentially with rainwater perching on impervious layers.

Mitigation: Soil characteristics can be managed with secondary treatment unit with nutrient removal and the incorporation of sand pads for subsurface irrigation of treated waste water.

FIGURE 6: SOIL TYPES



Source: National Map (2021) Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010); https://www.nationalmap.gov.au/

FIGURE 7: PHOSPHORUS EXPORT RISK

Source: National Map (2021) Soil Landscape Mapping – Best Available (DPIRD-027)

2.7 CATCHMENT

The subject land is part of the Wilson Inlet catchment.

Level of Constraint: Moderate constraint.

Mitigation: Management of drainage via UWMP treatment train. Use of secondary treatment systems with nutrient removal.

2.8 WATERCOURSES/ WETLANDS

The subject land does not contain any wetlands or watercourses but is adjacent to Wilson Inlet. There is a water gaining area in the valley to the east (150 m) which flows into Wilson Inlet.

Level of Constraint: Low

Mitigation: Compliance with 'Better Urban Water Management' with implementation of an Urban Water Management Plan.

3 REQUIREMENTS – GOVERNMENT SEWERAGE POLICY 2019

The following requirements outline how the Amendment area complies with GSP criteria (Table 2).

TABLE 2: REQUIREMENTS OF GOVERNMENT SEWERAGE POLICY

REQUIREMENT		STATUS
Location/ Land Use		
Sewerage sensitive zone		Yes: within 2 km of Wilson Inlet (selected estuary). Minimum Lot size would usually be required to be 1 ha. However, as the surrounding area supports Lot sizes of between 3,000 and 5,000 m^2, a minimum of 3,000 m^2 is proposed (as already supported by the Shire of Denmark in referral of the Amendment).
Public Drinking Water Source Area		No
Separation from Water Resources: On-site Effluent Disposal – Primary Treatment		
Resource	**Distance Requirement**	**Comment**
Wellhead protection zone (WHPZ) or on Crown land within a reservoir protection zone	Not to be located within zone	The subject land is not within 100 m of a WHPZ or reservoir.
High water mark of a reservoir	100 m	The subject land is not within 100 m of a reservoir.
Bore used for public drinking water supply	100 m	No bores within 100 m
Private bore used for household/ drinking water purposes	30 m	The subject land is not within 30 m of private bores used for drinking water (Water Information Reporting: http://wir.water.wa.gov.au/Pages/Water-Information-Reporting.aspx)
Waterway or significant wetland and not within a waterway foreshore area or wetland buffer	100 m for primary treatment. Down to 30 m for secondary treatment with nutrient removal.	The subject land does not contain any water courses or significant wetlands. The Amendment area is adjacent to Wilson Inlet and its foreshore. The closest water course is 150 m to the east, which flows into Wilson Inlet. The closest point to Wilson Inlet from the Amendment area is 110 m (noting that on-site effluent disposal can be place further away – minimum 150 m).
Drainage system that discharges directly into a waterway or significant wetland without treatment	100 m	There are no drainage systems which directly discharge into a waterway or significant wetland (Wilsons Inlet). All water is treated via a treatment train (approved UWMP) prior to discharge.
Area subject to inundation and/or flooding in a 10%	Subject to flooding in a	The subject land is not subject to flooding.

Annual Exceedance Probability (AEP) rainfall event	10% AEP rainfall event	
Groundwater – Vertical separation		
Public drinking water source area (PDWSA)	2 m	No
Sewage sensitive area (SSA)	1.5 m	The Amendment area is within a sewage sensitive area: as it is within 2 km of Wilson Inlet. Soil profile data, including groundwater levels are included below. All of the locations tested meet the criteria for 1.5 m separation to groundwater (winter testing; Opus, 2007). Due to duplex soils and hardpans in some areas, wastewater irrigation areas will need to be incorporated into sand pads in areas associated with TP10c, TP10d, TP 2a and TP12b. Alternatively, testing may reveal suitable sites available for these lots that do not require sand pads.
Separation to groundwater outside PDWSA and SSA: 0.6 m loams and heavy soils 1 m for gravels 0.6 m for sands – secondary treatment with nutrient removal 1.5 m for sands – primary treatment		These criteria do not apply to the Amendment area.

SOIL PROFILE DATA (OPUS 2007) ASSESSED AGAINST GSP (2019) REQUIREMENTS				
LOCATION TEST PIT	**DEPTH OF PROFILE**	**SOIL DESCRIPTION**	**WATER TABLE (21 SEPTEMBER 2006)**	**COMMENT**
Test pit locations are shown in Appendix A.				
10a	Depth to clay or hard pan: > 200 cm	Yellow deep sand; Grey silty sand to 20 cm, cemented yellow-orange sand to 135 cm, yellow silty sand to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m below ground level (BGL))
10b	Depth to clay or hard pan: > 200 cm	Pale deep sand; Grey silty sand to 30 cm, white silty sand to 180 cm, gravelly silty sand to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL) Permeability test result > 3 m /day (i.e. 'rapidly drained')

10c	Depth to clay or hard pan: 110 cm	Pale deep sand over clay (duplex) Grey silty sand to 40 cm, dark brown gravelly sand (weak pan) to 110 cm, over silty clay to 200 + cm	Nil	Permeability test result > 3 m /day (i.e. 'rapidly drained') for most of soil but likely restriction in subsoil permeability at 110 cm. 'Moderately high' PRI result for gravelly sand. Groundwater separation meets criteria (1.5 m BGL). This area is likely to require a sand pad for irrigation of treated wastewater due to presence of hard pan.
10d	Depth to clay or hard pan: 100 cm to weak hard pan	Pale deep sand over clay (duplex); Grey silty sand to 40 cm, dark brown gravelly sand (weak pan) to 100 cm, over silty clay to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL). Will require sand pad for irrigation area due to hardpan. This TP is associated with proposed lots 10, 11 and 12. Further testing could determine that a suitable irrigation area is present that does not require a sand pad.
11a	Depth to clay or hard pan: > 200 cm	Pale deep sand; Grey silty sand to 25 cm, light grey sand to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL)
11b	Depth to clay or hard pan: 180 cm cm	Pale deep sand – over hardpan; Grey silty sand to 40 cm, white silty sand to 180 cm, orange brown rock (hardpan) to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL)
11c	Depth to clay or hard pan: > 200 cm	Pale deep sand; Grey silty sand to 30 cm, white silty sand to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL)
11d	Depth to clay or hard pan: > 200 cm	Pale deep sand; Grey silty sand to 30 cm, white silty sand to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL)

12a	Depth to clay or hard pan: 50 cm	Pale shallow sand – over hardpan; Grey silty sand to 35 cm, hard cemented yellow-orange sand (hardpan) to 50 cm	Nil	Groundwater separation meets criteria (1.5 m BGL). This area is likely to require a sand pad for irrigation of treated waste water due to the presence of a hard pan. This TP is associated with proposed lots 13 and 14. Further testing could determine that a suitable irrigation area is present without the need for a sand pad.
12b	Depth to clay or hard pan: 10 cm	Semi wet soil – very shallow hardpan; Dark grey wet silty sand to 10 cm, orange brown rock (hardpan) to 30 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL). This area is likely to require a sand pad for irrigation of treated waste water due to the presence of clay/ hardpan. This TP is associated with proposed lots 15 and 14. Further testing could determine that a suitable irrigation area is present without the need for a sand pad.
12c	Depth to clay or hard pan: > 200 cm	Gravelly pale deep sand; Dark grey to grey silty sand to 40 cm, light brown to orange gravelly silty sand (weak pan) to 200 + cm	Nil	Groundwater separation meets criteria (1.5 m BGL). Permeability test result > 3 m/ day (i.e. 'rapidly drained'). 'Very low' PRI result for silty sand layer
12d	Depth to clay or hard pan: 140 cm	Pale deep sand – over clay (effective duplex); Dark grey silty sand to 70 cm, dark brown gravelly sand (weak pan) to 140 cm, over silty clay to 200 + cm	Nil	This area has been incorporated into the foreshore reserve.

WASTEWATER VOLUME

WASTEWATER VOLUME		
Development: Average 3,000 m^2 lots, each with a single residence and on-site effluent disposal		
Anticipated Wastewater Volume	900 L/day Sewage (L) per dwelling	Based on 6 persons in a 5-bedroom house or 150 L per person per day (standard residential dwellings)

Based on: The land application area has been determined using design loading rates, extrapolated from Table L1 *AZ/NZS 1547 On-site domestic wastewater management (Australian Standards, 2012)*.

Application of treated wastewater via subsurface drippers is one of the most practical method of irrigation as it prevents aerosolising wastewater (compared to above ground sprays). Recommendations for application areas of treated wastewater are outlined in Table 3 below.

TABLE 3: LAND APPLICATION AREAS

Land Application Areas
Land application areas for treated wastewater are to be used only for that purpose and should be kept free of any temporary or permanent structures.
Activities within the land application area shall not interfere with the function of the current and future land application system and people should avoid potential contact with effluent residues. Unless allowed for in the design, the land application area) should: • not be built on or paved in a manner which precludes reasonable access; • not be subject to vehicular traffic (other than a pedestrian-controlled lawnmower); • not be subject to regular foot traffic such as pathways and clothesline areas; and • should be kept in a manner which enables servicing and maintenance of the disposal system.

The size of the land application area has been determined in accordance with the conversion factors prescribed in Table 4 and *AS/NZS 1547 On-site domestic wastewater management* as follows:

1. Estimate hydraulic load (L/day): Occupancy rate (persons) x design loading rate (L/person/day)

2. Calculate land application area (m^2): Hydraulic load (L/day) x conversion factor from Schedule 2 Table 2 of GSP (2019).

TABLE 4: LAND APPLICATION AREA

Minimum required land application area treated wastewater disposal					
Soil Category	Soil Texture	Conversion Factor and Square Metres Required			
		Primary Treatment	Area (m^2)	Secondary Treatment	Area (m^2)
1	Gravels and sands	0.377	339.3	0.2	180
2	Sandy loams	0.377	339.3	0.2	180
3	Loams	0.477	429.3	0.25	225
4	Clay loam	0.689	620.1	0.286	257.4
5	Light clays	1.284	1155.6	0.333	299.7
6	Medium to heavy clays	Special design requirements and distribution		0.5	450

		techniques or soil modification procedures will be necessary			

Note: From GSP, 2019. Schedule 2 Table 2. Conversion factors based on a hydraulic load of 1 L/day. Red text indicates attributes which apply to the subject land.

TABLE 5: TREATMENT OF SLOPES

Slopes	
Gradient of the land application area	Most of the amendment area comprise gently undulating areas that do not exceed one in five (1:5). Areas that do exceed 1:5 slope can be avoided through placement of irrigation areas (e.g. proposed lot 7). Therefore, wastewater application areas do not need to be engineered to prevent run-off.

4 DRAFT STATE PLANNING POLICY 2.9 PLANNING FOR WATER

In addition to the GSP (2019), the Draft State Planning Policy (SPP) 2.9 Planning for Water is currently being considered (public comment period). The following summarised the approach to on-site waste water treatment in Draft SPP2.9.

The Draft State Planning Policy 2.9 Planning for Water (2021) states the following:

7.4 Infrastructure and supply

Wastewater

j) Proposals for on-site wastewater disposal may be considered where the decision maker is satisfied that:

i. reticulated sewerage is not required in accordance with measure 7.4(l) of this policy;

ii. the highest groundwater level is greater than 0.5m from the natural ground surface for rezoning proposals to create unsewered lots less than 1 hectare in size;

iii. each lot can accommodate on-site wastewater disposal in accordance with *AS/NZS 1547:2012 On-site domestic wastewater management* where relevant;

iv. the site requirements for on-site wastewater disposal outlined in the Guidelines can be met; and

v. development will be serviced by an appropriate on-site wastewater system that will manage risk to the environment and public health where relevant.

The Amendment area complies with these requirements.

8.7.5 Onsite wastewater disposal

Where reticulated sewerage is not required in accordance with measure 7.4(j) of SPP 2.9, on-site wastewater disposal may be considered where the responsible authority is satisfied that:

1. Each lot can accommodate on-site sewage disposal in accordance with *AS/NZS 1547 On-Site Domestic Wastewater Management* (Standards Australia/New Zealand Standard, 2012) (AS/NZS 1547). This should generally be provided in the form of a Site and Soil Evaluation (SSE) (refer to section 8.7.6); and

2. The site requirements (as outlined in sections 8.7.7 – 8.7.10) for on-site sewage disposal can be met.

The Amendment area complies with these requirements.

8.7.7 Site Requirements: Lot Size

LOCATION/ LAND USE	MINIMUM LOT SIZE	NOTES/ COMMENT
In sensitive water resource area	One hectare	Note: Land in a sensitive water resource area that is already zoned for urban use with a residential density coding of R2 to R12.5 under a local planning scheme or structure plan endorsed by the WAPC, may be subdivided in accordance with the existing density coding. Where R10 subdivision is proposed, it should be demonstrated that the density coding was assigned with the understanding that reticulated sewerage would not be provided. Smaller lots in a sensitive water resource area may be considered for non-residential subdivision on a case-by-case basis where it can be demonstrated that the proposal meets the minimum site requirements and the responsible authority, in consultation with relevant agencies, is satisfied that the proposal is consistent with the objectives of SPP 2.9. Comment: The Amendment area is proposed to be rezoned to a similar density to the surrounding Rural Residential zone which is 3,000 – 5,000 m^2.

Information on compliance should be provided in a water management report and may be in the form of a:

a) checklist or statement against criteria, and/or

b) site plans showing (where relevant):

i. existing and proposed buildings, paved surfaces (including driveways, verandas and alfresco areas), private bores and soak wells. This is particularly relevant for infill subdivision where existing dwellings are to be retained;

ii. land application areas. For residential subdivision that provides for single houses, areas should be in accordance with Table F.3 of Appendix F. Where hydraulic loads can be estimated for non-residential subdivision/development or built strata areas should be calculated in accordance with Table F.2 of Appendix F;

iii. setbacks from water resources; and

iv. PDWSAs and protection zones and sensitive water resource areas.

This document has addressed a), b) iii, b) iv.

b) i and ii can be investigated at the subdivision stage.

8.7.9 Site Requirements: Separation from Groundwater

Where the use of fill is proposed to achieve separation distances, proponents may be required to provide additional information to demonstrate that solutions are effective, do not impact on other lots

through water diversion, are not cost prohibitive and will not compromise amenity or landscape values. Where a substantial amount of fill is required, conditions of subdivision may require fill to be provided prior to lots being created or a notification on title.

This requirement can be fulfilled at the subdivision stage.

8.7.11 Type of On-site Treatment System Required

Relevant considerations include:

i. Site and soil conditions.

ii. Potential impact on water resources. Within PDWSAs and sensitive water resource areas, secondary treatment systems with nutrient removal are recommended, particularly where lots are less than one hectare in size or where soils have low capacity to retain nutrients. The systems should meet the criteria for nutrient removal of Table 2.2 of AS1546.3:2017.

However, where these systems are not suited to the proposed land use or there are issues with the availability of maintenance personnel, other site specific solutions should be considered.

iii. Proposed land use. The on-site wastewater system should be designed to accommodate hydraulic loads (including seasonal variation) and composition of wastewater generated (including trade waste where applicable).

iv. The availability of systems and maintenance personnel required to service secondary treatment systems in accordance with certification requirements. This is particularly important in rural and remote areas.

v. Secondary treatment systems should only be required in response to site constraints or to manage specific risks to public health, the environment or water resources.

This document outlines that secondary treatment units with nutrient removal are the most appropriate systems, given the soil types and proximity to Wilson Inlet.

5 STATE PLANNING POLICY 2.5 RURAL PLANNING

The State Planning Policy 2.5 Rural Planning states:

6.5.1 Servicing Conditions

For wastewater disposal for rural and rural living subdivisions, WAPC policy is:

On-site wastewater disposal is generally acceptable, subject to the appropriate separation from buildings, watercourses, water bodies and/or drinking water sources being demonstrated.

This document has outlined that separation distances can be met.

6 RECOMMENDATIONS

The requirements of the GSP and Draft SPP 2.9 Planning for Water for the amendment area can be met. Key points are:

- All separation requirements can be met.
- Testing information from Opus (2007) is considered adequate to record maximum winter groundwater levels and soil types.
- Winter groundwater levels were greater than 1.5 m below ground level, as required in a sewage sensitive area.
- The eastern portion of the amendment area may experience perched water on duplex soils during wetter months. These areas may require sand pads to achieve adequate separation. Alternatively, additional testing by new landowners may assist in identifying areas with adequate clearance (depending on where they propose to locate dwellings within the building envelope).

Installation of secondary treatment units with nutrient removal capacity are recommended due to the proximity to Wilson Inlet (sewage sensitive area).

7 REFERENCES

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Landgate (2021) Locate V: https://maps.slip.wa.gov.au/landgate/locate/

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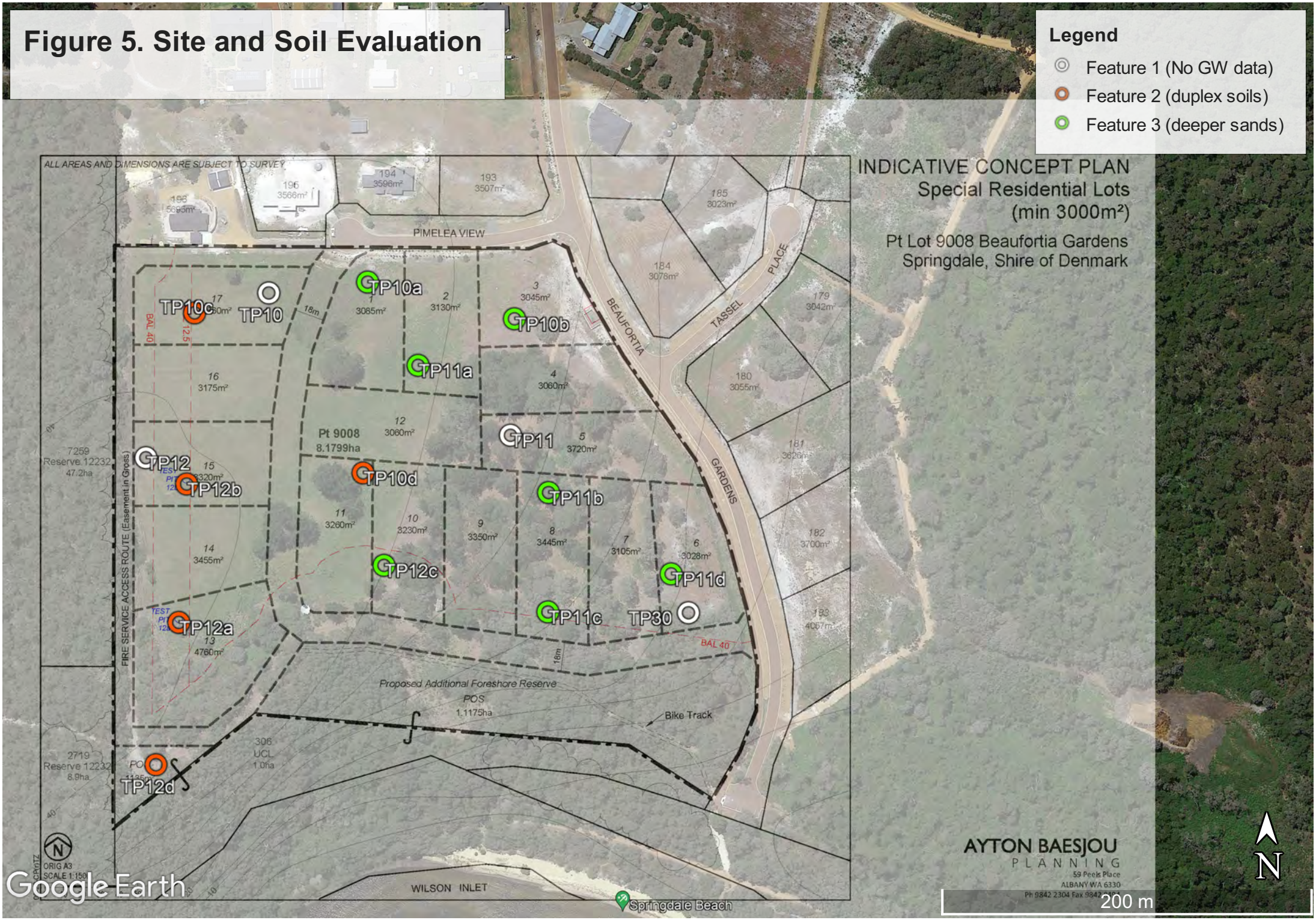
Western Australian Planning Commission and Department of Planning, Land and Heritage (2021). Draft State Planning Policy 2.9 – Planning for Water.

APPENDIX A

Test Pit Locations

Figure 5. Site and Soil Evaluation



ATTACHMENT 5

BASIC FAUNA ASSESSMENT

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Prepared For:	LWP Group Pty Ltd PO Box 7568 Cloisters Square PERTH GPO WA 6850
Report Number:	AA2020/056
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An internal quality review process has been applied to each project task undertaken by us. Each document is carefully reviewed and signed off by senior members of the consultancy team prior to issue to the client.

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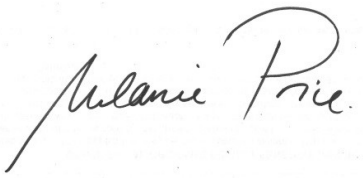
Author:	Melanie Price Associate Environmental Scientist		3 December 2021	
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LIST OF ABBREVIATIONS

AHD	Australian Height Datum
ALA	Atlas of Living Australia
ASS	Acid Sulfate Soil
BAL	Bushfire Attack Level
BGL	Below ground level
BOM	Bureau of Meteorology
DAWE	Department of Water and Environment (Commonwealth)
DEE	Department of Environment and Energy
DER	Department of Environment Regulation
DBCA	Department of Biodiversity, Conservation and Attractions
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*
ESA	Environmentally sensitive area
ha	Hectare
km	Kilometre
m	Metre
mm	Millimetres
MNES	Matters of National Environmental Significance
PMST	Protected Matters Search Tool
SPP	State Planning Policy
Spp.	Species

1 INTRODUCTION

A basic fauna survey with a targeted survey for Western Ringtail Possum and three species of Black Cockatoo has been undertaken by Aurora Environmental for Lot 9008 Beaufortia Gardens, Springdale Beach Estate (the Amendment area) in accordance with:

- *Technical Guidance Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2020) to determine the presence of rare, endangered and/or threatened fauna species.
- Department of Agriculture, Water and Environment (DAWE) guidelines *EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species* (Department of Sustainability, Environment, Water, Population and Communities, 2012).

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant environmental information pertaining to the Amendment area and to assist in survey design. The desktop assessment involved a review of:

- General environmental information (climate, soils, topography) relating to the Amendment area. The Opus (2006) fauna and vegetation report has summarised this information, which is still current.
- A review of literature to assess the potential habitats present on the Amendment area (vegetation). The Opus (2006) fauna and vegetation report has summarised this information, which is still current.
- Existing datasets including previous vegetation mapping of the Amendment area aerial photography, geology, soils and hydrology information to provide background information on the variability of the environment, likely vegetation units, fauna habitats and to identify areas with potential to contain Threatened and Priority listed fauna species. Recent and older aerial photographs were compared to determine the current status of vegetation within the amendment area.
- The Department of Biodiversity, Conservation and Attractions (DBCA) NatureMap database for fauna species previously recorded within the Amendment area (DBCA, 2020) (Appendix 1).
- DAWE Protected Matters Search Tool (PMST) to identify communities and species listed under the EPBC Act potentially occurring within the Amendment area (DAWE, 2020) (Appendix 2).
- Atlas of Living Australia Database (Appendix 3).
- Birdlife Database (Appendix 4).

2 SUBJECT LAND

The amendment area comprises 53.5525 ha and is part of the Springdale Beach Estate Figure 1. The Amendment area abuts the Wilson Inlet foreshore.

FIGURE 1: LOCATION

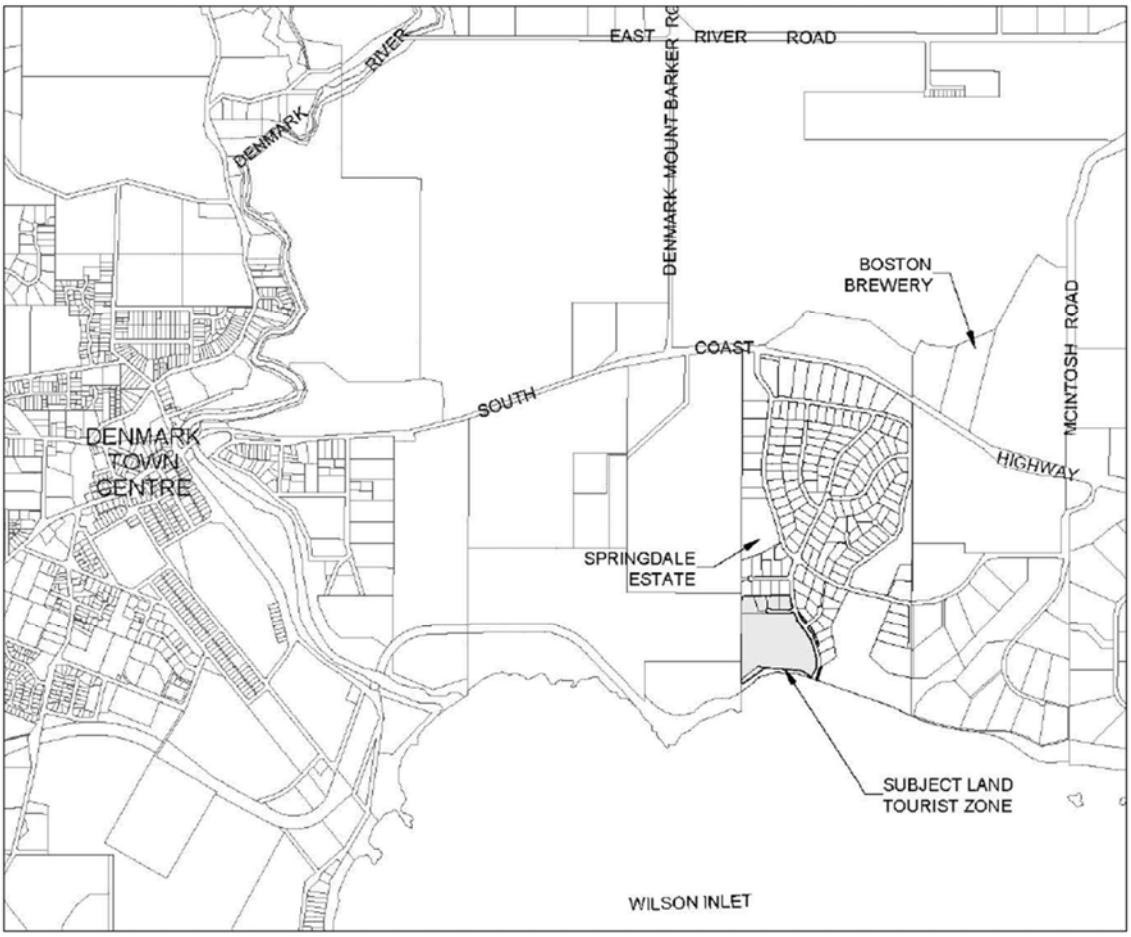
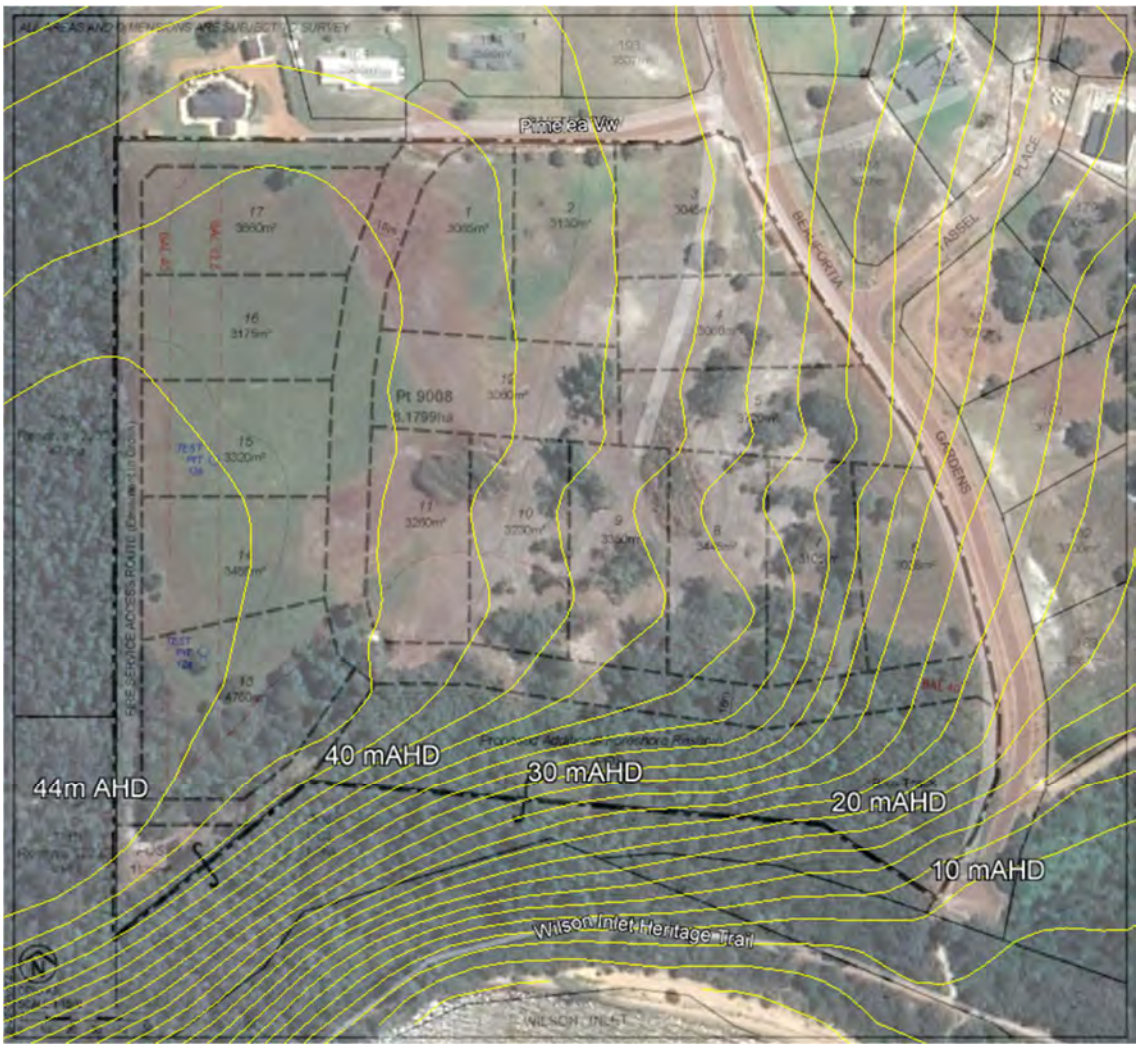


FIGURE 2: SUBDIVISION GUIDE PLAN

Source: Indicative Concept Plan (Ayton Baesjou Planning).

