

11.4 Corporate and Community Services

11.4.6 TURNER CARAVAN PARK MASTERPLAN

Attachment 1 – Concept Masterplan

Attachment 2 – **CONFIDENTIAL** Business Plan

Attachment 3 – Fauna Assessment

Attachment 4 – Rehabilitation Plan

Attachment 5 – Bushfire Management Plan

Attachment 6 – Consultation Report Summary

Attachment 7 – Consultation Report Comments

Attachment 8 – **CONFIDENTIAL** Acting CEO notice letter 2 December 2009

Attachment 9 – Current Turner Caravan Park Site Plan



- Existing Long Term x 5
 - Existing Chalet x 3
 - Existing Park Building (Labelled)
 - Existing Annual/Holiday Sites x 30
- Existing Sites x 194 (159 Powered and 30 x Unpowered)
- Total 232**

Existing Site Plan
 Scale: 1:750 @ A1 / 1:1500 @ A3
 0 15m 37.5m



TOURIST PARK CONSULTANTS
 e: dave@greenhilldesign.com.au
 ph: 0431 938762
 PO Box 42 Highbury SA 5089



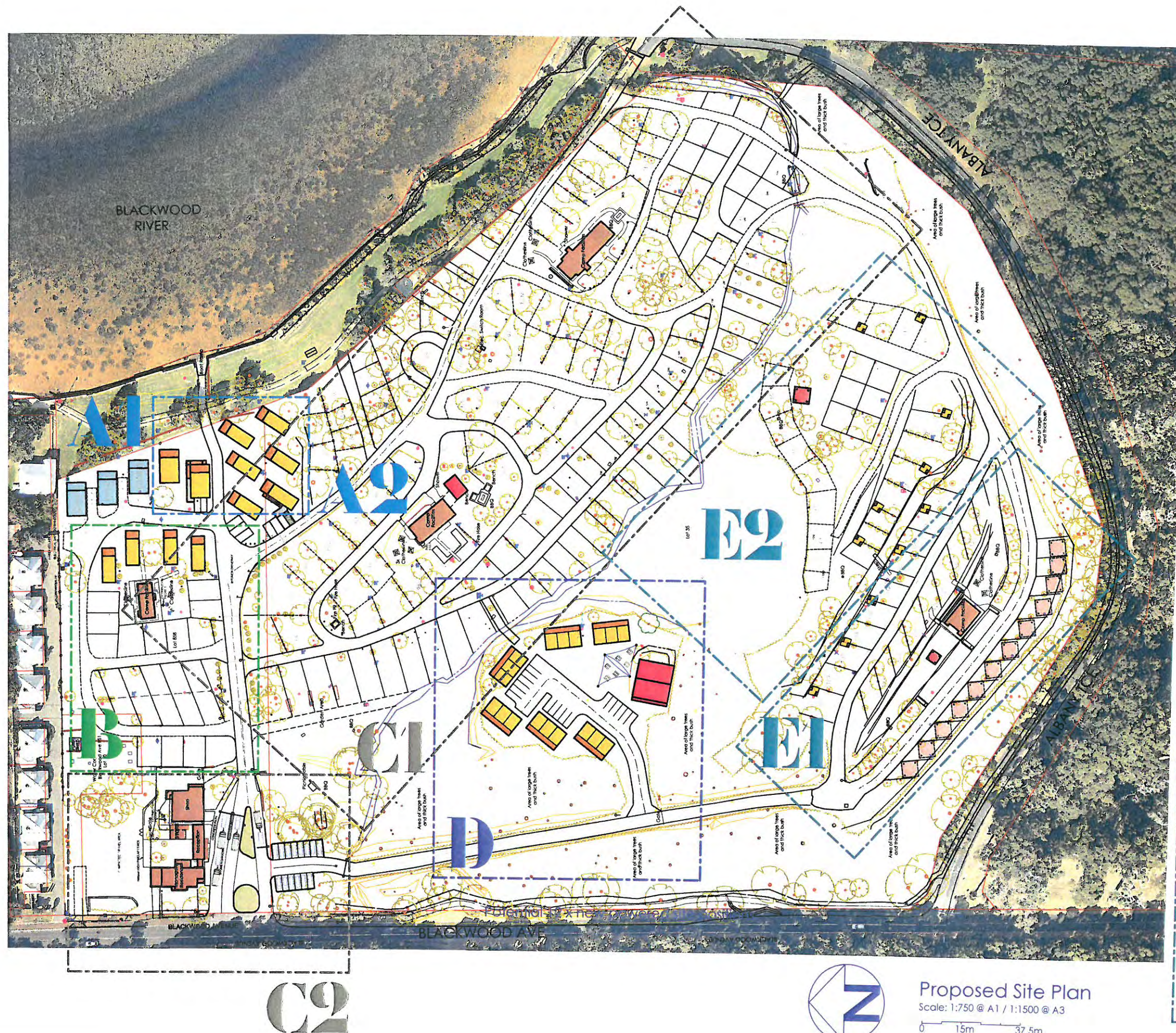
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Project:	Proposed Development	Checked:	AC	Drawing Issue:	SK13
Drawing:	Existing/Proposed Site Plan	Sheet Size:	A1	Date of Issue:	22 Oct 2018



- A Proposed Works Area A1**
- Remove existing holiday van/long term sites 42-46
 - Build 2 x chalets of the same design as existing 3 chalets sited to the south of existing chalets (1 of which is to be a DDA compliant chalet)
 - Remove existing holiday van/long term sites 28-31
 - Build 3 new smaller chalets as part of a new "precinct". These to be a smaller 2-bedroom Chalet. (10 x 5m with 3 x 5m covered deck)

- Proposed Works Area A2**
- Remove existing powered sites 48-51
 - Build 3 x smaller 2-bedroom chalets (10 x 5m with 3 x 5m covered deck) including 1 DDA compliant chalet.
 - DDA regulations require 1 in the first 10 chalets sited to be DDA compliant, with 1 further chalet required for the next 11-40 chalets, meaning once 10 chalets are sited, only when the 11th is sited will another DDA compliant chalet be required.

- B Proposed Works Area B**
- Change road loop east of Dekkers amenities block
 - Remove 17 x holiday van and 5 x powered sites around Dekkers block and replace with 13 powered sites of approximately 8 x 12m
 - Create 5 large 20 x 8m drive through rig sites
 - Build 4 x smaller 2-bedroom chalet (10 x 5m with 3 x 5m covered deck)

- C Proposed Works Area C1**
- Create new roads to rationalise park layout and create a ring road through the park joining to main road. Divide sites and join new road back to the main entry road
 - Create 8 new sites on foreshore (with road/tree management)
 - Remove holiday van/permanent sites 74-83 and sites 15-10 as well as 1-5 from front of park and individual sites 73, 68b and 91 (28 sites total)
 - Create 46 new sites including: -
 - 5 large drive through sites
 - 8 large powered sites
 - 33 standard sized sites approximately 8 x 12m
 - Design and construct new stormwater disposal system alongside new road
 - Power up Tent Land/Church flats: - Remove all existing unpowered sites and replace with powered sites - rationalise site layouts to lose 5 sites (from 27 to 22)
 - Retain trees from 2-7 in tent land and regenerate as 'environmental area'
 - Create new exit point onto Albany Terrace with linkages to this area from the park, and the reserve via a network of new pedestrian paths
 - Upgrade amenities block

- Proposed Works Area C2**
- Update, rationalise and landscape entry area with visitor parking
 - Convert sites 5-9 into play area and start of nature trail

- D Proposed Works Area D**
- Build new all-weather group meeting facility
 - Provide up to 18 x dorms/group units (max occupancy 4 people per unit). Include 18 car parking spaces with DDA provisions
 - Optional group camp kitchen and BBQ facility
 - Outdoor shaded seating area and fire pit for winter
 - Bridge connection to existing park
 - Remove existing dump point and staff residence

- E Proposed Works Area E1**
- Rationalise road loop - make east side 4m one way - (holiday vans only) make west side 6m two-way main access road
 - Turn sites 101-110 and 123-130 into holiday van sites (10 x ensuite sites and 10 x standard powered sites)
 - Turn sites 111-122 into boat/van store - with optional 6 x 6 'carport' structures over (lose 12 sites)
 - Upgrade amenities block

- Proposed Works Area E2**
- Basic open style camp kitchen should be sited on the southern side of the creek to cater to unpowered sites
 - Sites 16-23 to be converted to ensuite sites and new sites added in where possible. (18 sites total)
 - Under clearing of the current area and use as a natural playground
 - New dump point



Proposed Site Plan

Scale: 1:750 @ A1 / 1:1500 @ A3

0 15m 37.5m



TOURIST PARK CONSULTANTS
e: dave@greenhilldesign.com.au
ph: 0431 938762
PO Box 42 Highbury SA 5089



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andrew@innoviv.com.au
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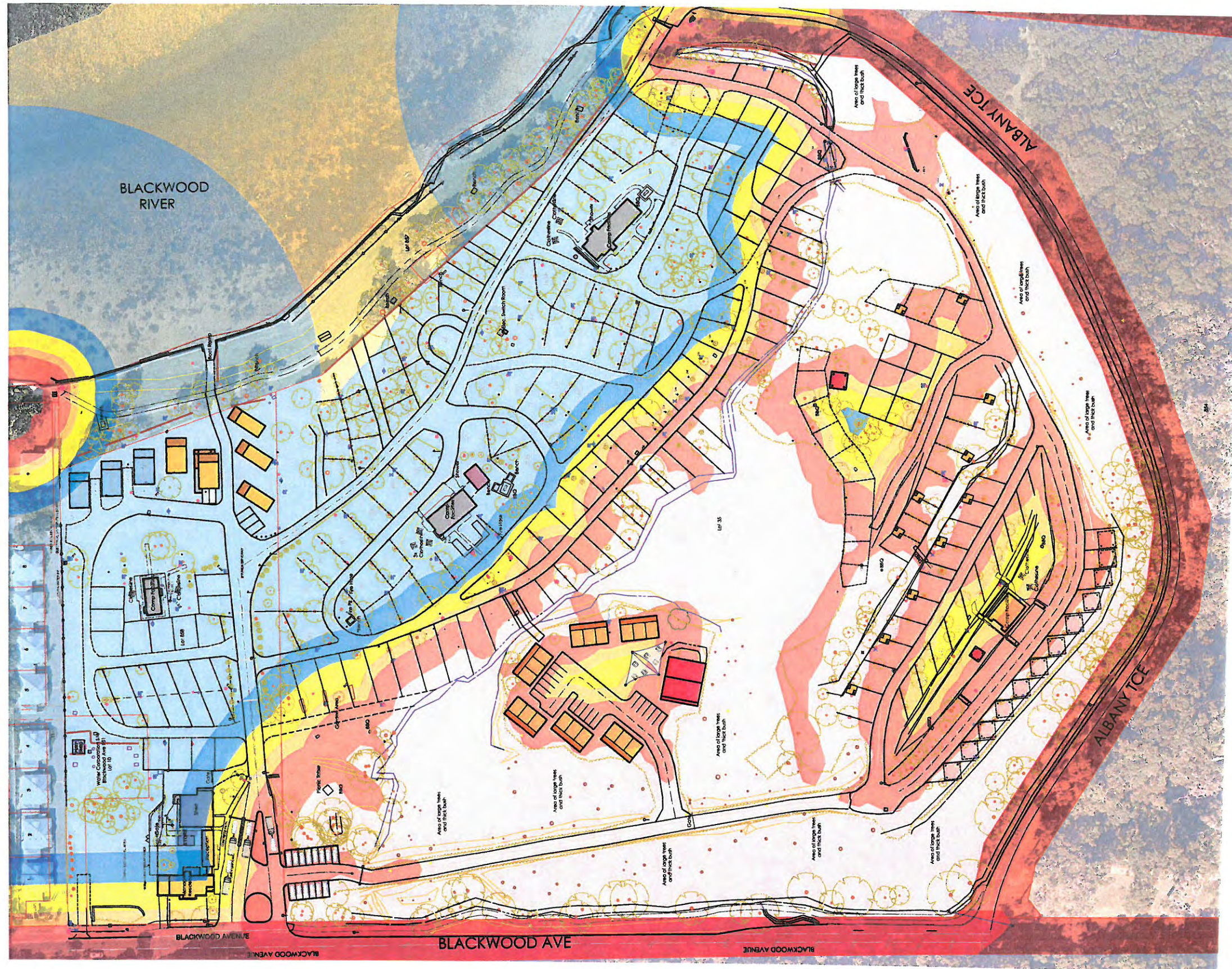
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BAL contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low

Classified Vegetation



Approx North

Proposed Site Plan (Bushfire Overlay)

Scale: 1:750 @ A1 / 1:1500 @ A3

0 15m 37.5m



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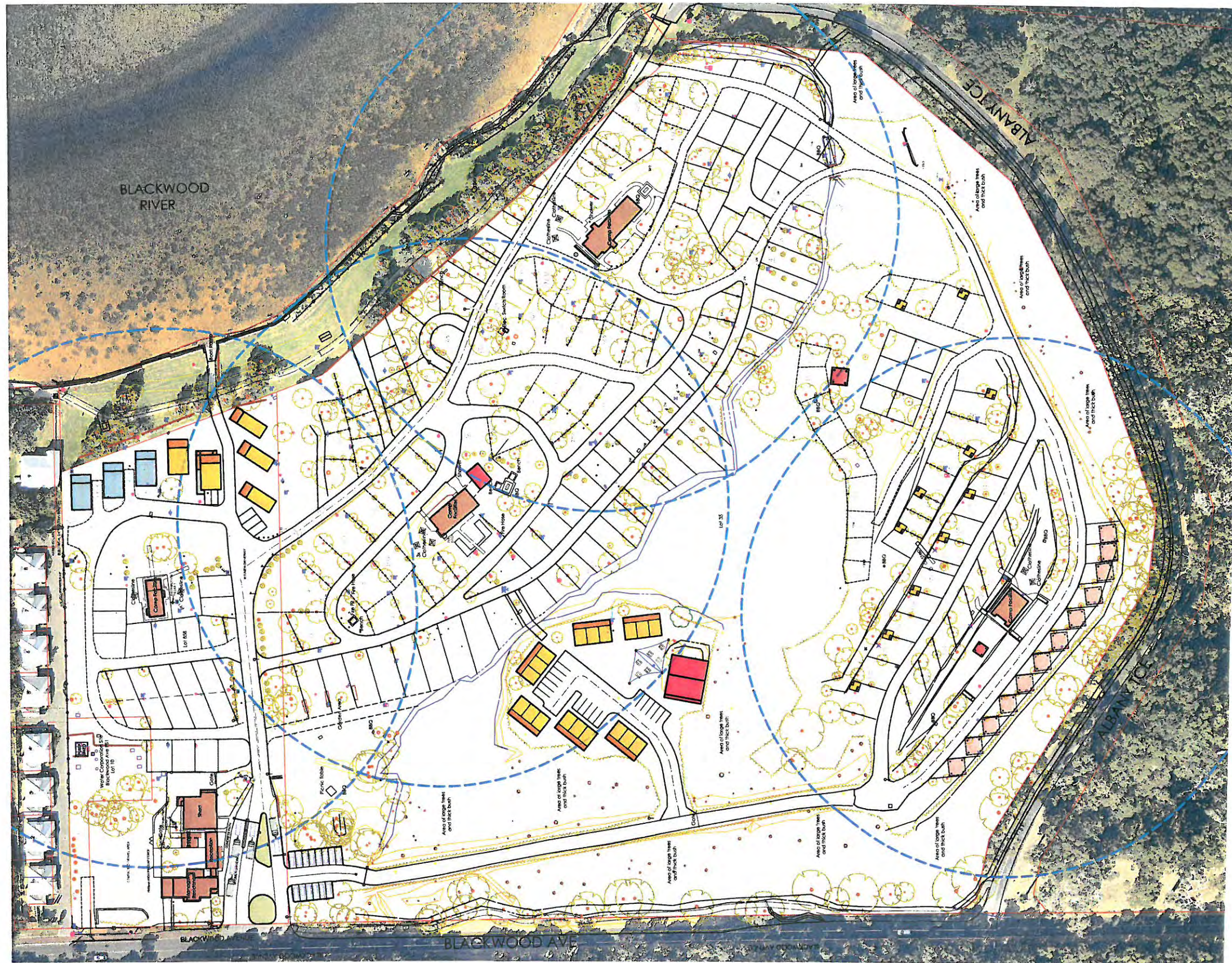
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Approx North

Proposed Site Plan (Amenities 90m Distance Overlay)

Scale: 1:750 @ A1 / 1:1500 @ A3

0 15m 37.5m



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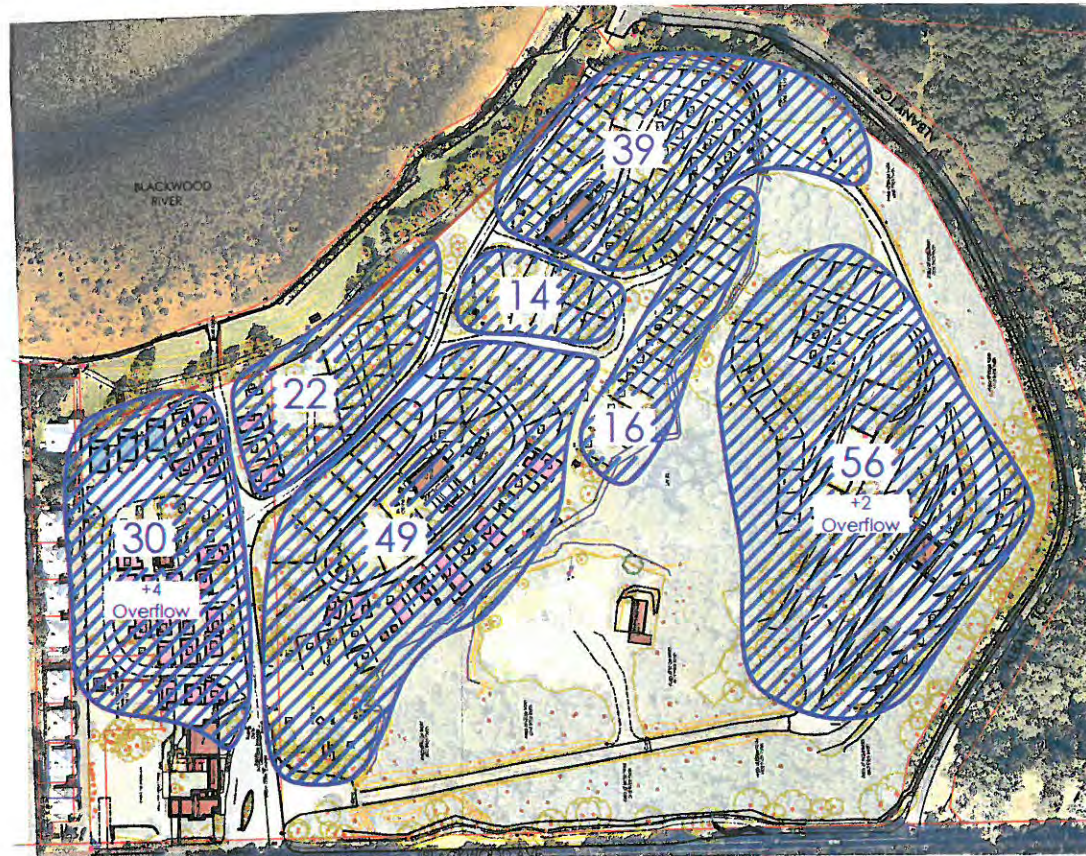
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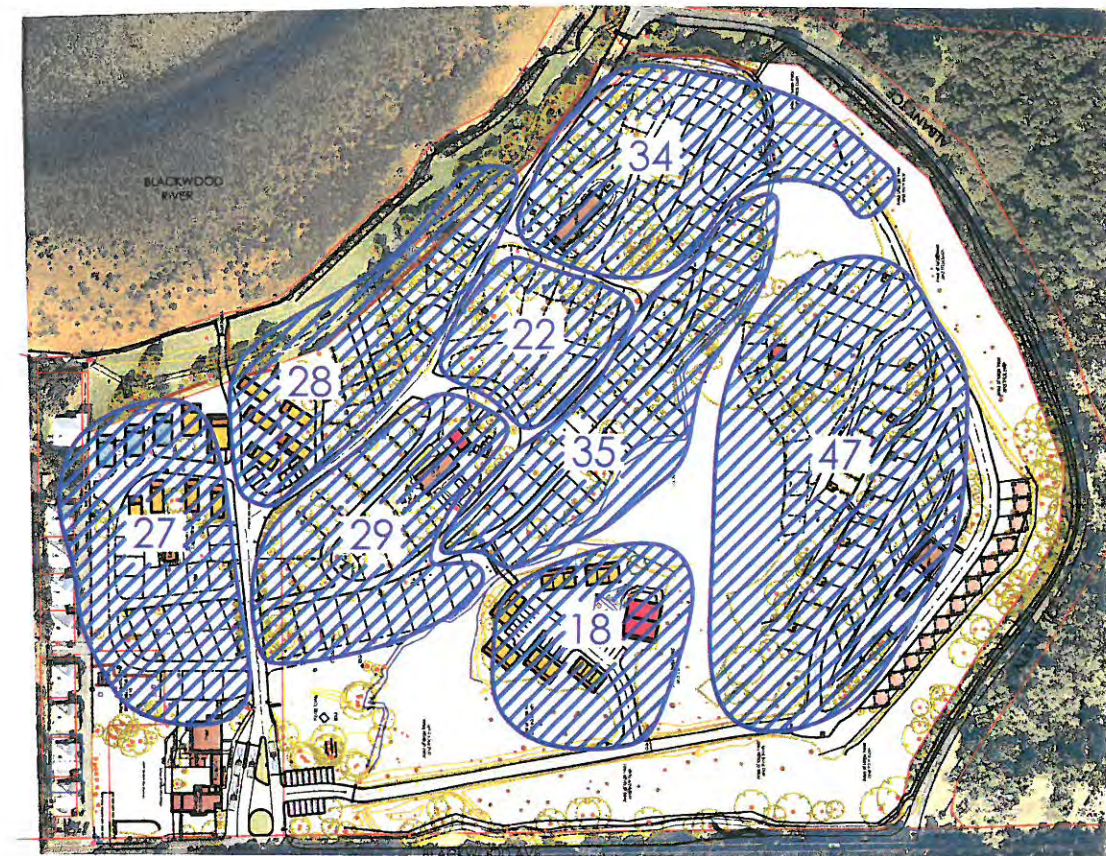


