TECHNICAL REPORTS & GUIDELINES

PART I

TECHNICAL REPORTS & GUIDELINES

DEVELOPMENT REPORT
Appendices A to I & K to L
Issued September 2016

PARTI

CONTENTS

Report: Public Environmental Report Infrastructure Section

Project: American River Resort Development

Issue: Final Issue

Revision: B

Reference: 3205.160301.G.3

Dated: September 2016

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Contents

1.0 Water Supply and Wastewater

1.1 Executive Summary

For the water supply to the site, the use of a combination of rainwater collected from the roofs, treated and used for toilet flushing/ irrigation purposes is proposed. As a supplement for the remainder of the site, a truck will deliver water as required to ensure a suitable amount of water is available.

Sewer from the site is proposed to discharge into Kangaroo Island Council sewer via sewer pumping stations with rising mains connected to the central pumping station. The Council sewer pumping station would be upgraded by developer as part of the requirement by Council to remain connected to sewer network.

1.2 The Hotel Precinct

Water supply

The Hotel Precinct requires secure water supply of approximately 170,000 litres per day of storage capacity. The base figure for total usage of water in proposed Hotel Precinct has been calculated from the published evidence on hotel water usage by Tourism Australia. The daily storage capacity has been calculated as per the following: - 416 guests x 400 litres per day = 166,400 litres. We recommend that the water storage on site would be double of daily capacity to allow for any down time of the plant supplying drinking water

At the moment American River has no reticulated water supply. The neighboring residences rely on rainwater collection and on private water supply delivered by truck. The truck can deliver 22,000 litres at a time.

We have pursued alternative options for delivery of water to site:

Water provided by Authority:

We have consulted SA Water if there are future plans to provide reticulated infrastructure in American River. We have been advised that there are no plans to provide any water infrastructure to the region. Refer to Appendix A for correspondence.

We understand there is the possibility of expansion to the water infrastructure by a private party. If this occurs in the future, we would investigate extending the expansion to connect into the hotel precinct.

Bore Water Supply:

Various bores have been drilled around proposed site in 1950's. There is a limited information on bore water quality due to lack of monitoring by Authorities. The information provided by Department of Environment and Water resources shows that the salinity of bore water taken from nearby bores is above 9,000mg/litre and flow rate less than 0,6 litres/second. The water is considered "brackish" and cannot be a source of secure water supply due to poor quality. We therefore conclude that bore water option is not viable for security of water supply to the Precinct.

Rainwater Supply:

The average rainfall in the area is 320-660 mm per year. In order to capture all roof water, the rainwater tanks would be installed to all buildings and have maximum capacity (roof area x highest daily rainfall based on historical data). The capacity of the tank will depend on roofed areas of each building. We recommend that the entire roof should be used as a rainwater catchment area. The best application for rainwater use would be toilet flushing and irrigation. Each building would have its own rainwater tank, pump and reticulation system to each amenity. The water required for toilet flushing is on average 15 litres per day per guest. With projected 416 guests the daily use of potable water could be reduced by 6,240 litres

and irrigation use by 13,000 litres. The irrigation rate is 4.5 litres per square meter per hour. For example 1,000 square meters of garden would use 4.5 litres x 3 hours x 1000metres = 13,500 litres per day.

It is also worth considering detention of surface runoff on site for purpose of irrigation use and storage of water in an artificial dam with bio-filtration. The water could be detained and treated from carbons and sediments and then reticulated as subsurface irrigation. This method should be investigated by Civil Engineer once detailed information of site is available.

Sewer Management

The Kangaroo Island Council has constructed gravity/pumped sewer network in 2010. The sewer network is located on Thomas Road and currently there is a private pumping station on site connected via rising main into Council's Pumping Station 1 (marked as PS1). The area is "fully sewered" which means that no septic tank is required prior to private pumping station. After consultation with Council representative, we have been advised on the following:

In order for Hotel Precinct to remain connected, the pumps within Council's PS1 (refer to plan in Appendix B) will have to be upgraded to greater capacity (exact capacity will be advised by Council)

We also note that the existing sewer pumping station located on site will have to be upgraded with dual heavy-duty pumps of flow 4.0 per second at 200kPa. The pumping well itself would have to be inspected for purpose of assessing capacity and level of connection of gravity inlet. The effective capacity of sewer pumping station must be at least 1440mm from the gravity inlet.

The general site sewer layout would consist of local pumping stations near each building with rising mains connected to main pumping station. This is based on the assumption that the rock is present at shallow depth and therefore it would be economical to provide pumped sewer instead of gravity drainage. Once a Geotech report is available, the method of sewer discharge from each building would be determined.

Grey Water

Grey water collection and re-use was considered for the project, however, we recommend that no grey water be collected and re-used for the following reasons:

- The site is within the sewered zone and sewer discharge does not require any additional pre-treatment.
- Grey water re-use system will require approval by Department of Health and regular "on-spot" inspections.
- Grey water collection within buildings will require second waste pipe in lieu of just one soil drain/stack. It will also require dedicated grey water pump stations and rising mains connected to grey water plant.
- Because all soil fixtures would have already low flow rate (3/4.5 litres per flush), by taking grey water away from soil pipes, the sewer cleansing velocity of 0.8m/s may not be achievable. We would have to increase sewer pipe grades to deal with reduced flow to prevent septicity thus taking sewer deeper into the ground.
- Overall cost of grey water treatment on site is considered to be cost prohibitive.

LPG Supply

It has been ascertained that there will be a requirement for Natural Gas within proposed precinct. The Natural Gas would be have many uses such as restaurant kitchens, pool heating, hot water heating, outdoor and indoor heating. Because there is no reticulated Natural Gas supply in Kangaroo Island, it is proposed that the Gas would be supplied as LPG and stored on site in 7500 litres bullet tank (it may be that 2 tanks are required depending on consumption rate). Also note that currently ELGAS is only one supplier of LPG to the Island. The gas from the tank would be reticulated at 70kPa below ground and then at 2.75 kPa within buildings through second stage regulators. Contractor once the level in the tank drops to 1/3 would refill the gas bullet. The frequency is every 3 weeks.

Appendix A Water: Correspondence with SA Water

Correspondence with SA Water dated 10/02/16 between Daniel Fisher (Major Projects Development Officer at SA Water)

Hi Natalia,

Thank you for your email.

At present there are no plans to extend the water network on Kangaroo Island.

As you are aware water is scarce on the island and SA Water has no plans to increase infrastructure due to the high costs associated with increasing capacity.

Under regulation through ESCOSA SA Water has to set out any proposed capital works for a Regulatory Business Period – there is currently no expansion work on KI for the next two RBP's taking us through to 2024.

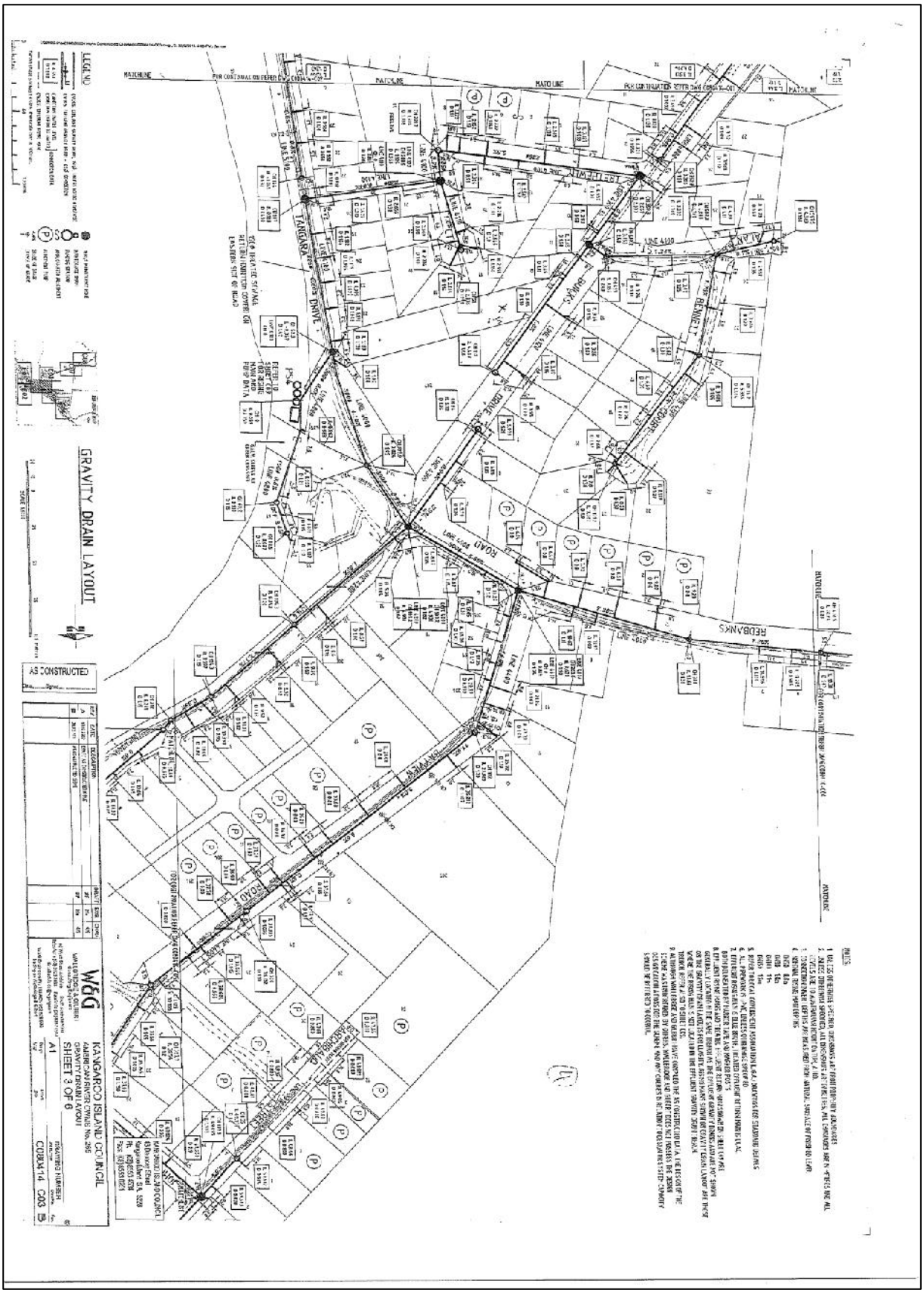
If anything changes in this area we will communicate it to the industry.

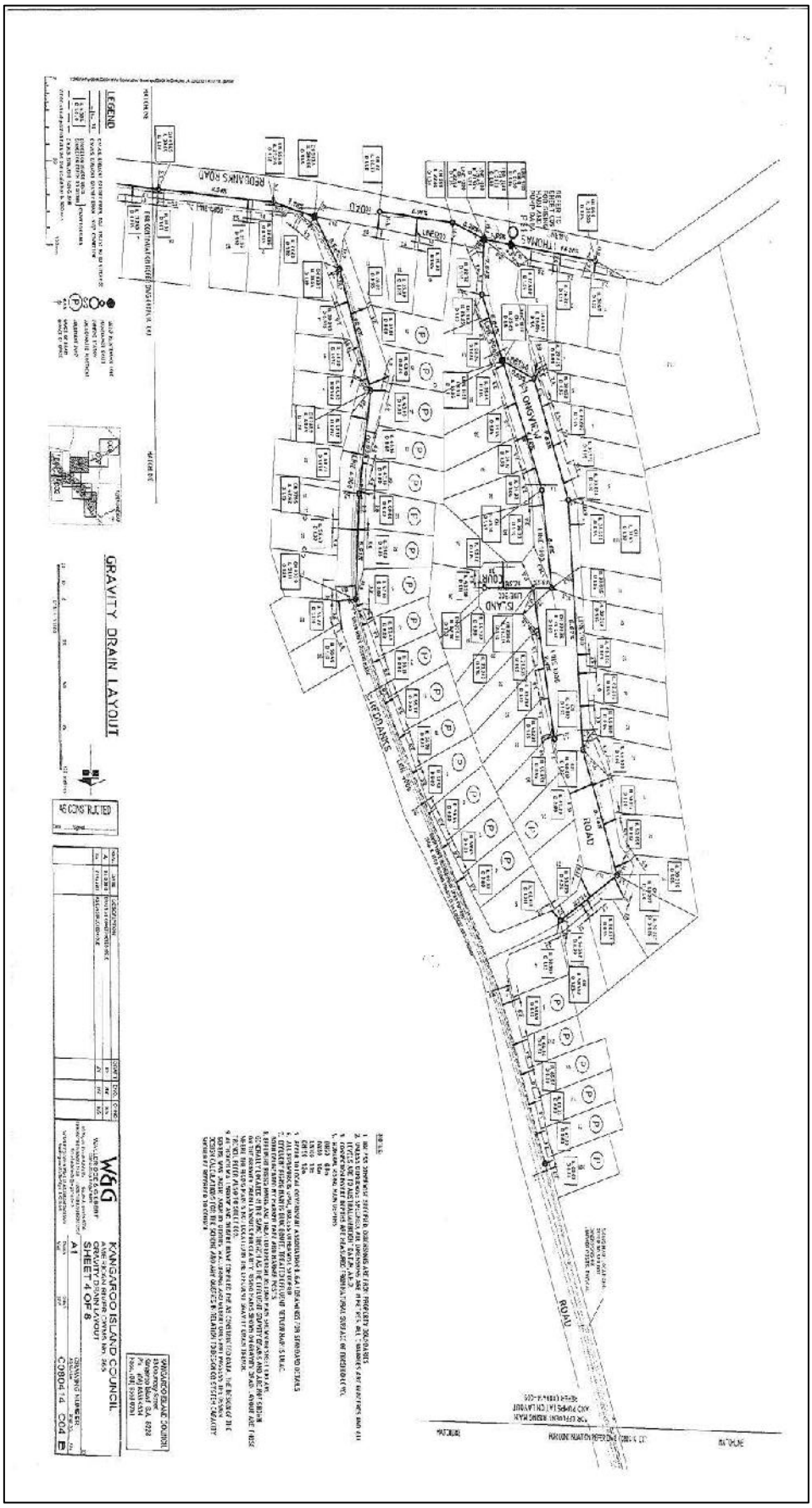
Please let me know if you require any further information.

Regards,

Dan

Appendix B Water: Kangaroo Island Council Sewer Schematic




GRAVITY DRAIN LAYOUT
AS CONSTRUCTED
LEGEND
ROAD
KANGAROO ISLAND COUNCIL
SHEET 4 OF 8
A1
C0804-14_C04

2.0 Power

2.1 Executive Summary

SA Power Networks are the responsible authority for the electricity provided to Kangaroo Island, with substations located on the western side of the island at Penneshaw, American River, Kingscote and MacGillivray. Through discussions with SA Power Networks, there appears to generally be enough electrical capacity available for the hotel precinct at the American River substation, thus should not have any effect on existing consumers. If we were to require more power than what is reasonably estimated at this stage, then there would be a more involved level of infrastructure works that will require upgrades to the existing SA Power Networks substation.

The current electricity supply on Kangaroo Island is prone to the occasional power outage, due to the remote location, continual demand increases and the existing submarine cable supplying the island. Although the capacity has been advised as a non-issue, continual demand increase will mean that this will change over time and the occasional power outage is to be expected.

Of the renewable electrical energy options available for the development, the only one with any potential is solar photo-voltaic system, which is discussed in detail below. The other major option is wind power generation, which would require wind measurements to be determined for the site generally over the space of a year to determine the true potential. Generally wind speeds over 5m/s are required as a minimum to determine feasibility, where the average for Kangaroo Island is just over at 5.71m/s. Additionally there are increase maintenance issues due to moving parts which brings into play safe access issues as well. Also due to their height they bring into play increase chance of lightning strikes, which could pose safety risks to any visitors staying at the precinct.

2.2 The Hotel Precinct

We have estimated that the hotel precinct will have an electrical maximum demand in the order of 1,000 kVA, though this will have to be confirm once the design has reached a more developed stage. Initial concept designs includes three transformers that will be installed around the precinct, ideally in strategic locations to serve all the buildings in an effective and efficient manner.

Based on initial discussions with SA Power Networks the American River Substation has enough existing capacity to support our expected maximum demand. To supply our new connection it is expected that minor infrastructure works will be required by SA Power Networks, which should not affect the supply to current customers. If the actual demand were to increase above 1,000 kVA, we have be informally advised that this would push the substation beyond its limits, thus requiring substation upgrades. To minimize this risk, a load management should be implemented for the site should the estimated electrical load of the site during the detailed design stage prove to be near to or greater than 1,000 kVA.

We propose that a High Voltage (HV) connection is provided by SA Power Networks for the purpose of a HV ring main to distribute power around the hotel precinct. The ring main is likely to have two incoming connection points, one located on the north boundary off of Red Banks Road and the other off of Alan Street on the west boundary, as both these locations have high voltage infrastructure in the vicinity.

Although SA Power Networks have advised that there is enough existing capacity in the American River substation, it would be best to include provisions for the occasional power outage as in addition to capacity issues there are other factors that could cause power outages.

Backup power provided via diesel generators will be considered for providing power during the power outages. This is the most common and economical option for providing backup power to the site, as one generator could be located adjacent each Main Switchboard for the site. An alternative backup power option would be to provide a battery storage system that is charged by either wind or solar power, though for the scale of the hotel precinct this would be an extremely costly option.

For a solar photo voltaic (PV) system the cottages are not feasible for the installation of a solar system due to the tariff rate that will be charged, which is based on the connection established for the entire site. So instead of the approximate saving of 35c/kWh being saved there would only be a saving of roughly 10c/kWh. Based on these numbers it you not be suitable to install a separate system on each cottage. Therefore the analysis of a solar PV system for the site will just be focused on the main buildings excluding the Stables and Gardener's Lodge, as these buildings would have minimal demand thus the solar system is likely to trigger larger infrastructure required for these two buildings.

So for a solar PV system based on the other eight buildings we have approximately 3500m^2 of roof space available. Of that roof space only around 70% will actually be solar panels, this takes into account safe distances from roof edges and allowing for access between the panels for maintenance. Based on these numbers this would be able to provide us with a maximum generation capability of 350kW. Incorporating the average numbers for sun hours and efficiencies of the system based on ideal positioning of the panels, this would give us around 490MWh per year of power generation by the solar PV system. This could possibly offset the site's energy consumption to provide a saving of around $50,000 per year.

It is important to note that these numbers are only approximate (can vary substantially) and a more detailed analysis will need to be provided during the design phase of the project to determine actual potentials of such a system. There are also other limiting factors including positioning of the panels, the weight of the panels and the possible affects this would have on the structure of the buildings, which would all have implications on the possible costs to provide such systems to these buildings.

Appendix C Power: Formal Correspondence with SA Power Networks

Our Ref: CN-500004746

08 April 2016

BCA Engineers
PO Box 2620
KENT TOWN SA 5067

Attention: Mr. Frank Langone

Dear Sir,

SA Power Networks' Response to your request for an Indicative Estimate

Re: Proposal to establish a new electricity supply connection for American River Resort at Redbanks Road, American River SA 5221

We acknowledge receipt of your request for an Indicative Estimate dated 29 February 2016 concerning your proposal and all information received 11 March 2016 to establish a new electricity supply connection for American River Resort at Redbanks Road, American River SA 5221 ('**Project**').

From our initial analysis based on the information you provided with your request, we believe that your proposed work is of a Negotiated Connection Service type under our current service classification. (Please refer to Annexure 2 for a high-level process flow for this type of connection service provided by us.) More information about our Negotiated Connection Services is available on our website at:

http://www.sapowernetworks.com.au/centric/customers/necfconnections/comminddevconnections.jsp

This letter seeks to advise you of:

1. An Indicative Estimate for your proposed work.
2. What you need to do next if you decide to proceed with the required work.

1. **Indicative Estimate**

SA Power Networks has made assumptions with best intentions on both the scope and line route that may be available or suitable, and estimate the project to be in the order of $1,000,000 (GST inclusive).

The above figure includes an augmentation charge in the order of $403,000 (GST Inc)

This estimate is based on the information that you have provided within your initial enquiry dated 29 February 2016 and all information received 11 March 2016.

The scope of works includes:
Maximum Capacity 1000 kVA
a maximum capacity of 400volt, 1,449 ampere, three phase service

- Install 11KV looped underground extension approximately 1,200m;
- Install two 11kV over to unders via two load switches;
- Install three 500kVA pad mount transformers;
- Install three pad mount transformer vaults and footings;
- Connection and Metering Works; and
- Project Management – SA Power Networks overall project management of this work.

The cost of civil works e.g. trenching, conduits, conduit installation and reinstatement has not been included in this estimate

There are easements required across your land and that of third parties. You as the registered proprietor of the land to be supplied shall grant to SA Power Networks all easements required on your and neighbouring land for no monetary consideration on such terms and conditions as SA Power Networks considers appropriate. You are responsible for the cost of all such easements and a cost for this has been included in this estimate.

SA Power Networks are committed to working with our customers to investigate practical, sustainable strategies to lower charges to our customers and to defer the costly requirements of distribution expansion.

While giving consideration to this indicative estimate cost, you might wish to take notice of the following:

- An Incremental Revenue Rebate may be deducted from our offer once we receive your electrical load details. This rebate has not been included in this indicative estimate but may be in the order of $200,000 (GST Inclusive).

- Demand Management is a method of managing the customer's pattern of energy use on the distribution network, so as to minimise the supply cost to customers whilst maintaining or enhancing customer service. Supply costs include costs of projects associated with augmentation of, or extension to, the distribution network.

- The amount outlined in this indicative estimate is based on the demand requested in your connection enquiry. We are available to discuss possible demand management strategies that may be available to you to reduce your requested demand.

The meter charge is in addition to your Connection Charges and will be initiated on receipt of your Form A Connection Application (Form A is normally arranged by your electrician). A separate invoice will be generated for each meter charge. Meter charges are detailed in the Network Tariff & Negotiated Services Manual, Chapter 9 Negotiated Distribution Services, published on our website at http://www.sapowernetworks.com.au/public/download.jsp?id=50898&sstat=324938 .

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Page 2 of 10

The Electricity Act 1996 and Regulations prescribe penalties of up to $10,000 for persons who erect buildings or structures in the proximity to powerlines. In addition the Court can order the removal or modification of the building and payment of compensation for the cost of rectifying the situation. Persons intending to erect buildings or structures in the proximity to powerlines should consult with the Office of the Technical Regulator (tel : 8226 5500) for further information regarding the clearances that must be maintained between powerlines and buildings and structures.

This is an indicative estimate only and does not commit SA Power Networks or any other contractor to undertake the connection works at the estimated cost. That is, this letter does not constitute a binding offer by SA Power Networks to carry out the connection works at the figure referred to in this letter. In addition, this estimate is based on the information that you have provided to SA Power Networks and, as such, if this information is incomplete or inaccurate, SA Power Networks reserves the right to vary its estimate of the costs involved in carrying out the connection works. In particular this estimate is given without the benefit of other authorities' requirements or a detailed site inspection.

2. What you need to do next?

If you do wish to proceed with this proposal we will need final details of your requirements so that a firm Offer for the works can be prepared. You are thus required to:

1. Complete the *Connection Enquiry form* set out in Annexure 1 and provide the information referred to in Table 1 of that form.
2. Return the completed *Connection Enquiry form* and the requested information to us at the address set out at the top of the form.
3. Pay the appropriate *Offer Preparation Fee* set out in the Connection Enquiry form. Please read on to find out more on this fee.

If you do not wish to proceed with the proposal, please indicate your decision by ticking the box next to "Option 3" in the Annexure 1.

3. What is an Offer Preparation Fee?

We are entitled under the National Electricity Rules to charge a fee for preparing offers in response to connection enquiries from customers. Our offer preparation fee is based on our current estimate of the likely cost of the electricity infrastructure work for your Project. In the case of a large project (i.e. where the project cost is likely to exceed $100,000) our offer preparation fee is based on our estimate of the actual cost to prepare the offer.

Please note that this fee is non-refundable. However, if you elect to accept our offer the amount of the fee will be deducted from the final amount payable to us in relation to the Project. A tax invoice for the fee will be issued to you on receipt of your payment.

If you do not accept our offer before the end of the prescribed validity period and you subsequently request us to prepare another offer for the same Project, we may require you to make a further Connection Enquiry and pay a further fee for the preparation of that new offer. You must pay this further fee before we start to prepare the new offer.

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Page 3 of 10

4. Contestability:

We are required by the National Electricity Rules to inform you that the design and construction of the electricity infrastructure work within your proposed development and the design and construction of any extension to our existing distribution network which may be required to connect the new connection assets to our existing distribution network is contestable work, which means that you may call for tenders for this work in accordance with clause 3.4 of the National Electricity Rules. However, you will need our technical specifications for the design and construction of this work before you may call for tenders.

We may need further information from you in order to prepare these technical specifications. You will also be asked to pay a fee for the preparation of the technical specifications.

We are also required by the National Electricity Rules to inform you that any tenderer for this portion of the Works must submit separate amounts for designing and constructing the connection assets and any required extensions.

Where you elect to engage a contractor to undertake and complete all or a part of the contestable works, the External Contractor Design and Construction Terms will also apply between you and SA Power Networks (these Terms and Conditions are available from the Project Officer assigned to your project upon request).

Which type of offer do you require?

You can request two types of offers in relation to the electricity infrastructure work for your Project. The type of offer you request will depend upon whether you want us to undertake all of the electricity infrastructure work in relation to the Project, or you elect to undertake the project as a contestable venture.

Option 1 – All Work

This option applies where you want us to undertake all of the electricity infrastructure work in relation to the Project. This work will include:

- the design and construction of your new connection assets;
- the design and construction of any extension to our existing distribution network which may be required to connect your new connection assets to our existing distribution network;
- all other work required to complete the connection of your new connection assets and/or extension to our existing distribution network and their commissioning and energisation; and
- our overall project management of this work.

Option 2 – Non-Contestable Work Only

This option applies where you elect to engage an appropriately qualified contractor, to design and construct the contestable components of the electricity infrastructure work for the Project (i.e. the design and construction of your new connection assets and any required extension to our existing distribution network).

Under this option our offer will only relate to the non-contestable components of the electricity infrastructure work for the Project. This work will include:

- all work required to complete the connection of the new connection assets and/or extension to our existing distribution network and their commissioning and energisation;
- compliance inspection and issuing of the 'Certificate of Electrical Compliance' (CEC) for the contestable works; and
- our overall project management of this work.

Please note, if you select Option 2, we may not be able to provide an offer for the Non-Contestable Works until a design has been completed to SA Power Networks Specification or the appropriately qualified design contractor you have engaged has provided us a precise scope of works to connect the contestable works to the existing distribution network.

Under *Option 2* you must also pay an additional non-refundable fee for the cost of preparing our technical specification for the design and construction of the contestable work for the Project. The amount of the *specification preparation fee* is set out in the attached Connection Enquiry form.

Once again, we are entitled under the National Electricity Rules to charge a fee for preparing technical specifications. Our specification preparation fee is based on our estimate of the likely cost of the contestable work for your Project and in the case of a large project (i.e. where the project cost is likely to exceed $100,000) our estimate of our actual cost to prepare the technical specification.

5. Customer Payment

The customer payment associated with the customer demand of 1,000kVA outlined in your initial enquiry will be calculated in accordance with clause 3.5 of the National Electricity Rules.

Please select the type of offer you would like to receive by ticking the appropriate box in the attached Connection Enquiry form.

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Page 5 of 10

If you need any assistance or information please contact Luke Georgeff, Network Project Officer at our SA Power Networks, 33 Ayliffes Road, St Marys SA 5042 office on 8275 0938 or luke.georgeff@sapowernetworks.com.au.

Yours faithfully

Stephen Jolly
Manager Customer Solutions

Encl:

Annexure 1 - Connection Enquiry Pro-Forma (including Table 1 – Further Information Required)
Annexure 2 - SA Power Networks - Negotiated Connection Service Process Flow (high-level)

Annexure 1

CONNECTION ENQUIRY PRO-FORMA

SA Power Networks Ref:	CN-500004746, American River Resort, Redbanks Road, American River SA 5221
Date:	08 April 2016
SA Power Networks Project Manager:	Luke Georgeff
Contact details:	SA Power Networks, 33 Ayliffes Road, St Marys SA 5042
Telephone	8275 0938
Email	luke.georgeff@sapowernetworks.com.au

Please indicate your decision regarding this project by ticking *one* of the following boxes.

I/We hereby agree that:

1.	**OPTION 1:** SA Power Networks to undertake all work (both contestable and non-contestable) for the Project $1,936 (GST Inclusive) Offer Fee based on the estimated project cost.	☐
2.	**OPTION 2:** SA Power Networks to undertake non-contestable work only $1,936 (GST Inclusive) Offer Fee based on the estimated project cost. $3,245 (GST Inclusive) Specification Preparation Fee based on the estimated project cost.	☐
3.	**DO NOT PROCEED:** I/We do *not* wish to proceed with this project	☐

By ticking either box 1 or 2, signing this Acceptance Form and returning it to the SA Power Networks Project Manager nominated above, you are entering into a binding legal contract and undertaking a commitment to pay the amounts referred to in this Contract. That Contract is constituted by this letter (including all of its attachments).

I have enclosed payment for the Offer Preparation Fee, and Specification Preparation Fee, as selected above and request a Tax Invoice to be prepared and issued to the undersigned.

Alternatively if you require a Tax Invoice prior to making payment of the appropriate Fee outlined above, please complete the attached Annexure 1 (CONNECTION ENQUIRY PRO-FORMA) and return to our office. SA Power Networks will not commence preparation of the Offer and where appropriate, the Design Specification until payment is received.

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Page 7 of 10

SA Power Networks Ref:	CN-500004746, American River Resort, Redbanks Road, American River SA 5221
Date:	08 April 2016
SA Power Networks Project Manager:	Luke Georgeff
Contact details:	SA Power Networks, 33 Ayliffes Road, St Marys SA 5042
Telephone	8275 0938
Email	luke.georgeff@sapowernetworks.com.au

If the signatory is not the Customer, then the signatory warrants that they are authorised to accept the Offer for and on behalf of the Customer.

Signed by, or for and on behalf of, the Customer:

..... **Date** .....
Signature

Name of signatory: (print) .....

Relationship to Customer: (print) .....

Customer's ABN: (print) .....

Company Name: (print) .....

Address for forwarding Invoices: (print) .....

.....

Contact Phone: Mobile ..... **Office:** .....

Please note: if unable to provide an ABN, the Customer must provide a 'Reason for not quoting an ABN' statement on the appropriate Australian Taxation Office form obtainable at https://www.ato.gov.au/Forms/Statement-by-a-supplier-not-quoting-an-ABN/

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Page 8 of 10

TABLE 1. FURTHER INFORMATION REQUIRED FROM YOU

Please provide the requested information for each ticked item. (*tick box as applicable*)

Information required	Description	Information, Notes & Feedback (attach information separately as required)
1 ☑	**Program Dates** • Construction Start & Completion • Forecast connection date • "Your Works Program"	
2 ☑	**Supply Type** – 3 phase , single phase, other **Proposed use/Type of installation** **Load details**	
3 ☑	**Tenancy Type** – commercial, industrial, residential, apartments or combination	
4	**Customer's electrical load requirements (i.e. Maximum Demand – Existing** (AS3000))	Not Applicable
5 ☑	**Customer's electrical load requirements (i.e. Maximum Demand – Proposed** (AS 3000))	
6 ☑	**Load Operation Cycle – Existing & Proposed** operation cycle (i.e. typical operating times of plant & equipment)	
7 ☑	**Motor Starting** - Magnitude & incidence per day of anticipated plant inrush currents (i.e. for motors include DOL / Soft Start characteristics)	
8 ☑	**Harmonic distortion** expected if any (in % odd / even terms)	
9 ☑	**Main Switch Board** details • Consumer mains size / number of cables	
10 ☑	**Drawings & Plans** • Site Plans - detailed site / location / elevation / plans • Survey Plans - • Sewer • Road Designs	
11 ☑	**Land Title Status** (i.e. Torrens, Community, Strata, Other) Installation address	
12 ☑	**Easements** acquisition responsibility: • SA Power Networks overall (if constructed by SA Power Networks) • Customer overall (if constructed by Contractor)	
13 ☑	**Metering:** • Quantity & Type • Preliminary metering arrangement anticipated (for future confirmation) • Account and / or existing meter numbers & serial numbers for all existing site services	
14 ☑	**Retailer** • Name of Retailer for proposed single customer consumers greater than 160MWh / annum & where existing tariff structure will not be retained.	
15 ☑	**Contact Details** - If other than the customer, the nominated agencies and their respective point of contact acting on behalf of the customer re: • Overall Project Management • Electrician. • Builder.	

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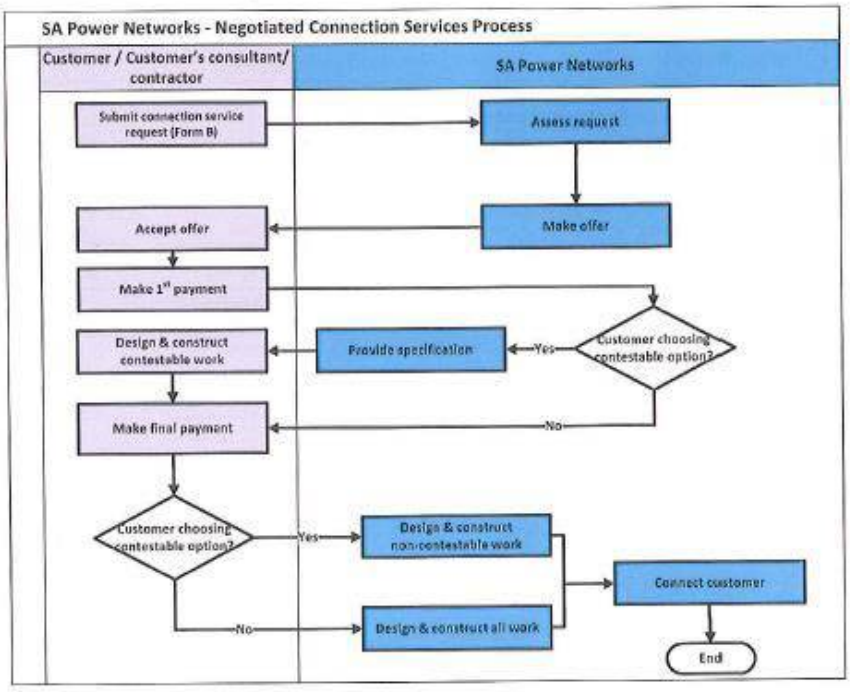
Page 9 of 10

Annexure 2

SA Power Networks - Negotiated Connection Service Process Flow (high-level)



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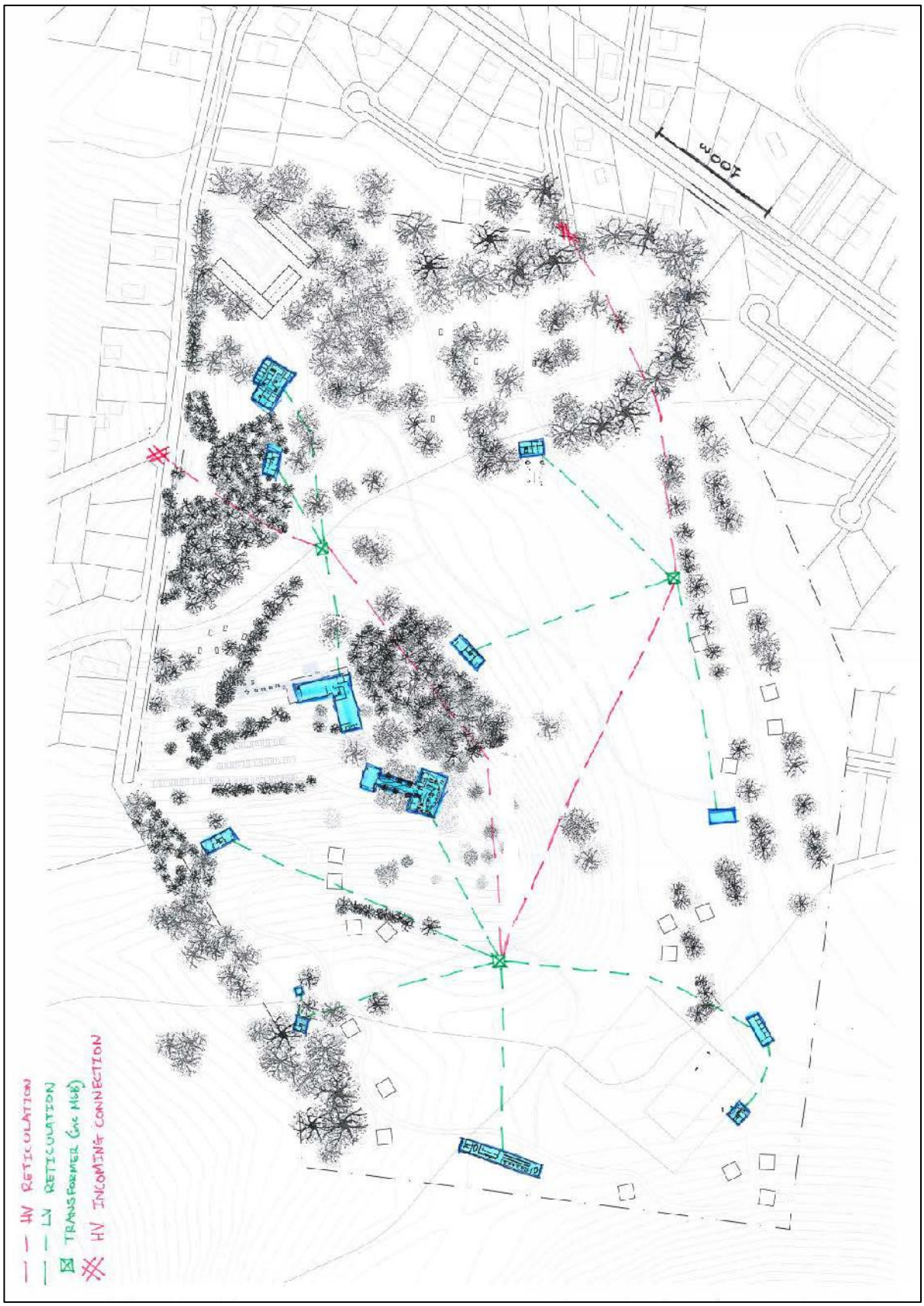
Page 10 of 10

Appendix D Power: Hotel Precinct Elec Infrastructure Sketch



3.0 Communication

3.1 Executive Summary

As part of the Australia wide Nation Broadband Network (NBN) rollout that is in progress 'Wireless NBN' is currently available in the American River area.

3.2 The Hotel Precinct

Appropriate infrastructure will be incorporated as part of the design to facilitate the connection to the NBN.

Appendix E Communication: Formal Correspondence with NBN

NBN Co. are unable to confirm any details regarding a 'Wireless NBN' connection until a more formal application is made, due to no information being available at this time on a 'Wireless NBN' connection. A formal application can be submitted once the design has reached a more detailed stage, so that specific items can be accurately determined.

4.0 Fire

4.1 Executive Summary

In South Australia there are strict requirements for development within bushfire prone areas in addition to the requirements to the Building Code of Australia. The proposed development in American River is located in a medium bushfire risk area for the Hotel Precinct. Therefore the development is required to be undertaken in accordance with the Minister's Code, *Undertaking development in Bushfire Protection Areas, February 2009 (as amended October 2012).*

This report covers the high level firefighting requirements for the proposed site, however a bushfire assessment in accordance with AS3959 has not been undertaken.

4.2 The Hotel Precinct

In accordance with the Building Code of Australia the site will require a fire fighting water supply. The supply will need to consist of at least two dedicated fire tanks and two fire pumpsets provided to comply with the requirements of AS2419.1-2005, AS2118.6-2012 and SAMFS/CFS Policy 0014 for fire tanks as follows:

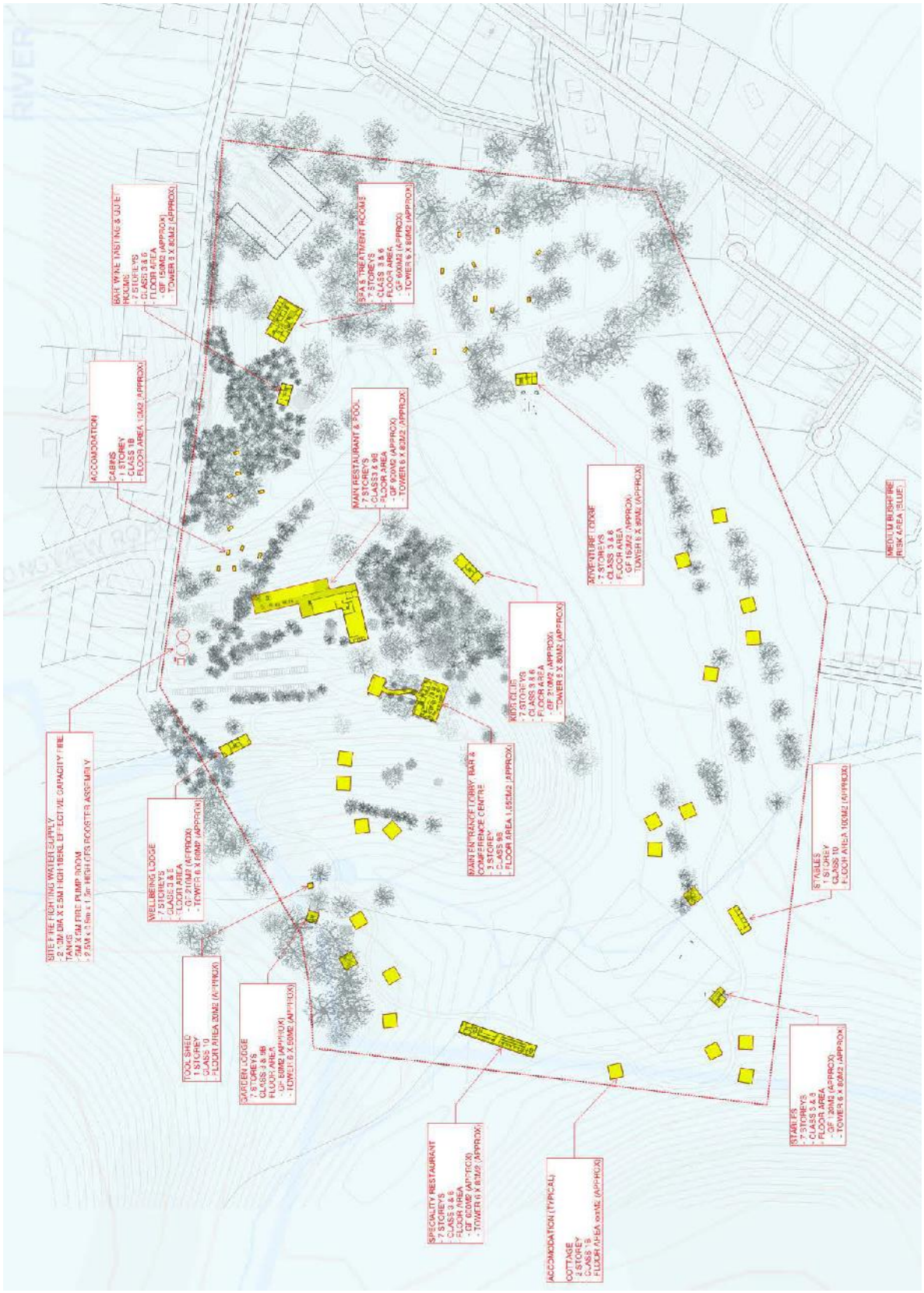
- The size of the tanks will in the order of 370kL ; 4 hours supply based upon 20L/s for hydrants and 60min supply plus 20% based upon 18L/s for sprinklers. The pumps will need to be suitably sized to provide the fire hydrants the required flow and pressure of 5L/s @ 700kPa.
- The fire pumpsets (2 x diesel) and tanks would need to be located ideally at the entrance to site along with a CFS booster assembly.
- It is recommended that the fire pumpsets are located in a building meeting the same BAL as the other buildings on the site.
- Each building within the precinct will be required to be provided with a combined sprinkler and hydrant booster, a sprinkler valve set, one or more hydrants (internal or external, as required) along with fire hose reels for bushfire protection.

In accordance with Minister's Code the Hotel Precinct will require the following:

- Suitable site entry/exit from the allotment for fire fighting services (personnel and vehicles)
- Suitable access within and around the site
- The buildings to be sited away from areas that pose an unacceptable bushfire risk. This includes areas with rugged terrain or hazardous vegetation. We note that the KI Council Development plan requires building be set back at least 20 metres from existing hazardous vegetation.
- Sites located in a medium bushfire risk area are required to comply with the requirements for a bushfire attack level of BAL- 12.5.

In preliminary discussions with the CFS they indicated their preference for the inclusion of for sprinkler systems to the mutli-storey accommodation buildings as part of an overall fire safety solution due to their concerns regarding the ability and expertise of the local volunteer fire brigade.