FIGURE 3: AERIAL PHOTOGRAPH AND TOPOGRAPHY



3 DESKTOP ASSESSMENT

A NatureMap database search was undertaken on 29 November 2021 for an area of 3 km^2 around the amendment area (Appendix 1) to ensure adequate identification of species that may be present. However, this includes species associated with habitats not present at the Amendment area. The NatureMap database search return identified 50 bird species previously recorded around the amendment area

In addition, an Atlas of Living Australia database search (ALA, 2021) was undertaken on 29 November 2021 for areas within 2 km of the Amendment area. The search indicated that 9 species of gastropod, 13 species of insect, 5 species of frog, 1 species of reptile and 73 species of birds have been recorded. The results are included in Appendix 3.

3.1 CONSERVATION SIGNIFICANT FAUNA

The search tools (NatureMap, ALA and EPBC Act Protected Matters Search Tool) identified the presence of habitat, or potential presence of 22 conservation significant fauna species that could be associated with the Amendment area (Appendices 1, 2 and 3; Table A). Table A excludes those species that are exclusively marine, migratory or where there is no suitable habitat present within the Amendment area.

The extent and habitat requirements of these species are documented below. The field portion of the survey included targeted searches for these species and their habitat as described in Section 4.

Based on the desktop assessment, including consideration of vegetation types, habitat and the range of conservation significant fauna, it was decided that a targeted survey for the following species be conducted:

- *Calyptorhynchus banksii naso* - Forest Red-tailed Black-Cockatoo
- *Calyptorhynchus baudinii* - Baudin's Cockatoo
- *Calyptorhynchus latirostris* - Carnaby's Cockatoo
- *Pseudocheirus occidentalis* – Western Ringtail Possum

TABLE A: POTENTIAL CONSERVATION SIGNIFICANT FAUNA SPECIES

SPECIES	STATUS: BIODIVERSITY CONSERVATION Act 2016, WILDLIFE CONSERVATION (SPECIALLY PROTECTED FAUNA) NOTICE 2018	STATUS: EPBC ACT	COMMENT
Calyptorhynchus baudinii (Baudin's Cockatoo)	Endangered	Endangered	Database indicates that the survey area may contain suitable habitat for this species.
Calyptorhynchus latirostris (Carnaby's Cockatoo)	Endangered	Endangered	Database indicates that the survey area may contain suitable habitat for this species.
Calyptorhynchus banksii naso *(Forest Red-tailed Black-Cockatoo, Karrak)*	Vulnerable	Vulnerable	Database indicates that the survey area may contain suitable habitat for this species.
Falco peregrinus (Peregrine Falcon)	Other specially protected fauna		Species may utilise the area but is unlikely to rely on the survey area as the species forages across a large area.
Calidris canutus (Red Knot)	Endangered	Endangered	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. This habitat is not present in the Amendment area and the species is unlikely to be found there.
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered	Critically Endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. This habitat is not present in the Amendment area and the species is unlikely to be found there.

SPECIES	STATUS: BIODIVERSITY CONSERVATION Act 2016, WILDLIFE CONSERVATION (SPECIALLY PROTECTED FAUNA) NOTICE 2018	STATUS: EPBC ACT	COMMENT
Calidris tenuirostris (Great Knot)	Critically Endangered	Critically Endangered	Roosting known to occur in Wilson Inlet. The species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps. This habitat is not present in the Amendment area and the species is unlikely to be found there.
Charadrius leschenaultia (Greater Sand Plover)	Vulnerable	Vulnerable	The species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons. This habitat is not present in the Amendment area and the species is unlikely to be found there.
Charadrius mongolus (Lesser Sand Plover)	Endangered	Endangered	Roosting known to occur in Wilson Inlet. This species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. This habitat is not present in the Amendment area and the species is unlikely to be found there.
Psophodes nigrogularis subsp. nigrogularis (Western Whipbird (western heath))	Endangered	Endangered	The species is unlikely to utilise the Amendment area as it does not contain 'long unburnt' habitat consistent with 'dense heath-like shrubby thickets' on coastal dunes, and mallee woodland or shrubland with an open upper storey above a dense shrubby understorey.
Falco hypoleucos (Grey Falcon)	Vulnerable	Vulnerable	This species utilizes a wide range of habitats across Australia. It is unlikely that the species relies on the Amendment area as habitat.

SPECIES	STATUS: BIODIVERSITY CONSERVATION Act 2016, WILDLIFE CONSERVATION (SPECIALLY PROTECTED FAUNA) NOTICE 2018	STATUS: EPBC ACT	COMMENT
Halobaena caerulea (Blue Petrel)		Vulnerable	The species breeds on Macquarie Island and is unlikely to rely on the Amendment area as habitat.
Limosa lapponica menzbieri (Northern Siberian Bar-tailed Godwit)	Critically Endangered	Critically Endangered	Habitat includes mudflats and shores. While Wilson Inlet is nearby, the Amendment area does not support habitat suitable for the species and is therefore not likely to rely on the area.
Pandion haliaetus *(Osprey)*	Migratory birds protected under an international agreement	Migratory Wetlands Species	Species may fly by but is unlikely to rely on the survey area.
Merops ornatus *(Rainbow Bee-eater)*		Listed Marine Species	Species possibly in the survey area but is unlikely to rely on it.
Pseudocheirus occidentalis (Western Ringtail Possum)	Critically Endangered	Critically Endangered	Database indicates that the area may contain habitat suitable for this species.
Dasyurus geoffroii (Chuditch, Western Quoll)	Vulnerable	Vulnerable	Database indicates that the area may contain habitat suitable for this species. NatureMaps indicates that there are no recent records for this species in the Denmark area (since 1994). The species is unlikely to rely on the Amendment area.
Parantechinus apicalis *(Dibbler)*	Endangered	Endangered	Dibblers prefer vegetation with a dense canopy greater than 1 m high which has been unburnt for at least 10 years or more. In some locations, the presence of Proteaceous and Myrtaceous flowering shrubs may also be important. The species is not likely to be found in the Amendment area due to the lack of understorey in the proposed development area.

SPECIES	STATUS: BIODIVERSITY CONSERVATION Act 2016, WILDLIFE CONSERVATION (SPECIALLY PROTECTED FAUNA) NOTICE 2018	STATUS: EPBC ACT	COMMENT
Setonix brachyurus (Quokka)	Vulnerable	Vulnerable	The Quokka is a habitat specialist. In the south of its range, quokkas are strongly linked to complex vegetation structure (minimum of three layers), low densities of woody debris and habitat patchiness (between 0 and 450 m to an alternative vegetation age). The Quokka also has relatively high water requirements, which necessitates close proximity to fresh water throughout the year and the species is often present in riparian and swamp habitat. The Amendment area proposed to be developed does not contain habitat suitable for the species.
Galaxiella nigrostriatal (Blackstriped Dwarf Galaxias)	Endangered	Endangered	This species is not found in Wilson Inlet. The Amendment area does not contain suitable habitat for this species.
Nannoperca pygmaea (Little Pygmy Perch)	Endangered		The survey area does not contain habitat suitable for this species.
Nannatherina balstoni *(Balston's Pygmy Perch)*	Vulnerable	Vulnerable	The survey area does not contain habitat suitable for this species.

Note: Government Gazette (2018) Wildlife Conservation (Specially Protected Fauna) Notice 2018. Appendix 2: Matters of National Environmental Significance (MNES) report (DAWE, 2021). Conservation Codes for WA are included in Appendix 5. Atlas of Living Australia (2021) https://www.ala.org.au/. Conservation categories for EPBC can be found in Section 178 of the EPBC Act (https://www.legislation.gov.au/Details/C2020C00291). Information regarding habitat types was sourced from DAWE Species Profile and Threats Database: https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

3.2 CARNABY'S BLACK COCKATOO

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is endemic to and widespread in the south-west of Western Australia and occurs mostly in the Wheatbelt (areas with between 300mm and 750mm of rainfall annually) and wetter regions including the Swan Coastal Plain and South Coast (Department of the Environment, DoE, 2018b). It occupies an area between 32,000km^2 and 60, 525km^2 (Department of Parks and Wildlife, DPaW, 2013).

The species' habitat mostly comprises uncleared or remnant native eucalypt woodlands, especially those that contain Salmon Gum (*E. salmonophloia*) and Wandoo, and in shrubland or kwongan heathland dominated by *Hakea*, *Banksia* and *Grevillea* species.

Breeding habitat (or sites) encompasses those areas that contain suitable nest trees within the range of the species. Breeding activity is restricted to eucalypt woodlands mainly in the semi-arid and sub-humid interior (records from Three Springs District south to the Stirling Range, west to Cockleshell Gully and east to Manmanning) (DoE, 2021b). Breeding records indicate that this species is currently expanding its breeding range westward and south into the Jarrah-Marri forests of the Darling Scarp and into the Tuart (*E. gomphocephala*) forests of the Swan Coastal Plain, including Yanchep area, Lake Clifton and near Bunbury (DoE, 2021b).

The birds nest in large hollows in tall, living or dead eucalypts, mainly smooth-barked Salmon Gums and Wandoo, although other tree species have also been reported (Department Parks and Wildlife, 2013). Suitable hollows can take from 120–150 years to develop. A map prepared by Department of Agriculture, Water and Environment (DAWE) using modelling techniques (Department of Sustainability, Environment, Water, Population and Communities, 2012) indicates that the Springdale Beach Estate is within the breeding range of the species. However, Birdlife Australia (2018; Plate A) indicates that the birds are not known to breed in the area but may use the area for foraging and roosting in summer months. It is noted by DAWE (Department of Sustainability, Environment, Water, Population and Communities, 2012) that birds may be starting to breed at new locations such as the Jarrah - Marri forests and coastal Tuart forest south of Perth (DPaW, 2013).

During the non-breeding season, when most of the cockatoos migrate to the mid-west coast, Swan Coastal Plain and South Coast (DPaW, 2013), they roost in tall native or introduced eucalypts, and occasionally in Marri and pines. Species known to be used for roosting include Flat-topped Yate (*E. occidentalis*), Salmon Gum, Wandoo, Karri, Blackbutt, Tuart, Blue Gum (*E. globulous*, introduced), *Pinus radiata* and *P. pinaster* (DoE, 2021b).

This species is threatened due to the high level of clearing of native vegetation in the Wheatbelt. Carnaby's black-cockatoos will traverse open space but may not use forage resources isolated from roosting habitat by long stretches of cleared agricultural land. A lack of connectivity between patches is "strongly implicated in the failure of Carnaby's cockatoo to survive in heavily cleared and fragmented rural landscapes" (DoE, 2021b). Corridors with breaks of less than 4 km between other foraging, commuting, breeding and roosting sites are considered important to allow the birds to move between areas.

NatureMaps indicates that this species has been recorded in the Denmark area. The MNES database indicates that the survey area could contain habitat suitable for the species.

PLATE A: DISTRIBUTION OF CARNABY'S COCKATOO

Source: http://www.birdlife.org/datazone/speciesfactsheet.php?id=1391

3.3 BAUDIN'S BLACK COCKATOO

Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) is listed as Vulnerable under the *EPBC Act 1999* which means the species is facing a high risk of extinction in the wild (DoE, 2021c).

This Cockatoo is found only in the south-west of Western Australia and generally bounded by the 750mm rainfall isohyet (Albany, Gidgegannup and up to Mundaring and inland to the Stirling Ranges and Boyup Brook). Breeding has been recorded between Nornalup, northward to near Bridgetown, Lowden and Harvey (DoE, 2021c). Habitat comprises heavily forested areas dominated by Marri and other Eucalyptus species (particularly Karri and Jarrah). The distribution of the species comprises 40,000km^2 (DoE, 2021c) as shown in Plate B (Birdlife Australia, 2018).

Baudin's Cockatoo nests in hollows in mature trees such as Marri, Karri, Jarrah and Wandoo in the lower south-west of Western Australia (DoE, 2021b). Breeding has been recorded in the far south of the range, in an area extending from Nornalup northward to near Bridgetown, or sometimes further north to Lowden and Harvey (DoE, 2021c). Baudin's Black-Cockatoo roosts are generally located in the tallest trees in or near riparian environments or permanent water (DoE, 2021c).

PLATE B: DISTRIBUTION OF BAUDIN'S BLACK COCKATOO

Source: http://www.birdlife.org/datazone/speciesfactsheet.php?id=1390

Loss of habitat and forest management practices (not maintaining older trees) has previously impacted on the species. While the threat from habitat loss has largely abated in recent times (DoE, 2021c) there has been an ongoing decline in population numbers due to illegal shooting and competition for nesting hollows with feral bees, compounded by a low annual reproductive rate.

NatureMaps indicates that this species has been recorded in the Denmark area. The MNES database indicates that the area could contain habitat suitable for the species.

3.4 FOREST RED-TAILED BLACK-COCKATOO

The Forest Red-Tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) is a sub-species endemic to the south west of Western Australia and has been recorded from Gingin in the north and east to Mt Helena, Christmas Tree Well, West Dale (rarely to Brookton), North Bannister (rarely to Wandering) Mt Saddleback, Kojonup, Rocky Gully, upper King River and east to the Green Range (DoE, 2018c; Plate C). The current distribution is estimated to be 52,198km^2 (DoE, 2021d). The species inhabits dense Jarrah, Karri and Marri forests in areas that receive more than 600mm average rainfall annually (DoE, 2021d).

While there are no definitive maps of breeding areas, studies indicate that this cockatoo generally breeds in Marri, Jarrah, Blackbutt and Bullich (*E. megacarpa*) and Wandoo (DoE, 2021d). Nests are generally large, deep hollows with a broad floor and located high up in large 'veteran' trees. In Marri, the nest hollows of the Forest Red-tailed Black Cockatoo range from 8-14 m above ground, the entrance is 12–41 cm in diameter and the depth is 1-5 m (Department of Environment and Conservation, 2008).

PLATE C: DISTRIBUTION OF FOREST RED-TAILED BLACK COCKATOO

Source: DAWE (2021) http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=67034

Key threats to the Forest Red-tailed Black Cockatoo are habitat loss, nest hollow shortage and competition for available nest hollows from other species, injury or death from the European Honeybee (*Apis mellifera*), illegal shooting and fire (DoE, 2021d).

NatureMaps indicates that this species has been recorded in the Denmark area. The MNES database indicates that the area could contain habitat suitable for the species.

3.5 WESTERN RINGTAIL POSSUM

The Western Ringtail Possum (*Pseudocheirus occidentalis*) (WRP) has a patchy distribution from the Collie River to Two Peoples Bay in Western Australia, occurring most commonly in coastal or near coastal forest (DoE, 2021e). While populations of the species on the south west coast of Western Australia appear to prefer a habitat preference for Peppermint trees (*Agonis flexuosa*) (DoE, 2021e), recent studies indicate that the Albany urban population of WRP have a habitat preference for Sheoak (*Allocasuarina fraseriana*), Marri (*Corymbia calophylla*) and Eucalypt (*Eucalyptus marginata* and *E. staeri*) woodlands (Bader *et al.,* 2019). Habitat use may affect densities due to diet and structural factors (Gilfillan, 2008).

In urban areas possums feed on introduced garden species (DPAW, 2017) and captive animals fed on peppermint leaves show a preference for fresh, young green leaves rather than red leaves (Ellis and Jones, 1992). Jones *et al.* (1994) also found that the highest density populations were near-coastal and associated with abundant Peppermint trees with a high continuity of either the canopy or mid-strata, but that many areas with abundant *A. flexuosa* did not support WRPs.

The most inland population of WRP occurs at Perup. The species has been recorded as far north as Dawesville and as far east as Eucla. In the towns of Busselton and Dunsborough, some urban or developed areas support viable populations. Other populations in urban or semi-urban areas occur at Augusta and Albany (Jones *et al.,* 1994). The post-1995 range of the WRP has been calculated at 7,155km^2 (DoE, 2021e).

Processes threatening the occurrence and geographical extent of the species include clearing and habitat fragmentation, urbanisation, fox and cat predation, harvesting of plantation forests, altered fire regimes, road kill, drought, disease and competition with Brush-tail Possums (DoE, 2021).

NatureMap records indicated that there are no records of WRP in the Springdale Beach Estate or Denmark area (Appendix 1). The MNES database indicates that the area could contain habitat suitable for the species.

4 RECONNAISSANCE AND FIELD SURVEY METHODOLOGY

The area of investigation included the Amendment area excluding the proposed Foreshore Reserve (Figure 2). Surveys were undertaken by Melanie Price of Aurora Environmental, an experienced environmental scientist and qualified zoologist with an experienced field assistant.

4.1 FAUNA HABITAT ASSESSMENT

A fauna habitat assessment was undertaken to document the type, condition and extent of habitats within the survey area. Vegetation, landform and soils units present at the subject site have been used to define broad fauna habitat types. The following information was recorded:

- Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and mid storey.
- Presence/absence of refuge including: density of ground covers, fallen timber (coarse woody debris), hollow-bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge.
- Presence/absence of waterways including type, extent and habitat quality within any waterway.
- Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape.
- Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area.
- Current land use and disturbance history.
- Evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance.
- Evaluation of the likelihood of occurrence of conservation significant fauna within the habitat (based on presence of suitable habitat).
- Vegetation condition based on Keighery (2006, Appendix 6).

A representative photograph of each habitat type.

4.2 HABITAT TYPE AND CONDITION

Vegetation in proposed Lot 13 (2000 m^2) comprises Marri and Sheoak Woodland in 'Very Good' Condition. This area will be retained (pending bushfire protection measures). The balance of the Amendment area contains paddock trees (no understorey) of Marri (*Corymbia calophylla*) and Peppermint (*Agonis flexuosa*). This vegetation will be retained (pending bushfire protection measures). The proposed road reserve contains 3000 m^2 of Marri and Peppermint Woodland (no understorey in degraded condition) which will be cleared for access.

Vegetation types are shown in Plates D, E and F.

PLATE D: MARRI PEPPERMINT WOODLAND

Note: 2000 m^2 located on proposed Lot 13. Vegetation is in 'Very Good' Condition.

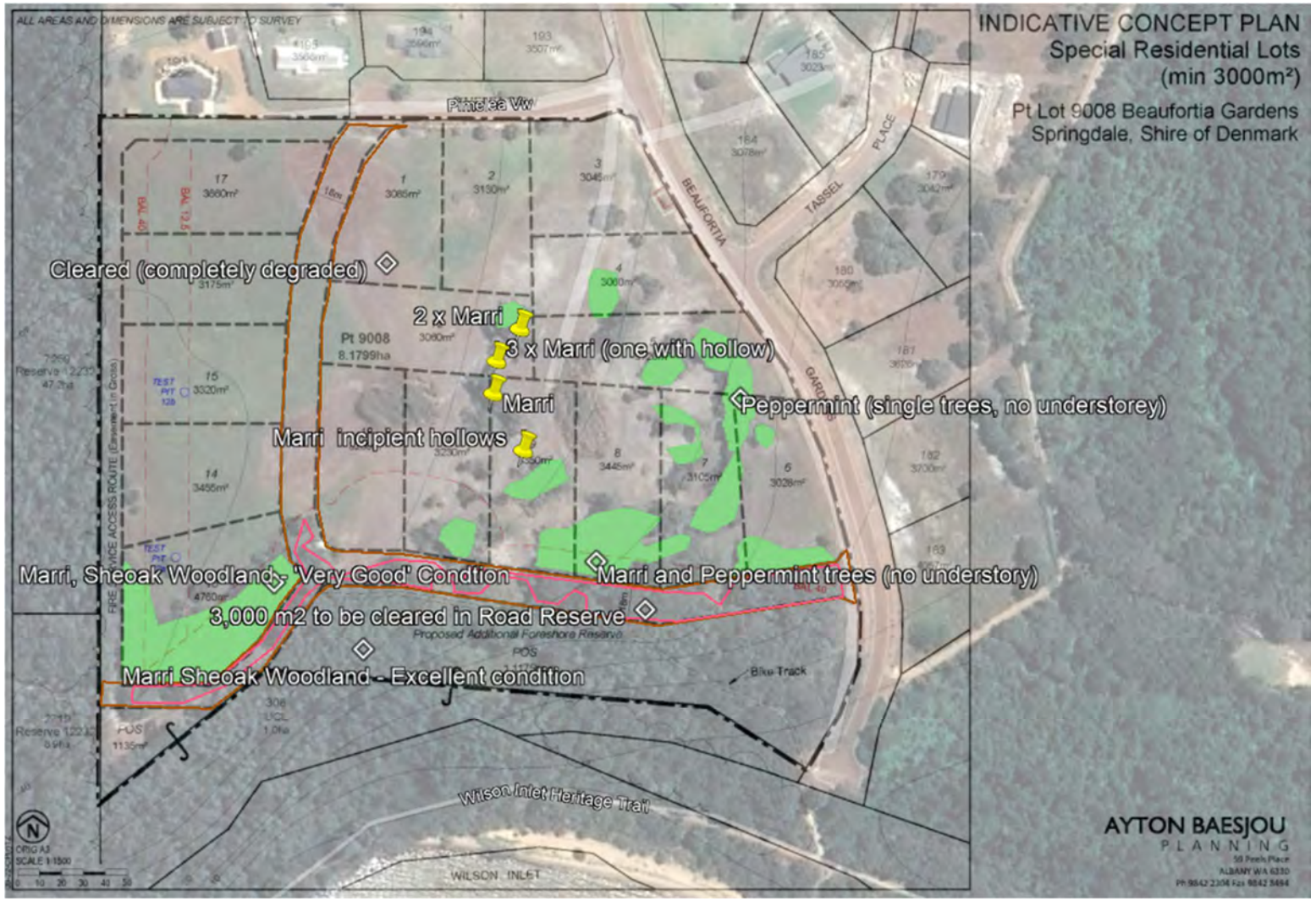
PLATE E: MARRI & PEPPERMINT - SINGLE TREES

Note: Single Peppermint trees in fore and midground. The vegetation is in 'Degraded' condition. Large Marri in left hand background.

PLATE D: MARRI & PEPPERMINT - SINGLE TREES

Note: Vegetation has no understory and is in 'Degraded' Condition. Windrow on right comprises pine trees and blue gums that were removed in 2020.

FIGURE 4: VEGETATION



Note: Green areas - vegetation to be retained. Large Marri (seven trees) proposed to be retained. 3000 m2 of vegetation in proposed road reserve (no understorey) to be removed. 1.2 ha of 'Excellent' condition vegetation to be retained in Foreshore Reserve.

4.3 BLACK COCKATOO HABITAT ASSESSMENT

Habitat used by black cockatoos have been placed into three categories by DAWE (Department Sustainability, Environment, Water, Population and Communities, 2012) as shown in Table B:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

A habitat assessment of the Amendment area (excluding the proposed Foreshore Reserve) was carried out on 11 November 2021.

TABLE B: HABITATS USED BY BLACK COCKATOOS

HABITAT	BAUDIN'S	CARNABY'S	FOREST RED-TAILED
Breeding	Generally, in woodland or forest, but may also breed in former woodland or forest now present as isolated trees. Nest in hollows in live or dead trees of karri (*Eucalyptus diversicolor)*, marri (*Corymbia calophylla)*, wandoo (*E. wandoo*) and tuart (*E. gomphocephala*).	Generally, in woodland or forest, but also breeds in former woodland or forest now present as isolated trees. Nest in hollows in live or dead trees of salmon gum (*E. salmonophloia*), wandoo, tuart, jarrah (*E. marginata*), flooded gum (*E. rudis*), York gum (*E. loxophleba subsp. loxophleba*), powderbark (*E. accedens*), karri and marri.	Generally, in woodland or forest, but may also breed in former woodland or forest now present as isolated trees. Nest in hollows in live or dead trees of marri, karri, wandoo, bullich (*E. megacarpa*), blackbutt (*E. patens*), tuart and jarrah.
Night roosting	Generally, in or near riparian environments or other permanent water sources. Jarrah, marri, flooded gum, blackbutt (*E. patens*), tuart, and introduced eucalypts including blue gum (*E. globulus*), and lemon scented gum (*Corymbia citriodora*).	Generally, in or near riparian environments or natural and artificial permanent water sources. Flat-topped yate (*E. occidentalis*), salmon gum, wandoo, marri, karri, blackbutt, tuart, introduced eucalypts (for example blue gum) and introduced pines.	Tall jarrah, marri, blackbutt, tuart and introduced eucalypt trees within or on the edges of forests.

Source: Department of Sustainability, Environment, Water, Population and Communities (2012).

Breeding Habitat

Assessment of black cockatoo breeding habitat involves the identification of all suitable breeding trees species within the survey area that have a diameter at breast height (DBH) of over 50cm. If present, the DBH of each tree is estimated using a pre-made 50 cm gauge. The location of each tree identified as being over the threshold DBH is recorded with a GPS and details on tree species, number and size of hollows (if any) noted. The location of trees observed to contain hollows (of any size/type) are

recorded using a GPS. Target tree species include Marri, Jarrah and Karri or any other endemic *Corymbia/Eucalyptus* species of a suitable size that is present. Peppermints, *Banksia*, Sheoak and Melaleuca tree species (for example) are not assessed as they typically do not develop hollows that are used by black cockatoos.

For the purposes of this survey a tree containing a potential cockatoo nest hollow is defined as:

> *Any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 12cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk, will be recorded as a 'potential nest hollow'. Identified hollows are examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). The calls of chicks were also listened for, if a suitable hollow is present.*

4.3.1 Foraging Habitat

Foraging habitat is described in Table C. The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey is recorded, if present. The nature and extent of potential foraging habitat present is also documented irrespective of the presence of any actual foraging evidence.

TABLE C: FORAGING DESCRIPTION FOR THREE SPECIES OF BLACK COCKATOO

HABITAT	BAUDIN'S	CARNABY'S	FOREST RED-TAILED
Foraging	Eucalypt woodlands and forest, and proteaceous woodland and heath. During the breeding season feed primarily on native vegetation, particularly Marri (*Corymbia calophylla*). Outside the breeding season, may feed in fruit orchards (mostly apple and pear, but also persimmon) and tips of *Pinus* spp.	Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as *Banksia* spp., *Hakea* spp. and *Grevillea* spp. Forages in pine plantations (*Pinus* spp.), eucalypt woodland and forest that contains foraging species. Also, individual trees and small stands of these species.	Jarrah and Marri woodlands and forest, and edges of Karri (*Eucalyptus diversicolor*) forests including Wandoo (*E. wandoo*) and Blackbutt (*E. patens*), within the range of the subspecies.
Foraging: common food items	Mostly marri (seeds, flowers, nectar and grubs) and proteaceous trees and shrubs. Also other native seeds and introduced fruits; insects and insect larvae; pith of kangaroo paw (*Anigozanthos flavidus*); juice of ripe persimmons; tips of *Pinus*	Seeds, flowers and nectar of native proteaceous plant species (for example, *Banksia* spp., *Hakea* spp. and *Grevillea* spp), eucalypts and *Callistemon*. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds and pecan nuts; insects and insect larvae; occasionally	Mostly seeds of marri and jarrah, also *Eucalyptus caesia*, illyarrie (*E. erythrocorys*) and some introduced eucalypts such as river red gum (*E. camaldulensis*) and flooded gum (*E. grandis*), *Allocasuarina* cones, fruits of snottygobble (*Persoonia longifolia*) and mountain marri (*Corymbia haematoxylon*). On

	spp. and seeds of apples and pears.	flesh and juice of apples and persimmons.	the Swan Coastal Plain, often feed on introduced cape lilac (*Melia azedarach*).

Source: Department of Sustainability, Environment, Water, Population and Communities, 2012

4.3.2 Night Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees on site is noted if observed (e.g. branch clippings, droppings or moulted feathers). This included a dusk survey prior to commencement of the nocturnal WRP survey aimed at observing any actual roosting activity at the time of the survey.

4.4 WESTERN RINGTAIL POSSUM SURVEY

4.4.1 Daytime Survey

A day time survey was undertaken in the Amendment area (excluding proposed Foreshore Reserve) to locate and record dreys, obvious tree hollows, scats and individual WRPs. The day time surveys involved traversing the survey area on foot.

4.4.2 Night Time Survey

A night time/ spotlighting survey was undertaken on 2 December 2021. An experienced zoologist and field assistant surveyed the area for one hour (two people hours).

4.4.3 Habitat Assessment

Description and comments on the amount and quality of WRP habitat within the survey area are provided based on observations made during the site surveys.

5 SURVEY LIMITATIONS

5.1 DESKTOP LIMITATIONS

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species in the area. The records from the DBCA searches of threatened flora and fauna provide more accurate information for the general area. However, some records of collections, sightings or trappings cannot be dated and often misrepresent the current range of threatened species.