Approx North



Existing Total Sites
232

Existing Site Plan
Scale: 1:1500 @ A1 / 1:3000 @ A3
0 15m 75m



New Total Sites
240

Proposed Site Plan
Scale: 1:1500 @ A1 / 1:3000 @ A3
0 15m 75m



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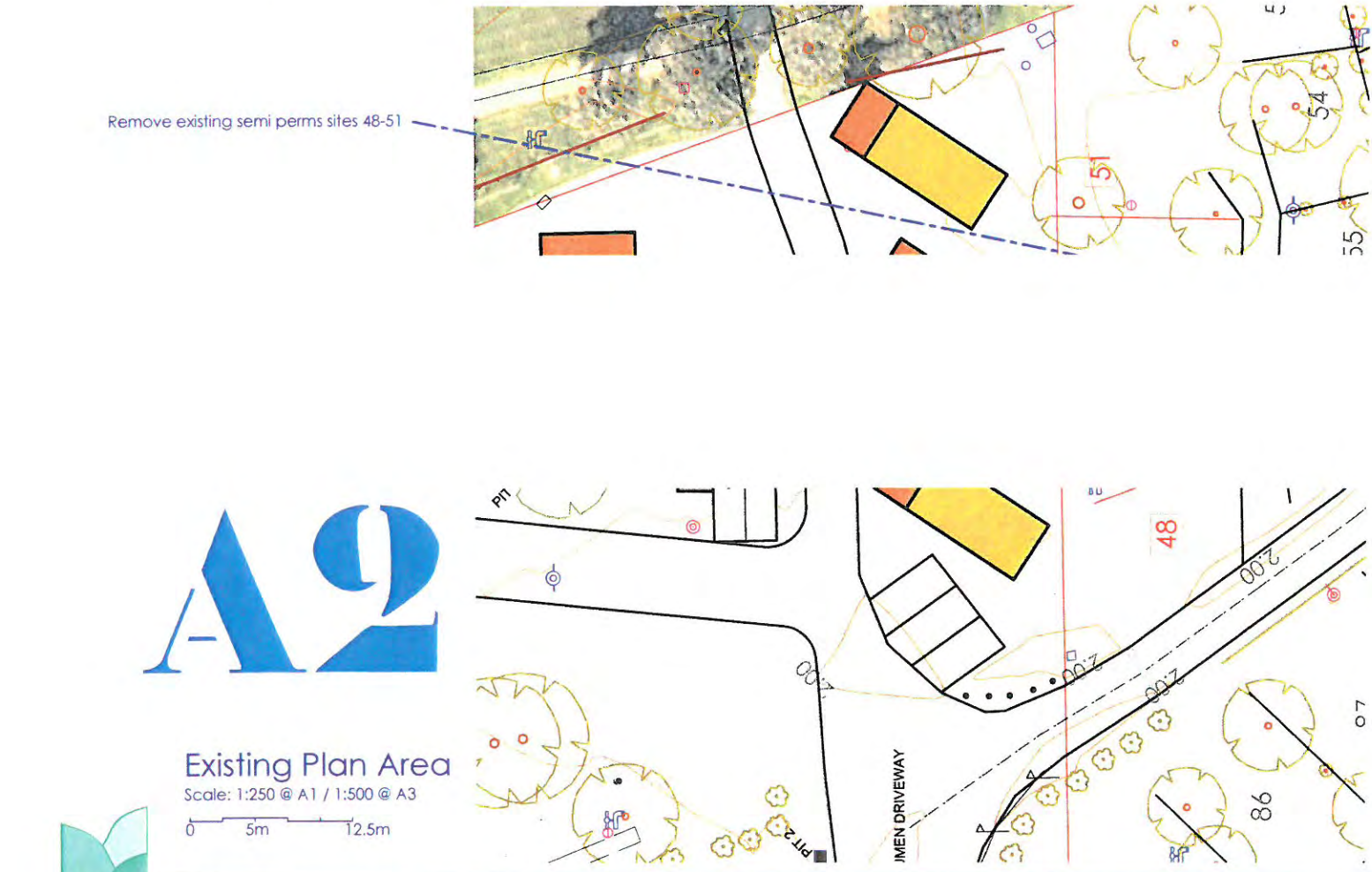
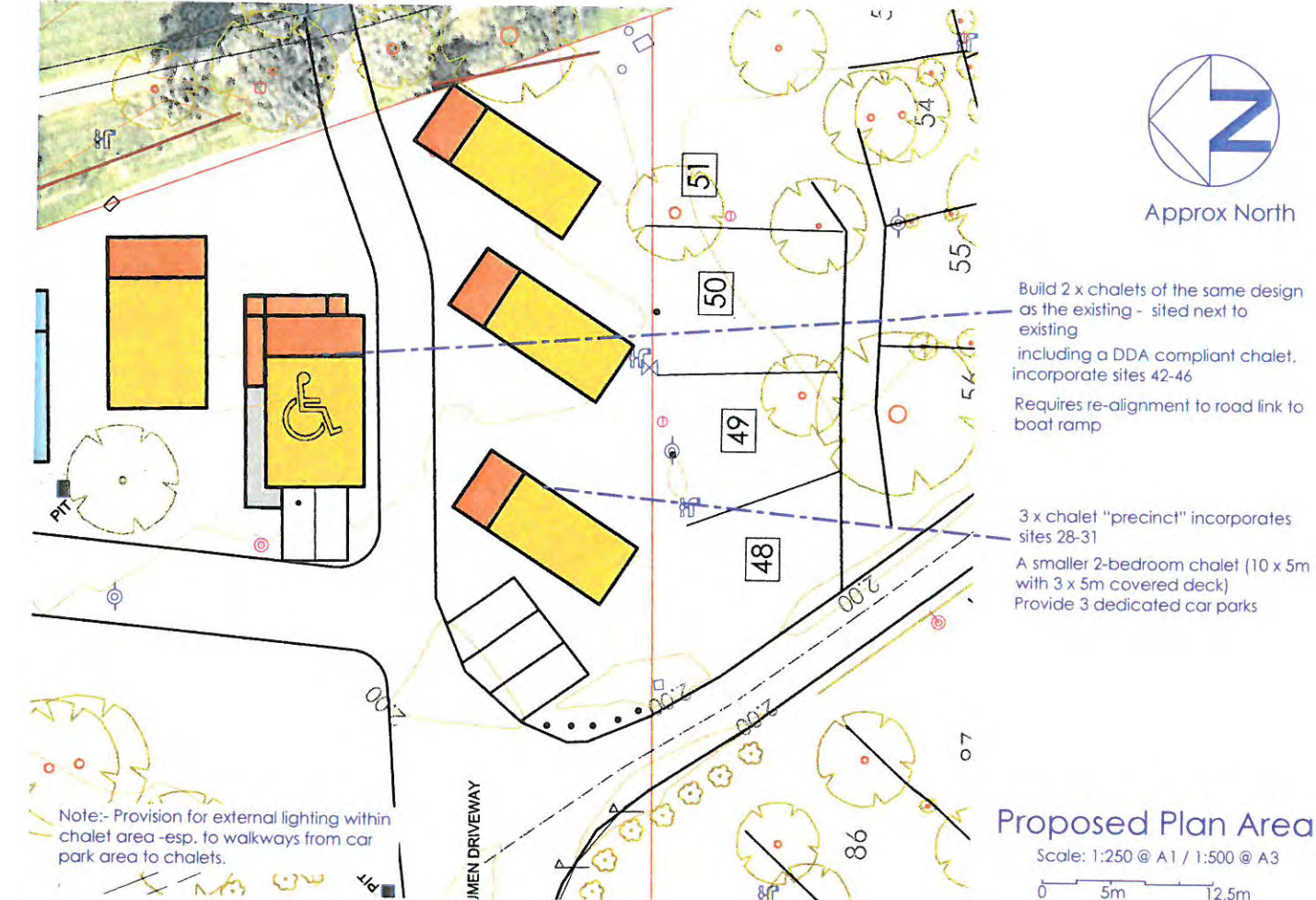
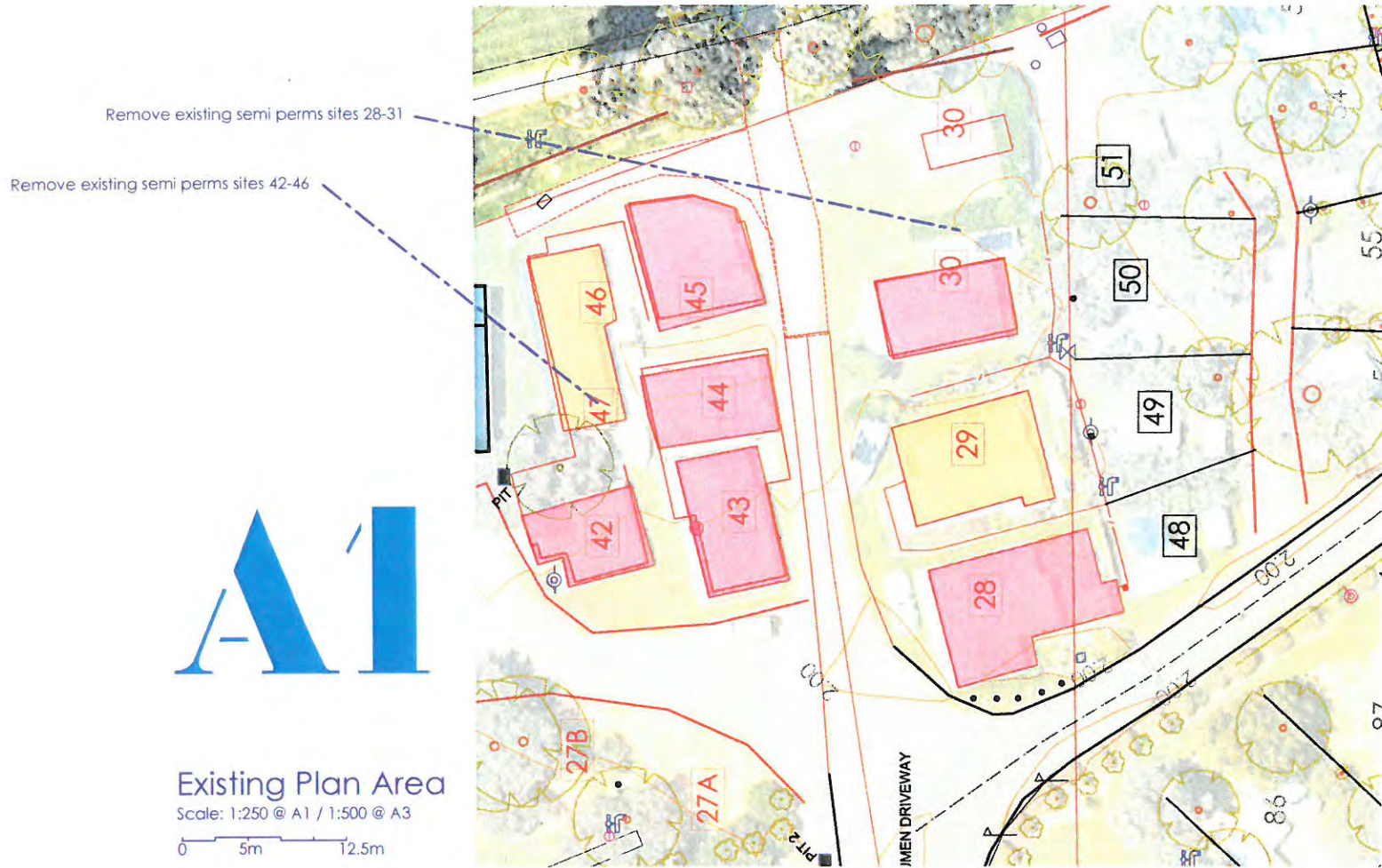
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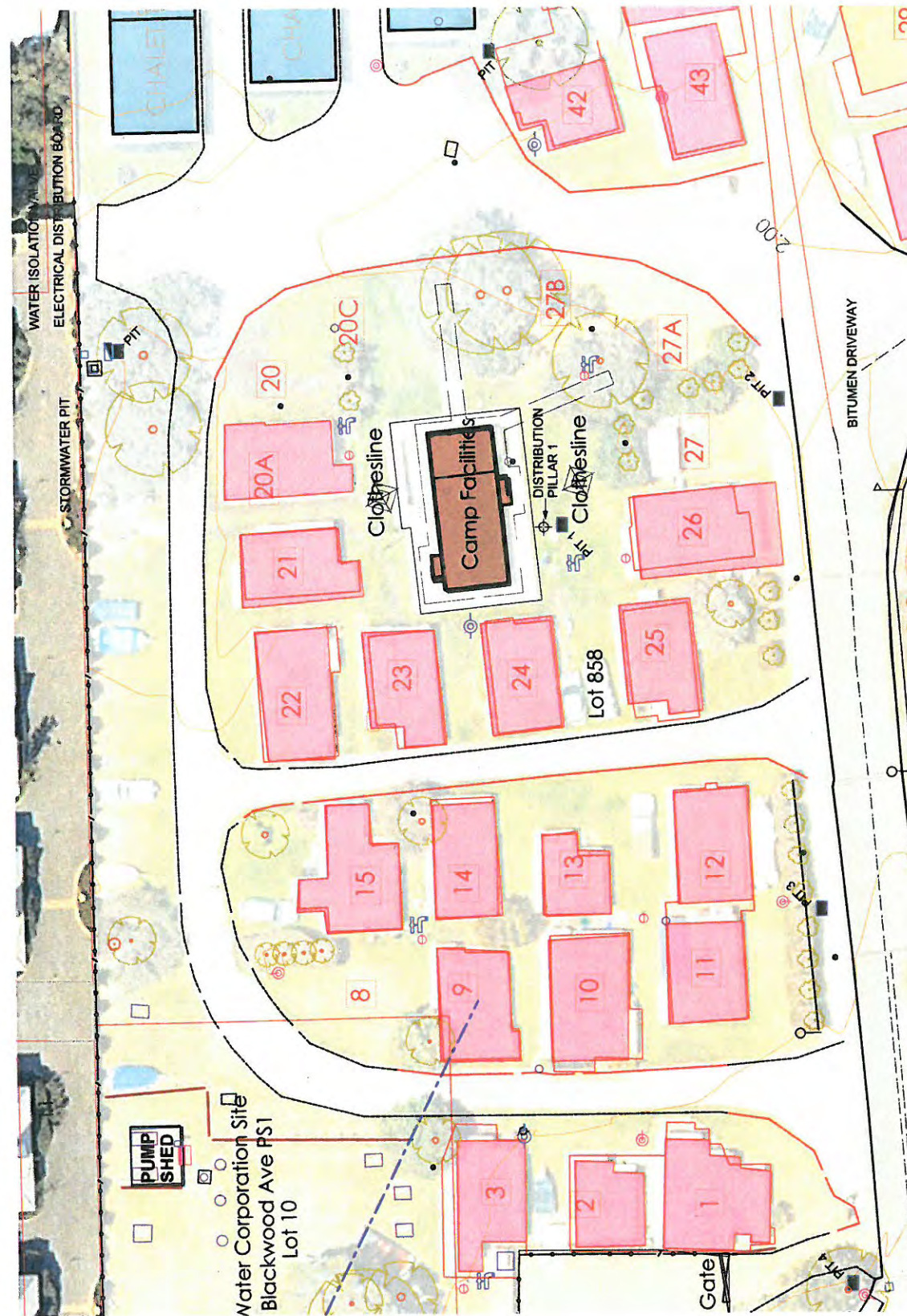
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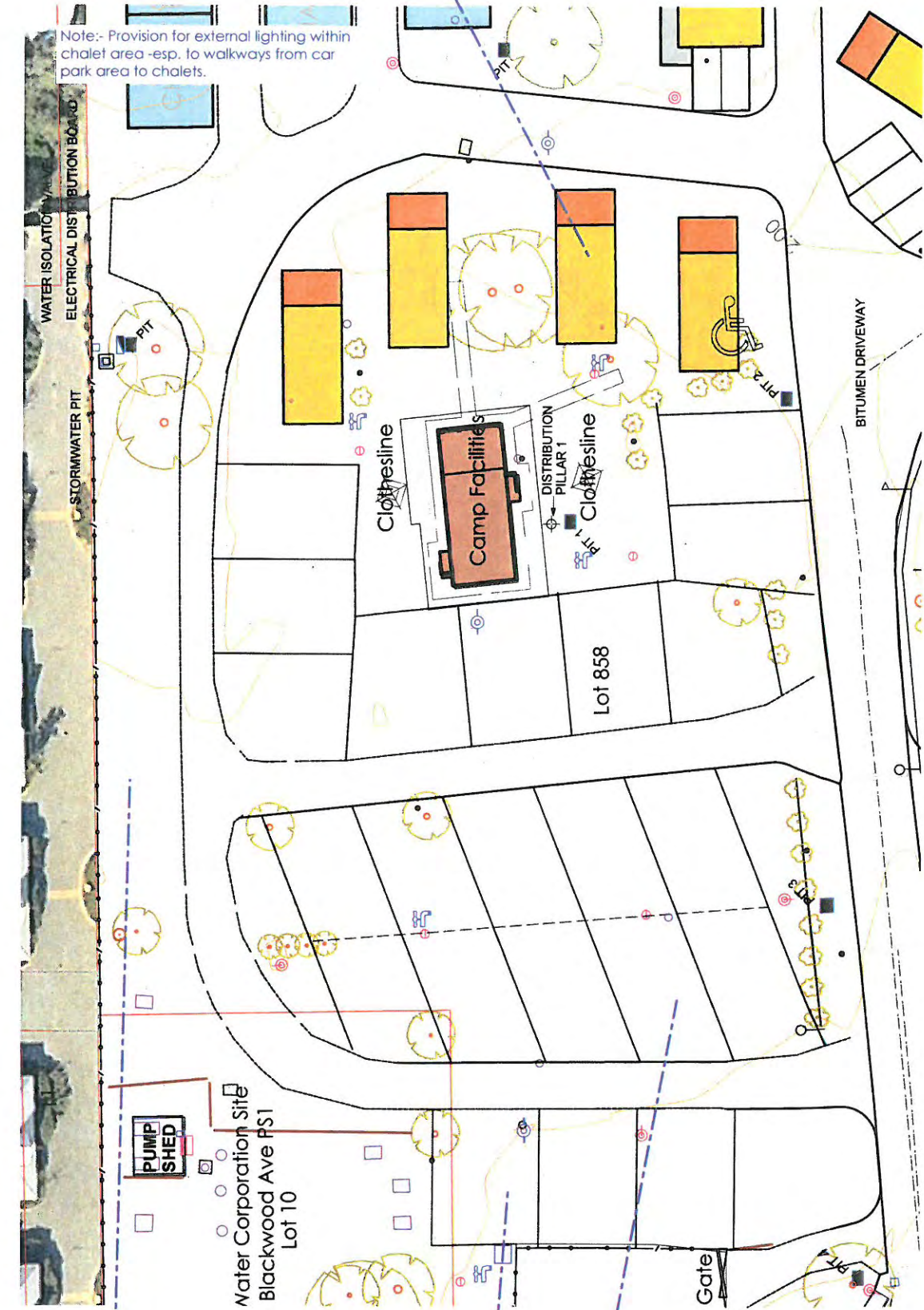
Remove 17 x Semi perms and 5 x powered sites around Dekkers Block and replace with powered sites:-

Existing Plan Area

Scale: 1:250 @ A1 / 1:500 @ A3

0 5m 12.5m

Build 4 x smaller 2-bedroom chalet (10 x 5m with 3 x 5m covered deck)
Potentially include DDA compliant chalet, incorporate sites 20a, 20, 20C, 27a and 27



replace with powered sites:-

- standard 8 x 12m approx powered sites (x 13)
- large 20 x 8m drive through rig sites (5 or 10 if divided in two)

Proposed Plan Area

Scale: 1:250 @ A1 / 1:500 @ A3

0 5m 12.5m



Approx North

Reconfigure/rationalise all sites at Church Flats (8 x powered & 8 x unpowered existing)

Remove 7 unpowered sites at Tent Land (2 to 8)

C1

Existing Plan Area

Scale: 1:500 @ A1 / 1:1000 @ A3

0 5m 25m

Re-configure foreshore sites - lose none but gain 8 new sites - re-establish roadways (4m one way) and manage trees accordingly

New exit point onto Albany Terrace + linkages to this area from the park, and the reserve area with new paths

Upgrade amenities blocks - add extra facilities where required
Connection of stormwater down pipes to Wilson block

Convert this area from 2 sites up to 4

redesignate as 'environmental area' create a wetland area that may accommodate surface water run during the winter period.