Appendix F Fire: Site Plan



Appendix G Fire: CFS Meeting Minutes

American River

Minutes of Meeting

Project:	American River, Kangaroo Island	**Reference Number:**	3205.160603.F.1
Meeting Date:	9 March 2016	**Meeting Time:**	8:30 am
Location:	CFS Offices, Mt Barker	**No. Pages**	2
Attendees:	Colin Paton – South Australian Country Fire Service (CFS) Ian Dodd – Katnich Dodd (KD) Alex Munn – BCA Engineers (BCAE)	**Apologies:**	Nil

Item	Description	Action
1.0	**Project Overview**	
1.1	BCAE tabled drawings detailing the proposed development including the details of the buildings proposed for the Hotel Facility and Harbour. CFS tabled that they were aware of the development and would be pleased to work with the design team to get the project off the ground. The CFS did note that the existing CFS equipment and training of local fire brigades may not be suitable for this type of development, however should the project proceed they will push the state Government for replacement of the equipment and additional training for the fire brigades.	NOTE
2.0	**Hotel Facility – Site Infrastructure**	
2.1	BCAE noted that the Hotel Facility site does not have access to adequate water infrastructure for fire fighting. Therefore it has been proposed to provide full capacity tanks (2 – tanks) along with diesel fire pumps (2-fire pumpsets). The pumps would then pump the water around the site to the individual buildings via a site fire water ring main.	NOTE
2.2	BCA discussed that a Fire Brigade Booster Assembly is proposed at the pump location, however discussed that it may be more appropriate to have a Booster at each building. CFS agreed and indicated that this would be their preference. The final locations would need to be discussed and agreed with the CFS and would be dependent on the location of the CFS accessible fire tracks through the site	NOTE
3.0	**Hotel Facility - Multi-Storey Buildings**	
3.1	BCAE noted that the Hotel Facility is proposed to incorporate multi-storey accommodation buildings, up to 7 storeys high. BCAE discussed that these buildings are proposed to be compliant with the Building Code of Australia (BCA) with no alternative solutions.	NOTE
3.2	BCAE noted that the following fire systems are proposed for these buildings: - Smoke detection and alarm systems - Fire extinguishers - Fire hydrants, located on the external stair	NOTE
3.3	KD noted that the current design of the stair will likely require drenching sprinklers to protect openings within 6m of the external stair. CFS agreed.	NOTE
3.4	KD also noted that there may be issues associated with the Lift arrangement as there is no common lift lobby. KD recommended discussing the proposed arrangement	

3205.160603.F.1 CFS meeting minutes

American River

Item	Description	Action
	with SafeWork SA.	
3.5	CFS noted that the multi-storey buildings will pose issues for the local fire brigade. CFS requested that additional fire safety provisions be provided to these buildings under BCA E1.10, Provisions for Special Hazard, due to these issues. The likely additional fire safety provisions would be sprinklers to all the multi-storey buildings. The final solution would need to be agreed with the CFS should the development proceed. BCAE noted that should sprinklers be provided to these buildings then the fire water storage capacity would need to be increased along with the size of the fire pumpsets.	NOTE
4.0	**Harbour**	
4.1	BCAE noted the Harbour development would also be compliant with the Building Code of Australia (BCA) with no alternative solutions. The largest building is approximately 760m2 and all buildings are single storey.	NOTE
4.2	BCAE also noted that due to the current building size being over 500m2 that fire tanks and pumps are also required to serve the Harbour. KD recommended that the Hotel Reception/Ferry Ticket Booth/Restaurant building be separated by a fire wall to reduce the size of the fire compartments to less than 500m2. This would then negate the need to the fire tanks and pumps for this area.	NOTE
5.0	**General**	
5.1	CFS requested some plans to review along with any detailed information regarding the site layout and multi-storey buildings.	BCAE

Meeting Closed: 9.30am

Distribution: All Above

3205.160603.F 1 CFS meeting minutes

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NATIVE VEGETATION CLEARANCE ASSESSMENT AND LANDSCAPE PLAN

PROPOSED KANGAROO ISLAND RESORT
AMERICAN RIVER

CITY AND CENTRAL DEVELOPMENT (CCD) HOTEL AND RESORTS LLC

31 AUGUST 2016

BOTANICAL ENIGMERASE

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Citation: Haby, M and Rowley, D.J. (2016) Native Vegetation Assessment and Landscape Plan- Proposed American River Resort. Internal report to City and Central Development (CCD) Hotel and Resorts LLC.

This report was researched and prepared by

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in accordance with the agreement between, on behalf of and for the exclusive use of

City and Central Development (CCD) Hotel and Resorts LLC
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Michelle Haby is a Native Vegetation Council accredited consultant, accredited to prepare data reports for clearance consent under Section 28 of the *Native Vegetation Act 1991* and applications made under one of the *Native Vegetation Regulations 2003*. Michelle has also undertaken training in the BushRAT method and Bushland Condition Monitoring for a BushRAT Registered Consultant.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PHOTOS

SUMMARY OF ASSESSMENT WITH REFERENCE TO THE DEVELOPMENT ASSESSMENT COMMISSION GUIDELINES

The Draft Development Assessment Commission Guidelines for the proposed Kangaroo Island Resort has identified two criteria that need to be addressed relating specifically to native vegetation. Following is a summary of the Native Vegetation Assessment results relative to the criteria-

Criteria 1-

Quantify and detail the extent, condition and significance of native vegetation (individual species and communities) on site, that which needs to be cleared or disturbed (directly or indirectly) during construction (including ancillary clearing for bushfire safety or infrastructure), and the proposed framework for ongoing management, including opportunities for rehabilitation and revegetation.

- The proposal includes to clearance of approximately 0.11ha of native vegetation consisting of upto 6 Kangaroo Island Leafed Mallee trees, overhanging limbs and understory vegetation;
- The BushRAT Survey of the native vegetation determined-
    - The native vegetation is of poor to moderate condition;
    - No nationally threatened, state listed or regionally significant plant species were observed during the vegetation assessment;
    - The property contains potential habitat for *Caladenia ovata* which is listed as Vulnerable under the EPBC Act;
    - The property contains a small portion of degraded Kangaroo-Island Narrow-leafed Mallee Woodland which is listed as Critically Endangered under the EPBC Act;
    - The property contains, and observed during the survey, feeding and nesting habitat for the Glossy Black Cockatoo which is listed as Endangered under the EPBC Act;
    - The property contains potential habitat for the Southern Brown Bandicoot which is listed as Endangered under the EPBC Act.
- Weekly Surveys for *Caladenia ovata* should occur in the months of September and October to determine if the plant occur on the property;
- The off-set for the native vegetation clearance is calculated at 1.6 SEB Hectares or a payment of $8.892.68 to the Native Vegetation Fund under the soon to be introduced Policy for Significant Environmental Benefit. Note the SEB Hectare calculation is consistent with the current policy;
- The Landscape Plan maybe used as a set-off for the clearance if implemented by someone who has extensive experience in the propagation of a large number of different Kangaroo island native plant species. The Landscape Plan for the site proposes to establish the following landscapes-

Landscape	Area	Proposal
Native Vegetation	~10ha	• Infill the existing native vegetation to enhance the Glossy Black Cockatoo, Southern Brown Bandicoot and Kangaroo Island Narrow-leafed Mallee Woodland habitats • 2,000 stems per hectare with a combination of existing and planted native vegetation • Minimum of 20 locally indigenous species

Grassland	~12ha	• Establish a native grassland • Planted at 3,000 seedlings per hectare
Shrubland	~10ha	• Up to 1.5m high shrubland to be established using native plants suited to the American River area
Flower Meadow	~0.4ha	• U pto 1.5m high shrubland to be established using native plants suited to the American River area that have strong smell and/or vibrant colours to enhance the spa experience
Botanical Garden	~0.5ha	• Plants of Kangaroo Island significance
Lawn	~0.7ha	• Lawn for activities
Vegetable Patch	~0.3ha	• Vegetables for the restaurant etc

Criteria 2-

Describe the effect of, and measures to appropriately manage the risk of introduced weed species on native vegetation, before and after construction, including species that may originate from landscaped areas or gardens.

- The implementation of the Landscape Plan above, will require extensive weed management, including eradication, to achieve the desired result;
- The management of weed species will be an ongoing requirement;
- The Landscape Plan includes the establishment of native plant species, as such the management of the weed species currently on the site is required.

1.0 BACKGROUND

Kangaroo Island is the third largest island in Australia covering approximately 4,500 km² located off the Fleurieu Peninsula in South Australia. Kangaroo Island has a resident population of approximately 4,200 people.

Due to the relative isolation, Kangaroo Island is free from rabbits and foxes and has a relatively low number of introduced plant species. This, along with being isolated from mainland Australia, has resulted in Kangaroo Island having a high level of endemic flora and fauna. Kangaroo Island remains covered with approximately 55% native vegetation.

Of the remaining native vegetation on Kangaroo Island approximately 55% is contained within Government Reserves and managed by the Department of Environment, Water and Natural Resources. Another 9% is contained within Heritage Agreements protected under the *Native Vegetation Act 1991* with the remaining in private ownership (*Willoughby et al 2001*). A total of 30% of Kangaroo Island is dedicated as a protected area.

Co City & Central Consulting Pty Ltd are proposing to establish a "Kangaroo Island Resort" on an approximately 35 hectare site adjoin American River on Kangaroo Island. The land comprises of primarily cleared farmland with some native vegetation and small portions of planted vegetation.

The proposed Kangaroo Island Resort is proposed to consist of 108 hotel rooms (in 9 lodges), and 20 cottages and 20 cabins, a 115 room Micro Hotel and associated infrastructure, Figure 1.

Figure 1- Kangaroo Island Resort Proposal

City and Central Development (CCD) Hotel and Resorts LLC commissioned Botanical Enigmerase to undertake a native vegetation assessment of the property.

2.0 ASSESSMENT OF NATIVE VEGETATION

The Native Vegetation on Section 84 Hundred of Haines was assessed on 8 June 2015 utilising the Native Vegetation Council BushRAT survey technique. A BushRAT survey was undertaken at 5 sites within the property, Figure 2, Table 1.

Figure 2- BushRAT Survey Sites

	Latitude	Longitude
Site 1	35° 45' 56" S	137° 45' 53" E
Site 2	35° 47' 3" S	137° 46' 2" E
Site 3	35° 46' 58" S	137° 46' 2" E
Site 4	35° 46' 51" S	137° 45' 54" E
Site 5	35° 46' 50" S	137° 45' 47" E

Table 1- BushRAT Survey Sites

Table 2 provides a summary of the outcomes of the BushRAT survey undertaken on 8 June 2015. The detailed results of the BushRAT Survey are contained within Appendix 1.

Features of the property	The property consists of poor quality native vegetation, based on BushRAT assessment consisting of an *Allocasuarina verticillata* forest in the centre of the property, many large *Eucalyptus cladocalyx* with hollows, remanent mallee vegetation and some planted vegetation including *Allocasuarina verticillata.*

Topographic/landform description and remnancy	The northern boundary of the property follows along Thomas Street, American River. The property slopes generally downwards from Thomas Street towards Pelican Lagoon.
Conservation significance	The area includes a remanent of the Kangaroo Island Narrow Leafed Mallee Woodland and provides feeding and nesting trees for the Glossy Black Cockatoo. There is also potential habitat for the Southern Brown Bandicoot and the Kangaroo Island Spider Orchid

	Site 1	Site 2	Site 3	Site 4	Site 5
Intact Stratum	No	No	No	No	No
Native Plant Species	9	4	5	17	3
Weed Species	12	5	5	5	7
Nationally Threatened Plant Species	0	0	0	0	0
State listed Plant Species	0	0	0	0	0
Regionally Significant Plant Species	0	0	0	0	0
Plant Community	KI1901	KI1108	KI1108	KI1108	KI0504
Nationally Threatened Plant Community		CR	CR	CR	
Regionally Significant Plant Community	RA	TH	TH	TH	RA
Benchmark Community	KI 2	KI 5.1	KI 5.1	KI 5.1	KI 2
Landscape Context Score	9	9	9	9	9
Vegetation Condition Score	33	31	34	58	37
Conservation Significance Score	5	10	10	10	5
Unit Biodiversity Score	63	80	86	134	69

Table 2- BushRAT Survey Summary

The detailed Native Vegetation Assessment, following, has been undertaken using the Native Vegetation Council Clearance Principles as a basis for determining significance.

2.1 Plant Species Diversity- Principle 1(a)

Table 3 provides the native plant species observed as part of the BushRAT survey undertaken on 8 June 2015.

BushRAT Inspection Date	8 June 2015
Conservation Status Source	*Gillam, S. and Urban, R. (2014)*

Species	Status			Site					Other
	AU	SA	KI	1	2	3	4	5	
Acacia paradoxa			LC	■			■	■	
Acacia pycnantha			LC				■		
Allocasuarina verticillata			LC	■			■	■	
Astroloma humifusum			LC	■			■		
Austrostipa sp.				■					
Bertya rotundifolia			LC				■		
Clematis microphylla							■		
Dianella brevicaulis			LC	■			■		
Dodonaea viscosa ssp. angustissima			LC				■		
Enchylaena tomentosa var. tomentosa			LC		■	■	■		

Eucalyptus cladocalyx ssp. crassa									
Eucalyptus cneorifolia			LC						
Ficinia nodosa			LC						
Gonocarpus mezianus			LC						
Hibbertia riparia			LC						
Melaleuca gibbosa			LC						
Olearia ramulosa			LC						
Orthrosanthus multiflorus			LC						
Pteridium esculentum ssp. esculentum			LC						
Rhagodia candolleana ssp. candolleana			LC						
Rytidosperma sp.									

Table 3- Native Plant Species Recorded

Table 4 provides the introduced plant species observed as part of the BushRAT survey undertaken on 8 June 2015.

BushRAT inspection date:	8 June 2015							
Declared Sources	*Biosecurity 2015*							
Species	Weed Threat	Declared	Site					
			1	2	3	4	5	
Arctotheca calendula	1							
Asparagus asparagoides f. asparagoides	5	Yes						
Briza minor	2							
Ehrharta calycina	4							
Ehrharta longiflora	2							
Eucalyptus leucoxylon ssp.								
Freesia cultivar	3							
Lagurus ovatus	2							
Lycium ferocissimum	3	Yes						
Olea europaea ssp. europaea	4	Yes						
Oxalis pes-caprae	3							
Pinus radiata	3							
Romulea rosea var. australis	2							
Trifolium sp.	2							

Table 4- Introduced Plant Species Recorded

Indigenous Species- 21
Introduced Species- 14
Total Species- 35

A significant number of introduced plant species have been recorded on the property, three of which are declared species. A comprehensive introduced plant species management program will be required to be implemented as part of the project.

The plant species diversity principle is not significant for this project.

2.2 Wildlife Habitat- Principle 1(b)

The *EPBC Act* "on-line tool" was utilised to determine potential fauna species on the property. Coordinates from the centre of the property with a 2km buffer were used to provide the "EPBC Act Protected Matters Report" on 4 June 2015.

The "EPBC Act Protected Matters report" was cross reference with species records to determine likelihood of the species being recorded on the property based on if the property was near a recording or preferred habitat. This assessment determined that the property contains the preferred habitat of Glossy Black Cockatoo and there are records of the Southern Brown Bandicoot in the general area, Table 5.

Scientific Name	Common Name	EPBC Act Status	Record
Calyptorhynchus lathami halmaturinus	Glossy Black Cockatoo	Endangered	Yes
Isoodon obesulus obesulus	Southern Brown Bandicoot	Endangered	Records in general area
Sminthopsis aitkeni	Kangaroo Island Dunnart	Endangered	No

Table 5- EPBC Act Fauna Species

The vegetation on the property provides habitat for the following fauna species of conservation significance, Table 6.

Data sourced from:	• Birds of Conservation Significance- Community Habitat Preferences Spreadsheet • *Masters P and Southgate RI (2016)* AMERICAN RIVER RESORT & HARBOUR: Fauna Survey.		
Status Source	*Gillam, S. and Urban, R. (2014)*		
Common Name	Conservation Status		
	AU	SA	KI
Glossy Black Cockatoo	EN	E	EN
Short-beaked Echidna	EN		
Heath Goanna		V	
Scarlet Robin		V	

Table 6- Fauna Species of Conservation Significance

During the BushRAT Survey undertaken on 8 June 2015 four different locations were observed with Glossy Black Cockatoo "chewings" under a total of 9 different *Allocasuarina verticillata* trees, both indigenous and planted, Figure 3. This indicates that the Glossy Black Cockatoos are feeding on the property.

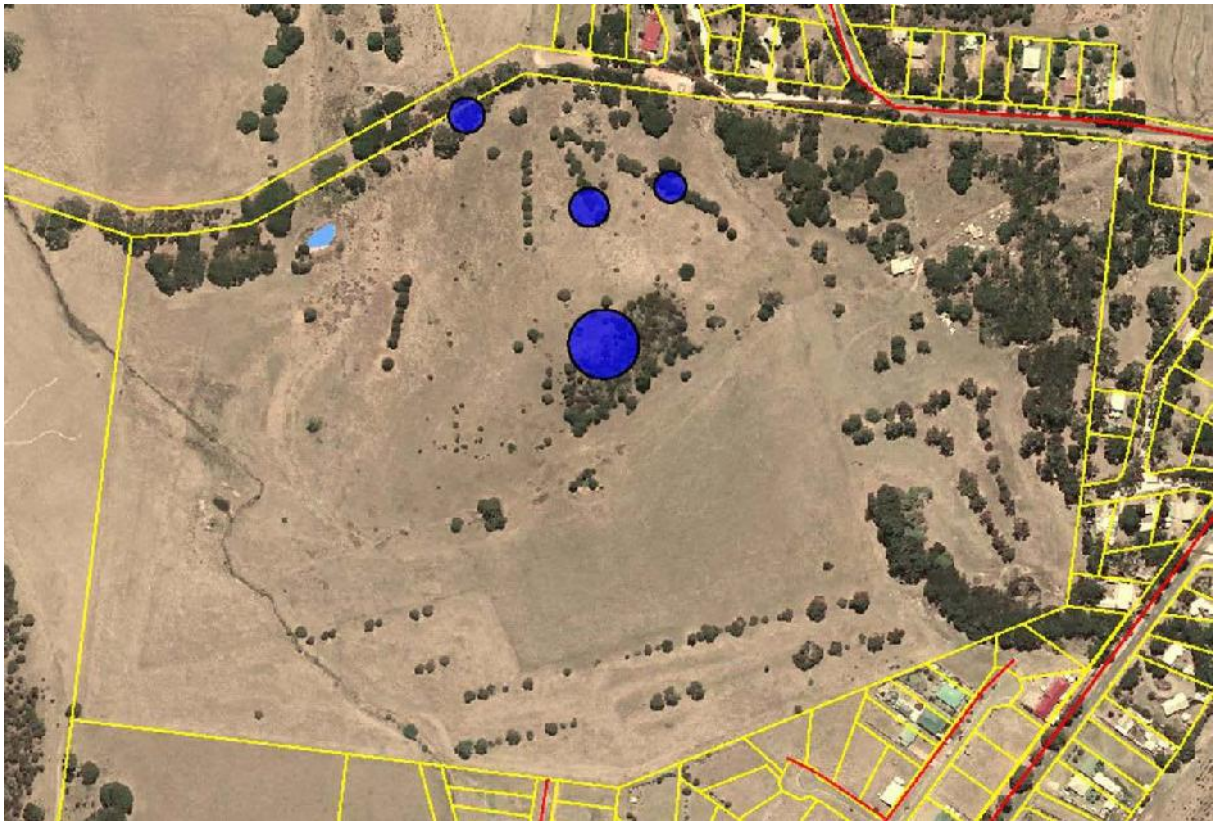


Figure 3- Chewings Locations

The wildlife habitat principle is significant for this project.

2.3 Rare Plant Species- Principle 1(c)

The *EPBC Act* "on-line tool" was utilised to determine potential plant species on the property. Coordinates from the centre of the property with a 2km buffer were used to provide the "EPBC Act Protected Matters Report" on 4 June 2015.

The "EPBC Act Protected Matters report" was cross reference with *Taylor 2003* to determine the likelihood of the species being recorded on the property based on if the property contained the preferred habitat. This assessment determined that *Caladenia ovata* and *Leionema equestre* have been recorded near the property, Table 7. The property contains a very small remanent of the preferred habitat of *Caladenia ovata*.

Scientific Name	Common Name	EPBC Act Status	Potential Habitat on Property (*Taylor 2003*)
Caladenia ovata	Kangaroo Island Spider-orchid	Vulnerable	Recorded nearby
Caladenia tensa	Greencomb Spider-orchid	Endangered	No
Euphrasia collina subsp. osbornii	Osborn's Eyebright	Endangered	No
Leionema equestre	Kangaroo Island Phebalium	Endangered	Recorded nearby
Pomaderris halmaturina subsp. halmaturina	Kangaroo Island Pomaderris	Vulnerable	No

Ptilotus beckerianus	Mulla mulla	Vulnerable	No
Spyridium eriocephalum var. glabrisepalum	MacGillivray Spyridium	Vulnerable	No
Thelymitra matthewsii	Spiral Sun-orchid	Vulnerable	No

Table 7- EPBC Act Flora Species

No plant species of conservation significance were recorded on the property during the BushRAT survey undertaken on 8 June 2015, Table 8.

Data sourced from:	• *Gillam, S. and Urban, R. (2014)*		
Status Source	*Gillam, S. and Urban, R. (2014)*		
Species	Common Name	Conservation Status	
		AUS	SA	KI

Table 8- Rare Native Plant Species Recorded

The property contains habitat for *Caladenia ovata* which was not observed during the BushRAT Surveys. *Caladenia ovata* generally flowers in September/October each year and as a result surveys should be undertaken at this time before construction commences to determine the presence or otherwise of this plant species.

The rare plant species principle will be significant for this project if *Caladenia ovata* is confirmed on the property.

2.4 Rare Plant Communities-Principle 1(d)

The *EPBC Act* "on-line tool" was utilised to determine potential rare plant communities on the property. Coordinates from the centre of the property with a 2km buffer were used to provide the "EPBC Act Protected Matters Report" on 4 June 2015.

The "EPBC Act Protected Matters report" was cross reference with *NatureMaps* and the on-site survey to determine if present on the property. This assessment determined that the property contains a very small portion of the Kangaroo Island Narrow-leafed Mallee Woodland community, Table 8.

Community Name	EPBC Act Status	On Property
Kangaroo Island Narrow-leafed Mallee (*Eucalyptus cneorifolia)* Woodland	Critically Endangered	Yes
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	No

Table 9- EPBC Act Communities

Nature Maps identifies the vegetation communities on the property as KI1108 and a number of unknown vegetation communities.

The onsite survey determined the vegetation communities on the property were consistent with Nature Maps with some additions, Figure 4, Table 10.

Figure 4- Native Vegetation Communities

Data sourced from:			• Kangaroo Island Floristic Vegetation Mapping • Willoughby, N, Oppermann, A., Innes, R.W. (2001) • Provisional List Of Threatened Ecosystems Of South Australia (DEH 2009) • EPBC Protected Matters Report			
Formation	Original ID	SA VEG ID	New Detailed Floristic Description	Conservation Status		
				A	SA	KI
Woodland	5D	KI0504	*Eucalyptus cladocalyx, Eucalyptus fasciculosa* mid woodland over *Allocasuarina verticillata* over *Acacia paradoxa* shrubs over *Prostanthera spinosa* shrubs			Rare
Mallee	11H	KI1108	*Eucalyptus cneorifolia, +/- Eucalyptus phenax* ssp. *compressa* mid mallee woodland over *Melaleuca uncinata (NC), Acacia paradoxa, Choretrum glomeratum* var. *glomeratum* shrubs	CR		Threatened
Forest	19A	KI1901	*Allocasuarina verticillata, +/- Eucalyptus cladocalyx* low open forest over *Acacia paradoxa, Prostanthera spinosa, Hibbertia australis* shrubs			Rare

Table 10- Native Vegetation Communities

Vegetation Association KI 1108 is the Kangaroo Island Narrow-leafed Mallee (*Eucalyptus cneorifolia*) Woodland which is listed as a Critically Endangered ecological community under *the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The patch on the property meets the Condition Thesholds by-

1. Vegetation is not on a roadside;
2. The shortest cross-sectional mature canopy width is more than 60 meters;
3. The area is more than 1 hectare;
4. The understorey layer is less than 50% total perennial cover of non-indigenous plant species; and
5. There are more than four native plant species present.

The rare plant community principle is significant for this project.

2.5 Remnancy- Principle 1(e)

The property is located within the Amberly Environmental Association which in 2002 was estimated to retain 10% of its original native vegetation.

The remnancy principle is significant for this project.

2.6 Wetland- Principle 1(f)

The definition of a wetland, for the purpose of this principle is-

- land permanently or temporarily underwater or waterlogged that must have surface water or waterlogging of sufficient frequency and/or duration to effect the biota; and/or
- if the area is defined on 1:50,000 series topographic map as either a perennial or intermittent lake or land subject to inundation.

The wetland principle has no consideration for this project.

2.7 Amenity- Principle 1(g)

The amenity principle maybe significant for this project subject to the perception of the development in the landscape.

2.8 Soil Erosion, Salinity, Water Issues- Principle 1(h, i, j and k)

The Kangaroo Island Natural Resources Management Board may provide comment to address the principles as per below-

(h) the clearance of the vegetation is likely to contribute to soil erosion or salinity in an area in which appreciable erosion or salinization has already occurred or, where such erosion or salinization has not yet occurred, the clearance of the vegetation is likely to cause appreciable soil erosion or salinity; or

(i) the clearance of the vegetation is likely to cause deterioration in the quality of surface or underground water; or

(j) the clearance of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding; or

(k) -

(i) after clearance the land will be used for a particular purpose; and

(ii) the regional NRM board for the NRM region where the land is situated has, as part of its NRM plan under the *Natural Resources Management Act 2004*- assessed-

(A) the capability and preferred uses of the land; and

(B) the condition of the land; and

(iii) according to that assessment the use of the land for that purpose cannot be sustained.

2.9 River Murray Act- Principle 1(l)

Not Applicable

2.10 Dolphin Sanctuary- Principle 1(m)

Not Applicable

2.11 Other considerations

The vegetation on the property includes nest hollows, both natural and artificial, of the Glossy Black Cockatoo in the *Eucalyptus cladocalyx* trees. As such none of these trees should be removed as part of the project.

The *Allocasuarina verticillata*, both natural and planted, are providing a food source for the Glossy Black Cockatoo and as such should also not be removed.

The Fauna Survey (*Masters P and Southgate RI (2016)* AMERICAN RIVER RESORT & HARBOUR: Fauna Survey) has suggested appropriate wildlife management to be included as part of the proposed development.

3.0 NATIVE VEGETATION MANAGEMENT

The construction of the Kangaroo Island Resort will require a small amount of native vegetation clearance which will require an off-set. The proposal also proposes revegetation through the landscape plan focusing on local plant species.

3.1 Native Vegetation Clearance

The construction of the Kangaroo Island Resort, in accordance with Figure 1, will require the clearance of three areas consisting of approximately 0.11 hectares of native vegetation, Figure 5.

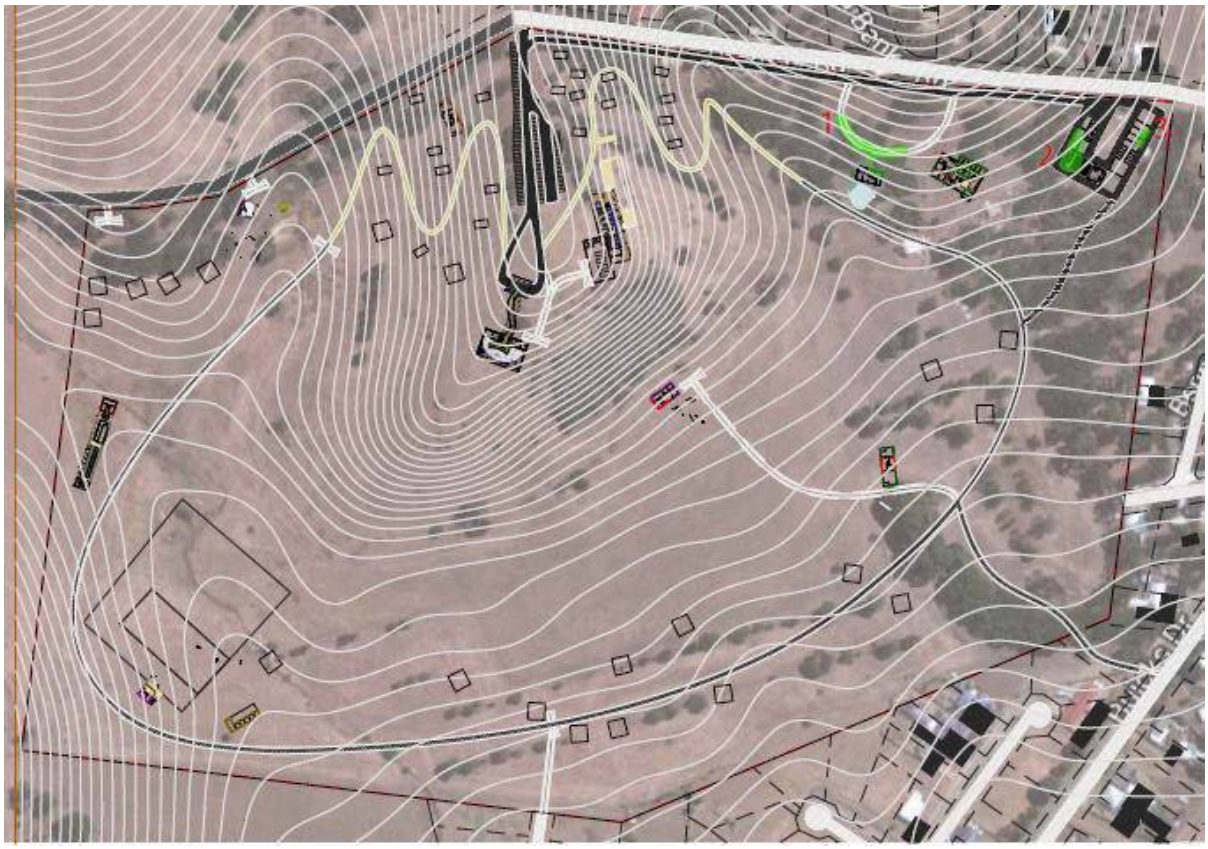


Figure 5- Proposed Native Vegetation Clearance Areas

Table 11 provides the proposed clearance within each plant community and equivalent BushRAT Site with reference to the Clearance Areas as identified in Figure 5.

BushRAT Site	Plant Community	Proposed Clearance	Clearance Area
Site 1	KI1901	0ha	
Site 2	KI1108	0ha	
Site 3	KI1108	0.03ha	Area 2
		0.01ha	Area 3
Site 4	KI0504	0.07ha	Area 1
Site 5	KI0504	0ha	

Table 11- Proposed Clearance in each Plant Community

Table 2 summarises the Clearance Principles for each BushRAT Site.

3.1.1 Clearance Area 1

Clearance Area 1 consists of developing a 4m wide by 5m high clearance envelope along the access road to the Library and Wine Bar Lodge for emergency vehicles.

Photo 1- Clearance Area 1

The native vegetation proposed to be cleared in Area 1 is defined as vegetation community KI0504 and equivalent to BushRAT Site 4. The native vegetation proposed to be cleared is consistent with BushRAT Site 4 with a diverse understory.

Clearance will be primarily overhanging branches as trees will be avoided by the access road. The understory within the clearance envelope will require removal for the construction of the roadways etc.

3.1.2 Clearance Area 2

Clearance Area 2 consists of removal of native vegetation for the Micro Hotel. The footprint and location of the building has been designed to minimise the native vegetation clearance as it is primarily located within a cleared area.

Photo 2- Clearance Area 2

The native vegetation proposed to be cleared in Area 2 is defined as vegetation community KI1108 and equivalent to BushRAT Site 3.

The vegetation proposed to be cleared is however of relatively poor quality consisting of Kangaroo Island Narrow Leafed Mallee, *Eucalyptus cneorifolia*, and *Rhagodia candolleana ssp. candolleana,* and a large number of introduced plant species including boxthorn and bridle creeper. Upto 6 Kangaroo Island Narrow Leafed Mallee trees may be removed.

3.1.3 Clearance Area 3

Clearance Area 3 consists of the removal of limbs on one side of a very large Kangaroo Island Narrow-leafed Mallee, *Eucalyptus cneorifolia*, for the Micro Hotel.

Photo 3- Clearance Area 3

The native vegetation proposed to be cleared in Area 3 is defined as vegetation community KI1108 and equivalent to BushRAT Site 3.

The clearance however will only consist of the removal of limbs from one side of one large Kangaroo Island Narrow-leafed Mallee. The remaining vegetation consists of *Rhagodia candolleana ssp. candolleana,* and a large number of introduced plant species including boxthorn.

3.2 Significant Environmental Benefit

Under certain circumstances the *Native Vegetation Act 1991* and *Native Vegetation Regulations 2003* allow the clearance of native vegetation. Many of these clearance activities require an offset in the form of a Significant Environmental Benefit (SEB).

The SEB is determined based on the quality of the native vegetation, from the BushRAT Survey proposed to be cleared and can be in the form of equivalent SEB Hectares or a payment made to the Native Vegetation Fund.

The native vegetation on the property is considered of poor condition and low biodiversity value however the vegetation, including planted vegetation, is providing feeding and nesting habitat for the Glossy Black Cockatoo.

Based on the Vegetation Assessment of the property and utilising the NVC soon to be introduced Policy for Significant Environmental Benefit, the Kangaroo Island Resort proposal will need to establish an off-set area of 1.6 SEB Hectares or make a payment of $8,892.68, including administration charge, to the Native Vegetation Fund, Table 12. Appendix 1 includes the calculations for determining the offset based on the BushRAT Assessment.

BushRAT Site	Plant Community	Proposed Clearance	SEB Hectares	Payment to Fund (inc Admin charge)
Site 1	KI1901	0ha	0ha	$0
Site 2	KI1108	0ha	0ha	$0
Site 3	KI1108	0.04ha	0.43ha	$2,386.18
Site 4	KI0504	0.07ha	1.17ha	$6,506.50
Site 5	KI0504	0ha	0ha	$0
Total		0.11ha	1.6ha	$8,892.68

Table 12- SEB Requirements

This result is consistent with the current Native Vegetation Council process for determining SEB Hectares.

3.3 Clearance Offset

The Kangaroo Island Resort proposal includes a significant Landscape Plan (section 4.0) focusing on the establishment of Kangaroo Island native plants. Table 13 summarises the Landscape Plan outcomes.

Landscape	Area	Proposal
Native Vegetation	~10ha	• Infill the existing native vegetation to enhance the Glossy Black Cockatoo, Southern Brown Bandicoot and Kangaroo Island Narrow-leafed Mallee Woodland habitats • 2,000 stems per hectare with a combination of existing and planted native vegetation • Minimum of 20 locally indigenous species
Grassland	~12ha	• Establish a native grassland • Planted at 3,000 seedlings per hectare
Shrubland	~10ha	• Up to 1.5m high shrubland to be established using native plants suited to the American River area
Flower Meadow	~0.4ha	• U pto 1.5m high shrubland to be established using native plants suited to the American River area that have strong smell and/or vibrant colours to enhance the spa experience
Botanical Garden	~0.5ha	• Plants of Kangaroo Island significance
Lawn	~0.7ha	• Lawn for activities
Vegetable Patch	~0.3ha	• Vegetables for the restaurant etc

Table 13- Summary of Landscape Plan Proposal

The Landscape Plan could be considered an appropriate offset for the native vegetation clearance as-

1. It adds to and enhances the current native vegetation on the property; and
2. It is proposed to be undertaken by someone with extensive experience in the establishment of native vegetation on Kangaroo Island.

4.0 LANDSCAPE PLAN

The developers of the proposed Kangaroo Island Resort are proposing a comprehensive Landscape Plan to be included within the development. The concept Landscape Plan for the Kangaroo Island Resort is divided into seven different areas being-

- Sparse native vegetation;
- Agricultural grassland;
- Shrubland (heathers);
- Lawn Areas;
- Flower meadow;
- Vegetable Patch; and
- Kangaroo Island Botanical Garden.

This plan focuses on the native plant requirements for the Landscape Plan and makes recommendations for the planting of these. The areas of focus are-

1. Native Vegetation Landscape
2. Grassland Landscape
3. Shrubland Landscape
4. Flower Meadow Landscape
5. Botanical Garden Landscape

Table 14 provides the list of native plant species that are specific for each of the Landscapes described above.

Species	Status			Description	Landscape				
	AU	SA	KI		1	2	3	4	5
Acacia acinacea			VU	Showy yellow flowers			■		
Acacia paradoxa				Good for little birds to hide in	■		■		
Acacia pycnantha				Showy yellow flowers in winter	■				
Acacia spinescens				Showy yellow flowers			■	■	
Acacia triquetra				Dense shrub with showy yellow flowers			■		
Acrotriche cordata				Dense shrub			■		
Acrotriche depressa				Lovely scent when flowering and fruiting. Edible berries				■	
Acrotriche patula				Dense shrub with glossy green leaves			■		
Adenanthos macropodianus				KI endemic, bird attracting					■
Allocasuarina muelleriana				KI endemic	■		■		
Allocasuarina verticillata				Glossy Black-Cockatoo feeding tree	■				■
Arthropodium fimbriatum			VU	Attractive purple nodding flowers				■	
Asterolasia muricata		R	RA	Stunning clear yellow star flowers					■
Astroloma conostephioides				Showy red flowers			■	■	
Astroloma humifusum				Attractive ground cover	■			■	
Austrostipa elegantissima			RA	Attractive native grass		■			■
Austrostipa sp.				Native grass	■	■			
Bertya rotundifolia				KI endemic	■		■		■
Beyeria subtecta	VU	E	EN	Nationally threatened plant species					■
Billardiera versicolor				Creeper with bell shaped flowers			■	■	■

Burchardia umbellata				Native bulb				■	
Calytrix glaberrima				Showy little pink flowers, mildly scented			■	■	
Calytrix tetragona				Showy pink flowers			■	■	
Cassinia complanata				White flowered daisy			■		
Chamaescilla corymbosa var. corymbosa				Native bulb				■	
Choretrum glomeratum				Very different shade of green. Striking			■	■	
Clematis microphylla				Creeper with attractive fluffy seeds	■		■		
Coronidium adenophorum				White paper daisy				■	
Correa backhousiana var. orbicularis		R		Bird attracting			■	■	
Correa calycina var halmaturina	VU	E	EN	Nationally threatened, KI endemic, bird attracting					■
Daviesia asperula				Showy orange pea flowers			■	■	
Daviesia brevifolia				Showy orange pea flowers			■	■	
Dianella brevicaulis				Clumping sedge with dark green leaves	■		■	■	
Dillwynia hispida				Showy red orange pea flowers			■		
Dodonaea viscosa				Attractive papery red brown seeds	■				
Enchylaena tomentosa var. tomentosa				Groundcover that produces edible berries that birds like	■				
Eremophila behriana			VU	Pretty purple flowered ground cover				■	
Eremophila glabra			VU	Bird attracting			■	■	■
Eucalyptus cladocalyx ssp. crassa				Glossy Black-Cockatoo nesting tree	■				
Eucalyptus cneorifolia				Dominant overstory tree in area	■				■
Eutaxia diffusa			RA	Attractive yellow pea flowered shrub			■		■
Ficinia nodosa				Rush that favours damp areas	■				
Gonocarpus mezianus				Understory herb	■		■		
Goodenia blackiana				Stunning small groundcover				■	
Grevillea illicifolia				Bird attracting			■		
Grevillea lavandulacea ssp. rogersii		R	RA	KI endemic, stunning red flowers					■
Grevillea muricata		V	VU	Bird attracting				■	■
Grevillea quinquenervis				KI endemic, lovely pink flowers					■
Hakea mitchellii				Sweet smelling flowered large shrub	■				
Hardenbergia violacea			RA	Stunning purple pea flowered creeper			■		
Hibbertia platyphylla ssp halmaturina			VU	Showy yellow flowers			■	■	■
Hibbertia riparia				Attractive yellow flowered shrub	■		■		
Juncus subsecundus			RA	Grey green rush that favours damp areas			■		■
Kennedia prostrata				Brilliant red flowering groundcover				■	
Lasiopetalum bauerii				Interesting leaf colour			■		
Lasiopetalum shulzenii				Papery pink lantern flowers			■		
Leionema equestre	EN	E	EN	Lovely star pinkish flowers					■
Lepidosperma sp. Flinders Chase				Fabulously scented sedge			■	■	
Leucopogon rufus				Interesting little white flowers			■		
Logania linifolia				Interesting leaf colour			■		

Lomandra micrantha				Understory sedge			■	■	
Melaleuca gibbosa				Pretty mauve 'bottlebrush' flowers	■		■		
Melaleuca uncinata				Pretty creamy yellow 'bottlebrush' flowers			■		
Micrantheum demissum				Nice dense little shrub			■		
Olearia ciliata var. squamifolia				Lovely purple daisy flowers				■	
Olearia microdisca	EN	E	VU	Nice scent, showy white flowers				■	■
Olearia ramulosa				Nice scent	■		■	■	
Olearia teretifolia				Profuse white flowering shrub			■		
Orthrosanthus multiflorus				Showy purple flowers	■		■	■	
Petrophile multisecta				KI endemic			■	■	
Phyllanthus striaticaulis				Large herb			■		
Pimelea flava				Showy flowers.			■	■	
Pomaderris obcordata				Eye-catching white flowered shrub			■		
Pultenaea acerosa				Attractive yellow pea flowers			■	■	
Pultenaea canaliculata				Attractive yellow pea flowers			■	■	
Pultenaea insularis			EN	Endemic, yellow pea flowered groundcover					■
Pultenaea penna				Attractive yellow pea flowered shrub			■		
Pultenaea villifera var. glabrescens	VU	V	VU	Yellow pea flowered shrub					■
Rhagodia candolleana ssp. candolleana				Dominant understory shrub in area	■				
Rytidosperma sp.				Native grass	■	■			
Scaevola linearis				Pretty purple fan flowers			■	■	
Solanum capsiciforme			EN	Purple flower and interesting fruit shape					■
Spyridium eriocephalum var. glabrisepalum	VU	E	EN	Nationally threatened					■
Spyridium halmaturinum				Interesting grey foliage and white 'flowers'			■	■	
Spyridium nitidum				Shiny silver foliage			■	■	
Spyridium spathulatum		R		Profuse white flowers			■	■	■
Thomasia petalocalyx				Long flowering purple lantern flowers			■		
Thryptomene ericaea				Dominant understory shrub in area			■		
Vittadinia australasica var. australasica				Nice purple flowers and pom pom seed heads				■	
Xanthorrhoea semiplana ssp tateana		R		Attractive growth form			■		■
Zieria veronicea ssp. insularis		R	RA	Amazing lemon scented shrub				■	■

Table 14- Native Plant Species recommended for planting

Each of the native plant species listed in Table 14 have been propagated on Kangaroo Island. Some species are readily germinated while others require many different treatments to propagate. Table 15 summarises the ability to propagate each species.

Species	Propagate	Species	Propagate
Acacia acinacea	Easy	*Grevillea muricata*	Hard
Acacia paradoxa	Easy	*Grevillea quinquenervis*	Hard
Acacia pycnantha	Easy	*Hakea mitchellii*	Easy
Acacia spinescens	Moderate	*Hardenbergia violacea*	Moderate
Acacia triquetra	Easy	*Hibbertia platyphylla ssp. halmaturina*	Hard

Acrotriche cordata	Specialist	*Hibbertia riparia*	Hard
Acrotriche depressa	Specialist	*Juncus subsecundus*	Easy
Acrotriche patula	Specialist	*Kennedia prostrata*	Moderate
Adenanthos macropodianus	Specialist	*Lasiopetalum baueri*	Moderate
Allocasuarina muelleriana	Easy	*Lasiopetalum schulzenii*	Moderate
Allocasuarina verticillata	Easy	*Leionema equestre*	Specialist
Arthropodium fimbriatum	Specialist	*Lepidosperma sp. Flinders Chase*	Specialist
Asterolasia muricata	Specialist	*Leucopogon rufus*	Specialist
Astroloma conostephioides	Specialist	*Logania linifolia*	Hard
Astroloma humifusum	Specialist	*Lomandra micrantha*	Hard
Austrostipa elegantissima	Moderate	*Melaleuca gibbosa*	Easy
Austrostipa sp.	Easy	*Melaleuca uncinata*	Easy
Bertya rotundifolia	Specialist	*Micrantheum demissum*	Specialist
Beyeria subtecta	Specialist	*Olearia ciliata var. squamifolia*	Moderate
Billardiera versicolor	Moderate	*Olearia microdisca*	Moderate
Burchardia umbellata	Specialist	*Olearia ramulosa*	Moderate
Calytrix glaberrima	Moderate	*Olearia teretifolia*	Moderate
Calytrix tetragona	Moderate	*Orthrosanthus multiflorus*	Easy
Cassinia complanata	Moderate	*Petrophile multisecta*	Specialist
Chamaescilla corymbosa var. corymbosa	Specialist	*Phyllanthus striaticaulis*	Specialist
Choretrum glomeratum	Specialist	*Pimelea flava*	Specialist
Clematis microphylla	Easy	*Pomaderris obcordata*	Moderate
Coronidium adenophorum	Moderate	*Pultenaea acerosa*	Hard
Correa backhousiana var. orbicularis	Moderate	*Pultenaea canaliculata*	Hard
Correa calycina var halmaturina	Specialist	*Pultenaea insularis*	Hard
Daviesia asperula	Moderate	*Pultenaea penna*	Hard
Daviesia brevifolia	Moderate	*Pultenaea villifera var. glabrescens*	Hard
Dianella brevicaulis	Hard	*Rhagodia candolleana ssp. candolleana*	Easy
Dillwynia hispida	Moderate	*Rytidosperma sp.*	Easy
Dodonaea viscosa	Easy	*Scaevola linearis*	Specialist
Enchylaena tomentosa var. tomentosa	Moderate	*Solanum capsiciforme*	Specialist
Eremophila behriana	Moderate	*Spyridium eriocephalum var. glabrisepalum*	Specialist
Eremophila glabra	Easy	*Spyridium halmaturinum*	Hard
Eucalyptus cladocalyx ssp. crassa	Easy	*Spyridium nitidum*	Hard
Eucalyptus cneorifolia	Easy	*Spyridium spathulatum*	Hard
Eutaxia diffusa	Moderate	*Thomasia petalocalyx*	Moderate
Ficinia nodosa	Easy	*Thryptomene ericaea*	Hard
Gonocarpus mezianus	Hard	*Vittadinia australasica var. australasica*	Easy
Goodenia blackiana	Specialist	*Xanthorrhoea semiplana ssp tateana*	Hard
Grevillea illicifolia	Hard	*Zieria veronicea ssp. insularis*	Specialist
Grevillea lavandulacea ssp. rogersii	Hard		

Notes- Easy- Readily propagated from seed or Cutting
Moderate- Requires some seed treatment
Hard- Requires multiple treatments and can be difficult to collect seed
Specialist- Unique treatments maybe required, seed difficult to obtain and collect, slow to germinate etc

Table 15- Ability of Plant Species to be Propagated

The plant species requirements for each of the native plant landscapes are described below with general revegetation notes for each landscape. Table 16 provides an explanation of the revegetation notes provided for each landscape.