Seasonal sampling has not been carried out as part of this fauna assessment. The conclusions presented are based on information from Western Australian and Commonwealth databases, field data and the environmental monitoring carried out over a limited period of time. Therefore, the data and interpreted outcomes are indicative of the environmental conditions on the site at the time of the field assessment, as interpreted by an experienced zoologist. It is recognised that site conditions may change over time.

5.2 FIELD SURVEY LIMITATIONS

The EPA (2016a) Technical Guide states flora and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table D. Based on this assessment, the present survey effort has not been subject to any constraints which affect the thoroughness of the assessment and the conclusions which have been formed.

TABLE D: FIELD SURVEY LIMITATIONS

ASPECT	LIMITATION	COMMENT
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, this includes broad scale (1:250,000) mapping by Beard (1979) and digitised by Shepherd *et al*. (2002), plus a previous flora, vegetation and fauna survey (Opus, 2006).
Scope (what life forms were sampled etc.)	Nil	Following desktop review, reconnaissance and field surveys targeted conservation significant fauna most likely to be present in the survey area.
Proportion of fauna identified, recorded and/or collected	Minor	The fauna survey was undertaken November 2021 and comprised a reconnaissance and targeted survey. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Cryptic species would not have been identified during a reconnaissance survey and seasonal variation within species often requires targeted surveys at a particular time of the year. The fauna assessment was aimed at identifying habitat types and conservation significant terrestrial vertebrate fauna likely to be utilising the survey area. A targeted survey for Black Cockatoo habitat and WRP was undertaken.
Completeness and further work which might be	Nil	Adequate coverage of the survey area was undertaken.

ASPECT	LIMITATION	COMMENT
needed (e.g. was the relevant area fully surveyed)		
Mapping reliability	Nil	The vegetation was mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard, 1979) and field data and more detailed vegetation mapping, where available. Data was recorded in the field using hand-held GPS tools. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The GPS units used for this survey are accurate to within ±5 metres on average. Therefore, the data points consisting of coordinates recorded from the GPS may contain slight inaccuracies.
Timing/weather/ season/cycle	Minor	The fauna survey was conducted during Spring (November 2021). The weather conditions during the field survey were mild with no rain. The survey timing is considered appropriate for the survey conducted.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	The survey area is parkland cleared Marri (*Corymbia calophylla*) and Peppermint (*Agonis flexuosa*). No understorey is present.
Intensity (in retrospect, was the intensity adequate)	Nil	The survey area was sufficiently covered by the zoologist and field assistant during the survey.
Resources	Nil	Adequate resources were employed during the field survey. On 11 November 2021. Three hours were spent undertaking the day time survey.
Access restrictions	Minor	Where possible the survey area was accessed on foot and traversed by vehicle.
Experience levels	Nil	The zoologist who executed the survey is suitably qualified and experienced with a Bachelor of Science (Honours) Zoology from the University of Western Australia

6 RESULTS AND DISCUSSION

6.1 FAUNA HABITAT

Vegetation and fauna habitat in the survey area is shown in Figure 4, comprising 2000 m^2 Marri Peppermint Woodland (Very Good condition) and parkland cleared Marri (*Corymbia calophylla*) and Peppermint (*Agonis flexuosa*) woodland (degraded condition).

6.2 BLACK COCKATOO HABITAT ASSESSMENT

6.2.1 Black Cockatoo Breeding Habitat

Seven Marri trees meeting the DAWE criteria (Department of Sustainability, Environment, Water, Population and Communities, 2012) as habitat trees were observed in the Amendment area (Figure 3). One of the trees had a large hollow, no hollows suitable for nesting were observed.

Mapping prepared by DBCA indicates that the nearest nesting sites for black cockatoos is in the Stirling Ranges (66 km north-east; Appendix 7).

6.2.2 Black Cockatoo Foraging Habitat

When nesting, black cockatoos will generally forage within a 6 – 12 km radius of their nesting site. Following breeding, birds assemble into flocks and move across the landscape searching for food, usually foraging within 6 km of a night roost. Because of this mobility, potential for reduced seed set and flowering due to drought, and the irregular or infrequent flowering and fruiting patterns of many of their food sources, large areas of foraging habitat are required to support black cockatoo populations. Table C indicates the preferred foraging habitat for each cockatoo species.

The vegetation remining in the Amendment area (excluding the proposed Foreshore Reserve) contains few trees (e.g. Marri) which would provide high quality foraging for the three species of black cockatoos. However, the remaining trees can be retained within the Special Residential lots.

A small area (2,000 m^2) of relatively intact vegetation comprising Jarrah Marri Woodland in the south western portion of the Amendment area provides some Myrtaceous and Proteaceous species (such as Marri (*Corymbia calophylla),* Peppermint (*Agonis flexuosa*), Balga (*Xanthorrhoea species) Banksia seminuda* and *Hakea sp.* This vegetation is proposed to be retained within the Special Residential area.

While some foraging habitat is present, the area to be rezoned to Special Residential is unlikely to significantly impact the three species of Black Cockatoo to the extent that the species would decline. In addition, there are large areas of foraging habitat in the coastal and inland areas of Denmark and Albany. DBCA mapping indicates that potential feeding areas for Carnaby's Black Cockatoos comprises Jarrah forest inland from the coast (Appendix 7). There are significant areas of Jarrah forest within 15km, including Denmark Catchment State Forest, Mount Lindesay National Park and other potential foraging habitat (Quarram Nature Reserve, William Bay National Park, West Cape Howe National Park and coastal reserves managed by the City of Albany).

6.2.3 Black Cockatoo Roosting Habitat

The trees generally favoured by black cockatoos for roosting are included in Table E.

TABLE E: NIGHT ROOSTING HABITAT

BAUDIN'S	CARNABY'S	FOREST RED-TAILED
Generally, in or near riparian environments or other permanent water sources. Jarrah, marri, flooded gum, Blackbutt *E. patens*, tuart, and introduced eucalypts including blue gum *E. globulus*, and lemon scented gum *Corymbia citriodora*.	Generally, in or near riparian environments or natural and artificial permanent water sources. Flat-topped yate *E. occidentalis*, salmon gum, wandoo, marri, karri, blackbutt, tuart, introduced eucalypts (for example blue gum) and introduced pines.	Tall jarrah, marri, blackbutt, tuart and introduced eucalypt trees within or on the edges of forests.

Source: Department of Sustainability, Environment, Water, Population and Communities, 2012

Black Cockatoo Habitat Assessment

Seven trees met the criteria set by DAWE as potentially suitable for black cockatoos to use as nesting habitat, with a diameter of breast height of greater than 50 cm (Department of Sustainability, Environment, Water, Population and Communities, 2012) (Figure 5; Table F). One of the Marri trees had a large hollow (inhabited by feral bees) and another Marri had an incipient hollow. An incipient hollow is not considered suitable for nesting at the current time but may be suitable at some time in the future.

FIGURE 5: MARRI TREES MEETING CRITERIA AS HABITAT TREES

TABLE F: TREES WITH DIAMETER AT BREAST HEIGHT OF GREATER THAN 50 CM

SPECIES	EASTING	NORTHING	COMMENT
2 x Corymbia calophylla	117° 23.181'E	34° 58.014'S	One hollow detected (feral bees)
3 x Corymbia calophylla	117° 23.174'E	34° 58.022'S	No hollows detected
Corymbia calophylla	117° 23.173'E	34° 58.030'S	No hollows detected
Corymbia calophylla	117° 23.182'E	34° 58.044'S	Incipient hollow detected

There were no observed traces of Black Cockatoo foraging (chewed trees or fruits). The vegetation is considered to be a low to medium value foraging resource for the black cockatoo species.

The trees generally favoured by black cockatoos for roosting are included in Table E.

Seven tall (greater than 20m) Marri (*Corymbia calophylla*) trees are present in the Amendment area. No evidence of roosting was observed.

A review of available data (National Maps DBCA, 2019; DBCA-064) indicates that there are confirmed roosting sites for Black Cockatoos on the western edge of Wilson Inlet, Mount Shadforth, Lowlands and Hay (Appendix 7). There are no known roost sites mapped for the northern edge of Wilson Inlet. The seven Marri trees are proposed to be retained in the lots.

6.3 WESTERN RINGTAIL POSSUM

No traces of WRP were identified in the Amendment area (excluding the proposed Foreshore Reserve), including scats, other evidence such as dreys.

6.4 OTHER SPECIES

Other common species which were detected as part of the survey included:

- Australian Magpie (*Gymnorhina tibicen*)
- New Holland Honeyeater (*Phylidonyris novaehollandiae)*;
- Kookaburra (**Dacelo novaeguineae*).

6.5 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas (ESA) are declared in *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, Government Gazette No. 55 and comprise:

- World Heritage properties;
- Areas included on the Register of the National Estate, because of its natural heritage value;
- Ramsar, nationally important and conservation category wetlands and the area within 50 metres of the wetland;
- the area covered by vegetation within 50 metres of Threatened flora;
- the area covered by a threatened ecological community;

- A Bush Forever site;
- A declared World Heritage property;
- An area that is included on the Register of the National Estate (natural heritage value)
- Areas covered by the *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*;
- Areas covered by the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002*;
- Protected wetlands in the *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*.

There are no ESAs within the Amendment area. The closest is Mount Lindsay National Park, 13 km to the north west.

7 ENVIRONMENTAL APPROVALS AND MANAGEMENT

This section provides advice on potential environmental approvals and referrals likely to be required, based on the ecological values identified within the survey area.

7.1 FEDERAL GOVERNMENT

MNES are factors that are protected under the EPBC Act. Referral to Department of Agriculture, Water and the Environment (DAWE) under the EPBC Act is triggered if a proposed action has or potentially has a significant impact on any MNES as described in *Significant Impact Guidelines 1.1* (Department of the Environment, 2013).

Significant impact criteria assist in determining if an action is likely to have a significant impact on Threatened species, including:

- Lead to a long-term decrease in the size of a population.
- Reduce the area of occupancy of the species.
- Fragment an existing population into two or more populations.
- Adversely affect habitat critical to the survival of a species.
- Disrupt the breeding cycle of a population.
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
- Result in invasive species that are harmful to a Threatened species becoming established in the species' habitat.
- Introduce disease that may cause the species to decline.
- Interfere with the recovery of the species.

The Amendment is likely to result in the clearing of 3000 m^2 of native vegetation in degraded condition to establish the road reserve.

Ceding the 1.2 ha of excellent quality vegetation into the Foreshore Reserve will increase overall foreshore width and consolidate the best quality vegetation adjacent to Wilson Inlet.

Vegetation protection measures will ensure that Marri and Peppermint trees are retained in lots (where clearing is not required for bushfire protection purposes).

Based on the assessment, survey and application of significant impact guidelines, it is considered that no MNES will be significantly impacted by the proposal, and that referral under the EPBC Act is not required.

Table G shows an assessment of this Project against the criteria listed for the three species of Threatened black cockatoo.

TABLE G: ASSESSMENT OF SIGNIFICANCE CRITERIA FOR BLACK COCKATOO

MATTER OF NATIONAL ENVIRONMENTAL SIGNIFICANCE	TRIGGERS FOR REFERRAL	COMMENT AND NEED FOR REFERRAL TO DAWE UNDER EPBC ACT
Listed Threatened Species:	Clearing of any known nesting tree.	No trees with suitable hollows are present in the survey area.
Carnaby's Cockatoo (Endangered) Forest Red-tailed Black Cockatoo (Vulnerable) Baudin's Cockatoo (Vulnerable)	Clearing or degradation of any part of a vegetation community known to contain breeding habitat.	Seven trees with diameter of greater than 50cm at chest height are present in the survey area. However, none contain hollows suitable for Black Cockatoos.
	Clearing of more than 1 ha of quality foraging habitat.	Foraging habitat is present (Banksia, Hakea). Less than a hectare of the subject land is proposed to be cleared (road reserve 3,000 m^2).
	Clearing or degradation (including pruning of top canopy) of a known roosting project area.	No known roosting areas have been recorded in the survey area and there were no traces of Black Cockatoos roosting.
	Creating a gap or greater than 4 km between patches of Black Cockatoo habitat breeding, foraging or roosting.	Not applicable.
	Uncertainty: Degradation (such as through altered hydrology or fire regimes) of more than 1 ha of foraging habitat.	Not applicable.

7.2 WESTERN AUSTRALIAN GOVERNMENT

7.2.1 Environmental Protection Authority

Scheme amendments are required to be referred to the EPA under Section 48A of the EP Act. In deciding whether a proposal will be subject to the formal environmental impact assessment process, the EPA considers the environmental significance of any potential impacts that may result from the implementation of the scheme. As this project is unlikely to have significant environmental impacts, it is not likely that the amendment will be formally assessed.

7.2.2 Department of Water and Environmental Regulation

Clearing of native vegetation is administered by the Department of Water and Environmental Regulation and requires a clearing permit under Part V of the EP Act, except when a project is assessed under Schedule 6 of the Act. Such exemptions include:

> *'Clearing in accordance with a subdivision approval given by the responsible authority under the Planning and Development Act 2005 , including —*

(a) clearing for the purposes of any development that is deemed by section 157 of that Act to have been approved by the responsible authority; and

(b) clearing in any building envelope described in the approved plan or diagram.'

Other exemptions are prescribed by regulation in the *Environmental Protection (Clearing Native Vegetation) Regulations 2004* as exempt from needing a clearing permit and not in an ESA.

Exemptions for clearing of native vegetation which may apply to this scheme amendment include:

- Clearing to construct a building (Regulation 5, Item 1)
- Clearing for fence lines (Regulation 5, Item 10)
- Clearing for vehicular tracks (Regulation 5, Item 12)
- Clearing for walking tracks (Regulation 5, Item 13)

Each exemption is subject to conditions, which are summarised in Appendix 8.

Based on the Subdivision Guide Plan in Figure 2, an exemption will apply for clearing undertaken as required under the *Planning and Development Act 2005* (such as conditions of subdivision – road construction and installation of services). In addition, the clearing for vehicular tracks, driveways, fences and (approved) dwellings do not require a permit.

However, should clearing be required for non-exempt purposes, a native vegetation clearing application will need to be lodged. DWER will assess the application against the 'Ten Clearing Principles' to determine whether the clearing is likely to be at variance to the Principles. The Ten Clearing Principles aim to ensure that potential impacts resulting from removal of native vegetation can be assessed in an integrated way. The clearing principles are included in Table H with an assessment response based on the environmental assessment described in this document.

TABLE H: ASSESSMENT AGAINST CLEARING PRINCIPLES

CLEARING PRINCIPLE	ASSESSMENT RESPONSE
a) – Native vegetation should not be cleared if it comprises a high level of biological diversity	The Amendment area (excluding the proposed Foreshore Reserve) has a low level of biodiversity, with no understorey in most of the area. One fauna habitat type was recorded in the survey area (Marri Peppermint woodland, park land cleared). The desktop survey indicated that the area may support a low number of fauna species. The targeted survey for three species of Black Cockatoos indicated: • Breeding habitat is not present. • Foraging habitat is present (low to medium value). • Roosting for Black Cockatoos in the Amendment area has not been recorded. The proposed development in line with the Amendment will not significantly impact on the biodiversity values of the area as the proposal includes retention of vegetation and replanting of native species. Clearing is not considered to be at variance with this clearing principle.

CLEARING PRINCIPLE	ASSESSMENT RESPONSE
b) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA	One fauna habitat type was recorded in the survey area (Marri Peppermint woodland, park land cleared). A search of the *NatureMap* database (DBCA, 2020) indicates that 50 species of birds have been recorded within 3 km of the Amendment area (Appendix 1 In addition, an Atlas of Living Australia database search (ALA, 2021) was undertaken on 29 November 2021 for areas within 2 km of the Amendment area. The search indicated that 9 species of gastropod, 13 species of insect, 5 species of frog, 1 species of reptile and 73 species of birds have been recorded. The desktop survey indicated that the area may support a moderate range of fauna species, potentially including conservation significant species. The targeted survey for WRP did not indicate that the species is present in the area. The results for the three species of Black Cockatoos indicated: • Breeding habitat is not present. • Foraging habitat is present (low to medium quality). • Roosting for Black Cockatoos at the subject land has not been recorded. The targeted fauna survey indicates that with appropriate management, the proposed development will not significantly impact: • Three species of Black Cockatoo; or • Western Ringtail Possum; • Other native fauna species. The proposal is not considered to be at variance with this clearing principle.
c) – Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No Threatened flora were detected on the subject land (Opus, 2006). Clearing is not considered to be at variance with this clearing principle.
d) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community	No Threatened or Priority ecological communities were detected on the subject land. Clearing is not considered to be at variance with this clearing principle.
e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	Vegetation comprises Clearing is not at variance with this clearing principle. However, the proposal seeks to retain and enhance vegetation with development located on already cleared areas.
f) – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated	There are no wetlands or watercourses associated with the subject land. Clearing is not at variance with this clearing principle.

CLEARING PRINCIPLE	ASSESSMENT RESPONSE
with a watercourse or wetland.	
g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The soils on the subject land comprise laterite and sandy gravels. Management techniques will be used to reduce the risk of erosion (e.g. dampening down) which will mitigate the impact of wind erosion from any proposed clearing. Clearing is not considered to be at variance with this clearing principle.
h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	There are no DBCA conservation areas abutting the subject land. The Amendment will augment the existing foreshore Reserve by 2.1 ha and retain vegetation in excellent condition. The clearing is not considered to be at variance with this clearing principle.
i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	There are no wetlands, watercourses or groundwater dependent ecosystems that will be impacted on from clearing associated with the proposal. The scheme amendment and subsequent land use is not likely to impact on groundwater levels or quality as Better Urban Water Management principles will be applied via an Urban Water Management Plan. The clearing is not considered to be at variance with this clearing principle.
j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The subject land is not associated with a flood plain or area subject to flooding. The clearing is not at variance with this clearing principle.

7.3 VEGETATION AND HABITAT PROTECTION

Clearing of native vegetation will be minimised, with existing cleared areas used for dwellings where possible. During construction/ subdivision works, demarcation of vegetation to be retained will assist in protection of the area's current values.

8 ENVIRONMENTAL ASSESSMENT

Aurora Environmental has reviewed the EPA's Environmental Factors to identify those factors relevant to development of the subject land. The relevant factors identified include the following:

- Flora and Vegetation; and
- Terrestrial Fauna.

In addition, the above factors, Commonwealth listed Matters of National Environmental Significance (MNES) that are regarded to be relevant to the project area include the following:

- Western Ringtail Possum; and
- Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo and Baudin's Cockatoo.

8.1 TERRESTRIAL FAUNA

8.1.1 Potential Impacts

The potential impacts to terrestrial fauna arising from development of the subject land can be split into direct and indirect impacts. These include the following:

Direct Impact

- Clearing of fauna habitat and habitat fragmentation; and
- Injury / mortality of fauna during construction or due to vehicle strike post-construction.

Indirect Impacts

- Habitat degradation via indirect impacts such as unauthorised clearing/entry to surrounding areas, spread of weeds and dieback, dust deposition, changes to local hydrology or increased fire risk during construction.

8.1.2 Assessment of Impacts

8.1.2.1 Loss of Fauna Habitat

The Amendment indicates that approximately 1.2 ha of Excellent quality Marri Peppermint Woodland will be protected in Foreshore Reserve. 2,000 m^2 of 'Very Good' quality Marri Peppermint Woodland will be retained in proposed Lot 13. 3,000 m^2 of degraded quality Marri Peppermint single trees will be removed to allow for construction of a road. Seven Marri habitat trees will be retained on proposed Lots may need to be cleared. Less clearing could be achieved through fine tuning of the concept design.

8.1.2.2 Loss of Native Fauna

Clearing for the construction of the road will result in the removal of 3000 m2 of relatively poor quality habitat. However, the impact is not considered to be significant in light of the vegetation retained in the Foreshore Reserve and on the proposed Lots. The risk of direct loss of fauna species is considered to be low.

8.1.2.3 Conservation Significant Fauna Species

The predicted impacts to conservation significant fauna from the loss of habitat for the development of the subject land is discussed below.

Three Species of Black Cockatoo

The subject land is within the modelled feeding distribution range for the three threatened species of black cockatoo. The fauna survey indicated that the subject land contains some foraging habitat and that the area buffers the periphery of the Wilson Inlet foreshore.

Seven Marri trees with a diameter at breast height greater than 50 cm were identified as potential habitat trees. One tree appeared to have a large hollow, however its depth was not able to be determined. Inspection of the trees did not reveal any hollows suitable for nesting and there was no sign of roosting.

The Amendment area is not considered to be critical habitat for the three threatened species of black cockatoo due to its small size, lack of breeding and roosting habitat and distance to known roosting and breeding areas. Table 3 of the Black Cockatoo Referral Guidelines (DSEWPaC, 2012) indicate that the clearing of more than 1 ha of quality foraging habitat is regarded as high risk of having a significant impact on the species. The construction of the road is likely to require clearing of 0.3 ha of native vegetation (including some Marri trees suitable for foraging). The proposed clearing is not considered to represent a significant impact to black cockatoo habitat.

Western Ringtail Possum

While within the know range of WRP, there was no evidence of the species during day time searches and evening spotlighting. There are no historic records of WRP on the northern side of Wilson Inlet. However, should WRP respread to the area, the Amendment design has retained the vegetation most suitable for WRP in the extended Foreshore Reserve (1.2 ha).

8.1.2.4 Indirect Impacts

The proposed development has little to no potential to indirectly impact surrounding areas of fauna habitat. Certain activities and design decisions can lead to degradation of habitat values in adjacent bushland areas. These indirect impacts include:

- Unauthorised clearing or entry into surroundings areas causing loss or degradation of fauna habitat;
- Potential spread of weeds and pathogens such as dieback into surrounding bushland leading to degradation of habitat values;
- Modification to local hydrology potentially causing degradation of fauna habitat; and
- Deposition of dust on surrounding vegetation during construction causing loss or degradation of habitat.

These impacts can be readily managed through implementation of strategies during construction and notification of prospective landowners of vegetation protection (particularly for the 2,000 m2 patch of ‘Very Good’ quality Marri Peppermint Woodland and the 7 Marri habitat trees.

8.1.3 Recommended Mitigation and Management

The avoidance, mitigation and management measures considered during the development of the subject land are outlined below:

- Notification to prospective landowners regarding retention of vegetation.
- The presence of a road between Lots and the Foreshore Reserve will reduce the risk of rubbish and garden waste dumping.
- During subdivision construction measures relevant to the management of fauna will be included:
    - Provision of coordinates for clearing extents to the contractor;
    - Plan for site access, wash down areas (if required), parking areas, drainage and fencing;
    - In field demarcation of clearing extents;
    - Requirement to conduct regular inspections of clearing boundaries and document the clearing activities undertaken;
    - Inclusion of fauna management requirements in site induction training;
    - Weed and pathogen hygiene management measures to prevent the introduction and spread of weeds and dieback;
    - Dust suppression measures to reduce dust emissions;
    - Procedures to manage risk of causing fire during construction;
    - Requirement to restrict vehicles and equipment to the construction footprint; and
    - Requirement for regular inspections of waste management.

8.1.4 Predicted Outcome

8.1.4.1 Significant Residual Impacts

With the implementation of the mitigation measures outlined above, it is considered that all indirect impacts can be managed so that adverse impacts on surrounding fauna habitat can be avoided.

8.2 VEGETATION AND HABITAT PROTECTION

Clearing of native vegetation will be minimised through:

- 1.2 ha of Excellent quality vegetation incorporated into the Foreshore Reserve;
- Retention of 2000 m2 of ‘Very Good’ quality vegetation retained in proposed Lot 13;
- Retention of 7 habitat Marri trees on Lot 9, 10 and 12;
- Clearing to establish road reserve with removal of ‘Degraded’ quality Marri Peppermint Woodland (no understorey).

9 RECOMMENDATIONS

The recommendations in Table I can form part of the amendment documentation, if appropriate.

TABLE I: RECOMMENDATIONS

ISSUE	RECOMMENDTATIONS	TIMING
Vegetation Protection	Clearing of native vegetation will be minimised through: • 1.2 ha of Excellent quality vegetation incorporated into the Foreshore Reserve; • Retention of 2000 m2 of 'Very Good' quality vegetation retained in proposed Lot 13; • Retention of 7 habitat Marri trees on Lot 9, 10 and 12; • Clearing to establish road reserve with removal of 'Degraded' quality Marri Peppermint Woodland (no understorey).	Planning, construction and operations.
Approvals	This assessment indicates that development of the Amendment area is not likely to be a controlled action. Therefore, referral to DAWE under the EPBC Act is not considered to be required. Exemptions may apply for the limited clearing of native vegetation. The landowners will need to consider if exemptions apply and where they do not, apply for a clearing permit under Part V of the *Environmental Protection Act 1986*.	Planning

10 REFERENCES

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APPENDIX 1

NatureMap Database

NatureMap
Mapping Western Australia's biodiversity

Springdale Beach Amendment Area

Printed by Guest user on 29/11/2021

Query details : Current Names Only=Yes; Core Datasets Only=Yes; Method='By Rectangle'; Extent=117° 22' 40" E, 117° 24' 02" E, 34° 58' 43" S, 34° 57' 15" S;

Search Results

Selected

- Selected Species

All Results

- Bird
- Bryopsid (Moss)
- Dicotyledon
- Hepatic (Liverwort)
- Lichen
- Monocotyledon

Reference Layers

Major WA Towns

Major WA Towns

Major WA Towns

State Borders

Department of Biodiversity, Conservation and Attractions

WESTERN AUSTRALIAN MUSEUM

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 29/11/2021

Current Names Only Yes
Core Datasets Only Yes
Method 'By Rectangle'
Extent 117° 22' 40" E, 117° 24' 02" E, 34° 58' 43" S, 34° 57' 15" S
Group By Species Group

Species Group	Species	Records
Bird	50	98
Bryopsid (Moss)	4	4
Dicotyledon	29	32
Hepatic (Liverwort)	3	3
Lichen	2	3
Monocotyledon	5	6
TOTAL	**93**	**146**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Bird					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
4.	24312	*Anas gracilis (Grey Teal)*			
5.	24316	*Anas superciliosa (Pacific Black Duck)*			
6.	24561	*Anthochaera carunculata (Red Wattlebird)*			
7.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
8.		*Barnardius zonarius*			
9.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
10.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
11.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
12.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
13.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
14.		*Chroicocephalus novaehollandiae*			
15.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
16.	25592	*Corvus coronoides (Australian Raven)*			
17.	25595	*Cracticus tibicen (Australian Magpie)*			
18.	24322	*Cygnus atratus (Black Swan)*			
19.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
20.		*Egretta novaehollandiae*			
21.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
22.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
23.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
24.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
25.	25727	*Fulica atra (Eurasian Coot)*			
26.	25530	*Gerygone fusca (Western Gerygone)*			
27.	24443	*Grallina cyanoleuca (Magpie-lark)*			
28.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
29.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
30.	24491	*Hirundo neoxena (Welcome Swallow)*			
31.	25661	*Lichmera indistincta (Brown Honeyeater)*			
32.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
33.	25654	*Malurus splendens (Splendid Fairy-wren)*			
34.		*Microcarbo melanoleucos*			
35.	24738	*Neophema elegans (Elegant Parrot)*			
36.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
37.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
38.	25697	*Phalacrocorax carbo (Great Cormorant)*			
39.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
40.	24409	*Phaps chalcoptera (Common Bronzewing)*			
41.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
42.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
43.	25720	*Platycercus icterotis (Western Rosella)*			
44.		*Purpureicephalus spurius*			
45.	48096	*Rhipidura albiscapa (Grey Fantail)*			
46.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
47.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
48.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
49.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
50.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
Bryopsid (Moss)					
51.	32327	*Breutelia affinis*			
52.	32363	*Fissidens curvatus*			
53.	32369	*Fissidens tenellus*			
54.	32450	*Trichostomum eckelianum*			
Dicotyledon					
55.	3363	*Acacia hastulata*			
56.	35624	*Acacia pentadenia subsp. pentadenia*			
57.	3713	*Bossiaea linophylla*			
58.	10861	*Callistachys lanceolata (Wonnich)*			
59.	11799	*Cassytha racemosa forma racemosa*			
60.	3760	*Chorizema reticulatum (Showy Flame Pea)*			
61.	15610	*Conospermum caeruleum subsp. caeruleum*			
62.	7444	*Dampiera hederacea (Karri Dampiera)*			
63.	7452	*Dampiera leptoclada (Slender-shooted Dampiera)*			
64.	7462	*Dampiera pedunculata*			
65.	5508	*Darwinia citriodora (Lemon-scented Darwinia)*			
66.	3867	*Dipogon lignosus (Dolichos Pea)*	Y		
67.	3891	*Gastrolobium bilobum (Heart Leaf Poison)*			
68.	3965	*Hovea elliptica (Tree Hovea)*			
69.	4028	*Jacksonia spinosa*			
70.	4036	*Kennedia carinata*			
71.	4037	*Kennedia coccinea (Coral Vine)*			
72.	6396	*Leucopogon glabellus*			
73.	40941	*Leucopogon obovatus subsp. revolutus*			
74.	6454	*Leucopogon verticillatus (Tassel Flower)*			
75.	5987	*Melaleuca viminea (Mohan)*			
76.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
77.	7646	*Scaevola striata (Royal Robe)*			
78.	31931	*Sphenotoma capitata*			
79.	31951	*Sphenotoma parviflora*			
80.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			
81.	20114	*Taxandria fragrans*			
82.	5097	*Thomasia rhynchocarpa*			
83.	33438	*Trymalium odoratissimum subsp. trifidum*			
Hepatic (Liverwort)					
84.		*Anthoceros punctatus*			
85.		*Chaetophyllopsis whiteleggei*			
86.		*Riccardia bipinnatifida*			
Lichen					
87.	27680	*Cladonia floerkeana*			
88.	27850	*Megalaria grossa*			
Monocotyledon					
89.	197	*Amphipogon debilis*			
90.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
91.	17241	*Austrostipa hemipogon*			
92.	376	*Eragrostis curvula (African Lovegrass)*	Y		
93.	1150	*Xyris lanata*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