Power up and reconfigure Tent Land/Church Flats :-

convert any unpowered sites to powered sites

Overall 18 total standard sized approx 8 x 12m powered sites

Creation of new roads to gently rationalise park layout and create a ring road through the park joining to main road

(Main ring road to be bitumen with a concrete kerb, all other roads to be compacted gravel)

Create approx 46 new sites, including:-

- 5 drive through big sites
- 8 more large sites
- 33 standard sized sites 8 x 12m min

Bridge connection to existing park (complete during Stage C2)

Proposed Plan Area

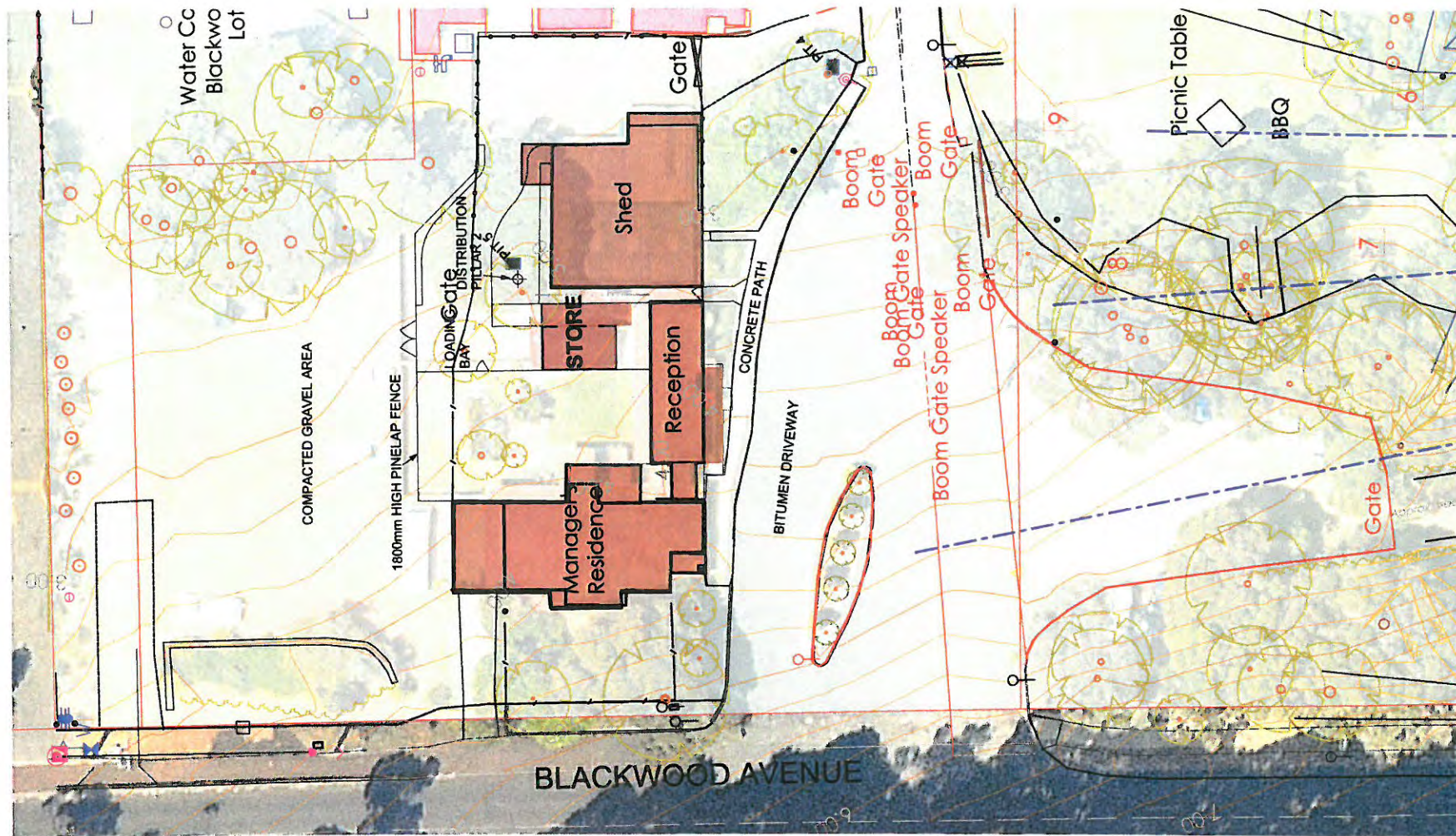
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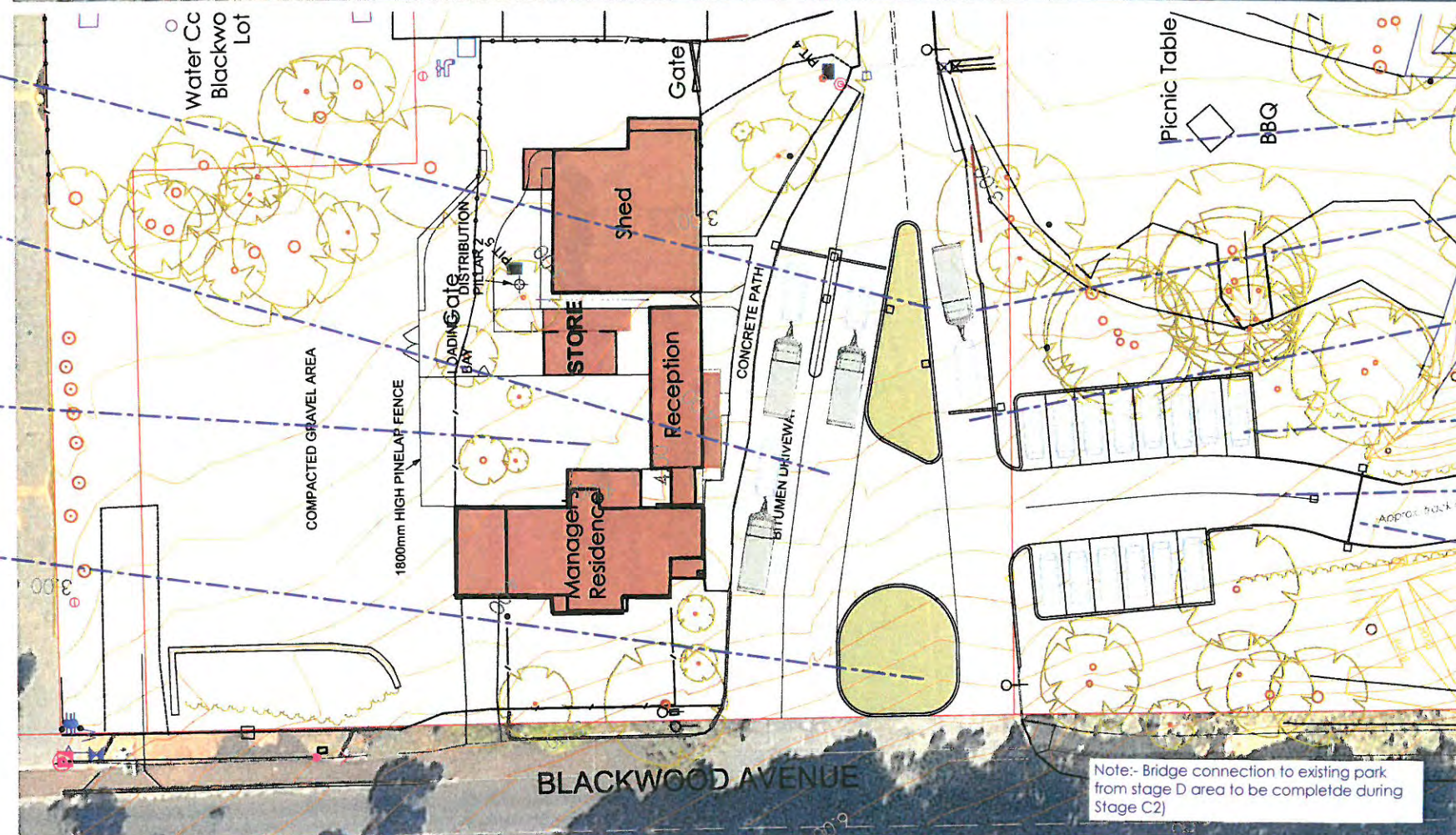
Note:- include provision for all new power, sullage and water infrastructure to campsites. Provision for external lighting around park. Stormwater drainage to be considered in the detailed design works including overall low lying areas, road run off

Approx North

C2



Existing Plan Area
Scale: 1:250 @ A1 / 1:500 @ A3
0 5m 12.5m



Proposed Plan Area
Scale: 1:250 @ A1 / 1:500 @ A3
0 5m 12.5m

Note:- Bridge connection to existing park from stage D area to be complete during Stage C2)



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e: dave@greenhilldesign.com.au
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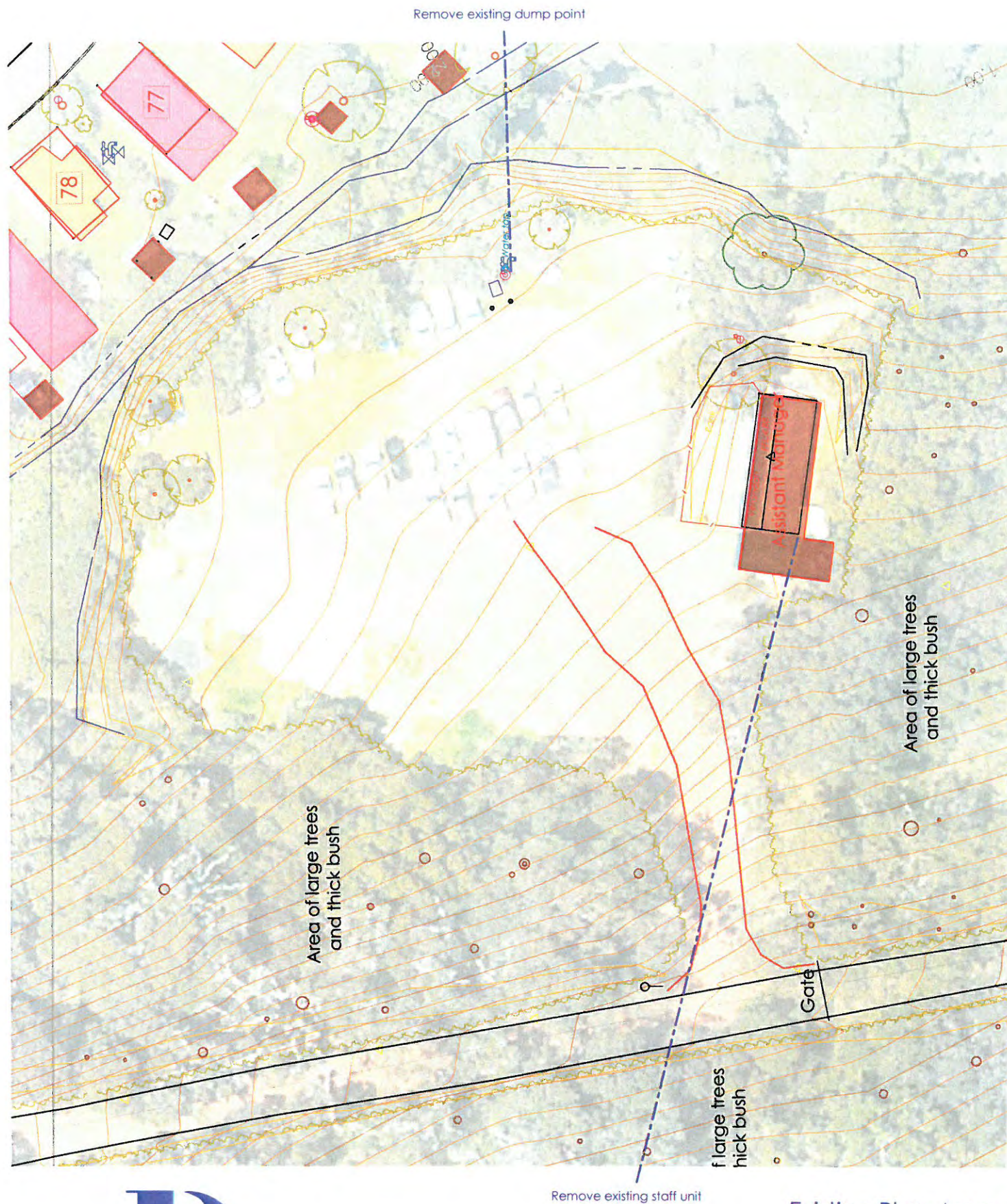
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Existing Plan Area
Scale: 1:250 @ A1 / 1:500 @ A3
0 5m 12.5m



Proposed Plan Area
Scale: 1:250 @ A1 / 1:500 @ A3
0 5m 12.5m



Approx North



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e: dave@greenhilldesign.com.au
ph: 0431 938762
PO Box 42 Highbury SA 5089



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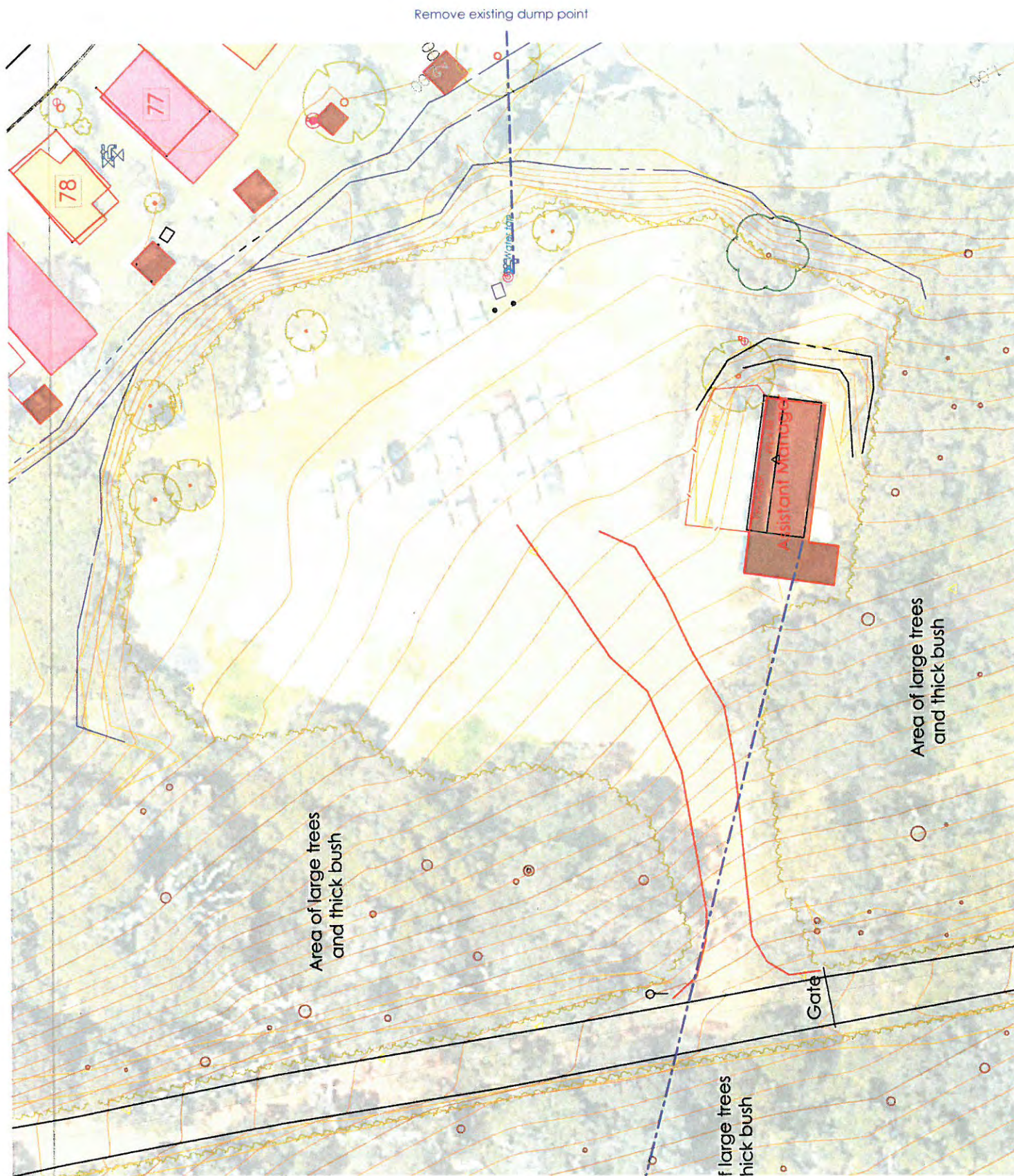
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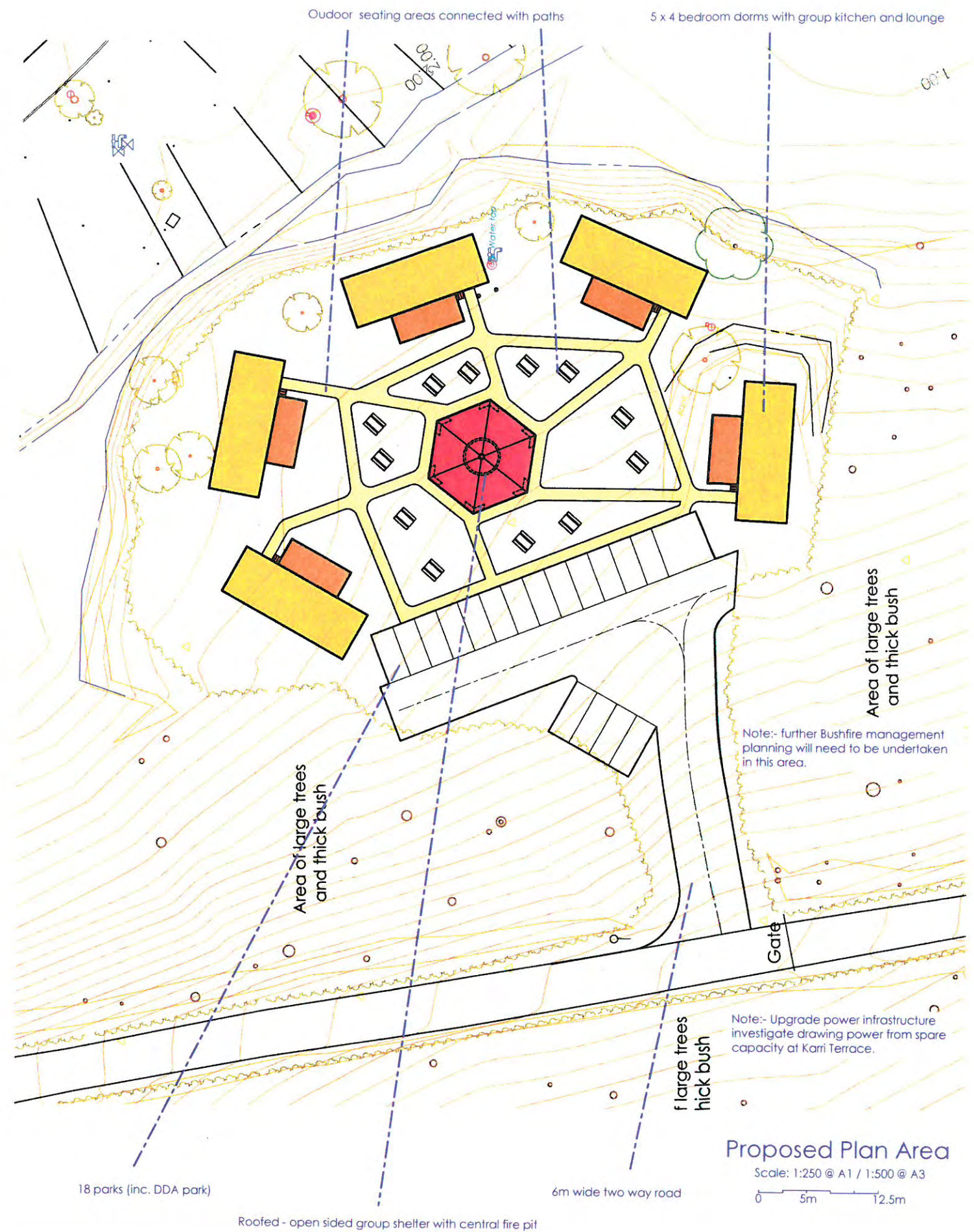
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Existing Plan Area

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0 5m 12.5m



Proposed Plan Area

Scale: 1:250 @ A1 / 1:500 @ A3

0 5m 12.5m



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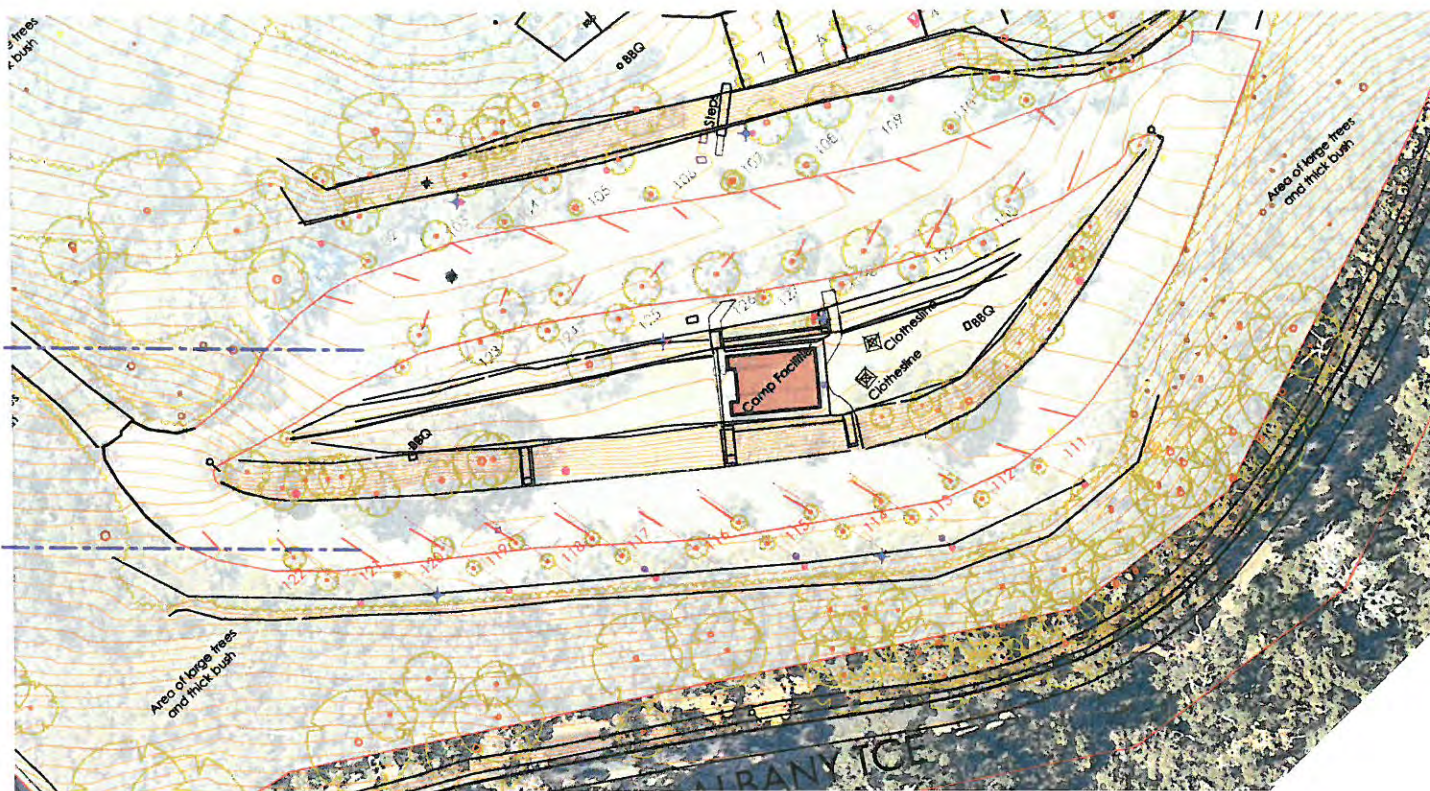
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Approx North