Revegetation Objectives	• Objective of the revegetation for the landscape
General Requirements	• Requirements provided by the developer
Area	Approximate area that will be revegetated on completion of revegetation
Stems per hectare	Plants per hectare including existing native vegetation
Minimum species number	Minimum number of plant species from Table 14 for the landscape. Table 15 assists in the selection based on skills of propagator.
Species composition	Proportion of tree shrubs and groundcover from Table 14 for landscape
Native Plants required	Approximate number of individual plants required to achieve the stems per hectare
Planting notes	• General notes

Table 16- Explanation of Revegetation notes

It is important to note that this plan recommends a minimum number of plant species for each landscape selected from Table 14. This minimum number of species will achieve the objectives of the revegetation in each landscape. Planting a greater number of species will ensure the revegetation maintains the character required.

4.1 Native Vegetation Landscape

The native vegetation on the property consists of both natural and planted vegetation which in parts is extremely sparse and weed infested. The vegetation however provides feeding and nesting habitat for the Glossy Black Cockatoo. The area may also provide habitat for the Southern Brown Bandicoot.

The native vegetation assessment of the property identified three native vegetation communities, Figure 4. The revegetation of these areas should be consistent with the native vegetation communities.

Approximately 10ha are proposed to be rehabilitated in the concept Landscape Plan, Figure 6.

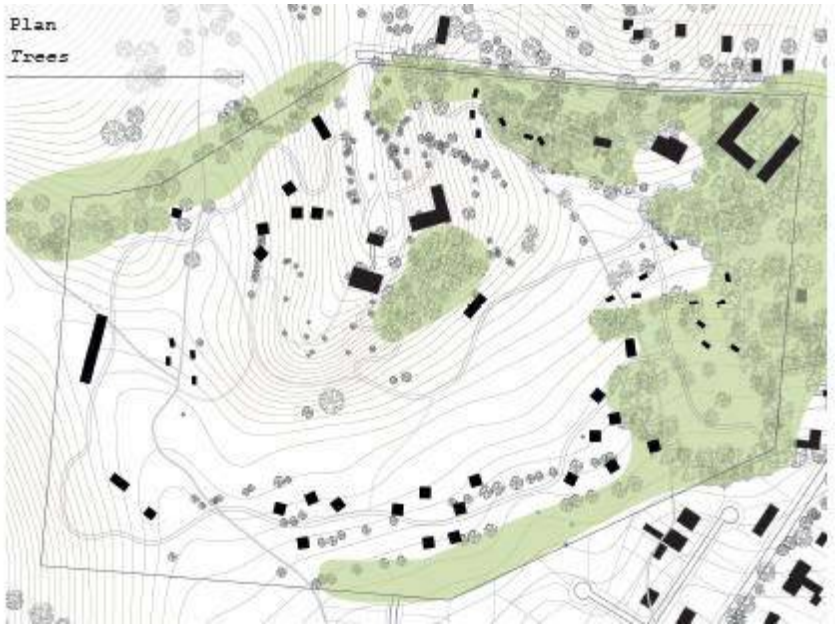


Figure 6- Native Vegetation Landscape

Table 17 provides general direction for the revegetation of the Native Vegetation Landscape.

Revegetation Objectives	• Enhance the Glossy Black Cockatoo and Southern Brown Bandicoot habitat • Enhance the Kangaroo Island Narrow-leafed mallee woodland
General Requirements	• Plants to be planted and left (not maintained). • Consistent with existing native vegetation.
Area	~10ha
Stems per hectare	2,000 in areas away from infrastructure. Reducing in density closer to infrastructure Stems per hectare achieved with planted and existing native vegetation
Minimum species number	20
Species composition	10% Tree 80% Shrub 10% groundcover
Native Plants required	~5,000
Planting notes	• Weed species need to be controlled • *Allocasuarina verticillata* in the northern section for Glossy Black Cockatoo feeding habitat • *Eucalyptus cladocalyx ssp crassa* in the southern section for Glossy Black Cockatoo nesting sites. Plant away from infrastructure as limbs of mature trees fall regularly. • Kangaroo Island Narrow-leafed Mallee Woodland species in the east for Southern Brown Bandicoot habitat. • Infill plant between existing native plants with tubestock. • Where areas are large enough, use rip lines to plant

Table 17- Revegetation Notes for Native Vegetation Landscape

4.2 Grassland Landscape

The proposed development proposes to maintain a grassland on the site, Figure 7 (yellow).

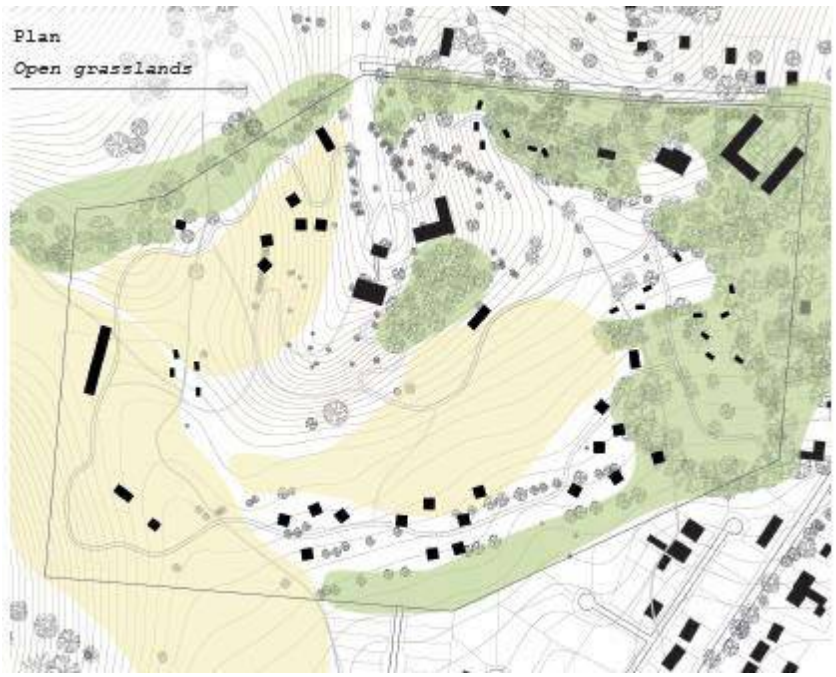


Figure 7- Grassland (yellow) Landscape

Table 18 provides general direction for the revegetation of the Grassland Landscape.

Revegetation Objectives	• Establish a native grassland • Maintain current agricultural aspect
General Requirements	• Plants to be planted and left (not maintained).
Area	~12ha
Stems per hectare	3,000 seedlings per hectare
Minimum species number	N/A
Species composition	N/A
Native Plants required	30,000
Planting notes	• Weeds will need to be managed • Direct plant into scrapped land

Table 18- Revegetation Notes for Grassland Landscape

4.3 Shrubland (Heathers) Landscape

The proposed development proposes to develop a low shrubland on the site, Figure 8 (pink).

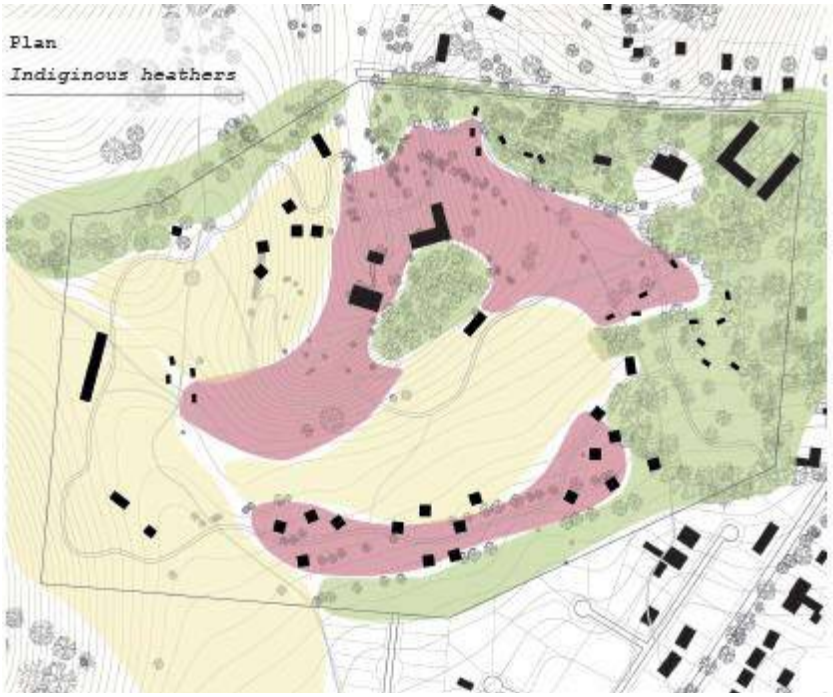


Figure 8- Shrubland (pink) Landscape

Table 19 provides general direction for the revegetation of the Shrubland Landscape.

Revegetation Objectives	• Visual aesthetics. • Maintain current views from infrastructure over Pelican Lagoon
General Requirements	• Plants to be planted and left (not maintained). • Native Plants suited to the American River area. • Height to be 1.5m or less • Pathways included
Area	~10ha
Stems per hectare	2,000
Minimum species number	30
Species composition	N/A
Native Plants required	20,000
Planting notes	• Plant randomly throughout the area • Use tubestock planting as these species will not grow from direct seeding • Rip random lines prior to planting

Table 19- Revegetation Notes for Shrubland Landscape

4.4 Flower Meadow Landscape

The proposed development proposes to develop a flower meadow near the proposed spa to enhance the experience, Figure 9.

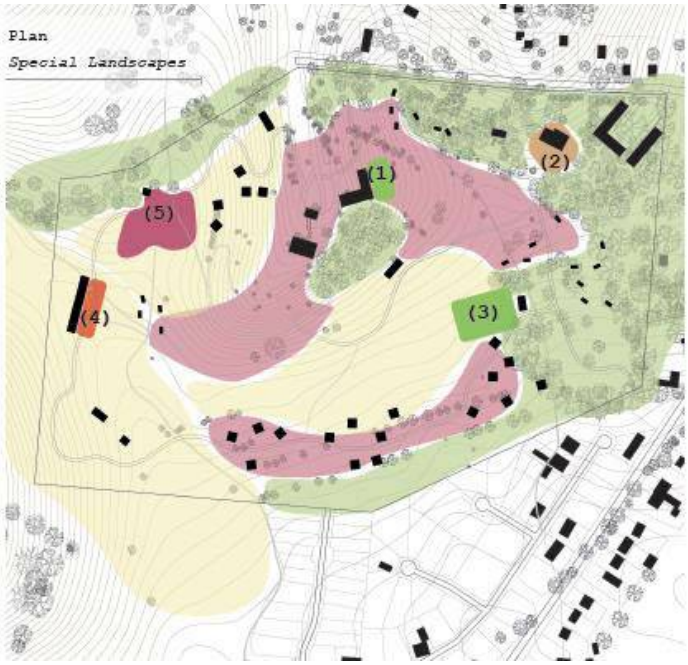


Figure 9- Specialist Landscapes

Table 20 provides general direction for the revegetation of the Flower Meadow Landscape.

Revegetation Objectives	• Enhance the spa experience
General Requirements	• Plants to be planted and left (not maintained). • Plants with strong smell and/or vibrant flowers for the spa. • Height to be 1.5m or less • Pathways to be included
Area	~0.4ha (including pathways and spa etc)
Stems per hectare	2,000
Minimum species number	30
Species composition	N/A
Native Plants required	500
Planting notes	• Use tubestock planting as these species will not grow from direct seeding • Strong scented plants near spa • Lines of vibrant flowering plants along pathways and near spa • Plant to enhance the spa and pathway experience

Table 20- Flower Meadow Landscape

4.5 Botanical Garden Landscape

The proposed development proposes to develop a Botanical Garden of Kangaroo Island Native Plants, Figure 9.

Table 21 provides general direction for the revegetation of the Botanical Garden Landscape.

Revegetation Objectives	• Showcase unique Kangaroo Island native plants
General Requirements	• Plants to be maintained by gardener.

	• Pathways to be included
Area	~0.5ha (including pathways)
Stems per hectare	N/A
Minimum species number	N/A
Species composition	N/A
Native Plants required	500
Planting notes	• Use tubestock planting as these species will not grow from direct seeding • Plant each species in clumps of 10-20 individuals • Plant so each species is visible from the pathways • Grade from lower plants near paths to higher trees further away • Include a label for each species with some unique features/aspects

Table 21- Botanical Garden Landscape

5.0 RECOMENDATIONS

1. The clearance of 0.6ha of native vegetation has a set-aside of 1.6 SEB hectares or a payment of $8,892.68 into the Native Vegetation Fund in accordance with the soon to be introduced Policy for Significant Environmental Benefit. Note the calculated set-aside hectares is equivalent to the current policy.

2. The Landscape Plan be considered as an appropriate off-set subject to being undertaken by someone with extensive experience, and success, in the establishment of a wide range of Kangaroo Island native plant species.

3. *Caladenia ovata* generally flowers in September/October each year and as a result weekly surveys should be undertaken at this time before construction commences to determine the presence or otherwise of this plant species.

6.0 BIBLIOGRAPHY

Atlas of Living Australia, http://www.ala.org.au/

Atlas of South Australia *Environments of South Australia* http://www.atlas.sa.gov.au/resources/environments-of-south-australia

Baxter, C. (2015) *Birds of Kangaroo Island: a photographic field guide*, ATF Ltd.

Biosecurity SA (2015) *Declared Plants of South Australia 2015*, http://pir.sa.gov.au/biosecurity/weeds_and_pest_animals/plant_pests_in_south_australia/plant_policies

Department of Environment and Heritage (2009) *Provisional List Of Threatened Ecosystems Of South Australia,* (in progress) unpublished and provisional list.

Department of Environment, Water and Natural Resources *Birds Of Conservation Significance-Community Habitat Preferences Spreadsheet*, http://www.environment.sa.gov.au/managing-natural-resources/native-vegetation/Managing_native_vegetation/BushRAT

Department of Environment, Water and Natural Resources *eFlora SA* http://www.flora.sa.gov.au/

Department of Environment, Water and Natural Resources, *Kangaroo Island Floristic Vegetation Mapping*

Department of Environment, Water and Natural Resources *NatureMaps* https://data.environment.sa.gov.au/NatureMaps/Pages/default.aspx

Environment Protection and Biodiversity Conservation Act (1999) *Conservation Advise for Kangaroo Island Narrow leafed Mallee (Eucalyptus cneorifolia) Woodland*

Environment Protection and Biodiversity Conservation Act (1999) *EPBC Protected Matters Database* [on-line tool] http://www.environment.gov.au/epbc/protected-matters-search-tool

Gates, J.A. (2009). *Recovery Plan for the Kangaroo Island Dunnart Sminthopsis aitkeni.* Department for Environment and Heritage, South Australia

Gillam, S. and Urban, R. (2014) *Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments*, Kangaroo island NRM Region. Department of Environment, Water and Natural Resources South Australia

Kangaroo Island Council (2011) *Kangaroo Island Development Plan* http://www.sa.gov.au/topics/housing-property-and-land/local-government/development-plans/online-development-plans/country-development-plans/kangaroo-island-council-development-plan

Kangaroo Island Natural Resource Management Board (2009) *Kangaroo Island Natural Resource Management Plan*, Kangaroo Island Natural Resource Management Board. http://www.naturalresources.sa.gov.au/kangarooisland/about-us/our-regions-plan

Masters P and Southgate RI (2016) AMERICAN RIVER RESORT & HARBOUR: Fauna Survey. Internal report to Co City & Central Consulting Pty Ltd.

Milne, T and McCallum (2012) *Bushland Condition Monitoring Manual: Benchmark Communities for Kangaroo Island*, Nature Conservation Society of South Australia

Mooney, P.A. and Pedler, L.P. (2005): *Recovery Plan for the South Australian subspecies of the Glossy Black-Cockatoo (Calyptorhynchus lathami halmaturinus): 2005-2010*. Unpublished report to South Australian Department for Environment and Heritage. Adelaide.

Muller K.L. and Schutz A. (2015). *Native Vegetation Council: Rangelands Assessment Manual*. Native Vegetation Management Unit, Urrbrae, South Australia.

Native Vegetation Council (2015) *Guide for Calculating a Significant Environmental Benefit*, Native Vegetation Council, Government of South Australia

Native Vegetation Council (2015) *Native Vegetation Council (NVC) Bushland Assessment Manual*, Native Vegetation Council, Government of South Australia

Native Vegetation Council (2015) *Native Vegetation Council (NVC) Scattered Tree Assessment Manual*, Native Vegetation Council, Government of South Australia

Native Vegetation Council (2015) *Policy for Significant Environmental Benefit*, Native Vegetation Council, Government of South Australia

Overton, B and D (2012) *Discover Kangaroo Island's Native Plants*, Environmental Realist.

Paull, D.J. (1999). *A survey of the distribution and abundance of the southern brown bandicoot in the south of South Australia*. Randwick: School of Geography and Oceanography, The University of New South Wales.

Prescott, A (1995) *Its Blue with Five Petals- Kangaroo Island Field Guide: Wildflowers of Kangaroo Island and the Fleurieu Peninsula*. Ann Prescott and Associates Pty, Adelaide, South Australia

Taylor, D.A. (2003) *Recovery Plan for 15 Nationally Threatened Plant Species on Kangaroo Island, South Australia*. Report to the Threatened Species and Communities Section, Department for Environment and Heritage.

Willoughby, N, Oppermann, A., Innes, R.W. (2001) *Biodiversity Plan for Kangaroo Island, South Australia*, Department for Environment and Heritage, South Australia

APPENDIX 1- PROPOSED KANGAROO ISLAND RESORT- BIODIVERSITY ASSESSMENT & BUSHRAT SCORE

Bushland Assessment Data Report

Block	Proposed Kangaroo Island Resort
Size of Block (Ha)	10.5
NRM Region	Kangaroo Island
BCM Region	Kangaroo Island
IBRA Association	Amberley

ASSESSOR(S)	Michelle Haby
DATE OF ASSESSMENT	8/06/2015

Map of the Block (Including the Sites)

Landscape Context Scores

Percent Vegetation Cover (5km radius) (%)	20
0-5% = 0 pts; >5-10% = 1 pts; >10-25% = 2 pts; >25-50% = 3 pts; >50-75% = 1 pt; >75-100% = 0 pts	
Score	2

Block Shape Cleared perimeter:Area (km/km2)	
Cleared Perimeter (m) =	3668
Cleared Perimeter to area ratio	34.93
<6 = 3 pts; 6 to <12 = 2 pts; 12 to <18 = 1 pt	
Score	0

Size of remnant patch (incl. native veg on adjacent properties) (Hectares)	10.5
Patch size less than 2 ha = 0 pts; Patch size 2-5 ha = 1 pt; Patch size 5-10 ha = 2 pts; Patch size 10-20 ha = 3 pts; Patch size 20-100 ha = 4 pts; Patch size >100 ha = 5 pts;	
Score	3

Distance to remnant area of more than 50 hectares (km) enter 0km for contiguous	10.00
>3km = 0 pts; 1-3km = 1 pt; <1km = 2 pts; contiguous = 3 pts	
Score	0

% native veg. remaining in IBRA Assoc.	10
0-2% = 5 pts; >2-5% = 4 pts; >5-10% = 3 pts; >10-20%= 2 pts; >20-50%= 1 pt; >50% = 0 pts	
Score	3

% native veg. protected IBRA Assoc.	11
0-5% = 3 pts; >5-10% = 2 pts; >10-25% = 1 pt; >25% = 0	
Score	1

Wetland or Riparian Habitat present	
Riparian zone present (Yes/No) = 1 pt	No
Swamp/wetland present (Yes/No) = 2 pts	No
(Swamp/wetland may be +/- riparian zone)	
Score	0

LANDSCAPE CONTEXT SCORE (max 24)	**9**

BushRAT Site 1

Plant Species Recorded (Native and Introduced)		Threatened Sp.		Natives only		
Species	**Common Name**	**EPBC**	**SA**	**Regen**	**Annual Herbs** (Spring survey only)	**Introduced Species**
Acacia paradoxa	Kangaroo Thorn					
Allocasuarina verticillata	Drooping Sheoak					
Astroloma humifusum	Cranberry Heath					
Austrostipa sp.	Spear-grass					
Dianella brevicaulis	Short-stem Flax-lily					
Eucalyptus cneorifolia	Kangaroo Island Narrow-leaf Mallee					
Hibbertia riparia	Bristly Guinea-flower					
Orthrosanthus multiflorus	Morning Flag					
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush					
Arctotheca calendula	Cape Weed					*
Asparagus asparagoides f. asparagoides	Bridal Creeper					*
Briza minor	Lesser Quaking-grass					*
Ehrharta calycina	Perennial Veldt Grass					*
Ehrharta longiflora	Annual Veldt Grass					*
Eucalyptus leucoxylon ssp.	South Australian Blue Gum					*
Freesia cultivar	Freesia					*
Lagurus ovatus	Hare's Tail Grass					*
Lycium ferocissimum	African Boxthorn					*
Olea europaea ssp. europaea	Olive					*
Oxalis pes-caprae	Soursob					*
Romulea rosea var. australis	Common Onion-grass					*

Threatened or Introduced Animal Species Recorded or Observed		Threatened Species				
Species	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	**Introduced Species**
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island ssp)	EN	E		Chewings	
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN				
Varanus rosenbergi	Heath Goanna		V			
Petroica boodang	Scarlet Robin		V			

Vegetation Condition Scores

SITE:	Site 1
BCM COMMUNITY	KI 2 Open forests and woodlands with an open sclerophyll shrub understorey
VEGETATION ASSOCIATION DESCRIPTION	KI 1901
SIZE OF SITE (Ha)	

Benchmarked attributes
(Scores determined by comparing to a Benchmark community)

Number of Native Species (Minus herbaceous annuals for spring Surveys)	9
Native Plant Species Diversity Score (max 15) from benchmark community	**4**
Number of regenerating native species	0
Regeneration Score (max 8) from benchmark community	**0**

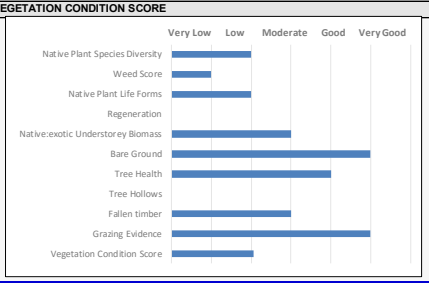
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Asparagus asparagoides forma	2	5	10
Ehrharta longiflora	4	2	8
Lycium ferocissimum	2	3	6
Olea europaea ssp.	1	4	4
Oxalis pes-caprae	4	3	12
	Cover x Threat		40
Weed Score (max 15) from benchmark community			**3**

Native Plant Life Forms	**Cover rating**
Trees > 15m	
Trees 5 - 15 m	
Trees < 5m	4
Mallee > 5m	
Mallee < 5m	2
Shrubs > 2m	
Shrubs 0.5 - 2m	3
Shrubs < 0.5	
Forbs	
Mat Plants	2
Grasses > 0.2m	
Grasses < 0.2m	1
Sedges > 1m	
Sedges < 1m	2
Hummock grasses	
Vines, scramblers	
Mistletoe	
Ferns	
Grass-tree	
Total	14
Native Plant Life Forms (max 10) from benchmark community	**6**

Non-Benchmarked Attributes
(Scores determined from direct field observations)

		Tree attributes - not scored for treeless communities	
Native:exotic Understorey biomass score (max 10)	**6**	**Tree Health Score (max 5)**	**4**
Bare Ground Score (max 3)	**3**	**Fallen timber/debris (max 5)**	**3**
Grazing Evidence (max 4)	**4**	**Hollow-bearing trees Score (max 5)**	**0**

VEGETATION CONDITION SCORE	33
Is the community naturally treeless (Score is multiplied by 1.23)	☐
Is the community **Score Not Benchmarked (SNB)** for regeneration (Score is multiplied 1.11)	☐
ADJUSTED VEGETATION CONDITION SCORE	**33.00**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	**Yes/No**
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.5 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (1 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (1.5 pts)	☐
Nationally (EPBC Act) V**ulnerable** community (3 pts)	☐
Contains a Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (5 pts)	☐
Score	0

Number of Threatened Plant Species recorded for the site (within the survey quadrat)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (0.1 pt each)	
State **Vulnerable** species recorded (0.25 pt each)	
State **Endangered** recorded (0.5 pts each)	
Nationally **Vulnerable** species recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species recorded (2 pts each)	
Score	**0**

Potential habitat for Threatened Animal Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (0.1 pt each)	
State **Vulnerable** species observed or locally recorded (0.25 pt each)	2
State **Endangered** species observed or locally recorded (0.5 pt each)	1
Nationally Vulnerable species observed or locally recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (2 pts each)	2
Score	**5**

CONSERVATION SIGNIFICANCE SCORE	**5**

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	**9.00**
VEGETATION CONDITION SCORE	**33.00**
CONSERVATION SIGNIFICANCE SCORE	**5.00**

(Vegetation Condition + Landscape Context) x (1 + Conservation Significance/10) =

UNIT BIODIVERSITY SCORE	63.00
Total Biodiversity Score (UBS x size)	0.00

Photo Point and Vegetation Survey Location

Direction of the Photo

GPS Reference (Eastings and Northings)

35° 45' 56" S
137° 45' 53" E

Description

Consists of an Allocasuarina verticillata forest with high weed density in relatively poor condition. Glossy Black Cockatoo chewings were observed under 6 trees.

What is the purpose of Assessment? Clearance | SEB Area | Other

Assessment for Clearance

Clearance - SEB Hectares required	0.00
Loadings for clearance of protected areas (%)	
Reductions for rehabilitation of impact site (%)	
Adjusted clearance - SEB Hectares required	**0.00**

SEB Payment	
Mean Annual rainfall for the site (mm)	528.5
Payment into the fund	**$0.00**
Administration fee	**$0.00**

BushRAT Site 2

Plant Species Recorded (Native and Introduced)		Threatened Sp.		Natives only		
Species	**Common Name**	**EPBC**	**SA**	**Regen**	**Annual Herbs** (Spring survey only)	**Introduced Species**
Enchylaena tomentosa var. tomentosa	Ruby Saltbush					
Eucalyptus cladocalyx ssp. crassa	Sugar Gum					
Eucalyptus cneorifolia	Kangaroo Island Narrow-leaf Mallee					
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush					
Asparagus asparagoides f. asparagoides	Bridal Creeper					*
Ehrharta longiflora	Annual Veldt Grass					*
Lycium ferocissimum	African Boxthorn					*
Oxalis pes-caprae	Soursob					*
Pinus radiata	Radiata Pine					*

Threatened or Introduced Animal Species Recorded or Observed		Threatened Species				
Species	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	**Introduced Species**
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island ssp)	EN	E		Chewings	
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN				
Varanus rosenbergi	Heath Goanna		V			
Petroica boodang	Scarlet Robin		V			

Vegetation Condition Scores

SITE:	Site 2
BCM COMMUNITY	KI 5.1 Mallee with an open to very open shrub understorey on clay based soils
VEGETATION ASSOCIATION DESCRIPTION	KI 1108
SIZE OF SITE (Ha)	

Benchmarked attributes
(Scores determined by comparing to a Benchmark community)

Number of Native Species (Minus herbaceous annuals for spring Surveys)	4
Native Plant Species Diversity Score (max 15) from benchmark community	1
Number of regenerating native species	0
Regeneration Score (max 8) from benchmark community	0

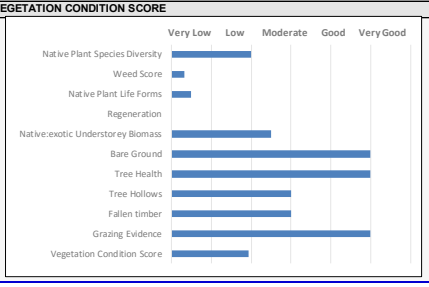
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Asparagus asparagoides forma	1	5	5
Ehrharta longiflora	3	2	6
Lycium ferocissimum	3	3	9
Oxalis pes-caprae	5	3	15
Pinus radiata	3	3	9
	Cover x Threat		44
Weed Score (max 15) from benchmark community			1

Native Plant Life Forms	**Cover rating**
Trees > 15m	
Trees 5 - 15 m	3
Trees < 5m	
Mallee > 5m	4
Mallee < 5m	
Shrubs > 2m	
Shrubs 0.5 - 2m	3
Shrubs < 0.5	
Forbs	
Mat Plants	2
Grasses > 0.2m	
Grasses < 0.2m	
Sedges > 1m	
Sedges < 1m	
Hummock grasses	
Vines, scramblers	
Mistletoe	
Ferns	
Grass-tree	
Total	12
Native Plant Life Forms (max 10) from benchmark community	6

Non-Benchmarked Attributes
(Scores determined from direct field observations)

Native:exotic Understorey biomass score (max 10)	5	*Tree attributes - not scored for treeless communities*	
Bare Ground Score (max 3)	3	**Tree Health Score (max 5)**	5
Grazing Evidence (max 4)	4	**Fallen timber/debris (max 5)**	3
		Hollow-bearing trees Score (max 5)	3

VEGETATION CONDITION SCORE	31
Is the community naturally treeless (Score is multiplied by 1.23)	☐
Is the community **Score Not Benchmarked (SNB)** for regeneration (Score is multiplied 1.11)	☐
ADJUSTED VEGETATION CONDITION SCORE	**31.00**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	**Yes/No**
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.5 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (1 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (1.5 pts)	☐
Nationally (EPBC Act) V**ulnerable** community (3 pts)	☐
Contains a Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (5 pts)	☑
Score	5

Number of Threatened Plant Species recorded for the site (within the survey quadrat)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (0.1 pt each)	
State **Vulnerable** species recorded (0.25 pt each)	
State **Endangered** recorded (0.5 pts each)	
Nationally **Vulnerable** species recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species recorded (2 pts each)	
Score	0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (0.1 pt each)	
State **Vulnerable** species observed or locally recorded (0.25 pt each)	2
State **Endangered** species observed or locally recorded (0.5 pt each)	1
Nationally Vulnerable species observed or locally recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (2 pts each)	2
Score	5

CONSERVATION SIGNIFICANCE SCORE	10

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	9.00
VEGETATION CONDITION SCORE	31.00
CONSERVATION SIGNIFICANCE SCORE	10.00

(Vegetation Condition + Landscape Context) x (1 + Conservation Significance/10) =

UNIT BIODIVERSITY SCORE	80.00
Total Biodiversity Score (UBS x size)	0.00

Photo Point and Vegetation Survey Location	**Direction of the Photo**
	
	GPS Reference (Eastings and Northings)
	35° 47' 03" S
	137° 46' 02" E
	Description
	Consists of Eucalyptus cneorifolia scrub with minimal understorey with high weed density in relatively poor condition. A number of Eucalyptus cladocalyx occur in the area.

What is the purpose of Assessment? Clearance | SEB Area | Other

Assessment for Clearance

Clearance - SEB Hectares required	0.00	**SEB Payment**	
Loadings for clearance of protected areas (%)		**Mean Annual rainfall for the site (mm)**	528.5
Reductions for rehabilitation of impact site (%)		**Payment into the fund**	**$0.00**
Adjusted clearance - SEB Hectares required	**0.00**	**Administration fee**	**$0.00**

BushRAT Site 3

Plant Species Recorded (Native and Introduced)		Threatened Sp.		Natives only		
Species	**Common Name**	**EPBC**	**SA**	**Regen**	**Annual Herbs** (Spring survey only)	**Introduced Species**
Enchylaena tomentosa var. tomentosa	Ruby Saltbush					
Eucalyptus cladocalyx ssp. crassa	Sugar Gum					
Eucalyptus cneorifolia	Kangaroo Island Narrow-leaf Mallee					
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush					
Rytidosperma sp.						
Asparagus asparagoides f. asparagoides	Bridal Creeper					*
Ehrharta longiflora	Annual Veldt Grass					*
Lycium ferocissimum	African Boxthorn					*
Oxalis pes-caprae	Soursob					*
Romulea rosea var. australis	Common Onion-grass					*

Threatened or Introduced Animal Species Recorded or Observed		Threatened Species				
Species	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	**Introduced Species**
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island ssp)	EN	E		Chewings	
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN				
Varanus rosenbergi	Heath Goanna		V			
Petroica boodang	Scarlet Robin		V			

Vegetation Condition Scores

SITE:	Site 3
BCM COMMUNITY	KI 5.1 Mallee with an open to very open shrub understorey on clay based soils
VEGETATION ASSOCIATION DESCRIPTION	KI 1108
SIZE OF SITE (Ha)	0.04

Benchmarked attributes
(Scores determined by comparing to a Benchmark community)

Number of Native Species (Minus herbaceous annuals for spring Surveys)	5
Native Plant Species Diversity Score (max 15) from benchmark community	**2**
Number of regenerating native species	0
Regeneration Score (max 8) from benchmark community	**0**

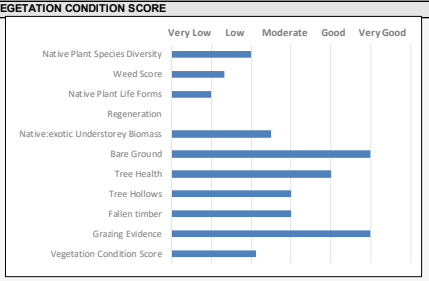
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Asparagus asparagoides forma	1	5	5
Ehrharta longiflora	1	2	2
Lycium ferocissimum	2	3	6
Oxalis pes-caprae	5	3	15
Romulea rosea var. australis	1	2	2
	Cover x Threat		30
Weed Score (max 15) from benchmark community			**4**

Native Plant Life Forms	**Cover rating**
Trees > 15m	
Trees 5 - 15 m	3
Trees < 5m	
Mallee > 5m	3
Mallee < 5m	
Shrubs > 2m	
Shrubs 0.5 - 2m	2
Shrubs < 0.5	
Forbs	
Mat Plants	2
Grasses > 0.2m	
Grasses < 0.2m	2
Sedges > 1m	
Sedges < 1m	
Hummock grasses	
Vines, scramblers	
Mistletoe	
Ferns	
Grass-tree	
Total	12
Native Plant Life Forms (max 10) from benchmark community	**6**

Non-Benchmarked Attributes
(Scores determined from direct field observations)

		Tree attributes - not scored for treeless communities	
Native:exotic Understorey biomass score (max 10)	**5**	**Tree Health Score (max 5)**	**4**
Bare Ground Score (max 3)	**3**	**Fallen timber/debris (max 5)**	**3**
Grazing Evidence (max 4)	**4**	**Hollow-bearing trees Score (max 5)**	**3**

VEGETATION CONDITION SCORE	34
Is the community naturally treeless (Score is multiplied by 1.23)	☐
Is the community **Score Not Benchmarked (SNB)** for regeneration (Score is multiplied 1.11)	☐
ADJUSTED VEGETATION CONDITION SCORE	**34.00**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	**Yes/No**
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.5 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (1 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (1.5 pts)	☐
Nationally (EPBC Act) V**ulnerable** community (3 pts)	☐
Contains a Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (5 pts)	☑
Score	5

Number of Threatened Plant Species recorded for the site (within the survey quadrat)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (0.1 pt each)	
State **Vulnerable** species recorded (0.25 pt each)	
State **Endangered** recorded (0.5 pts each)	
Nationally **Vulnerable** species recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species recorded (2 pts each)	
Score	**0**

Potential habitat for Threatened Animal Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (0.1 pt each)	
State **Vulnerable** species observed or locally recorded (0.25 pt each)	2
State **Endangered** species observed or locally recorded (0.5 pt each)	1
Nationally Vulnerable species observed or locally recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (2 pts each)	2
Score	**5**

CONSERVATION SIGNIFICANCE SCORE	**10**

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	**9.00**
VEGETATION CONDITION SCORE	**34.00**
CONSERVATION SIGNIFICANCE SCORE	**10.00**

(Vegetation Condition + Landscape Context) x (1 + Conservation Significance/10) =

UNIT BIODIVERSITY SCORE	86.00
Total Biodiversity Score (UBS x size)	3.44

Photo Point and Vegetation Survey Location

Direction of the Photo

GPS Reference (Eastings and Northings)

35° 46' 58" S
137° 46' 02" E

Description

Consists primarily of Eucalyptus cneorifolia scrub with minimal understorey with high weed density in relatively poor condition. A number of Eucalyptus cladocalyx ssp crassa have been identified as Glossy Black Cockatoo nesting trees.

What is the purpose of Assessment? Clearance | SEB Area | Other

Assessment for Clearance

Clearance - SEB Hectares required	0.43	**SEB Payment**	
Loadings for clearance of protected areas (%)		**Mean Annual rainfall for the site (mm)**	528.5
Reductions for rehabilitation of impact site (%)		**Payment into the fund**	**$2,272.55**
Adjusted clearance - SEB Hectares required	**0.43**	**Administration fee**	**$113.63**

BushRAT Site 4

Plant Species Recorded (Native and Introduced)		Threatened Sp.		Natives only		
Species	**Common Name**	**EPBC**	**SA**	**Regen**	**Annual Herbs** (Spring survey only)	**Introduced Species**
Acacia paradoxa	Kangaroo Thorn			Yes		
Acacia pycnantha	Golden Wattle			Yes		
Allocasuarina verticillata	Drooping Sheoak			Yes		
Astroloma humifusum	Cranberry Heath					
Bertya rotundifolia	Round-leaf Bertya					
Clematis microphylla	Old Man's Beard					
Dianella brevicaulis	Short-stem Flax-lily					
Dodonaea viscosa ssp. angustissima	Narrow-leaf Hop-bush			Yes		
Enchylaena tomentosa var. tomentosa	Ruby Saltbush					
Eucalyptus cladocalyx ssp. crassa	Sugar Gum					
Eucalyptus cneorifolia	Kangaroo Island Narrow-leaf Mallee			Yes		
Gonocarpus mezianus	Broad-leaf Raspwort					
Hibbertia riparia	Bristly Guinea-flower					
Olearia ramulosa	Twiggy Daisy-bush					
Orthrosanthus multiflorus	Morning Flag					
Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush					
Rytidosperma sp.						
Asparagus asparagoides f. asparagoides	Bridal Creeper					*
Ehrharta longiflora	Annual Veldt Grass					*
Freesia cultivar	Freesia					*
Olea europaea ssp. europaea	Olive					*
Oxalis pes-caprae	Soursob					*

Threatened or Introduced Animal Species Recorded or Observed		Threatened Species				
Species	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	**Introduced Species**
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island ssp)	EN	E		Chewings	
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN				
Varanus rosenbergi	Heath Goanna		V			
Petroica boodang	Scarlet Robin		V			

Vegetation Condition Scores

SITE:	Site 4
BCM COMMUNITY	KI 5.1 Mallee with an open to very open shrub understorey on clay based soils
VEGETATION ASSOCIATION DESCRIPTION	KI 1108
SIZE OF SITE (Ha)	0.07

Benchmarked attributes
(Scores determined by comparing to a Benchmark community)

Number of Native Species (Minus herbaceous annuals for spring Surveys)	17
Native Plant Species Diversity Score (max 15) from benchmark community	7
Number of regenerating native species	5
Regeneration Score (max 8) from benchmark community	7

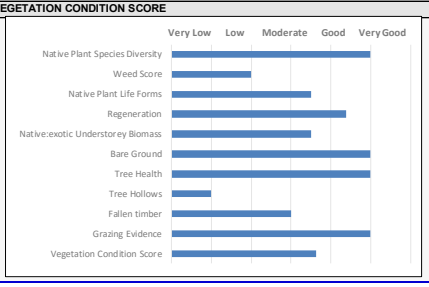
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Asparagus asparagoides forma	1	5	5
Ehrharta longiflora	5	2	10
Freesia cultivar	1	3	3
Olea europaea ssp.	1	4	4
Oxalis pes-caprae	1	3	3
	Cover x Threat		25
Weed Score (max 15) from benchmark community			6

Native Plant Life Forms	**Cover rating**
Trees > 15m	
Trees 5 - 15 m	2
Trees < 5m	
Mallee > 5m	3
Mallee < 5m	4
Shrubs > 2m	2
Shrubs 0.5 - 2m	3
Shrubs < 0.5	3
Forbs	2
Mat Plants	3
Grasses > 0.2m	
Grasses < 0.2m	2
Sedges > 1m	
Sedges < 1m	2
Hummock grasses	
Vines, scramblers	2
Mistletoe	
Ferns	
Grass-tree	
Total	28
Native Plant Life Forms (max 10) from benchmark community	15

Non-Benchmarked Attributes
(Scores determined from direct field observations)

		Tree attributes - not scored for treeless communities	
Native:exotic Understorey biomass score (max 10)	7	**Tree Health Score (max 5)**	5
Bare Ground Score (max 3)	3	**Fallen timber/debris (max 5)**	3
Grazing Evidence (max 4)	4	**Hollow-bearing trees Score (max 5)**	1

VEGETATION CONDITION SCORE	58
Is the community naturally treeless (Score is multiplied by 1.23)	☐
Is the community **Score Not Benchmarked (SNB)** for regeneration (Score is multiplied 1.11)	☐
ADJUSTED VEGETATION CONDITION SCORE	**58.00**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	**Yes/No**
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.5 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (1 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (1.5 pts)	☐
Nationally (EPBC Act) V**ulnerable** community (3 pts)	☐
Contains a Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (5 pts)	☑
Score	5

Number of Threatened Plant Species recorded for the site (within the survey quadrat)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (0.1 pt each)	
State **Vulnerable** species recorded (0.25 pt each)	
State **Endangered** recorded (0.5 pts each)	
Nationally **Vulnerable** species recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species recorded (2 pts each)	
Score	0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (0.1 pt each)	
State **Vulnerable** species observed or locally recorded (0.25 pt each)	2
State **Endangered** species observed or locally recorded (0.5 pt each)	1
Nationally Vulnerable species observed or locally recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (2 pts each)	2
Score	5

CONSERVATION SIGNIFICANCE SCORE	10

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	9.00
VEGETATION CONDITION SCORE	58.00
CONSERVATION SIGNIFICANCE SCORE	10.00

(Vegetation Condition + Landscape Context) x (1 + Conservation Significance/10) =

UNIT BIODIVERSITY SCORE	134.00
Total Biodiversity Score (UBS x size)	9.38

Photo Point and Vegetation Survey Location

Direction of the Photo

GPS Reference (Eastings and Northings)

35° 46' 51" S
137° 45' 54" E

Description

Site 4 is the most diverse of all the native vegetation on the property with a moderate condition and a relatively high weed presence

What is the purpose of Assessment? Clearance | SEB Area | Other

Assessment for Clearance

Clearance - SEB Hectares required	1.17
Loadings for clearance of protected areas (%)	
Reductions for rehabilitation of impact site (%)	
Adjusted clearance - SEB Hectares required	1.17

SEB Payment	
Mean Annual rainfall for the site (mm)	528.5
Payment into the fund	$6,196.66
Administration fee	$309.83

BushRAT Site 5

Plant Species Recorded (Native and Introduced)		Threatened Sp.		Natives only		
Species	**Common Name**	**EPBC**	**SA**	**Regen**	**Annual Herbs** (Spring survey only)	**Introduced Species**
Acacia paradoxa	Kangaroo Thorn					
Allocasuarina verticillata	Drooping Sheoak					
Eucalyptus cladocalyx ssp. crassa	Sugar Gum					
Arctotheca calendula	Cape Weed					*
Asparagus asparagoides f. asparagoides	Bridal Creeper					*
Ehrharta longiflora	Annual Veldt Grass					*
Lagurus ovatus	Hare's Tail Grass					*
Lycium ferocissimum	African Boxthorn					*
Romulea rosea var. australis	Common Onion-grass					*
Trifolium sp.	Clover					*

Threatened or Introduced Animal Species Recorded or Observed		Threatened Species				
Species	**Common Name**	**EPBC**	**SA**	**Past Record**	**Observed**	**Introduced Species**
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island ssp)	EN	E		Chewings	
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN				
Varanus rosenbergi	Heath Goanna		V			
Petroica boodang	Scarlet Robin		V			

Vegetation Condition Scores

SITE:	Site 5
BCM COMMUNITY	KI 2 Open forests and woodlands with an open sclerophyll shrub understorey
VEGETATION ASSOCIATION DESCRIPTION	KI 0504
SIZE OF SITE (Ha)	0

Benchmarked attributes
(Scores determined by comparing to a Benchmark community)

Number of Native Species (Minus herbaceous annuals for spring Surveys)	3
Native Plant Species Diversity Score (max 15) from benchmark community	1
Number of regenerating native species	0
Regeneration Score (max 8) from benchmark community	0

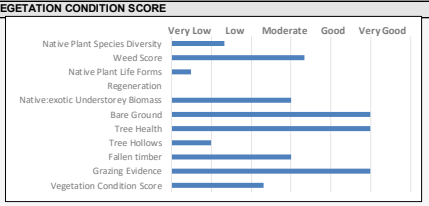
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Arctotheca calendula	1	1	1
Asparagus asparagoides forma	1	5	5
Ehrharta longiflora	4	2	8
Lagurus ovatus	1	2	2
Lycium ferocissimum	1	3	3
	Cover x Threat		19
Weed Score (max 15) from benchmark community			**10**

Native Plant Life Forms	**Cover rating**
Trees > 15m	
Trees 5 - 15 m	3
Trees < 5m	4
Mallee > 5m	
Mallee < 5m	
Shrubs > 2m	2
Shrubs 0.5 - 2m	
Shrubs < 0.5	
Forbs	
Mat Plants	
Grasses > 0.2m	
Grasses < 0.2m	
Sedges > 1m	
Sedges < 1m	
Hummock grasses	
Vines, scramblers	
Mistletoe	
Ferns	
Grass-tree	
Total	9
Native Plant Life Forms (max 10) from benchmark community	4

Non-Benchmarked Attributes
(Scores determined from direct field observations)

		Tree attributes - not scored for treeless communities	
Native:exotic Understorey biomass score (max 10)	6	**Tree Health Score (max 5)**	5
Bare Ground Score (max 3)	3	**Fallen timber/debris (max 5)**	3
Grazing Evidence (max 4)	4	**Hollow-bearing trees Score (max 5)**	1

VEGETATION CONDITION SCORE	37
Is the community naturally treeless (Score is multiplied by 1.23)	☐
Is the community **Score Not Benchmarked (SNB)** for regeneration (Score is multiplied 1.11)	☐
ADJUSTED VEGETATION CONDITION SCORE	**37.00**



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	**Yes/No**
State (Provisional List of Threatened Ecosystems of SA) **Rare** community (0.5 pt)	☐
State (Provisional List of Threatened Ecosystems of SA) **Vulnerable** community (1 pts)	☐
State (Provisional List of Threatened Ecosystems of SA) **Endangered** community (1.5 pts)	☐
Nationally (EPBC Act) V**ulnerable** community (3 pts)	☐
Contains a Nationally (EPBC Act) **Endangered** or **Critically Endangered** community (5 pts)	☐
Score	0

Number of Threatened Plant Species recorded for the site (within the survey quadrat)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species recorded (0.1 pt each)	
State **Vulnerable** species recorded (0.25 pt each)	
State **Endangered** recorded (0.5 pts each)	
Nationally **Vulnerable** species recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species recorded (2 pts each)	
Score	**0**

Potential habitat for Threatened Animal Species (number observed or previously recorded)	**Number**
**If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.*	
State **Rare** species observed or locally recorded (0.1 pt each)	
State **Vulnerable** species observed or locally recorded (0.25 pt each)	2
State **Endangered** species observed or locally recorded (0.5 pt each)	1
Nationally Vulnerable species observed or locally recorded (1 pts each)	
Nationally **Endangered** or **Critically endangered** species observed or locally recorded (2 pts each)	2
Score	**5**

CONSERVATION SIGNIFICANCE SCORE	5

Total Scores for the Site

	Score
LANDSCAPE CONTEXT SCORE	**9.00**
VEGETATION CONDITION SCORE	**37.00**
CONSERVATION SIGNIFICANCE SCORE	**5.00**

(Vegetation Condition + Landscape Context) x (1 + Conservation Significance/10) =

UNIT BIODIVERSITY SCORE	69.00
Total Biodiversity Score (UBS x size)	0.00

Photo Point and Vegetation Survey Location

Direction of the Photo

GPS Reference (Eastings and Northings)

35° 46' 50" S
137° 45' 47" E

Description

Consists of an Allocasuarina verticillata and Eucalyptus cladocalyx forest with high weed density in relatively poor condition. Glossy Black Cockatoo chewings were observed at this site.