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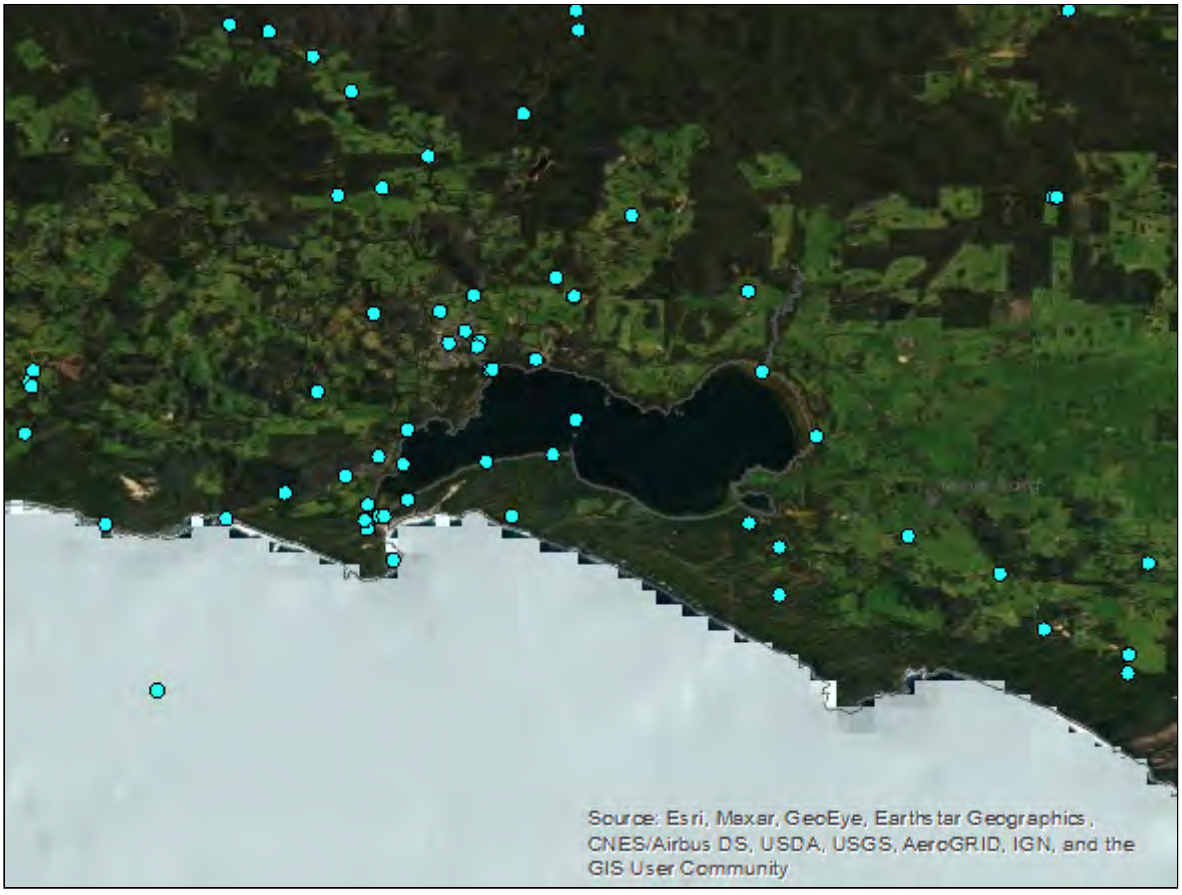
Historic Records of Carnaby's Black Cockatoo

Printed by Guest user on 29/11/2021

Query details : Name=Calyptorhynchus latirostris; Current Names Only=Yes; Core Datasets Only=Yes



Search Results

Selected

- Selected Species

All Results

- Default
- Confirmed
- Corrected
- Reported

Reference Layers

Major WA Towns

Major WA Towns

Major WA Towns

State Borders

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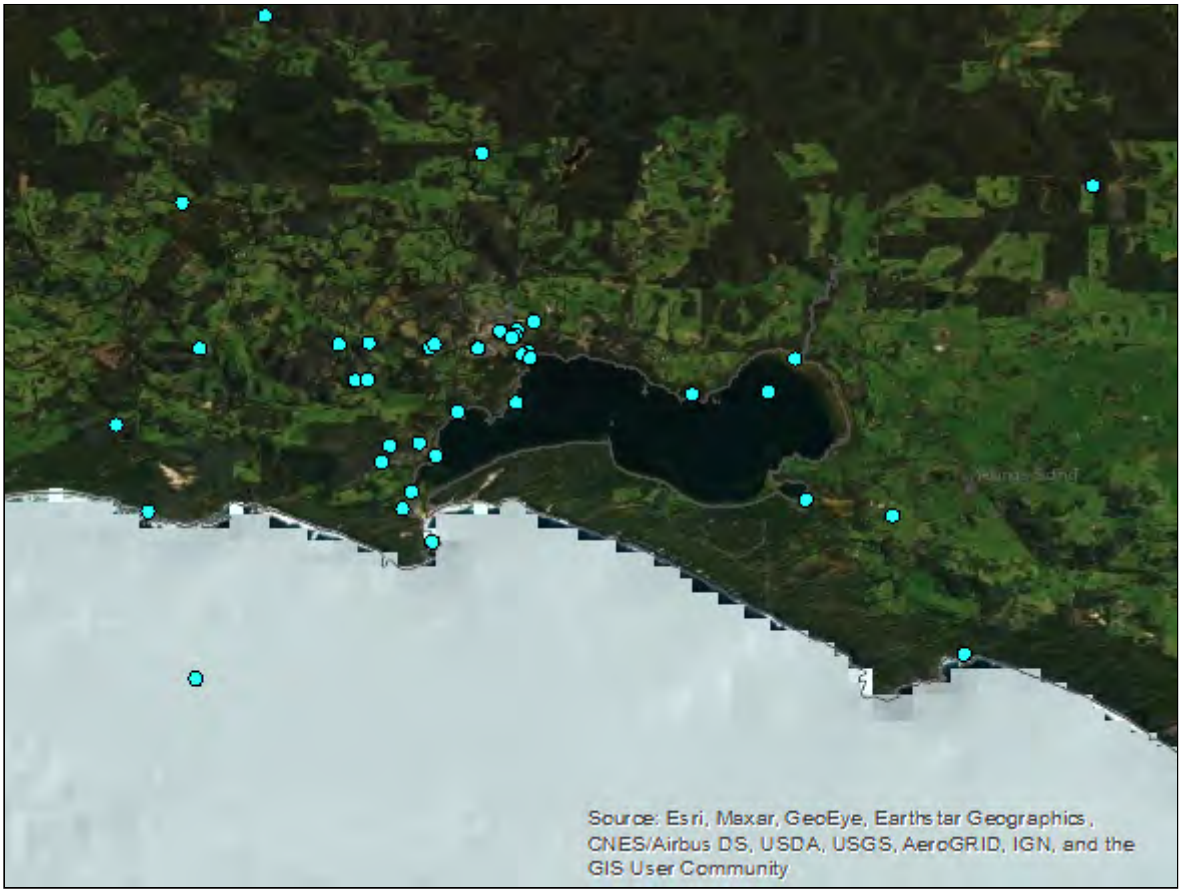
Historic Records of Baudin's Cockatoo

Printed by Guest user on 29/11/2021

Query details : Name=Calyptorhynchus baudinii; Current Names Only=Yes; Core Datasets Only=Yes



Search Results

Selected

- Selected Species

All Results

- Default
- Confirmed
- Corrected
- Reported

Reference Layers

Major WA Towns

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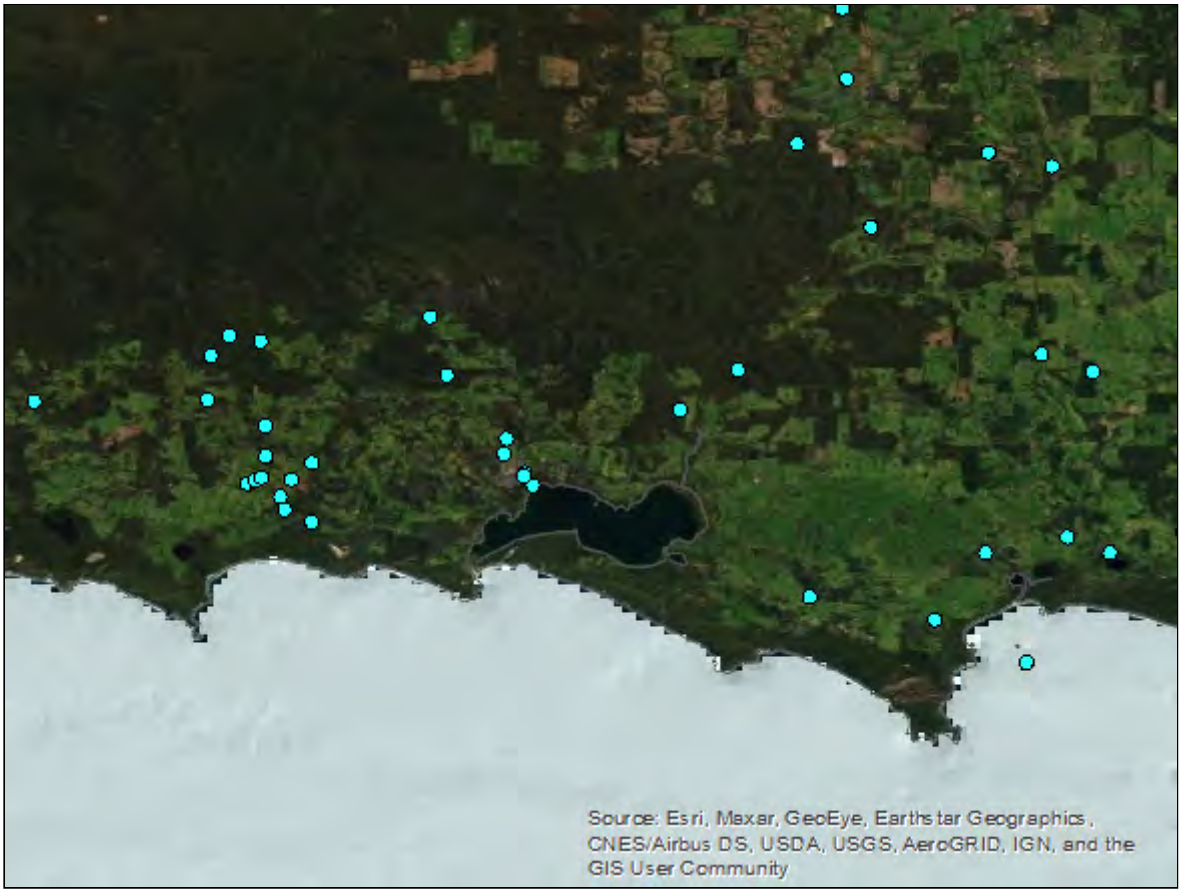
Historic Records of Forest Red-tail Black Cockatoo

Printed by Guest user on 29/11/2021

Query details : Common Name=%Forest red-tailed black cockatoo%; Current Names Only=Yes; Core Datasets Only=Yes



Search Results

Selected

- Selected Species

All Results

- Default
- Confirmed
- Corrected
- Reported

Reference Layers

Major WA Towns

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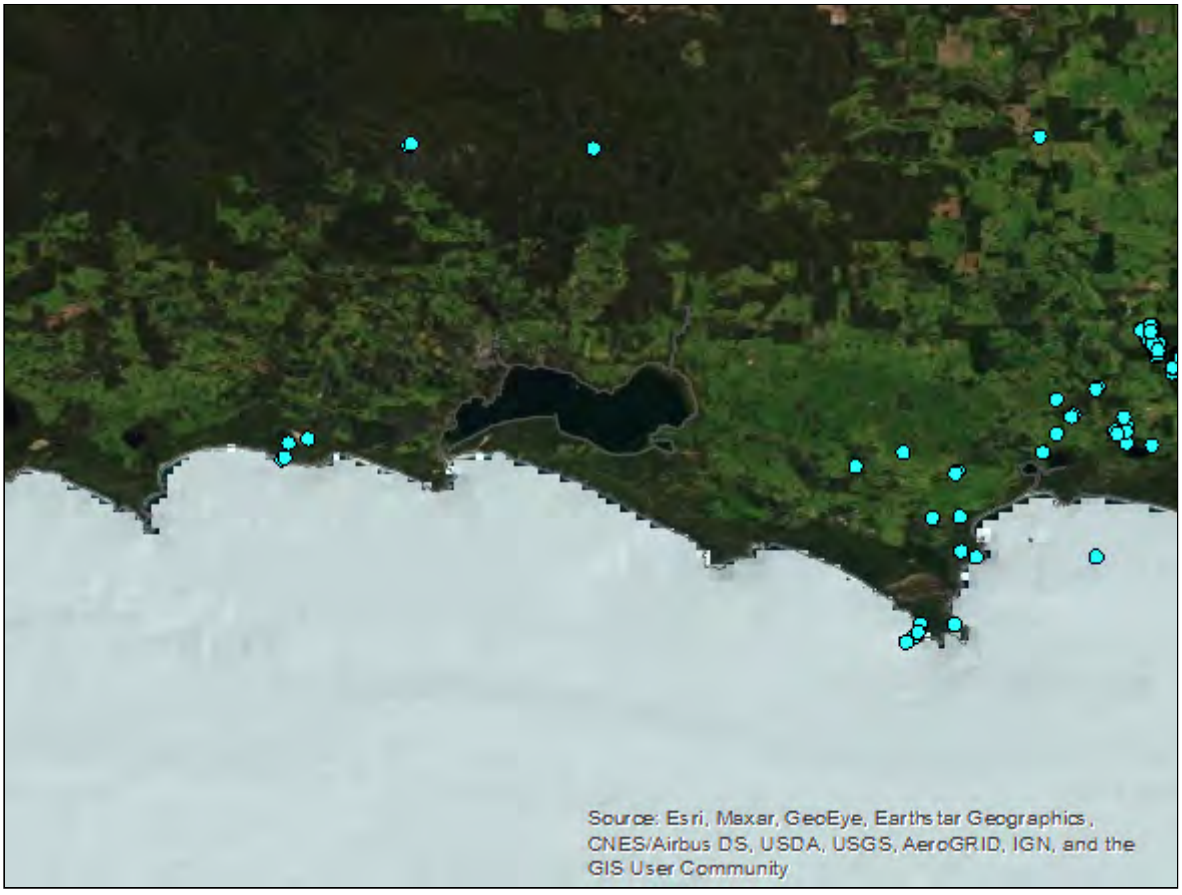
Historic Records of Western Ringtail Possum

Printed by Guest user on 29/11/2021

Query details : Common Name=%western ringtail possum%; Current Names Only=Yes; Core Datasets Only=Yes



Search Results

Selected

- Selected Species

All Results

- Default
- Confirmed
- Corrected
- Reported

Reference Layers

Major WA Towns

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Historic Records for Dasyurus geoffroii

Printed by Guest user on 29/11/2021

Query details : Name=Dasyurus geoffroii; Current Names Only=Yes; Core Datasets Only=Yes

Search Results

Selected

- Selected Species

All Results

- Default
- Confirmed
- Corrected
- Reported

Reference Layers

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APPENDIX 2

Protected Matters Search Tool

Australian Government
Department of Agriculture, Water and the Environment

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: 29-Nov-2021

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	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	65
Listed Migratory Species:	64

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

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 http://www.environment.gov.au/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:	5
Commonwealth Heritage Places:	None
Listed Marine Species:	84
Whales and Other Cetaceans:	31
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:	21
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	12
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
EEZ and Territorial Sea	In buffer area only

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
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

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
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Dasyornis longirostris Western Bristlebird [515]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Zanda baudinii listed as Calyptorhynchus baudinii			
Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding known 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
FISH			
Galaxiella nigrostriata			
Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat known to occur within area	In buffer area only
Nannatherina balstoni			
Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat known to occur within area	In feature area
Nannoperca pygmaea			
Little Pygmy Perch [88315]	Endangered	Species or species habitat known to occur within area	In buffer area only
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Species or species habitat may occur within area	In buffer area only

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
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
[Parantechinus apicalis](#) Dibbler [313]	Endangered	Species or species habitat likely 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
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat known to occur within area	In feature area
OTHER			
[Westralunio carteri](#) Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
[Banksia brownii](#) Brown's Banksia, Feather-leaved Banksia [8277]	Endangered	Species or species habitat may occur within area	In buffer area only
[Banksia goodii](#) Good's Banksia [16727]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Caladenia christineae](#) Christine's Spider Orchid [56716]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calectasia cyanea Blue Tinsel Lily [7669]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Commersonia apella Many-flowered Commersonia [86877]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Conostylis misera Grass Conostylis [21320]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area	In feature area
Isopogon uncinatus Albany Cone Bush, Hook-leaf Isopogon [20871]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Kennedia glabrata Northcliffe Kennedia [16452]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area	In buffer area only
Verticordia apecta Hay River Featherflower, Scruffy Verticordia [65545]	Critically Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
SHARK			
Carcharias taurus (west coast population)			
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	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]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea dabbenena](#) Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Hydroprogne caspia](#) Caspian Tern [808]		Breeding known to occur within area	In feature area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Onychoprion anaethetus](#) Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Migratory Marine Species			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In buffer area only
Carcharhinus longimanus			
Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Rhincodon typus](#) Whale Shark [66680]	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			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting 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 known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In feature area
[Calidris subminuta](#) Long-toed Stint [861]		Roosting known to occur within area	In feature area
[Calidris tenuirostris](#) Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting known to occur within area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area	In feature area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
Tringa stagnatilis			
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
Xenus cinereus			
Terek Sandpiper [59300]		Roosting known 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 - [51621]	WA	In buffer area only
Commonwealth Land - [51614]	WA	In buffer area only
Commonwealth Land - [51440]	WA	In buffer area only
Commonwealth Land - [50307]	WA	In buffer area only
Commonwealth Land - [51396]	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]		Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
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]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting 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 known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting known to occur within area overfly marine area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area	In feature area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Stercorarius skua as Catharacta skua](#) Great Skua [823]		Species or species habitat may occur within area	In buffer area only
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thinornis cucullatus as Thinornis rubricollis](#) Hooded Dotterel, Hooded Plover [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
[Tringa glareola](#) Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Xenus cinereus](#) Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area	In feature area
Fish			
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In feature area
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area	In feature area
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
[Leptoichthys fistularius](#) Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
[Lissocampus caudalis](#) Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
[Lissocampus runa](#) Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
[Maroubra perserrata](#) Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
[Nannocampus subosseus](#) Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat likely to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal		
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In feature area
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Berardius arnuxii](#) Arnoux's Beaked Whale [70]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area	In buffer area only
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In buffer area only
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In buffer area only
Kogia sima as Kogia simus Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In buffer area only
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area	In buffer area only
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area	In buffer area only
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area	In buffer area only
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area	In buffer area only
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area	In buffer area only
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area	In buffer area only
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area	In buffer area only
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
[Tursiops aduncus](#) Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
[Tursiops truncatus s. str.](#) Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
[Ziphius cavirostris](#) Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
McIntosh Road	Nature Reserve	WA	In buffer area only
McLean Road	Nature Reserve	WA	In buffer area only
Mount Lindesay	National Park	WA	In buffer area only
Mount Shadforth	Nature Reserve	WA	In buffer area only
NTWA Bushland covenant (0017)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0096)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0097)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0120A)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0137)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0140)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0142)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0143)	Conservation Covenant	WA	In buffer area only
Redmond Road	Nature Reserve	WA	In buffer area only
Rudyard Beach	Nature Reserve	WA	In buffer area only
Scotsdale Road	Nature Reserve	WA	In buffer area only
Tennessee North	Nature Reserve	WA	In buffer area only
Unnamed WA15623	5(1)(g) Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Unnamed WA27398	5(1)(g) Reserve	WA	In buffer area only
Unnamed WA46405	5(1)(h) Reserve	WA	In buffer area only
West Cape Howe	National Park	WA	In buffer area only
William Bay	National Park	WA	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
South West WA RFA	Western Australia	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Denmark East Development Precinct (clearing for eastern precinct)	2016/7835	Not Controlled Action	Completed	In buffer area only
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
Seismic Survey, Bremer Basin, Mentelle Basin and Zeewyck Sub-basin	2004/1700	Not Controlled Action	Completed	In buffer area only
Wind Farm development	2005/2105	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna carneipes			
Flesh-footed Shearwater [82404]	Foraging (in high numbers)	Known to occur	In buffer area only
Eudyptula minor			
Little Penguin [1085]	Foraging (provisioning young)	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Hydroprogne caspia			
Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In feature area
Larus pacificus			
Pacific Gull [811]	Foraging (in high numbers)	Known to occur	In buffer area only
Onychoprion anaethetus			
Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In buffer area only
Puffinus assimilis tunneyi			
Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In buffer area only
Sternula nereis			
Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In buffer area only
Thalassarche chlororhynchos bassi			
Indian Yellow-nosed Albatross [85249]	Foraging (in high numbers)	Known to occur	In buffer area only
Whales			
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Distribution	Known to occur	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Calving buffer	Known to occur	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Seasonal calving habitat	Known to occur	In buffer area only
Megaptera novaeangliae			
Humpback Whale [38]	Migration (north)	Known to occur	In buffer area only

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

Atlas of Living Australia Databases

SPECIES NAME	SCIENTIFIC NAME AUTHORSHIP	VERNACULAR NAME	INVASIVE
Kalotermes hilli	Emerson in Snyder, 1949		
Kalotermes aemulus	Sewell & Gay, 1978		
Coptotermes acinaciformis raffrayi	Wasmann, 1900	Subterranean Termite	
Heterotermes platycephalus	Froggatt, 1897		
Amitermes obeuntis	(Silvestri, 1909)		
Hesperotermes infrequens	(Hill, 1927)		
Nasutitermes exitiosus	(Hill, 1925)		
Occasitermes occasus	(Silvestri, 1909)		
Xylochomitermes occidualis	(Gay, 1971)		
Ctenaphides porcellus	Pascoe, 1870		
Saprinus (Saprinus) laetus	Erichson, 1834		
Melangyna (Austrosyrphus) viridiceps	(Macquart, 1847)		
Apis (Apis) mellifera	Linnaeus, 1758		GRIIS - Global Register of Introduced and Invasive Species - Australia | Non-native species
Litoria adelaidensis	(Gray, 1841)	Slender Tree Frog	
Heleioporus eyrei	(Gray, 1845)	Moaning Frog	
Limnodynastes dorsalis	(Gray, 1841)	Bullfrog	
Crinia glauerti	Loveridge, 1933	Glauert's Froglet	
Crinia georgiana	Tschudi, 1838	Tschudi's Froglet	
Anas (Anas) superciliosa	Gmelin, 1789	Grey duck	
Anas (Nettion) gracilis	Buller, 1869	Grey teal	
Chenonetta jubata	(Latham, 1801)	Maned Duck	
Cygnus (Chenopis) atratus	(Latham, 1790)	Black Swan	
Tadorna (Casarca) tadornoides	(Jardine & Selby, 1828)	Grunter	
Elseyornis melanops	(Vieillot, 1818)	Black-fronted Dotterel	
Haematopus fuliginosus fuliginosus	Gould, 1845	Sooty Oystercatcher	
Haematopus longirostris	Vieillot, 1817	Australian Pied Oystercatcher	
Chroicocephalus novaehollandiae	(Stephens, 1826)	Silver Gull	
Larus (Larus) pacificus georgii	P.P. King, 1826		
Ardea (Ardea) pacifica	Latham, 1801	White-necked Heron	
Egretta novaehollandiae	(Latham, 1790)	White-faced Heron	
Platalea (Platibis) flavipes	Gould, 1838	Yellow-billed Spoonbill	
Threskiornis moluccus	(Cuvier, 1829)	Australian White Ibis	
Threskiornis spinicollis	(Jameson, 1835)	Straw-necked Ibis	
Phaps (Phaps) chalcoptera	(Latham, 1790)	Common Bronzewing	
Dacelo (Dacelo) novaeguineae	(Hermann, 1783)	Kookaburra	GRIIS - Global Register of Introduced and Invasive Species - Australia
Cacomantis (Vidgenia) flabelliformis	(Latham, 1801)	Fan-tailed Cuckoo	
Circus approximans	Peale, 1848	Kahu	
Haliaeetus (Pontoaetus) leucogaster	(Gmelin, 1788)	white-bellied sea-eagle	
Hieraaetus (Hieraaetus) morphnoides	(Gould, 1841)	Little Eagle	
Lophoictinia isura	(Gould, 1838)	Square-tailed Kite	
Falco (Tinnunculus) cenchroides	Vigors & Horsfield, 1827	Nankeen Kestrel	
Falco (Ieracidea) berigora occidentalis	Gould, 1844		
Fulica atra	Linnaeus, 1758	Eurasian Coot	
Porphyrio (Porphyrio) porphyrio melanotus	Temminck, 1820		
Acanthiza (Acanthiza) apicalis	Gould, 1847	Inland Thornbill	
Acanthiza (Geobasileus) chrysorrhoa	(Quoy & Gaimard, 1830)	Yellow-tail	
Acanthiza (Geobasileus) inornata	Gould, 1841	Western Thornbill	
Gerygone fusca	(Gould, 1838)	Western Gerygone	
Sericornis (Sericornis) frontalis	(Vigors & Horsfield, 1827)	White-browed Scrubwren	
Sericornis (Sericornis) frontalis maculatus	Gould, 1847		
Smicrornis brevirostris	(Gould, 1838)	Weebill	
Artamus (Angroyan) cyanopterus	(Latham, 1801)	Dusky Woodswallow	
Gymnorhina tibicen	(Latham, 1801)	Australian Magpie	GRIIS - Global Register of Introduced and Invasive Species - Australia
Gymnorhina tibicen dorsalis	A.J. Campbell, 1895		GRIIS - Global Register of Introduced and Invasive Species - Australia
Coracina (Coracina) novaehollandiae	(Gmelin, 1789)	Black-faced cuckoo-shrike	

SPECIES NAME	SCIENTIFIC NAME AUTHORSHIP	VERNACULAR NAME	INVASIVE
Corvus coronoides	Vigors & Horsfield, 1827	Australian Raven	GRIIS - Global Register of Introduced and Invasive Species - Australia | Non-native species | Pest animals list
Stagonopleura (Zonaeginthus) oculata	(Quoy & Gaimard, 1830)	Red-eared Firetail	
Hirundo (Hirundo) neoxena	Gould, 1843	Welcome Swallow	
Petrochelidon (Hylochelidon) nigricans	(Vieillot, 1817)	Tree Martin	
Malurus (Malurus) splendens	(Quoy & Gaimard, 1830)	Splendid Fairy-wren	
Malurus (Leggeornis) elegans	Gould, 1837	Red-winged Fairy-wren	
Acanthorhynchus superciliosus	Gould, 1837	Western Spinebill	
Anthochaera (Anthochaera) carunculata	(Shaw, 1790)	Red wattlebird	
Anthochaera (Anellobia) lunulata	Gould, 1838	Western Wattlebird	
Lichmera (Lichmera) indistincta	(Vigors & Horsfield, 1827)	Brown Honeyeater	
Melithreptus (Melithreptus) chloropsis	Gould, 1848		
Phylidonyris (Meliornis) novaehollandiae	(Latham, 1790)	New Holland Honeyeater	
Grallina cyanoleuca	(Latham, 1801)	Magpie-lark	GRIIS - Global Register of Introduced and Invasive Species - Australia
Anthus (Anthus) novaeseelandiae	(Gmelin, 1789)	Australian Pipit	
Pachycephala (Pachycephala) occidentalis	E.P. Ramsay, 1878	Western Whistler	
Pardalotus (Pardalotinus) striatus	(Gmelin, 1789)	Striated Pardalote	
Pardalotus (Pardalotus) punctatus	(Shaw, 1792)	Spotted Pardalote	
Eopsaltria (Quoyornis) georgiana	(Quoy & Gaimard, 1830)	White-breasted Robin	
Rhipidura (Rhipidura) albiscapa	Gould, 1840	Grey Fantail	
Rhipidura (Sauloprocta) leucophrys	(Latham, 1801)	Willie Wagtail	
Zosterops lateralis	(Latham, 1801)	Silvereye	
Pelecanus conspicillatus	Temminck, 1824	Australian pelican	
Microcarbo melanoleucos	(Vieillot, 1817)	Little Pied Cormorant	
Phalacrocorax (Phalacrocorax) sulcirostris	(Brandt, 1837)	Little Black Cormorant	
Phalacrocorax (Phalacrocorax) varius	(Gmelin, 1789)	Pied Cormorant	
Phalacrocorax (Phalacrocorax) carbo	(Linnaeus, 1758)	Great Cormorant	
Poliocephalus poliocephalus	(Jardine & Selby, 1827)	Hoary-headed Grebe	
Tachybaptus novaehollandiae	(Stephens, 1826)	Australasian Little Grebe	
Pterodroma (Pterodroma) macroptera macroptera	(A. Smith, 1840)		
Eolophus roseicapilla	(Vieillot, 1817)	Galah	
Barnardius zonarius	(Shaw, 1805)	Australian Ringneck	
Neophema (Neonanodes) elegans	(Gould, 1838)	Elegant Parrot	
Parvipsitta porphyrocephala	(Dietrichsen, 1837)	Purple-crowned Lorikeet	
Platycercus (Violania) icterotis	(Temminck & Kuhl, 1820)	Western Rosella	
Purpureicephalus spurius	(Kuhl, 1820)	Red-capped Parrot	
Eudyptula minor	(J.R. Forster, 1781)	Little Penguin	
Notechis scutatus	(Peters, 1861)	Tiger Snake	GRIIS - Global Register of Introduced and Invasive Species - Australia
Cominella (Josepha) tasmanica	Tenison-Woods, 1876	Tasmanian Buccinum Whelk	
Dentimitrella menkeana	(Reeve, 1859)	Menke's Dove Shell	
Euplica bidentata	(Menke, 1843)		
Conus (Virroconus) dorreensis	PÃ©ron, 1807	Chocolate-banded Cone	
Hipponix australis	(Lamarck, 1819)	horse hoof limpet	Global Invasive Species Information Network (GISIN)
Bothriembryon (Bothriembryon) kingii	(Gray, 1825)		
Chlorodiloma crinita	(Philippi, 1849)		
Prothalotia pulcherrimus	(Wood, 1828)	Crimson Lip Weed Shell	
Phasianella angasi	Crosse, 1864		
Favolaschia calocera	R.Heim ex R.Heim		
Zelleromyces daucinus	G.W.Beaton et al.		
Anthoceros	L.		
Breutelia affinis	(Hook.) Mitt.		
Fissidens curvatus	Hornsch.		
Fissidens tenellus	Hook.f. & Wilson		
Trichostomum eckelianum	R.H.Zander		
Lemnoideae	Engl.		
Lomandra brittanii	T.S.Choo		
Thysanotus glaucifolius	Brittan		