Significantly alter road edges in this area

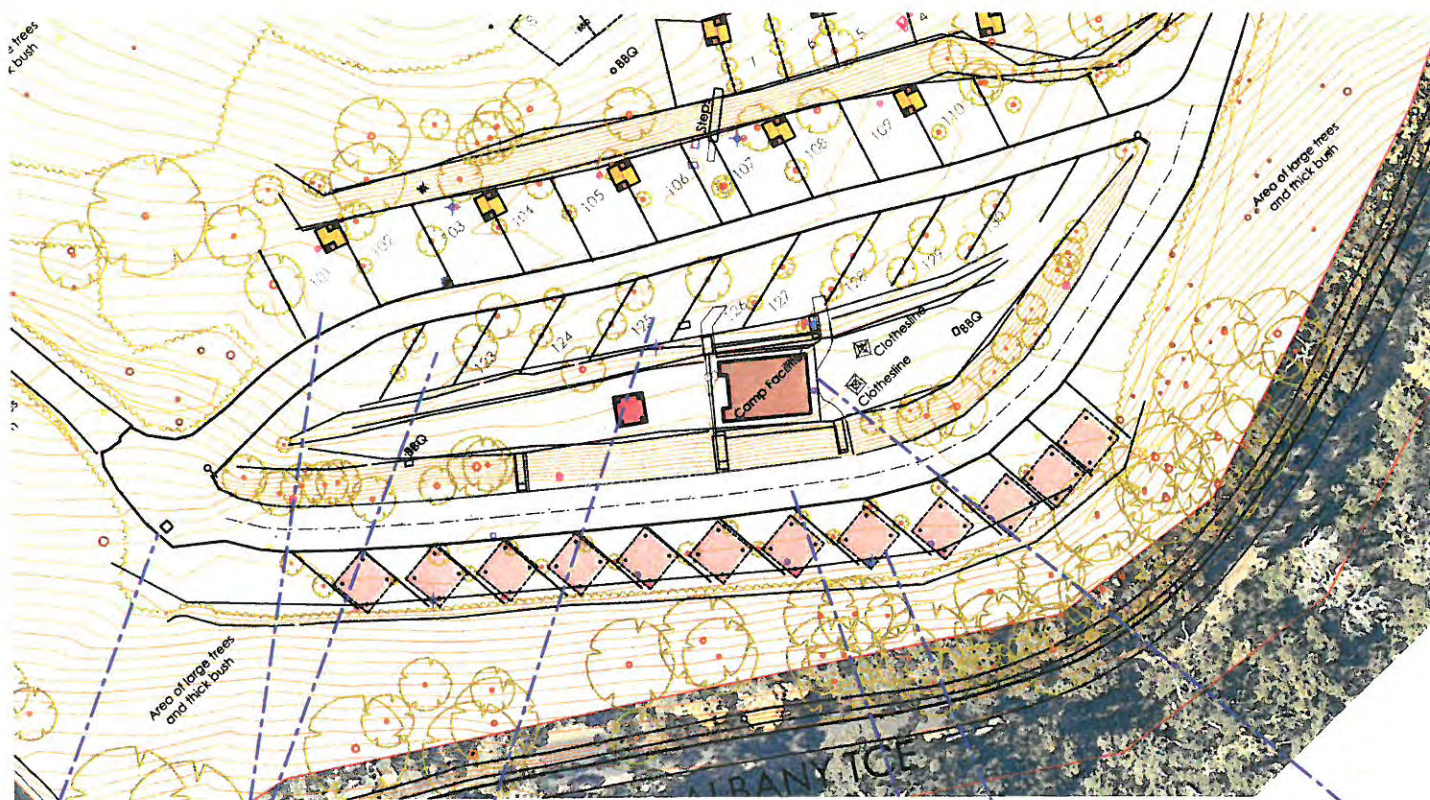
Remove existing sites 111 to 122



Existing Plan Area

Scale: 1:500 @ A1 / 1:1000 @ A3

0 5m 25m



Proposed Plan Area

Scale: 1:500 @ A1 / 1:1000 @ A3

0 5m 25m

new dump point
(part of E2 developments)

Turn sites 101-110 and 123-130 into semi-permanent sites
(10 x ensuite sites and 10 x standard powered sites)

Turn sites 111-122 into boat/van store - with optional 6 x 6 'carport' structures
over (lose 12 sites)

Rationalise road loop - make east side 4m one way - (perms only)
make west side 6m two way main access road

Upgrade amenities block -
optional BBQ shelter in communal area



TOURIST PARK CONSULTANTS
e: dave@greenhilldesign.com.au
ph: 0431 938762
PO Box 42 Highbury SA 5089



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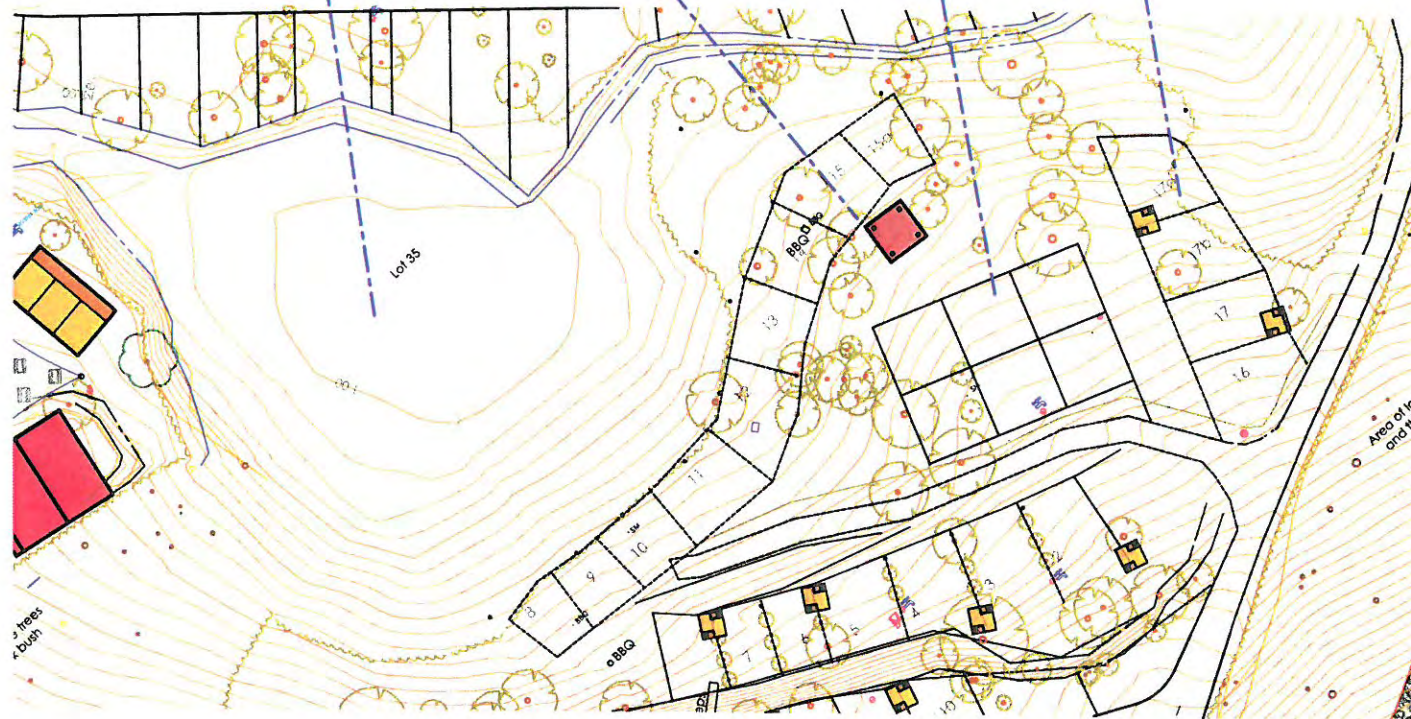


Existing Plan Area

Scale: 1:500 @ A1 / 1:1000 @ A3

0 5m 25m

- Underclearing of the current area and use as a natural playground
- Basic open style camp kitchen should be sited on the Southern side of the creek to cater to unpowered sites
- Realign sites 18 - 23 for greater vehicle accessibility
- sites 16-17b converted to ensuite sites and new sites added in where possible (12 x sites)



Proposed Plan Area

Scale: 1:500 @ A1 / 1:1000 @ A3

0 5m 25m



Approx North



TOURIST PARK CONSULTANTS
e: dave@greenhilldesign.com.au
ph: 0431 938762
PO Box 42 Highbury SA 5089



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andrew@innoviv.com.au
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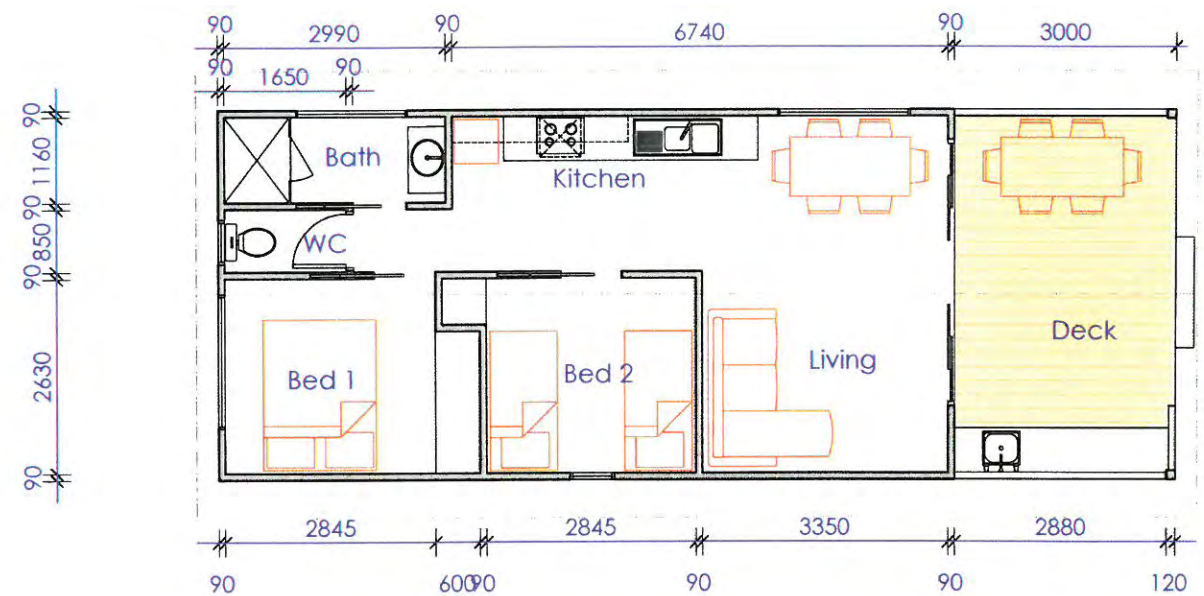
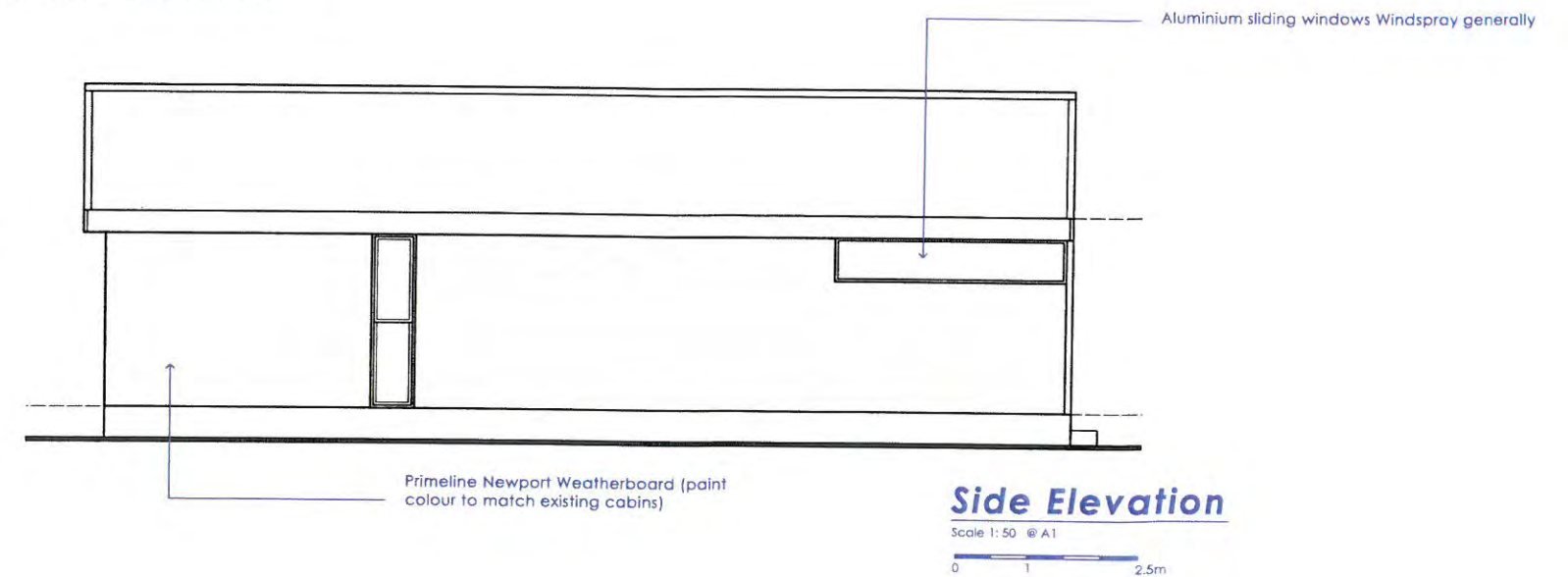
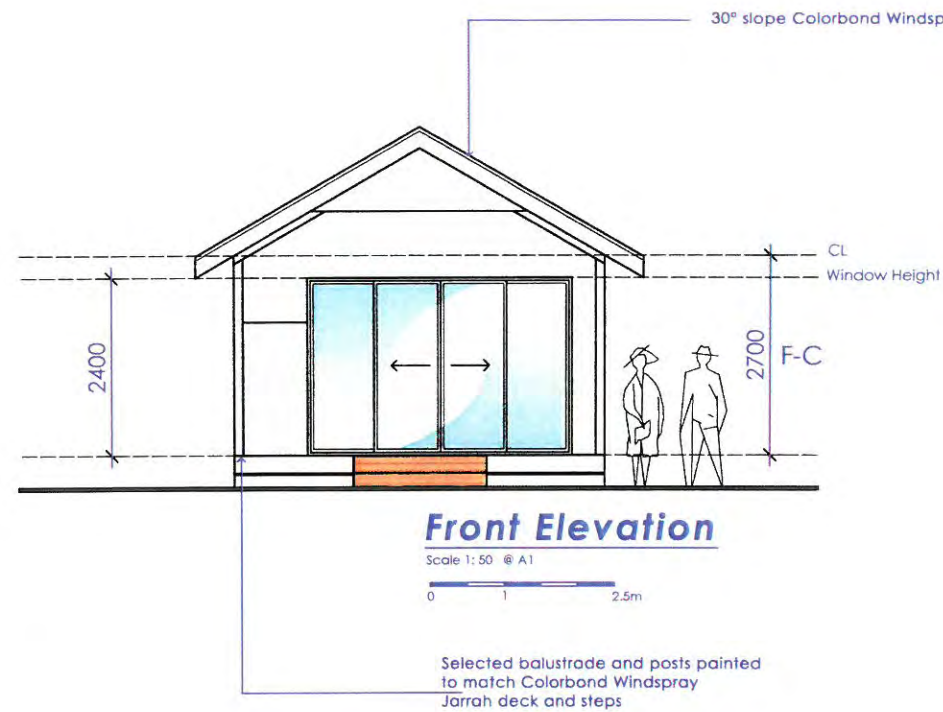
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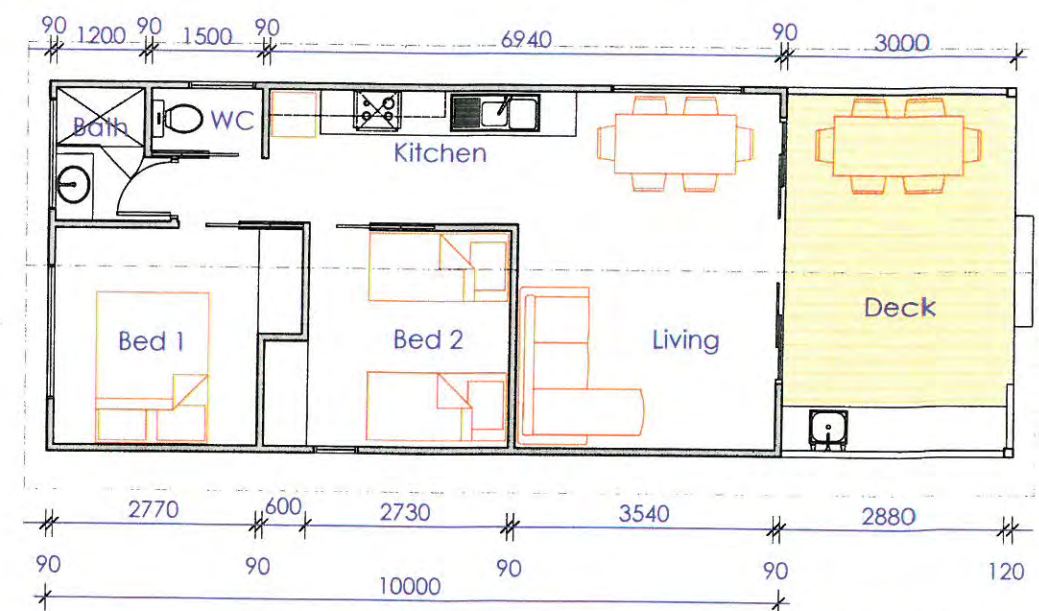
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Floor Plan Proposed 2 Bed Standard - Cabin A