What is the purpose of Assessment? Clearance | SEB Area | Other

Assessment for Clearance

Clearance - SEB Hectares required	0.00	**SEB Payment**	
Loadings for clearance of protected areas (%)		**Mean Annual rainfall for the site (mm)**	528.5
Reductions for rehabilitation of impact site (%)		**Payment into the fund**	**$0.00**
Adjusted clearance - SEB Hectares required	**0.00**	**Administration fee**	**$0.00**

APPENDIX 2: BENCHMARK COMMUNITY KI 2.

Open forests and woodlands with an open sclerophyll shrub understorey

Distinguishing Features

- Trees generally >10 metres and may exceed 30 metres, in woodland (10-30%) or open forest form (3070% cover)
- Common overstorey species include *Eucalyptus baxteri* (Brown Stringybark), *Eucalyptus cladocalyx* (Sugar Gum), *Eucalyptus fasciculosa* (Pink Gum), *Eucalyptus leucoxylon ssp. leucoxylon* (South Australian Blue Gum) and *Eucalyptus obliqua* (Messmate Stringybark)
- Sparse (10-30%) sub-tree layer of one or more of *Allocasuarina verticillata* (Drooping Sheoak), *Exocarpos cupressiformis* (Native Cherry) and *Banksia marginata* (Silver Banksia) usually present Generally a sparse (10-30%) tall (>2m) shrub layer with common species including *Hakea rostrata* (Beaked Hakea), *Xanthorrhoea semiplana ssp. tateana* (Tate's Grass-tree) , *Bursaria spinosa ssp. spinosa* (Sweet Bursaria), *Acacia paradoxa* (Kangaroo Thorn), *Callistemon rugulosus* (Bottlebrush) and *Prostanthera spinosa* (Spiny Mintbush)
- Both the medium (1-2m) shrub layer and the ground cover layer (small shrubs, mat plants, tussocks, and herbs) are prominent and contribute roughly equally to the 30-70% combined understorey and ground layer foliage cover. Common species in these layers include *Hibbertia spp.* (Guinea flowers), *Dianella revoluta/brevicaulis* (Flax Lilies), and in some areas *Lepidosperma semiteres* (Wire Rapiersedge) and/or *Lepidosperma carphoides* (Black Rapier-sedge may be of mid-dense cover (30-70%).
- Grasses are not a prominent component, generally comprising <5% cover
- *Pteridium esculentum* (Bracken Fern) may be present, but is generally of low cover (<5%)
- Leaf litter layer generally prominent (30%+ cover)
- High species diversity
- On alluvial or sandstone based soils

There were four vegetation groupings within the Biological Survey of Kangaroo Island that fit within this community – these are shown below with the average species richness and range of species richness shown in brackets:

- Eucalyptus cladocalyx (Sugar Gum) Open forest 27 (7 – 44) Biosurvey report
- Eucalyptus cladocalyx (Sugar Gum),, +/- E. fasciculosa (Pink Gum) Woodland 40 (27 – 54)
- Eucalyptus leucoxylon (South Australian Blue Gum), +/- E. cosmophylla (Cup Gum) Open forest 34 (11-61)

Overstorey Dominants

Eucalyptus baxteri (Brown Stringybark)
Eucalyptus cladocalyx (Sugar Gum)
Eucalyptus fasciculosa (Pink Gum)
Eucalyptus leucoxylon ssp. leucoxylon (South Australian Blue Gum)
Eucalyptus obliqua (Messmate Stringybark)

Sub-dominants or Minor Occurrences

Eucalyptus viminalis ssp. cygnetensis (Rough-bark Manna Gum)
Eucalyptus paludicola (Mount Compass Swamp Gum) (Kelly Hill CP)
Allocasuarina verticillata (Drooping Sheoak)

Structural Formations

Tall Open Forest, Tall Woodland, Tall Open Woodland, Open Forest, Woodland

2 Open forests and woodlands with an open sclerophyll shrub understorey					
	Very Poor	Poor	Moderate	Good	Excellent
1. Species Diversity	1 - 6	7 - 13	14 - 21	22 - 29	30+
2. Weed Abundance & Threat	> 35	26 - 35	18 - 25	11 - 17	0 - 10
3. Structural Diversity A - Ground Cover	-4 to -1	0 to 1	2	3	4
3. Structural Diversity B - Plant Life Forms	< 6	6 - 7	8 - 11	12 - 16	17+
4. Regeneration – Trees	0	0	1	2	3+
4. Regeneration – Trees & Woody Shrubs	1	2	3	4 - 5	6+
5. Tree Health – Dieback	-8 to -3.6	-3.5 to -1.1	-1.0 to 0.4	0.5 to 1.4	1.5 to 2
5. Tree Health – Lerp	-4 to -2.1	-2.0 to -0.1	0 to 1.9	2.0 to 2.9	3.0 to 4
5. Tree Health – Mistletoe	-6 to -4.1	-4.0 to -2.1	-2.0 to -0.6	-0.5 to -0.1	0 to 1
5. Shrub Health – Dieback	-8 to -3.1	-3.0 to -0.1	0 to 0.9	1.0 to 1.7	1.8 to 2
6. Tree Habitat Score†	0 - 1	2 - 3	4 - 6	7 - 8	9 - 10
6. Tree Hollow Score†	0	1	2 - 3	4 - 6	7 - 10
6. Fallen Log & Tree Score†	0	1 - 2	3 - 4	5 - 6	7 +
7. Feral Animal Abundance	> 7	5.1 - 7	2.1 - 5	1.1 - 2	0 - 1
7. Feral Animal Frequency	<-15	-15 to -9	-8 to -5	-4 to -2	-1 to 0
8. Total Grazing Pressure	< -16	-16 to -9	-8 to -5	-4 to -3	-2 to 0

APPENDIX 3: BENCHMARK COMMUNITY KI 5.

Mallee and Tall Shrublands with an open to very open shrub understorey on shallow sand over clay

Distinguishing Features

- Mallees <10m generally of mid-dense (30-70%) cover
- Dominant species include *Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee), *Eucalyptus rugosa* (Coastal White Mallee) and *Eucalyptus phenax ssp. compressa* (Kangaroo Island Mallee)
- *Melaleuca uncinata* (Broombush), *Allocasuarina muelleriana ssp. notocolpica* (Kangaroo Island Oakbush) and/or *Acacia paradoxa* (Kangaroo Thorn) may form sub canopy or may be principal overstorey with emergent mallee species.
- Very sparse (<10%) to sparse (10-30%) low and medium shrub layer, with common species including *Acacia paradoxa* (Kangaroo Thorn), *Thryptomene ericaea* (Heath Thryptomene), *Dodonaea baueri* (Crinkled Hop-bush), *Calytrix tetragona* (Common Fringe-myrtle), *Acrotriche depressa* (Native Currant), *Astroloma humifusum* (Cranberry Heath), *Atriplex paludosa ssp. cordata* (Marsh Saltbush), *Rhagodia crassifolia* (Fleshy Saltbush), *Correa reflexa var. reflexa* (Common Correa), *Grevillea ilicifolia ssp. ilicifolia* (Holly-leaf Grevillea)
- Creepers, such as *Clematis microphylla* and *Comesperma volubile* are often present, but of low cover (<10%)
- Very sparse (<10%) tussocky layer which may include *Dianella brevicaulis* (Short-stem Flax-lily), *Orthrosanthus multiflorus* (Morning Flag) and the sedge *Lepidosperma viscidum* (Sticky Sword-sedge) Usually found on hillslopes and crests of eastern Kangaroo Island
- Very few native grasses
- High to very high species diversity
- Mid-dense (30-70%) to dense (70%+) leaf litter layer

This community is found principally on the Dudley Peninsula and MacGillivray Plains of eastern Kangaroo Island.

Atriplex paludosa, Dianella revoluta, Rhagodia crassifolia, Orthrosansus multiflorus, Dodonaea baueri, Callistemon rugulosus are positive associates with *Eucalyptus cneorifolia* "The undulating plains where *Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) grows best comprise mostly poorly drained soils which have a surface sandy layer over a dense, compacted impermeable and often saline clay" "Where significant E. cneorifolia is present, it is usually also with *Thryptomene ericaea*, *Correa reflexa* and *Grevillea ilicifolia ilicifolia. "E. cneorifolia* is clay dependent, although pH appears to determine its distribution" This community can also occur as a shrubland form, with dominant species including *Melaleuca uncinata* (Broombush), *Allocasuarina muelleriana ssp. notocolpica* (Kangaroo Island Oak-bush) and/or *Acacia paradoxa* (Kangaroo Thorn), with or without emergent mallee species. Broombush is particularly common where there is a sand overlay over clay. Where the understorey is diverse and dense this should be considered as Community 1.2.

There were two vegetation groupings within the Biological Survey of Kangaroo Island that fit within this community – these are shown below with the average species richness and range of species richness shown in brackets:

- Eucalyptus cneorifolia (Kangaroo Island Narrow-leaf Mallee), Melaleuca uncinata (Broombush) Mallee 26 (16 – 46)
- Eucalyptus cneorifolia (Kangaroo Island Narrow-leaf Mallee), Acacia paradoxa (Kangaroo Thorn) Malleee 47 (13 – 79)

Overstorey Dominants

Eucalyptus cneorifolia (Kangaroo Island Narrow-leaf Mallee)
Eucalyptus rugosa (Coastal White Mallee)
Eucalyptus phenax ssp. compressa (Kangaroo Island Mallee)

Sub-dominants or Minor Occurrences

Melaleuca lanceolata (Dryland Tea-tree)
Melaleuca uncinata (Broombush)

Structural Formations

Closed Mallee, Mallee, Open Mallee, Tall Shrubland, Shrubland (the latter two in Broombush shrublands with emergent mallee)

5.1 Mallee with an open to very open shrub understorey on clay based soils					
	Very Poor	Poor	Moderate	Good	Excellent
1. Species Diversity	1 - 6	7 - 13	14 - 21	22 - 29	30+
2. Weed Abundance & Threat	> 30	21 - 30	14 - 20	9 - 13	0 - 8
3. Structural Diversity A - Ground Cover	-4 to 0	1	2	3	4
3. Structural Diversity B - Plant Life Forms	< 5	5 - 7	8 - 11	12 - 14	15+
4. Regeneration – Trees	0	0	1	1	2+
4. Regeneration – Trees & Woody Shrubs	0	1	2	3	4+
5. Tree Health – Dieback	-8 to -3.6	-3.5 to -1.1	-1.0 to 0.4	0.5 to 1.4	1.5 to 2
5. Tree Health – Lerp	-4 to -0.6	-0.5 to 0.9	1.0 to 2.4	2.5 to 3.4	3.5 to 4
5. Tree Health – Mistletoe	-6 to -2.1	-2.0 to -1.1	-1.0 to -0.1	0 to 0.4	0.5 to 1
5. Shrub Health – Dieback	-8 to -3.1	-3.0 to -0.1	0 to 0.9	1.0 to 1.7	1.8 to 2
6. Tree Habitat Score†	0 - 1	2 - 3	4 - 5	6 - 7	8 - 10
6. Tree Hollow Score†	0	1	2	3 - 5	6 - 10
6. Fallen Log & Tree Score†	0	1	2	3 - 4	5 +
7. Feral Animal Abundance	> 7	5.1 - 7	2.1 - 5	1.1 - 2	0 - 1
7. Feral Animal Frequency	<-15	-15 to -9	-8 to -5	-4 to -2	-1 to 0
8. Total Grazing Pressure	< -12	-12 to -7	-6 to -4	-3 to -2	-1 to 0

CO CITY & CENTRAL CONSULTING PTY LTD

LANDSCAPE CONCEPT PLAN

KANGAROO ISLAND RESORT
AMERICAN RIVER

4 MARCH 2016

BOTANICAL ENIGMERASE

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Enigmerase

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for

Co City & Central Consulting Pty Ltd

Michelle Haby is a Native Vegetation Council accredited consultant, accredited to prepare data reports for clearance consent under Section 28 of the *Native Vegetation Act 1991* and applications made under one of the *Native Vegetation Regulations 2003*. Michelle has also undertaken training in the BushRAT method and Bushland Condition Monitoring for a BushRAT Registered Consultant.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

BACKGROUND

Kangaroo Island is the third largest island in Australia covering approximately 4,500 km² located off the Fleurieu Peninsula in South Australia. Kangaroo Island has a resident population of approximately 4,200 people.

Due to the relative isolation, Kangaroo Island is free from rabbits and foxes and has a relatively low number of introduced plant species. This, along with being isolated from mainland Australia, has resulted in Kangaroo Island having a high level of endemic flora and fauna. Kangaroo Island remains covered with approximately 55% native vegetation.

Of the remaining native vegetation on Kangaroo Island approximately 55% is contained within Government Reserves and managed by the Department of Environment, Water and Natural Resources. Another 9% is contained within Heritage Agreements protected under the *Native Vegetation Act 1991* with the remaining in private ownership (*Willoughby et al 2001*). A total of 30% of Kangaroo Island is dedicated as a protected area.

Co City & Central Consulting Pty Ltd are proposing to establish a "Kangaroo Island Resort" on an approximately 35 hectare site adjoin American River on Kangaroo Island. The land comprises of primarily cleared farmland with some native vegetation and small portions of planted vegetation.

The proposed Kangaroo Island Resort is proposed to consist of 108 hotel rooms (in 9 lodges), and 20 cottages and 20 cabins, a staff accommodation block for 100 staff and associated infrastructure, Figure 1.

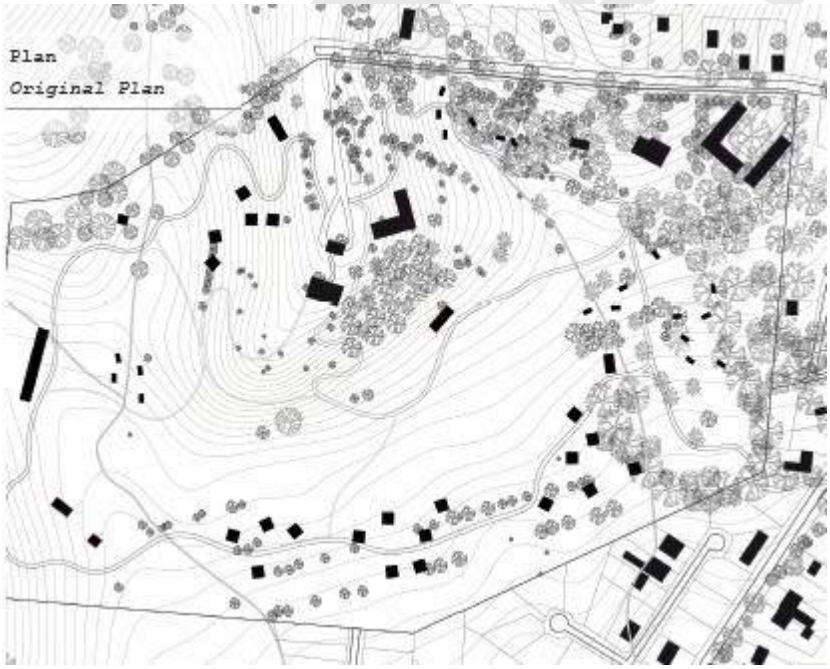

Figure 1- Kangaroo Island Resort Proposal

Co City & Central Consulting Pty Ltd commissioned Botanical Enigmerase to prepare a preliminary concept landscape plan.

LANDSCAPE PLAN

The concept landscape plan for the Kangaroo Island Resort is divided into seven different areas being-

- Sparse native vegetation;
- Agricultural grassland;
- Shrubland (heathers);
- Lawn Areas;
- Flower meadow;
- Vegetable Patch; and
- Kangaroo Island Botanical Garden.

This plan focuses on the native plant requirements for the landscape plan and makes recommendations for the planting of these. The areas of focus are-

1. Native Vegetation Landscape
2. Grassland Landscape
3. Shrubland Landscape
4. Flower Meadow Landscape
5. Botanical Garden Landscape

Table 1 provides the list of native plant species recommended for the Landscapes as described above.

Species	Status			Description	Landscape				
	AU	SA	KI		1	2	3	4	5
Acacia acinacea			VU	Showy yellow flowers			■		
Acacia paradoxa				Good for little birds to hide in	■		■		
Acacia pycnantha				Showy yellow flowers in winter	■				
Acacia spinescens				Showy yellow flowers			■	■	
Acacia triquetra				Dense shrub with showy yellow flowers			■		
Acrotriche cordata				Dense shrub			■		
Acrotriche depressa				Lovely scent when flowering and fruiting. Edible berries				■	
Acrotriche patula				Dense shrub with glossy green leaves			■		
Adenanthos macropodianus				KI endemic, bird attracting					■
Allocasuarina muelleriana				KI endemic	■		■		
Allocasuarina verticillata				Glossy Black-Cockatoo feeding tree	■				■
Arthropodium fimbriatum			VU	Attractive purple nodding flowers				■	
Asterolasia muricata		R	RA	Stunning clear yellow star flowers					■
Astroloma conostephioides				Showy red flowers			■	■	
Astroloma humifusum				Attractive ground cover	■			■	
Austrostipa elegantissima			RA	Attractive native grass		■			■
Austrostipa sp.				Native grass	■	■			
Bertya rotundifolia				KI endemic	■		■		■
Beyeria subtecta	VU	E	EN	Nationally threatened plant species					■
Billardiera versicolor				Creeper with bell shaped flowers			■	■	■
Burchardia umbellata				Native bulb				■	
Calytrix glaberrima				Showy little pink flowers, mildly scented			■	■	

Calytrix tetragona				Showy pink flowers			■	■	
Cassinia complanata				White flowered daisy			■		
Chamaescilla corymbosa var. corymbosa				Native bulb				■	
Choretrum glomeratum				Very different shade of green. Striking			■	■	
Clematis microphylla				Creeper with attractive fluffy seeds	■		■		
Coronidium adenophorum				White paper daisy				■	
Correa backhousiana var. orbicularis		R		Bird attracting			■	■	
Correa calycina var halmaturina	VU	E	EN	Nationally threatened, KI endemic, bird attracting					■
Daviesia asperula				Showy orange pea flowers			■	■	
Daviesia brevifolia				Showy orange pea flowers			■	■	
Dianella brevicaulis				Clumping sedge with dark green leaves	■		■	■	
Dillwynia hispida				Showy red orange pea flowers			■		
Dodonaea viscosa				Attractive papery red brown seeds	■				
Enchylaena tomentosa var. tomentosa				Groundcover that produces edible berries that birds like	■				
Eremophila behriana			VU	Pretty purple flowered ground cover				■	
Eremophila glabra			VU	Bird attracting			■	■	■
Eucalyptus cladocalyx ssp. crassa				Glossy Black-Cockatoo nesting tree	■				
Eucalyptus cneorifolia				Dominant overstory tree in area	■				■
Eutaxia diffusa			RA	Attractive yellow pea flowered shrub			■		■
Ficinia nodosa				Rush that favours damp areas	■				
Gonocarpus mezianus				Understory herb	■		■		
Goodenia blackiana				Stunning small groundcover				■	
Grevillea illicifolia				Bird attracting			■		
Grevillea lavandulacea ssp. rogersii		R	RA	KI endemic, stunning red flowers					■
Grevillea muricata		V	VU	Bird attracting				■	■
Grevillea quinquenervis				KI endemic, lovely pink flowers					■
Hakea mitchellii				Sweet smelling flowered large shrub	■				
Hardenbergia violacea			RA	Stunning purple pea flowered creeper			■		
Hibbertia platyphylla ssp halmaturina			VU	Showy yellow flowers			■	■	■
Hibbertia riparia				Attractive yellow flowered shrub	■		■		
Juncus subsecundus			RA	Grey green rush that favours damp areas			■		■
Kennedia prostrata				Brilliant red flowering groundcover				■	
Lasiopetalum bauerii				Interesting leaf colour			■		
Lasiopetalum shulzenii				Papery pink lantern flowers			■		
Leionema equestre	EN	E	EN	Lovely star pinkish flowers					■
Lepidosperma sp. Flinders Chase				Fabulously scented sedge			■	■	
Leucopogon rufus				Interesting little white flowers			■		
Logania linifolia				Interesting leaf colour			■		
Lomandra micrantha				Understory sedge			■	■	
Melaleuca gibbosa				Pretty mauve 'bottlebrush' flowers	■		■		

Melaleuca uncinata				Pretty creamy yellow 'bottlebrush' flowers			■		
Micrantheum demissum				Nice dense little shrub			■		
Olearia ciliata var. squamifolia				Lovely purple daisy flowers				■	
Olearia microdisca	EN	E	VU	Nice scent, showy white flowers				■	■
Olearia ramulosa				Nice scent	■		■	■	
Olearia teretifolia				Profuse white flowering shrub			■		
Orthrosanthus multiflorus				Showy purple flowers	■		■	■	
Petrophile multisecta				KI endemic			■	■	
Phyllanthus striaticaulis				Large herb			■		
Pimelea flava				Showy flowers.			■	■	
Pomaderris obcordata				Eye-catching white flowered shrub			■		
Pultenaea acerosa				Attractive yellow pea flowers			■	■	
Pultenaea canaliculata				Attractive yellow pea flowers			■	■	
Pultenaea insularis			EN	Endemic, yellow pea flowered groundcover					■
Pultenaea penna				Attractive yellow pea flowered shrub			■		
Pultenaea villifera var. glabrescens	VU	V	VU	Yellow pea flowered shrub					■
Rhagodia candolleana ssp. candolleana				Dominant understory shrub in area	■				
Rytidosperma sp.				Native grass	■	■			
Scaevola linearis				Pretty purple fan flowers			■	■	
Solanum capsiciforme			EN	Purple flower and interesting fruit shape					■
Spyridium eriocephalum var. glabrisepalum	VU	E	EN	Nationally threatened					■
Spyridium halmaturinum				Interesting grey foliage and white 'flowers'			■	■	
Spyridium nitidum				Shiny silver foliage			■	■	
Spyridium spathulatum		R		Profuse white flowers			■	■	■
Thomasia petalocalyx				Long flowering purple lantern flowers			■		
Thryptomene ericaea				Dominant understory shrub in area			■		
Vittadinia australasica var. australasica				Nice purple flowers and pom pom seed heads				■	
Xanthorrhoea semiplana ssp tateana		R		Attractive growth form			■		■
Zieria veronicea ssp. insularis		R	RA	Amazing lemon scented shrub				■	■

Table 1- Native Plant Species recommended for planting

Native Vegetation Landscape

The native vegetation on the property consists of both natural and planted vegetation which in parts is extremely sparse and weed infested. The vegetation however provides feeding and nesting habitat for the Glossy Black Cockatoo. The area may also provide habitat for the Southern Brown Bandicoot.

The native vegetation assessment of the property identified three native vegetation communities, Figure 2. The revegetation of these areas should be consistent with the native vegetation communities.

Figure 2- Native Vegetation Communities

Approximately 10ha are proposed to be rehabilitated in the draft landscape plan, Figure 3.

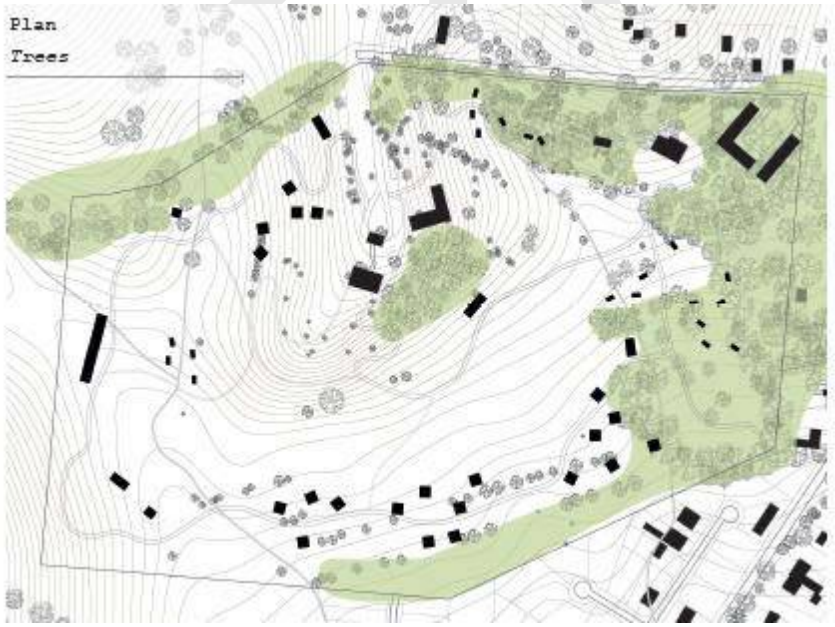

Figure 3- Native Vegetation Landscape

Table 2 provides general direction for the revegetation of the Native Vegetation Landscape.

Revegetation Objectives	• Enhance the Glossy Black Cockatoo and Southern Brown Bandicoot habitat • Enhance the Kangaroo Island Narrow-leafed mallee woodland
General Requirements	• Plants to be planted and left (not maintained). • Consistent with existing native vegetation.
Area	~10ha
Stems per hectare	2,000 in areas away from infrastructure. Reducing in density closer to infrastructure Stems per hectare achieved with planted and existing native vegetation
Minimum species number	20
Species composition	10% Tree 80% Shrub 10% groundcover
Native Plants required	~5,000
Planting notes	• Weed species need to be controlled • *Allocasuarina verticillata* in the northern section for Glossy Black Cockatoo feeding habitat • *Eucalyptus cladocalyx ssp crassa* in the southern section for Glossy Black Cockatoo nesting sites. Plant away from infrastructure as limbs of mature trees fall regularly. • Kangaroo Island Narrow-leafed Mallee Woodland species in the east for Southern Brown Bandicoot habitat. • Infill plant between existing native plants with tubestock. • Where areas are large enough, use rip lines to plant

Table 2- Revegetation Notes for Native Vegetation Landscape

Grassland Landscape

The proposed development proposes to maintain a grassland on the site, Figure 4 (yellow).

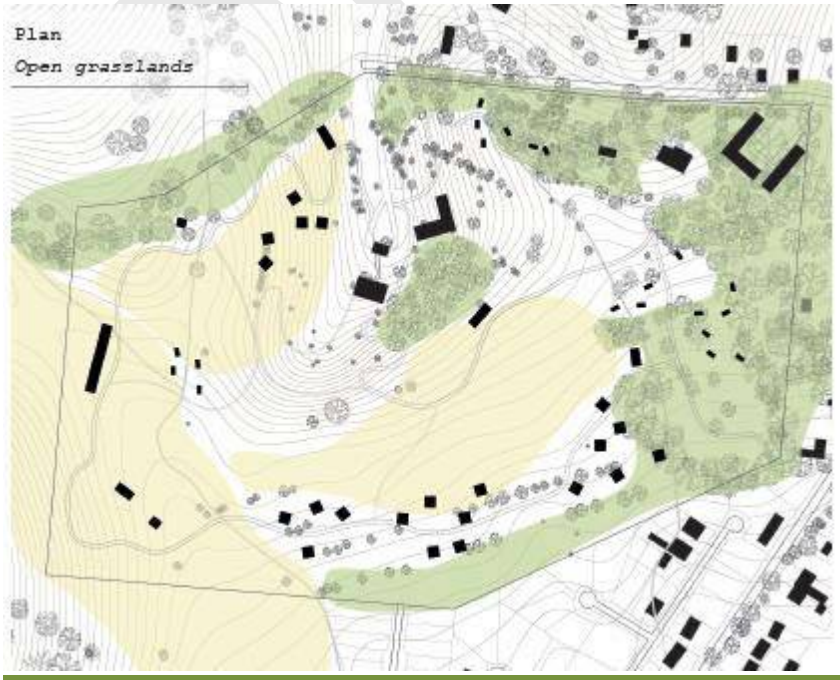

Figure 4- Grassland (yellow) Landscape

Table 3 provides general direction for the revegetation of the Grassland Landscape.

Revegetation Objectives	• Establish a native grassland • Maintain current agricultural aspect
General Requirements	• Plants to be planted and left (not maintained).
Area	~12ha
Stems per hectare	3,000 seedlings per hectare
Minimum species number	N/A
Species composition	N/A
Native Plants required	30,000
Planting notes	• Weeds will need to be managed • Direct plant into scrapped land

Table 3- Revegetation Notes for Grassland Landscape

Shrubland (Heathers) Landscape

The proposed development proposes to develop a low shrubland on the site, Figure 5 (pink).

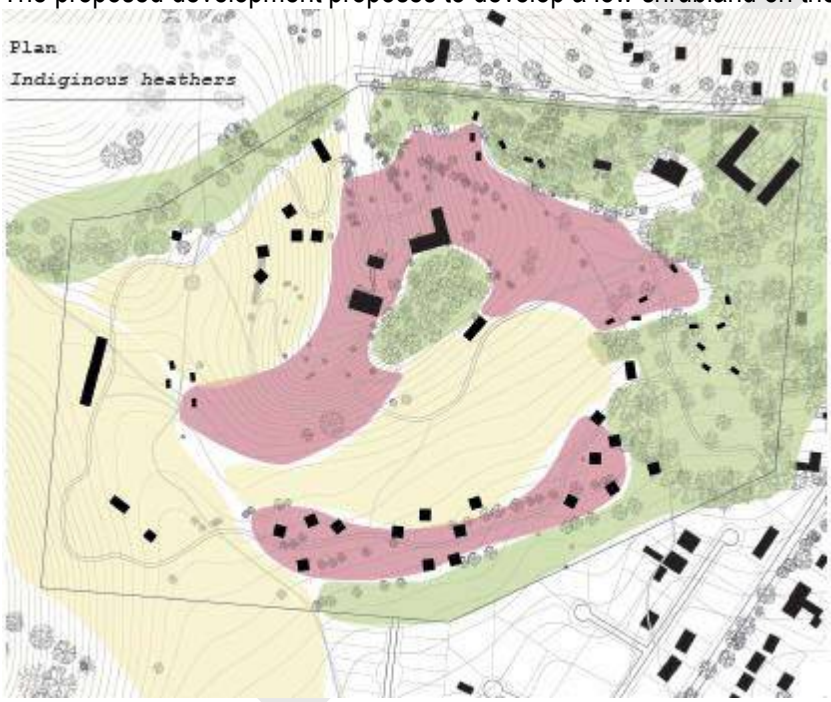

Figure 5- Shrubland (pink) Landscape

Table 4 provides general direction for the revegetation of the Shrubland Landscape.

Revegetation Objectives	• Visual aesthetics. • Maintain current views from infrastructure over Pelican Lagoon
General Requirements	• Plants to be planted and left (not maintained). • Native Plants suited to the American River area. • Height to be 1.5m or less • Pathways included

Area	~10ha
Stems per hectare	2,000
Minimum species number	30
Species composition	N/A
Native Plants required	20,000
Planting notes	• Plant randomly throughout the area • Use tubestock planting as these species will not grow from direct seeding • Rip random lines prior to planting

Table 4- Revegetation Notes for Shrubland Landscape

Flower Meadow Landscape

The proposed development proposes to develop a flower meadow near the proposed spa to enhance the experience, Figure 6.

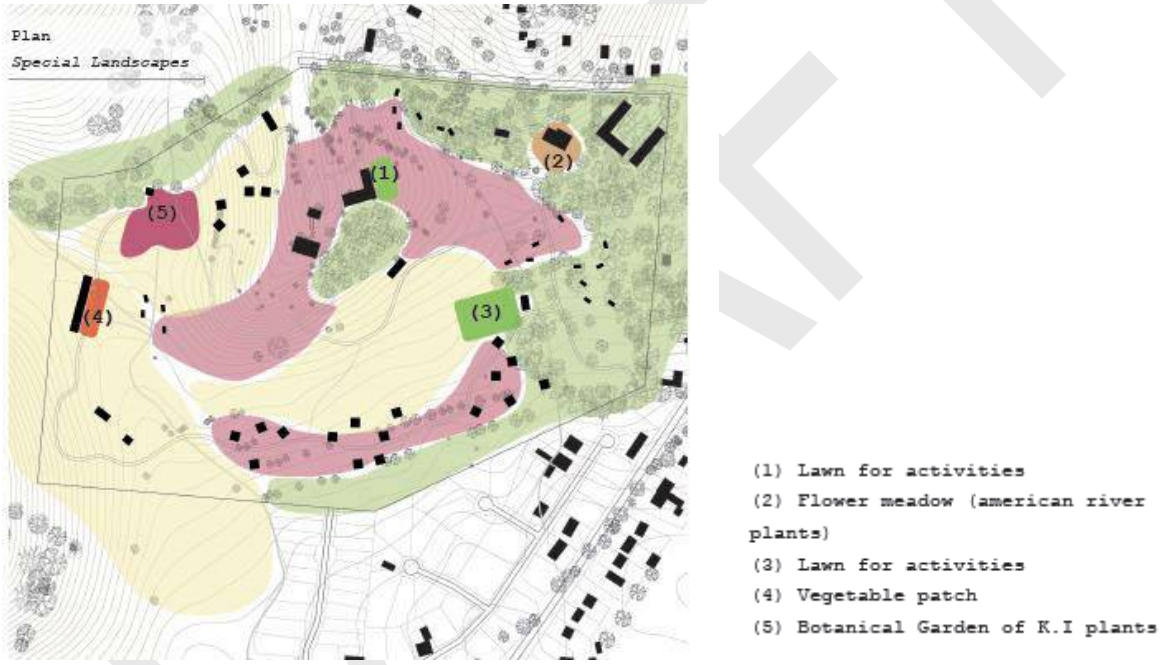

Figure 6- Specialist Landscapes

Table 5 provides general direction for the revegetation of the Flower Meadow Landscape.

Revegetation Objectives	• Enhance the spa experience
General Requirements	• Plants to be planted and left (not maintained). • Plants with strong smell and/or vibrant flowers for the spa. • Height to be 1.5m or less • Pathways to be included
Area	~0.4ha (including pathways and spa etc)
Stems per hectare	2,000
Minimum species number	30
Species composition	N/A
Native Plants required	500

Planting notes	• Use tubestock planting as these species will not grow from direct seeding • Strong scented plants near spa • Lines of vibrant flowering plants along pathways and near spa • Plant to enhance the spa and pathway experience

Table 5- Flower Meadow Landscape

Botanical Garden Landscape

The proposed development proposes to develop a Botanical Garden of Kangaroo Island Native Plants, Figure 6.

Table 6 provides general direction for the revegetation of the Botanical Garden Landscape.

Revegetation Objectives	• Showcase unique Kangaroo Island native plants
General Requirements	• Plants to be maintained by gardener. • Pathways to be included
Area	~0.5ha (including pathways)
Stems per hectare	N/A
Minimum species number	N/A
Species composition	N/A
Native Plants required	500
Planting notes	• Use tubestock planting as these species will not grow from direct seeding • Plant each species in clumps of 10-20 individuals • Plant so each species is visible from the pathways • Grade from lower plants near paths to higher trees further away • Include a label for each species with some unique features/aspects

Table 6- Botanical Garden Landscape

BIBLIOGRAPHY

Atlas of Living Australia, http://www.ala.org.au/

Department of Environment, Water and Natural Resources *eFlora SA* http://www.flora.sa.gov.au/

Department of Environment, Water and Natural Resources, *Kangaroo Island Floristic Vegetation Mapping*

Department of Environment, Water and Natural Resources *NatureMaps* https://data.environment.sa.gov.au/NatureMaps/Pages/default.aspx

Environment Protection and Biodiversity Conservation Act (1999) *Conservation Advise for Kangaroo Island Narrow leafed Mallee (Eucalyptus cneorifolia) Woodland*

Environment Protection and Biodiversity Conservation Act (1999) *EPBC Protected Matters Database* [on-line tool] http://www.environment.gov.au/epbc/protected-matters-search-tool

Gillam, S. and Urban, R. (2014) *Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments*, Kangaroo island NRM Region. Department of Environment, Water and Natural Resources South Australia

Milne, T and McCallum (2012) *Bushland Condition Monitoring Manual: Benchmark Communities for Kangaroo Island*, Nature Conservation Society of South Australia

Mooney, P.A. and Pedler, L.P. (2005): *Recovery Plan for the South Australian subspecies of the Glossy Black-Cockatoo (Calyptorhynchus lathami halmaturinus): 2005-2010*. Unpublished report to South Australian Department for Environment and Heritage. Adelaide.

Native Vegetation Council (2015) *Guide for Calculating a Significant Environmental Benefit*, Native Vegetation Council, Government of South Australia

Native Vegetation Council (2015) *Native Vegetation Council (NVC) Bushland Assessment Manual*, Native Vegetation Council, Government of South Australia

Native Vegetation Council (2015) *Policy for Significant Environmental Benefit*, Native Vegetation Council, Government of South Australia

Overton, B and D (2012) *Discover Kangaroo Island's Native Plants*, Environmental Realist.

Paull, D.J. (1999). *A survey of the distribution and abundance of the southern brown bandicoot in the south of South Australia*. Randwick: School of Geography and Oceanography, The University of New South Wales.

Prescott, A (1995) *Its Blue with Five Petals- Kangaroo Island Field Guide: Wildflowers of Kangaroo Island and the Fleurieu Peninsula*. Ann Prescott and Associates Pty, Adelaide, South Australia

Taylor, D.A. (2003) *Recovery Plan for 15 Nationally Threatened Plant Species on Kangaroo Island, South Australia*. Report to the Threatened Species and Communities Section, Department for Environment and Heritage.

Willoughby, N, Oppermann, A., Innes, R.W. (2001) *Biodiversity Plan for Kangaroo Island, South Australia*, Department for Environment and Heritage, South Australia

APPENDIX 1

			
Acacia spinescens	*Adenanthos macropodianus*	*Asterolasia muricata*	*Astroloma humifusum*
			
Beyeria subtecta	*Calytrix tetragona*	*Chamaescilla corymbosa var. corymbosa*	*Correa calycina var. halmaturorum*
			
Dillwynia hispida	*Eutaxia diffusa*	*Grevillea muricata*	*Hardenbergia violacea*
			
Hibbertia platyphylla ssp. halmaturina	*Leionema equestre*	*Leucopogon rufus*	*Olearia ciliata var. squamifolia*
			
Orthrosanthus multiflorus	*Pomaderris obcordata*	*Spyridium nitidum*	*Thryptomene ericaea*

American River Resort Proposal: Fauna assessment

PER Fauna: August 2016

Pip Masters and Richard Southgate

Envisage Environmental Services

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PO Box 305, Kingscote, SA 5223

Citation: Masters P and Southgate RI (2016) AMERICAN RIVER RESORT: Fauna Survey. Internal report to Co City & Central Consulting Pty Ltd.

Disclaimer

EXECUTIVE SUMMARY

The proposed 250 bed resort, will be located on Kangaroo Island in South Australia on a 33 ha site on the western edge of the coastal settlement of American River (Hundred of Haines). The assessment found the following federal and state listed to occur in the area.

The Short-beaked Echidna (*Tachyglossus aculeatus multiaculeatus*) is listed as endangered under the EPBC Act.

The South Australian Glossy Black-Cockatoo (*Calyptorhynchus lathami halmaturinus*) listed as endangered under the EPBC Act.

The Heath Goanna (*Varanus rosenbergi*) – listed as vulnerable under the NPW Act.

The Scarlet Robin (*Petroica boodang campbelli*) – listed as vulnerable under the NPW Act.

Legislation and compliance

Once the infrastructure locations for the proposed resort are finalized, submitting an EPBC referral should be undertaken with respect to the Glossy Black-Cockatoo and Short-beaked Echidna.

Protect and enhance ecological values

Key recommendations for the site of the proposed resort development:

- Major infrastructure development and clearance of native vegetation should not occur on the eastern side of the property where the majority of native species reside which includes habitat for the Heath Goanna, Short-beaked Echidna and bushbirds such as the Scarlet Robin.
- All mature sugar gums on the property should be protected, particularly those where the Glossy Black-Cockatoos roost and breed.
- Avoid the clearance of *Allocasuarina verticullata* which is providing food for the Glossy Black-Cockatoo and revegetate areas with suitable feeding and nesting tree habitat (advice can be gained from Glossy Black Recovery Program, Natural Resources Kangaroo Island, Kingscote).
- Implement an environmental and fire management plan for the entire site which incorporates revegetation and restoration of landscape providing habitat for native species.
- Develop a management plan for construction workers, staff and tourists/visitors to ensure interaction with wildlife, particularly the Heath Goanna, Short-beaked Echidna and the Glossy Black-Cockatoo does not harm species' recovery
- Implement cat management programs to reduce predation on small birds, Heath Goannas, Short-beaked Echidnas and Southern Brown Bandicoots.
- Design windows on buildings to ensure that they do not reflect the landscape, to reduce the potential for bird strike.
- Prohibit pets on the site.

- Limit artificial lighting across the site at night
- Adopt best practice environmental management measures during the construction and operation phases including:
    - vehicles and equipment cleaned to reduce spread of weeds and soil pathogens
    - appropriate waste management
    - protect native vegetation from dumping, trampling and disturbance
    - monitoring the spread of declared and environmental weeds

Contents

1. INTRODUCTION

1.1 Project proposal

The project proposes to build a 250 bed resort on the western edge of American River, Kangaroo Island. The project will focus on niche tourists interested in horticulture, conservation, bird watching, and local food products. The resort proposes to have festivals, markets and conferences which would be open to the community.

The project brief outlines the desire to limit impacts on threatened species in construction and operations, enhance the current environmental conditions through re-introduction of indigenous species, promote conservation tourism, and to strengthen populations of threatened local birdlife. Protection of nature and environmental sustainability are two of the objectives listed by the developers.