SPECIES NAME	SCIENTIFIC NAME AUTHORSHIP	VERNACULAR NAME	INVASIVE
Caladenia brownii	Hopper		
Dampiera	R.Br.		
Dampiera hederacea	R.Br.		
Dampiera leptoclada	Benth.		
Dampiera pedunculata	Rajput & Carolin		
Scaevola	L.		
Scaevola striata	R.Br.		
Stylidium piliferum	R.Br.		
Drosera erythrogyne	N.G.Marchant & Lowrie		
Anigozanthos flavidus	RedoutÃ©	Evergreen kangaroo paw	
Anigozanthos preissii	Endl.		
Macrozamia riedlei	(Fisch. ex Gaudich.) C.A.Gardner		
Leucopogon glabellus	R.Br.		
Leucopogon obovatus subsp. revolutus	(R.Br.) Hislop		
Leucopogon verticillatus	R.Br.		
Sphenotoma capitata	(R.Br.) Lindl.		
Sphenotoma parviflora	(F.Muell. ex Benth.) F.Muell.		
Acacia pentadenia subsp. pentadenia			
Acacia hastulata	Sm.		
Acacia saligna	(Labill.) H.L.Wendl.		GRIIS - Global Register of Introduced and Invasive Species - Australia
Acacia pentadenia	Lindl.		
Bossiaea linophylla	R.Br.		
Bossiaea dentata	(R.Br.) Benth.		
Callistachys lanceolata	Vent.		GRIIS - Global Register of Introduced and Invasive Species - Australia
Chorizema reticulatum	Meisn.		
Dipogon lignosus	(L.) Verdc.	mile-a-minute	GRIIS - Global Register of Introduced and Invasive Species - Australia | Non-native species
Gastrolobium bilobum	R.Br.		
Gompholobium scabrum	Sm.		
Hovea elliptica	(Sm.) DC.		
Jacksonia spinosa	(Labill.) R.Br. ex Sm.		
Kennedia carinata	(Benth.) Van Houtte		
Kennedia coccinea	(Curtis) Vent.		
Sphaerolobium drummondii	Turcz.		
Opercularia hispidula	Endl.		
Cassytha racemosa f. racemosa			
Thomasia rhynchocarpa	Turcz.		
Darwinia citriodora	(Endl.) Benth.		
Eucalyptus jacksonii	Maiden		
Eucalyptus staeri	(Maiden) Kessell & C.A.Gardner		
Kunzea baxteri	(Klotzsch) Schauer		GRIIS - Global Register of Introduced and Invasive Species - Australia
Kunzea recurva	Schauer		
Melaleuca cuticularis	Labill.	Salt Paperbark	
Melaleuca viminea	Lindl.		GRIIS - Global Register of Introduced and Invasive Species - Australia
Taxandria fragrans	(J.R.Wheeler & N.G.Marchant) J.R.Wheeler & N.G.Marchant		
Amphipogon debilis	R.Br.		
Xyris lanata	R.Br.		
Histiopteris incisa	(Thunb.) J.Sm.	Matata	
Adenanthos obovatus	Labill.		
Banksia seminuda	(A.S.George) Rye		
Banksia grandis	Willd.		
Banksia attenuata	R.Br.		
Conospermum caeruleum subsp. caeruleum			
Trymalium odoratissimum subsp. trifidum	(Rye) Kellermann, Rye & K.R.Thiele		

SPECIES NAME	SCIENTIFIC NAME AUTHORSHIP	VERNACULAR NAME	INVASIVE
Azolla pinnata	R.Br.		GRIIS - Global Register of Introduced and Invasive Species - Australia | Global Invasive Species Information Network (GISIN)
Azolla rubra	R.Br.	Red water fern	GRIIS - Global Register of Introduced and Invasive Species - Australia | Global Invasive Species Information Network (GISIN)
Correa	Andrews		Global Invasive Species Information Network (GISIN)
Fossombronia	Raddi		
Riccardia bipinnatifida	(Colenso) Hewson		
Magnoliopsida	Brongn.		
Cladonia floerkeana	Florke		

APPENDIX 4

Birdlife Database

BIRDLIFE AUSTRALIA (SOURCED 30 NOVEMBER 2021)

COMMON NAME	SCIENTIFIC NAME	COUNT	REPORTING RATE
Emu	Dromaius novaehollandiae	9	0.93%
Blue-billed Duck	Oxyura australis	3	0.31%
Pink-eared Duck	Malacorhynchus membranaceus	5	0.52%
Black Swan	Cygnus atratus	467	48.39%
Australian Shelduck	Tadorna tadornoides	238	24.66%
Hardhead	Aythya australis	8	0.83%
Australasian Shoveler	Spatula rhynchotis	50	5.18%
Pacific Black Duck	Anas superciliosa	421	43.63%
Northern Mallard	Anas platyrhynchos	1	0.10%
Grey Teal	Anas gracilis	260	26.94%
Chestnut Teal	Anas castanea	50	5.18%
Musk Duck	Biziura lobata	103	10.67%
Australian Wood Duck	Chenonetta jubata	140	14.51%
Stubble Quail	Coturnix pectoralis	4	0.41%
Brown Quail	Synoicus ypsilophora	8	0.83%
Australasian Grebe	Tachybaptus novaehollandiae	28	2.90%
Hoary-headed Grebe	Poliocephalus poliocephalus	147	15.23%
Great Crested Grebe	Podiceps cristatus	12	1.24%
Rock Dove	Columba livia	1	0.10%
Laughing Dove	Streptopelia senegalensis	1	0.10%
Common Bronzewing	Phaps chalcoptera	136	14.09%
Brush Bronzewing	Phaps elegans	8	0.83%
Crested Pigeon	Ocyphaps lophotes	20	2.07%
Horsfield's Bronze-Cuckoo	Chalcites basalis	6	0.62%
Shining Bronze-Cuckoo	Chalcites lucidus	32	3.32%
Fan-tailed Cuckoo	Cacomantis flabelliformis	30	3.11%
Pallid Cuckoo	Heteroscenes pallidus	2	0.21%
Tawny Frogmouth	Podargus strigoides	6	0.62%
Australian Owlet-nightjar	Aegotheles cristatus	12	1.24%
Buff-banded Rail	Hypotaenidia philippensis	2	0.21%
Baillon's Crake	Zapornia pusilla	1	0.10%
Spotless Crake	Zapornia tabuensis	3	0.31%
Purple Swamphen	Porphyrio porphyrio	12	1.24%
Dusky Moorhen	Gallinula tenebrosa	20	2.07%
Eurasian Coot	Fulica atra	172	17.82%
Australian Pied Oystercatcher	Haematopus longirostris	284	29.43%
Sooty Oystercatcher	Haematopus fuliginosus	36	3.73%
Banded Stilt	Cladorhynchus leucocephalus	126	13.06%
Red-necked Avocet	Recurvirostra novaehollandiae	229	23.73%
Black-winged Stilt	Himantopus leucocephalus	269	27.88%
Grey Plover	Pluvialis squatarola	81	8.39%
Pacific Golden Plover	Pluvialis fulva	25	2.59%
Red-capped Plover	Charadrius ruficapillus	329	34.09%
Double-banded Plover	Charadrius bicinctus	1	0.10%
Lesser Sand Plover	Charadrius mongolus	8	0.83%
Greater Sand Plover	Charadrius leschenaultii	31	3.21%
Hooded Plover	Thinornis cucullatus	17	1.76%

COMMON NAME	SCIENTIFIC NAME	COUNT	REPORTING RATE
Black-fronted Dotterel	Elseyornis melanops	15	1.55%
Banded Lapwing	Vanellus tricolor	1	0.10%
Masked Lapwing	Vanellus miles	2	0.21%
Eastern Curlew	Numenius madagascariensis	4	0.41%
Bar-tailed Godwit	Limosa lapponica	90	9.33%
Black-tailed Godwit	Limosa limosa	36	3.73%
Ruddy Turnstone	Arenaria interpres	7	0.73%
Great Knot	Calidris tenuirostris	46	4.77%
Red Knot	Calidris canutus	28	2.90%
Sharp-tailed Sandpiper	Calidris acuminata	191	19.79%
Curlew Sandpiper	Calidris ferruginea	170	17.62%
Long-toed Stint	Calidris subminuta	7	0.73%
Red-necked Stint	Calidris ruficollis	281	29.12%
Sanderling	Calidris alba	3	0.31%
Pectoral Sandpiper	Calidris melanotos	15	1.55%
Common Sandpiper	Actitis hypoleucos	23	2.38%
Grey-tailed Tattler	Tringa brevipes	1	0.10%
Common Greenshank	Tringa nebularia	340	35.23%
Wood Sandpiper	Tringa glareola	2	0.21%
Marsh Sandpiper	Tringa stagnatilis	16	1.66%
Painted Button-quail	Turnix varius	1	0.10%
Oriental Pratincole	Glareola maldivarum	1	0.10%
Arctic Jaeger	Stercorarius parasiticus	1	0.10%
Silver Gull	Chroicocephalus novaehollandiae	526	54.51%
Pacific Gull	Larus pacificus	32	3.32%
Fairy Tern	Sternula nereis	45	4.66%
Australian Gull-billed Tern	Gelochelidon macrotarsa	1	0.10%
Caspian Tern	Hydroprogne caspia	76	7.88%
Whiskered Tern	Chlidonias hybrida	17	1.76%
Crested Tern	Thalasseus bergii	137	14.20%
Southern Rockhopper Penguin	Eudyptes chrysocome	1	0.10%
Hutton's Shearwater	Puffinus huttoni	1	0.10%
Australian Pelican	Pelecanus conspicillatus	522	54.09%
Nankeen Night-Heron	Nycticorax caledonicus	13	1.35%
Cattle Egret	Bubulcus ibis	1	0.10%
White-necked Heron	Ardea pacifica	13	1.35%
Great Egret	Ardea alba	147	15.23%
White-faced Heron	Egretta novaehollandiae	431	44.66%
Little Egret	Egretta garzetta	6	0.62%
Eastern Reef Egret	Egretta sacra	4	0.41%
Australian White Ibis	Threskiornis moluccus	322	33.37%
Straw-necked Ibis	Threskiornis spinicollis	115	11.92%
Yellow-billed Spoonbill	Platalea flavipes	258	26.74%
Australasian Gannet	Morus serrator	5	0.52%
Little Pied Cormorant	Microcarbo melanoleucos	514	53.26%
Great Cormorant	Phalacrocorax carbo	85	8.81%
Little Black Cormorant	Phalacrocorax sulcirostris	353	36.58%
Pied Cormorant	Phalacrocorax varius	243	25.18%

COMMON NAME	SCIENTIFIC NAME	COUNT	REPORTING RATE
Australasian Darter	Anhinga novaehollandiae	18	1.87%
Osprey	Pandion haliaetus	61	6.32%
Black-shouldered Kite	Elanus axillaris	3	0.31%
Square-tailed Kite	Lophoictinia isura	4	0.41%
Wedge-tailed Eagle	Aquila audax	23	2.38%
Little Eagle	Hieraaetus morphnoides	15	1.55%
Swamp Harrier	Circus approximans	31	3.21%
Brown Goshawk	Accipiter fasciatus	16	1.66%
Collared Sparrowhawk	Accipiter cirrocephalus	10	1.04%
White-bellied Sea-Eagle	Haliaeetus leucogaster	52	5.39%
Whistling Kite	Haliastur sphenurus	52	5.39%
Barn Owl	Tyto alba	2	0.21%
Southern Boobook	Ninox boobook	35	3.63%
Sacred Kingfisher	Todiramphus sanctus	31	3.21%
Laughing Kookaburra	Dacelo novaeguineae	166	17.20%
Nankeen Kestrel	Falco cenchroides	30	3.11%
Australian Hobby	Falco longipennis	5	0.52%
Brown Falcon	Falco berigora	5	0.52%
Peregrine Falcon	Falco peregrinus	7	0.73%
Red-tailed Black-Cockatoo	Calyptorhynchus banksii	39	4.04%
Baudin's Black-Cockatoo	Zanda baudinii	38	3.94%
Carnaby's Black-Cockatoo	Zanda latirostris	28	2.90%
Galah	Eolophus roseicapilla	108	11.19%
Western Corella	Cacatua pastinator	2	0.21%
Little Corella	Cacatua sanguinea	2	0.21%
Regent Parrot	Polytelis anthopeplus	1	0.10%
Mulga Parrot	Psephotellus varius	1	0.10%
Red-capped Parrot	Purpureicephalus spurius	101	10.47%
Western Rosella	Platycercus icterotis	185	19.17%
Australian Ringneck	Barnardius zonarius	204	21.14%
Elegant Parrot	Neophema elegans	19	1.97%
Rock Parrot	Neophema petrophila	6	0.62%
Purple-crowned Lorikeet	Glossopsitta porphyrocephala	77	7.98%
Rufous Treecreeper	Climacteris rufus	8	0.83%
Red-winged Fairy-wren	Malurus elegans	156	16.17%
Splendid Fairy-wren	Malurus splendens	163	16.89%
Southern Emu-wren	Stipiturus malachurus	15	1.55%
Brown Honeyeater	Lichmera indistincta	80	8.29%
New Holland Honeyeater	Phylidonyris novaehollandiae	222	23.01%
White-cheeked Honeyeater	Phylidonyris niger	1	0.10%
Brown-headed Honeyeater	Melithreptus brevirostris	1	0.10%
White-naped Honeyeater	Melithreptus lunatus	120	12.44%
Tawny-crowned Honeyeater	Glyciphila melanops	5	0.52%
Western Spinebill	Acanthorhynchus superciliosus	107	11.09%
White-fronted Chat	Epthianura albifrons	28	2.90%
Western Wattlebird	Anthochaera lunulata	18	1.87%
Red Wattlebird	Anthochaera carunculata	215	22.28%
Singing Honeyeater	Gavicalis virescens	3	0.31%

COMMON NAME	SCIENTIFIC NAME	COUNT	REPORTING RATE
Spotted Pardalote	Pardalotus punctatus	82	8.50%
Striated Pardalote	Pardalotus striatus	49	5.08%
Western Gerygone	Gerygone fusca	92	9.53%
Weebill	Smicrornis brevirostris	5	0.52%
White-browed Scrubwren	Sericornis frontalis	135	13.99%
Yellow-rumped Thornbill	Acanthiza chrysorrhoa	72	7.46%
Inland Thornbill	Acanthiza apicalis	171	17.72%
Western Thornbill	Acanthiza inornata	31	3.21%
White-browed Babbler	Pomatostomus superciliosus	38	3.94%
Varied Sittella	Daphoenositta chrysoptera	8	0.83%
Black-faced Cuckoo-shrike	Coracina novaehollandiae	94	9.74%
White-winged Triller	Lalage tricolor	3	0.31%
Rufous Whistler	Pachycephala rufiventris	15	1.55%
Golden Whistler	Pachycephala pectoralis	160	16.58%
Grey Shrike-thrush	Colluricincla harmonica	93	9.64%
Crested Shrike-tit	Falcunculus frontatus	4	0.41%
Grey Currawong	Strepera versicolor	21	2.18%
Australian Magpie	Gymnorhina tibicen	220	22.80%
Grey Butcherbird	Cracticus torquatus	4	0.41%
Dusky Woodswallow	Artamus cyanopterus	25	2.59%
Black-faced Woodswallow	Artamus cinereus	1	0.10%
Willie Wagtail	Rhipidura leucophrys	93	9.64%
Grey Fantail	Rhipidura fuliginosa	242	25.08%
Australian Raven	Corvus coronoides	218	22.59%
Restless Flycatcher	Myiagra inquieta	2	0.21%
Magpie-lark	Grallina cyanoleuca	89	9.22%
Scarlet Robin	Petroica multicolor	33	3.42%
Jacky Winter	Microeca fascinans	1	0.10%
Western Yellow Robin	Eopsaltria griseogularis	2	0.21%
White-breasted Robin	Quoyornis georgianus	100	10.36%
Red-eared Firetail	Stagonopleura oculata	98	10.16%
Australasian Pipit	Anthus novaeseelandiae	44	4.56%
Rufous Songlark	Cincloramphus mathewsi	1	0.10%
Little Grassbird	Poodytes gramineus	10	1.04%
Australian Reed-Warbler	Acrocephalus australis	2	0.21%
Fairy Martin	Petrochelidon ariel	1	0.10%
Tree Martin	Petrochelidon nigricans	118	12.23%
Welcome Swallow	Hirundo neoxena	80	8.29%
Silvereye	Zosterops lateralis	202	20.93%
Black Duck-Mallard hybrid		4	0.41%
Corella spp		5	0.52%
Crow & Raven spp		1	0.10%
White-tailed Black-Cockatoo spp		47	4.87%
Domestic Goose		1	0.10%
Domestic Duck		12	1.24%
Fairy-wren spp		1	0.10%
Large wader spp		2	0.21%
Medium wader spp		2	0.21%

COMMON NAME	SCIENTIFIC NAME	COUNT	REPORTING RATE
Small wader spp		1	0.10%

APPENDIX 5

Conservation Codes for WA

CONSERVATION CODES

For Western Australian Fauna and Flora

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016.*

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T **Threatened species**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens
[2]Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

APPENDIX 6

Vegetation Condition Descriptions

Vegetation Condition Scale (Thackway and Lesslie 2006)

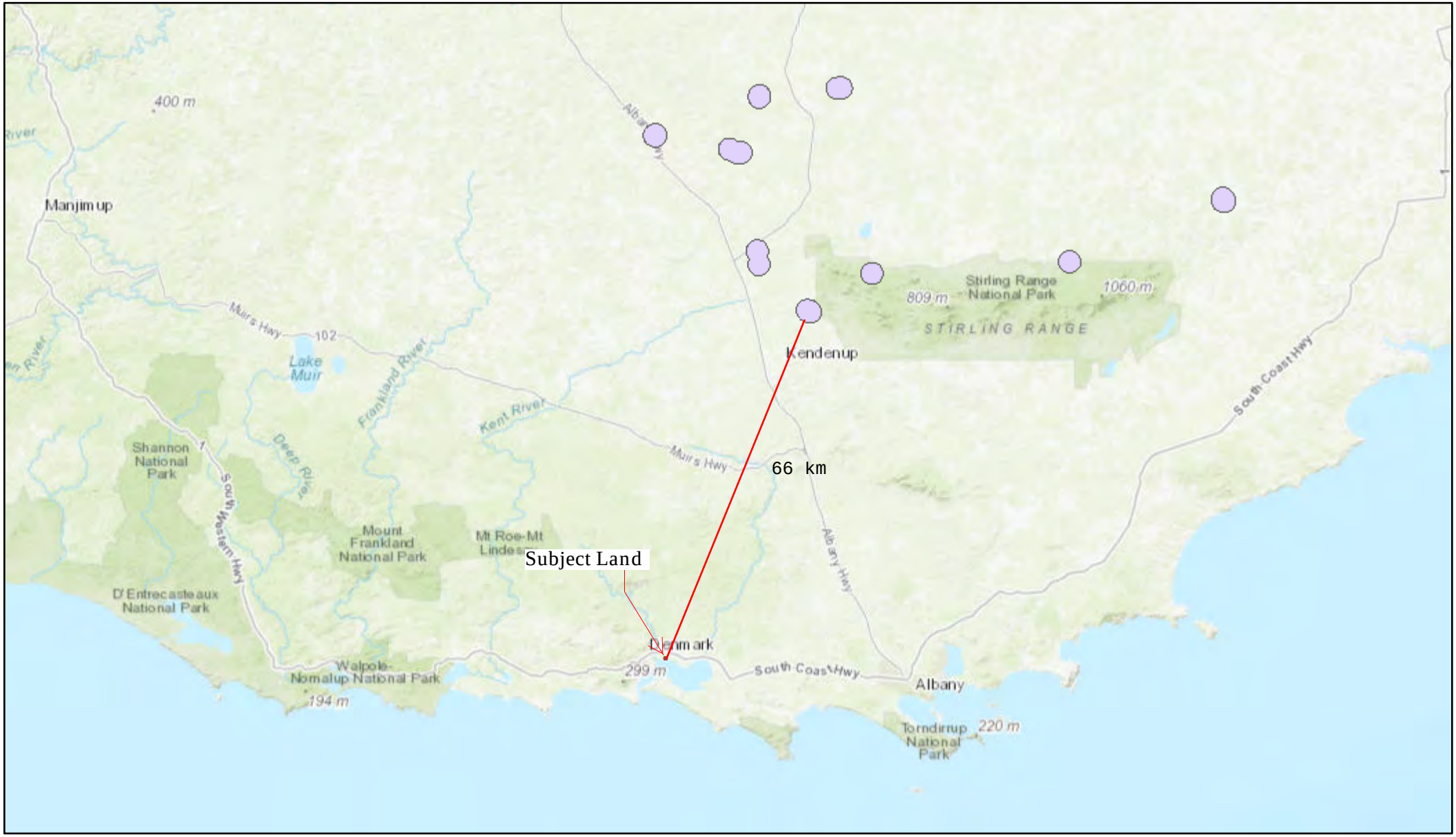
		Native Vegetation Cover			Non-native Vegetation Cover		
Vegetation Cover Class Criteria	**Type 0 - Naturally bare Areas where native vegetation does not naturally persist**	**Type I Residual** Native vegetation community structure, composition, and regenerative capacity intact – no significant perturbation form landuse/land management practice	**Type II Modified** Native vegetation community structure, composition and regenerative capacity intact – perturbed by land use /land management practice	**Type III Transformed** Native vegetation community structure, composition and regenerative capacity significantly altered by land use/land management practice	**Type IV Replaced Adventive** Native vegetation replacement – species alien to the locality and spontaneous in occurrence	**Type V Replaced Managed** Native vegetation replacement with cultivated vegetation	**Type VI Removed** Vegetation removal
Diagnostic Criteria	Natural regenerative capacility unmodified	unmodified, structural and compositional integrity of native vegetation is very high	Natural regeneration tolerates/endures under past &/or present current land management practices. Structure is predominantly altered but intact e.g. a layer and/growth form and or age classes removed. Composition of vegetation is altered but intact	Natural regenerative capacity is limited/at risk under past &/or current land use or land management practices. Rehabilitation and restoration possible through modified land management practice Dominant structuring species of native vegetation community significantly altered e.g. a layer frequently and repeatedly removed	Regeneration of native vegetation community has been suppressed by ongoing disturbances of the natural regenerative capacity Limited potential for restoration. Dominant structuring species of native vegetation removed or predominantly cleared or extremely degraded.	Regeneration of native vegetation community lost or suppressed by intensive land management. Limited potential for restoration. Dominant structuring species of native vegetation community removed.	Nil or minimal. Vegetation absent or ornamental
Corresponding Keighery (1994) Condition Scale		Very good excellent, pristine	Good to very good	Very degraded to degraded/good	Completely degraded	Completely degraded	

Thackway, R. and Lesslie, R. (2006) Reporting Vegetation Condition Using the Vegetation Assets, States and Transitions (VAST) Framework. Ecological Management and Restoration. 7, Suppl. 1. S53-S62
Keighery (1994) Keighery, B.J. (1994) Bushland plant survey. A guide to plant community survey for the community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

APPENDIX 7

DBCA Threatened Fauna Database

Black Cockatoo Breeding Sites (Buffered)



11/30/2021, 1:32:29 PM

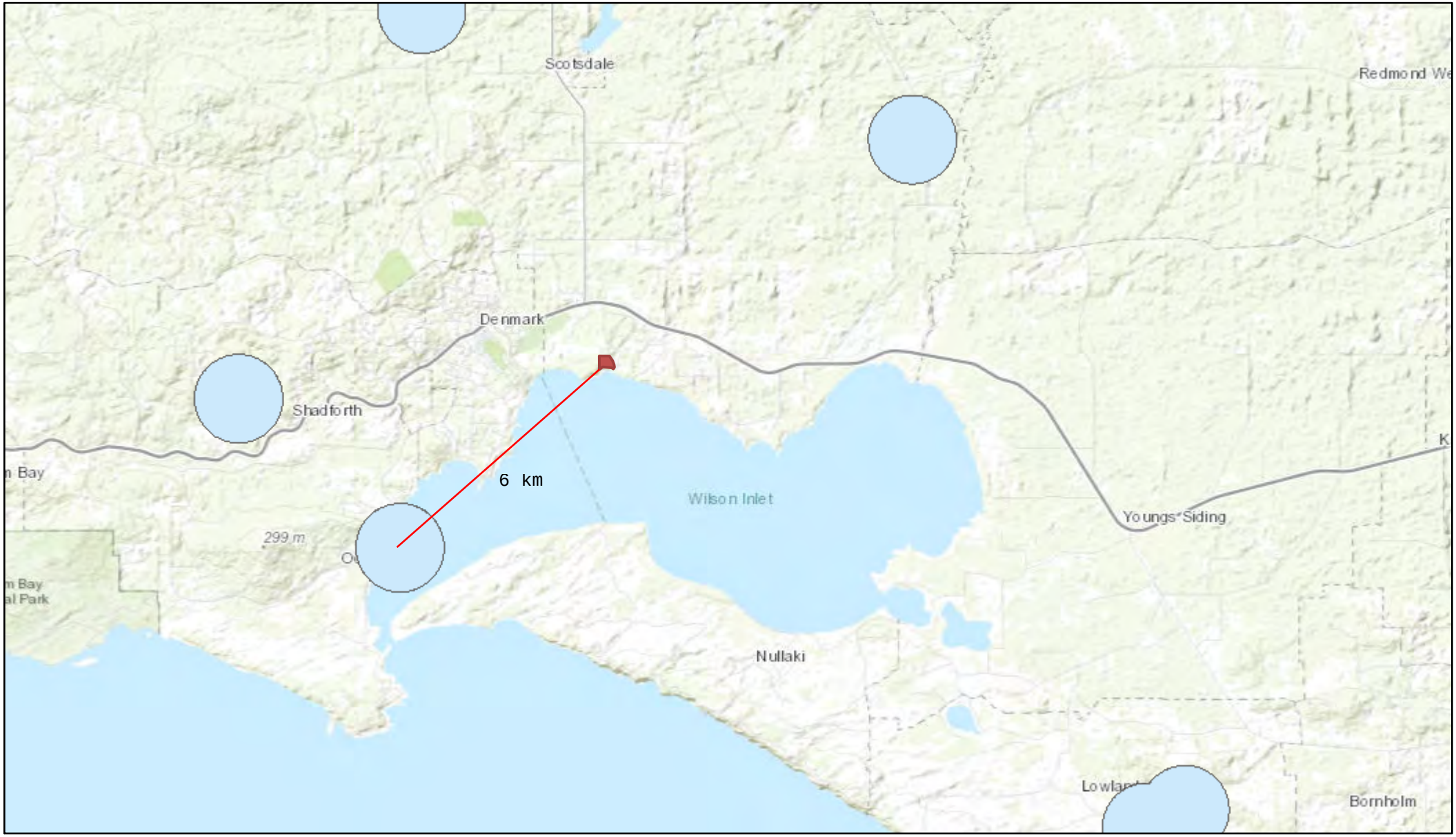
Black Cockatoo Breeding Sites - Buffered (DBCA-063)

1:1,155,581

0 5 10 20 mi

0 12.5 25 50 km

Black Cockatoo Roosting Sites (Buffered)



11/30/2021, 1:30:06 PM

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

Black Cockatoo Roosting Sites - Buffered (DBCA-064)

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, LANDGATE/SLIP

powered by SLIP

APPENDIX 8

Clearing Permit Exemptions

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
		Under this item you should note that clearing for a building, combined with other exempt clearing activities on the property, must not exceed five hectares in a financial year. This means that if you clear for any of the following purposes, the clearing may not add up to more than five hectares in a financial year. • Clearing to construct a building (Item 1) • Clearing to collect firewood (Item 5) • Clearing to obtain fencing or farming materials (Item 6) • Clearing for woodwork (Item 7) • Clearing for fence lines (Item 10) • Clearing for vehicular tracks (Item 12) • Clearing for walking tracks (Item 13) • Clearing isolated trees (Item 19) This exemption does not apply in an environmentally sensitive area.

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
Regulation 5, Item 8 Clearing for cultural purposes of an Aboriginal person Clearing must be done by: The Aboriginal person.	Clearing for the cultural or spiritual, but not commercial, purposes of an Aboriginal person on land to which the person has a cultural or spiritual connection and a right of access.	This exemption allows clearing of native vegetation for traditional purposes by an Aboriginal person, provided that the Aboriginal person has a spiritual or cultural connection and has a right to access the land in question. An Aboriginal person's cultural or spiritual connection to particular land is determined in accordance with the body of traditions, observances and customs of the particular community or communities to which the Aboriginal person belongs or with which the person identifies. An "Aboriginal person" means a person who is a descendant of one or more of the Aboriginal peoples of Australia, who claims to be an Aboriginal person and who is accepted as such in the community in which he or she lives. This exemption does not allow for commercial use of the native vegetation. This exemption does not apply in an environmentally sensitive area.