Scale 1:50 @ A1 / 1:100 @ A3

0 1 2.5m



Floor Plan Proposed 2 Bed Standard - Cabin B

Scale 1:50 @ A1 / 1:100 @ A3

0 1 2.5m



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e: dave@greenhilldesign.com.au
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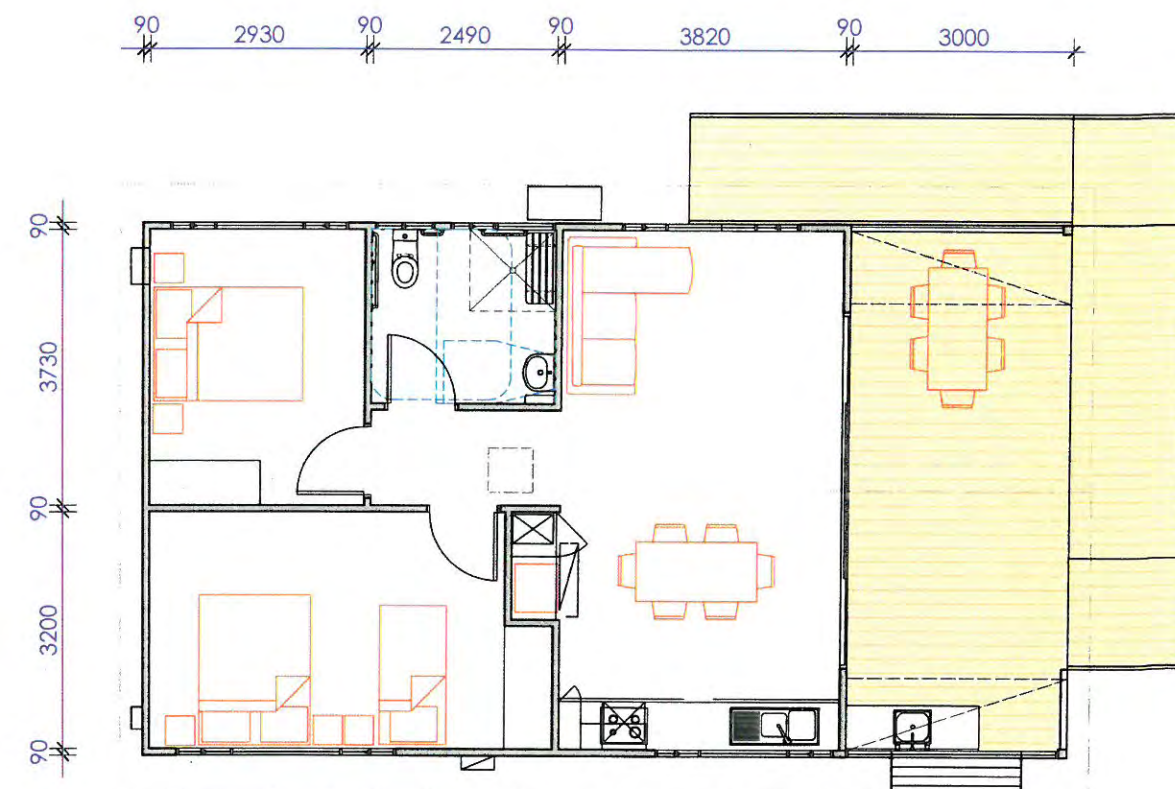
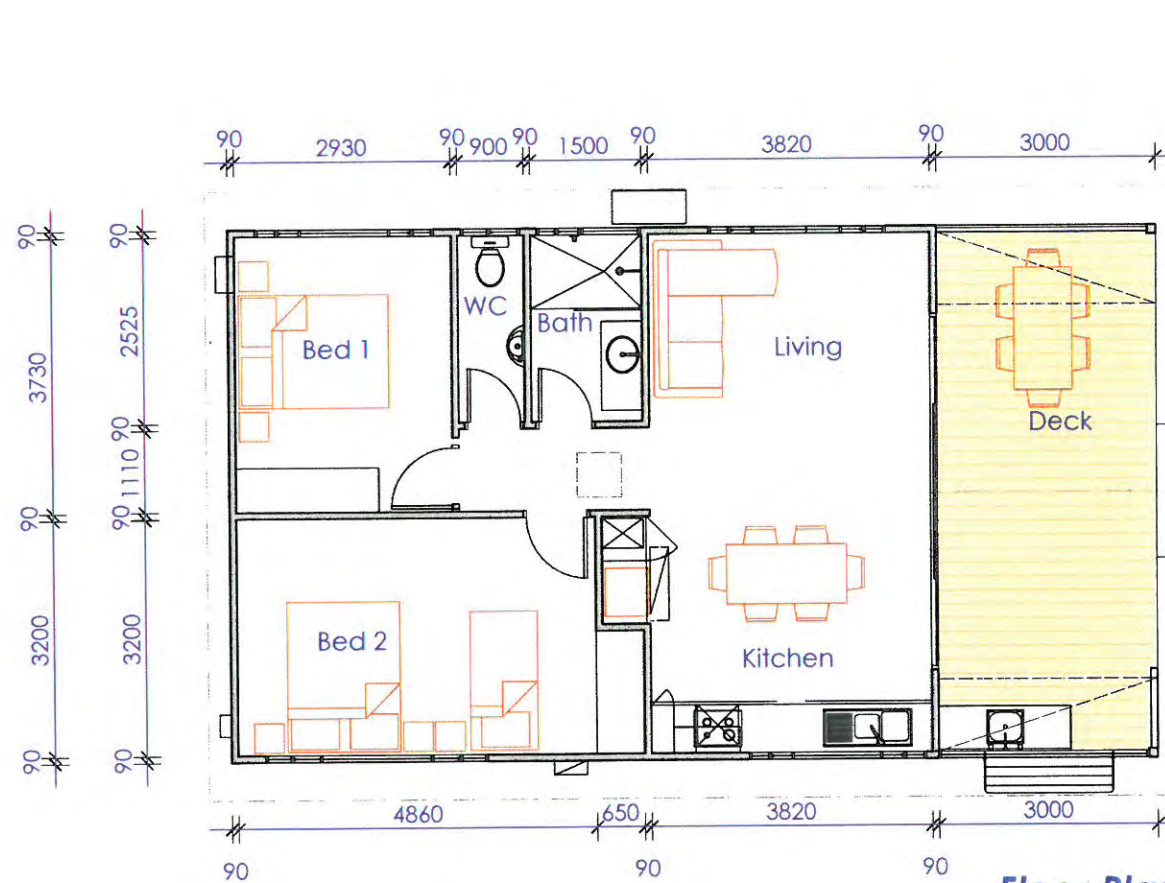
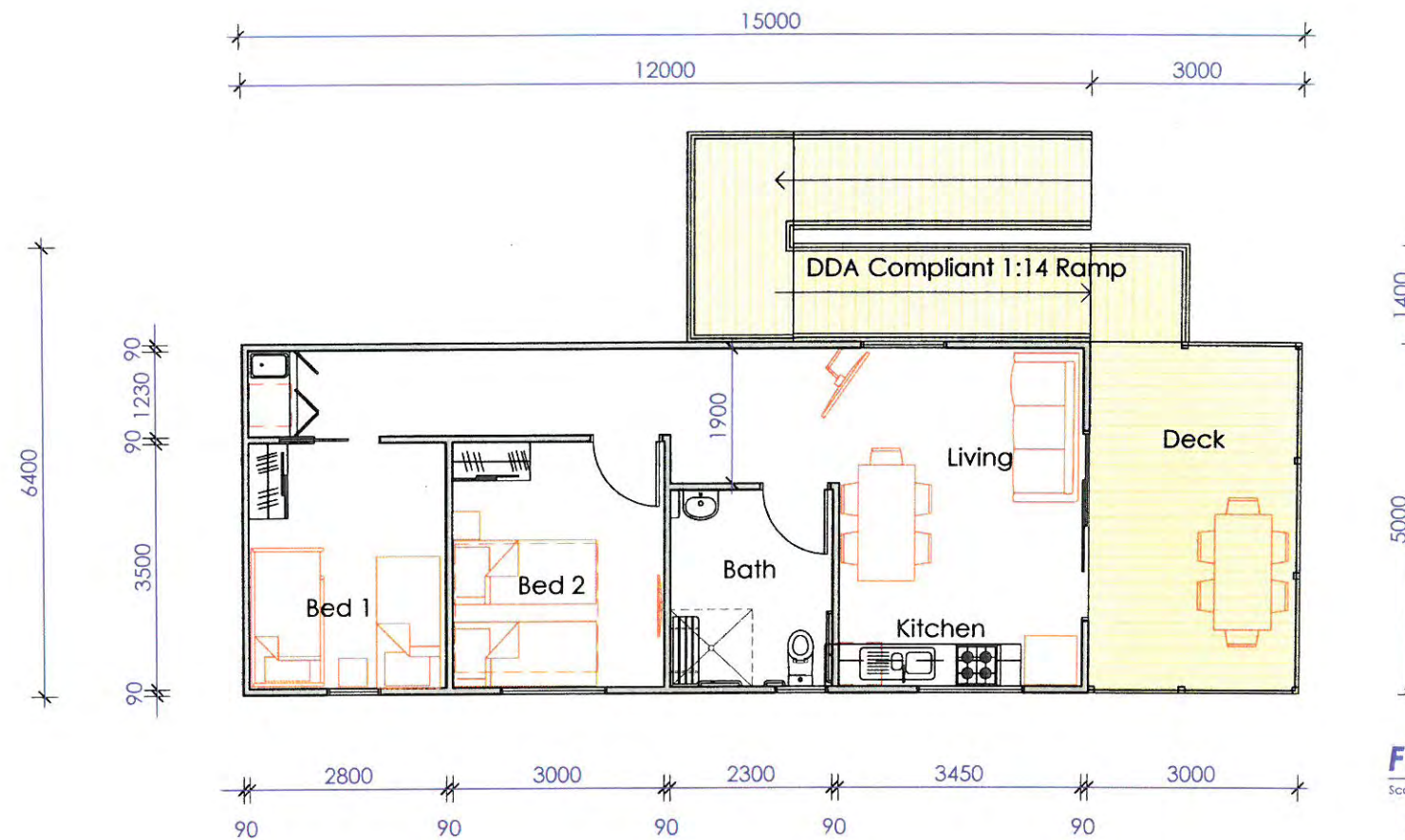
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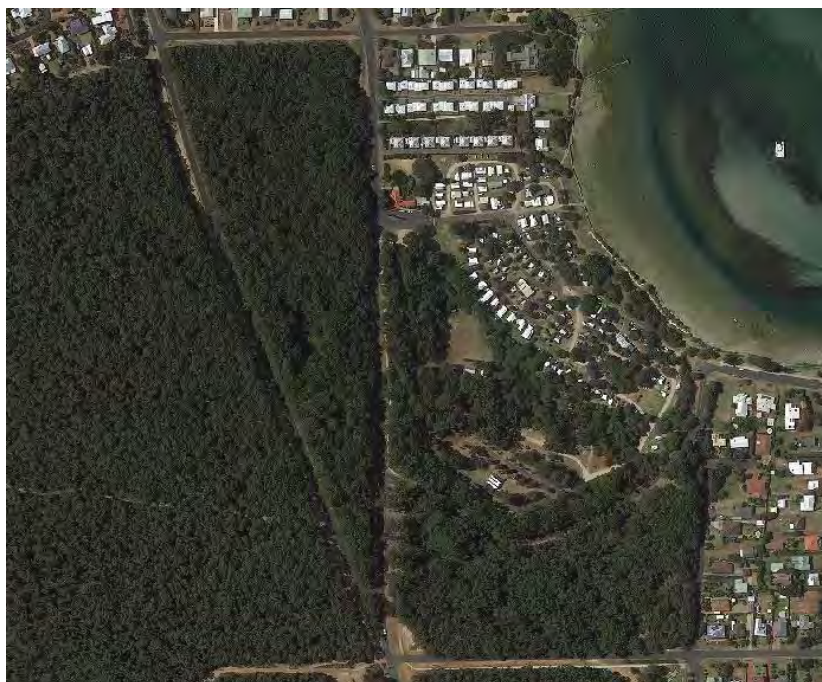
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Fauna Assessment



Turner Caravan Park Augusta

MAY 2018

Version 1

On behalf of:

The Chief Executive Officer
Shire of Augusta Margaret River
PO Box 61
Margaret River WA 6285

Prepared by:

Greg Harewood
Zoologist
PO Box 755
BUNBURY WA 6231
M: 0402 141 197
E: gharewood@iinet.net.au

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Acronyms/Abbreviations:

ALA: Atlas of Living Australia – Website - www.ala.org.au/

BA: Birdlife Australia (Formerly RAOU, Birds Australia).

BC Bill: *Biodiversity Conservation Bill (2015)*. WA Government.

BoM: Bureau of Meteorology, Australian Government.

°C: Degrees Celsius.

CALM: Department of Conservation and Land Management (now DPaW), WA Government.

CAMBA: China Australia Migratory Bird Agreement 1998.

CBD: Central Business District.

DAA: Department of Aboriginal Affairs, Western Australia.

DAFWA: Department of Agriculture and Food, Western Australia.

DBCA: Department of Biodiversity, Conservation and Attractions (formerly DPaW, DEC, CALM, DoE), WA Government

DBH: Diametre at breast height (~1.5m) of a tree.

DEC: Department of Environment and Conservation (now DPaW and DER), WA Government.

DEH: Department of Environment and Heritage (now DotE), Australian Government.

DEP: Department of Environment Protection (now DER), WA Government.

DER: Department of Environment Regulation (formerly DEC, DoE), WA Government.

DEWHA: Department of the Environment, Water, Heritage and the Arts (now DotEE), Australian Government

DMP: Department of Mines and Petroleum (now DMIRS), WA Government.

DoE: Department of Environment (now DWER), WA Government.

DotE: Department of the Environment (now DotEE), Australian Government.

DotEE: Department of the Environment and Energy (formerly DotE, SEWPac, DWEHA, DEH), Australian Government.

DoIR: Department of Industry and Resources (now DMIRS), WA Government.

DMIRS: Department of Mines, Industry Regulation and Safety (formerly DMP, DoIR), WA Government.

DoW: Department of Water (now DWER), WA Government.

DPaW: Department of Parks and Wildlife (formerly DEC, CALM, DoE), WA Government.

DWER: Department of Water and Environmental Regulation (formed by the amalgamation of OEPA, DoW and DER), WA Government.

EP Act: *Environmental Protection Act 1986*, WA Government.

EPA: Environmental Protection Authority, WA Government.

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999*, Australian Government.

GIS: Geographical Information System.

ha: Hectare (10,000 square metres).

IBRA: Interim Biogeographic Regionalisation for Australia.

IUCN: International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.

JAMBA: Japan Australia Migratory Bird Agreement 1981.

kms: Kilometres.

MNES: Matters of National Environmental Significance.

MRWA: Main Roads Western Australia, WA Government

m: Metre.

mm: Millimetre.

P: Priority - DPaW fauna conservation ranking.

POS: Public Open Space.

RAOU: Royal Australia Ornithologist Union.

ROKAMBA: Republic of Korea-Australia Migratory Bird Agreement 2007.

S: Schedule - Western Australian *Wildlife Conservation Act (1950)* Threatened Fauna Category.

SEWPaC: Department of Sustainability, Environment, Water, Population and Communities (now DotEE, formerly DEH, DEWHA), Australian Government

SRE: Short Range Endemic.

SSC: Species Survival Commission, International.

WA: Western Australia.

WAM: Western Australian Museum, WA Government.

WRP: Western Ringtail Possum.

SUMMARY

This report details the results of a “fauna survey” of the Turner Caravan Park (and some adjoining reserves) carried out on behalf of the Shire of Augusta Margaret River (The Shire). The area assessed has included the entire Turner Caravan Park area (the Park) (Lots 35 and 858) and adjacent reserves and public land bounded by Osnaburg Street, Allnut Terrace and Hardy Street (R9658, R4376, R39910, R19230, VCL) and vegetation bordering Blackwood Avenue and Albany Terrace, in total referred to as the Subject Site. The subject site totals about 21.5 hectares (Figure 1 and 2).

The primary aim of the fauna assessment was to identify any likely constraints (with an emphasis on the presence and habitat of the western ringtail possum and black cockatoos) on proposed development initiatives already identified within the Park including the following:

- additional foreshore camping sites as per the 2017 site layout plan;
- new chalets as per 2017 Chalet Masterplan; and
- Tree removals as designated by the Shire and those classified as unsafe trees by the Arbor Guy. (see Appendix F for plans and listings).

To comply with the scope of works a Level 1 fauna survey as defined by the EPA (EPA 2016c) was undertaken and in accordance with these guidelines the assessment has therefore included a literature review and a field reconnaissance survey. Because of the known or likely presence of some listed threatened species (e.g. several species of black cockatoo and the western ringtail possum) are known to occur in the general area, the survey work has also included a targeted assessment of the site’s significance to these species as well.

Field survey work has also included several daytime reconnaissance surveys, two nocturnal surveys and the deployment of camera traps and a bat call recorder (Figure 3).

Daytime field survey work at the site was carried out on various days during March, April and May 2018 (4 March, 24 March, 13, 14 & 15 April and 1 May 2018). Nocturnal surveys of the subject site were carried out on the 13 and 15 April 2018. All field survey work was carried out by Greg Harewood (Zoologist).

Descriptions and examples images of the main fauna habitats/dominant vegetation present within the subject site are provided in Table 1. The location and extent of each unit are shown in Figure 4.

The majority (~63%) of the caravan park itself is cleared or parkland cleared with scattered peppermint, marri, karri, paperbark and a range of other endemic, non-endemic and exotic trees and shrubs. The centre of the Park contains a remnant paperbark swamp which appears to be seasonally inundated or at least waterlogged

during the wetter months of the year. The western and eastern sides of caravan park contain a remnant karri and marri dominated open forest over dese shrubland.

The bushland reserves contain karri and marri dominated open forest in the south and a marri jarrah dominated open forest in the north.

The fauna habitat values of the cleared and parkland cleared sections of the Park are low given the absence of native ground cover, leaf litter, hollow logs, and a paucity of hollow trees. Biodiversity would therefore be very low with only a fraction of the potential species likely to occur. This area does however represent potential habitat for the western ringtail possum given the high number of peppermints. There are also a number of marri trees known to be favoured by black cockatoos as a food source.

The remnant bushland areas (within the Park and in the reserves) are in very good condition with dense ground cover, abundant leaf litter, fallen hollow logs and numerous hollow trees. These areas have a high potential to host a large number of the predicted fauna species including a number of threatened and priority species.

The black cockatoo habitat tree assessment identified a total of 583 trees with a DBH of ≥ 50 cms within the subject site. Four hundred and twenty of the trees (420, ~72.0%) were not observed to contain hollows of any size. One hundred and thirty trees (130, ~22.3%) contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

Thirty three trees (33, ~5.7%) were identified as potentially containing a hollow that appeared possibly big enough to allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk though conclusive evidence of actual use by black cockatoos (e.g. chew marks) was not seen in any instance.

None of the identified potential black cockatoo hollows were located within trees located inside the bounds of the caravan park itself, where trees with hollows on any size are rare (only 10 trees with possible hollows recorded).

Additional details on each habitat tree observed can be found in Appendix D.

Excluding totally cleared areas, almost the entire site can be regarded as containing foraging habitat of some type given the presence of a range of plant species documented as being foraged upon by cockatoos. It should however be noted that some plant species are favoured over others, with marri, when present, being the preferred food source for all three species of black cockatoo. Plant species such as karri do not contribute to the resource significantly despite being common as it is much less frequently fed upon.

In some areas the favoured foraging species are absent or represented by only a small number of specimens. Much of the caravan park contains only poor quality foraging habitat given the absence of favoured foraging species such as marri and jarrah.

Very little foraging debris left by black cockatoos was observed within the subject site with evidence being limited to chewed fruits from a non-endemic eucalyptus species. This evidence could not be attributed specifically to any one of three black cockatoo species known to frequent the general area.

No evidence of black cockatoo roosting within trees located within the subject site was observed during the field reconnaissance survey.

The locations of various western ringtail possum observations made during the site surveys are shown in Figure 6.

Eight WRPs were observed during the first nocturnal survey of the site, all within the Park boundary (or very close). Eleven individuals were recorded during the second nocturnal survey (nine with the Park Boundary). The distribution of the observations suggests that there were at least 10 WRPs present with the Park boundary at the time of the surveys.

Based on the observations made, the majority of the vegetated sections of the site represents WRP habitat of some type (i.e. refuge, foraging or dispersal).

Two other fauna species of conservation significance were recorded during the assessment these being the quenda and the south-western brush-tailed phascogale (both recorded several times at several locations on camera traps).

With respect to native vertebrate fauna, 20 mammal (including nine bat species), 107 bird, 28 reptile and 11 frog species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Nine species of introduced animals could also frequent the area.

Of the 166 native vertebrate animals that are listed as potentially occurring, six are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law (the three black cockatoo species, peregrine falcon, western ringtail possum and south-western brush-tailed phascogale (Schedule 6). In addition, four DBCA priority species are also listed as potentially occurring (short-nosed snake, masked owl, quenda and western false pipistrelle).

Three species were confirmed as present during the fauna survey south-western brush-tailed phascogale, western ringtail possum and quenda. Black cockatoo foraging activity was also recorded but the specific species responsible could not be determined. Thirty four other native fauna species were also recorded during the assessment, most being common widespread bird species.

Constraints on development within the study area will largely be centred on the presence of habitat used or potentially used by the western ringtail possum. The potential impacts on this species and/or its habitat will need to be taken into consideration during the ongoing planning and construction phases of the proposed development initiatives and tree trimming or removal.

A series of other recommendations aimed at mitigating and minimising potential impacts on western ringtail possum (and fauna and fauna habitat in general) are provided in Section 7. These should be taken into consideration during planning and development and implemented if considered reasonable and practicable.

The need to refer the proposed development initiatives to the DoTEE for assessment to ensure compliance with the *EPBC Act* should be considered by the Shire given the recent upgrade of the western ringtail possum's status to critically endangered at the federal level.

1. INTRODUCTION

This report details the results of a “fauna survey” of the Turner Caravan Park (and some adjoining reserves) carried out on behalf of the Shire of Augusta Margaret River (The Shire).

The Shire Council has approved funding in the 2017-18 budget to conduct a review of the Turner Caravan Park and to develop a Concept Master Plan that will inform future development within the Park.

As a part of the concept master planning process the Shire require a “Fauna Survey” be undertaken with the main objectives being defined as:

Undertake a fauna survey of the Caravan Park with emphasis on the presence and habitat of the western ringtail possum and black cockatoos and provide a report based on the Environmental Protection Authority “Guidelines for Fauna surveys for environmental impact assessment” including identification of those constraints and opportunities for the Park.

The area assessed has included the entire Turner Caravan Park area (the Park) (Lots 35 and 858) and adjacent reserves and public land bounded by Osnaburg Street, Allnut Terrace and Hardy Street (R9658, R4376, R39910, R19230, VCL) and vegetation bordering Blackwood Avenue and Albany Terrace, in total referred to as the Subject Site (Figure 1 and 2).

The subject site totals about 21.5 hectares.

2. SCOPE OF WORKS

The Shire have defined the following services as the scope of works:

- Undertake a fauna survey of the entire Park area and adjacent public land including reconnaissance surveys of Reserves in the area bounded by Osnaburg Street, Allnut Terrace and Hardy Street, with emphasis on the presence and habitat of the western ringtail possum and black cockatoos and provide a report based on the Environmental Protection Authority “Guidelines for Fauna surveys for environmental impact assessment” (EPA 2016c) including identification of those constraints and opportunities for the Park.
- Report fauna sighting signs and observations.
- A minimum of two non-consecutive night surveying sessions should be undertaken.
- The consultant is required to make an assessment on the impacts on the proposed development initiatives already identified within the Park including the following:
 - additional foreshore camping sites as per the 2017 site layout plan;
 - new chalets as per 2017 Chalet Masterplan; and
 - Tree removals as designated by the Shire and those classified as unsafe trees by the Arbor Guy.

(See Appendix F for plans and listings)

- If significant fauna species are located in the proposed development areas the consultant is required to provide advice about the potential impact on the species and appropriate ways to reduce, mitigate and manage impacts; and
- Identify any fauna constraints and opportunities for the Park to inform the overall masterplan.

Note: For the purposes of this proposal the term Black Cockatoo is in reference to Baudin’s Black Cockatoo *Calyptorhynchus baudinii*, Carnaby’s Black Cockatoo *Calyptorhynchus latirostris* and the Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*.

3. METHODS

3.1 POTENTIAL FAUNA INVENTORY - LITERATURE REVIEW

3.1.1 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of conservation significant fauna potentially occurring within the subject site:

- DBCA's NatureMap Database Search (combined data from DBCA, ALA, WAM, BA and consultant's reports) (DBCA 2018b); and
- Protected Matters Search Tool (DotEE 2018).

It should be noted that lists produced during the abovementioned database searches contain observations/inferred distributions from a broader area than the subject site and therefore may include species that would only ever occur as vagrants due to a lack of suitable habitat or the presence of only marginal habitat within the subject site itself. The databases also often included or are based on very old records and in some cases the species in question have become locally or regionally extinct.

Information from these sources should therefore be taken as indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

3.1.2 Previous Fauna Surveys in the Area

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publicly available and could not be referenced. The most significant of those available have been used as the primary reference material for compiling a list of fauna species of conservation significance most likely to occur in the general area.

Those reports referred to included, but were not limited to:

- ATA Environmental (2005). Fauna Survey Riverslea Subdivision. Unpublished Report for Greendene Development Corporation Ltd.
- ATA Environmental (2006). Location 413 Smiths Beach Fauna Assessment Survey. Unpublished report for Canal Rocks Properties.
- Biota (2009). Milyeannup Wind Farm - Terrestrial Fauna Survey. Unpublished report for Verve Energy.
- Christensen, P., Annels, A., Liddelow, G. and Skinner, P. (1985). Vertebrate Fauna in The Southern Forests of Western Australia, A Survey. Forest Dept. of Western Australia, Bull. No. 94. Perth.

- ENV Australia (2007). Busselton to Margaret River Transmission Line – Biological Assessment. Unpublished report for Western Power.
- GHD (2012). Flora and Fauna Assessment - Report for Margaret River Bypass. Unpublished report for MRWA.
- Green Iguana (2009). Vertebrate fauna of Lot 320 Higgins Road, Margaret River, and Shire of Augusta-Margaret River Reserves R27633 and R39081. Unpublished report for Strategen.
- Harewood, G. (2009). Fauna Survey (Level 2). Gracetown. Unpublished report for Strategen.
- Harewood, G. (2013). Fauna Assessment Busselton to Flinders Bay Rail Trail. Unpublished report for ngh environmental.
- How, R.A., Dell, J., and Humphreys, W. F. (1987). The ground vertebrate fauna of coastal areas between Busselton and Albany, Western Australia. Records of the Western Australian Museum 13(4):553-574.
- Ninox Wildlife Consulting (1989). Fauna Survey - Beenup Heavy Minerals Mine ERMP. Unpublished report for BHP UTAH.
- NGH/Harewood, G. (2015). Level 2 Fauna Survey Meelup Regional Park. Unpublished report for City of Busselton.