1.2 Project area and surrounds

The project area is 33 ha located on the western edge of the coastal settlement of American River (Hundred of Haines) on Kangaroo Island in South Australia. Kangaroo Island is Australia's third largest island. The fauna is relatively intact because foxes and rabbits are absent from the island, and there is a high proportion of land still under native vegetation (approx. 50%), particularly on the south coast and western end of the island. Despite the high cover of native vegetation, some catchments are heavily cleared particularly in the north eastern area where the major townships are situated, with farmland dominating the landscape.

The proposed project includes a 250 bed resort within the area zoned as Residential and Deferred Urban (DPTI 2014). This area is a block of land which was previously grazed by sheep. It is an area of predominantly cleared land with patches of native vegetation as well as revegetated areas consisting of both local native and Australian native species. There is a small creek line on the western side and a drainage channel on the eastern side. There are substantial issues with proclaimed weed species particularly boxthorn which is located on the southern-eastern side of the property.

1.3 Compliance and legislative summary

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act protects and manages nationally and internationally important species and communities or 'matters of national environmental significance' using a number of categories. The relevant categories to this report include:

- Listed threatened species and ecological communities
- Migratory and marine species protected under international agreement

An act is regarded as having a significant impact on a matter of national significance if there is a chance that the action is likely to:

- Lead to a long term decrease in the population
- Reduce the area of occupancy of a species
- Fragment an existing population

- Adversely affect critical habitat
- Disrupt breeding cycles
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in the establishment of invasive species that are harmful to the species
- Introduce disease that may cause the species to decline
- Interfere with the recovery of the species (Commonwealth of Australia 2013).

To make a decision as to whether or not to refer an action to the Minister, you should consider the following:

a. Are there any matters of national environmental significance located in the area of the proposed action (noting that 'the area of the proposed action' is broader than the immediate location where the action is undertaken; consider also whether there are any matters of national environmental significance adjacent to or downstream from the immediate location that may potentially be impacted)?
b. Considering the proposed action at its broadest scope (that is, considering all stages and components of the action, and all related activities and infrastructure), is there potential for impacts, including indirect impacts, on matters of national environmental significance?
c. Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance (and if so, is the effectiveness of these measures certain enough to reduce the level of impact below the 'significant impact' threshold)?
d. Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts (important, notable, or of consequence, having regard to their context or intensity)?

National Parks and Wildlife Act 1972 (NPW Act)

The NPW Act protects vertebrate species in South Australia under Schedule 7 (endangered species), Schedule 8 (vulnerable species) and Schedule 9 (rare species).

Natural Resources Management Act 2004

This act requires landholders to manage their invasive species declared under the act and to undertake activities to prevent land degradation.

2. METHODS

2.1 Desktop assessment and expert information

A review of relevant literature and databases was undertaken for the project site and the immediate surrounds. Information was obtained from the following databases:

- Birdlife Australia Atlas
- Atlas of Living Australia

- Naturemaps (DEWNR online mapping)
- Biological Database of South Australia
- Unpublished and published literature relevant to fauna on KI
- Local experts were contacted to clarify points of concern.

Few formalised fauna surveys have been undertaken in the area with the most systematic effort occurring between 1989 and 1993 (Robinson and Armstrong 1999). A number of conservation and research programs have been undertaken in the area focusing primarily on threatened and migratory species including:

- The Glossy Black-Cockatoo (*Calyptorhynchus lathami halmaturinus*) recovery program
- Shorebird surveys (including Hooded Plover *Thinornis rubricollis*) surveys as part of a Birdlife Australia program (see Kangaroo Island Shorebird website, Masters and Dennis 2001)
- Southern Brown Bandicoot (*Isoodon obesulus obesulus*) surveys (Paull 1993, 1995; Jones *et al*. 2010) including a current southern brown bandicoot community project managed by Natural Resources Kangaroo Island
- White–bellied Sea Eagle (*Haliaeetus leucogaster*) and Osprey (*Pandion crisitatus*) surveys coordinated by Natural Resources Kangaroo Island (Dennis *et al*. 2011a, b; Dennis and Baxter 2006)
- Short-beaked Echidna (*Tachyglossus aculeatus multiaculeatus*) and Heath Goanna (*Varanus rosenbergi*) research undertaken by the Pelican Lagoon Research Field Station (Green *et al*. 2000; Rismiller 1999).

Kangaroo Island has an active bird group (Birdlife KI) and a recently published field guide by a local bird enthusiast (Baxter 2015).

2.2 Field survey

The field survey work was conducted in line with the EPBC Act survey guidelines (Commonwealth of Australia 2010; 2011) between the 10 March and 14 March 2016. The species targeted during the field survey were determined based on a desktop assessment, expert knowledge and known habitat suitability for particular species.

The surveys were carry out using three methods which targeted the area of interest (Fig. 1).

Bird surveys were conducted on five different occasions: three morning surveys (<10 am), two afternoon surveys (>5 pm) and one evening vocalisation survey (9-10 pm). Each survey took around an hour. The area was searched for all species, with a particular focus on the nationally endangered Glossy Black-Cockatoo (using methods outlined in Commonwealth of Australia (2010) p. 86). All species were recorded for each survey with additional information collected on Glossy Black-Cockatoo nesting and feeding sites.

Mammals and reptiles were targeted using searches for sign using tracks, scats and diggings (2 morning searches and 1 afternoon search), spotlighting (2 hours) and Elliott trapping (80 trap nights over 2 nights). The species' of particular focus were:

- the nationally endangered Southern Brown Bandicoot. A record of a Southern Brown Bandicoot was recorded in 1979 within 500 m of the site (BDBSA database), searches were conducted in line with the recommendations (Commonwealth of Australia 2011)
- the Heath Goanna considered vulnerable in SA. This species is still commonly encountered on the Island but believed to be declining in number (Green *et al.* 2000)
- the Short-beaked Echidna sub-species which is nationally endangered (Woinarski *et al*. 2014).

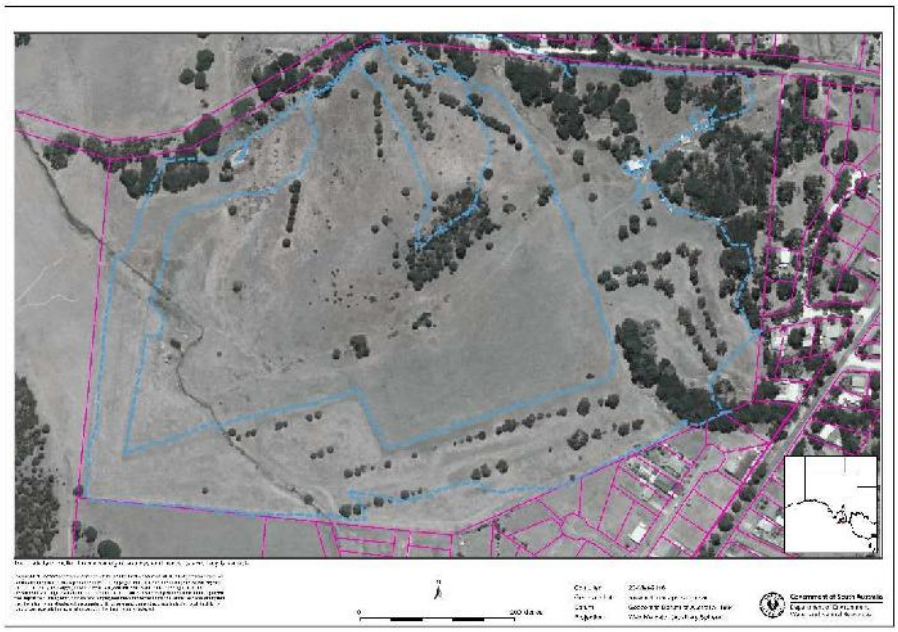

Fig. 1 Location of the proposed resort area. The blue dashed lines indicate the route taken during the spot light transect and one of the morning searches,

3. RESULTS

3.1 Desktop assessment

Desktop assessment was carriedout using on line tools and databases, and published reports and papers relevant to the area (Robinson and Armstrong 1999; Willoughby et al. 2001; Woinarski et al. 2014; Paull 1993,1995; Gates 2009; Gillam and Urban 2014; Baxter 2015).

3.1.1 Matters of national environmental significance

The EPBC Protected Matters Online Search Report identified the following matters of national environmental significance within a 5 km radius of the proposed development site and potentially having relevance for the project (Table 1).

Table 1 Matters of national environmental significance as at March 2016.

Matter of national environmental significance	Number
Listed ecological communities	2
Nationally important wetland	1
Listed threatened fauna species	36
Threatened migratory terrestrial species	4
Migratory wetland species	15
Listed migratory species	45
Listed marine species	79
Whales and other cetaceans	12

3.1.2 Threatened ecological communities

Two threatened ecological communities were listed:

- Kangaroo island Narrow-leafed Mallee (*Eucalyptus cneorifolia*) woodland – critically endangered;
- Subtropical and Temperate Coastal Saltmarsh - vulnerable

The native vegetation assessment component of the PER found that the Kangaroo Island narrow-leaf community was on the proposed resort development site (Haby and Rowley 2016). The coastal saltmarsh community is part of the American River Wetland system and is not impacted by this development.

3.1.3 Threatened fauna species

A number of species were disregarded from the search tool list because it was considered that the proposed development would not impact on their survival. These included species which were recorded as vagrants (Baxter 2015), ocean going seabirds, marine turtles, whales and other cetaceans.

Ten albatross, three whales, the Great White Shark (*Carcharodon carcharias*), four petrels, the Fairy Prion (*Pachyptila turtur*), three turtles and the Night Parrot (*Pezoporous occidentalis*) were the species not considered further.

The threatened species identified from database searches and their likelihood of occurring within the project area are summarised in Table 2. In addition to the species listed in Table 2, a further three reptile species and 11 bird species are considered regionally threatened (see Appendix 1).

Table 2 Nationally and State threatened fauna species which were listed and considered within 5 km of the site.

Scientific name	Common name	Conservation status			Likelihood
		Aus	SA	KI	
Bird species		(EPBC)			
Botaurus poiciloptilus	Australasian Bittern	EN	VU		Unlikely
Calidris ferruginea	Curlew Sandpiper	CE			Unlikely
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo	EN	EN	EN	Definite
Numenius madagascariensis	Eastern Curlew	CE	VU		Unikely
Zoothera lunulata halmaturina	Bassian Thrush	VU			Unlikely
Rostratula australis	Australian Painted Snipe	EN	VU		Unlikely
Sternula nereis nereis	Australian Fairy Tern	VU	EN	CE	Unliekly
Thinornis rubricollis rubricollis	Hooded Plover	VU	VU	CE	Unlikely
Cladorhynchus leucocephalas	Banded Stilt		VU	NT	Unlikely
Pandion crisitatus haliaetus	Osprey		EN	CE	Likely
Haliaeetus leucogaster	White-bellied Sea-Eagle		EN	EN	Definite
Mammal species					
Sminthopsis aitkeni	Kangaroo Island Dunnart	EN	EN	CE	Unlikely
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN			Definite
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	VU	NT	Possible
Neophoca cinerea	Australian Sea-lion	VU	VU	VU	Nil
Reptiles					
Varanus rosenbergi	Heath Goanna		VU	NT	Definite

Conservation status codes
Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). **SA**: South Australia (*National Parks and Wildlife Act 1972*). **KI** regional classification.
Conservation Codes: **CE**: Critically Endangered. **EN** Endangered **VU** Vulnerable **RA** Rare. ssp.: the conservation status applies at the sub-species level.
Source of Information
1. EPBC Act Protected Matters Report (DOE 2016) – 5 km buffer applied.
2. Biological Database of South Australia data extract (DEWNR 2016) - 5 km buffer applied to project area.

3.1.4 Migratory marine birds

Fork-tailed Swift (*Apus pacificus*), 10 albatross species, 2 petrel species and the Fleshfooted Shearwater (*Puffinus carneipes*). . None of these species will be impacted by this development and were not considered further.

3.1.5 Migratory marine (non-bird) species

This list included the Dusky Dolphin (*Lagenorhynchus obscurus*), 6 whales, 2 shark, and 3 turtles. None of these species will be impacted by this development and were not considered further.

3.1.6 Migratory terrestrial species

The list included the Rainbow Bee-eater (*Merops ornatus*), Grey Wagtail (*Motacilla cinerea*), Yellow Wagtail (*Motacilla flava*) and the Satin Flycatcher (*Myiagra cyanoleuca*). These species are all vagrants to the Island and unlikely to be impacted by the development. The White-bellied Sea Eagle (*Haliaeetus leucogaster)* was not listed but is listed under this category.

3.2 Results from the field survey

Forty-five species were recorded during the field survey, five mammal species, 39 bird species, and sign of the Heath Goanna (Appendix 2). Of these species, six were introduced species. Table 3 lists the species observed that have a threatened status at a national, state or regional level. Each species is recorded with a number that indicates the number of surveys that the species was recorded.

Table 3 Listed species identified during the field component of the impact assessment.

Scientific name	Common name	Conservation status			Resort
		Aus	SA	KI	
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN		NT	P
Calyptorhynchus lathami	Glossy Black-Cockatoo	EN	EN	EN	3
Varanus rosenbergi	Heath Goanna		VU	NT	3 (digging)
Haliaeetus leucogaster	White-bellied Sea Eagle		EN	CR	1
Petroica boodang	Scarlet Robin		VU	NT	1

3.2.1 Matters of conservation significance

There are two nationally endangered species, one endangered species and two vulnerable species at a state level.

The South Australian Glossy Black-Cockatoo sub-species is listed as endangered under the EPBC Act. Two individuals were observed roosting in a tree on the eastern side of the resort development near the proposed adventure lodge. Two major feeding sites were found in groves of *Allocasuarina* (plus two other sites were identified as part of the vegetation survey Haby and Rowley 2016), near the proposed restaurant and reception areas, and three collared nesting trees were on the eastern side of the site in the vicinity of the proposed

location of some of the smaller lodges (Fig. 2 and 3). This area is mapped as critical nesting habitat (extrapolated from DEWNR data) (Fig. 4).

The Short-beaked Echidna sub-species is listed as endangered under the EPBC Act. Diggings of the echidna were common on the resort site and a scat was found in the small grove of *Allocasuarina verticillata* in the middle of the site near the location of the proposed reception area (Fig. 5).

The Heath Goanna is listed as vulnerable under the NPW Act. Diggings of this species were observed on the site (Fig. 6). They are likely to live in the better vegetated areas.

Scarlet Robin (*Petroica boodang campbelli*) is listed as vulnerable under the NPW Act. The sub-species of Scarlet Robin on Kangaroo Island is uncertain but for this purpose we have assumed it is *campbelli*. A robin was observed in bushland on the north eastern side of the property.

3.2.2 Other species of interest

Western Grey Kangaroo (*Macropus fuliginosus*) was sighted on three occasions on the site. Tammar Wallaby (*Macropus eugenii decres*) and Common Brush-tailed Possum (*Trichosurus vulpecula*) scats were also found but no wallabies or possums were sighted. Local residents believe that these species are not over-abundant like other parts of Kangaroo island but do occur. The Common Brush-tail Possum is regarded as rare in SA but not on the island. An introduced cat (*Felis catus*) was observed on the resort site and six house mice (*Mus domesticus*) were captured during trapping.

Other species not seen but likely to be in the area include the Bush Stone curlew and Cape Barren Goose (Appendix 1).

Fig. 2 Glossy Black-Cockatoo chewings below Drooping Sheoak located near the proposed main entrance, conference, bar facilities

Fig. 3 Glossy Black-Cockatoo nest trees (Sugar Gums) located on the eastern side of the development with tin collars to prevent use by Brush-tailed Possums

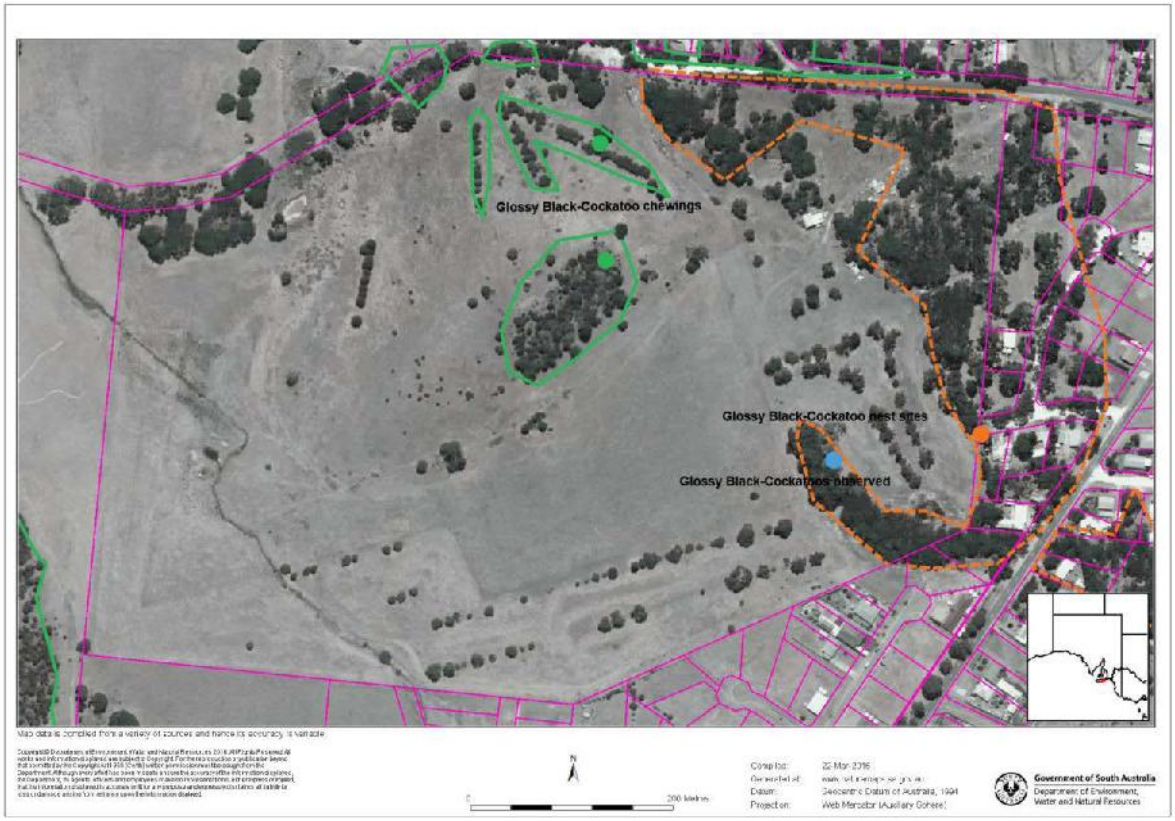

Fig. 4 Map of critical nesting habitat (enclosed by orange dashed line) and feeding habitat (enclosed by green solid line) for the Glossy Black-cockatoo

Fig. 5 Short-beaked Echidna scat among a Drooping Sheoak grove located near the proposed main entrance, conference, bar facilities

Fig. 6 Heath Goanna burrow located to the west of the proposed main entrance, conference, bar facilities

4. DISCUSSION

The site of the proposed resort is mostly cleared farm land on the western side of the American River township, with intact bushland on the eastern side of the property. The close proximity to residential areas means that the additional disturbance is unlikely to create additional significant disturbance to mobile species such as Osprey and the White-bellied Sea-eagle.

The eastern side of the property has areas of mature sugar gum, and patches of original and revegetated Drooping Sheoak (*Allocasuarina verticillata*) provide feeding and breeding habitat for the Glossy Black-Cockatoo. Prior to a threatened species recovery program being implemented, the Glossy Black-Cockatoo population size was estimated at approximately 200 birds. This number was though t to be declining due to habitat loss, possums preying on eggs and nestlings, and competition from honey bees at nest sites. Since the program commenced, numbers of Glossy Black-Cockatoos on the island have steadily increased to over 350 individuals. The American River sub-population consists of 26 adult birds that produced 5 juveniles in 2014 (Berris and Barth 2015). Three nest trees occur on the site in habitat identified as critical breeding habitat.

Sugar Gum in the area should be protected considering the many decades that are needed for a tree to produce suitable nesting hollows. The revegetated Drooping Sheoak area currently used as a food source should be maintained as feeding sites for the birds. This should fit well with the resorts objectives to focus on *promoting conservation tourism, and strengthening populations of threatened local birdlife*. With an informed management strategy which maximizes habitat and minimizes disturbance, and dove-tails with the objectives and activities of the Glossy Black–Cockatoo Recovery Program, the disturbance of the resort should not be significant in the long-term. It is likely that the development stage will cause substantial disturbance and consideration should be given to avoiding the breeding season for structures in close proximity to the nesting sites.

Wide spread sign of the endangered Short-beaked Echidna was found on the property. This species is threatened by habitat fragmentation, road kill, feral pigs, electric fences and cats predating on young (Woinarski *et al*. 2014). Sign of the State listed Heath Goanna was also found in a wide range of habitats. Individuals require large home range areas and termite mounds for nesting purposes and feed on road kill, birds, eggs, small mammals, invertebrates and other reptiles. This species is threatened by clearing, vehicle traffic and predation by cats.

Disturbance during the construction and operational phase of the proposed development could cause significant impact on both the Short-beaked Echidna and the Heath Goanna local population if individuals are harmed, harassed or disturbed. Their distribution and abundance on the site could be enhanced with appropriate revegetation using native species. Traffic speed and behaviour of construction workers, staff and visitors may need to be managed to ensure the foraging and nesting activities of the species are not adversely affected. Cat control on the proposed development site would improve the survival of these and a number of other native species.

No diggings or sign of the Southern Brown Bandicoot were observed during the survey but the species has been recorded in past years within 500 m of the site (Jones *et al*. 2010,

DEWNR BDBSA database). Individuals may use or move through the vegetation on the eastern boundary of the project site, which is physically connected to larger, more intact native vegetation patches. Whilst impact from the proposed development is not considered significant considering the proximity to existing settlement, habitat removal should be limited where possible, and the proposed extensive revegetation using appropriate local native plant species on the site could increase habitat suitability. Patchy low dense heath or grass and shrub cover is required by the species for nesting and protection from predators (Paull 1993).

A number of animal species are listed for the area but are unlikely to occur including the Kangaroo Island Dunnart (*Sminthopsis griseoventer aitkeni*) which is listed as endangered under the EPBC Act. The Kangaroo Island Dunnart has been recorded in a variety of habitats but all the records since the 1970s are from the western end of the island where the vegetation remains more intact (Gates 2009). The species is not considered to be present in the area primarily because of the fragmented nature of the vegetation. The proposed development is unlikely to have an impact on this species.

The site had a good diversity of native bird species, including the Scarlet Robin, which were predominantly located on the eastern side of the property in the bushland and groves of flowering Eucalypt. This vegetation should be protected and enhanced through weed removal and revegetation to strengthen local birdlife.

5. RECOMMENDATIONS

5.1 Legislation and compliance

Once the infrastructure locations for the proposed resort are finalized, submitting an EPBC referral should be undertaken with respect to the Glossy Black-Cockatoo and Short-beaked Echidna.

5.2 Protect and enhance ecological values

Key recommendations for the site of the proposed resort development:

- Major infrastructure development and clearance of native vegetation should not occur on the eastern side of the property where the majority of native species reside which includes habitat for the Heath Goanna, Short-beaked Echidna and bushbirds such as the Scarlet Robin.
- All mature sugar gums on the property should be protected, particularly those where the Glossy Black-Cockatoos roost and breed.
- Avoid the clearance of *Allocasuarina verticullata* which is providing food for the Glossy Black-Cockatoo and revegetate areas with suitable feeding and nesting tree habitat (advice can be gained from Glossy Black Recovery Program, Natural Resources Kangaroo Island, Kingscote).
- Implement an environmental and fire management plan for the entire site which incorporates revegetation and restoration of landscape providing habitat for native species.

- Develop a management plan for construction workers, staff and tourists/visitors to ensure interaction with wildlife, particularly the Heath Goanna, Short-beaked Echidna and the Glossy Black-Cockatoo does not harm species' recovery
- Implement cat management programs to reduce predation on small birds, Heath Goannas, Short-beaked Echidnas and Southern Brown Bandicoots.
- Design windows on buildings to ensure that they do not reflect the landscape, to reduce the potential for bird strike.
- Prohibit pets on the site.
- Limit artificial lighting across the site at night
- Adopt best practice environmental management measures during the construction and operation phases including:
    - vehicles and equipment cleaned to reduce spread of weeds and soil pathogens
    - appropriate waste management
    - protect native vegetation from dumping, trampling and disturbance
    - monitoring the spread of declared and environmental weeds
- Recommendations in relation to the siting of specific developments located on the proposed resort site are included in Table 4.

Table 4 The impact of specific sub-developments across the property and recommendations

Proposed development	Impact	Recommendation
Car access points	Possible clearance of vegetation and habitat for native species including scarlet robin, possible bandicoot habitat	Maintain and improve native vegetation
Buggy access points	Limited	
Main entrance, conference, bar facilities	Limited. Glossy Black-Cockatoo (GBC) feeding area to the east	Maintain and enhance feeding area
Restaurant, pool, terrace	Limited. GBC feeding area to the east	Maintain and enhance feeding area
Wine bar and spa	Located in eastern bushland. Habitat for native species including scarlet robin, possible bandicoot habitat	Consider moving further to the west
Kids club, stables	Limited	
Birdwatching facility	Located within glossy feeding and nesting area	Ensure facility is unobtrusive
Restaurant, garden and wellbeing lodge	Limited	
Cottages	Those proposed east of the creek line are more likely to impact on GBC habitat	Reconsider cottage placement

	The cottages proposed west of the eastern creek line are unlikely to have impact.	
Additional service buildings located on north east boundary	Vegetation clearance and potential for associated disturbance in construction phase	Consider moving these buildings or implement strict environmental management

6. REFERENCES

Atlas of Living Australia website (2016) http://www.ala.org.au/, accessed 17 March 2016.

Baxter C (2015) Birds of Kangaroo Island: a photographic filed guide. Lane Print and Post: Adelaide.

Berris, K. and Barth M. (2015) The South Australian subspecies of the Glossy Black-cockatoo *Calyptorhynchus lathami halmaturinus* Recovery Program: Annual Report 2014. A report by Natural Resources Kangaroo Island for the Kangaroo Island Natural Resources Management Board.

Commonwealth of Australia (2010) Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the *Environment Protection and Biodiversity Conservation* Act (1999) Australian Government Department of Sustainability, Environment, Water, Population and Communities.

Commonwealth of Australia (2011) Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation* Act (1999) Australian Government Department of Sustainability, Environment, Water, Population and Communities.

Commonwealth of Australia (2013) Significant Impact Guidelines 1.1 - Matters of National Environmental Significance, Environment Protection and Biodiversity Conservation Act 1999, Australian Government Department of the Environment, Water, Heritage and the Arts.

Dennis T E, Detmar S A, Brooks A V and Dennis H M (2011a) Distribution and status of the Whitebellied Sea-Eagle *Haliaeetus leucog*aster and Eastern Osprey *Pandion cristatus* populations in South Australia. *South Australian Ornithologist* **37**, 1–16.

Dennis TE, McIntosh RR and Shaughnessy PD (2011b) Effects of human disturbance on productivity of White-bellied Sea-Eagles *Haliaeetus leucogaster*. *Emu* **111**, 179–185.

Dennis, T E and Baxter C I (2006) The Status of the White-bellied Sea-eagle and Osprey on Kangaroo Island in 2005. *South Australian Ornithologist* **35**, 47-51.

Department of Environment, Water and Natural Resources (2016) NatureMaps Online,

http://www.naturemaps.sa.gov.au/, accessed 17 March 2016.

Department of the Environment (2016) EPBC Act Protected Matters Report, generated 17/3/16.

Gates J A (2009) Recovery Plan for the Kangaroo Island Dunnart *Sminthopsis aitkeni*. Department for Environment and Heritage, South Australia.

Gillam S and Urban R (2014) Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Kangaroo Island NRM Region. Department of Environment, Water and Natural Resources South Australia.

Glossy Black-Cockatoo recovery program. http://www.naturalresources.sa.gov.au/kangarooisland/plants-and-animals/native-animals/glossy-black-cockatoo-recovery.

Green, B, Rismiller, PD and McKelvey M. (2000) Behaviour and energetics of hatchling *Varanus rosenbergi*. *Mertensiella* **11**, 105-112.

Haby M and Rowley D. (2016) Native Vegetation Assessment, Kangaroo Island Resort American River. Report to Co City & Central Consulting Pty Ltd.

Jones SJ, Mooney T, Ross J and Pisanu, P. (2010) The distribution and ecology of threatened small mammals on Kangaroo Island. Department for Environment and Heritage, Kingscote, SA.

Paull DJ (1995) The distribution of the southern brown bandicoot (*Isoodon obesulus obesulus*) in South Australia. *Wildlife Research* **22**, 585-600.

Paull DJ (1993) The distribution, ecology and conservation of the Southern Brown Bandicoot (*Isoodon obesulus obesulus*) in South Australia. Master of Arts thesis. University of Adelaide.

Rismiller, P. (1999) *The echidna: Australia's enigma*. Hugh Lauter Levin Associates,

Robinson A and Armstrong D (Eds) (1999) A Biological Survey of Kangaroo Island South Australia 1989 and 1990, Department for Environment, Heritage and Aboriginal Affairs, South Australia.

Willoughby N, Oppermann A and Innes R W (2001) Biodiversity Plan for Kangaroo Island, South Australia, Department for Environment and Heritage, South Australia.

Woinarski, JCZ, Burbidge AA and Harrison PL (2014) The action plan for Australian mammals. CSIRO Publishing, Collingwood.

7. APPENDICES

Appendix 1. Fauna list of species which could possibly be in the area.

Databases: Birdlife Australia Atlas, Biological Database of South Australia and Baxter (2015). Regional significance (Gillan and Urban 2014).

SPECIES	COMMON NAME	Conservation significance			TREND
		EPBC Status	NPW Act	Regional	
Acanthiza lineata	Striated Thornbill			LC	Stable/No Change
Acanthiza pusilla	Brown Thornbill			LC	Stable/No Change
Acanthorhynchus tenuirostris	Eastern Spinebill			LC	Stable/No Change
Accipiter cirrocephalus	Collared Sparrowhawk			LC	Stable/No Change
Accipiter fasciatus	Brown Goshawk			RA	Stable/No Change
Acrocephalus australis	Australian Reed Warbler			NT	Stable/No Change
Actitis hypoleucos	Common Sandpiper		R	CR	Stable/No Change
Aegotheles cristatus	Australian Owlet-nightjar			VU	Data Deficient
Alauda arvensis	Eurasian Skylark			IN	Introduced resident
Anas castanea	Chestnut Teal			LC	Stable/No Change
Anas gracilis	Grey Teal			LC	Stable/No Change
Anas rhynchotis	Australasian Shoveler		R	RA	Stable/No Change
Anas superciliosa	Pacific Black Duck			LC	Stable/No Change
Anhinga novaehollandiae	Australasian Darter		R	RA	Data Deficient
Anthochaera carunculata	Red Wattlebird			LC	Stable/No Change
Anthochaera chrysoptera	Little Wattlebird			RA	Probable Decline
Anthus australis	Australian Pipit			LC	Stable/No Change
Apus (Hirundapus) caudacutus	White-throated Needletail			CR	Definite Decline
Apus pacificus	Fork-tailed Swift			RA	Probable Decline
Aquila audax	Wedge-tailed Eagle			LC	Stable/No Change
Ardea alba	Great Egret			RA	Stable/No Change

Ardea ibis	Cattle Egret		R	RA	Stable/No Change
Arenaria interpres	Ruddy Turnstone		R	EN	Definite Decline
Artamus cyanopterus	Dusky Woodswallow			LC	Stable/No Change
Aythya australis	Hardhead			LC	Stable/No Change
Biziura lobata	Musk Duck		R	RA	Stable/No Change
Botaurus poiciloptilus	Australian Bittern	EN		VU	Nonbreeding Vagrant CB 2015
Bubulcus coromandus	Eastern Cattle Egret				Non-breeding visitor CB 2015
Burhinus grallarius	Bush Stonecurlew		R	NT	Stable/No Change
Cacatua galerita	Sulphur-crested Cockatoo			EN	Probable Decline
Cacatua sanguinea	Little Corella			LC	Definite Increase
Cacomantis flabelliformis	Fan-tailed Cuckoo			LC	Stable/No Change
Calamanthus (Hylacola) cautus	Shy Heathwren		R	RA	Stable/No Change
Calidris acuminata	Sharp-tailed Sandpiper			VU	Definite Decline
Calidris alba	Sanderling		R	RA	Data Deficient
Calidris canutus	Red Knot			EN	Data Deficient
Calidris ferruginea	Curlew Sandpiper			EN	Definite Decline
Calidris hypoleucos	Common Sandpiper	CE			Non-breeding visitor CB 2015
Calidris melanotos	Pectoral Sandpiper		R	RA	Data Deficient
Calidris ruficollis	Red-necked Stint			RA	Probable Decline
Calidris subminuta	Long-toed Stint		R	CR	Data Deficient
Calidris tenuirostris	Great Knot		R	EN	Data Deficient
Calyptorhynchus funereus	Yellow-tailed Black Cockatoo		V	RA	Probable Decline
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island ssp)	EN	E	EN	Probable Increase
Carduelis carduelis	European Goldfinch			IN	Introduced resident CB 2015
Cereopsis novaehollandiae	Cape Barren Goose		R	RA	Stable/No Change
Chalcites basalis	Horsfield's Bronze Cuckoo			LC	Stable/No Change
Chalcites lucidus	Shining Bronze Cuckoo			NT	Stable/No Change
Charadrius bicinctus	Double-banded Plover			EN	Data Deficient
Charadrius leschenaulti	Greater Sand Plover				Northern Hemisphere migrant CB2015

Charadrius mongolus	Lesser Sand Plover				Non-breeding visitor CB 2015
Charadrius ruficapillus	Red-capped Plover			LC	Stable/No Change
Chenonetta jubata	Maned (Australian Wood Duck)			LC	Probable Increase
Chlidonias hybridus	Whiskered Tern			RA	Data Deficient
Chlidonias leucopterus	White-winged Tern				Northern Hemisphere migrant CB2015
Chroicocephalus novaehollandiae	Silver Gull			LC	Stable/No Change
Circus approximans	Swamp Harrier			VU	Stable/No Change
Circus assimilis	Spotted Harrier			RA	Stable/No Change
Cladorhynchus leucocephalus	Banded Stilt		V	NT	Stable/No Change
Colluricincla harmonica	Grey Shrikethrush			LC	Stable/No Change
Columba livia	Rock Dove			IN	Introduced exotic resident CB 2015
Coracina novaehollandiae	Black-faced Cuckooshrike			LC	Stable/No Change
Corvus coronoides	Australian Raven			NT	Stable/No Change
Corvus mellori	Little Raven			LC	Probable Increase
Coturnix pectoralis	Stubble Quail			LC	Stable/No Change
Coturnix ypsilophora	Brown Quail		V	RA	Probable Increase
Cygnus atratus	Black Swan			LC	Stable/No Change
Dacelo novaeguineae	Laughing Kookaburra			IN	Resident introduced native CB 2015
Egretta garzetta	Little Egret		R	RA	Probable Increase
Egretta novaehollandiae	White-faced Heron			LC	Stable/No Change
Egretta sacra	Eastern Reef Egret		R	RA	Stable/No Change
Elanus axillaris	Black-shouldered Kite			LC	Definite Increase
Elseyornis melanops	Black-fronted Dotterel			RA	Stable/No Change
Eolophus roseicapilla	Galah			LC	Stable/No Change
Epthianura albifrons	White-fronted Chat			LC	Stable/No Change
Eudyptula minor	Little Penguin			EN	Definite Decline
Falco berigora	Brown Falcon			LC	Definite Increase
Falco cenchroides	Nankeen Kestrel			LC	Stable/No Change
Falco longipennis	Australian Hobby			RA	Data Deficient
Falco peregrinus	Peregrine Falcon		R	VU	Stable/No Change

Falco subniger	Black Falcon				Vagrant rare CB 2015
Fulica atra	Eurasian Coot			LC	Stable/No Change
Gallinago hardwickii	Latham's Snipe		R	CR	Data Deficient
Gallinula tenebrosa	Dusky Moorhen			VU	Stable/No Change
Gallirallus philippensis	Buff-banded Rail			RA	Data Deficient
Gliciphila melanops	Tawny-crowned Honeyeater			NT	Stable/No Change
Glossopsitta concinna	Musk Lorikeet				Vagrant CB 2015
Glossopsitta porphyrocephala	Purple-crowned Lorikeet			LC	Stable/No Change
Glossopsitta pusilla	Little Lorikeet		E	RE	Not listed in CB 2015
Grallina cyanoleuca	Magpielark			LC	Stable/No Change
Gymnorhina tibicen	Australian Magpie			LC	Stable/No Change
Haematopus fuliginosus	Sooty Oystercatcher		R	RA	Stable/No Change
Haematopus longirostris	Australian Pied Oystercatcher		R	RA	Stable/No Change
Haliaeetus leucogaster	White-bellied Sea-Eagle		E	CR	Definite Decline
Himantopus leucocephalus (himantopus)	Black-winged Stilt			LC	Stable/No Change
Hirundo neoxena	Welcome Swallow			LC	Stable/No Change
Hydroprogne caspia	Caspian Tern			EN	Stable/No Change
Larus pacificus	Pacific Gull			VU	Stable/No Change
Lewinia pectoralis	Lewin's Rail		V	VU	Data Deficient
Lichenostomus cratitius	Purple-gaped Honeyeater			LC	Stable/No Change
Limosa lapponica	Bar-tailed Godwit			CR	Data Deficient
Malacorhynchus membranaceus	Pink-eared Duck			LC	Stable/No Change
Malurus cyaneus	Superb Fairywren			LC	Stable/No Change
Megalurus gramineus	Little Grassbird			NT	Stable/No Change
Melithreptus brevirostris	Brown-headed Honeyeater			LC	Stable/No Change
Melithreptus lunatus	White-naped Honeyeater			RA	Stable/No Change
Microcarbo melanoleucos	Little Pied Cormorant			LC	Stable/No Change
Mirafra javanica	Horsfield's Bush Lark			RA	Data Deficient

Myiagra cyanoleuca	Satin Flycatcher				Vagrant Non-breeding Rare CB 2015
Myiagra inquieta	Restless Flycatcher		R	VU	Data Deficient
Neochmia temporalis	Red-browed Finch			LC	Stable/No Change
Neophema elegans	Elegant Parrot		R	RA	Probable Decline
Neophema petrophila	Rock Parrot		R	RA	Stable/No Change
Nesoptilotis leucotis	White-eared Honeyeater			NT	Stable/No Change
Ninox novaeseelandiae	Southern Boobook			LC	Stable/No Change
Numenius madagascariensis	Far Eastern Curlew	CE	V	CR	Definite Decline
Numenius phaeopus	Whimbrel		R	CR	Data Deficient
Nycticorax caledonicus	Nankeen Night Heron			VU	Stable/No Change
Oxyura australis	Blue-billed Duck		R	RA	Stable/No Change
Pachycephala pectoralis	Golden Whistler			LC	Stable/No Change
Pandion crisitatus haliaetus	Osprey		E	CR	Stable/No Change
Pardalotus punctatus	Spotted Pardalote			LC	Stable/No Change
Pardalotus striatus	Striated Pardalote			LC	Stable/No Change
Passer domesticus	House sparrow			IN	Introduced exotic common CB 2015
Pavo cristatus	Indian Peafowl			IN	Introduced exotic patchy CB 2015
Pelecanus conspicillatus	Australian Pelican			VU	Stable/No Change
Petrochelidon nigricans	Tree Martin			LC	Stable/No Change
Petroica boodang	Scarlet Robin			NT	Stable/No Change
Phalacrocorax carbo	Great Cormorant			RA	Stable/No Change
Phalacrocorax fuscescens	Black-faced Cormorant			LC	Stable/No Change
Phalacrocorax melanoleucos	Little Pied Cormorant				Common Resident CB 2015
Phalacrocorax sulcirostris	Little Black Cormorant			NT	Stable/No Change
Phalacrocorax varius	Pied Cormorant			LC	Stable/No Change
Phaps chalcoptera	Common Bronzewing			LC	Probable Increase
Phaps elegans	Brush Bronzewing			NT	Stable/No Change
Phylidonyris novaehollandiae	New Holland Honeyeater			LC	Stable/No Change

Phylidonyris pyrrhopterus	Crescent Honeyeater			LC	Stable/No Change
Platalea flavipes	Yellow-billed Spoonbill			RA	Probable Increase
Platalea regia	Royal Spoonbill			RA	Probable Increase
Platycercus elegans	Crimson Rosella			LC	Stable/No Change
Pluvialis fulva	Pacific Golden Plover		R	CR	Definite Decline
Pluvialis squatarola	Grey Plover			EN	Stable/No Change
Poliocephalus poliocephalus	Hoary-headed Grebe			LC	Stable/No Change
Porphyrio porphyrio	Purple Swamphen			VU	Stable/No Change
Porzana fluminea	Australian Spotted Crake			NT	Stable/No Change
Porzana pusilla	Baillon's Crake			VU	Data Deficient
Porzana tabuensis	Spotless Crake		R	VU	Data Deficient
Psophodes nigrogularis lashamri	Western Whipbird (Kangaroo Island ssp)		R	RA	Data Deficient
Recurvirostra novaehollandiae	Red-necked Avocet			RA	Data Deficient
Rhipidura albiscapa	Grey Fantail			LC	Stable/No Change
Rhipidura leucophrys	Willie Wagtail			LC	Stable/No Change
Sericornis frontalis	White-browed Scrubwren			LC	Stable/No Change
Stagonopleura bella	Beautiful Firetail		R	NT	Stable/No Change
Sternula nereis	Fairy Tern	V	E	CR	Definite Decline
Stictonetta naevosa	Freckled Duck		V	RA	Stable/No Change
Stipiturus malachurus halmaturinus	Southern Emu-wren (Kangaroo Island ssp)		R	RA	Stable/No Change
Strepera versicolor	Grey Currawong			LC	Stable/No Change
Tachybaptus novaehollandiae	Australasian Grebe			LC	Stable/No Change
Tadorna tadornoides	Australian Shelduck			LC	Stable/No Change
Thalasseus bergii	Greater Crested Tern			LC	Stable/No Change
Thinornis rubricollis	Hooded Plover	V	V	EN	Probable Decline
Threskiornis moluccus	Australian White Ibis			LC	Definite Increase
Threskiornis spinicollis	Straw-necked Ibis			RA	Definite Increase
Todiramphus sanctus	Sacred Kingfisher			RA	Stable/No Change
Tribonyx ventralis	Black-tailed Nativehen			LC	Stable/No Change
Trichoglossus haematodus	Rainbow Lorikeet			LC	Stable/No Change
Tringa brevipes	Grey-tailed Tattler		R	CR	Definite Decline

Tringa glareola	Wood Sandpiper		R	CR	Data Deficient
Tringa nebularia	Common Greenshank			EN	Stable/No Change
Tringa stagnatilis	Marsh Sandpiper				Northern Hemisphere mirgant CB2015
Turdus merula	Common Blackbird			IN	Introduced common CB 2015
Turnix varia	Painted Buttonquail		R	EN	Definite Decline
Tyto alba (delicatula)	Eastern Barn Owl			LC	Probable Increase
Vanellus miles	Masked Lapwing			LC	Stable/No Change
Vanellus tricolor	Banded Lapwing			RA	Stable/No Change
Xenus cinereus	Terek Sandpiper				migrant Nonbreeding CB 2015
Zoothera lunulata	Bassian Thrush	V	R	VU	Probable Decline
Zosterops lateralis	Silvereye			LC	Stable/No Change
Cercartetus concinnus	Western Pygmy-possum			LC	Data Deficient
Sminthopsis aitkeni	Kangaroo Island Dunnart	EN	E	CR	Probable Decline
Macropus eugenii decres	Tammar Wallaby			LC	Data Deficient
Macropus fuliginosus	Western Grey Kangaroo			LC	Data Deficient
Austronomus (Tadarida) australis	White-striped Free-tailed Bat			DD	Data Deficient
Mormopterus planiceps	Southern Free-tailed Bat			DD	Data Deficient
Pseudomys shortridgei	Heath Mouse	VU	E	CR	Data Deficient
Rattus fuscipes	Bush Rat			LC	Stable/No Change
Rattus lutreolus	Swamp Rat		R	VU	Data Deficient
Ornithorhynchus anatinus	Platypus	VU	E	VU IN	Introduced native
Arctocephalus forsteri	New Zealand Fur Seal (Australasian Fur Seal)			LC	Definite Increase
Arctocephalus pusillus	Australian Fur Seal (Brown Fur Seal)		R	RA	Probable Increase
Arctocephalus tropicalis	Subantarctic Fur Seal	VU	E	RA	Probable Increase
Neophoca cinerea	Australian Sea Lion	VU	V	VU	Stable/No Change
Isoodon obesulus obesulus	Southern Brown Bandicoot (SA mainland and KI ssp)	EN	V	NT	Data Deficient
Trichosurus vulpecula	Common Brushtail Possum		R	LC	Stable/No Change

Phascolarctos cinereus	Koala			LC IN	Introduced native
Tachyglossus aculeatus multiaculeatus	Short-beaked Echidna	EN		NT	Definite Decline
Chalinolobus gouldii	Gould's Wattled Bat			LC	Data Deficient
Chalinolobus morio	Chocolate Wattled Bat			LC	Data Deficient
Nyctophilus geoffroyi	Lesser Long-eared Bat			LC	Data Deficient
Vespadelus darlingtoni	Large Forest Bat			DD	Data Deficient
Vespadelus regulus	Southern Forest Bat			LC	Data Deficient
Vespadelus vulturnus	Little Forest Bat			DD	Data Deficient
Felis catus	Cat			IN	Introduced exotic
Mus domesticus	House mouse			IN	Introduced exotic
Ratus ratus	Black rat			IN	Introduced exotic
Pseudocheirus peregrinus	Common Ringtail Possum			IN	Introduced native
Crinia signifera	Common Froglet			LC	Stable/No Change
Limnodynastes dumerilii	Banjo Frog			LC	Stable/No Change
Limnodynastes tasmaniensis	Spotted Marsh Frog			LC	Stable/No Change
Litoria ewingii	Brown Tree Frog			LC	Stable/No Change
Neobatrachus pictus	Burrowing frog			LC	Stable/No Change
Pseudophryne bibronii	Brown Toadlet		R	DD	Data Deficient
Ctenophorus decresii	Tawny Dragon			RA	Stable/No Change
Pogona barbarata	Eastern Bearded Dragon			IN	Introduced native
Nephrurus milii	Barking Gecko			LC	Stable/No Change
Chelodina longicollis	Common Long-necked Tortoise			IN	Introduced native
Caretta caretta	Loggerhead Turtle	EN			
Chelonina mydas	Green Turtle	V			
Dermochelys coriacea	Leathery Turtle	EN			
Austrelaps labialis	Pygmy Copperhead			LC	Stable/No Change
Notechis scutatus	Eastern Tiger Snake			LC	Stable/No Change
Christinus (Phyllodactylus) marmoratus	Marbled Gecko			LC	Stable/No Change
Aprasia striolata	Lined Worm-lizard			LC	Stable/No Change

Bassiana duperreyi	Eastern Three-lined Skink			LC	Stable/No Change
Hemiergis decresiensis	Three-toed Earless Skink			LC	Stable/No Change
Hemiergis peronii	Four-toed Earless Skink			LC	Stable/No Change
Lampropholis guichenoti	Garden Skink			LC	Stable/No Change
Lerista bougainvillii	Bougainville's Skink			LC	Stable/No Change
Lerista dorsalis	Southern Four-toed Slider			RA	Stable/No Change
Liopholis (Egernia) multiscutata	Bull Skink			RA	Stable/No Change
Liopholis (Egernia) whitii	White's Skink			LC	Stable/No Change
Menetia greyii	Dwarf Skink			RA	Stable/No Change
Morethia obscura	Mallee Snake-eye			LC	Stable/No Change
Pseudemoia entrecasteauxii	Southern Grass Skink			RA	Stable/No Change
Tiliqua spp	Blue tongue Lizard			IN	Introduced native
Varanus rosenbergi	Heath Goanna		V	NT	Definite Decline

Appendix 2: Species found during the field work undertaken on the proposed site and surrounds.