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
Regulation 5, Item 10 Clearing along a fence line - alienated land Clearing must be done by or with the prior authority of: The owner of the property on which the clearing is to take place.	Clearing of alienated land along a fence line of, or within, a property to the width necessary to provide access to construct or maintain a fence, being clearing which does not, together with all other limited clearing carried out on the property in the financial year in which the clearing takes place, exceed five hectares.	This exemption allows an owner to clear a strip of native vegetation on either side of a fence line on private property to provide access for fence maintenance or construction. "Fence" means a structure that is permanently fixed to the ground for controlling movement of persons and/or animals. "Property" means an area of land that is managed as a single property whether or not it is made up of a number of properties held under separate titles. Under this item you should note that clearing along a fence line, combined with other exempt clearing activities on the property, must not exceed five hectares in a financial year. This means that if you clear for any of the following purposes, the clearing must not add up to more than five hectares in a financial year. • Clearing to construct a building (Item 1) • Clearing to collect firewood (Item 5) • Clearing to obtain fencing or farming materials (Item 6) • Clearing for woodwork (Item 7) • Clearing for fence lines (Item 10) • Clearing for vehicular tracks (Item 12) • Clearing for walking tracks (Item 13) • Clearing isolated trees (Item 19) This exemption does not apply in an environmentally sensitive area.

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
Regulation 5, Item 11 Clearing along a fence line □ Crown land Clearing must be done by or with the prior authority of: The owner of the land on which the clearing is to take place.	Clearing of Crown land along a fence line to provide access to construct or maintain a fence – (a) between alienated land and Crown land - if the clearing is no more than 1.5 metres from the fence line; or (b) between Crown land and Crown land - if the clearing is no more than 5 metres from the fence line on one side and no more than 1.5 metres from the fence line on the other side.	This exemption allows the government agency which has the care, control or management of the land, or a lessee under a lease lawfully granted by the Crown (such as a pastoral lease), to clear to provide access for fence maintenance or construction: (a) between alienated land and Crown land, a strip of native vegetation up to 1.5 metres wide on the Crown land along the fence line (this Item does not deal with clearing for a fence line on alienated land – see Item 10); or (b) between Crown land and Crown land a strip of native vegetation up to 5 metres on one side and 1.5 metres on the other side. "Fence" means a structure that is permanently fixed to the ground for controlling movement of persons and/or animals. This exemption does not apply in an environmentally sensitive area.
Regulation 5, Item 12 Clearing for vehicular tracks Clearing must be done by or with the prior authority of:	Clearing to construct a vehicular track on a property, being clearing which does not, together with all other limited clearing carried out on the property in the financial year in which the clearing takes place, exceed five hectares, if – (a) the clearing for the track is no wider than	This exemption allows for clearing of a strip of native vegetation to the extent necessary for an access track. For example, this may be for general access to a property or to farm infrastructure such as a hay shed. There must be at least 100 metres between the track and any other cleared land that can be used for the purpose intended for that track. This may include other cleared areas.

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
The owner of the property on which the clearing is to take place.	necessary; (b) there is at least 100 metres between that track and any other cleared land that can be used for the purpose for which the particular track is intended; (c) the vegetation is not in a road reserve; and (d) the vegetation is not riparian vegetation (unless there is no reasonable alternative route and the track is necessary for the commercial activities carried out on the property).	Construction of vehicle tracks within riparian vegetation is generally not allowed, but where there is no reasonable alternative route, and the track is necessary for the commercial activities of the property, it may pass through riparian vegetation. "Riparian vegetation" means the distinctive vegetation associated with a wetland or watercourse. "Property" means an area of land that is managed as a single property whether or not it is made up of a number of properties held under separate titles. Under this item you should note that clearing for a vehicle track, combined with other exempt clearing activities on the property, must not exceed five hectares in a financial year. This means that if you clear for any of the following purposes, the clearing must not add up to more than five hectares in a financial year. • Clearing to construct a building (Item 1) • Clearing to collect firewood (Item 5) • Clearing to obtain fencing or farming materials (Item 6) • Clearing for woodwork (Item 7) • Clearing for fence lines (Item 10) • Clearing for vehicular tracks (Item 12) • Clearing for walking tracks (Item 13) • Clearing isolated trees (Item 19) This exemption does not apply in an environmentally sensitive area.

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
Regulation 5, Item 13 Clearing for walking tracks Clearing must be done by or with the prior authority of: The owner of the property on which the clearing is to take place.	Clearing to construct a walking track on a property, being clearing which does not, together with all other limited clearing carried out on the property in the financial year in which the clearing takes place, exceed five hectares, if – (a) the clearing for the track is no wider than necessary; (b) the track is used by pedestrians or there is a reasonable expectation that it will be used by pedestrians.	This exemption allows clearing for the installation of walking tracks for use by pedestrians. "Property" means an area of land that is managed as a single property whether or not it is made up of a number of properties held under separate titles. Under this item you should note that clearing for a walking track, combined with other exempt clearing activities on the property, must not exceed five hectares in a financial year. This means that if you clear for any of the following purposes, the clearing must not add up to more than five hectares in a financial year. • Clearing to construct a building (Item 1) • Clearing to collect firewood (Item 5) • Clearing to obtain fencing or farming materials (Item 6) • Clearing for woodwork (Item 7) • Clearing for fence lines (Item 10) • Clearing for vehicular tracks (Item 12) • Clearing for walking tracks (Item 13) • Clearing isolated trees (Item 19) This exemption does not apply in an environmentally sensitive area.

Excerpt from: A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986 (DWER, 2019)

Item no.	Wording of exemption	Comment / explanation
Regulation 5, Item 21A A Clearing for a crossover Clearing must be done by or with the authority of: The person with the authority to construct the crossover.	Clearing that is the result of constructing a crossover from a road to a property adjacent to the road, and any associated sight line areas, if the construction is within the scope of the authority to construct the crossover.	This exemption allows for the creation of a crossover between a road and a property, to enable access to that property through the road reserve. "Property" means an area of land that is managed as a single property whether or not it is made up of a number of properties held under separate titles. This exemption does not apply in an environmentally sensitive area.

Appendix B

Coastal Vulnerability Assessment
MP Rogers & Assoc - October 2020

m p rogers & associates pl ABN 14 062 681 252
consulting engineers specialising in coastal, port and marine projects

Form 001 10/01/14

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Osborne Park WA 6017, Australia
e: admin@coastsandports.com.au
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f: +61 8 9254 6699

Our reference: K1830:BST:Letter 20111 Rev 0
Enquiries: Ben Turner, direct line: 9254 6625

30 October 2020

Mr Nick Ayton
Ayton Baesjou Planning
59 Peels Place
ALBANY WA 6330
nick@aytonbaesjou.com.au

Dear Nick

LOT 9007 SPRINGDALE BEACH ESTATE DENMARK – COASTAL VULNERABILITY ASSESSMENT

We have completed a first pass coastal hazard assessment of the Springdale Beach Estate in accordance with State Planning Policy 2.6 – The State Coastal Planning Policy (SPP2.6).

M P Rogers & Associates Pty Ltd (MRA) previously completed a detailed coastal hazard assessment for Lot 32 Ocean Beach Road, Denmark. For this preliminary review we have modified the previous assessment of potential coastal hazards to be specific to the Springdale Beach Estate location.

The following sections of this report discuss the relevant preliminary coastal hazard allowances for the site.

S1 Allowance

MRA has previously assessed records from Albany to determine a representative storm for the south coast, which is estimated to represent the 100 year ARI event in relation to beach erosion, particularly in areas that have a greater exposure from the south east. This storm was experienced in August 1984 and is known to have resulted in severe beach erosion on the south coast. The event was significantly more severe than other observed events and had the largest recorded (since 1943) offshore wave heights from the south through east direction. The storm also resulted in the highest recorded level of erosion along Middleton Beach (approximately 30 m) which has the same south easterly facing aspect as the Wilson Inlet shoreline fronting Lot 9007.

The severe conditions and south easterly direction of the 1984 storm are likely to represent the 100 year ARI conditions for the shoreline fronting Lot 9007. Having a coastal frontage within the Wilson Inlet means that the shoreline fronting Lot 9007 would not be exposed to oceanic conditions. As a result, a local wave hindcast was completed to determine the wave conditions within the Inlet. These wave conditions were applied to the shoreline change model together with a conservative assessment of associated water levels and wind conditions for the site, consistent with the methodology adopted for Lot 32 Ocean Beach Road. The design event was modelled using the SBECH profile change model and an estimate of the potential erosion extent was made. Based on the modelled erosion extent, an S1 Allowance for severe storm erosion of 6 m is considered to be appropriate for the site. The results of the SBEACH modelling are presented in Figure 1.

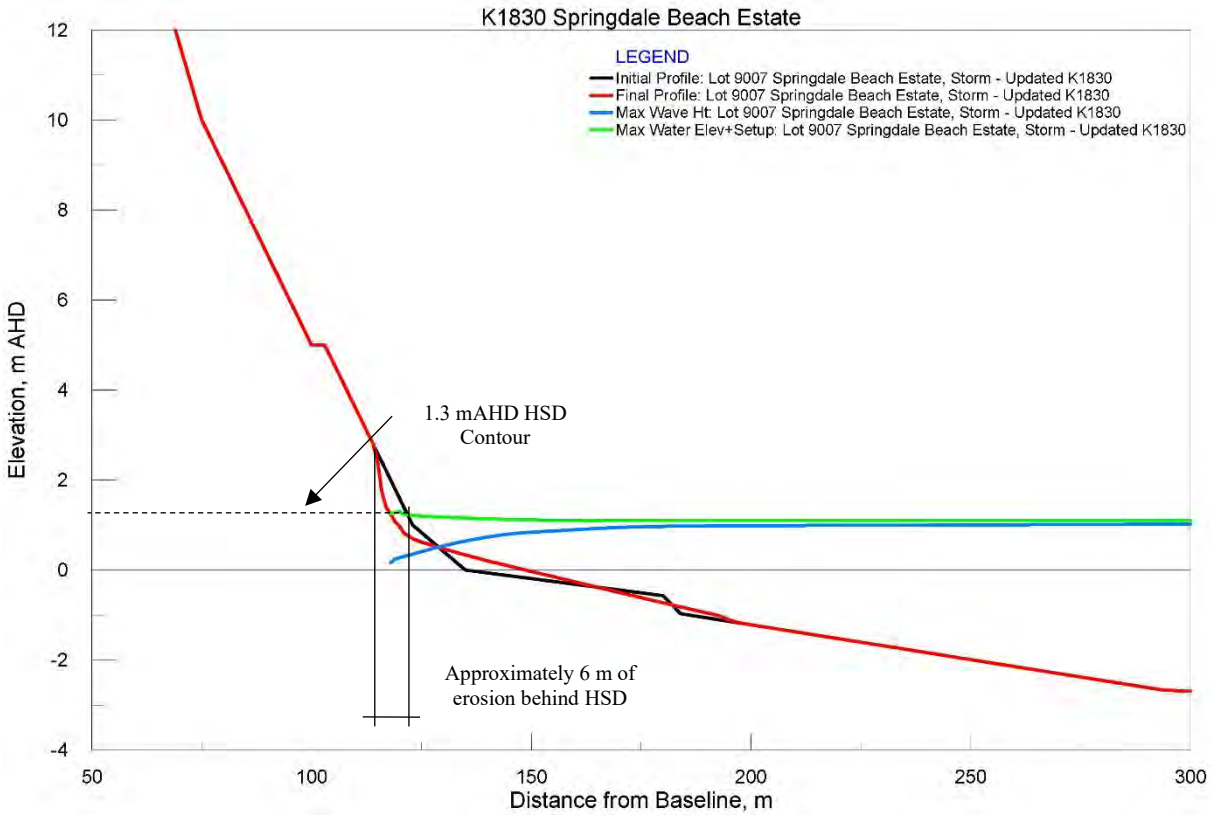

Figure 1 SBEACH Storm Erosion Simulation Results

S2 Allowance

The S2 Allowance for long term shoreline movement was determined using ortho-rectified historical aerial photographs purchased from Landgate. The preliminary assessment used aerial imagery from 2001 and 2020 to represent the longest period of aerial photo coverage readily available in the public domain. Mapping of the shoreline position at each of these timeframes (as presented in Figure 2) found that there was no significant movement of the shoreline over the mapped timeframe. If anything, the shoreline may have experienced a minor accretion trend, though it is difficult to tell with any certainty given the low energy nature of the shoreline. Overall, minimal change of this shoreline would be expected over time given the low energy environment of the Inlet. It is therefore recommended that a 0 m/year S2 Allowance be applied, corresponding to a 0 m allowance for the 100 year timeframe to 2120. This assessment is not uncommon for water bodies such as the Wilson Inlet where there is no significant mechanism for erosion of the shoreline to occur.

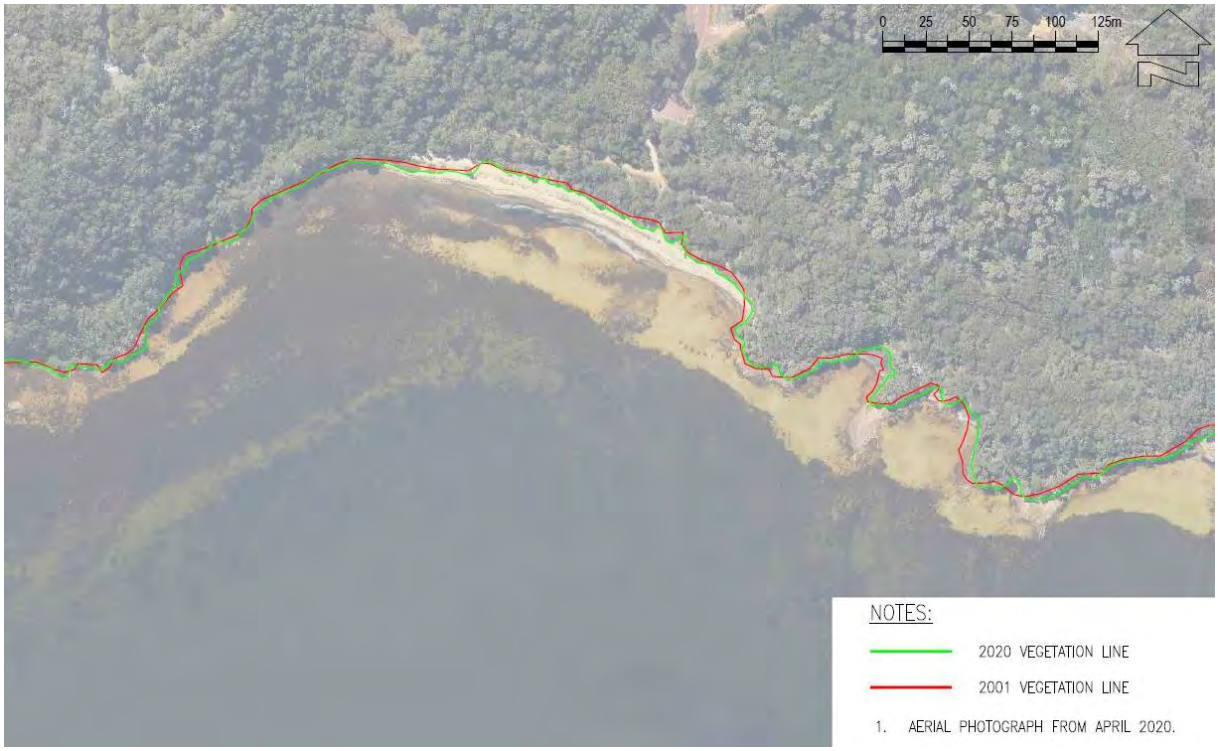

Figure 2 Shoreline Movement Plan

S3 Allowance

The Department of Transport completed an assessment of the potential increase in sea level that could be experienced on the Western Australian coast in the coming 100 years. This assessment extrapolated work by Hunter (2009) to provide sea level rise values based on the IPCC (2007) A1FI climate change scenario projections to the year 2110. The derived sea level rise scenario was subsequently adopted by the Western Australian Planning Commission (and SPP 2.6) for use in coastal planning along the Western Australian coast. This sea level rise scenario was adopted for this assessment and estimates a rise of 0.9 m to 2110.

SPP2.6 notes that the S3 Allowance for erosion caused by future sea level rise on a sandy coast should be calculated as 100 times the adopted sea level rise value of 0.9 m over a 100-year planning horizon or 90 m.

Total Coastal Erosion Hazard Extent

Each of the erosion allowances were determined for the 100 year planning timeframe to 2120. A present day scenario was also considered to illustrate the change in the total erosion allowance over the 100 year planning timeframe. The allowances are combined with a 0.2 m/year allowance for uncertainty to create a total erosion allowance for the 100 year planning timeframe as required by SPP2.6. Table 1 summarises the total coastal erosion allowances for the 100 year planning timeframe to 2120.

Table 1 Allowance Combinations for Coastal Erosion

Planning Horizon	S1 (m)	S2 (m)	S3 (m)	Uncertainty (m)	Total Erosion Allowance (m)
Present Day (2020)	6	0	0	0	6
2120	6	0	90	20	116

The calculated total erosion allowance over the 100 year planning timeframe is less than the 135 m setback distance between the building envelope of Lot 9007 and the Wilson Inlet as indicated by the concept plan provided by Ayton Baesjou Planning. Lot 9007 would therefore avoid impact from coastal erosion over the 100 year planning timeframe.

S4 Inundation Levels

SPP2.6 requires that the S4 Allowance for inundation be taken as the maximum extent of inundation experienced during a water level event with a 0.2% AEP (500 year ARI) plus the appropriate allowance for sea level rise. MRA has previously completed an extreme water level analysis for Albany that is representative of the extreme water levels that could be experienced within the Wilson Inlet. Extreme inundation water levels within the Wilson Inlet are influenced by the sandbar present at the south-western extent and this was assumed to be open and connected with the Southern Ocean for this assessment.

The 500 year ARI water level plus the allowance for sea level rise to 2120 was determined to be 2.15 mAHD. Survey provided by Ayton Baesjou Planning showed that the levels of the proposed Lot 9007 are well above 5 mAHD at the southern most boundary. Lot 9007 is therefore not considered to be at risk of inundation over the 100 year planning timeframe to 2120.

Discussion & Conclusion

This first pass coastal vulnerability assessment has been completed to inform Ayton Baesjou Planning of potential risk to the proposed development of Lot 9007 from being impacted by coastal hazards over the 100 year planning timeframe to 2120. It has been completed in line with the recommendations of SPP2.6.

The completion of the coastal vulnerability assessment for the shoreline fronting Lot 9007 has shown that the proposed development site avoids impact from coastal erosion over the 100 year planning timeframe. As Lot 9007 is located above the 500 year ARI inundation levels expected at the Wilson Inlet it is not considered to be at risk of inundation over the 100 year planning timeframe to 2120.

We trust this meets your requirements but please don't hesitate to contact us if you want to discuss any aspect.

Yours sincerely

for and on behalf of
m p rogers & associates pl

Appendix C

Fire Management Plan – FirePlan WA – Oct 2015
BAL Contour Plan & Bushfire Management Statement
BioDiverse Solutions - Nov 2017

FIRE MANAGEMENT PLAN

SPRINGDALE BEACH ESTATE

Lot 9000 South Coast Hwy

Shire of Denmark

FirePlan WA

October 2015

Fire Management Plan.

Prepared For

Ayton Baesjou Planning
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Document Status

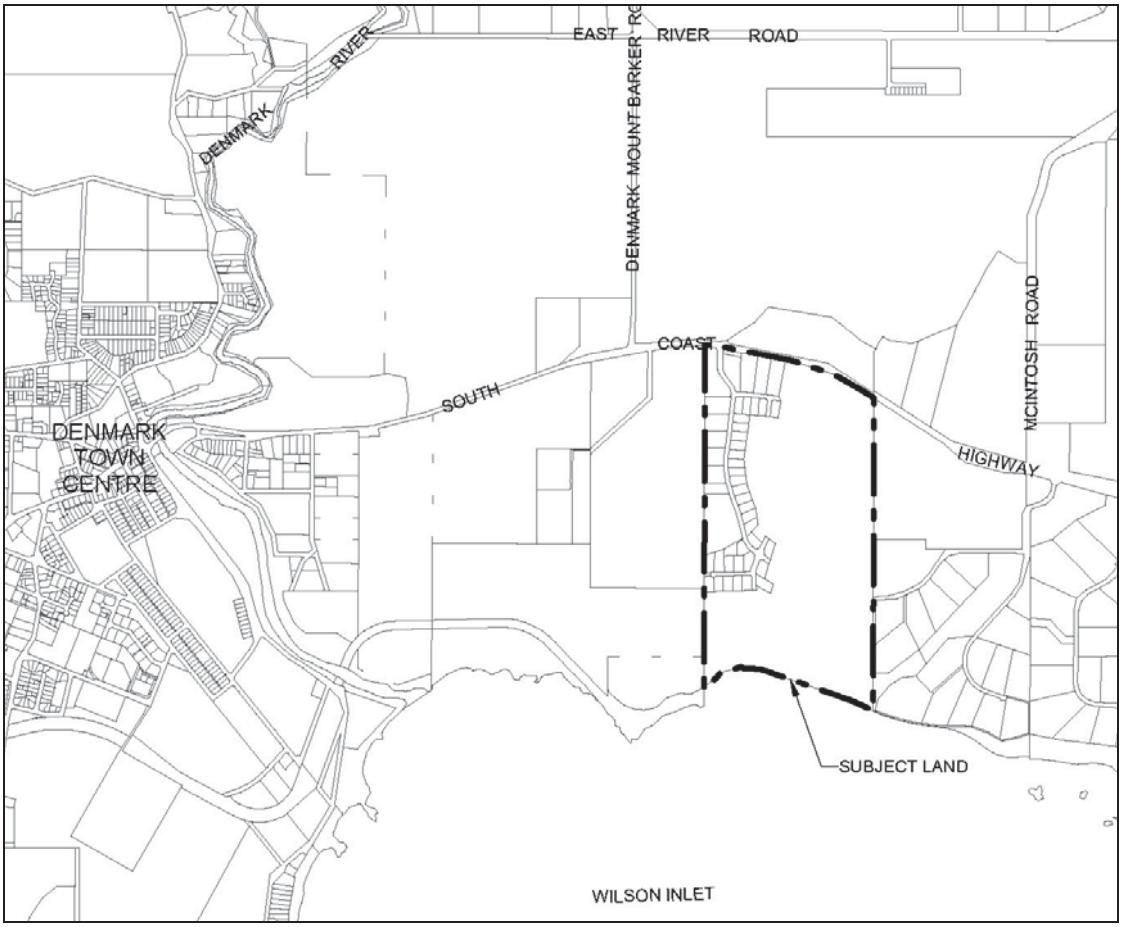
Version	Date	Comment	Review Date
Version 1			
Version 2	**April 2015**		
Version 3	**September 2015**		
Version 4	**October 2015**	Figure 2 Overall Staging Plan updated	**29/10/2015**

TABLE OF CONTENTS

1.0 PURPOSE OF THE MANAGEMENT PLAN

The purpose of this Bushfire Management Plan is to review the strategic fire management methods and requirements that are or will be implemented in a staged subdivision and development of the subject land following endorsement of the Subdivision Guide Plan. The aim of the Bushfire Management Plan is to reduce the occurrence of and minimise the impact of bush fires thereby reducing the threat to residents, adjoining landowners, fire fighters and the environment in the event of a fire within or near the development. The measures required by this plan will satisfy the conditions set down in the Planning for Bush Fire Protection Guidelines (PfBFP) 2010.

Figure 1 Location of site



2.0 PROPOSED DEVELOPMENT

Following approval and development of Stage 1 of Lot 9000 South Coast Highway, Denmark, the owner of the property proceeded to develop Stage 4 which abuts the southern boundary of Stage 1. FirePlan WA was commissioned to prepare a Fire Management Plan for Stage 4 and to update the overall Fire Plan for the whole estate. This plan sets out the requirements for bush fire mitigation for Stage 4 and the remaining Stages 2, 3, 5 and 6 as shown on Figure 2 overleaf.

Stage 1 has largely been completed with only a few lots remaining to be developed. The majority of Stage 1 has a Low Hazard rating and only lots located in proximity to vegetation will require a BAL assessment prior to a building licence being issued. A pine plantation is located opposite the southern end of Stage 1 and will require housing immediately opposite to also be assessed. It is noted that the Pine Plantation is currently being progressively harvested over the next five years.

Stage 4 has been brought forward to follow Stage 1 and will be followed by Stage 2 which has recently been granted conditional approval.

Stage 4 links with the existing internal road system of Stage 1 to the north providing points of access and egress from the site.

As Stage 1 and 4 effectively create a north south access road without an egress, temporary egress will be provided by way of the unconstructed extension of Beaufortia Gardens which will provide an alternative means of access and egress to South Coast Highway. This route will be upgraded as a Fire Service Access Way until such time as it is constructed as part of Stage 2.

A second means of access and egress to the estate will be provided as part of Stage 6 and will involve the extension of Woodward Heights to the east. This will connect through to the rural residential development on the adjoining property and will provide another access /egress onto South Coast Highway. Figure 2 overleaf, shows the current and future access routes.

The remaining pine trees on the estate will be progressively removed as Stages 2, 3, 5 and 6 proceed, ensuring that no pines remain within 100 metres of a proposed lot within any stage.

As each stage is developed, water supplies for domestic and fire service will be provided from the Water Corporation service and fire hydrants will form part of that network.

At such time as Stages 2, 3, 5 and 6 are developed, the Fire Plan can be reviewed and modified as necessary.

Figure 2 Overall Staging Plan.

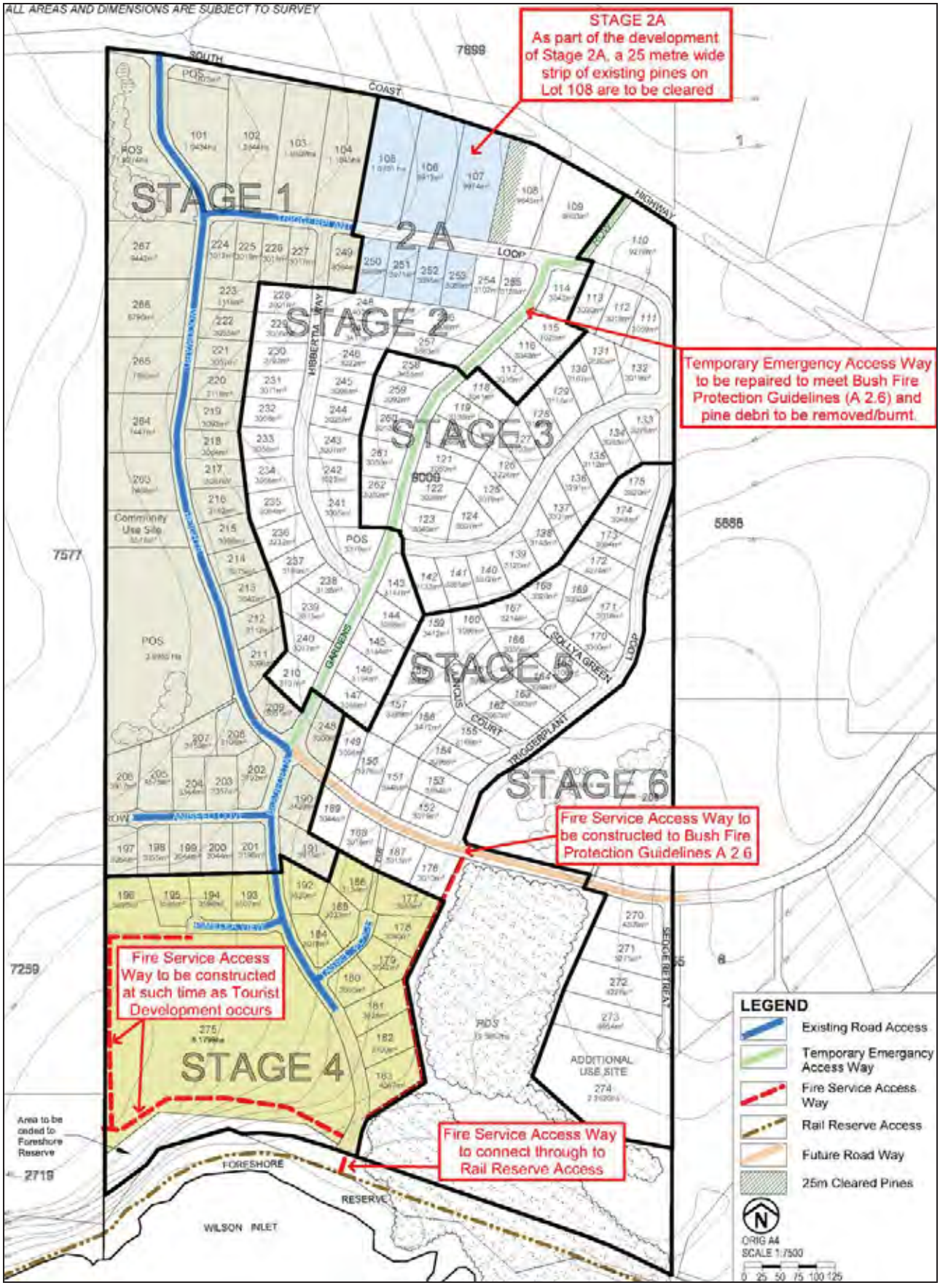
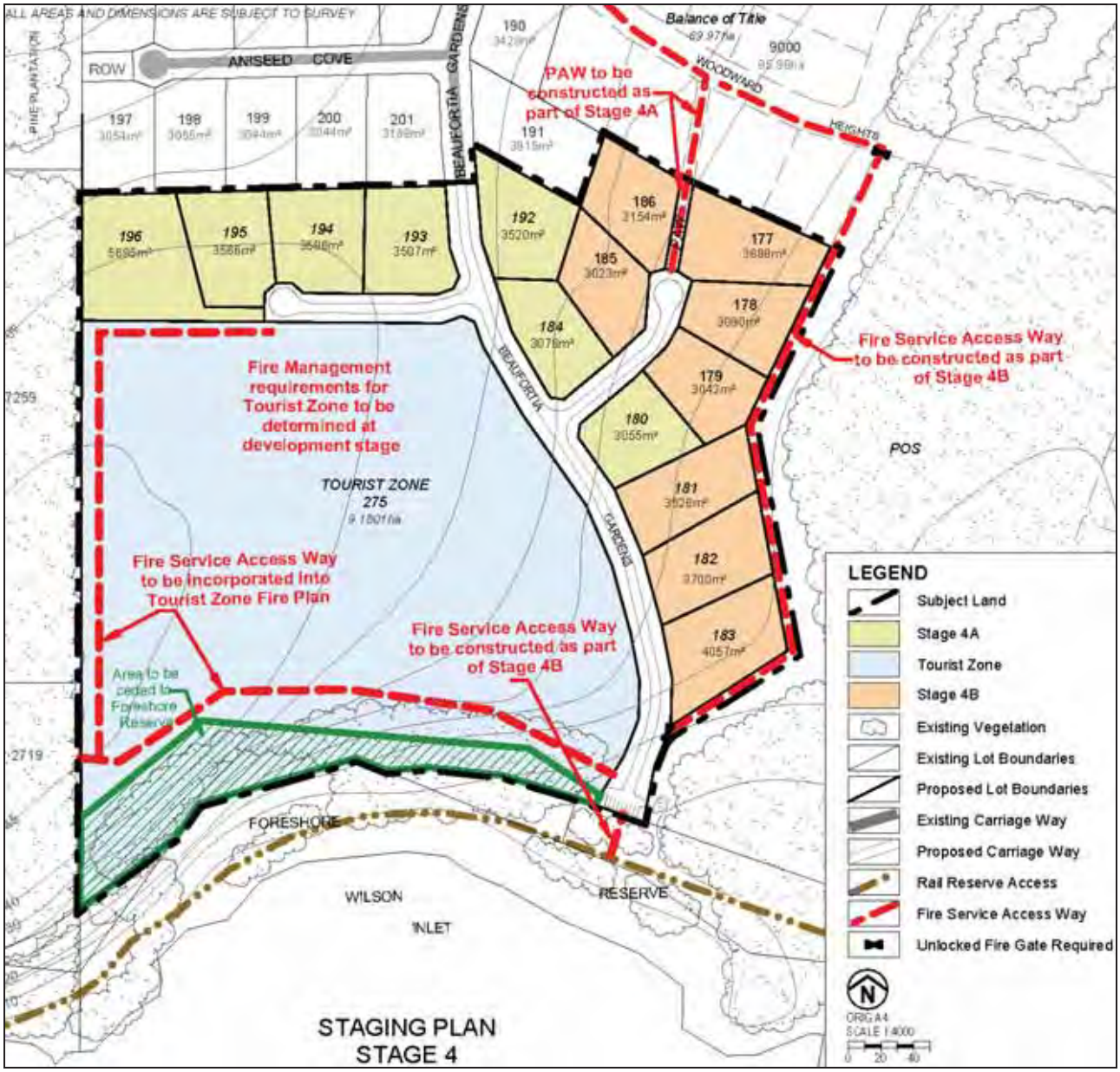


Figure 3 below shows the lots to be created in Stage 4 Release 1 and Stage 4 Release 2. As part of construction of Release 1, the PAW will be constructed through to Woodward Heights and will act as a preliminary FSA. As part of the construction of Release 2, a FSA between the proposed lots and the POS to the east will be constructed running from Beaufortia Gardens to Woodward Heights and also a FSA through to the Rail Reserve Access.