As with the databases searches some reports refer to species that would not occur in the subject site due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential fauna species list. It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

3.1.3 Existing Publications

The following represent the main publications used to identify and refine the potential fauna species list for the subject site:

- Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.
- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.
- Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.
- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.

- Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.
- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.
- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.
- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Oxford University Press, Melbourne.
- Morgan, D.L., Beatty, S.J., Klunzinger, M.W, Allen, M.G. and Burnham, Q.E (2011). Field Guide to the Freshwater Fishes, Crayfishes and Mussels of South Western Australia. Published by SERCUL.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.
- Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.
- Van Dyck, S., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.
- Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Reed, New Holland, Sydney.
- Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing.

3.1.4 Fauna of Conservation Significance

The conservation significance of fauna species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Administered by the Australian Government DoEE;
- *Wildlife Conservation Act 1950 (WC Act)*. Administered by the Western Australian DBCA (Govt. of WA 2018);
- Red List produced by the SSC of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- DBCA Priority Fauna list. A non-statutory list maintained by the DBCA for management purposes (DBCA 2018a).

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA);
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

(Note - Species listed under JAMBA are also protected under Schedule 5 of the *WC Act*.)

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (MNES) under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the subject site has been assessed using the most recent lists published in accordance with the above mentioned instruments and is indicated as such in the fauna listings of this report. A full listing of conservation codes is provided in Appendix A.

3.1.5 Taxonomy and Nomenclature

Taxonomy and nomenclature for vertebrate fauna species used in this report is generally taken from the DBCA's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles and Johnstone (2001) for birds. Jackson and Groves (2015) has been used for mammals.

Common names are taken from the Western Australia Museum (WAM) recognised primary common name listings when specified, though where common names are not provided they have been acquired from other publications. Sources include Cogger (2014), Wilson and Swan (2017), Van Dyck & Strahan (2013), Christidis and Boles (2008), Bush *et al.* (2010), Bush *et al.* (2007), Tyler & Doughty (2009), and Glauret (1961). Not all common names are generally accepted.

3.1.6 Likelihood of Occurrence – Fauna of Conservation Significance

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the subject site itself. The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the subject site and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
 - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20 km of the subject site. Populations do however persist outside of this area.
 - Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the Cape Naturaliste/Leeuwin Ridge area. Populations do however persist outside of this area.
- Unlikely to Occur: The subject site is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the subject site itself would not support individuals or a population the species.
- Possibly Occurs: The subject site is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field assessment, supported in some cases by recent records being documented in literature from within or near the subject site. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

- **Known to Occur:** The species in question was positively identified as being present (for sedentary species) or as using the subject site as habitat for some other purpose (for non-sedentary/mobile species) during the field survey. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. foraging debris, tracks and scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

3.2 SITE SURVEYS

Daytime field survey work at the site was carried out on various days during March, April and May 2018 (4 March, 24 March, 13, 14 & 15 April and 1 May 2018). Nocturnal surveys of the subject site were carried out on the 13 and 15 April 2018. All field survey work was carried out by Greg Harewood (Zoologist).

3.2.1 Fauna Habitat Assessment

Vegetation units, landforms and soils observed during the daytime inspection have been used to define broad fauna habitat types across the subject site.

The main aim of the habitat assessment was to determine if it was likely that any species of conservation significance would be utilising the areas that maybe impacted on as a consequence of development at the site. The habitat information obtained was also used to aid in finalising the overall potential fauna list.

As part of the desktop literature review, available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area was researched. During the field survey the habitats within the subject site were assessed and specific elements identified, if present, to determine the likelihood of listed threatened species utilising the area and its significance to them.

3.2.2 Black Cockatoo Habitat Assessment

The following methods were employed during the black cockatoo habitat assessment to comply with the defined scope of works and are based on guidelines published by the DotEE (Commonwealth of Australia 2012) which states that surveys for Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;
- maximise the chance of detecting the species' habitat and/or signs of use;
- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km);

- account for uncertainty and error (false presence and absences); and
- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

Habitat used by black cockatoos have been placed into three categories by the DotEE (Commonwealth of Australia 2012) these being:

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

So as to comply with the requested scope of works and in line with the published guidelines the following was carried out.

3.2.2.1 Black Cockatoo Breeding Habitat

The black cockatoo breeding habitat assessment involved the identification of all suitable breeding trees species (native, endemic species only) within the subject site that had a DBH of equal to or over 50cm. The DBH of each tree was estimated using a pre-made 50 cm “caliper”.

Target tree species included marri and jarrah or any other *Corymbia/Eucalyptus* species of a suitable size that may have been present. Peppermints, *banksia*, sheoak and *melaleuca* tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) were marked with “H” using spray paint for easy future reference.

Potential hollows were placed into one of four categories, based on the size of the apparent hollow entrance, these being:

- Small = ~<5cm diameter (i.e. entrance too small for a black cockatoo);
- Medium = ~5cm-10cm diameter (i.e. entrance too small for a black cockatoo);
- Large = ~>10cm diameter (entrance large enough for a black cockatoo but possible hollow appears to be unsuitable for nesting i.e. wrong orientation, too small, too low or too shallow); or
- Large (cockatoo) = ~>10cm diameter (entrance appears big enough to provide access to a possible hollow that may be suitable for a black cockatoo to use for nesting).

Based on this assessment trees present within the subject site have been placed into one of four categories:

- Tree < 50cm DBH or an unsuitable species (not recorded);
- Tree \geq 50cm DBH, no hollows seen;
- Tree \geq 50cm DBH, one or more hollows seen, none of which were considered suitable for black cockatoos to use for nesting; or
- Tree \geq 50cm DBH, one or more hollows seen, with at least one considered suitable for black cockatoos to use for nesting.

For the purposes of this assessment a tree containing a potential cockatoo nest hollow was defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by a black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 10cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk were recorded as a “potential black cockatoo nest hollow”.

Identified hollows were 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). Trees with possible nest hollows were also scratched and raked with a large stick/pole in attempt to flush any sitting birds from hollows and calls of chicks were also listened for. It should be noted that the survey may have been conducted outside of the main breeding season of one or more of the three species of black cockatoo.

3.2.2.2 Black Cockatoo Foraging Habitat

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the reconnaissance survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

3.2.2.3 Black Cockatoo Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees was with the subject site was noted if observed (e.g. branch clippings, droppings or moulted feathers).

3.2.3 Western Ringtail Possum Assessment

To determine if western ringtail possums were utilising the study area the following was carried out:

- Concurrent with the daytime black cockatoo habitat assessment dreys (and other potential daytime refuge habitat), scats and individual WRPs were searched for and recorded if observed; and
- Two night time surveys to locate and record the distribution and abundance of WRPs within the subject site was carried out. The nocturnal counts involved the systematic searching of potential WRP habitats on foot using a head torch.

3.2.4 Camera Traps

Eleven motion sensing, infrared “camera traps” (Acorn model LTI 5210A) were placed within subject site on the 4 March 2018. These were retrieved in 24 March 2018 (20 days of deployment). The camera traps were set to take three consecutive pictures when triggered, with a 10 second time lapse before any subsequent trigger event. The location of each camera trap is shown in Figure 3.

A total of 220 “camera trap days” were achieved and 962 pictures taken, though it should be noted that on some cameras a high percentage of photos taken were caused by moving vegetation. All pictures were examined and fauna species, where possible, identified. Only one image of each species taken on any one day was documented as a record.

3.2.5 Acoustic Bat Recordings

Two nights of acoustic bat call recordings was undertaken using a Wildlife Acoustics SM2+ Bat Detector. The recordings were undertaken on the 14 and 15 April 2018, commencing at sunset and continuing until sunrise the following day. The recording location is shown in Figure 3.

The detector converts ultrasonic echolocation signals produced by bats into audible electronic signals that are then recorded. The recordings were later processed by Bob Bullen (Bat Call WA Pty Ltd) to determine the presence of species specific calls.

3.2.6 Other Fauna Species of Conservation Significance

Evidence of the presence or likely presence of other fauna species of conservation significance (or suitable habitat) was searched for and recorded concurrent with other site surveys. The aim was to obtain sufficient information to make a definitive comment on the likely significance of the subject site to other fauna species of conservation significance.

Methods involved searching microhabitats such as logs, rocks, leaf litter and observations with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted if observed/heard.

3.2.7 Opportunistic Fauna Observations

Opportunistic observations of fauna species were made during all field survey work and recorded where positive species identifications were made.

4. SURVEY CONSTRAINTS

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. It should also be recognised that site conditions can change with time.

Some fauna species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the subject site or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to:

- seasonal inactivity during the field survey;
- species present within micro habitats not surveyed;
- cryptic species able to avoid detection; and
- transient wide-ranging species not present during the survey period.

Lack of observational data on some species should therefore not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

The habitat requirements and ecology of many of the species known to occur in the wider area are often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on an apparent lack of a specific habitat or microhabitat within the subject site. As a consequence of this limitation the potential fauna list produced is most likely an overestimation of those species that actually utilise the subject site for some purpose. Some species may be present in the general area but may only use the subject site itself on rare occasions or as vagrants/transients.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any fauna species that would possibly occur within the subject site (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author, has been assumed to potentially occur in the subject site.

During the black cockatoo habitat survey trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.

5. RESULTS

5.1 POTENTIAL FAUNA INVENTORY – LITERATURE REVIEW

A list of vertebrate fauna species considered most likely to occur in the subject site has been compiled from information obtained during the literature review and is presented in Appendix B. This listing was refined after information gathered during the site reconnaissance survey was assessed. The results of some previous fauna surveys carried out in the general area are summarised in this listing as are the DBCA NatureMap database search results (with species considered unlikely to occur being omitted). The raw database search results from NatureMap (DBCA 2017) and the Protected Matters Search Tool (DotEE 2017) are contained within Appendix C.

The list of potential fauna takes into consideration that firstly, the species in question is not known to be locally extinct and secondly, that suitable habitat for each species, as identified during the habitat assessment, is present within the subject site, though compiling an accurate list has limitations (see Section 4 above) and therefore as discussed, the listing is very likely to be an overestimation of the fauna species actually present onsite at any one time. Some of the species listed are less likely to occur in some section of the subject site than others (i.e. the actual Caravan Park area is less likely to harbour some of the listed species than the vegetated reserves).





With respect to native vertebrate fauna, 20 mammal (including nine bat species), 107 bird, 28 reptile and 11 frog species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Nine species of introduced animals could also frequent the area.


Of the 166 native vertebrate animals that are listed as potentially occurring, six are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law. In addition, four DBCA priority species are also listed as potentially occurring.

5.1.1 Fauna Habitat Assessment

Descriptions and examples images of the main fauna habitats/dominant vegetation present within the subject site are provided in Table 1. The location and extent of each unit are shown in Figure 4.

Table 1: Main Fauna Habitats within the Subject Site

Fauna Habitat Description	Example Image
<p>Karri (<i>Eucalyptus diversicolor</i>) and Marri (<i>Corymbia calophylla</i>) Open Forest over Shrubland.</p> <p>Total Area = ~9.4 ha (~43.9%)</p>	
<p>Marri (<i>Corymbia calophylla</i>) Jarrah (<i>Eucalyptus marginata</i>) Open Forest over Low Shrubland.</p> <p>Total Area = ~3.9 ha (~18.2%)</p>	
<p>Paperbark Low Open Forest over shrubland and sedges. Small area of <i>Typha orientalis</i>. Seasonally inundated/waterlogged.</p> <p>Total Area = ~1.0 ha (~4.7%)</p>	
<p>Sedgeland within Karri Marri Open Forest. Seasonally inundated/waterlogged.</p> <p>Total Area = ~0.1 ha (~0.5%)</p>	

Fauna Habitat Description	Example Image
<p>Scattered trees over grassland, buildings & minor roads (63% of Caravan Park).</p> <p>Total Area = ~5.6 ha (~26.2%)</p>	
<p>Major Roads/Verges</p> <p>Total Area = ~1.4 ha (~6.5%)</p>	<p>No Image</p>

The majority (~63%) of the caravan park itself is cleared or parkland cleared with scattered peppermint, marri, karri, paperbark and a range of other endemic, non-endemic and exotic trees and shrubs. The centre of the Park contains a remnant paperbark swamp which appears to be seasonally inundated or at least waterlogged during the wetter months of the year. The western and eastern sides of caravan park contain a remnant karri and marri dominated open forest over dese shrubland.

The bushland reserves contain karri-marri dominated open forest in the south and a marri-jarraah dominated open forest in the north.

The overall fauna habitat values of the cleared and parkland cleared sections of the Park are low given the absence of native ground cover, leaf litter, hollow logs, and a paucity of hollow trees. Biodiversity would therefore be very low with only a fraction of the potential species likely to occur. This area does however represent potential habitat for the western ringtail possum given the high number of peppermints. There are also a number of marri trees, the fruits of which are known to be favoured by black cockatoos as a food source.

The remnant bushland areas (within the Park and in the reserves) are in very good condition with dense ground cover, abundant leaf litter, fallen hollow logs and numerous hollow trees. These areas have a high potential to host a large number of the predicted fauna species including a number of threatened and priority species.

5.1.2 Black Cockatoo Habitat Assessment

5.1.2.1 Black Cockatoo Habitat Tree Assessment

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) which were found within the subject site are comprised of the following species:

- Karri – *Eucalyptus diversicolor*;
- Marri – *Corymbia calophylla*;
- Jarrah - *Eucalyptus marginata*;
- Blackbutt - *Eucalyptus patens*; and
- Dead unidentifiable or unknown species.

A summary of the potential black cockatoo breeding trees (using DotEE criteria i.e. any suitable tree species with a DBH \geq 50cm (Commonwealth of Australia 2012)) observed within the subject site is provided in Table 2 below and their location shown in Figure 5.

Table 2: Summary of potential cockatoo breeding habitat trees (DBH \geq 50cm)

Total Number of Habitat Trees	Number of Trees with <u>No Hollows</u> Observed	Number of Trees with Hollows Considered <u>Unsuitable</u> for Nesting Black Cockatoos	Number of Trees with Hollows Considered <u>Possibly Suitable</u> for Nesting Black Cockatoos	Tree Species				
				Karri	Marri	Jarrah	Blackbutt	Unknown
583	420	130	33	252	223	57	26	25

The assessment identified a total of 583 trees with a DBH of \geq 50cms within the subject site. Four hundred and twenty of the trees (420, ~72.0%) were not observed to contain hollows of any size. One hundred and thirty trees (130, ~22.3%) contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

Thirty three trees (33, ~5.7%) were identified as potentially containing a hollow that appeared possibly big enough to allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk though conclusive evidence of actual use by black cockatoos (e.g. chew marks) was not seen in any instance.

None of the identified potential black cockatoo hollows were located within trees located inside the bounds of the caravan park itself where trees with hollows on any size are rare (only 10 trees with possible hollows recorded).

Additional details on each habitat tree observed can be found in Appendix D.

5.1.2.2 Black Cockatoo Foraging Habitat Assessment

Following is a list of the main flora species recorded within the subject site during the fauna assessment that are known to be used as a direct food source (i.e. seeds or flowers) by one or more species of black cockatoo:

- Karri – *Eucalyptus diversicolor*;
- Marri – *Corymbia calophylla*;
- Jarrah - *Eucalyptus marginata*;
- Blackbutt - *Eucalyptus patens*; and
- Small number of endemic, no-nendemic and exotic species.

Excluding totally cleared areas, almost the entire site can be regarded as containing foraging habitat of some type given the presence of the above-mentioned plant species, though the density and distribution of species varies from area to area and therefore the exact extent and quality is difficult to quantify. It should also be noted that some plant species are favoured over others with marri, when present, being the preferred food source for all three species of black cockatoo. Plant species such as karri do not contribute to the resource significantly despite being common as it is much less frequently fed upon.

In some areas the favoured foraging species are absent or represented by only a small number of specimens. Much of the caravan park contains only poor quality foraging habitat given the absence of favoured foraging species such as marri and jarrah.

Very little foraging debris left by black cockatoos was observed within the subject site with evidence being limited to chewed fruits from a non-endemic eucalyptus species. This evidence could not be attributed specifically to any one of three black cockatoo species known to frequent the general area.

5.1.2.3 Black Cockatoo Roosting Habitat Assessment

No evidence of black cockatoo roosting within trees located within the subject site was observed during the field reconnaissance survey.

5.1.3 Western Ringtail Possum Assessment

The locations of various western ringtail possum observations made during the site surveys are shown in Figure 6.

Only two WRP dreys were observed during the day survey. One hundred and sixty three trees containing possible hollows were also observed though not all are likely to be suitable for WRPs to utilise. Forks in trees, subtle cavities in tree trunks, fallen hollow logs, rabbit burrows and dense ground cover (e.g. swordgrass/sedges) are also use by

WRPs for daytime refuge and therefore observations of dreys and hollows only provide a guide to WRP habitat use/quality as other opportunities for daytime refuge may exist.

WRP scats were observed at seven separate locations. Over the majority of the subject site dense groundcover made searching for scats difficult and time consuming and therefore this method for determining WRP presence was not employed extensively.

Eight WRPs were observed during the first nocturnal survey of the site, all within the Park boundary (or very close). Eleven individuals were recorded during the second nocturnal survey (nine with the Park Boundary). The distribution of the observations suggests that there were at least 10 WRPs present with the Park boundary at the time of the surveys.

Four common brushtail possums were observed during the first night survey (none with the park boundary). Two individuals were observed on the second night survey, both within the Park boundary.

Based on the observations made, the majority of the vegetated sections of the site represents WRP habitat of some type (i.e. refuge, foraging or dispersal).

5.1.4 Camera Traps

The complete results of the camera trapping carried out are provided within Appendix E. In total, 18 fauna species (native and introduced) were recorded. Of most interest was the recording of the Priority 4 quenda (*Isoodon fusciventer*) six times at four locations, the Schedule 6 (*WC Act*) south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) five times at six times at four locations and the critically endangered (*WC Act* and *EPBC Act*) western ringtail possum (*Pseudocheirus occidentalis*) once at one location.

Feral species recorded included numerous photos of the red fox (*Vulpes vulpes*) and several black rats (*Rattus rattus*).

5.1.5 Acoustic Bat Recordings

Four bat species were recorded during the survey, these being:

- Gould's Long-eared Bat - *Nyctophilus gouldi*;
- Lesser Long-eared Bat - *Nyctophilus geoffroyi*;
- Western Long-eared Bat - *Nyctophilus major major*; and
- Southern Forest Bat - *Vespadelus regulus*.

All of the bats recorded are common widespread species.

5.1.6 Other Fauna Species of Conservation Significance

Besides those species already mentioned as having been recorded (quenda, south-western brush-tailed phascogale and the western ringtail possum) no other fauna species of conservation significance was recorded. Evidence of black cockatoos foraging on site was found but the species responsible could not be determined.

The habitat assessment and other observations made during the field reconnaissance survey suggests that some other fauna species of conservation significance are also likely to persist in the general area. Subject to suitable habitat being present (i.e. quality and extent) it is therefore considered possible that some are likely to reside or at least frequent the subject site at times despite not having been observed/recorded. A summary of those species considered likely to be present is provided in Table 4 (within Section 7) and in Appendix B.

5.1.7 Opportunistic Fauna Observations

Opportunistic fauna observations are listed in Appendix B. Including those species recorded on camera traps and during the nocturnal survey, a total of 37 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons or calls) within the subject site during the survey period. Five introduced species (house mouse, red fox, rabbit, black rat and laughing kookaburra) were also recorded.

Most of the fauna species recorded were common, widespread bird species.

5.2 FAUNA INVENTORY – SUMMARY

Table 3 summarises the number of vertebrate fauna species potentially occurring within or utilising at times the subject site, based on results from the literature review and observations made during the field assessment. A complete list of fauna possibly inhabiting or frequenting the subject site is located in Appendix B.

As previously indicated, not all species listed as potentially occurring within the wider area in existing databases and publications (i.e. *EPBC Act* Threatened Fauna and Migratory species lists, DBCA's NatureMap database, various reports and publications) are shown in the expected listing in Appendix B. Some species have been excluded from this list based largely on the lack of suitable habitat at the subject site and in the general area or known local extinction even if suitable habitat is present.

Table 3: Summary of Potential Vertebrate Fauna Species (as listed in Appendix B)

Group	Total number of <u>Potential</u> species	Potential number of <u>Specially Protected</u> species	Potential number of <u>Migratory</u> species	Potential number of <u>Priority</u> species	Number of species <u>Observed</u>: Field Survey 2018
Amphibians	11	0	0	0	3
Reptiles	28	0	0	1	1
Birds	110 ³	4	0	1	23 ¹
Non-Volant Mammals	17 ⁶	2	0	1	11 ⁴
Volant Mammals (Bats)	9	0	0	1	4
Total	175⁹	6	0	4	42⁵

Superscript = number of introduced species included in total.

Despite the omission of some species it should be noted that the list provided is still very likely an over estimation of the fauna species utilising the site (either on a regular or infrequent basis) as a result of the precautionary approach adopted for the assessment. At any one time only a subset of the listed potential species are likely to be present within the bounds of the subject site.

A number of other species of conservation significance, while possibly present in the general area, are not listed as potential species due to known localised extinction (and no subsequent recruitment from adjoining areas) and/or lack of suitable habitat and/or the presence of feral predators.

6. LIKELIHOOD OF OCCURRENCE AND POTENTIAL IMPACTS

Fauna of conservation significance identified during the literature review as previously being recorded in the general area are listed in Table 4. Each has been assessed and ranked for their likelihood of occurrence within the subject site itself based on information obtained during the fauna assessment.

Proposed development initiatives already identified within the Park include the following:

- Eight (8) additional foreshore camping sites as per the 2017 site layout plan;
- Eight (8) additional chalets as per 2017 Chalet Masterplan (note: some have already been constructed); and
- Tree removals as designated by the Shire and those classified as unsafe trees by the Arbor Guy.

Plans showing the location and layout of the foreshore camping sites and new chalets are contained within Appendix F along with a list of trees recommended by the Arbor Guy as requiring removal or trimming.

The construction of the additional foreshore camping sites (eight in total) and the new chalets (some of which have already been constructed) will likely require the removal or trimming of some trees (mainly peppermints).