The numbers relate to the number of surveys on which a species was detected.

Conservation status codes

Aus: Australia (Environment Protection and Biodiversity Conservation Act 1999). **SA**: South Australia (National Parks and Wildlife Act 1972). **KI** regional classification.

Conservation Codes: **CE**: Critically Endangered. **EN**, Vulnerable **VU RA**: Rare. ssp.: the conservation status applies at the sub-species level.

Mi(W): listed as migratory wetland species under the EPBC Act. **Ma**: listed as marine under the EPBC Act.

Scientific name	Common name	Conservation status			Number
		Aus	SA	KI	
Bird					
Acanthiza pusilla	Brown Thornbill			LC	4
Acanthiza lineata	Striated Thornbill			LC	2
Acanthorhynchus tenuirostris	Eastern Spinebill			LC	2
Anthochaera carunculata	Red Wattlebird			LC	4
Aquila audax	Wedge-tailed Eagle			LC	1
Calyptorhynchus lathami	Glossy Black-Cockatoo	EN	EN	EN	3
**Carduelis carduelis*	European Goldfinch			IN	1
Chroicocephalus novaehollandiae	Silver Gull			LC	5
Coracina novaehollandiae	Black-faced Cuckoo-shrike			LC	2
Corvus mellori	Little Raven			LC	4
Corvus coronoides	Australian Raven			NT	1
**Dacelo novaeguineae*	Laughing Kookaburra			IN	2
Eolophus roseicapilla	Galah			LC	4
Elanus axillaris	Black-shouldered Kite			LC	1
Falco cenchroides	Nankeen Kestrel			LC	1
Grallina cyanoleuca	Magpielark			LC	1
Gymnorhina tibicen	Australian Magpie			LC	4
Glossopsitta porphyrocephala	Purple-crowned Lorikeet			LC	1
Haliaeetus leucogaster	White-bellied Sea-Eagle		EN	CR	
Hirundo neoxena	Welcome Swallow			LC	3
Malurus cyaneus	Superb Fairywren			LC	4
Neochmia temporalis	Red-browed Finch			LC	1

Ninox novaeseelandiae	Southern Boobook			LC	1
Pardalotus striatus	Striated Pardalote			LC	3
Petroica boodang	Scarlet Robin		VU	NT	1
Phylidonyris novaehollandiae	New Holland Honeyeater			LC	4
Phylidonyris pyrrhopterus	Crescent Honeyeater			LC	4
Platycercus elegans	Crimson Rosella			LC	2
Rhipidura albiscapa	Grey Fantail			LC	2
Sericornis frontalis	White-browed Scrubwren			LC	2
Strepera versicolor	Grey Currawong			LC	4
* *Sturnus vulgaris*	Common Starling			IN	1
Threskiornis molucca	Australian White Ibis			LC	2
Trichoglossus haematodus	Rainbow Lorikeet			LC	4
* *Turdus merula*	Common Blackbird			IN	1
Tyto javanica	Eastern Barn Owl			LC	1
Vanellus miles	Masked Lapwing			LC	3
Zosterops lateralis	Silvereye			LC	4
Mammals					
**Felis catus*	Cat			IN	1
**Mus musculus*	House Mouse			IN	8
Tachyglossus aculeatus	Short-beaked Echidna	EN		NT	P
Macropus eugenii	Tammar Wallaby			LC	P
Macropus fuliginosus	Western Grey Kangaroo			LC	3
Reptile					
Varanus rosenbergi	Heath Goanna		V	NT	P

American River Project

Preliminary Archaeological and Cultural Heritage Investigation

March 2016
Keryn Walshe
(PhD, Principal Researcher, Archaeology, SA Museum)

note this report has been amended in 09/16 by PARTI to reflect a reduced scheme.

Contents

1. Summary of finds and recommendations

Current Status of Aboriginal Heritage in the ARP:

- No records of Aboriginal sites or objects and
- No finds recorded during a pedestrian survey across the proposed ARP.

Potential Status of Aboriginal Heritage in the ARP:

- Very low probability of Aboriginal sites or objects, including burials, to be found during earth moving.

Recommendations for Aboriginal Heritage in the ARP:

- Identify consultative party prior to construction or earth moving works and
- Develop into the on-site induction a response to any finds, including burials.

Current Status of Non-Aboriginal Heritage in the ARP:

- Historic listing under the Register of the National Estate (plaque and anchor on Tangara Dr) and
-

Recommendations for Non-Aboriginal Heritage in the ARP:

- Avoid and safeguard the historic listing during construction phase and
- Develop a management plan in liaison with DEWNR for the reported maritime site if confirmation is positive.

2. American River Project

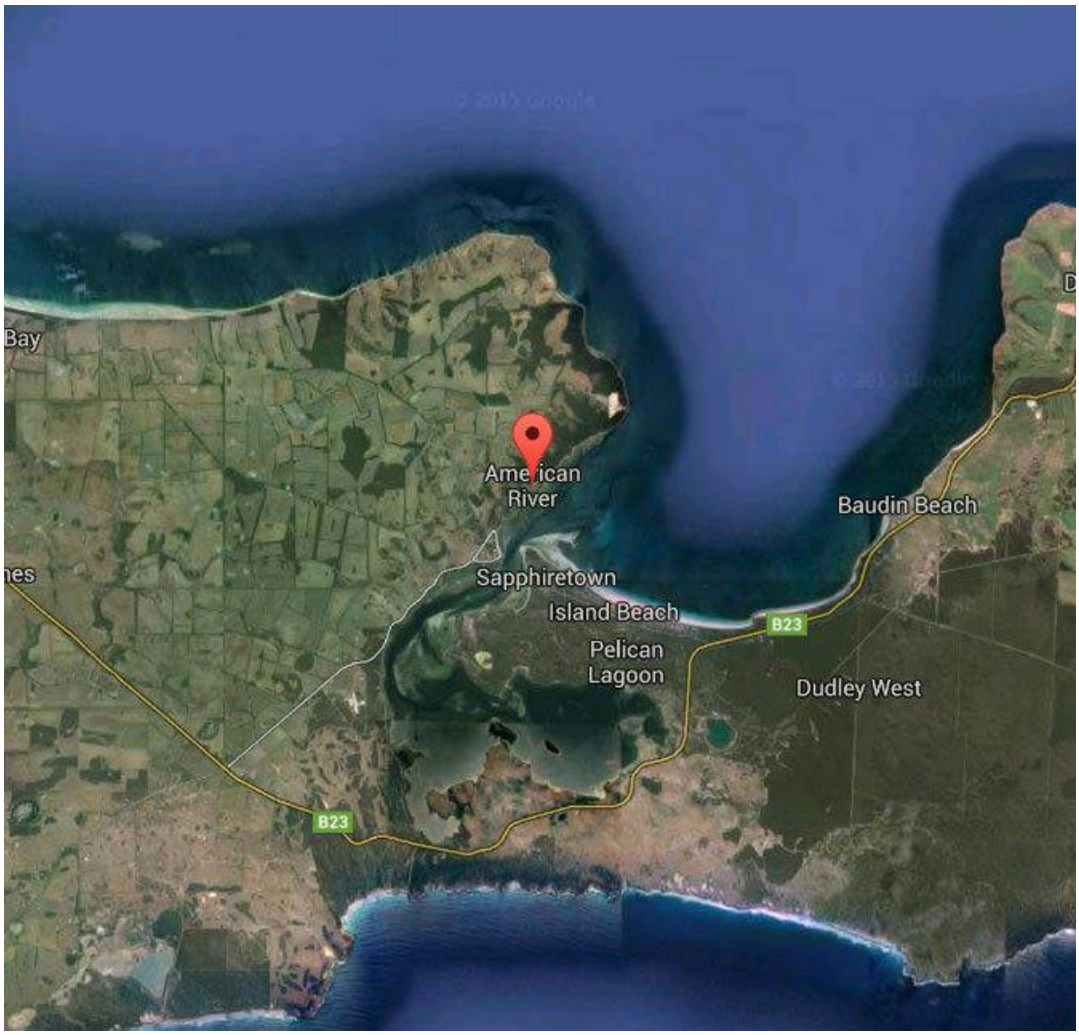

Fig 1: Project Location- American River, Kangaroo Island

The 'American River Project' (ARP) proposes to construct a tourist resort on privately owned land above the water front at American River, Kangaroo Island (Figures 1 and 2).

Figure 2: Site proposed for the American River Project.

Prior to final development approval the ARP is required to respond to a number of issues, including heritage:

The proposal is to be developed cognisant of, and in a manner which makes a positive contribution to the social fabric of American River and Kangaroo Island. The proposal is developed in a manner respectful of Aboriginal Heritage and Native Title rights and interests, consistent with relevant legislative requirements.

In order for the proponent to respond to this request, a number of PER guidelines were provided by DPTI in response to the ARP application. This are;

- Identify the impact on the heritage significance of any known heritage places on or adjacent to the site, including National, State or local heritage places entered on the South Australian Heritage Register, or identified after consultation with the Heritage Branch of the Department for Environment, Water and Natural Resources.
- Describe measures to protect any sites of non-indigenous heritage and historic shipwrecks within the declared area during construction, in accordance with the Heritage Act 1993 and the Historic Shipwrecks Act 1981.

- Describe the measures taken to identify and record any Aboriginal sites, objects or remains, including consultation details with relevant Aboriginal parties during the preparation and development of the assessment document.
- Detail measures to ensure compliance with the Aboriginal Heritage Act 1988, including plans for the possible discovery of Aboriginal ancestral remains and any Aboriginal sites or objects of archaeological, anthropological or historical significance under the Aboriginal Heritage Act 1988.
- Identify any Native Title issues in respect of the requirements of the Native Title Act 1993 (Commonwealth) and the Native Title Act 1994 (South Australia).
- Describe the impact on the appropriate Native Title Claimants and the consequent impact on the potential ongoing enjoyment of native title rights and interests by native title holders.

A preliminary archaeological and cultural heritage investigation was undertaken in order to address these guidelines. This investigation involved a desktop survey of registered or reported heritage sites, places and features in the proposed AMR and a ground archaeological survey of the AMR land parcel. The results of this investigation form the focus of this report and importantly, the PER guidelines have shaped its format.

3. PER Heritage Guidelines

1a. Impact on the heritage significance of any known heritage places on or adjacent to the site, including National, State or local heritage places entered on the South Australian Heritage Register, or identified after consultation with the Heritage Branch of the Department for Environment, Water and Natural Resources.

The South Australia Heritage Places Database; Australian Heritage Database and the Australian Places Inventory were searched. Seven listed places were identified for American River and are presented in Table 1.

ID	Address	Details	Class	SHP No.	Council Ref.
16015	Near American River	D'Estrees Bay Whaling Station	State	1422	
16016	Pelican Lagoon	Threshing Floor	State	14737	
20608	Redbanks Road	House (former school)	Local		AR01
20609	Ryberg Road	House	Local		AR02
20610	Scenic Dr	Art Gallery/Tea Rooms	Local		AR03
20611	Scenic Dr	Shop (former general store)	Local		AR04
20615	Wattle Ave / Ryberg Rd	Memorial Hall	Local		AR08

Table 1: Heritage Places Databases (State and Local)

The Register of the National Estate (RNE) was also searched and found to hold no relevant listings.

The Uniting Church on Scenic Dr was registered as an indicative place for its novel combination of accepted church form with Australian rural vernacular.

All listings on the RNE are non-statutory archives.

1b. Describe measures to protect any sites of non-indigenous heritage and historic shipwrecks within the declared area during construction, in accordance with the Heritage Act 1993 and the Historic Shipwrecks Act 1981.

The seven heritage places listed in Table 1 above are outside of the proposed development boundary and therefore will not be impacted by the development proposal.

2a. Measures to identify and record any Aboriginal sites, objects or remains, including consultation details with relevant Aboriginal parties during the preparation and development of the assessment document.

A search was made of the South Australia Museum (SAM) Archaeology Site Cards, the SAM Archaeology database and the SAM Human Biology database. This search did not reveal any listings for the proposed development area. A request for data from the Register of Sites and Objects maintained by Aboriginal Affairs and Reconciliation under the Aboriginal Heritage Act, SA, 1988, is yet to be made.

A pedestrian survey of the proposed development area was undertaken on 17th March 2016. This survey did not locate any sites or objects as described under the Aboriginal Heritage Act, SA, 1988. Details of this survey are given in Appendix One of this report.

An amendment to the Aboriginal Heritage Act, SA, 1988, has recently been tabled in Parliament. This amendment has significant outcomes for undertaking consultation with Aboriginal parties. In view of this recent amendment and in view of the preliminary nature of this report, it was not appropriate to undertake consultation at this stage.

2b. Measures ensuring compliance with the Aboriginal Heritage Act 1988, including plans for the possible discovery of Aboriginal ancestral remains and any Aboriginal sites or objects of archaeological, anthropological or historical significance under the Aboriginal Heritage Act 1988.

No Aboriginal archaeological sites or objects are listed in the SAM systems and no such sites or objects were recorded during a recent pedestrian survey (Appendix One). The *Register of Sites and Objects* administered by AAR is yet to be formally searched. Such requests require considerable time frames to be available and in view of the preliminary nature of this report, this action will be completed in the near future. At this stage, it is considered a very low probability that a site(s) or object(s) is registered or reported in the development area due to the absence of such mention in the SAM Archaeology cards and databases. In 1988, the SAM data provided the foundation for the *Register of Sites and Objects* to be established. Given the undeveloped nature of the ARP area, it is unlikely that a site or object has been surveyed since 1988.

The pedestrian survey (Appendix One) revealed a very low probability for sites or objects, including burials, to be discovered during earth moving activities. There are no burials listed for Kangaroo Island and it is highly unlikely that any burials will be discovered in this proposed development area given the nature of the substrate, which is a coarse grained siltstone. The siltstone is visibly outcropping on the eroded slopes and higher elevations and is also visible at lower levels around dams and watercourses. This indicates that the different heights are reliant on the underlying bedrock which is close to the surface at all times. Poor soil development over the bedrock is obvious and in all this matrix is not conducive for digging. The SAM database of human biology (burial finds) clearly indicates that sandy environments were typically selected for the ease of digging. The water courses in the ARP offer a better environment for burials, but as mentioned above the bedrock here is also close to the surface. Additionally no burial has been recorded for Kangaroo Island and it is unlikely given the time span since occupation (approximately 5,000 years).

The pedestrian survey noted numerous veins of milky white quartz of varying thickness wedged between outcropping bedrock. The quartz is naturally fracturing and moving down resulting in a considerably amount of small pieces of quartz lining watercourses. Quartz was selected for stone tool knapping during the peak of Aboriginal occupation on Kangaroo Island has been dated to range from 20,000 to 5,000 years ago (Lampert 1981) but quartz was also used in more recent occupation by Aboriginal people working and living with whalers

and sealers (Walshe 2014). Despite the abundance of quartz in the water courses in the southwest area of the AMR, no conchoidally fractured quartz was observed (see Appendix One). It is considered a very low probability therefore, for any sites or objects to be discovered during the proposed development works.

There is no legislative requirement for further archaeological survey work and given the very low probability for sites (including burials) or objects to be discovered in the proposed development area, further survey and monitoring during earth moving is not recommended. It is recommended that the earth moving crews be inducted on the possibility of an Aboriginal object being found and the response to that (Appendix Two).

If the Aboriginal Heritage (Miscellaneous) Amendment Bill 2016 proceeds and if under that Bill a Registered Aboriginal Party is appointed for Kangaroo Island, then it is recommended that the proponent establish a consultative process with that Party so that any other Aboriginal cultural heritage concerns can be identified.

3a. Native Title issues in respect of the requirements of the Native Title Act 1993 (Commonwealth) and the Native Title Act 1994 (South Australia).

There is no native title grant or application over the proposed development area. Further, it is unlikely that a claim under the Native Title Act 1994 will be made given the lack of continuous occupation on Kangaroo Island.

3B. Impact on the appropriate Native Title Claimants and the consequent impact on the potential ongoing enjoyment of native title rights and interests by native title holders.

Not relevant given 3a above.

4. Summary of response to PER Guidelines

Aboriginal Heritage-

- no sites or objects in the ARP area

Potential for finding Aboriginal sites (including burials) or objects-

- very low to nil

Native Title issues-

- no native title claim determined, pending or likely

Aboriginal Heritage consultation-

- pending establishment of registered Aboriginal Part under *Amendment Bill*, 2016.

Non-Aboriginal Heritage-

- no historic listing (non-statutory archived)
-

Future non-Aboriginal Heritage issues-

- Offer protection to historic entry
-

Appendix One- Archaeological Survey of Proposed American River Project

Aim: to record any visible archaeological surface sites or objects in the proposed American River Project development area.

Methodology: The sites and objects survey was undertaken on foot. In the usual manner, areas of ground with higher visibility were selected over areas with low visibility. This generated a strategic focus on vehicle and animal tracks; water courses; tree swept surfaces; rock outcrops and fence lines.

Areas with dense grass cover (as shown in Plate 1) offered low visibility and were omitted from the strategic survey.

Plate 1: Example of limited visibility.

Plate 2: Example of higher visibility near eroded water courses.

Survey Results: No Aboriginal archaeological sites or objects were identified during the pedestrian survey.

Plate 3: outcropping siltstone bedrock..

Discussion: The survey identified areas of outcropping rock, including quartz, particularly on the high elevations. These did not offer signs of cultural modification. Despite veins of quartz being visible and extractable from between layers of bedrock, as shown in Plate 4, the quartz did not offer any evidence for cultural modification or quarrying.

Plate 4: quartz vein fracturing out..

Quartz has naturally formed within the bedrock and as the bedrock is exposed and breaks down, the quartz is also breaking down. There is a good deal of quartz that has been shifted downslope by water and found its way into the creeks dominating the southwest section of the proposed development area. The creek

bed and banks are eroded, thus offering clear visibility of the expansive scatters of highly fragmented quartz that has settled here. Dams expose the underlying bedrock (Plate 5), indicating that the bedrock follows the natural contours from highest to lowest levels.

Plate 5: erosion around dam exposing bedrock.

The debate over field identification of a cultural modified piece of quartz (ie a stone tool) on Kangaroo Island and Australia more generally has been a long and exhaustive one (Kamminga 1982, Walshe 2006, Dendarsky 2001). Essentially, with siliceous material such as quartz, a stone tool is distinguished from a piece of naturally fractured quartz is by the presence of a conchoidal fracture. After examining numerous specimens of quartz in the creek area for conchoidal fractures, none were found to have evidence for cultural modification or use.

The survey also failed to record typical Kangaroo Island larger implements such as hammerstones and choppers. It is unusual for water courses and high points on the Island to be completely devoid of archaeology, however it is not possible to comment on the nature of this absence, as very few large scale and independent surveys have been undertaken across the Island.

Plate 6: example of naturally fractured quartz.

Conclusion: Based on the absence of evidence for sites or objects on the surface of the proposed development area, including the normally higher potential areas such as water courses, it is considered that a very low potential exists for finding sites or objects during earth moving.

The potential for finding burials during earth moving is extremely low. This statement is based on the general absence of burials on Kangaroo Island and the hard, rocky substrate and poor soil development dominating the whole proposed ARP area. Such a matrix is not conducive to digging. Creeks and dams are highly eroded and yet have failed to reveal stone tools or other finds suggesting that even these softer, more 'diggable' zones hold low potential for revealing subsurface finds. This is due to the underlying bedrock being in close proximity to the surface at all contour heights.

References

Dendarsky, M. 2001. Some Preliminary Observations on Subsurface Damage on Experimental and Archaeological Quartz Tools using CLSM and Dye. *Journal of Archaeological Science* 28:1149-1158.

Kamminga, J. 1982. *Over the edge: functional analysis of Australian stone tools*. Uni Qld, Brisbane.

Lampert, R. 1981. *The Great Kartan Mystery*. Terra Australis, ANU, Canberra

Walshe, K. 2005. Indigenous archaeological sites and the Black Swamp Fossil Bed, Rocky River Precinct, Flinders Chase National Park, Kangaroo Island, South Australia. *Australian Archaeology* 60:61-64.

Walshe, K. 2014. Archaeological Evidence for a Sealer's and Wallaby Hunter's Skinning Site on Kangaroo Island, South Australia. *The Journal of Island and Coastal Archaeology* 9(1): 130-143.

Appendix Two: Procedure for Earth Moving Crews

Although it is considered a very low risk for an Aboriginal heritage site or object to be found during earth moving, it remains a legislative issue.

It is recommended that:

1. If an Aboriginal Party is established, under the Amendment Bill 2016, for Kangaroo Island, prior to construction commencing, then this Party be consulted on the following:

- ensuring that the on-site induction for work crews includes a demonstration about Aboriginal heritage finds typical to the broader area and
- establishing a clear 'chain of command' that is responsive to legislative requirements, in the case of any such finds.

Or

1. If an Aboriginal Party is not established, under the Amendment Bill 2016, for Kangaroo Island, prior to construction commencing, then advice should be sought from Aboriginal Affairs and Reconciliation on a consultative process so that the following can be enacted:
   -ensuring that the on-site induction for work crews includes a demonstration about Aboriginal heritage finds typical to the broader area and
   -establishing a clear 'chain of command' that is responsive to legislative requirements, in the case of any such finds.

[In the case of any human remains being found, it is legislated that the first point of contact is with SAPOL.]

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File No:
2014\11234\01

Ref No:
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23 September 2016

Mr Thomas Leahy
Principal
PARTI

tom@parti.global

Dear Mr Leahy,

Thank you for consulting the Office for Design and Architecture SA (ODASA) about this proposal. I understand that the scheme presented at the Design Review session held on 17 February 2016 has now been revised, including removal of the marina component. While this revised proposal will be subject to further Design Review, commentary provided in the previous recommendations letter remains applicable to the revised scheme. Relevant extracts from this original recommendations letter have been provided below.

We reiterate that the following extracts relate to materials submitted and considered by the Design Review Panel at the project's first design review session on 17 February 2016. As Chair of the Panel, my recommendations for this original scheme are set out below.

American River Hotel Resort

In response to materials presented at the first Design Review session for this scheme, I strongly support the overall design approach for the proposal. I also support the layout that separates uses in discrete buildings, and the novel built form in response to the unique setting. This proposal has the potential to offer a benchmark for tourism development of this size and type in this sensitive environment on Kangaroo Island. While I support the proposed intensity and diversity of uses for the development, the current expression and materiality of the buildings is yet to respond fully to the natural and climatic setting. My ongoing support will be contingent on successful demonstration of the proposal being resolved to an exemplary quality appropriate to this environmentally sensitive setting. To achieve the best possible design outcome for this proposal I encourage consideration of the following issues through the next stages of design development.

I recognise the early stages of design development for the project. I commend the design team on their voluntary public consultation with the local primary industry, resident and commercial interest groups within American River.

The site is located north west of American River, on a rising incline that provides significant views over the estuary. The proposal seeks to construct a hotel to be provided over a number of structures, strategically scattered across the site. The variation intends to offer different experiences for different types of patronage, ranging from families to large groups and couples. I support the proposition of tourist accommodation as an alternative to the existing options available to visitors in American River. I also support the ambition for Kangaroo Island as a premium

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10847979

South Australian holiday destination for local, interstate and international visitors. However, I note that the site organisation strategy and the built form configuration of the ten accommodation units, generates two very different arrival interfaces with the American River Township. The ability to successfully manage the constraints and opportunities of these interfaces will be critical to my overall support for the site organization strategy.

The proposed hotel buildings are to be prefabricated, to address economic constraints and reduced availability of construction materials on Kangaroo Island. I support the intention of utilising prefabricated modules in varying configurations to house the various accommodations and support uses. Acknowledging the early stages of design development, I support the unique concept that allows the differentiation of the external form and material expression of the proposed prefabricated structures. I also support the consistency of the material palette to the separate structures that provides a unified visual identity to the proposal. The decision to treat the various elevations, depending on orientation to maximise views and natural light is encouraged. My continued support will be contingent on the design team's ability to resolve in accord with the varied climatic conditions of this elevated site and the design response to the quality of the visitor experience and expectation of patrons using the site and structures.

Recognising the early stages of the design development, I support the proposition of utilising the natural setting of creeks, tributaries and contours to provide a unique visitor experience as well as harvest rainfall for reuse within the hotel complex. I urge the design team to work closely with their nominated environmental consultants to ensure minimal disruption to the endangered bird species known to habituate the site. A successful integrated approach to managing and implementing the different consultants' advice is vital to my ongoing support in ensuring a model sustainable development is achieved.

The visitor car and bus parking is located to the centre of the site, elevated and hidden from view within existing trees. I support the intention to consolidate the density of the vegetation in this location to ensure views of the car parking are minimal, if at all visible from any point of the site.

The tourism proposition anticipates accommodation units, restaurants, pools, a library and wine bar, spa, fitness studio, kids club, cooking school, activity centre, botanic gardens and stables. The deliberate separation of a traditional resort architectural form into various multi storey components, strategically distributed across the contours of the site and informed by the typology, local produce and industries of the township is a unique approach to tourist accommodation that I strongly support. The proposal has the opportunity to become a unique destination for American River, and Kangaroo Island. I urge the design team to make the most of the diversity of experiences offered, and ensure the quality of the final design is commensurate to the aspiration sought at this early stage in the design development.

I thank the proponent team for participating in the Design Review process and recommend that the project would benefit from further Review. While I am encouraged by the current design direction for this proposal, my ongoing support will be contingent on the successful resolution of the issues outlined above. Additionally, achieving design excellence will be critical to justify my support for this

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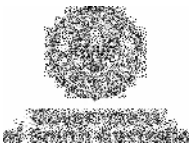

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Ref No:
10260587

unique tourism proposal in this sensitive location. I look forward to discussing this proposal in more detail at a future Design Review session.

Yours sincerely

Nick Tridente
Associate South Australian Government Architect

cc Janine Philbey DPTI Janine.philbey@sa.gov.au

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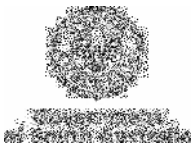

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AMERICAN RIVER PROJECT
KANGAROO ISLAND

Environmental Noise Assessment

S4854C3

September 2016

INTRODUCTION

A preliminary environmental noise assessment has been made of the proposed development of a resort and hotel at American River, Kangaroo Island, as generally depicted and described in:

- Hotel building plan, dated 30/8/2016; and
- "Micro Hotel Drawing Set, dated 26/8/2016.

Appendix A shows the location of the proposed development relative to existing residences.

The noise sources associated with the development comprise:

- music and patrons within restaurants and cafes;
- mechanical plant such as air conditioning, ventilation and refrigeration systems;
- pool associated plant, such as pumps.

The development spans both the Residential and Deferred Urban zones. The nearest dwellings to the proposed development are to the east of the proposed development.

This preliminary environmental noise assessment establishes appropriate environmental noise assessment criteria relevant to each noise source which, if complied with, would ensure the amenity of the locality is not unreasonably impacted upon.

The assessment also provides the likely extent of acoustic treatment required in order to comply with the established criteria. The final extent of treatment would need to be confirmed during the detailed design and licensing phases of the project. This would be when mechanical plant is selected and operational information is known, such as the envisaged number of patrons at particular times and the frequency, timing and nature of proposed events.

DEVELOPMENT PLAN

The subject site spans both the Residential and Deferred Urban zones of the Kangaroo Island Council Development Plan. The nearest dwellings to the development are located within the Residential Zone of the Development Plan. The Plan has been reviewed and the following provisions relating to environmental noise are considered relevant.

General Section – Interface Between Land Uses

Objectives

1. *Development located and designed to minimise adverse impact and conflict between land uses.*
2. *Protect community health and amenity from adverse impacts of development.*

Principles of Development Control

1. *Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:*

   ....

   (b) noise

   ....
2. *Development should be sited and designed to minimise negative impacts on existing and potential future land uses desired in the locality.*
6. *Non-residential development on land abutting a residential zone should be designed to minimise noise impacts to achieve adequate levels of compatibility between existing and proposed uses.*

Noise Generating Activity

7. *Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest existing noise sensitive premises.*
9. *Outdoor areas (such as beer gardens or dining areas) associated with licensed premises should be designed or sited to minimise adverse noise impacts on adjacent existing or future noise sensitive development.*
10. *Development proposing music should include noise attenuation measures that achieve the following desired noise levels:*

Noise level assessment location	***Desired noise level***
Adjacent existing noise sensitive development property boundary	*Less than 8 dB above the level of background noise ($L_{90,15min}$) in any octave band of the sound spectrum* *and* *Less than 5 dB(A) above the level of background noise ($L_{A90,15min}$) for the overall (sum of all octave bands) A-weighted level.*
Adjacent land property boundary	*Less than 65dB(Lin) at 63Hz and 70dB(Lin) in all other octave bands of the sound spectrum* *or* *less than 8 dB above the level of background noise ($L_{90,15min}$) in any octave band of the sound spectrum and 5 dB(A) overall (sum of all octave bands) A-weighted level.*

ASSESSMENT

Patrons, Mechanical Plant and Car Park Activity

Interface Between Land Uses Principle of Development Control 7 specifically references the *Environment Protection (Noise) Policy*. The current version is the *Environment Protection (Noise) Policy 2007* (the Policy). The Policy provides the most appropriate criteria for patrons, mechanical plant and hotel car park activity.

The Policy provides goal noise levels based on the Development Plan zones in which the noise source (the resort and hotel) and the noise sensitive land uses (the surrounding dwellings) are located.

For a development which spans the Deferred Urban and Residential zones, the Policy recommends the following goal noise levels to be achieved at the dwellings in the Residential zone:

Daytime Goal Noise Level	50 L_{Aeq}
Night Time Goal Noise Level	43 L_{Aeq}
Night Time Maximum Noise Level	60 L_{Amax}

When measuring or predicting noise levels for comparison with the goal noise levels of the Policy, penalties may be applied to the goal noise levels for each characteristic of tone, impulse, low frequency and modulation of the noise source.

Based on the assessment, the following measures are likely to be required to achieve the criteria:

- careful placement and screening of mechanical plant;
- restricting the location and number of patrons outside venues after 10pm;
- limiting the location of any outdoor events to designated areas.

A further assessment should be conducted at the detailed design stage of the project to confirm the required extent of treatment and ensure the project criteria are achieved.

Music from Indoors

The Environment Protection Authority (EPA) provides guidelines for premises where music is proposed. Similar to the Development Plan, the *Music noise from indoor venues and the South Australian Planning System* (the EPA guidelines) provides noise criteria to be met at noise sensitive locations based on the existing acoustic environment.

The EPA guidelines recommend:

> *The music noise ($L_{10,15}$) from an entertainment venue when assessed externally at the nearest existing noise sensitive location should be:*
>
> - *Less than 8 dB above the level of background noise ($L_{90,15}$) in any octave band of the sound spectrum.*

The above criterion is the same as that specified within the Development Plan. Therefore, music which complies with the Development Plan will also achieve the EPA guidelines.

To objectively assess music noise against these criteria, the existing background noise environment would need to be measured. However, to provide an indication, it is likely that the facade and roof of venues will need to be upgraded subject to the level of music which is proposed.

Music from Outdoor Events

The above guidelines do not provide objective criteria for outdoor events. In these circumstances, reference is made to the South Australian EPA's "Noise Management for outdoor events" information sheet (the Information Sheet) and the Adelaide City Council's "Noise Mitigation Standard Operating Procedures" (the ACC Procedures).

Both the Information Sheet and the ACC Procedures require a Noise Management Plan to be prepared and implemented. The ACC procedures require the Noise Management Plan to detail how the following criteria will be achieved:

At the front of house (FOH) mixing desk

- $L_{Ceq\ (15\ min)}$ sound pressure level not to exceed 110 dB(C)

At noise sensitive premises

- Day-time (7.00am to 11.00pm): 60dB(A) $L_{Aeq\ (15\ min)}$ and 75dB(A) $L_{Amax\ (1\ min)}$
- Night-time (11.00pm to 7.00am): 45dB(A) $L_{Aeq\ (15\ min)}$ and 60dB (A) $L_{Amax\ (1\ min)}$
- 70dB unweighted L_{eq} in the 31.5Hz, 63Hz or 125Hz octave bands.

Based on the above, it is recommended that a condition require that a noise management plan be prepared and implemented for outdoor music events to achieve the criteria of the ACC Procedures.

Resort and Hotel Accommodation Amenity

The proposed hotel development is within a quiet environment and therefore it is not expected that an upgraded facade construction will be required to achieve adequate levels of amenity within the accommodation from external sources.

The noise from the other activities at the hotel development will be assessed during the detailed design stage, once operating details are known. This will ensure the noise from sources such as mechanical plant, patrons and music are adequately separated from the accommodation. Treatments may include careful placement and screening of mechanical plant and outdoor cafe/restaurant areas, notwithstanding upgraded constructions to the accommodation are considered unlikely to be required.

Construction Noise

Division 1 of the Policy requires construction activity to either achieve an equivalent noise level of 45 dB(A) and maximum of 60 dB(A) at noise sensitive locations, or only occur between the hours of 7am and 7pm on any day other than Sundays or public holidays, and between 9am and 7pm on Sundays and public holidays. The Policy also states that "*all reasonable and practicable measures must be taken to minimise noise resulting from the activity and to minimise its impact*". These measures include:

(i) commencing any particularly noisy part of the activity (such as masonry sawing or jack hammering) after 9.00 a.m.; and

(ii) locating noisy equipment (such as masonry saws or cement mixers) or processes so that their impact on neighbouring premises is minimised (whether by maximising the distance to the premises, using structures or elevations to create barriers or otherwise); and

(iii) shutting or throttling equipment down whenever it is not in actual use; and

(iv) ensuring that noise reduction devices such as mufflers are fitted and operating effectively; and

(v) ensuring that equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation that is audible at noise-affected premises; and

(vi) operating equipment and handling materials so as to minimise impact noise; and

(vii) using off-site or other alternative processes that eliminate or lessen resulting noise.

A Construction Noise and Vibration Management Plan should be prepared to ensure that the requirements of the Policy are achieved.

Vibration

There are no operational activities which have the potential to produce perceptible ground vibration at sensitive receptors in the vicinity of the site. The greatest potential for vibration is during construction but this will be dependent on the method of construction. The potential for vibration during construction should be considered as part of a Construction Noise and Vibration Management Plan.

SUMMARY

A preliminary environmental noise assessment has been made for the proposed hotel resort development at American River, Kangaroo Island.

The preliminary assessment summarises the assessment criteria and determines the likely acoustic treatment measures in order to achieve compliance with them. Achievement of the criteria will ensure that the development does not detrimentally affect or unreasonably interfere with the amenity of the locality or cause nuisance to the community by the emission of noise in accordance with the relevant provisions of the Kangaroo Island Council Development Plan. The treatments will need to be confirmed at the detailed design stage through site measurements and additional operating information, however the extent of likely treatments are typical of similar developments.

To ensure the facility is adequately designed and noise does not detrimentally affect or unreasonably interfere with the locality, the following conditions of approval (or similar) are recommended:

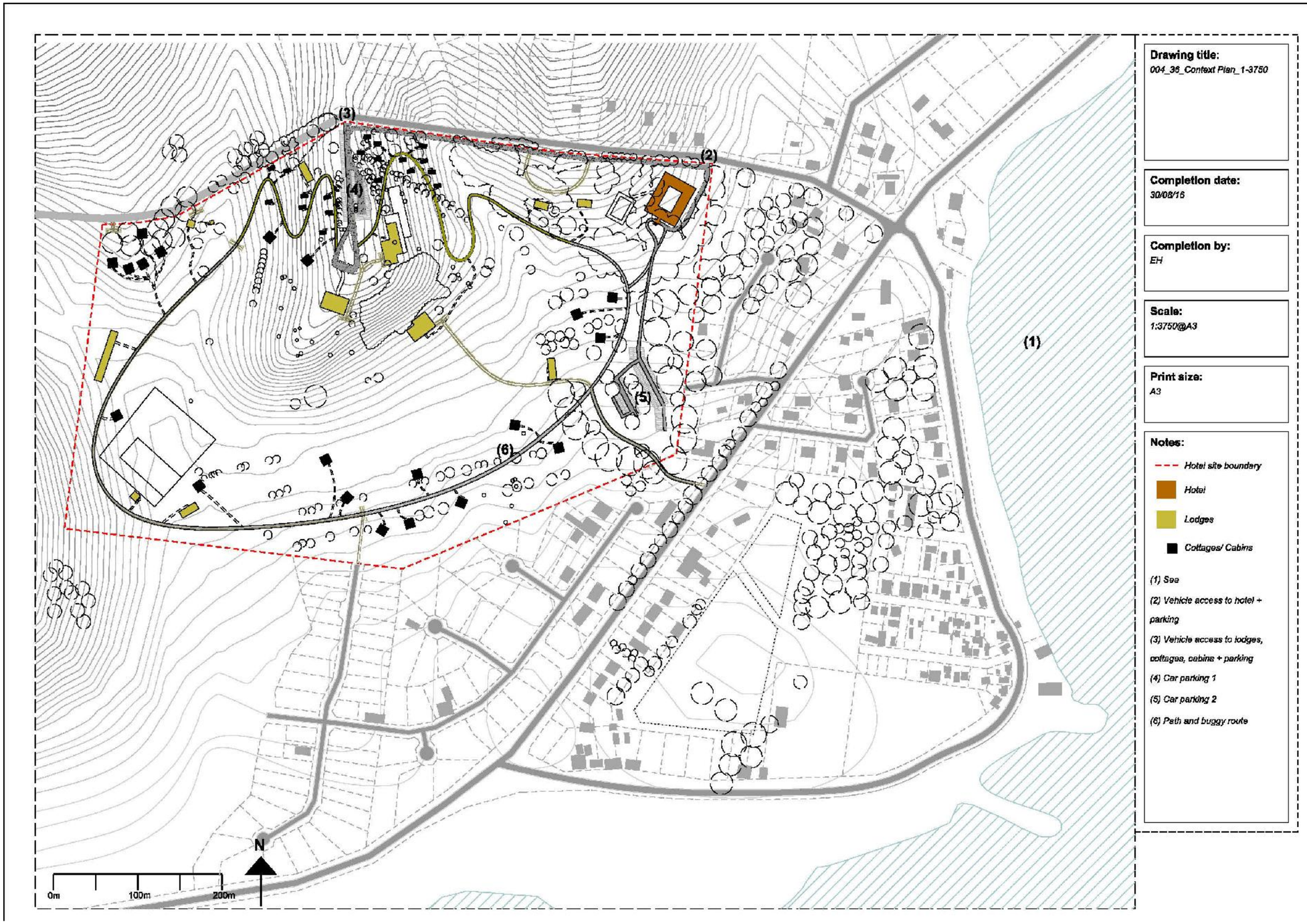
- *The noise (L_{eq}) from patrons, mechanical plant and car park activity shall be no greater than 50 dB(A) during the day (7am to 10pm) and 43 dB(A) during the night (10pm to 7am) when measured and adjusted in accordance with the Environment Protection (Noise) Policy (2007).Maximum instantaneous noise levels at night (L_{max}) shall not exceed 60 dB(A).*

- *The noise ($L_{10,15}$) from music played indoors when assessed at the nearest existing noise sensitive location shall be less than 8 dB above the level of background noise ($L_{90,15}$) in any octave band of the sound spectrum.*

- *A noise management plan must be prepared and implemented for outdoor music events in accordance with the EPA's "Noise management for outdoor events" information sheet to achieve the objective criteria of the Adelaide City Council's "Noise Mitigation Standard Operating Procedures".*

- *A Construction Noise and Vibration Management Plan shall be prepared to ensure that the construction activity achieves the requirements of the Environment Protection (Noise) Policy (2007) and to ensure that vibration during construction is minimised.*

APPENDIX A: Locality Plan



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Stormwater Concept for P.E.R.

JOB NUMBER:	**S28427 - 243240**
CLIENT:	**BCA Engineers**
SITE:	**American River, KANGAROO ISLAND, SA 5223**
DATE:	**September 2016**
REVISION:	**0**

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Document Status

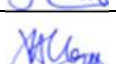
Rev No.	Status	Author	Reviewer			Approved for Issue		
			Name	Signature	Date	Name	Signature	Date
A	Preliminary	A. Vingelis	J. Clapp		3/09/2016	J. Clapp		3/03/2016
0	Final	A. Vingelis	J. Clapp		1/09/2016	J. Clapp		1/09/2016

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Table of Contents

1. Executive Summary

This stormwater concept was prepared to inform the Public Environmental Report and was undertaken prior to preparation of a detailed investigations phase and civil design. Accordingly the plan is considered conceptual in nature and is subject to further design development.
Stormwater Runoff and surface water is considered a valuable resource at this location due to the limited available potable water.
This project aims to implement the objectives of Water Sensitive Design through the following key strategies:

Objective	Strategy
Water Conservation	• Integrating water recycling measures from hardstand, roof and surface water to reduce demand for potable water. • Encouraging water sensitive design which minimises the reliance on water i.e. through diverting existing runoff to benefit vegetation, or introducing drought tolerant native plantings. • Where feasible maximising groundwater recharge through promoting infiltration.
Improving Water Quality	• Treatment of car parking and hardstand areas in the Hotel Precinct through bio-retention. • Treating runoff from access roads and paths via vegetated swales. • Treating roofwater such that it may be used as an alternate source of potable or grey water.
Maintaining and Mimicking a More Natural Regime	• Managing stormwater onsite such that post-development peak flows do not exceed pre-development peak flows; though detention storage and soakage. • Reducing flooding risk for downstream communities. • Rehabilitation of the existing watercourse and riparian areas such that environmental flows are mimicked by reduction of the volume, velocity and peak flow of runoff contributing from the site.
Maximising Environmental Benefits	• Improved amenity, environmental and social outcomes for the community.

2. Catchment Description

2.1. American River and Pelican Lagoon

American River is an open sea channel connecting the Gulf Saint Vincent and Pelican Lagoon. Pelican Lagoon is a nationally important wetland and is listed on the Register of the National Estate.
Pelican Lagoon comprises a wetland system of permanently shallow lagoons which are home to protected bird species, fish nurseries and marine life. Pelican Lagoon relies on fluctuating salinity levels and accordingly it relies on the interactions between stormwater and groundwater. Accordingly stormwater runoff should be managed in a way that best mimics the natural water cycle.
Understanding the impacts that stormwater from the development will have on the marine environment is complex and there are many other contributing elements which may impact. The Kangaroo Island NRM Region has identified the following broader strategies relating to stormwater and groundwater to better understand the impacts on the local estuaries:

- Identify environmental flow requirements
- Identify groundwater influences and uses within estuaries
- Develop and implement an monitoring program (including water quality and quantity and the influence this has on the habitat, species diversity and abundance)
- Determine the impacts of stormwater and urban encroachment and amend the Council development plan accordingly

2.2. Catchment Extent

The proposed Hotel Precinct site comprises approximately 32 hectares of semi-rural residential catchment which contributes to two unnamed watercourses. The sites ultimately discharge to the Gulf Saint Vincent and north of the inlet to Pelican Lagoon Conservation Park.
There are three significant sized rural external catchments contributing from the north.