Figure 3 Staging Plan Stage 4 Development



3.0 SITE DETAILS

The subject land is situated within the Shire of Denmark and is located approximately 2 kilometers east of the town site off the South Coast Highway.

All lots with in the proposed development site have slopes of 0^0>5^0 for the purpose of BAL calculations set out in section 6 of this report.

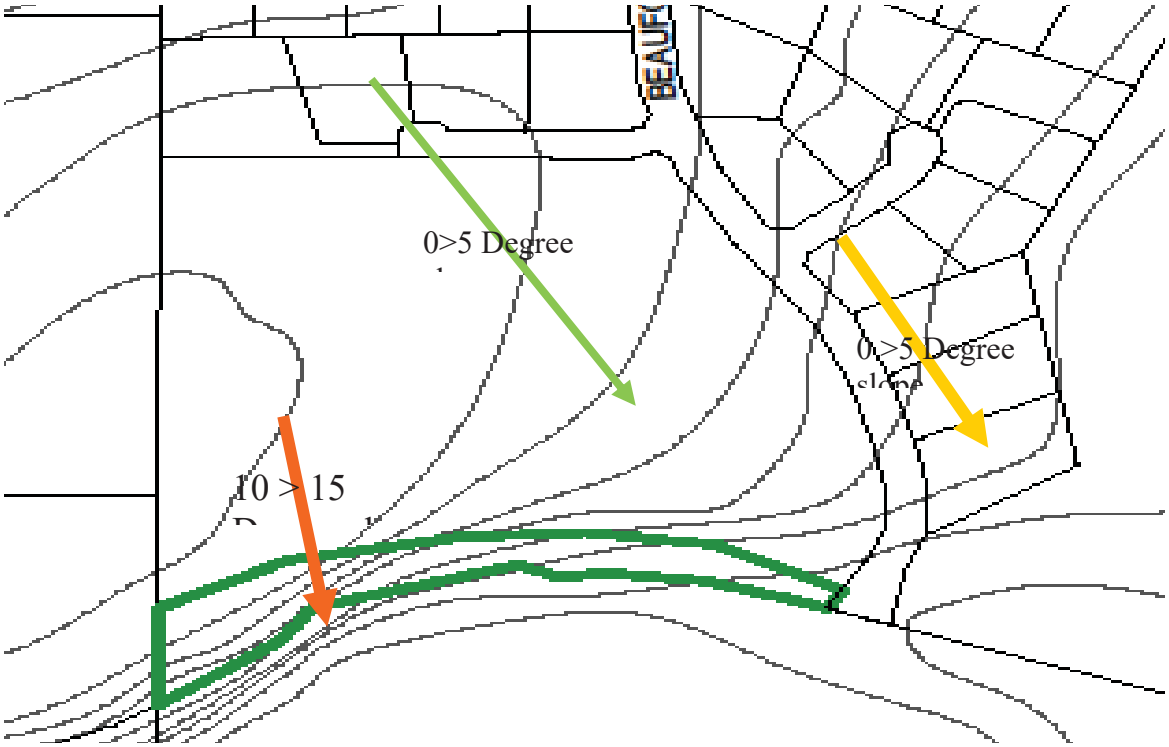
The site is predominantly covered with Group G Sown grassland 2.2.26 (refer to Figure 1 of Planning for Bush Fires Protection Guidelines), with a limited amount of Group B Woodland 2.2.05 below the proposed dwellings along the water's edge and to the east of the lot which will affect construction standards.

The land to the west is covered with Group B Woodland 2.2.05, this land is held as reserve and will affect the BAL rating of lot 196.

The slope for the stage 4 is shown at ***figure 4*** ranges from 0^0 >5^0 the area near the water with in the lot is 0^0 >$10^{0.}$.(slope is calculated for 100 meters in each direction of a dwelling site).

The remaining stages 1, 2, 3, 5 and 6 are to be considered 0^0 >5^0 for the purposes of BAL assessment. All building licenses will require a BAL assessment prior to issue of a building license

Figure 4 Slope Map for Stage 4



4.0 STATUTORY CONDITIONS

The Western Australian Planning Commission and the Shire of Denmark require the preparation of a 'Bushfire Management Plan' as part of the conditions of subdivision approval. This document has been prepared to satisfy that requirement in accordance with the relevant acceptable solutions detailed in *Planning for Bush Fire Protection Edition 2 2010.*

As fire management strategies may require altering to meet changing climate, weather patterns, environmental and land use needs, landowners/occupiers are advised that provisions of the Bush Fires Act 1954 may still be enforced in addition to this Fire Management Plan.

The Shire of Denmark in conjunction with Landowners will be responsible for initiating a review of this fire management plan as it may see necessary to do so.

5.0 BUSH FIRE HAZARD ASSESSMENT

Bush Fire Hazard Assessment is determined by rating the vegetation type in accordance with Table 1 and Figure 2 of Planning for Bush Fire Protection 2010. It is also based on the underlying assumption that land in Western Australia is predominantly undulating with relatively short, steep inclines. In Planning for Bush Fire Protection (Edition 2 2010) the bush fire hazard assessment methodology identifies 3 three levels low; moderate and extreme.

The Bush Fire Hazard Assessment for the proposed development area is rated "Moderate" (B Woodland Figure 2.2.05) in the areas containing vegetation (with the exception of the Pine Plantation located to the north west of the development area which is rated 'Extreme'), and "Low" (Group G Sown grassland 2.2.26) in the cleared areas.

A map of the hazard rating and vegetation type is shown below at *Figure 5, 6 & 7.*
Stage 4 vegetation is down slope of the proposed dwellings and this will be taken into account when setting the BAL levels.

The bush fire hazard assessment is based on the vegetation types and class e.g. (B Woodland Figure 2.2.05) as described in Figure 1 of Planning for Bush Fire Protection. This bush fire assessment does not relate directly to the fuel loading within that vegetation. Fuel loading is described as grass, leaf litter and live vegetation.

The vegetation within and adjoining is similar being Woodland Figure 2.2.05 and Group G Sown grassland 2.2.26 for the development site as shown on the map below.

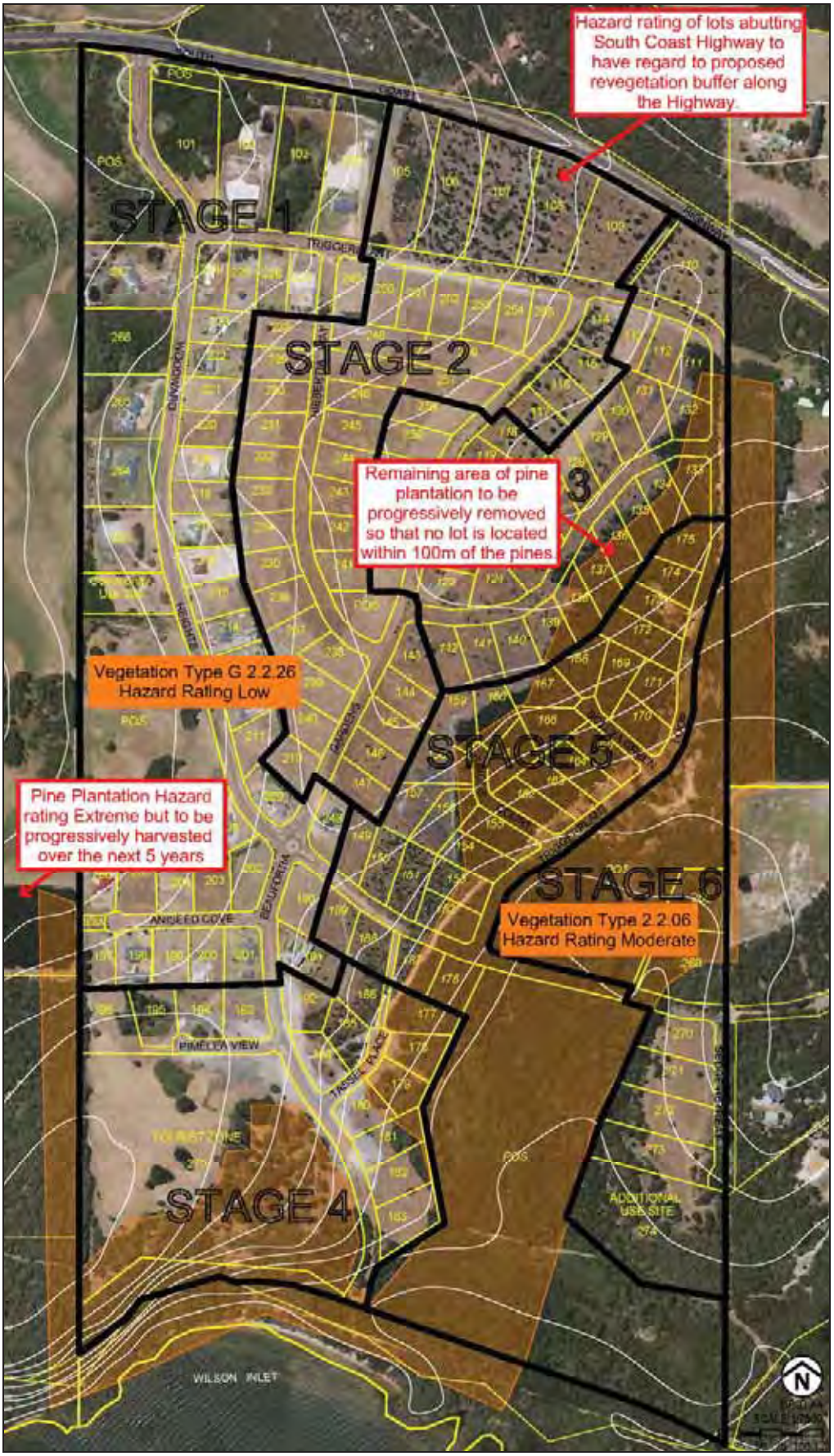
The Mediterranean climate experienced by this area is such that the majority of rain falls in late autumn through to early spring. This rainfall supports substantial vegetation growth which dries off in Summer/Autumn.

The maps below indicates the hazard rating and vegetation type as per AS 3959.

Figure 5 sample of site vegetation for stage 4

Figure 6 Vegetation Type Stage 4

Figure 7 Fuel hazard assessments for total site



6.0 BUSH FIRE MITIGATION

In this Section of the Fire Management Plan when complying with the Acceptable Solution detailed in *Planning for Bush Fire Protection Edition 2* 2010 it will be shown as (A2.1) meaning Acceptable Solution 2.1 of the guidelines.

The subdivision has been designed so as to take into account the following fire mitigation measures:-

- Element 1 Location of Development
- Element 2 Vehicle Access
  Public Roads, Private Driveways and Emergency Access
- Element 3 Water Supplies
- Element 4 Siting of Development
  Building Protection Zones, Hazard Separation Zones, Hazard Reduction, Planting of trees & Dwelling Construction Standards
- Element 5 Design of Development

6.1 ELEMENT 1 LOCATION OF DEVELOPMENT

The Bush Fire Hazard Assessment has identified the subject land and adjoining land as having “Low”, and “Moderate” bush fire hazard levels. Proposed new buildings are going to be located in areas that are rated as having a “Low” and Moderate bush fire hazard. Building Protection Zones and Hazard Separation zones will be introduced to increase protection around new dwellings which will be constructed to AS 3959. The remaining area of pine plantation within the property will be progressively removed so that no lot is located within 100 metres of the pine trees.

6.2 ELEMENT 2 VEHICLE ACCESS

6.2.1 Internal Road System

The proposed development links the South Coast Highway via Woodward Heights and Beaufortia Gardens with the existing internal road system of the adjoining development to the north out to South Coast Highway to provide two points of access and egress for site. Future development of stage 6 will complete the access to the east via the extension of Woodward Rd to Randall Rd.

All roads within the development will comply with A2.2. *see Appendix A*

The Culs de Sac comply with the standards set out in PfBFP
see Appendix A, A2.3 A2.4
The layout of roads within the stage 4 development are shown at Figure 3

6.2.2 Culs de sac

Two culs de sac off the Beaufortia Gardens internal road will provide access to some lots. Complies with A2.3. Refer to specification in A*ppendix A*.

6.2.3 Firebreaks

The developer/owner/occupier of the land will, at all times, comply with the requirements of the Shire of Denmark Firebreak Notice as published annually, in addition to this fire management plan (A2.9).

6.2.4 Fire Service Access Way (FSA) in Public Open Space (POS)

The developer is to install a FSA as shown on Figure 2 to connect the new road to the foreshore to the extension of Woodward Heights, this FSA will be gated at the northern end as per E2.8 and E2.10. A FSA will continue on from the southern end of Beaufortia Gardens to connect to the Rail Reserve Access. This FSA should be gated to the satisfaction of the Shire to restrict public access with a lock to the Shire's fire service standard if required. A car parking area will also be provided at the termination of Beaufortia Gardens.

The Shire of Denmark will be responsible for the ongoing maintenance of the FSA within the POS area on the eastern boundary of Stage 4.

6.3 ELEMENT 3 WATER SUPPLIES

6.3.1 Domestic Water Supply

Reticulated water will be provided to each lot by the developer in accordance with the Water Corp

6.3.2 Water for Fire Fighting

Fire hydrants will be installed along the public road ways to the Water Corporations No 63 Water Reticulation standard by the developer. Reflective road markings identifying the location of fire hydrants will also be installed by the Developer. Complies with acceptable solution A 3.1.

6.3.3 Fire Service

The closest Fire Services to Location 1935 South Coast Highway is the East Denmark Volunteer Bushfire Brigade which is located along East River Road. The brigade shed is 4 kilometres from Location 1935 via bitumen road. This service is backed up by Fire and Rescue volunteer Service from Denmark.

6.4 SITING OF DEVELOPMENT

Parts of proposed site contain vegetation that has a Bush fire hazard of "Moderate" while the remainder of the site is rated "Low". With the installation of Building Protection Zones, Hazard Separation Zones and an increase in Building construction in new buildings in accordance with AS 3959-2009 this complies with the acceptable solution detailed in A4.1 and A4.2.

The minimum distance of 100 metres from vegetation (rated 'Moderate' or 'Extreme') to proposed dwellings may be reduced in compliance with AS 3959.

Under AS 3959 as the distance from the vegetation is reduced, the construction standard must be increased. Table 2.4.3 AS 3959 sets out this relationship and Section 2 of AS 3959 details the methodology of determining the Bushfire Attack Level (BAL).

See Section 6.4.6 for details of BAL Ratings.

6.4.1 Building Protection Zone (BPZ)

The aim of the Building Protection Zones is to reduce the amount of accumulated bush fire fuel and to lower the intensity of the impact of a bush fire by flame contact or radiated heat. The Building Protection Zone is to be installed by the landowner prior to the commencement of new dwelling construction and maintained by the landowner.

Non flammable features such as driveways, paths, vegetable patches, reticulated lawn, or landscaped gardens should form part of Building Protection Zones. Isolated trees and shrubs may be retained within Building Protection Zones. A Building Protection Zone is to be constructed within the Lot around all buildings.
Size of BPZ/HSZ is set out in section 6.4.6 Refer to specifications in Appendix B. Building Protection Zones are to be installed and maintained in perpetuity by the landowner. Complies with (A4.3).

All fire breaks and fuel reduction work is to be completed prior to the release of the lots.

6.4.2 Hazard Separation Zone (HSZ)

To provide additional fire protection there must be a physical separation between the buildings and the surrounding vegetation to reduce the impact of bush fires upon the structures within the Building Protection Zone including ember attack. As the occurrence of bush fires in this district may occur and will burn in accordance with the prevailing weather and fuel conditions at the time, it is essential that property owners maintain HSZ on their land to have any degree of safety.

Hazard Separation Zone in addition to the 20m Building Protection Zone is required (refer to Section 6.5). (A4.4).

The developer is to modify fuel loadings on all Lots at the time of subdivision and/or development so as to achieve the requirements of the Building Protection Zone and Hazard Separation Zone prior to the sale of Lots. Landowners are also required to maintain building protection zones and hazard separation zones in perpetuity (i.e. from date of purchase irrespective of whether a dwelling is to be constructed or not) in accordance with this fire management plan.

Removal of bush fire fuels may be carried out by burning or mechanical means preference is for mechanical removal of selected trees and understorey. If burning is used is must be carried out in accordance with the provisions of the Bush Fires Act 1954 and the Shire of Firebreak Notice.

All fuel reduction work is to be completed prior to the release of the lots.

6.4.3 Hazard Reduction Program within the Site

Hazard reduction within the BPZ/HSZ can be achieved by slashing or planned prescribed burning. Bush Fire Fuels outside the BPZ & HSZ within lots are to be maintained to 6-8 tonnes/ha. Property owners have a responsibility to reduce bush fire hazards and maintaining properties annually in preparation for the summer season. The Shire of Denmark can provide advice on appropriate techniques to achieve bush fire hazard reduction for individual properties.

All fire fuel reduction work within the BPZ down to 2 tonnes per hectare is to be completed prior to the release of the lots.

As a guide, property owners should carry-out the following Fire Prevention activities:

Autumn to Winter (May – August)

- Tree pruning – remove lower branches; check that power lines are clear.
- Reduce fuel levels around the house – clear long grass, leaves, twigs and flammable shrubs.
- Ensure petrol and other flammables are safely stored away from the main dwelling.
- Make sure your fire fighting equipment is in good working condition and serviced where required.
- Make sure all residents are aware of your emergency plan including evacuation routes.

Spring (September – November)

- Move woodpiles and stacked timber away from the main dwelling.
- Keep grass short – not to exceed 50mm in height.
- Clean gutters and roof debris.
- Install and maintain firebreaks in accordance with this plan and the firebreak notice.
- Maintain Hazard Separation Zone complies with standard detailed in Section 6.4.2 of this Fire Management Plan

Summer (November – May)

- Water lawns, trees and shrubs near the buildings to keep them green.
- Re-check fire fighting equipment, screens, water supplies and that gutters remain clear.
- Maintain Firebreaks in accordance with the Shire of Denmark Firebreak Notice.
- Maintain Building Protection Zone (annually) to the standard detailed in Section 6.4.1 of this Fire Management Plan

Long Term Precautions

- Ensure firebreaks are prepared in accordance with this fire management plan, the latest Firebreak Notice and any variation to the fire order issued by council.
- Ensure that any planting of wind breaks or trees is in accordance with this fire management plan and will not be detrimental to fire suppression requirements in future years.
- Make sure that the buildings are safe – fit ‘wire’ fly screens and shutters, fill gaps in roof/wall spaces, fit fire screens to evaporative air conditioners and have them operable to provide a water only supply.
- Give consideration to installing external building sprinkler systems with static water supply and ‘back-up’ power for emergencies.
- Get basic training in fire fighting from your local bush fire brigade or even join your local brigade.
- Join or start a local Bushfire Ready Awareness Group.

6.4.4 Hazard Reduction within the Public Open Space.

The POS is contained within Stages 5 and 6 and hazard reduction will take place at such time as these stages are developed. All fire fuel reduction work is to be completed prior to the release of the lots, down to 8 tonnes per hectare unless stipulated by specific reserve management plans.

Hazard reduction within the POS is the responsibility of the Shire and they will maintain POS in accordance with their own policies.

6.4.5 Planting of Trees and Vegetation

Planting of new trees and shrubs are not permitted within 6 metres of the centre of any firebreak. Trees planted within the BPZ and HSZ must comply with the standard outlined in Section 6.4.1 and 6.4.2 respectively.

Any planting of trees and re-vegetation within the site is to be carried out so as not to increase the fire risk to existing and proposed dwellings/ buildings and also to ensure a safe refuge for residents in the event of bush fires. The BAL ratings of Lots adjoining this re-vegetation will have dwelling construction standards increased as a result of the re-vegetation.

6.4.6 Dwelling Standards

Individual dwellings on all lots shall be designed and built to conform with:

- The Building Code of Australia; and
- AS 3959 *Construction of Buildings in a Bushfire Prone Area*;

The minimum distance of 100 metres (from vegetation rated 'Moderate' or 'Extreme') may be reduced in compliance with AS 3959. Under AS 3959 as the distance from the vegetation is reduced, the construction standard must be increased. Table 2.4.3 AS 3959 sets out this relationship and Section 2 of AS 3959 details the methodology of determining the Bushfire Attack Level (BAL).

BAL (Bushfire Attack Level) Determination Using Methodology from Section 2.2.1 of current adopted AS 3959- 2009 and Table 2.4.3 will apply to all Lots.

Dwelling BAL's for all lots outside stage 4 are to have a BAL assessment completed having regards to the requirements of AS3959 Building in Bushfire Prone areas prior to the issue of a building license.

Lot 196 is located closest to the Pine plantation to the north west but will not require a BAL greater than BAL19 given the setback distance.

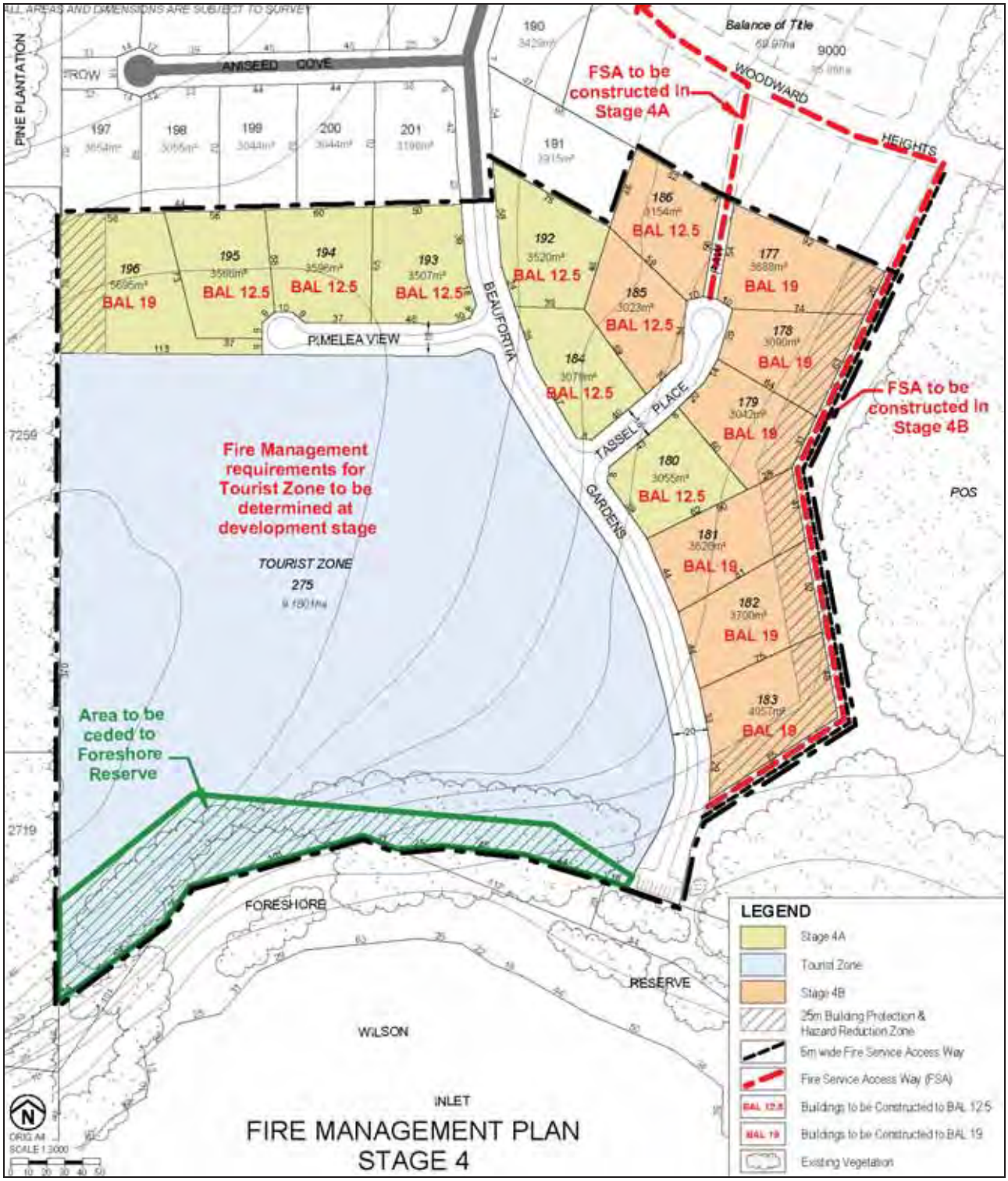
A Lot owner or the Shire of Denmark (at the landowners cost) may request that a Building Site Assessment is carried out by a competent Fire Consultant as part of the Building License Application to confirm the width of the BPZ, HSZ and dwelling construction standard in accordance with the current version of AS 3959 to determine the BAL (Bushfire Attack Level).

Other Public Safety and Community information on Bush Fires is available on the Department of Fire and Emergency Services web site www.dfes.wa.gov.au and the Shire of Denmark website www.denmark.wa.gov.au.

BAL for Stage 4 construction standards

All dwellings constructed within stage 4 shown below (Figure 9) will have BPZ/HSZ cleared to the size set out below and constructed to the BAL shown.
There are 2 BAL levels recommended BAL19 setback from dwelling wall 25meters and BAL 12.5 setback 35meters BPZ/HSZ may overlap neighboring sites.