The Arbor Guy (2017) provided an assessment of 644 trees within the Park boundary. No immediate action was recommended for 458 of these trees (71.1%). Twenty seven trees (including 18 Peppermints) have been recommended for removal with the balance (157) being subject to various degrees of trimming, ivy removal, bracing or ongoing monitoring.

The potential direct and indirect impact on fauna that may occur as a consequence of clearing, construction and then ongoing use of the area will be dependent on each fauna species habits, population density and the quantity and quality of potential habitat that will be affected.

In general, the most significant potential impacts to fauna of any development include:

- Loss of vegetation/fauna habitat that may be used for foraging, breeding, roosting, or dispersal (includes loss of hollow bearing trees);
- Fragmentation of vegetation/fauna habitat which may restrict the movement of some fauna species;
- Modifications to surface hydrology, siltation of creek lines;

- Changes to fire regimes;
- Pollution (e.g. oil spills);
- Noise/Light/Dust;
- Spread of plant pathogens (e.g. dieback) and weeds;
- Potential increase in the number of predatory introduced species (e.g. cats, foxes);
- Death or injury of fauna during clearing and construction; and
- An increase in fauna road kills subsequent to development.

In this instance impacts will most likely to be related to the loss of habitat and the potential for some species to be killed or injured during clearing. Based on available information the likely impacts on species of conservation significance previously recorded in the general area has been assessed, a summary of which is provided in Table 4 below.

Table 4: Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance (continues on following pages).

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts of Proposed Development Initiatives
	WC Act/ DBCA Priority	EPBC Act				
Cape Leeuwin Freshwater Snail <i>Austroassiminea lethra</i>	S3	-	Natural seepages from limestone or lime sands.	No	Would Not Occur.	No impact.
Carter's Freshwater Mussel <i>Westralunio carteri</i>	S3	-	Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots.	No	Would Not Occur.	No impact.
Western Mud Minnow <i>Galaxiella munda</i>	S3	-	Typically found in small flowing streams near submerged vegetation, occasionally in still water of ponds, swamps and roadside drains. Water is usually darkly tannin stained and acidic (pH 3.0 – 6.0).	No	Would Not Occur.	No impact.
Black stripe minnow <i>Galaxiella nigrostriata</i>	S2	EN	Acidic ephemeral wetlands of the south-west of Western Australia. Generally prefer sandy soils. Has been documented to survive in both natural wetlands, as well as excavated roadside pools.	No/Marginal	Would Not Occur. Locally extinct.	No impact.
Balston's Pygmy Perch <i>Nannatherina balstoni</i>	S3	VU	Acidic, tannin stained freshwater pools, streams and lakes within 30km of the coast, typically situated amongst peat flats. Prefers shallow water and is commonly found in association with tall sedge thickets.	No	Would Not Occur.	No impact.
Salamander Fish <i>Lepidogalaxias salamandroides</i>	S2	-	The species is found in pools in sandy peat flat areas. These waters are usually darkly tannin stained and often very acidic (pH 3.0-6.5). When pools start to dry up in summer, the fish constructs a small burrow in which it aestivates until heavy rains fall in winter.	No/Marginal	Would Not Occur. Locally extinct.	No impact.
Pouched Lamprey <i>Geotria australis</i>	P1	-	This species lives in mud burrows in the upper reaches of coastal streams for the first four years of life until migrating to the sea. Adults migrate up to 60km upstream during spawning.	No	Would Not Occur.	No impact.
White-bellied Frog <i>Geocrinia alba</i>	S1	EN	Occurs only in the Karradale-Witchcliffe area where it persists along creeklines within agricultural landscapes, provided suitable riparian habitat remains intact.	No	Would Not Occur.	No impact.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts of Proposed Development Initiatives
	WC Act/ DBCA Priority	EPBC Act				
Short-nosed Snake <i>Elapognathus minor</i>	P2	-	Restricted to the humid coastal plains of the deep south west. Inhabits heaths edging swamps though also known to inhabit wet sclerophyll forest. Shelters in low dense vegetation such as tussocks and sedges.	Yes	Possibly Occurs. Dense woodland areas only, outside of proposed development areas	No impact anticipated.
Malleefowl <i>Leipoa ocellata</i>	S3	VU	Mainly scrubs and thickets of mallee <i>Eucalyptus</i> spp., boree <i>Melaleuca lanceolata</i> and bowgada <i>Acacia linophylla</i> , also dense litter forming shrublands.	No	Would Not Occur. Regionally extinct.	No impact.
Australasian Bittern <i>Botaurus poiciloptilus</i>	S1	EN	Freshwater wetlands, occasionally estuarine; prefers heavy vegetation such as beds of tall dense <i>Typha</i> , <i>Baumea</i> and sedges in freshwater swamps.	Yes/Very Marginal	Possibly Occurs. May occur very occasionally in dense <i>Typha</i> during winter months?	No impact anticipated.
Black Bittern <i>Ixobrychus flavicollis</i>	P1	-	Freshwater pools, swamps and lagoons well screened with trees. Shelters in dense waterside vegetation.	Yes/Very Marginal	Possibly Occurs. May occur very occasionally in dense <i>Typha</i> during winter months?	No impact anticipated.
Little Bittern <i>Ixobrychus minutus</i>	P4	-	Dense vegetation surrounding/within freshwater pools, swamps and lagoons, well screened with trees. Shelters in dense beds of <i>Typha</i> , <i>Baumea</i> and tall rushes in freshwater swamps around lakes and along rivers.	Yes/Very Marginal	Possibly Occurs. May occur very occasionally in dense <i>Typha</i> during winter months?	No impact anticipated.
Blue-billed Duck <i>Oxyura australis</i>	P4	-	Well vegetated freshwater swamps, large dams and lakes, winters on more open water. Occasionally salt lakes and estuaries freshened by floodwaters.	No	Would Not Occur.	No impact.
Glossy Ibis <i>Plegadis falcinellus</i>	S5	Mig	Well vegetated wetlands, wet pastures, rice fields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats, occasionally dry grasslands.	No	Would Not Occur.	No impact.
Hooded Plover <i>Charadrius rubricollis</i>	P4	-	Broad sandy ocean beaches and bays, coastal and inland salt lakes.	No	Would Not Occur.	No impact.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts of Proposed Development Initiatives
	WC Act/ DBCA Priority	EPBC Act				
Migratory Shorebirds/Wetland Species/Marine Species (various reptiles, birds and mammals)	S5, Various	Ma, Mig, Various	Varies between species but includes open ocean, beaches and permanent/temporary wetlands varying from billabongs, swamps, lakes, floodplains, sewerage farms, saltwork ponds, estuaries, lagoons, mudflats sandbars, pastures, airfields, sports fields and lawns.	No	Would Not Occur.	No impact.
Eastern Osprey <i>Pandion haliaetus</i>	S5	Ma, Mig	Coasts, estuaries, bays, inlets, islands, and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Ascends larger rivers.	No	Possibly Occurs, Flyover only.	No impact.
Peregrine Falcon <i>Falco peregrinus</i>	S7	-	Diverse from rainforest to arid shrublands, from coastal heath to alpine. Mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes.	Yes	Possibly Occurs very occasionally – no potential nest sites.	No impact anticipated.
Masked Owl (SW population) <i>Tyto n. novaehollandiae</i>	P3	-	Roosts and nests in heavy forest, hunts over open woodlands and farmlands.	Yes	Possibly Occurs. May forage in Park area – no roost/nest sites.	No impact anticipated.
Barking Owl (SW population) <i>Ninox connivens connivens</i>	P2	-	Dense vegetation, especially forest and thickets of waterside vegetation such as <i>melaleucas</i> . Roosts in tree hollows.	No/Marginal	Unlikely to Occur.	No impact.
Carnaby's Black Cockatoo <i>Calyptorhynchus latirostris</i>	S2	EN	Forests, woodlands, heathlands, farms; feeds on <i>Banksia</i> , <i>Hakea</i> and Marri.	Yes	Possibly Occurs.	Loss/modification of a small number of habitat/foraging trees. No significant impact likely.
Baudin's Black Cockatoo <i>Calyptorhynchus baudinii</i>	S2	VU	Mainly eucalypt forests where it feeds primarily on the marri seeds.	Yes	Possibly Occurs.	Loss/modification of a small number of habitat/foraging trees. No significant impact likely.
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksia naso</i>	S3	VU	Eucalypt forests, feeds on marri, jarrah, blackbutt, karri, sheoak and snottygobble.	Yes	Possibly Occurs.	Loss/modification of a small number of habitat/foraging trees. No significant impact likely.
Muir's Corella <i>Cacatua pastinator pastinator</i>	S6	-	Farmland and river valleys, mainly partly cleared eucalypt forests.	Yes	Unlikely to Occur Locally extinct.	No impact.
Western Ground Parrot <i>Pezoporus flaviventris</i>	CR	CR	Inhabits low, dry or swampy near-coastal heathland. It usually occurs in habitat that has remained unburnt for long periods of time	No	Would Not Occur Locally extinct.	No impact.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts of Proposed Development Initiatives
	WC Act/ DBCA Priority	EPBC Act				
Fork-tailed Swift <i>Apus pacificus</i>	S5	Ma, Mig	Low to very high airspace over varied habitat from rainforest to semi desert.	Yes	Unlikely to Occur, Flyover only on very rare occasions.	No impact.
Chuditch <i>Dasyurus geoffroii</i>	S3	VU	Forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest.	Yes	Unlikely to Occur Locally extinct?	No impact anticipated.
South-western Brush-tailed Phascogale <i>Phascogale tapoatafa wambenger</i>	S6	-	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover.	Yes	Known to Occur but probably confined mainly to natural woodland areas only, outside of proposed development areas	No impact anticipated.
Quenda <i>Isodon fusciventer</i>	P4	-	Dense scrubby, often swampy, vegetation with dense cover.	Yes	Known to Occur. but probably confined mainly to natural woodland areas with dense ground cover, outside of proposed development areas.	No impact anticipated.
Western Ringtail Possum <i>Pseudocheirus occidentalis</i>	S1	VU	Coastal peppermint, coastal peppermint-tuart, jarrah-marri associations, sheoak woodland, and eucalypt woodland and mallee.	Yes	Known to Occur.	Loss/modification of areas of habitat. Death/injury of individuals during clearing.
Quokka <i>Setonix brachyurus</i>	S3	VU	Currently restricted to densely vegetated coastal heaths, swamps, riverine habitats including tea-tree thickets on sandy soils along creek systems.	Yes	Would Not Occur. Locally extinct.	No impact.
Gilbert's Potoroo <i>Potorous gilbertii</i>	S1	CR	Long-unburnt, dense shrubland on the valley slopes.	No	Would Not Occur. Locally extinct.	No impact.
Woylie <i>Bettongia penicillata ogibyi</i>	S1	EN	Open sclerophyll forest and woodland with a low, dense, understorey of tussock grasses or woody scrub.	No	Would Not Occur Locally extinct.	No impact.
Western Brush Wallaby <i>Macropus irma</i>	P4	-	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets.	Yes	Unlikely to Occur	No impact anticipated.
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	P4	-	Wet sclerophyll forest dominated by karri and in high rainfall zones of the jarrah and marri forest.	Yes	Possibly Occurs. May forage in Park area but unlikely to roost.	No impact anticipated.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts of Proposed Development Initiatives
	WC Act/ DBCA Priority	EPBC Act				
Water Rat <i>Hydromys chrysogaster</i>	P4	-	Permanent water, fresh, brackish or marine.	No/Marginal	Unlikely to Occur	No impact anticipated.
Heath Mouse <i>Pseudomys shortridgei</i>	S1	EN	Occurs in species-rich and structurally complex heathland and woodland	No	Would Not Occur. Locally extinct.	No impact.

See Appendix A for conservation status codes

7. MANAGEMENT RECOMMENDATIONS

The fauna assessment results indicate that the primary considerations required during ongoing development planning and implementation should be focussed on the identified presence of habitat used by the western ringtail possum.

Impacts on fauna in general and on other species of conservation significance (besides the western ringtail possum) are, based on available information, considered to be negligible. This conclusion is primarily supported by the fact that areas of proposed development and tree removal are highly degraded and unlikely to support a diverse fauna assemblage.

The Park area contains some potential black cockatoo breeding habitat (i.e. trees with a DBH ≥ 50 cm) but most contain no hollows or when present the possible hollows identified appeared as unlikely to be of a size large enough for use as nesting habitat. Black cockatoo foraging habitat is also present but is only represented by a relatively small number of scattered marri trees. Most of this potential breeding and foraging habitat will be retained and therefore no direct or indirect significant impact on black cockatoos is anticipated.

The south-western brush-tailed phascogale (Schedule 6) and quenda (Priority 4) were detected in the reserve areas near the Park. It is possible they also occur within the areas of remnant native vegetation in the Park itself but are unlikely to reside within the proposed development areas given they are already largely cleared and devoid of native ground cover.

A number of other specially protect and priority species are also considered as possibly occurring in the better quality bush area but are not considered likely to frequent the more development sections of the caravan park itself, except possibly on rare occasions.

The currently proposed development initiatives (new foreshore camping sites, chalets and the trimming or removal of unsafe trees) will have a direct impact on habitat in use or potentially in use by western ringtail possums and therefore management measures will need to be employed to primarily ensure individuals are not killed or injured when trees are trimmed or removed.

The western ringtail possum's federal conservation status has recently been upgraded to critically endangered by the DotEE which brings it in line with its status at a state level. Projects of the size proposed by the Shire at the Turner Caravan Park would not typically be referred to the DotEE for assessment under the *EPBC Act* as likely impacts would be considered to be of a low risk of being significant. Given the upgrading of the WRPs status it may now however be necessary to refer even smaller project to ensure compliance.

Based on the survey results the following recommendations are provided for guidance for the formulation of a management plan that should aim to reduce the impact on fauna and fauna habitat as much as reasonable and practicable and in particular impacts on western ringtail possums. It is recommended that:

- Planning for implementing the proposed development initiatives should aim to avoid the need to clear as much of the existing vegetation as possible.
- Standard DBCA clearing protocols should be employed during any clearing undertaken at the site. In particular during clearing operations, a suitably experienced “fauna spotter” should be employed to inspect logs, trees, dreys and hollows (where possible) before clearing to reduce likelihood of injury to fauna. Trees observed to contain dreys or hollows should be felled in a manner that reduces the likelihood that fauna present will be injured. Dreys and hollows in fallen trees should be inspected for fauna prior to removal from the site. If feasible any fauna encountered should be relocated to suitable retained habitat nearby.
- During site works areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained.
- Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a DBCA nominated wildlife carer.
- Any holes, pits or trenches required for services should be kept open for only as long as necessary and suitable escape ramps (45° batter) and bridging provided if the site is to be left unattended for extended periods. Significant sized holes, pits or trenches should be inspected for fauna immediately prior to filling.
- Any proposed revegetation/rehabilitation at the site should utilise local seed stock that includes peppermints (*Agonis flexuosa*) and cockatoo food plants, specifically *Eucalyptus*, *Corymbia*, *Banksia*, *Hakea*, and *Allocasuarina*. The final selection of suitable species should be carried out after liaison with appropriate experts or local land care groups to ascertain which species are most suitable for the area. Susceptibility to dieback should also be taken into consideration.
- The need to refer the proposed development initiatives to the DoTEE for assessment to ensure compliance with the *EPBC Act* should be considered by the Shire given the recent upgrade of the western ringtail possum’s status to critically endangered at the federal level.

8. CONCLUSION

The fauna assessment within the subject site was undertaken for the purposes of delineating and characterising the fauna habitats and faunal assemblages present and to identify potential impacts of the proposed development initiatives. Targeted searches for western ringtail possums and a black cockatoo habitat assessment were also carried out.

With respect to native vertebrate fauna, 20 mammal (including nine bat species), 107 bird, 28 reptile and 11 frog species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Nine species of introduced animals could also frequent the area.

Of the 166 native vertebrate animals that are listed as potentially occurring, six are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law (the three black cockatoo species, peregrine falcon, western ringtail possum and south-western brush-tailed phascogale (Schedule 6). In addition, four DBCA priority species are also listed as potentially occurring (short-nosed snake, masked owl, quenda and western false pipistrelle).

Three species were confirmed as present during the fauna survey south-western brush-tailed phascogale, western ringtail possum and quenda. Black cockatoo foraging activity was also recorded but the specific species responsible could not be determined.

Constraints on development within the study area will largely be centred on the presence of habitat used or potentially used by the western ringtail possum. The potential impacts on this species and/or its habitat will need to be taken into consideration during the ongoing planning and construction phases of the proposed development initiatives and tree trimming or removal.

A series of other recommendations aimed at mitigating and minimising potential impacts on western ringtail possum (and fauna and fauna habitat in general) are provided in Section 7. These should be taken into consideration during planning and development and implemented if considered reasonable and practicable.

The need to refer the proposed development initiatives to the DoTEE for assessment to ensure compliance with the *EPBC Act* should be considered by the Shire given the recent upgrade of the western ringtail possum's status to critically endangered at the federal level.

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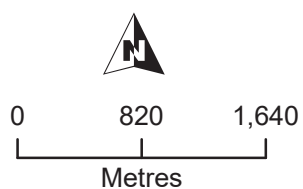
Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing.

FIGURES



Legend

- Subject Site
- National Park



Drawn: G Harewood

Date: Jan 2018

Scale: 1:50,000

Projection/Coordinate System: UTM/MGA Zone 50

Turner Caravan Park
Augusta

Subject Site & Surrounds

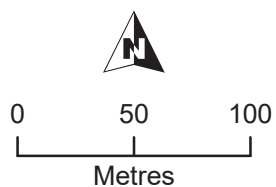
454

Figure: 1



Legend

 Subject Site



Drawn: G Harewood

Date: Jan 2018

Scale: 1:3,250

Projection/Coordinate System: UTM/MGA Zone 50

Turner Caravan Park
Augusta

Air Photo

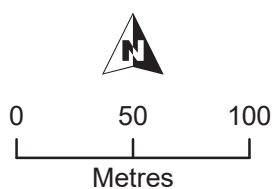
455

Figure: 2



Legend

- Subject Site
- Camera Trap Location
- + Bat Call Recording Site



Drawn: G Harewood
Date: May 2018
Scale: 1:3,250

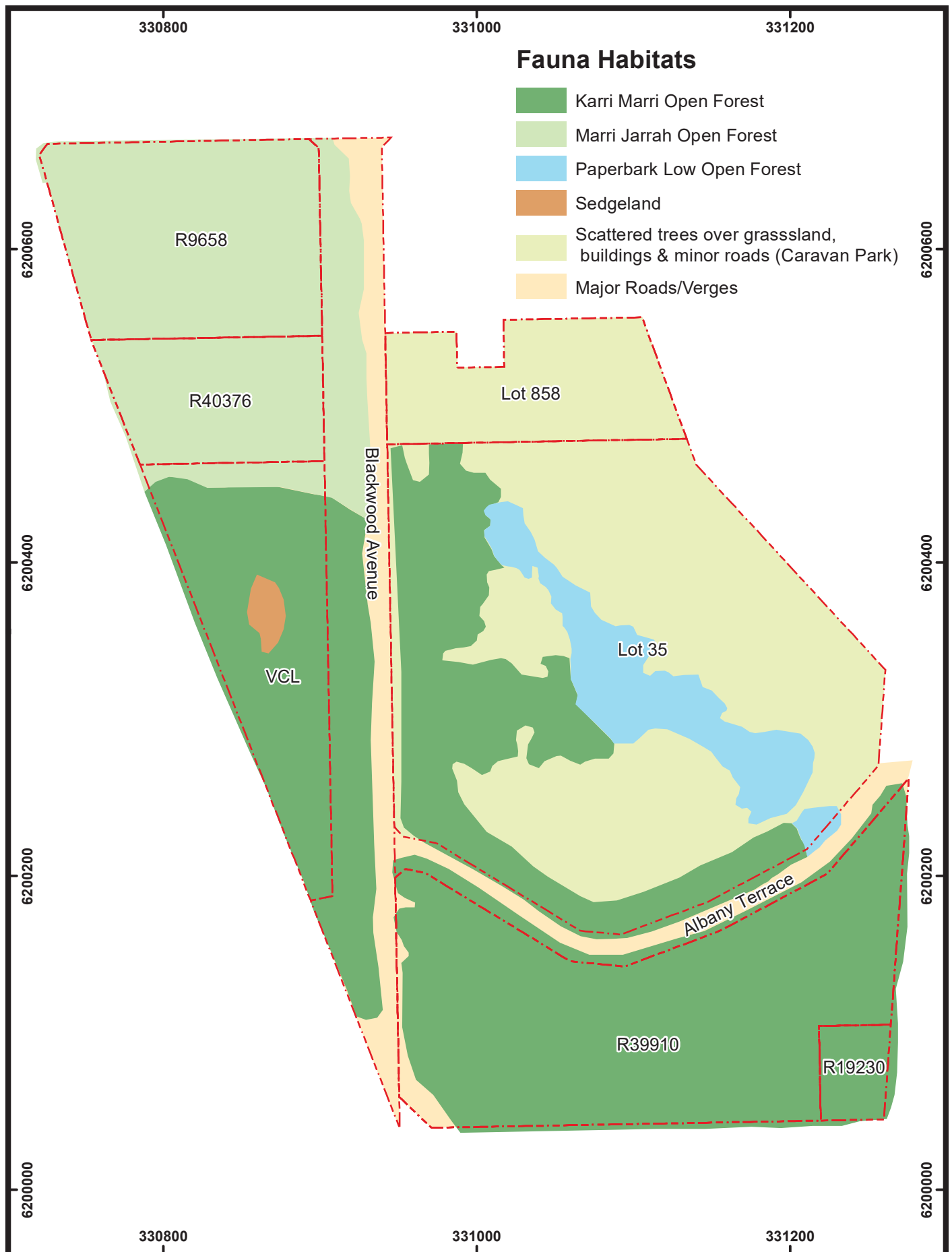
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Turner Caravan Park
Augusta

Recording Locations

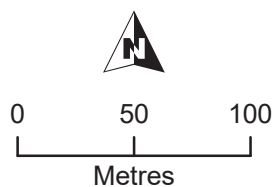
456

Figure: 3



Legend

 Subject Site



Drawn: G Harewood

Date: Jan 2018

Scale: 1:3,250

Projection/Coordinate System: UTM/MGA Zone 50

Turner Caravan Park
Augusta

Fauna Habitats

457

Figure: 4



Legend

 Subject Site

- Habitat Tree - One or more large hollows possibly suitable for black cockatoos
- Habitat Tree - One or more possible small/medium hollows
- Habitat Tree - No hollows seen



Drawn: G Harewood

Date: May 2018

Scale: 1:3,250

Projection/Coordinate System: UTM/MGA Zone 50

Turner Caravan Park
Augusta

Habitat Trees (DBH >50cm)

458

Figure: 5



Legend

- | | | |
|---|--|---|
| Subject Site | ● WRP - Night 1 | ■ Quenda |
| ⬠ WRP Drey | + CBP - Night 1 | ▲ SW Brushtailed Phascogale |
| ⊙ WRP Scats | ● WRP - Night 2 | |
| ● WRP (Camera Trap) | + CBP - Night 2 | |



Drawn: G Harewood

Date: May 2018

Scale: 1:3,250

Projection/Coordinate System: UTM/MGA Zone 50

Turner Caravan Park
Augusta

Significant Fauna Observations

Figure: 6

APPENDIX A

CONSERVATION CATEGORIES

EPBC Act (1999) Threatened Fauna Categories

Threatened fauna may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following categories:

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically Endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation Dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the <i>EPBC Act</i>

Note: Only species in those categories marked with an asterisk are matters of national environmental significance (NES) under the *EPBC Act*.