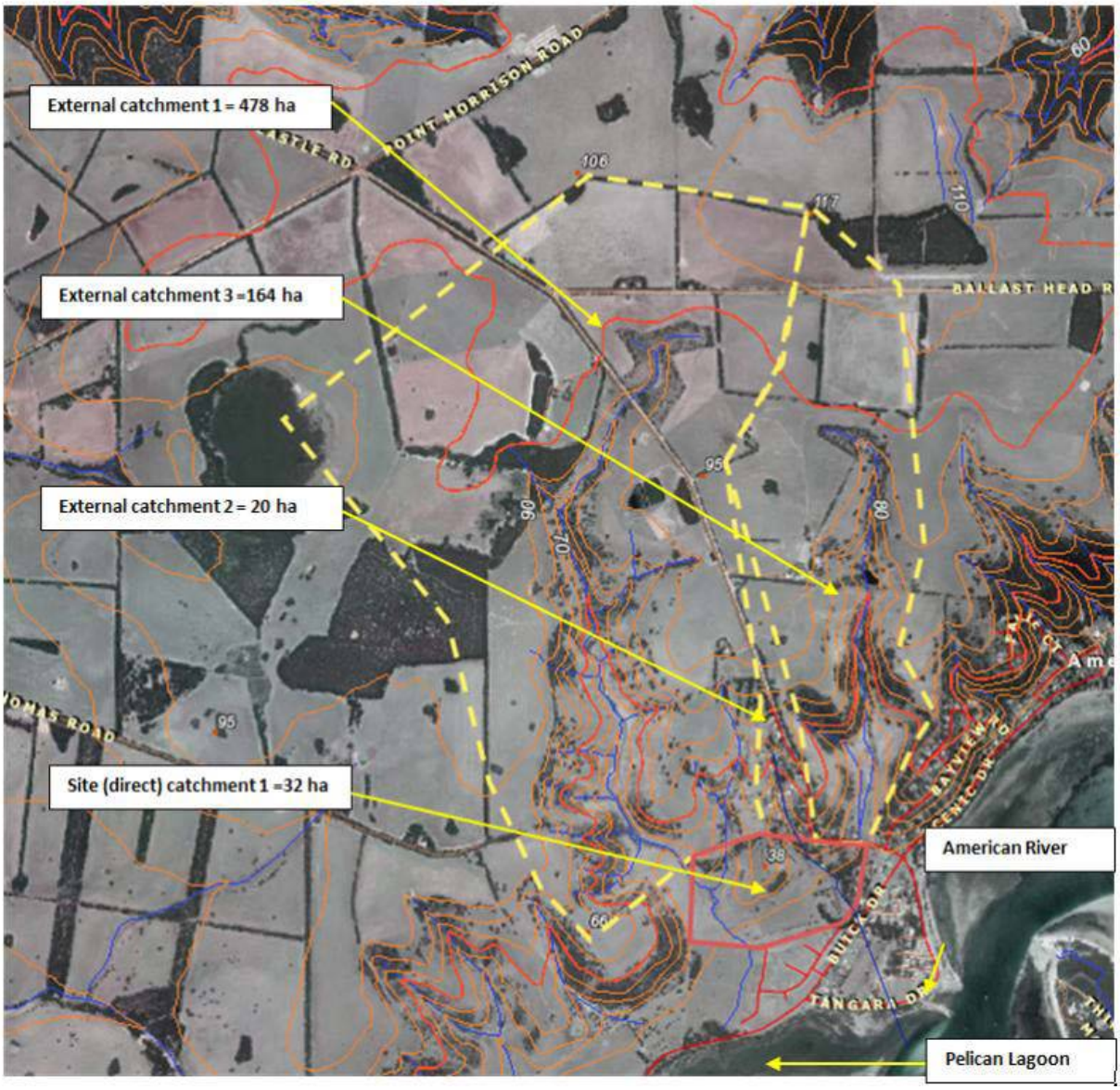


Figure 1 Internal and external catchments

Internally, the site grades to two main sub-catchments and surface flows are diverted towards the south via two watercourses. A figure showing the extent of the catchment and the topography of the site is shown in Figure 1.
The hotel site is considered relatively steep and has typical grades 8 - 10% the site is predominantly un-vegetated. The two existing perennial watercourses traversing the site show signs of scour and degradation and there are two dam storages located within the site.

2.3. Hydrogeology

The geology in the area forms part of the Kantmantoo Trough which is considered to be typically sandstone. The Kanmantoo Group is generally considered to be a poor aquifer due to the impermeable nature of the rocks. Where groundwater is encountered yield is expected to be low as it generally occurs within the bedding fractures; accordingly the likelihood of utilising either an existing groundwater source for the purpose of aquifer storage and recovery is considered low. The SARIG database indicates that moderate to high salinity levels are expected to be encountered at this location. The expected salinity levels are considered suitable for irrigation purposes (subject to the proposed landscaping plan) and further testing.
The geology indicates the presence of residual soils which typically are sandy silty soils with some low plasticity clays. These soil types typically have a moderate to high permeability this would be required to be confirmed with further geotechnical testing. The Soils Association map of the area is shown in
Figure 2.

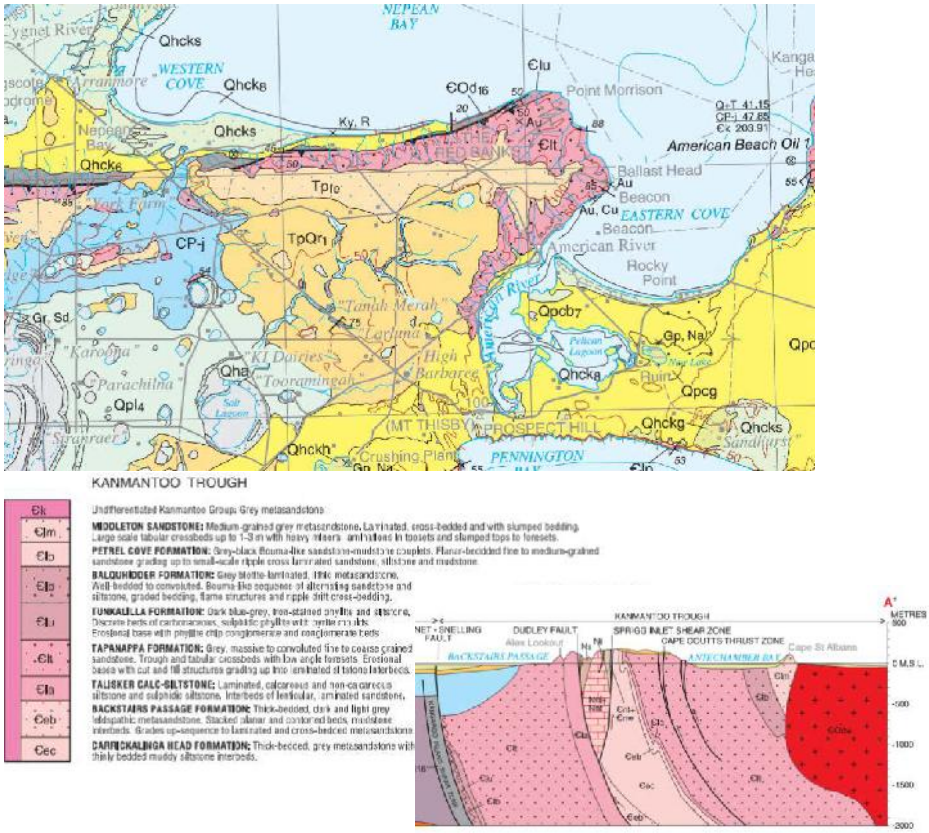


Figure 2 Soils Association Map

Groundwater in South Australia is under the care and management of DEWNR and accordingly the drilling of groundwater wells and or use of groundwater is approved and managed through the Water Affecting Actives permits.

2.4. The Hotel Precinct

The hotel precinct would be considered to be dispersed in nature and under post development conditions be expected to have a percentage impervious of less than 10% of the total site area. Stormwater runoff from the hotel precinct will comprise the flowing:

- Runoff from roof areas comprising various mixed use recreational buildings and dispersed accommodation facilities, runoff from these catchments is considered to be relatively clean and suitable to be considered for re-use as potable or greywater.
- Runoff from car parking; hardstand and access tracks. Runoff from these catchments is considered to have higher pollution load characteristics than the roofwater and accordingly is expected to require treatment and is suitable for re-use for irrigation purposes
- Runoff from the unsealed landscaped areas. The quantities and quality of runoff contributing from these areas are expected remain largely unchanged.
- Surface runoff contributing from the external perennial watercourses.

3. Stormwater Management and Water Sensitive Design

This stormwater management masterplan aims to meet the requirements, objectives and strategies outlined in the following documentation:

- *Kangaroo Island Development Plan,* September 2015
- *Kangaroo Island Natural Resources Management Plan,* 2009
- *Water for Good, DEWNR, 2010*
- *Water Sensitive Urban Design, Creating more Liveable and water sensitive cities in South Australia, 2*
- *Australian Guidelines for Water Recycling: Stormwater Harvesting and Re-Use*, 2009.

3.1. Flood Mitigation

Council's requirements for development control state that '*Detention and/or retention devices should be incorporated to maintain the volume and rate of runoff as near as possible to pre-development conditions.'*
It is proposed that stormwater runoff from the hotel precinct will be detained such that pre-development conditions are achieved and accordingly environmental flows in the watercourse are mimicked.
Accordingly the development will not increase the flood risk on downstream infrastructure and no upgrades on downstream stormwater infrastructure will be required.

Hotel Precinct

It is likely that the existing in-situ material will be relatively sandy and will have moderate to high infiltration properties; accordingly it is recommended that geotechnical investigations are undertaken to estimate the expected infiltration within the catchment.
Where possible it is recommended that infiltration is maximized for the purpose of flood mitigation, groundwater recharge and to benefit vegetation.
Where the post-development peak flows from site cannot be managed completely through infiltration it is recommended that stormwater drainage from the site is discharged to a designated legal point of discharge either within the road reserve or to the existing watercourses within the site.
Any legal point of discharge from the site shall be undertaken under advice from Council and where discharging to the adjacent watercourse shall be undertaken through a DEWNR permit for a water affecting activity.
Runoff from hardstand and car parking areas will be detained in basins such that pre-development peak discharge does not exceed post development peak discharge. It is proposed that, where feasible, opportunities to promote infiltration are maximized. Given the available open space within the development is proposed that detention storage is managed above ground.

Stormwater runoff from the internal access roads and paths will be managed as overland flows in vegetated swales for infiltration. Where the post-development peak flows are not able to be managed through infiltration swales it is proposed that detention storage is incorporated at the southern end of the catchment.
Roofwater is to be collected in above ground tanks for the purpose of re-use and detention. It is recommended that above ground storage tanks are shared between adjacent buildings and overflows from the detention storage tanks are managed via detention / infiltration swales.

The existing site has three significant external catchments which are contributing to three watercourses located within the site. It is recommended that flood modelling is undertaken to understand the inundation area and to ensure that access roads and buildings have adequate freeboard from the 100 year ARI storm event.
It is recommended that diversion bunds are incorporated along the southern boundary of the site to reduce the risk of any stormwater being diverted towards private property.

3.2. Water Quality

Council's requirements for development control state that '*Water discharged from a development should:*
'be of a physical, chemical and biological condition equivalent to or better than its pre-developed state'
Council's Development Plan does not provide specific stormwater quality criteria targets; however the minimum EPA target reductions for the treatment of stormwater are:

- 90% reduction in litter gross pollutants
- 45% reduction in average annual total nitrogen
- 60% reduction in average annual total phosphorous
- 80% reduction in average annual total suspended solids

It is proposed that all stormwater runoff from developed areas will meet or exceed best practice treatment targets, a treatment strategy will be adopted to promote natural water treatment processes within the development.

Hotel Precinct

Natural treatment methods include wetlands, bio-retention basins and vegetated swales. The construction of artificial wetlands were discounted for this development on the basis that the development is very dispersed and the fraction impervious is relatively low; hence collection of a significant volume of stormwater to support a wetland is unlikely. Additionally the steepness of the site is not considered suitable for construction of a wetland.
Stormwater runoff from the hardstand and car parking areas within the hotel precinct are considered suitable to be treated in bio-retention basins. The bio–retention basins should be located on a relatively flat grade and should be vegetated with nutrient removing species capable of tolerating inundation.
Stormwater runoff from the access roads and tracks will be managed in vegetated bio-retention swales. The steep site grades indicated that scour in the swales is likely and it is recommended that erosion protection measures are incorporated within the swales such as rock check dams to reduce velocities and promote infiltration. It is recommended that the swales are planted with nutrient removing native species.
It is recommended that water sensitive deign principles are integrated into all landscaping features this included but is not limited to:

- Construction of raingardens/ depressed areas to divert and store runoff to benefit existing vegetation
- Use of permeable paving to treat stormwater and promote recharging of the groundwater
- Planting of drought resistant species to reduce the requirement for irrigation

It is recommended that erosion protection and rehabilitation measures are incorporated into the existing watercourse to reduce the risk of further degradation, to improve the health and to improve visual amenity.

3.3. Water Recycling

Where water is to be harvested it is recommended that a water balance assessment is undertaken to estimate the expected supply and demand to gain an understanding of the size of the storage required and the certainty of supply.
Stormwater should be harvested in a way that minimizes health and environmental risks. It is recommended that any recycled stormwater scheme that is adopted in undertaken in accordance with the Australian Guidelines for Water Recycling: Stormwater Harvesting and Re-Use, 2009.

Hotel Precinct

The following opportunities for surface and stormwater harvesting were identified with the hotel precinct:

- Stormwater collected from roof catchments may be treated to replace and or supplement the reliance on an alternate potable water source for drinking, cooking and washing. It is proposed that retention facilities are provided as above ground tanks which may be shared between adjacent accommodation buildings to rationalize the amount of tanks.
- Re-using treated greywater into the building design for toilet flushing and or irrigation purposes.
- Stormwater from the car parking and hardstand areas may be re-used for the purpose of irrigation. Stormwater from the bio-retention basins may either be stored underground for local irrigation purposes or as a submerged detention storage area where the bio-retention basins become self-watering during summer months.
- Investigating storing and using the excess flows from the semi-permanent watercourses for the purpose of irrigation and or stock watering. Where water is collected from external surface water catchment consideration should be given to maintain environmental flows. Taking water from a prescribed watercourse is considered a water affecting activity and should be undertaken through the relevant approvals process with DEWNR.

Appendix A

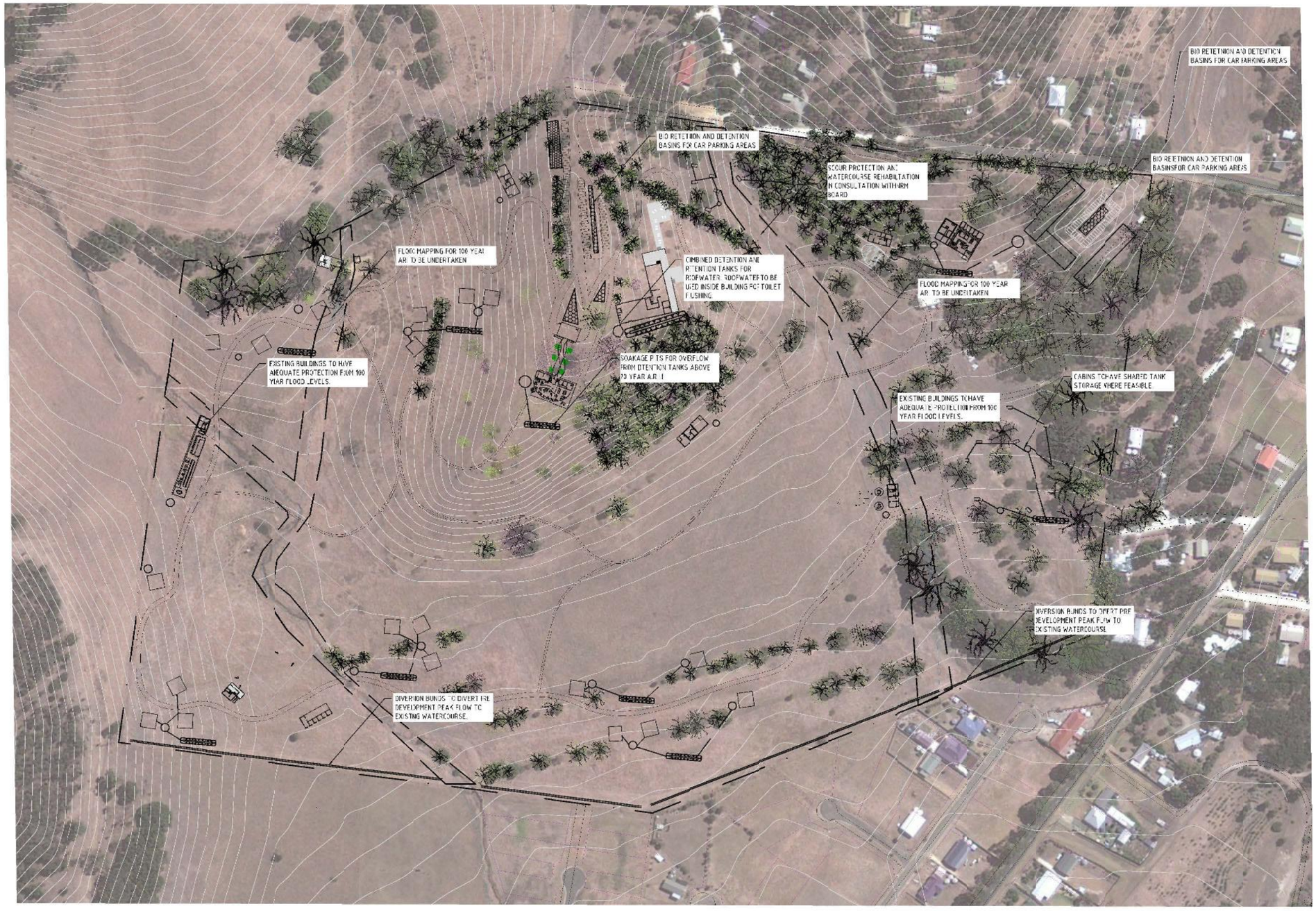
SK001 Hotel Precinct Stormwater Concept

HOTEL PRECINCT STORMWATER CONCEPT

N

LEGEND

- COMBINED ROOFWATER TANKS FOR DETENTION AND REUSE
- SOAKAGE TRENCH FOR E-W MITIGATION FROM IMPERVIOUS SURFACES
- B.C. RETENTION ZONE



N.T.S.

REV	DESCRIPTION	DATE	INIT	APP
B	PRELIMINARY ISSUE	31.03.16	AV	JC
A	PRELIMINARY ISSUE	29.02.16	AV	JC

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

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SOIL & MATERIAL TESTING | HOUSING | COMMERCIAL | PROJECT MANAGEMENT | SURVEY

CLIENT	BEA ENGINEERS
PROJECT TITLE	AMERICAN RIVER
SITE ADDRESS	BUICK'S DRIVE, AMERICAN RIVER
DRAWING TITLE	STORMWATER MASTERPLAN – HOTEL PRECINCT
DESIGNED	AV
DRAWN	AV
CHECKED	JC
No. OF SHEETS	1
SCALE	N.T.S @ A1
DATE STARTED	FEB 2016
SITE ID & JOB No.	S28427-243241
DRAWING No.	SK001
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ENGINEERING
incorporating
BURNS HAMILTON

GUIDELINES

For the preparation of a

DEVELOPMENT REPORT

Tourist Resort
American River, Kangaroo Island

City & Central Consulting Pty Ltd

VARIATION – 22 SEPTEMBER 2016

ISBN 978-0-7590-0248-7

1. BACKGROUND

On 20 August 2015, the Minister for Planning made a declaration in The *South Australian Government Gazette* that a proposed tourist resort development at American River, Kangaroo Island, be assessed as a Major Development pursuant to Section 46 of the *Development Act 1993* (the Act).

Subsequent to the declaration the proponent has reviewed the project scope and has removed, primarily, the commercial harbour and marine based elements. These may be revisited in the future.

On 26 August 2016 the proponent wrote to the Department seeking a variation to the Major Development declaration. The nature of the proposal is described below in Section 2.

Section 46 of the Act ensures that matters affecting the environment, the community or the economy to a significant extent, are fully examined and taken into account in the assessment of this proposal.

The major development process has six steps:

- The Development Assessment Commission sets the level of assessment (Environmental Impact Assessment, Public Environmental Report or Development Report) and provides guidelines (**this stage**).
- Proponent prepares an Assessment Document (in this case a Development Report).
- Public and agency consultation on the Assessment Document for a period of three weeks depending on the level of assessment.
- Responding to public comment on an Assessment Document.
- Assessing the proposal and releasing the Assessment Report.
- Decision.

This document establishes the guidelines as set by the Development Assessment Commission specifically prepared for this application. The Development Assessment Commission (Commission) has determined that the proposal will be subject to the processes of a Development Report (DR), as set out in Section 46D of the Act. The Commission's role in the assessment process is now completed. From this point the Minister will continue with the assessment under Section 46 of the Act.

2. DESCRIPTION OF THE PROPOSAL

The proposed resort is located in the American River 'hinterland' on a slope of the surrounding hills, at the edge of the township's urban area. The site is approximately 32 hectares in area and overlooks the township and Pelican Lagoon.

The proposal can be generally described as an international tourism resort, comprising the following components:

Phase 1

- 115 guest rooms, 3 star hotel, two lodges and 10 cabins

The proponent projects that 60 KI based temporary jobs will be created during construction and over 100 permanent jobs during operation of Phase 1.

Phase 2/3

- 4.5 star tourist facility and restaurant as well as additional lodges, cabins and cottages
- The central resort complex would comprise two main hotel buildings, including a reception area, retail, restaurants, bars, conference facilities and resort suites (with associated roads and car parking).
- The resort's main tourist accommodation is designed as a 'deconstructed hotel', comprising ten freestanding six-story towers strategically located around the site. Each tower would have either two

or four hotel rooms per floor (i.e. to provide multiple views from each room), above shared ground floor facilities. A range of self contained cottages would also be provided around the site.
- Resort amenities, including a pool, health spa, fitness centre, kid's club, activity centre (for adventure based recreation activities), specialty restaurant/cookery school, stables (for horse riding activities), library (including 'wine bar/whisky lounge') and landscaped gardens (including a greenhouse).
- Infrastructure for a water supply, electricity supply, telecommunications, stormwater management and waste management (including effluent treatment and disposal).
- The various components of the resort would be spread around the site to provide a variety of views and experiences, all connected by a network of roads and paths.

It is expected that this phase will create 100 temporary jobs during construction and 180 permanent full time jobs during operation.

The various components of the resort would be spread around the site to provide a variety of views and experiences, all connected by a network of internal roads and paths.

3. MAJOR DEVELOPMENT PROCESS AND ROLE OF GUIDELINES

In accordance with Section 46 (7) of the Development Act, 1993, the Development Assessment Commission has a role:

(a) to determine whether the major development or project will be subject to the processes and procedures prescribed by this Subdivision with respect to the preparation of an EIS, a PER or a DR; and
(b) to formulate guidelines to apply with respect to the preparation of the EIS, PER or DR (as determined by the Development Assessment Commission).

The revised nature of the proposal, which now excludes the commercial harbour component, removes a raft of environmental sensitivities and as such the major development as proposed should be subject to the processes and procedures associated with the preparation of a Development Report (DR).

Generally the following steps will occur.

- These Guidelines are to be used to inform the preparation of the Development Report (DR). They set out the assessment issues associated with the proposal along with their scale of risk, as determined by the Development Assessment Commission.

- Each guideline is intended to be outcome focused and may be accompanied by suggested assessment approaches. These suggestions are not exhaustive, and may be just one of a wide range of methods to consider and respond to a particular guideline.

- The DR must be prepared by the proponent, in accordance with the Guidelines, and should specifically address each guideline.

- The DR should detail any expected environmental, social and economic effects of the development, and the extent to which the development is consistent with the provisions of the Councils Development Plan, the Planning Strategy and any matter prescribed by the Regulations under the Act.

- The completed DR is submitted to the Minister for public release, and is subsequently referred to Council and relevant government agencies for comment.

- An opportunity for public comment will occur when the completed DR is released. Public exhibition is undertaken for a minimum of 15 business days. An advertisement will be placed in the Advertiser and the local newspaper inviting submissions.

- Copies of the submissions from the public, Council and other relevant agencies will be provided to the proponent.

- The proponent may then prepare a 'Response Document' to address the matters raised during the Public exhibition period.

- The Minister then prepares an Assessment Report. The Assessment Report and the Response Document will be available for inspection and purchase at a place determined by the Minister for a period determined by the Minister.

- Availability of each of these documents will be notified by advertisements in The Advertiser and the local newspaper. A copy of the DR, Response Document and the Assessment Report will be provided to the Council.

- When a proposal is subject to the DR process, the Governor makes the final decision under Section 48 of the Act.

- In deciding whether the proposal will be approved and any conditions that will apply, the Governor must have regard to:
  - Provisions of the Development Plan.
  - The Development Act and Regulations.
  - If relevant, the Building Code of Australia.
  - The South Australian Planning Strategy.
  - The Integrated Transport and Land Use Plan.
  - The DR and the Ministers Assessment Report.
  - Where relevant, any other government policy and/or legislation.

- The Governor can at any time indicate that the development will not be granted authorisation. This may occur if the development is inappropriate or cannot be properly managed. This is commonly referred to as an 'early no'.

4. DEVELOPMENT REPORT (DR)

4.1 The DR should be presented in terms that are readily understood by the general reader. Technical details should be included in the appendices.

4.2 THE REPORT MUST INCLUDE THE FOLLOWING

Information and Assessment

The provision of all information sought by the guidelines, together with consideration and assessment against each of the matters identified in Section 5 of these Guidelines.

Consistency with Policy and Legislation

The Act requires the DR to state its consistency with the relevant Development Plan and Planning Strategy, and other key policies and/or legislation, including the Environment Protection Act (refer to Appendix 3 for 'useful resources').

Commitment to Address Impacts

The DR should state the proponent's commitments to avoid, mitigate, manage and/or control any potentially unreasonable impacts from the development.

4.3 THE REPORT SHOULD INCLUDE THE FOLLOWING

Summary

A concise summary of the matters set out in Section 4.2 above, including all aspects covered in the Guidelines set out below, in order for the reader to obtain a quick but thorough understanding of the proposal and all its effects.

Introduction

The introduction to the DR should cover the following:
- Background to and objectives of the proposed development.
- Details of the proponent.
- Staging and timing of the proposal.
- Relevant legislative requirements and assessment process.

Need for the Proposal

A statement of the objectives and justification for the proposal, including:
- The specific objectives the proposal is intended to meet.
- Expected local, state or national benefits and costs.
- A summary of environmental, economic and social arguments to support the proposal; including the consequences of not proceeding with the proposal.

Plans and Forms

- **Current Certificate(s) of Title.**

- **Context and locality plans** illustrating and analysing existing site conditions and the relationship of the proposal to surrounding land and buildings. The plans should be drawn to a large scale to allow presentation on a single sheet and be readily legible.

- **Site plan(s)** clearly indicating the proposed buildings and works.

- **Landscaping plan(s)**, including the location of any native vegetation or significant trees on the site and/or adjoining land and any work intended within the public realm.

- **Floor plans** (drawn at a scale of 1:100 or 1:200) for each level of each buildings.

- **Elevations** (drawn at a scale of 1:100 or 1:200) of all sides of buildings and other structures, with levels and height dimensions provided in Australian Height Datum.

- **Cross sections** of buildings and other structures, including ground levels, floor levels, ceiling heights and maximum height in Australian Height Datum.

- Coloured high resolution **perspectives** of the proposal shown in context from various locations, including longer views from strategic approaches to the site.

- **Sequencing and staging plans** if staged Building Rules Consent is to be sought.

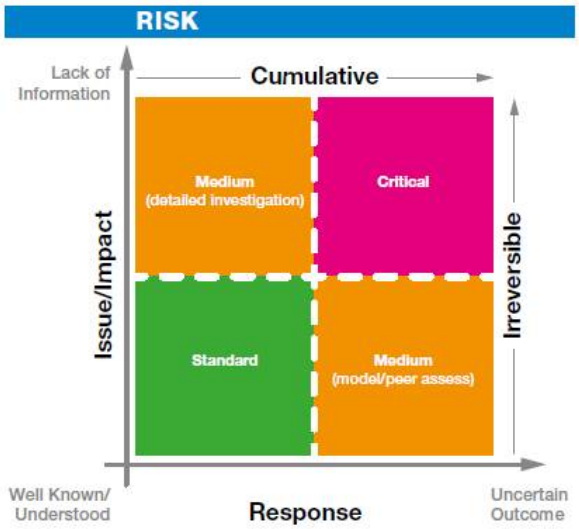
- A **schedule of materials, finishes and colours**.

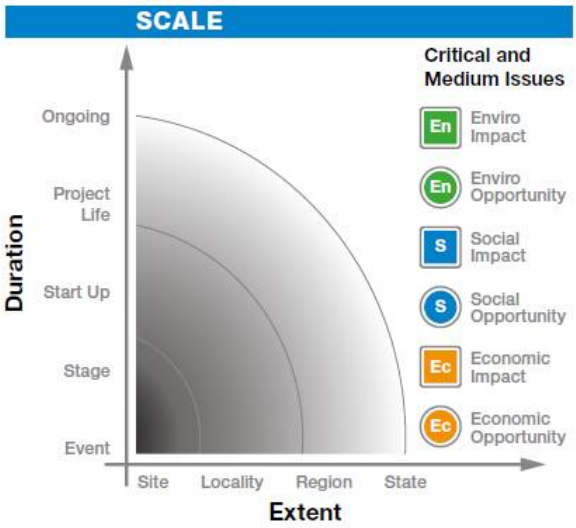
5. ASSESSMENT

Impact assessment is an important tool that enables the consideration of projects that might otherwise struggle to be addressed properly or fairly under the 'normal' assessment system.

In setting these Guidelines, the Development Assessment Commission has considered the scale of issues associated with the project and determined whether they represent issues or opportunities. The potential impacts and issues have then been organised according to the level of work and type of attention required by the Applicant: either standard, medium or critical:

- Where the issue is well known and the response is well understood then the risk assessment is classed as 'standard'.
- Where work is required to address the issue but the risk is likely to be manageable with additional information then the risk assessment is classed as 'medium'.
- Where information about the issue is lacking and the response is unclear, the issue is classed as 'critical'.





LEVEL OF ASSESSMENT

	Risk	Scale
DR	Medium (majority standard)	Standard/Medium
PER	Medium (limited critical)	Medium
EIS	Critical	Critical

From an environmental perspective both the nature of the receiving environment and the kind of activities proposed (which themselves may amount to activities of environmental significance under the *Environment Protection Act 1993* and likely be of interest to the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*) would indicate that the project is of major environmental importance.

The key environmental impacts are likely to be associated with:

- Protection of native flora and fauna, especially any species listed under the *Environment Protection and Biodiversity Conservation Act 1999 (i.e.* nationally threatened Red-tailed Glossy-black Cockatoo).

- Access to water supply on the Island, and the 'downstream' impact of taking larger quantities of water from potentially limited resources.
- Management of stormwater and effluent, including capture, treatment and re-use of recycled water where possible.

From an economic perspective the proponent has advised the total capital expenditure for the proposal is some $22 million, plus broader economic benefits to the local Kangaroo Island community.

- The proposal has potential to employ up to 100 staff associated with the tourist accommodation component. The Tourism sector accounts for 25% of Kangaroo Island's Gross Regional Product (GRP) and 20% of the employment market (466 FTE jobs). The anticipated 100 new jobs generated by the proposal would account for nearly 20% of the overall tourism employment market, and could see the development become one of the larger employers on Kangaroo Island.

- The overall impact of this project on the local community would be significant, and is expected to be a major contributor to visitation numbers by 2020 (currently peaking at 194,000 in 2011/12), a target set by the S*outh Australian Strategic Plan*.

Given the nature and complexity of the proposal the project would benefit from a whole of government assessment given the range of expertise required to manage a wide-ranging and complex planning and environmental assessment. The Major Development process also includes community consultation to a greater level than the standard council development assessment process (but with no appeal rights).

5.1 CRITICAL ASSESSMENT

The issues and impacts identified by the Commission as requiring standard, medium or critical level assessment are listed below. Each guideline includes a description of the issue/impact and a description of the action needed.

Design Quality

Guideline 1: The American River area has high landscape values (especially associated with the coast) and the township has a 'coastal village' character that provides a high level of amenity for residents and visitors.

Evaluate the visual impact of the resort and how it would integrate with the existing character of the American River settlement and surrounds.

Evaluate the proposal against the Principles of Good Design by Office for Design + Architecture SA, including input from the Government Architect led design review process.

Evaluate the proposal's relationship within its context, in particular the interface with neighbouring residents, businesses and open space areas around the development site.

5.2 MEDIUM ASSESSMENT

Economics

Guideline 2: The proposal should make a positive contribution to the commercial and tourism functions of Kangaroo Island and American River.

Provide an economic analysis of the proposal, including the long term economic viability of the project as a whole and its key elements.

Describe the economic contribution of the proposal on Kangaroo Island, including the potential for the project to attract and enhance the business operations of other allied industries and commercial ventures.

Describe the impacts (if any) on the access to housing and accommodation options within American River and the wider locality for employees of the proposal.

Describe strategies to manage and make good the site, should the project fail during the period between the commencement of earthworks and final completion.

Infrastructure

Guideline 3: The proposal requires adequate and appropriate infrastructure provision, in particular a source of power and water from an existing network that currently has limited supply to meet current and future demand.

Outline the requirements for and likely location of infrastructure for water, power, gas, sewerage, stormwater management, waste management, fire fighting and communications systems.

Outline the implications of connecting to the power grid for the existing infrastructure and current users.

Describe an integrated water management strategy, especially Water Sensitive Design measures (including ways in which water use would be minimised), and the use and management of alternative water sources (i.e. wastewater, grey water and stormwater).

Describe the impacts of either developing a new wastewater treatment system or disposing to the existing off-site system. Address the expected volume to be treated, disposal method and whether/how it would be managed to maximise reuse/recycling (including storage requirements). Outline how the treatment system elements would be installed, if it is a phased development.

Describe stormwater and grey water management strategies to maximise recycling (including recycled water storage requirements) and the potential impact on groundwater resources, surface water resources.

Detail the extent to which the facility would generate the need for upgraded infrastructure beyond the site boundaries, especially any broader impacts for the Kangaroo Island community (including strategic implications for Council and/or utility providers).

Social Issues

Guideline 4: The proposal is being developed in close proximity to an existing settlement context. While all forms of development have impacts and will generate change, it is important to consider the manner in which the proposal could make a positive contribution to the social and community fabric of American River and Kangaroo Island.

Describe the characteristics of the American River community (including the nature of their occupancy, such as permanent residents, short-term holiday home residents or with primary production interests).

Describe how the community currently engages with the sites and how the development may influence future activities.

Consider the way in which the broader Kangaroo Island community interacts with the American River settlement and surrounds and how the development would influence future activity.

Detail the likely size and composition of the construction workforce and employees required during operation, including "on island" support required for this workforce and the direct and indirect employment opportunities for the local community.

Outline the impact on existing tourism and recreation services and facilities (including opportunities for growth or improvement).

Aboriginal Heritage and Native Title

Guideline 5: The proposal is developed in a manner respectful of Aboriginal Heritage, consistent with relevant legislative requirements.

Describe the measures taken in consultation with the Department of State Development (DSD-AAR) to identify the Aboriginal heritage in the project area including the outcomes of:

- *A request for a search of the Register of Aboriginal Sites and Objects maintained by the Minister for Aboriginal Affairs and Reconciliation.*
- *Discussion with the relevant Aboriginal parties.*
- *Engagement of an expert archaeologist/anthropologist to assist with the assessment of any heritage sites.*

Describe the measures put in place to manage the risk of damaging, disturbing or interfering with any Aboriginal heritage that has been identified by the consultation undertaken above and any plans to deal with the discovery of Aboriginal heritage during project works. If avoidance has not been possible

in the project design phase, details the steps taken in consultation with DSD-AAR to ensure that any unavoidable damage, disturbance and interference is done in compliance with the Aboriginal Heritage Act 1988.

5.3 STANDARD ASSESSMENT

Management of Other Environmental Matters

Guideline 6: The proposal is developed cognisant of and in a manner which appropriately manages potential impacts and existing environmental values.

Prior and Adjacent Uses
Describe the impact of past and current land management practices on the environmental values of the site, especially any environmental constraints or degrading factors that may need to be addressed.

Native Vegetation and Fauna
Quantify and detail the extent, condition and significance of native vegetation (individual species and communities) on site, that which needs to be cleared or disturbed (directly or indirectly) during construction (including ancillary clearing for bushfire safety or infrastructure), and the proposed framework for ongoing management, including opportunities for rehabilitation and revegetation.

Describe the effect of, and measures to appropriately manage the risk of introduced weed species on native vegetation, before and after construction, including species that may originate from landscaped areas or gardens.

Quantify and detail the abundance, condition and significance of terrestrial and marine native fauna populations that currently exist or may depend on habitat on site or along the routes of infrastructure for the proposal.

Describe direct and indirect impacts to fauna associated with the proposal, the extent of expected fauna and/or habitat loss or disturbance during the construction and operation phases (both on and around site/s) and the ability of communities and individual species to recover, especially for any threatened or significant species (including those listed under the EPBC Act and the South Australian National Parks and Wildlife Act 1972).

Geology and Soils
Describe the physical environment and hydrogeology of the site in relation to landforms, soil types, geology and surface drainage patterns.

Noise
Describe the impact of noise emissions (and vibration) on any existing sensitive receivers (or potential new residents) or sensitive receivers to be introduced as part of the proposed development, during construction and operation. Detail strategies to minimise any potential impacts to meet the requirements of the Environment Protection (Noise) Policy 2007 (including the EPA Noise Guideline: Music noise from indoor venues and the South Australian Planning System - updated July 2015).

Sustainability and Climate Change

Guideline 7: The proposal is developed in a manner that seeks to optimise environmental sustainability.

Describe the measures taken to achieve energy efficiency, including target ratings for buildings.

Outline measures to minimise or reduce materials and resources used during the construction and operational phases, including the use of on-site (or local) and recycled materials.

Outline waste management strategies for residential uses and commercial facilities (including measures to deter scavenging by native or feral species) and the potential for incorporating recycling and resource recovery.

Identify ways in which power can be minimised or supplemented, especially using alternative energy sources and energy efficiency measures.

Describe implications of climate change with respect to the proposal and measures to minimise, reduce and ameliorate greenhouse gas emissions, particularly the use of alternative or renewable energy sources and off-sets.

Transport, Access and Pedestrian Impact

Guideline 8: The proposal is developed in a manner that provides for safe and convenient access within, and to and from the development.

Outline the level of traffic generation and vehicle movements to and from the development site, especially details of vehicle types and distribution (including the hours that vehicles would access the site) during the construction period and operational phase.

Outline the need for and the implications of any upgrading of road infrastructure.

Detail the proposed access and on-site car parking arrangements, including information about road width and associated drainage measures and maintenance requirements.

Evaluate the adequacy of the existing pedestrian facilities within the development site and associated communal facilities, and improvements required to establish and maintain a safe and pedestrian friendly interface.

Land Tenure and Management

Guideline 9: The proposal is developed in a manner that provides for appropriate land tenure arrangement.

Describe the current and proposed ownership arrangements associated with the development.

Describe what processes and approvals would be undertaken to reconcile encroachments on the adjacent Council land (access road).

Identify any required changes that would need to be made to the zoning of the site.

Construction and Operation

Guideline 10: The proposal is developed in a manner that ensures that construction and operational matters are appropriately managed and controlled.

Outline the staging and timing of construction (especially the time of year works are likely to occur and any expected impact on or management of the environment.

Describe the level of cut and fill required (including for access and infrastructure requirements) and the effect on the natural topography of the site.

Describe the measures proposed for the temporary storage, management and disposal of excavated material and construction waste.

Describe the proposed means of minimising stormwater runoff during the construction phase of the development.

Detail the proposed mitigation measures and monitoring of impacts during and after construction, including reporting and auditing measures.

Describe measures to be taken to meet the construction noise provisions of the Environment Protection (Noise) Policy 2007.

Risk and Hazard Management

Guideline 11: The proposal is developed with appropriate risk and hazard management frameworks in place.

Describe strategies for ensuring public safety during construction and operation.

Detail fire management processes and measures to reduce bushfire risk, especially those which minimise vegetation clearance and land disturbance.

Describe strategies for emergency evacuation during medical emergencies and/or bushfire risk.

APPENDIX 1 - TYPICAL SPECIALIST REPORTS THAT MAY NEED TO BE PREPARED

- **Design statement** providing an understanding of the evolution of the proposal (including options explored and discounted) from the initial concept to the final design, and addressing the following matters from a design perspective:
  - Site access, circulation and way finding.
  - Building site selection.
  - Built form and visual impact.
  - Landscaping.

- **Transport, access and pedestrian impact assessment,** prepared by a suitably qualified traffic and access planner/engineer, evaluating current and proposed access arrangements, car parking, and pedestrian and vehicle interface within the local road network for the resort precinct.

- **Waste management and minimization plan (for demolition, construction and operation)** demonstrating the location of waste storage (including separation of recyclables hard waste and e-waste) and disposal facilities on the site and provide details of how these facilities will be serviced.

- **Noise assessment** prepared by an acoustic engineer to moderate external and environmental noise disturbance and amenity impacts for future occupants of the development, but also other sensitive uses within the immediate area as a result of the proposed development.

- **Soil Erosion and Drainage Management Plan (SEDMP)** detailing proposed erosion control, stormwater management and flood impact mitigation measures, as well as any retention and reuse as part of the development, inclusive of details for connecting into any street drainage or council drain and the method of drainage and services proposed to be used.

- **Sustainability assessment** detailing the environmental sustainability measures (energy efficiency, water sensitive design etc) incorporated into the proposal.

- **Site history assessment**, where a development is to occur on land that has the potential to be contaminated (through previous land uses).

- **Site services and infrastructure** details, including utility services (water, gas, electricity, sewerage disposal, waste water, drainage, trenches or conduits); location of ground and roof plant and equipment (fire booster; electricity transformer; air conditioning; solar panels etc).

- **Construction Environmental Management and Monitoring Plan** (CEMMP) analysing potential impacts on the environment, including hazards and risks, proposed mitigation measures and any residual risks to address (but not necessarily limited to) the following matters:
  - Traffic management for the duration of demolition and construction.
  - Management of construction and works noise impacts.
  - Management of air quality, including odour and dust.
  - Sequencing of development, including construction timelines work on site, as well as periods and hours of construction.
  - Occupational health and safety matters.
  - Bio-security and wash down procedures to minimise the transfer of pests during the construction process.
  - Soils, including fill importation, stockpile management, waste fill management and prevention of soil contamination (chemicals and storage, pest plant, pathogenic).
  - Soil erosion and sediment control, including rehabilitation and stabilisation of land as construction progresses.
  - Stormwater management prior to implementation of a permanent solution.
  - Groundwater, including prevention of groundwater contamination.
  - Site contamination and remediation, including the categorisation of contaminated soil where required.

- Hydrology (particularly the protection water quality).
- Vegetation clearance and management, including the protection of remnant stands and the use of cleared material.
- Fauna disturbance, including minimising loss/injury and habitat protection measures.
- Aboriginal Heritage (in accordance with the *Aboriginal Heritage Act 1988*).
- Waste management (for all waste streams) and overall site clean-up.
- Use and storage of chemicals, oil, construction-related hazardous substances and other materials that have the potential to contaminate the environment (including emergency responses).
- Site security, fencing and safety, including the management of public access and local traffic.
- Communication and complaint resolution
- Monitoring program to monitor those items listed above

- **Operational Environmental Management and Monitoring Plan** (OEMMP) that analyses potential impacts on the environment, including hazards and risks, proposed mitigation measures and any residual risks and incorporates measures and actions to address (but not be limited to) the following matters:
    - General operational noise management (e.g. from machinery noise).
    - Waste Management strategies detailing the collection, storage and disposal of waste (for all waste streams) to comply with the Environment Protection (Waste to Resources) Policy 2010.
    - Wastewater collection and treatment to ensure that the general obligations of the Environment Protection (Water Quality) Policy 2015 at met.
    - Traffic and noise associated with any large events.
    - Emergency and evacuation procedures including a Fire Management Plan, prepared in consultation with the Country Fire Service.
    - Ongoing environmental protection and sustainability measures.
    - Monitoring program to monitor those items listed above.

- **Integrated Water Management Plan** (IWMP) that incorporates measures and actions to address (but not be limited to) the following issues:
    - Site plan identifying all water related features and infrastructure for the storage, treatment and/or reuse of potable water, stormwater, wastewater and irrigation water.
    - Water balance information, including the total water needs of all components of the development.
    - Total wastewater generation from the development (based on projected wastewater volumes per day).
    - Predicted greywater generation volumes and a description of how all greywater will be collected, stored and re-used on site (if greywater is to be collected separately to wastewater).
    - Predicted evaporative losses from water/wastewater storages.
    - Description of how all wastewater will be collected, stored and re-used on site, including the capacity of the system (i.e. number of people).
    - If treated wastewater to be used on-site, a Reclaimed Water Irrigation Management Plan, prepared in accordance with the EPA Guideline Wastewater Irrigation Management Plan – a Drafting Guide for Wastewater Irrigators (June 2009). Details of the proposed wastewater storage lagoon liners, as per the EPA Guideline Wastewater lagoon construction (November 2014).
    - Predicted stormwater generation volumes and details of stormwater quality improvements, including the location and sizing of bio-retention swales and basins, anticipated quality improvements and details of any other proposed stormwater quality treatment features.
    - Contingencies to address any detrimental effects, especially on local hydrology.