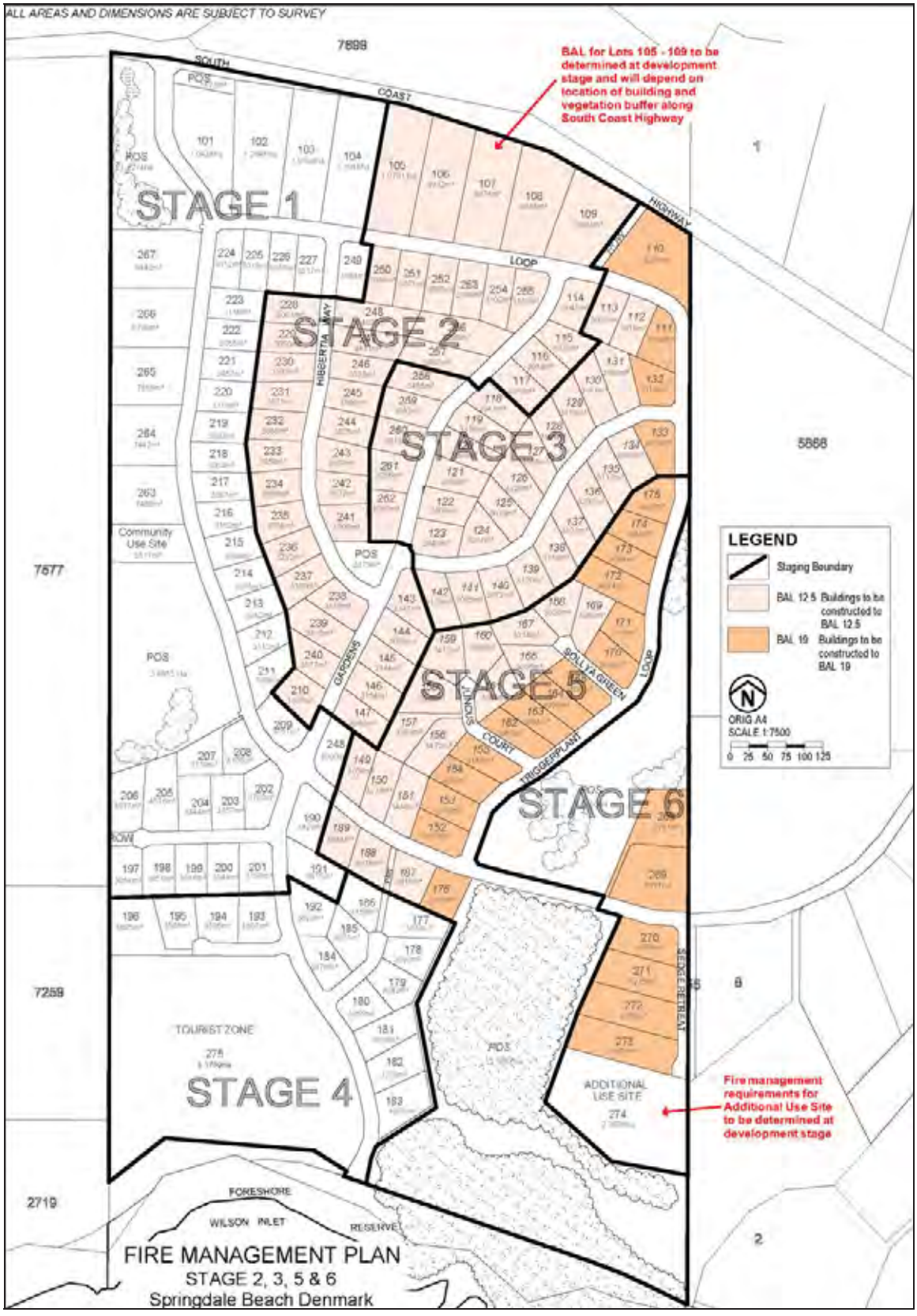
Figure 9 BAL for stage 4 lots.



BAL for Stages 2, 3 & 4B construction standards

All dwellings constructed within the remaining stages shown in Figure 10, will be constructed to the BAL shown.

Figure 10 BAL for Stages 2, 3, 5 & 6 lots.



6.5 DESIGN OF DEVELOPMENT

The development complies with acceptable solutions A4.1, A4.2, A4.3 & A4.4.

All dwellings/buildings will have a BPZ and HSZ installed around each dwelling appropriate to the slope of the Lot as indicated on Figure 9

7.0 SUMMARY

7.1 OVERALL FIRE THREAT

The design of this proposed development and the facilities constructed at the time of development are such that with implementation of this Fire Management Plan, fire threat to persons and property within the subdivision is reduced.

7.2 PROPERTY OWNER'S RESPONSIBILITIES

To maintain the reduced level of risk and threat of fire, the owners/occupiers of lots created by this proposal will be responsible for undertaking, complying and implementing measures protecting their own assets from the threat and risk of bush fire.

- Maintain internal firebreaks clear of flammable material on their property by the dates shown on the Shire of Denmark Firebreak Notice as detailed in Section 6.2 and relevant Appendices.

- Maintain in good order and condition all property fencing and gates ensuring that vegetation does not encroach over the firebreak;

- Ensure all dwellings have Building Protection Zones, Hazard Separation Zones, Hazard Reduction, Dwellings are constructed to AS 3959-2009, planting of trees/shrubs and re-vegetation are implemented and maintained as detailed in Section 6.4.1 & 6.4.2

7.3 DEVELOPER'S RESPONSIBILITIES

To facilitate the creation of the proposed lots, the developer/landowner shall be required to carry out the following works as described below.

- Lodging a 70A ‘Notification’ on each Certificate of title proposed by this subdivision. The Notification shall alert purchasers of land and successors in Title of the responsibilities of this Fire Management Plan;
- Construction of roads in accordance with A2.2 and Shire of Denmark standards.
- Construction of, FSA as per section 6.2.4

- Planting of trees and vegetation is to be carried out as detailed in Section 6.4.4;
- Install fire Hydrants as detailed in Section 6.3.2.
- Fuel reduction of the under storey of all lots, road reserves and public open spaces to be at least 8 tonnes per hectare generally and 2 tonnes per hectare for lots at hand over unless stipulated by specific reserve management plans.

7.4 SHIRE OF DENMARK RESPONSIBILITIES

The responsibility for compliance with the law rests with individual property owners and occupiers and the following conditions are not intended to unnecessarily transfer some of the responsibilities to the Shire of Denmark
The Shire of Denmark shall be responsible for:

- Developing and maintaining District Fire Fighting Facilities;
- Provide advice on appropriate techniques to achieve bush fire hazard reduction for individual properties;
- Maintaining in good order the condition of the district water tanks and the apparatus for firefighting purposes;
- Ensure that dwellings are designed to the appropriate AS 3959 BAL rating at the Building License Application stage.
- Maintain FSA in POS annually.
- Maintain POS in accordance with their own policy for POS

Appendix A - Access Standards

Public Road Standard A2.2

Two different vehicular access routes, both of which connect to the public road network, are available to all residents/the public at all times.

Public roads meet the following requirements:

- minimum trafficable surface: 6 metres
- horizontal clearance: 6 metres
- vertical clearance: 4 metres
- maximum grades: 1 in 8
- maximum grade over <50 metres: 1 in 5
- maximum average grade: 1 in 7
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres

6 metre trafficable surface width does not necessarily mean paving width. It could, for example, Include 4 metre wide paving and 1 metre wide constructed road shoulders.

In special circumstances, where 8 or less lots are being serviced, a public road with a minimum trafficable surface of 4 metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and DFES.

A2.3 Culs-de-sac

(including dead end roads) are generally not encouraged in bush fire prone areas. Where used, however, cul-de-sac standards are to be as follows:

- maximum length: 200 metres (if emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than 8 lots are serviced)
- minimum trafficable surface: 6 metres
- horizontal clearance: 6 metres
- maximum grades: 1 in 8
- maximum grade over <50 metres: 1 in 5
- maximum average grade: 1 in 7
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres• as per turn around area requirements – including 21 metre diameter head.

A2.4 Battle axes

- Battle axe access legs meet the following requirements:
- maximum length: 600 metres
- minimum width: 6 metres
- minimum trafficable surface: 4 metres
- horizontal clearance: 6 metres
- vertical clearance: 4 metres
- maximum grades: 1 in 8
- maximum grade over <50 metres: 1 in 5
- maximum average grade: 1 in 7
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres.

A2.5 Private Driveways

Constructed private driveways meet the following requirements:

- required where house site is more than 50 metres from a public road
- minimum trafficable surface: 4 metres
- horizontal clearance: 6 metres
- vertical clearance: 4 metres
- maximum grades: 1 in 8
- maximum grade over <50 metres: 1 in 5
- maximum average grade: 1 in 7
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres
- passing bays: every 200 metres with a minimum length of 20 metres and a minimum width of 2 metres (ie the combined width of the passing bay and constructed private driveway to be minimum 6 metres) turn around areas designed to accommodate 3.4 fire appliances and to enable them to turn around safely: every 500 metres and within 50 metres of a house

A2.7 Fire Service Access routes

Fire services access routes, providing links between public road networks for fire fighting purposes, meet the following requirements:

- surface: all weather
- dead end: not permitted
- minimum trafficable surface: 6 metres
- horizontal clearance: 6 metres
- vertical clearance: 4 metres
- maximum grades: 1 in 7
- maximum grade over <50 metres: 1 in 4
- maximum average grade: 1 in 5
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres
- turn around areas designed to accommodate 3.4 appliances and to enable them to turn around safely: every 500 metres
- erosion control measures and long term maintenance arrangements in place
- access to public road network: every 1000 metres
- allow for two way traffic.

A2.8 Gates

All gates used to restrict traffic on emergency access ways and fire service access routes meet the following requirements:

- minimum width 3.6 metres
- design and construction: to be approved by relevant local government
- emergency access way gates: must not be locked
- fire service access route gates: may be locked but only with a common key that is available to local fire service personnel

A2.10 Signs

Signs are erected where emergency access ways and fire services access routes adjoin public roads, and meet the following requirements:

- minimum height above ground: 0.9 metres
- design and construction: to be approved by relevant local government
- lettering height: 100 millimetres
- to display the following wording (as appropriate): ‘Fire Service Access – No Public Access’.

Appendix B - Building Protection Zone

Building Protection Zone standards are:-

- Bush Fire fuels to be maintained at or below 2 tonnes per hectare and dry grass must be maintained below a height of 50mm;
- The first 5m around all building is to be cleared of all flammable material. Reticulated gardens may be located in this zone;
- The spacing of trees should be 15-20 metres apart to provide for a separation of 10 metres between crowns;
- Trees are to be under/low pruned, to a height of 2 metres;
- No tall shrub or tree is to be planted within 2 metres of a building including windows;
- There are no tree crowns over hanging the building;
- Shrubs within the building protection zone have no dead material within the plant;
- Trees in the Building protection zone have no dead material within the plant's crown or on the bole (tree trunk)
- Sheds within the Building Protection Zone are to be constructed using non combustible materials (e.g. colourbond iron, brick, limestone);
- Branches, must be removed at least 2 metres back from the eaves of all buildings;
- All leaves, twigs, logs, branches must be periodically removed from within the building protection zone. Annual falls of leaf litter must be raked up and removed or burnt.

Appendix C - Hazard Separation Zone

Hazard Separation Zone Standards are:-

- Bush fire fuel loadings must be maintained within the Hazard Separation Zone to a maximum maximum of 4-6 tonnes/ha.
- Dry grass is to be slashed to 50 mm in height
- All accumulated litter, twigs, bark of trees, fallen tree branches and logs should be removed from the area on a regular basis prior to and during the Bush Fire Season.

The developer is to modify fuel loadings on all Lots at the time of subdivision and/or development so as to achieve the requirements of the Building Protection Zone and Hazard Separation Zone prior to the sale of Lots. Landowners are also required to maintain building protection zones and hazard separation zones in perpetuity (i.e. from date of purchase irrespective of whether a dwelling is to be constructed or not) in accordance with this fire management plan.

Removal of bush fire fuels may be carried out by burning or mechanical means preference is for mechanical removal of selected trees and understorey. If burning is used is must be carried out in accordance with the provisions of the Bush Fires Act 1954 and the Shire of Denmark Firebreak Notice.

Appendix D - A3.1Water Supplies for Fire Fighting

The development is provided with a reticulated water supply, together with fire hydrants, in accordance with the specifications of the relevant water supply authority and FESA.

Notes to A3.1
Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board.

The ‘Water Corporation’s No.63 Water Reticulation Standard’ is deemed to be the baseline criteria for developments and should be applied unless local water supply authorities conditions apply.

FIRE MANAGEMENT PLAN
Compliance checklist for performance criteria and acceptable solutions

PROPERTY DETAILS: Lot 9001 South Coast Highway
Local Government: Shire of Denmark

Element 1: Location

Does the proposal comply with the performance criteria by applying acceptable solution A1.1? **Yes** ✓ **No** ☐

Element 2: Vehicular Access

Does the proposal comply with the performance criteria by applying acceptable solution A2.1? **Yes** ✓ **No** ☐

Does the proposal comply with performance criteria by applying acceptable solution A2.2? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.3? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.4? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.5? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.6? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.7? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.8? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A2.9? **Yes** ✓ **No** ☐

Shire of Denmark annual Firebreak Notice.
Firebreaks in POS.
Does the proposal comply with the performance criteria by applying acceptable solution A2.10? **Yes** ✓ **No** ☐

Element 3: Water

Does the proposal comply with the performance criteria by applying acceptable solution A3.1? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A3.2? N/A

Does the proposal comply with the performance criteria by applying acceptable solution A3.3? N/A

Element 4: Siting of Development

Does the proposal comply with the performance criteria by applying acceptable solution A4.1? **Yes** ✓ **No** ☐
BPZ, HSZ installed increase in construction standard

Does the proposal comply with the performance criteria by applying acceptable solution A4.2? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A4.3? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A4.4? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A4.5? N/A

Element 5: Design of Development

Does the proposal comply with the performance criteria by applying acceptable solution A5.1? **Yes** ✓ **No** ☐

Does the proposal comply with the performance criteria by applying acceptable solution A5.2? N/A

Applicant Declaration:

I declare that the information provided is true and correct to the best of my knowledge.

Name of Person Preparing the Fire Management Plan:

Full Name: **Tony Moran** *for* FirePlan WA **Date: 12/05/14**

Developer:

Full Name: _____ **Signature:** _____

Date:

AS 3959 Bushfire Attack Level (BAL) Contour Plan & Bushfire Management Statement

Site Details			
Address:	Stage 3, 5 and Tourist Zone Springdale Beach Development		
Suburb:	Denmark	**State:**	W.A.
Local Government Area:	Shire of Denmark		
Description of Building Works:	N/A		
Stage of WAPC Planning	WAPC Clearance (Stage 3), Future Construction of Stage 5, and WAPC re-application (Tourist Zone)		

BAL Contour Plan Details			
Report / Job Number:	MSC0166	**Report Version:**	FINAL
Assessment Date:	8/11/2017	**Report Date:**	30/11/2017
BPAD Practitioner	Kathryn Kinnear	**Accreditation No.**	BPAD30794

SECTION 1: Proposal details

LWP Property Denmark Pty Ltd commissioned Bio Diverse Solutions to prepare a BAL Contour Plan and Bushfire Management Statement to support the previously approved Fire Management Plan for Springdale Beach Estate Denmark.

This BAL Contour Plan and Bushfire Management Statement has been prepared to address/support the following aspects of the estate:

- WAPC title clearances for Stage 3 of WAPC approval No.152491.
- Guide construction periods and address future WAPC title clearances for Stage 5 (WAPC 152491; and
- Assist in re-application of the proposed "Tourist Zone" in the south of the Estate.

The development of Springdale Beach Estate is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal will be briefly assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4 and documented in the Bushfire Management Statement (BMS). This will assist in the WAPC subdivision approvals and clearances. The BMS will review and update further information since the approved Fire Management Plan prepared by Fire Plan WA in October 2015.

The subdivision proposals include the following:

- Stage 3 (A, B & C) consists of 34 lots;
- Stage 5 (A, B & C) consists of 31 lots; and
- Tourist Zone (future development area).

Refer to Figure 1 over the page for the Staged Plan of Subdivision and Figure 2 for location plan.

Documents and reports relating to this report include:

- Springdale Beach Estate, Lot 9000 South Coast Highway, Shire of Denmark: Approved Fire Management Plan dated October 2015;
- Vegetation Clearing Plan – Mapping supplied to the Shire of Denmark for Springdale Beach Estate (See Appendix A);
- Approved Weed Management Program (Opus, 2014); and
- Scheme Provisions as outlined in the Springdale Beach Special Residential Zone Pt Plantagenet Location 1935 South Coast Highway, Shire of Denmark TPS 3.

This report does not supersede the approved Fire Management Plan (FirePlan WA, 2015), rather acts as an addendum document to update and review the subdivisions under the Guidelines for Planning in Bushfire prone Areas Version 1.2 (2017) and State Planning Policy 3.7.

The subject site is partially located in the WA state wide bushfire prone area mapping, refer to Figure 3.

Figure 1: Staged plan of subdivision

Figure 2: Location Plan

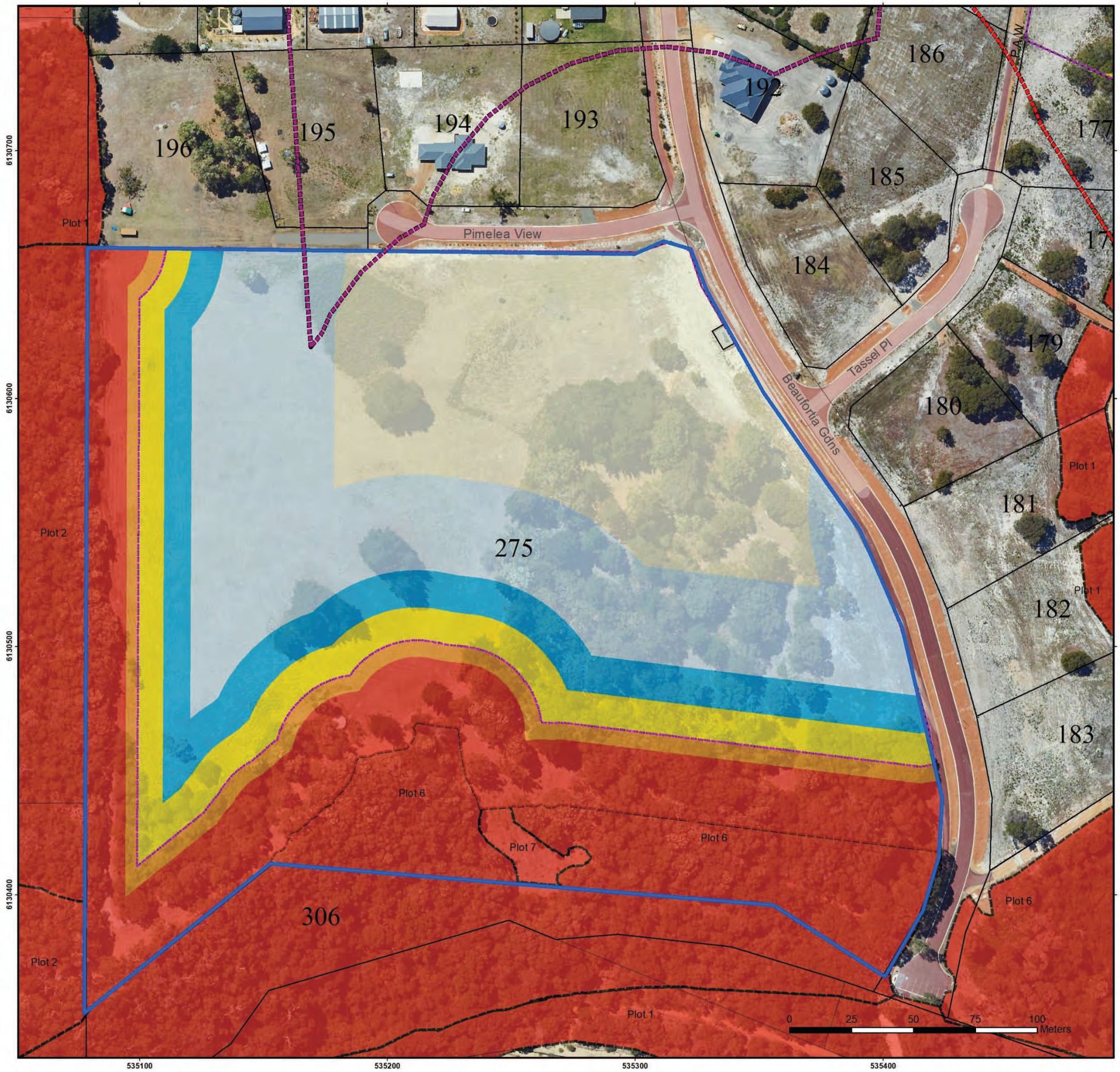
Figure 3: State Bushfire Prone Area Mapping

SECTION 2 - Vegetation Classification

All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the following pages.

COMMENTS ON VEGETATION CLASSIFCATIONS:

- Distances from vegetation were made based on surface fuels to edge of lot (subject site) boundary;
- Effective slopes were measured in the field using a Nikon Forestry Pro and represented on the respective plots;
- Method 1 (AS3959-2009) Simplified procedure was used for vegetation classification and assessment process;
- All vegetation was classified within the subject site and within 150m of the lot boundaries to AS3959 Table 2.3; and
- The perimeter of the vegetation was measured using field GPS and notations on field GIS maps.



This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

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Albany, WA 6330
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Overview Map Scale 1:100,000

Legend

- Subject Site
- 150m Assessment Boundary
- Developable Area
- Bush Fire Prone Areas 2017
- Cadastre

BAL Contours

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Client Name
Assessment Street Address
Suburb, WA Postcode

BAL Contour - Tourist Zone

BAL Assessor	*QA Check*	*Drawn by*
KK	**KK**	**BT**
STATUS	*FILE*	*DATE*
FINAL	**MSC0166**	**28/11/2017**

Appendix D

Existing Shire of Denmark TPS 3
Appendix XIV-Special Residential Zones
SRes 6 Special Provisions

APPENDIX XIV - SPECIAL RESIDENTIAL ZONES (CONT'D)

PARTICULARS OF THE LAND	PROPOSED USES	SPECIAL PROVISIONS
***SRes* 5. PT LOT 942 WARNHAM ROAD SPECIAL RESIDENTIAL ZONE** (Continued)		(xii) Roads within the zone shall: i) Be located in a manner which is sympathetic to the topography and minimise visual impact. ii) Be drained underground and kerbed to meet the requirements and specification of Council. (xiii) Council may request the Commission to impose a condition at the subdivision stage for the connection of the lots to Water Corporation reticulated water supply scheme. (xiv) Council may request the Commission to impose a condition at the subdivision stage for tree planting to be carried out generally in the locations shown on the Subdivision Guideline.
***SRes* 6. SPRINGDALE BEACH SPECIAL RESIDENTIAL ZONE** Portion of Plantagenet Location 1935 South Coast Highway, Denmark	Rural Residential Permitted Use (P): Permitted at Council's Discretion (AA): Single House Home Occupation Livestock Grazing *see clause (viii)a)*	i) a) the minimum lot size should be no less than 3000m^2. a) Subdivision shall generally be in accordance with the Subdivision Guide Plan. The Western Australian Planning Commission may consider minor variations to the Subdivision Guide Plan however the further breakdown of lots will be contrary to the Scheme. ii) a) All buildings shall be set back a minimum of: • 10m from the front boundary. • 10m from the rear boundary. • 10m from all other boundaries. b) Notwithstanding (a) above, Council may approve a reduction to the nominated "rear boundary" and "all other boundaries" setback, to a minimum of 5m each, where it is of the opinion that the topography or shape of the lot, or remnant vegetation on it, makes it desirable to alter the setback and that the location of the building will not detract from the amenity of the area or existing or future dwellings on surrounding lots. c) On lots allocated "Dwelling Areas" (500m^2) on the Subdivision Guide Plan, dwellings shall be confined to the Dwelling Area unless otherwise approved by Council. Such approvals may require additional siteworks to be performed at the landowner's expense. d) Council may request the Commission to impose a condition at the time of subdivision for the filling of "Dwelling Areas" as shown on the Subdivision Guide Plan. Filling is to be a minimum of 500mm above groundwater levels determined by geotechnical investigation [Provision c)ix)a)] and shall resolve the land's poor nutrient retention ability and high groundwater pollution potential to the satisfaction of the Waters & Rivers Commission. Batter slopes of "Dwelling Areas" shall be within the range of 1:4 to 1:6.

PARTICULARS OF THE LAND	PROPOSED USES	SPECIAL PROVISIONS
***SRes* 6. SPRINGDALE BEACH SPECIAL RESIDENTIAL ZONE** Portion of Plantagenet Location 1935 South Coast Highway, Denmark (Continued)	Rural Residential Permitted Use (P): Permitted at Council's Discretion (AA): Single House Home Occupation Livestock Grazing *see clause (viii)a)*	e) Subject to Provision c)ii)d), Council may request the Commission to impose a condition at the time of subdivision for the compaction of house pads within the identified "Dwelling Areas". Such house pads shall be certified as capable of accommodating a two storey double brick & tile dwelling and provide for the co-location of an amended soil effluent disposal system within the "Dwelling Area". f) No development shall be permitted within the Development Exclusion Area as shown on the Subdivision Guide Plan. iii) a) Council may request the Commission to impose a condition at the time of subdivision for the provision of Strategic Fire Breaks and other fire safety facilities. Such facilities shall be provided to the satisfaction of Council and the Fire & Emergency Services Authority. b) Council shall require that individual landowners are responsible for the maintenance of any strategic firebreaks crossing individual lots. c) The clearing of firebreaks other than for strategic firebreak purposes will not be permitted unless for safety reasons to comply with Council and Fire & Emergency Services Authority requirements. d) Low Fuel Areas a minimum of 30m wide shall be provided and maintained around all buildings. e) The subdivider shall make arrangements to the satisfaction of Council to ensure prospective purchasers, in the transfer of lots, are aware of the fire management guidelines of the Homeowners Bushfire Survival manual, the Fire Management Plan and Australian Standard 3959 'Construction of Buildings in Bushfire Prone Areas'. f) In cases where only part of the zone is developed, an interim firebreak system shall be prepared and put in place to the satisfaction of Council and the Fire & emergency Services Authority. g) Council may request the Commission to impose a condition at the time of subdivision for the provision fire hydrants at intervals of 200 metres along subdivisional water mains. iv) a) No clearing of remnant vegetation shall occur except for: • clearing to comply with the requirements of the Bush Fires Act 1954 (as amended); • clearing may reasonably be required to construct an approved building and curtilage; • trees that are diseased or dangerous; • clearing required to establish a low fuel buffer; • clearing to gain vehicular access to an approved dwelling or any other clearing which may be approved by the Council.

APPENDIX XIV - SPECIAL RESIDENTIAL ZONES (CONT'D)

PARTICULARS OF THE LAND	PROPOSED USES	SPECIAL PROVISIONS
***SRes* 6. SPRINGDALE BEACH SPECIAL RESIDENTIAL ZONE** Portion of Plantagenet Location 1935 South Coast Highway, Denmark (Continued)	Rural Residential Permitted Use (P): Permitted at Council's Discretion (AA): Single House Home Occupation Livestock Grazing *see clause (viii)a)*	b) Council may request the Commission to impose a condition at the time of subdivision for the removal of Taylorina or any other declared weeds from Public Open Space, Road Reserves and Private Lots. c) It shall be the responsibility of the landowner to preclude the establishment of invasive weed species on the individual allotments. d) Where in the opinion of Council invasive weed species are invading any land within the zone, notice may be served on the owner of the land, requiring immediate eradication of those weed species specified in the notice. e) Where notice has been served on a landowner, Council may also require the land to be stabilised or replanted to its satisfaction within three months of servicing the notice. f) In the event that such action is not undertaken, Council may carry out such works as are deemed necessary, with all costs being borne by the landowner. g) Council may request the Commission to impose a condition at the time of the subdivision for the preparation and implementation of a Public Open Space and Replanting Strategy. Such a strategy shall use local native tree and shrub species and be based on the requirements of the Visual Impact Assessment and the Subdivision Guide Plan so as to ensure a visual screen is obtained. Trees only should be used in road reserves. h) Additional tree/shrub planting may be required as a condition of development approval. i) Council may request the Commission to impose a condition at the time of Subdivision for the preparation of Foreshore Management Plan/s based on the requirements of the Subdivision Guide Plan. v) a) All buildings constructed within the zone shall be sympathetic to existing landscape elements (landform and vegetation) in terms of their location, scale, height, materials and colour. b) Buildings shall be constructed with roof and external wall materials and colours comprising natural earth or olive green colours. Reflective colours and materials such as zincalume, white and off white tones will not be permitted. Other roof and external wall materials which would, in the opinion of Council, prejudice the landscape amenity of the area, will not be permitted. c) All buildings shall be sited to maximise the natural screening effect of vegetation and topography.

APPENDIX XIV - SPECIAL RESIDENTIAL ZONES (CONT'D)

PARTICULARS OF THE LAND	PROPOSED USES	SPECIAL PROVISIONS
***SRes* 6. SPRINGDALE BEACH SPECIAL RESIDENTIAL ZONE** Portion of Plantagenet Location 1935 South Coast Highway, Denmark (Continued)	Rural Residential Permitted Use (P): Permitted at Council's Discretion (AA): Single House Home Occupation Livestock Grazing *see clause (viii)a)*	d) All buildings shall be single storey except where it can be proven to Council that a variation to the height restriction would not adversely affect the visual amenity of surrounding lots as well as the locality. e) Proposals to vary the height restrictions pursuant to (d) above, shall be accompanied by such plans, elevations and sketches as is determined by Council to assess the effect on visual amenity and the natural screening properties of vegetation and topography. vi) a) Council may request the Commission to impose a condition at the time of subdivision for the provision of reticulated water to the lots. b) Any water tanks shall be coloured an appropriate natural shade of brown or green and shall be suitably screened with vegetation in keeping with the amenity of the area to the satisfaction of Council. vii) No boundary fencing shall be constructed of fibre cement or metal sheeting. If boundary fencing is utilised, it shall be of rural construction such as pine posts/steel posts and 7 strand ringlock to the satisfaction of Council. viii) a) Intensive horticulture is not permitted. The grazing of livestock may be permitted and shall be restricted to fenced pastured areas of the lot. The owner shall be responsible for the erection and maintenance of stock proof fencing to protect remnant vegetation and replanting areas. Animal numbers shall not exceed the stocking rates recommended by Agriculture W.A. The keeping of animals shall not result in the removal or damage of endemic vegetation and trees or result in soil degradation and dust nuisance. b) Where in the opinion of Council the continued presence of animals on any portion of land is likely to contribute, or is contributing to dust nuisance or soil degradation, notice may be served on the owner of the land, requiring immediate removal of those animals specified in the notice. c) Where notice has been served on a landowner in accordance with (b) above the Council may also require the land to be rehabilitated to its satisfaction within three (3) months of serving the notice. d) In the event that such action is not undertaken, Council may carry out such works as are deemed necessary, with all costs being borne by the landowner. ix) a) Council may request the Commission to impose a condition at the time of subdivision to require the preparation of a Geotechnical Investigation which details soil profiles to a depth of at least 2.0 metres, permeability, winter water table levels and the topography of the land.