Wildlife Conservation (Specially Protected Fauna) Notice 2017 Categories

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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.

Category	Code	Description
Schedule 1 Critically Endangered species	CR	Threatened species considered to be facing an extremely high risk of extinction in the wild.
Schedule 2 Endangered species	EN	Threatened species considered to be facing a very high risk of extinction in the wild.
Schedule 3 Vulnerable species	VU	Threatened species considered to be facing a high risk of extinction in the wild.
Schedule 4 Presumed extinct species	EX	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Schedule 5 Migratory birds protected under an international agreement	IA	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 the Bonn Convention, relating to the protection of migratory birds.
Schedule 6 Fauna that is of special conservation need as conservation dependent fauna	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Schedule 7 Other specially protected fauna.	OS	Fauna otherwise in need of special protection to ensure their conservation.

Western Australian DBCA Priority Fauna Categories

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna 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 flora or fauna.

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.

Category	Code	Description
Priority 1 Poorly Known Species.	P1	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.
Priority 2 Poorly Known Species.	P2	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.
Priority 3 Poorly Known Species.	P3	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.
Priority 4 Rare, Near Threatened and other species in need of monitoring.	P4	<p>(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.</p> <p>(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.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

*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).

IUCN Red List Threatened Species Categories

The *IUCN Red List of Threatened Species™* is a checklist of taxa that have undergone an extinction risk assessment using the *IUCN Red List Categories and Criteria*.

Categories are summarized below.

Category	Code	Description
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.
Not Evaluated	NE	Taxa which has not been evaluated.

A full list of categories and their meanings are available at:

<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

APPENDIX B

OBSERVED AND POTENTIAL VERTEBRATE FAUNA LISTING

Fauna Observed or Potentially in Subject Site

Turner Caravan Park and Surrounds - Augusta, WA

Compiled by Greg Harewood - May 2018

Recorded (Trapped/Sighted/Heard/Signs) = X

A: Harewood (2018). Fauna Assessment. Turner Caravan park - Augusta. Unpublished report for Augusta Margaret River Shire.

B: Harewood, G. (2018). Fauna Survey - Carburnup Reserve, Carburnup. Unpublished report for the City of Busselton.

C: NGH/Harewood, G. (2015). Level 2 Fauna Survey Meelup Regional Park Unpublished report for City of Busselton.

C: ecologia Environmental Consultants (2001). Location 413 Smiths Beach Fauna Assessment Survey, Unpublished report for ATA Environmental.

D: ATA Environmental (2006). Location 413 Smiths Beach Fauna Assessment Survey, Unpublished report for Canal Rocks Properties.

E: Harewood (2009). Fauna Survey (Level 2). Gracetown. Unpublished report for Strategen.

F: Biota (2009). Milyeannup Wind Farm - Terrestrial Fauna Survey. Unpublished report for Verve Energy.

G: ENV Australia (2007). Busselton to Margaret River Transmission Line – Biological Assessment. Unpublished report for Western Power.

H: Ninox Wildlife Consulting (1989). Fauna Survey - Beenup Heavy Minerals Mine ERMP. Unpublished report for BHP UTAH.

I: Christensen, P., Annels, A., Liddelow, G. and Skinner, P. (1985). Vertebrate Fauna in The Southern Forests of Western Australia, A Survey. Forest Dept. of Western Australia, Bull. No. 94. Perth. (Borannup).

J: How, R.A., Dell, J. and Humphreys, W.F. (1987). The Ground Vertebrate Fauna of Coastal Areas between Busselton and Albany, Western Australia, Records of the WAM 13, 553-574 (Margaret River).

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Amphibians													
Myobatrachidae													
Ground or Burrowing Frogs													
<i>Crinia georgiana</i>	Quacking Frog	LC			X			X	X	X			X
<i>Crinia glauerti</i>	Glauert's Froglet	LC			X				X	X			X
<i>Crinia pseudinsignifera</i>	Bleating Froglet	LC								X			X
<i>Geocrinia leai</i>	Lea's Frog	LC	X		X				X	X			X
<i>Heleioporus eyrei</i>	Moaning Frog	LC	X		X	X		X	X		X	X	X
<i>Heleioporus inornatus</i>	Whooping Frog	LC							X				

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Class Family <i>Species</i>	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
<i>Limnodynastes dorsalis</i>	Banjo Frog	LC		X		X	X	X	X	X	X	X	X
<i>Metacrinia nichollsi</i>	Nicholls' Toadlet	LC	X						X				X
<i>Pseudophryne guentheri</i>	Güenther's Toadlet	LC			X					X			X
Hylidae Tree or Water-Holding Frogs													
<i>Litoria adelaidensis</i>	Slender Tree Frog	LC			X				X	X			X
<i>Litoria moorei</i>	Motorbike Frog	LC						X	X				X

Reptiles

Gekkonidae

Geckoes

<i>Christinus marmoratus</i>	Marbled Gecko			X	X	X	X	X	X	X	X	X	X
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Pygopodidae

Legless Lizards

<i>Aprasia pulchella</i>	Pretty Worm Lizard			X	X	X						X	X
<i>Pygopus lepidopodus</i>	Southern Scalefoot						X			X	X		X

Agamidae

Dragon Lizards

<i>Pogona minor</i>	Western Bearded Dragon			X		X	X					X	
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Class	Common	Conservation	A	B	C	D	E	F	G	H	I	J	K
Family	Name	Status											
Species													
Varanidae													
Monitor's or Goanna's													
<i>Varanus rosenbergi</i>	Heath Monitor				X	X	X	X	X				X

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Scincidae Skinks													
<i>Acritoscincus trilineatus</i>	South-western Cool Skink			X	X	X	X	X	X	X		X	
<i>Cryptoblepharus buchanani</i>	Fence Skink				X	X					X		
<i>Ctenotus catenifer</i>	Chain-striped Heath Ctenotus				X					X			X
<i>Ctenotus labillardieri</i>	Red-legged Skink					X		X	X	X	X	X	X
<i>Egernia kingii</i>	King's Skink		X	X	X	X			X				X
<i>Egernia luctuosa</i>	Western Swamp Skink								X				
<i>Egernia napoleonis</i>	Salmon-bellied Skink			X		X	X	X	X	X	X	X	X
<i>Hemiergus gracilipes</i>	Southwestern Mulch Skink												X
<i>Hemiergus peronii tridactyla</i>	Three-toed Mulch Skink			X	X	X	X	X	X			X	
<i>Lerista distinguenda</i>	South-western Four-toed Lerista				X	X							
<i>Lerista elegans</i>	West Coast Four-toed Lerista			X	X		X	X				X	X
<i>Lerista microtis microtis</i>	Southwestern Five-toed Lerista							X	X	X			
<i>Menetia greyii</i>	Dwarf Skink			X	X	X	X				X		
<i>Morethia lineocellata</i>	Western Pale-flecked Morethia			X	X	X	X	X	X			X	X
<i>Tiliqua rugosa rugosa</i>	Western Bobtail			X	X	X	X	X	X	X	X	X	

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Typhlopidae Blind Snakes													
<i>Ramphotyphlops australis</i>	Southern Blind Snake			X		X		X	X	X			
Boidae Pythons, Boas													
<i>Morelia spilota imbricata</i>	Southern Carpet Python					X	X						
Elapidae Elapid Snakes													
<i>Echiopsis curta</i>	Bardick				X	X		X				X	X
<i>Elapognathus coronatus</i>	Crowned Snake					X	X	X		X	X		X
<i>Elapognathus minor</i>	Short-nosed Snake	P2 LC											X
<i>Notechis scutatus</i>	Tiger Snake							X		X			X
<i>Pseudonaja affinis</i>	Dugite				X		X	X	X	X	X	X	X
<i>Rhinoplocephalus bicolor</i>	Square-nosed Snake									X			

Birds

Phasianidae Quails, Pheasants													
<i>Coturnix pectoralis</i>	Stubble Quail	LC											X
<i>Coturnix ypsilophora</i>	Brown Quail	LC								X			X

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Anatidae Geese, Swans, Ducks													
<i>Anas gracilis</i>	Grey Teal	LC		X					X				X
<i>Anas superciliosa</i>	Pacific Black Duck	LC	X	X	X				X	X			X
<i>Chenonetta jubata</i>	Australian Wood Duck	LC	X						X	X			X
<i>Tadorna tadornoides</i>	Australian Shelduck	LC		X				X	X	X			X
Ardeidae Herons, Egrets, Bitterns													
<i>Ardea alba</i>	Great Egret	CA JA LC											
<i>Ardea pacifica</i>	White-necked Heron	LC								X			X
<i>Egretta novaehollandiae</i>	White-faced Heron	LC		X					X	X			X
<i>Nycticorax caledonicus</i>	Rufous Night Heron	Bp LC			X								X
Threskiornithidae Ibises, Spoonbills													
<i>Platalea flavipes</i>	Yellow-billed Spoonbill	LC											X
<i>Threskiornis molucca</i>	Australian White Ibis	LC						X	X				
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	LC						X	X	X			X

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Accipitridae Kites, Goshawks, Eagles, Harriers													
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	Bp LC			X								X
<i>Accipiter fasciatus</i>	Brown Goshawk	Bp LC		X	X								X
<i>Aquila audax</i>	Wedge-tailed Eagle	Bp LC			X					X			X
<i>Aquila morphnoides</i>	Little Eagle	Bp LC					X						
<i>Circus approximans</i>	Swamp Harrier	LC						X		X			X
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC							X				
<i>Haliastur sphenurus</i>	Whistling Kite	Bp LC				X					X		X
<i>Hamirostra isura</i>	Square-tailed Kite	Bp LC			X		X						X
Falconidae Falcons													
<i>Falco berigora</i>	Brown Falcon	Bp LC				X				X	X		X
<i>Falco cenchroides</i>	Australian Kestrel	LC				X		X	X	X	X		X
<i>Falco longipennis</i>	Australian Hobby	LC						X	X	X			X
<i>Falco peregrinus</i>	Peregrine Falcon	S7 Bp LC								X			X

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Rallidae Rails, Crakes, Swampheens, Coots													
<i>Fulica atra</i>	Eurasian Coot	LC											X
<i>Gallinula tenebrosa</i>	Dusky Moorhen	Bh LC								X			
<i>Gallirallus philippensis</i>	Buff-banded Rail	LC											
<i>Porphyrio porphyrio</i>	Purple Swampheens	LC											X
<i>Porzana pusilla</i>	Baillon`s Crake	LC											X
<i>Porzana tabuensis</i>	Spotless Crake	LC											X
Turnicidae Button-quails													
<i>Turnix varia</i>	Painted Button-quail	Bp LC		X	X		X						
Laridae Gulls, Terns													
<i>Larus novaehollandiae</i>	Silver Gull	LC	X		X	X	X	X					

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Columbidae Pigeons, Doves													
<i>Columba livia</i>	Domestic Pigeon	Introduced											
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC											X
<i>Phaps chalcoptera</i>	Common Bronzewing	Bh LC	X	X	X		X	X		X	X		X
<i>Phaps elegans</i>	Brush Bronzewing	Bh LC				X	X				X		X
<i>Streptopelia senegalensis</i>	Laughing Turtle-Dove	Introduced											X
Cacatuidae Cockatoos, Corellas													
<i>Cacatua sanguinea</i>	Little Corella	LC							X				
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	S3 VU Bp LC		X	X				X	X			X
<i>Calyptorhynchus baudinii</i>	Baudin`s Cockatoo	S2 EN Bp EN A3cde		X	X	X	X	X	X	X	X		X
<i>Calyptorhynchus latirostris</i>	Carnaby`s Cockatoo	S2 EN Bp EN A2bcde		X	X			X					X
<i>Eolophus roseicapilla</i>	Galah	LC	X		X				X				

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Psittacidae Parrots													
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	LC	X	X	X			X	X	X			
<i>Neophema elegans</i>	Elegant Parrot	LC				X	X			X			X
<i>Platycercus icterotis icterotis</i>	Western Rosella (Western ssp)	Bp LC		X	X	X	X	X	X	X	X		
<i>Platycercus spurius</i>	Red-capped Parrot	LC	X	X	X	X	X	X	X				X
<i>Platycercus zonarius</i>	Australian Ringneck Parrot	LC	X	X	X	X	X	X	X	X	X		
<i>Polytelis anthopeplus</i>	Regent Parrot	LC											
Cuculidae Parasitic Cuckoos													
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	LC			X		X		X	X	X		X
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo	LC					X	X		X	X		
<i>Chrysococcyx lucidus</i>	Shining Bronze Cuckoo	LC			X		X	X		X			
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC			X					X			
Strigidae Hawk Owls													
<i>Ninox novaeseelandiae</i>	Boobook Owl	LC	X		X	X	X				X		

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Tytonidae Barn Owls													
<i>Tyto alba</i>	Barn Owl	LC									X		
<i>Tyto n. novaehollandiae</i>	Masked Owl (SW pop.)	P3 Bp											
Podargidae Frogmouths													
<i>Podargus strigoides</i>	Tawny Frogmouth	LC		X		X				X	X		X
Caprimulgidae Nightjars													
<i>Eurostopodus argus</i>	Spotted Nightjar	LC											
Aegothelidae Owlet-nightjars													
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	LC			X					X			
Halcyonidae Tree Kingfishers													
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Introduced	X	X	X	X	X	X	X	X	X		X
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC			X					X	X		X
Meropidae Bee-eaters													
<i>Merops ornatus</i>	Rainbow Bee-eater	JA LC		X	X		X	X	X				X

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Climacteridae Treecreepers													
<i>Climacteris rufa</i>	Rufous Treecreeper	Bh			X								
Maluridae Fairy Wrens, GrassWrens													
<i>Malurus elegans</i>	Red-winged Fairy-wren	Be LC	X	X				X	X	X	X		X
<i>Malurus splendens</i>	Splendid Fairy-wren	Bh LC		X	X	X	X	X	X	X	X		X
<i>Stipiturus malachurus</i>	Southern Emu-wren	Bh LC			X	X	X			X	X		X
Pardalotidae Pardalotes, Bristlebirds, Scrubwrens, Gerygones, Thornbills													
<i>Acanthiza apicalis</i>	Broad-tailed Thornbill	Bh LC	X	X	X	X	X	X	X	X	X		X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Bh LC		X	X			X	X	X			X
<i>Acanthiza inornata</i>	Western Thornbill	Bh LC			X	X				X			X
<i>Gerygone fusca</i>	Western Gerygone	LC	X	X	X		X	X	X	X			X
<i>Pardalotus punctatus</i>	Spotted Pardalote	LC		X				X		X			X
<i>Pardalotus striatus</i>	Striated Pardalote	LC			X			X	X	X			X
<i>Sericornis frontalis</i>	White-browed Scrubwren	Bh LC	X	X	X	X	X	X	X	X	X		X
<i>Smicrornis brevirostris</i>	Weebill	Bh LC			X				X				

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Meliphagidae Honeyeaters, Chats													
<i>Acanthorhynchus superciliosus</i>	Western Spinebill	LC		X	X	X				X			X
<i>Anthochaera carunculata</i>	Red Wattlebird	LC	X	X	X	X	X	X	X	X	X		X
<i>Anthochaera lunulata</i>	Western Little Wattlebird	Bp						X		X			X
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC				X		X					
<i>Lichmera indistincta</i>	Brown Honeyeater	LC	X	X	X	X				X			X
<i>Melithreptus chloropsis</i>	Gilbert's Honeyeater	LC		X						X	X		X
<i>Phylidonyris melanops</i>	Tawny-crowned Honeyeater	Bp LC								X			
<i>Phylidonyris nigra</i>	White-cheeked Honeyeater	Bp LC								X			
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Bp LC	X	X	X	X	X	X		X	X		X
Petroicidae Australian Robins													
<i>Eopsaltria australis</i>	Western Yellow Robin	Bh LC		X	X			X	X				X
<i>Eopsaltria georgiana</i>	White-breasted Robin	Bh LC		X	X	X	X	X	X	X	X		X
<i>Petroica multicolor</i>	Scarlet Robin	Bh LC			X	X		X	X	X	X		
Neosittidae Sitellas													
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Bh LC			X				X	X			X

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Pachycephalidae Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers													
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Bh LC		X	X		X	X	X	X			X
<i>Falcunculus frontatus leucogaster</i>	Western Shrike-tit	Be											X
<i>Pachycephala pectoralis</i>	Golden Whistler	Bh LC		X	X	X	X	X	X	X	X		
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC								X	X		X
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo													
<i>Grallina cyanoleuca</i>	Magpie-lark	LC							X	X	X		X
<i>Rhipidura fuliginosa</i>	Grey Fantail	LC	X	X	X	X	X	X	X	X	X		
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC	X	X	X	X	X	X	X	X	X		X
Campephagidae Cuckoo-shrikes, Trillers													
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC		X	X	X	X	X	X	X	X		X
<i>Lalage sueurii</i>	White-winged Triller	LC								X			

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Artamidae Woodswallows, Butcherbirds, Currawongs													
<i>Artamus cinereus</i>	Black-faced Woodswallow	Bp LC							X	X			X
<i>Artamus cyanopterus</i>	Dusky Woodswallow	Bp LC					X				X		X
<i>Cracticus tibicen</i>	Australian Magpie	LC	X	X	X	X	X	X	X	X	X		X
<i>Cracticus torquatus</i>	Grey Butcherbird	LC	X	X	X	X		X	X	X			X
<i>Strepera versicolor</i>	Grey Currawong	Bp LC						X		X	X		X
Corvidae Ravens, Crows													
<i>Corvus coronoides</i>	Australian Raven	LC	X	X	X	X	X	X	X	X	X		X
Motacillidae Old World Pipits, Wagtails													
<i>Anthus novaeseelandiae</i>	Australian Pipit	LC					X	X	X	X	X		
Passeridae Grass Finches, Mannikins, Sparrows													
<i>Stagonopleura oculata</i>	Red-eared Firetail	LC		X						X			X
Dicaeidae Flowerpeckers													
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC											

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Class Family <i>Species</i>	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Hirundinidae Swallows, Martins													
<i>Hirundo neoxena</i>	Welcome Swallow	LC			X	X	X	X	X	X			X
<i>Hirundo nigricans</i>	Tree Martin	LC			X			X	X	X			
Sylviidae Old World Warblers													
<i>Cincloramphus cruralis</i>	Brown Songlark	LC									X		
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC									X		
Zosteropidae White-eyes													
<i>Zosterops lateralis</i>	Silvereeye	LC	X	X	X	X	X	X	X	X	X		X

Mammals

Tachyglossidae

Echidnas

<i>Tachyglossus aculeatus</i>	Echidna	LC			X					X			
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Dasyuridae

Carnivorous Marsupials

<i>Antechinus flavipes</i>	Yellow-footed Antechinus, Mardo	LC	X										
<i>Phascogale tapoatafa wambenger</i>	Sth-west Brush-tailed Phascogale	S6	X	X									X
<i>Sminthopsis griseoventer</i>	Grey-bellied Dunnart	LC					X	X	X	X	X		X

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Peramelidae Bandicoots													
<i>Isodon fusciventer</i>	Quenda	P4 LC	X		X		X		X	X	X		X
Phalangeridae Brushtail Possums, Cuscuses													
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	LC	X	X	X	X			X		X		X
Burramyidae Pygmy Possums													
<i>Cercartetus concinnus</i>	Western Pygmy-possum	LC			X	X							X
Tarsipedidae Honey Possum													
<i>Tarsipes rostratus</i>	Honey Possum	LC			X	X	X			X			X
Pseudocheiridae Ringtail Possums													
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	S1 CR CR A2bce+3bce+4bc	X	X	X	X	X	X					X
Macropodidae Kangaroos, Wallabies													
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	LC	X	X	X	X	X	X	X	X	X		X
Molossidae Freetail Bats													
<i>Mormopterus planiceps</i>	South Western Freetail Bat	LC		X	X	X			X				
<i>Tadarida australis</i>	White-striped Freetail-bat	LC		X	X	X			X				

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Vespertilionidae Ordinary Bats													
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	LC		X	X	X		X	X		X		X
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	LC		X	X	X	X	X	X	X		X	X
<i>Falsistrellus mackenziei</i>	Western False Pipistrelle	P4 NT			X		X	X	X		X		
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	LC	X	X	X		X	X	X	X			X
<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat	LC	X	X	X								
<i>Nyctophilus major major</i>	Western Long-eared Bat	LC	X	X					X				
<i>Vespadelus regulus</i>	Southern Forest Bat	LC	X	X	X	X	X	X	X	X	X		X
Muridae Rats, Mice													
<i>Mus musculus</i>	House Mouse	Introduced	X	X	X	X	X	X		X	X		X
<i>Rattus fuscipes</i>	Western Bush Rat	LC	X			X	X	X	X	X	X	X	X
<i>Rattus rattus</i>	Black Rat	Introduced	X	X	X			X	X		X		X
Canidae Dogs, Foxes													
<i>Canis lupus</i>	Dog	Introduced				X	X						X
<i>Vulpes vulpes</i>	Red Fox	Introduced	X	X	X	X		X	X	X	X		X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Felidae Cats													
<i>Felis catus</i>	Cat	Introduced				X	X			X	X		X
Leporidae Rabbits, Hares													
<i>Oryctolagus cuniculus</i>	Rabbit	Introduced	X	X	X	X	X	X	X	X	X		

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