- **Native Vegetation Management, Rehabilitation and Revegetation Plan**, including details on how weeds and pests are to be managed following commencement of operations.

- **Social Impact Statement** that describes the characteristics and demographics of the local and regional community (including neighbouring land owners and land uses) and the impacts on affected groups of people (such as their way of life, life chances, health and culture).

APPENDIX 2 – USEFUL RESOURCES

- Kangaroo Island Development Plan and Planning Strategy (including the Kangaroo Island Structure Plan).

- 'National Landscapes Experience Development Strategy for Kangaroo Island' (2014) and the 'Brand for Kangaroo Island' (i.e. especially to deliver an 'extraordinary' tourism development consistent with the principles of ecologically sustainable development)

- Kangaroo Island Natural Resources Management Plan (amended version, 2015).

- South Australian Tourism Commission 'Design Guidelines for Sustainable Tourism Development' (2007).

- South Australian Tourism Commission Nature-based tourism plan for South Australia:

  http://www.environment.sa.gov.au/parks/get-involved/nature-based-tourism-plan#Nature-Based Tourism

- SA Tourism Commission Regional Tourism Profile – Kangaroo Island

  http://tourism.sa.gov.au/research-and-reports/regional-tourism-profiles.aspx

- 'Tackling Climate Change, SA's Greenhouse Strategy 2007 – 2020', the *Climate Change and Greenhouse Emissions Reduction Act 2007* and the *National Greenhouse and Energy Reporting Act 2007*.

- *Environment Protection Act 1993* and associated policies and guidelines, including:

  http://www.epa.sa.gov.au/business_and_industry/environmental_planning/position-statements-and-guidelines

  http://www.epa.sa.gov.au/reports_water/nepean-ecosystem-2011

APPENDIX 3 – SECTION 46D OF THE *DEVELOPMENT ACT 1993*

46D—DR process—specific provisions

(1) This section applies if a DR must be prepared for a proposed development.

(2) The Minister will, after consultation with the proponent—

(a) require the proponent to prepare the DR; or

(b) determine that the Minister will arrange for the preparation of the DR.

(3) The DR must be prepared in accordance with guidelines determined by the Development Assessment Commission under this Subdivision.

(4) The DR must include a statement of—

(a) the expected environmental, social and economic effects of the development;

(b) the extent to which the expected effects of the development are consistent with the provisions of—

(i) any relevant Development Plan; and

(ii) the Planning Strategy; and

(iii) any matters prescribed by the regulations;

(c) if the development involves, or is for the purposes of, a prescribed activity of environmental significance as defined by the *Environment Protection Act 1993*, the extent to which the expected effects of the development areconsistent with—

(i) the objects of the Environment Protection Act 1993; and

(ii) the general environmental duty under that Act; and

(iii) relevant environment protection policies under that Act;

(ca) if the development is to be undertaken within the Murray-Darling Basin, the extent to which the expected effects of the development are consistent with—

(i) the objects of the River Murray Act 2003; and

(ii) the Objectives for a Healthy River Murray under that Act; and

(iii) the general duty of care under that Act;

(cb) if the development is to be undertaken within, or is likely to have a direct impact on, the Adelaide Dolphin Sanctuary, the extent to which the expected effects of the development are consistent with—

(i) the objects and objectives of the Adelaide Dolphin Sanctuary

Act 2005; and

(ii) the general duty of care under that Act;

(cc) if the development is to be undertaken within, or is likely to have a direct impact on, a marine park, the extent to which the expected effects of the development are consistent with—

(i) the prohibitions and restrictions applying within the marine park

under the Marine Parks Act 2007; and

(ii) the general duty of care under that Act;

(d) the proponent's commitments to meet conditions (if any) that should be observed in order to avoid, mitigate or satisfactorily manage and control any potentially adverse effects of the development on the environment;

(e) other particulars in relation to the development required—

(i) by the regulations; or

(ii) by the Minister.

(5) After the DR has been prepared, the Minister—

(a) —

(i) must, if the DR relates to a development that involves, or is for the purposes of, a prescribed activity of environmental significance as defined by the Environment Protection Act 1993, refer the DR to the Environment Protection Authority;

(ia) must, if the DR relates to a development that is to be undertaken within the Murray-Darling Basin, refer the DR to the Minister for the River Murray;

(ib) must, if the DR relates to a development that is to be undertaken within, or is likely to have a direct impact on, the Adelaide Dolphin Sanctuary, refer the DR to the Minister for the Adelaide Dolphin Sanctuary;

(ic) must, if the DR relates to a development that is to be undertaken within, or is likely to have a direct impact on, a marine park, refer the DR to the Minister for Marine Parks;

(ii) must refer the DR to the relevant council (or councils), and to any prescribed authority or body; and

(iii) may refer the DR to such other authorities or bodies as the Minister thinks fit, for comment and report within the time prescribed by the regulations; and

(b) must ensure that copies of the DR are available for public inspection and purchase (during normal office hours) for at least 15 business days at a place or places determined by the Minister and, by public advertisement, give notice of the availability of copies of the DR and invite interested persons to make submissions to the Minister on the DR within the time determined by the Minister for the purposes of this paragraph.

(6) The Minister must, after the expiration of the time period that applies under subsection (5)(b), give to the proponent copies of all submissions made within time under that subsection.

(7) The proponent may then prepare a written response to—

(a) matters raised by a Minister, the Environment Protection Authority, any council or any prescribed or specified authority or body, for consideration by the proponent; and

(b) all submissions referred to the proponent under subsection (6), and provide a copy of that response to the Minister within the time prescribed by the regulations.

(8) The Minister must then prepare a report (an Assessment Report) on the matter taking into account—

(a) any submissions made under subsection (5); and

(b) the proponent's response (if any) under subsection (7); and

(c) comments provided by the Environment Protection Authority, a council or other authority or body; and

(d) other comments or matter as the Minister thinks fit.

(9) Copies of the DR, any response under subsection (7) and the Assessment Report must be kept available for inspection and purchase at a place determined by the Minister for a period determined by the Minister.

(10) If a proposed development to which a DR relates will, if the development proceeds, be situated wholly or partly within the area of a council, the Minister must give a copy of the DR, any response under subsection (7) and the Assessment Report to the council.

(11) **APPENDIX 4 – DECLARATION NOTICE**

DEVELOPMENT ACT 1993: SECTION 46 (1)

Preamble

On 18 July 2015, the Minister for Planning, by notice in the *Gazette* (see 18 July 2015, pages 3826-3827) declared that Section 46 of the Development Act 1993, applied to a development of a kind specified in Schedule 1 of that notice. The declaration applied to a tourist resort and commercial harbour development proposal at American River, Kangaroo Island. The commercial harbour component is no longer intended as part of the development proposal.

It has been decided to vary the declaration.

NOTICE

PURSUANT to Section 46 (4) of the Development Act 1993, I vary the declaration referred to in the preamble, by amending it as follows:

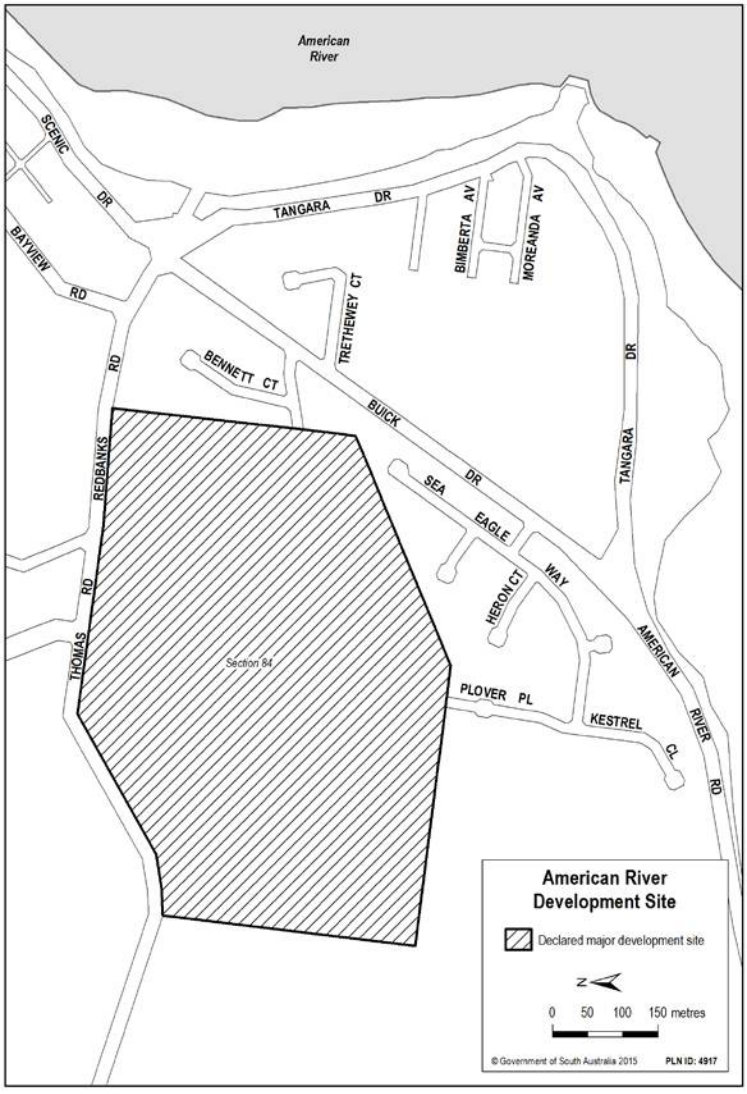
(a) by deleting item *(a)* (iii) marina and ferry docking facilitates from Schedule 1;

(b) by deleting item *(d)* the division of an allotment associated with any development within the ambit of a preceding paragraph from Schedule 1; and

(c) by deleting the following land from Schedule 2:

Plan Parcel	Title
D93295 A100	CT6142/412
H110500 S271	CR5856/801
H110500 S356	CR5757/351
H110500 S357	CR5759/875
and the land immediately to the east, adjacent to Sections 356 and 357, in the Area named American River (known as the American River boat ramp).	

(d) by replacing Schedule 3 with the following:



Dated 31 August 2016.

JOHN RAU, Minister For Planning

Operational Environmental Management and Monitoring Plan (OEMMP)
&
Construction Environmental Management and Monitoring Plan (CEMMP)

Hotel Resort American River
DRAFT – MAY 2016

PARTI

EXECUTIVE SUMMARY

This document contains a draft Construction Environmental Management and Monitoring Plan (CEMMP) and Operational Environmental Management and Monitoring Plan (OEMMP) for the proposed Hotel Resort development at American River. Together they cover the construction, operation and maintenance phases of the project on crown and privately owned land. Set out in this document is a draft set of policies aimed to provide best management of all construction and operational elements of the project for the protection of the environment. This draft sets out expected mechanisms by which the policies will be accomplished, alongside criteria by which the degree of achievement of the policies can be measured. Through adoption of and adherence to these plans, it is expected that environmental impact of the proposed development will be minimised as far as practicable.

The CEMMP and OEMMP will be developed as the proposed design and operation is refined, ensuring best practice for construction and operation in relation to the specific details of the project. Therefore, the proposed objectives, management strategies and monitoring are subject to change to ensure best practice policies are achieved and reflect the proposal accurately.

Introduction

City & Central Consulting Pty. propose to develop a 315 bedroom hotel resort, located at American River on Kangaroo Island, South Australia. The project area where the hotel will be built is within the American River area (Hundred of Haines): a 33 hectare site on the western edge of the American River settlement.

The hotel site covers 33 hectares of privately owned land. The land for the development is subject to South Australian legislation, under which various approvals are required. The draft CEMMP and OEMMP covers the development, and has been drawn up to assess the necessary and appropriate response to the sensitive environmental conditions of the site.

Site

Hotel
The hotel site covers 33 hectares of predominantly degraded agricultural land on the western edge of the American River settlement, within the area zoned as Residential and Deferred urban (DPTI 2014). This land is privately owned. This area is a block of land previously grazed by sheep, having been largely cleared for grazing and a previous proposal for a golf course.

Design

The overall layout of the hotel is described in Section 5 of the PER Submission. A short description of the design is set out below.

The Resort complex is designed as a 'deconstructed hotel', comprising a hotel building (115 rooms), ten lodges. 9 of the lodges contain tourist accommodation within six-story slender buildings strategically located around the site to minimise impact on the environment. Each of these lodges has two suites per floor to provide multiple views from each room (12 suites per lodge, with a total capacity of 108 suites). These rooms are located above shared ground floor facilities. A range of self-contained cottages (20 in total) and cabins (20 in total) is also to be provided around the site. The resort is to have a total guest capacity of 646 guests.

The main lodge buildings include a reception, retail, restaurants, bars, conference facilities and pool (with associated roads and car parking).

Further resort amenities within the various lodges will include a health spa, fitness centre, kid's club, conservation and activity centre, KI speciality restaurant/cookery school, stables (for horse riding activities), library (including wine bar) and indigenous botanic gardens. The project will focus on niche tourists interested in horticulture, conservation, bird watching, and local food products. Whilst there is no formal plan for festivals and markets, it is hoped that with the appointment of a hotel operator, a programme of events may be established, which would be open to both the local community and visitors.

The various components of the resort are spread around the site to provide a variety of views and experiences, all connected by a network of paths and access roads.

A hotel courtyard, comprising accommodation of 115 small guest rooms with terraces, dining room, bar and loby, staff canteen, and resort maintenance facilities (i.e. stores, workshop and laundry on the ground floor). Additional infrastructure for water supply, electricity supply, telecommunications, stormwater management and waste management (including effluent treatment and disposal) are included in the proposal, with details being available in the DR.

Assesment

The proposed development has been extensively assessed with respect to environmental values of the hotel site, and the implications during construction and operation. These reports are summarised in the DR submission, and formed the basis for the drafting of the CEMMP & OEMMP in this document.

The assessments undertaken include:

- BCA Engineers, *Public Environmental Report Infrastructure Section* March 2016
- Envisage Environmental Services, *American River Resort: Fauna assessment*, March 2016 (Pip Masters & Rick Southgate)
- Dr. Keryn Walshe, *Preliminary Archaeological and Cultural Heritage Investigation: American River Project,* March 2016
- Botnaical Enigmerase, *Native Vegetation Assessment Kangaroo Island Resort American River*, March 2016 (Daniel Rowley and Michelle Haby)
- infraPlan, *American River – Holiday Resort Traffic Impact Assessment,* April 2016
- Magryn Engineering Consultants, *Coastal Engineering Report for Public Environmental Review Proposed Marina and Ferry Terminal American River Kangaroo Island,* March
- Sonos Pty. Ltd., *American River Project Kangaroo Island Environmental Noise Assesment,* March 2016

Whilst their findings are reflected in the drafting of the CEMMP & OEMMP, greater detail can be found in each report. These documents can be found as an appendix to the PER submitted in support of the development application.

Scope of CEMMP & OEMMP

Legislation & Policy

The following legislations & policies have been considered to be relevant to the proposal, informing our consultant reports, and the formulation of the draft CEMMP & OEMMP:

- South Australian National Parks and Wildlife Act 1972
- Environment Protection (Noise) Policy 2007
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999
- South Australian Tourism Commission's Tourism Plan 2020.
- Aboriginal Heritage Act 1988.
- Native Title Act 1993 (Commonwealth).
- Native Title Act 1994 (South Australia).

Key Considerations

In relation to the hotel site, the following issues are covered with regards to construction and operation in the management and monitoring plans:

- Endangered, threatened & protected fauna
- Threatened vegetation communities
- Threatened flora
- Spread of nuisance organisms & diseases
- Introduction of pests
- Erosion control and landscape rehabilitation
- Aboriginal heritage
- Recreational value and local amenity
- Noise pollution
- Air pollution
- Water pollution
- Sediment control

- Waste management & disposal
- Fire protection & management

Guidance on Implementation
The draft CEMMP & OEMMP begins to assign responsibilities for activities in relation to the management of both construction and operation, including:

- Administration of the project, including designation of responsible parties
- Communication procedures to assign responsibilities and reporting
- Contingency and emergency response procedures
- Community training/workshops on environmental management
- Hours during which construction activity will take place
- Location of where buildings and building materials will be stored during construction
- Monitoring program and due diligence checklist for CEMMP & OEMMP, and legislation compliance

Objectives of CEMMP & OEMMP

General Objectives:

- Provide evidence of practical and achievable plans for the management of the project to ensure that environmental requirements are complied with by producing a comprehensive framework for control and monitoring of both construction and operational impacts; and
- Provide the community and the responsible authority with evidence of the project being undertaken and operated in an environmentally acceptable manner

Specific Objectives:

- Identify the key environmental issues that may be affected by the project;
- Provide a set of management actions to manage the identified values at all stages of construction and operation of the hotel, associated facilities and infrastructure; and
- provide a set of monitoring and reporting protocols against which to measure the completion and efficacy of management actions

Implementation of CEMMP & OEMMP

Context
The proposed American River resort development comprises the following components

Hotel:

- 10 lodges with associated hotel programme on the ground floor, 9 of which feature 6 floors of hotel accommodation above
- 115 hotel rooms in courtyard garden hotel
- 20 4-bedroom cottages
- 20 1-bedroom cabins
- Clearing, revegetation and landscaping
- Car-parking, vehicle access, pedestrian and buggy routes
- Connection to mains sewer system and power supply

Design Philosophy
In developing the proposal the significance of the site, for both it's unique environmental qualities as well as amenity, was considered paramount to the development of a suitable proposal, recognising that the proposal will modify the existing conditions to a certain extent.

The fundamental design principals set out below have informed the design philosophy behind the proposal:

- Limit removal of existing vegetation
- Revegetate the site to provide more habitats for native fauna
- Exemplify flora native to Kangaroo Island, but in particular to American River, in landscape plan
- Limit building footprints (to both preserve vegetation and existing wildlife habitats)
- Site buildings in a manner responsive to the landscape
- Allow guests to experience the diversity of landscape offered by the site
- Encourage pedestrian movement over vehicular movement
- Develop a series of accommodation offerings unique on Kangaroo Island
- Create a series of offerings to encourage year-round tourism
- Engage with the local community to create a town centre for American River
- Create a diverse mix of offerings for guests and locals

These elements have been developed through the deconstructing of the traditional large hotel into a series of lodges, engaging with the landscape, reducing building footprint and need for vegetation clearance, whilst reducing the visual impact of the resort. The landscaping plan relies predominantly on native flora, going beyond the offsetting requirements for the small amount of clearance proposed, providing paths for people to travel through and experience the landscape.

Monitoring Programme
A regular monitoring programme and schedule will be devised for all issues covered in this document. Both the draft CEMMP & OEMMP outline monitoring criteria; it is expected that these will be developed in conjunction with relative agencies, including KI council and the EPA, as well as third party suppliers as appropriate. The refinement of a monitoring strategy and programme will run alongside the development of the design and operation, being finalised prior to construction.

Adaptive management in response to Monitoring
The draft CEMMP & OEMMP have been prepared with an "adaptive management" strategy expected, allowing management, monitoring and response to adopt and achieve best practices in all aspects of environmental management from the production of this draft, its refinement and implementation, monitoring of actions and adopting altered management regimes in response to changing conditions.

Responsibilities

General
The proponent and design team will address the issues detailed in the draft CEMMP & OEMMP during the detailed design phase of the project. This will allow finalised CEMMP & OEMMP to be produced, with significant environmental management actions being defined in the contract documents for the main construction contractor and hotel operator, covering the construction and operation of the proposal respectively.
The proponent will ensure that the actions within the final CEMMP & OEMMP are implemented and that all parties involved are aware of the requirements and permits, and the associated monitoring process.

The implementation over the process of development from pre-construction through to operation, and the relevant parties, is described below.

Pre-construction

Water Quality

Prior to the commencement of any construction works on site, the following activities are to take place:

- Water harvesting & quality testing to existing streams on hotel site

The samples collected are to be tested for the following minimum parameters:

- Suspended solids
- Colour and turbidity
- BOD5/E. coli
- pH
- Acid Sulphates
- Sodium
- Other parameters as required

Water sampling is to be undertaken throughout the duration of the project to ensure that no decrease in water quality is experienced. The recommended testing interval is one test at each of the above locations every three (3) months during the construction phase of the project.

Vegetation Marking

Vegetation proposed for retention is to be protected by ensuring that construction works do not extend outside the designed areas (refer to Appendix B of the PER for proposed vegetation clearance). The designers, or nominated representative, will nominate all works areas prior to commencement of on-site earthworks.

Site Boundaries

A boundary fence will be erected around the entire property during construction, in accordance with local government authority specifications.

The boundary fence will be clearly identifiable and prohibit pedestrian and vehicle access to the construction site during construction works. The fence will be constructed as low as possible to meet the council needs. Fencing will be constructed of non-barbed materials and have reflective metal tags (approx 150 x 75mm) placed on the top wire at regular intervals of no less than 1m to help prevent bird strikes. The fence will be inspected and the tags replaced as needed each year.

Management of Fauna

A designated fauna expert will be made available during construction, for advice on management and disturbance to existing habitats. Earthworks will only commence within areas highlighted as habitats or feeding locations within the PER supporting Fauna Assessment (Appendix D to PER, Envisage Environmental Services, March 2016) once a designated fauna expert has reported a negative occupancy status at that time. The boundary fence shall ensure the risk of entry of vertebrate fauna species (with the exception of birds) to the site during construction works is minimised.

Construction

Appointed contractors and sub-contractors working on the site shall ensure that all construction activities comply with the policies and procedures identified in the CEMMP and permits. The CEMMP and permit conditions will be incorporated into the contract documents and the contractors will be required by the contracts to conform to the environmental requirements set out in the CEMMP and permits that relate to the construction period. An appointed Construction/Project Manager will review the performance of the contractors, and the sub-contractors in relation to the CEMMP regularly during the construction phase of the project.

Operation

The appointed hotel operator, and any other sub-operators, will be responsible for ensuring compliance with the OEMMP and permits within the hotel resort facility. The OEMMP and permit conditions will be incorporated into the contract documents and the operators will be required by the contracts to conform to the environmental requirements set out in the OEMMP and permits that relate to the operation of the hotel resort and associated facilities.

Site Access

The hotel site will be accessed via two points during construction. This will be from Thomas Road, the northern most point of the site, and Red Banks Road on the eastern most point of the site. These are both public roads. Internal site access to individual work sites during construction will be via the proposed routes through the site for buggies and emergency vehicles during operation.

Contractor Facilities

The principal contractor will utilise temporary buildings for site office use. Staff toilets will be Portaloo or equivalent serviced by an external contractor.

One fuel tank may be deployed on the resort site. This will be located in a bunded area having a bunded volume of not less that the volume of the tank.

Rubbish and litter will be removed off site as it accumulates and will be disposed of at a recognised municipal facility.

Other contractors and sub-contractors that are undertaking the construction of infrastructure will be required to adhere to the principles outlined above and their site offices and compounds may progressively move through the site to keep pace with construction.

Occupational Health and Safety (OH&S)

Contractors will be required to prepare a quality plan including system elements covering the management of OH&S, and shall provide for prompt notification to the Superintendent of any accident or injury occurring at the site.

Contractors will be required to co-operate with others, and co-ordinate with other parties, to ensure that relevant safety issues are reviewed and implemented.

Contractors and their agents shall, so far as is practically possible, provide and maintain for employees and its agents or the agents of the Principal and the Superintendent, a work site environment that is safe and without risk to health.

Contractors will be required to prepare a site safety plan to be submitted to the Superintendent prior to the commencement of works. The site safety plan shall include OH&S procedures relating to plant safety, worker safety and public safety that shall be instituted as a minimum requirement under the contract.

CEMMP & OEMMP Review

The CEMMP & OEMMP are intended to be adaptive management-planning tools. The CEMMP shall be reviewed at set construction review periods, agreed between the proponent and contractor.

The hotel operator, in conjunction with the landowners and other relevant parties, such as Kangaroo Island Council, shall review the OEMMP annually to ensure that all management actions have been implemented.

The review process will identify where the OEMMP & CEMMP can be modified to improve the management outcomes or achieve outcomes in a more efficient manner.

The reviews will include checking changes to policy elements and permit conditions under which the plans were originally prepared to ensure that the plans remain appropriate and relevant.

These reviews and changes will be provided to DPTI and other relevant agencies, and meetings to discuss will be held as necessary.

Documentation and Record-Keeping

All environment-related communications, including reports, minutes of meetings, records of non-conformance, corrective actions and site inspections will be kept at the hotel resort construction site office, and upon completion of all construction works, shall be held at the hotel offices so that they are readily retrievable.

A copy of the annual report against management actions (where relevant to Crown land or values covered under Acts, policies and permits administered by the Crown) will be supplied to Kangaroo Island Council and DPTI where applicable for their commentary and records.

Where an authority requests a greater degree of input into review and documentation protocols, the proponent will facilitate any such meetings and discussions in a timely manner.

Structure

The elements to be managed and monitored with the CEMMP & OEMMP are assessed against the following criteria:

- Objective: This is a statement of the guiding principle that applies to the element.
- Management Strategy: These are the specific actions by which the objective will be achieved.
- Performance criteria: These are the criteria by which the success of the implementation of the actions will be measured against.
- Monitoring: This is the process of measuring actual performance, or how well the policy has been achieved, including the format, timing and responsibility for reporting and auditing of the monitoring results.

Draft CEMMP

The following pages outline the structure for a Construction Environmental Management and Monitoring Plan (CEMMP) for the proposed Hotel resort development at American River. A full plan will be produced cognizant with the detailed development of the proposals, providing specific and meaningful strategies. This document is intended to provide a framework for developing the full plan. The full plan will be developed in conjunction with the relevant government agencies and appointed contractor, to reflect the technical details of the proposal as they are finalised. This will be before construction takes place, allowing for review as necessary by government agencies.

Traffic management for the duration of demolition and construction

Objective:

To reduce the conflict between operational efficiency of construction and local amenity, with regard to traffic flows in and out of the construction site. Namely:

- Deliveries causing disruption to traffic flow during peak hours
- Potential danger associated with deliveries causing traffic jams
- Noise disturbance to residents, particularly out-of-hours
- Noise disturbance to fauna

Strategy:

- Develop a deliveries schedule that minimise disruption to local amenity and traffic, according to peak traffic hours
- Develop a policy for out-of-hours delivery where normal delivery windows can not be adhered to

Performance Criteria:

- Adherence to delivery schedule and out-of-hours policy

Monitoring:

- Recording of all deliveries time
- Review of recorded delivery times against set schedules and policies
- Processing and review of any complaints from local residents with regards to traffic disruption by appointed Construction Manager

Management of construction and works noise impacts

The hotel site is relatively isolated, with residents scattered to the east and south of the site. To the east, dense planting will provide some screening to any operations, and associated noise. To the south, residents are predominantly located far from most of the proposed construction, therefore construction noise is expected to only have an impact for short periods of time, if at all.

Objective:

- Manage noise from construction so as to avoid causing disturbance to local residents and wildlife
- There is no specific statutory controls exist for noise from construction sites, however a plan should be developed to reduce noise nuisance from vehicles, fixed machinery within the site, blasting, general construction activities, and the movements of vehicles servicing the site.

Strategy:

- Develop hours of operation, with regard to sensitive hours to local residents
- Develop a plan for any necessary out of hours work, with appropriate documentation by site management and informing of residents
- During normal hours reasonable measures should be taken to minimise noise production
- Fit and maintain appropriate noise reduction devices to machinery and vehicles
- Enclose noisy equipment where possible

Performance:

- Noise levels kept to an acceptable level
- Minimal hours of excessive noise

Monitoring:

- Recording of excessive noise levels and times
- Processing and review of any complaints from local residents with regards to traffic disruption by appointed Construction Manager

Management of air quality, including odour and dust

Risks:

- Pollutants form exhaust gasses of vehicles and machinery reducing air quality

Objective:

- Prevent health risk or loss of amenity due to emission of exhaust gases to the environment.

Strategy:

- All vehicles and machinery should be fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications.

Sequencing of development, including construction timelines work on site, as well as periods and hours of construction

The sequencing of work should be scheduled with appropriate regard to issues of noise and traffic impact. This will take into consideration both local residents, as well as wildlife habits – including migration and mating. Local residents will be informed of key dates with regards to the schedule for construction, and hours of operation.

Occupational health and safety matters

Occupational health and safety during construction is key to the successful management of a construction site and smooth delivery of the project. Occupational health and safety requirements should be fulfilled in relation to criteria set by SafeWork SA, state and commonwealth legislation, including the Fair Act Work 2009.

Bio-security and wash down procedures to minimise the transfer of pests during the construction process

Necessary control structures will need to be identified and implemented. Suitable wash down catchments must be provided, with contaminated wash being collected, treated and/or disposed off appropriately.

Soils, including fill importation, stockpile management, waste fill management and prevention of soil contamination (chemicals and storage, pest plant, pathogenic).

Management of soils on the site must take into consideration importation, storage, waste and contamination. It is expected that little soil will be imported to the site to be used as fill, nonetheless the prevention of contamination of soils stored on site through contact with chemicals and pests present during construction, should follow disposal methods according to EPA levels of contamination.

Soil erosion and sediment control, including rehabilitation and stabilisation of land as construction progresses
Stormwater management prior to implementation of a permanent solution

Risks:

- Erosion and sediment run-off from construction site polluting natural waterways

Objective:

- Control the damage created through soil erosion, particularly sediment run-off
- To minimise the impact of contaminated stormwater on receiving waters
- Stabilise the land to prevent future run-off

Strategy:

- Where possible, schedule ground breaking works and other soil disrupting works to avoid times of the year when rainfall is high
- Management of risk during storms, with the ability to handle a one-in-two-year storm event (two-year ARI with intensity of six hours), for temporary structures, and a one-in-fifty year storm event, for permanent structures
- Installation of structures, both temporary and permanent, to handle peak flows and sediment load. All silt loads should be treated as close to their source as possible.
- Such devices may include detention dams, geotextile fences, straw bales, rock weirs, ponds and basins within identified drainage lines. Installation of temporary systems may take place before permanent stormwater management systems are in place. An assessment of the need for this will need to take place before construction and formulated in the final CEMMP.
- Where necessary, these devices may hold sediment-contaminated run-off long enough for suspended sediment to settle out. Clarified water can then be discharged to natural waterways.
- Special processes will need to be implemented for any fine colloidal clays (i.e. use of flocculants) and chemical sludge (i.e. licensed off-site disposal)
- An inspection, maintenance and cleaning program for sediment run-off control structures should be established. Appropriate care should be taken to ensure sediment is not resuspended when cleaning traps.
- Rehabilitation of the landscape is included as part of our landscape strategy (described in Appendix C to the PER). Existing waterways are to be appropriately

planted to allow for effective management of stormwater, as outlined in the stormwater report (Appendix L to the PER).

Waste management (for all waste streams) and overall site clean-up, including prevention of groundwater contamination, remediation of any site contamination and categorisation of contaminated soil or sediment (particularly acid sulphate soils), where required.

The construction should follow the hierarchy of reduction, reuse and recycling with regards to waste generation

Objective:

- Minimising waste generated by construction and discharged to the environment
- All contaminated material uncovered should be excavated and disposed of in an environmentally responsible manner

Strategy:

- Setting waste minimisation targets and measures as part of the CEMMP
- For inert waste, a waste minimisation assessment identifying waste and methods for reduction, reuse and recycling should be undertaken as part of the CEMMP
- Solid inert waste found on construction sites such as building rubble, concrete, bricks, timber, plastic, glass, metals, bitumen, trees and shredded tyres. Such wastes should be reused or recycled over disposal to a landfill site licensed to take such wastes
- For contaminated waste, material should be excavated in a manner, which avoids off-site environmental problems.
- Any contaminated material or wastes should be sealed as quickly as discovered.
- Transport odorous wastes in covered vehicles.
- Dispose of contaminated material in a landfill licensed to take the type of contaminated material or wastes uncovered.
- On going monitoring of any acid sulphate soils present will take place as necessary. In response to this a method for their disposal will be developed.

Hydrology and hydrodynamic processes of freshwater and/or marine systems (particularly the protection water quality).
Coastal processes and sea level rise implications, including affects on beach profiles.

Risks:

- Disturbance and change to hydrology and hydrodynamic processes
- Reduction of water quality

Objective:

- To maintain current land based water flows into the marine environment
- Management of any changes to stormwater run-off as a result of the proposal
- Limit impact on the tidal prism from the rise and fall of tides in Pelican Lagoon to maintain the current flow in the estuarine channel adjacent American River
- Protection of marine systems impacted upon by the hydrodynamic process
- Quality control for maintaining water quality
- Incorporation of sea level rise predictions for 1.0m by 2100

Strategy:

- Water quality monitoring will take place at regularly determined intervals during construction.
- Work will be ceased until such appropriate measures can be put into action.
- It is however expected that the construction process will have relatively little impact on freshwater and coastal processes, as expressed within the DR (further detail

being available in Appendices F and I to the DR). These issues are also highlighted below.

Vegetation clearance and management, including the protection of remnant stands and the use of cleared material

The native vegetation on the property is considered of poor condition and low biodiversity value however the vegetation, including planted vegetation, is providing feeding and nesting habitat for the Glossy Black Cockatoo. The removal of vegetation has risks associated with both the loss of habitats and changes to ground conditions which may create hydrogeological issues.

Risks:

- Removal of habitats for species, particularly feeding locations for the Glossy Black Cockatoo
- Reduction in native vegetation
- Exposure of soil vulnerable to erosion
- Soil erosions creating changes in hydrogeological conditions
- Exposure of erodible soil is a high-risk activity which may lead to dust generation and sediment run-off

Objective:

- Minimise need for vegetation clearance
- Off-set vegetation clearance through revegetation or contribution to Native Vegetation Fund, in accordance to the Policy for Significant Environmental Benefit
- Creation of new habitats for Glossy Black Cockatoo and other wildlife
- Manage any exposed soil through replanting
- Catchment of any erosion induced sediment in waterways

Strategy:

- Designated areas for clearance in accordance to Appendix B to the PER
- Coordination of construction activities to reduce multiple points of access, and therefore minimise clearance needed. Where densely vegetated, it is proposed that each building will be accessed from certain points, rather than 360^{o} access.
- The proposal to use prefabricated elements for construction significantly reduces the amount of work on site, and the amount of access required to each location, with the ability to crane whole units into place. This reduces the need for the movement of heavy machinery around each building to one crane during much of the construction.
- Mulching any disturbed areas during construction, until permanent revegetation can be implemented
- Pre-construction vegetation of existing cleared areas on the site to allow for the development of new habitats to mature before disturbing existing habitats.
- Pre-construction vegetation will also provide new catchment to any additional sediment run-off created through clearance.
- Pre-construction vegetation will be carefully planned in accordance to specified access routes and areas for construction, to avoid replanting and repeated disturbance
- Revegetation is preferred over contribution to the Native Vegetation Fund, this is so that the environment and habitat found in and around American River can be maintained and enhanced for residents and visitors, and future generations.
- Revegetating cleared areas as quickly as possible post-construction, minimising the interval between clearing and revegetation

- Revegetating with predominantly native vegetation in accordance with the Landscape Plan (see appendix….). This is considered to be an appropriate off-set subject to appropriate implementation. Vegetation has been chosen to enhance the Glossy Black Cockatoo and Southern Brown Bandicoot habitat, as well as enhance the Kangaroo Island Narrow-leafed mallee woodland

Fauna disturbance, including minimising loss/injury and habitat protection measures.

Whilst it is expected there will be little long-term impact, the construction phase may cause disturbance to local wildlife. Fauna disturbance during construction must be carefully managed to reduce impact on all wildlife on site. Particular caution must be taken in relation to listed endangered and threatened species.

The hotel construction must take care to minimize disturbance to the Glossy Black-Cockatoo and Short-beaked Echidna.

Risks:

- Removal of habitats and feeding locations for species, particularly feeding locations for the Glossy Black Cockatoo
- Habitat disruption due to atmospheric pollution caused by construction activity, such as noise and air pollution

Objective:

- Minimise vegetation clearance
- Coordinate construction so as not to disrupt the objectives and activities of the Glossy Black-Cockatoo Recovery Program
- Develop appropriate working methods for construction operations to limit all impacts on habitats
- Introduction of safeguard measures to reduce pollutants being released during construction

Strategy:

- Noisey and dusty construction activity of structures in close proximity to nesting sites must be limited during breeding season. With an engagement with fauna specialists to avoid any long-term impact.
- In accordance with the vegetation and landscape plan, minimise clearance of any vegetation in the eastern half of the site
- Removal of sugar gums and allocasuarina verticullata are to be limited in accordance to vegetation clearance plan
- All construction vehicles and equipment are to be cleaned on a determined regular basis to reduce the spread of weeds and soil pathogens
- Traffic speeds during construction will be limited
- Construction waste is to be appropriately managed, with adequate protection from wildlife interference
- protect native vegetation from dumping, trampling and disturbance
- Implementation of defined routes for workers and construction traffic
- Education of all construction workers to best practice for interaction with wildlife

Aboriginal Heritage (in accordance with the *Aboriginal Heritage Act 1988*). And Non-Aboriginal Heirtage

An archaeology and heritage report has been commissioned to highlight any implications relating to Aboriginal Heritage. It noted that it was highly unlikely that any Aboriginal ancestral remains, sites or objects of archaeological, anthropological or historical significance under the Aboriginal Heritage Act 1988, would be discovered during the construction.

To ensure best practice in line with the Aboriginal Heritage Act 1988 it is proposed that due consultation with any identified party be made, alongside the implementation of appropriate procedures for the discovery of historical artefacts.

Risks:

- Discovery of Aboriginal ancestral remains, sites or objects of archaeological, anthropological or historical significance
- Damage of any such objects during earth moving and other construction works

Objective:

- Ensure any discoveries are appropriately handled – where necessary with removal from site of discovery
- Safeguard any historical discoveries
- Ensure any Aboriginal parties with an interest in the area are duly consulted with regards to any discoveries

Strategy:

- Identify consultative party prior to construction or earth moving works
- Within the on-site induction, include a strategy for response to any finds, including burials. This must be in line with the Aboriginal Heritage Act 1988
- The on-site induction for work crews must include a demonstration about Aboriginal heritage finds typical to the broader area
- The strategy for discovery must include a clear 'chain of command' that is responsive to legislative requirements, in the case of any such finds

Use and storage of chemicals, oil, construction-related hazardous substances and other materials that have the potential to contaminate the environment (including emergency responses).

Objective:

- Ensure appropriate management of dangerous/hazardous substances on-site to avoid pollution of the environment or harm to persons

Management Strategy:

- Storage of all chemicals, oil and hazardous substances shall be restricted to designated areas during construction.
- All storage and handling of fuels and chemicals must be in accordance with EPA guidelines and Australian Standards
- Storage of such substances must be in an adequately designed enclosure. It is expected a permanent enclosure used for the ongoing operation will be created for use during the construction phase too. Such an enclosure will have a concrete floor and bund, and undergo regular maintenance.

- All transport of such substances on and off site will be as per relevant codes, and undertaken by licensed persons
- All bins and waste receptacles on site will be maintained, being kept clean and tidy.
- Quantities of chemicals and fuels stored on site will be kept to a minimum, with only approved chemicals to be used on site. Any chemicals will be entered into a site Chemical Register and relevant Material Safety Data Sheets will be kept on site.
- All staff are to be appropriately trained and provided with safety clothing which must be worn.
- Emergency equipment for dealing with accidents and spills must be kept on site and maintained at all times.
- An Emergency Response Plan must be provided by the contractors for handling and storage of chemicals.

Performance Criteria:

- Spillages prevented during handling.
- Storage within designated areas.
- Proper disposal of waste.
- Monitor all containment structures.

Monitoring:

- Regular inspect of the site, storage areas and control structures to ensure that the dangerous/hazardous substances are being stored, handled and disposed of in an appropriate manner.
- Inspect for ground contamination and if necessary undertake soil sampling and analysis of the contractors' work area.

Site security, fencing and safety, including the management of public access and local traffic.

Objective:

- Ensure public safety during construction
- Not to inhibit flow of local traffic
- To minimise limitations on access to public areas of proposal where possible

Management Strategy:

- Boundary fence to be erected around all construction sites, in accordance with local government authority specifications.
- For the hotel site, contractor access to the site will be via Thomas Road. This will be via 2 points – the most eastern and northern corners, which will become main vehicular access points post-construction.
- The boundary fence will be clearly identifiable and prohibit pedestrian and vehicle access to the construction site during construction works. All entrances will have appropriate site security to prevent public access
- Internal site access will be via the proposed buggy and fire truck acccess routes through the sites, as per the site plans provided within the DR.
- Where there is a need to disrupt local traffic due to transportation of construction goods and components to site, a traffic management system will be implemented. This will be developed in consultation with the council and traffic consultants.

Performance Criteria:

- Prevent public access to hotel site for duration of construction
- Limit impact on local traffic

Monitoring:

- Regular inspection of fences, and associated signage
- Record of people and machinery entering and exiting site

Documentation, Record-keeping, Communication and Complaint Resolution

All communications, including reports, minutes of meetings, records of non-conformance, corrective actions and site inspections will be kept at the construction site office, and upon completion of all construction works, shall be held at the hotel's offices so that they are readily retrievable.

The contractor will be responsible for producing complaint procedures. Procedures should cover both internal and external complaints relating to the management of the constructions. The contractor must designate an individual responsible for handling such procedures. All procedures must be documented, with records being kept in the site office. All procedures should look positively for resolution.

Monitoring Program

Each section of the draft CEMMP outlines criteria for monitoring. A monitoring plan will need to be developed in conjunction with the chosen contractor, assessing the points highlighted at regular and appropriate intervals. Such appropriateness will need to be assessed against the final design, proposed construction methods and expected construction schedule. Such monitoring must extrapolate from the outlined criteria stipulated in this draft to provide full accountability during construction, being kept on record at the hotel post-construction for reference.

Draft OEMMP

General operational noise management (e.g. from machinery noise).

Objective:

- Ensure that noise associated with the operation of the hotel resort do not cause significant nuisance to neighbouring residential properties and other land uses.

Management Strategy:

- A series of hours have been proposed to constrain noisy operations to set times.

Hotel **+** Back of House Facilities:

- *Deliveries and services block (including maintenance workshops)*
  September to May 0600 - Sunset
  June to August 0600 - 1800

Lodges:
Operation hours have been set dependent on the programme of each lodge. Guests staying in each lodge will have 24hr access to their rooms and shared spaces within the residential component of the lodge. The supporting functions of hotel facilities in each lodge are set out below.

- *Main Lodge & Panorama Bar*
  Reception & Guest Services Facility 24 hour
  Panorama Bar 1100 – 0000

- *Restaurant & Pool Lodge*
  Pool 0600 – Sunset
  Restaurant (service) 0630 – 2230
  Restaurant (BoH operation) 0500 – 2330

- *Wine Bar & Library Lodge*
  Bar 1100 – 2300
  Library 0800 – 2300

- *Spa Lodge*
  Spa 1000 – 1900

- *Adventure Lodge*
  Activities Centre 0800 – Sunset

- *Kids' Club Lodge*
  Club 0900 – 1800

- *Stables Lodge*
  Horse-riding Centre 1000 – 1800

- *Speciality Restaurant*
  Restaurant 1200 – 2230
  Cookery School 1000 - 1630

- *Garden Lodge*
  Potting Room 0800 – 1800

- *Wellbeing Lodge*
  Fitness Centre & Yoga Studio 0600 – 2200

Operational Notes:
For any other times or excessive noise, local residents will be notified.
All fixed plant shall be designed and installed to comply with regulations.
The engineering workshops, laundry facilities, desalination plant and other servicing outlets will be suitably noise insulated in accordance with guidelines provided by EPA.
Regular equipment maintenance to ensure adequate noise suppression.
For any live music and events, noise control measures will be put in place in accordance to guidelines and licensing.
Deliveries to the site will be scheduled so as to minimise disruption to local amenity and traffic.

Performance Criteria:

- All noise emissions from the site must comply with provisions set out by the Kangaroo Island Council Development Plan and EPA Policy.
- Machinery noise will be limited to that allowed by current environmental guidelines.
- Further details on the expected noise emissions can be found in Appendix K to the PER.

Monitoring:

- An assessment of the services block, engineering workshop and desalination plant will be conducted by a qualified acoustic consultant to certify the insulation and design is appropriate and to the satisfaction of the authorities.
- Other monitoring of noise-related issues will be in in response to complaints.

Waste Management strategies detailing the collection, storage and disposal of waste (for all waste streams) to comply with the Environment Protection (Waste to Resources) Policy 2010.

Objective:

- Ensure solid waste production during operation, including litter, is minimised and disposed of, on and off site, in a responsible manner and compliant to the Environment Protection (Waste to Resources) Policy 2010

Management Strategy:

- All solid wastes will be placed in appropriately designed storage areas and/or disposed of on an as-required basis to certified disposal facilities. Putrescible waste storage and disposal will conform to EPA regulations and KI Council waste storage policies.
- A high standard of housekeeping will be maintained both during operation to prevent litter across the hotel resort site, with secured bins for disposal of food waste, inaccessible to fauna.
- Each lodge will have dedicated refuse and recycling collection on a daily basis, being delivered to a centralised collection site in the Back of House services block at the Eastern corner of the site.
- Re-use or recycling opportunities will be investigated and adopted where possible.

Performance Criteria:

- A tidy, litter free, well maintained site.

- Sufficient waste and recycling receptacles to handle load of occupation, avoiding overloading of any waste
- Waste collection confined to designated areas
- Waste disposal confined to designated areas.
- Waste collection and disposal in manner appropriate to KI Council policies and EPA regulations

Monitoring:

- Undertake regular visual site inspections to ensure that solid wastes are being stored in the appropriate areas and disposed of in an appropriate time frame so that solid waste storage areas are not being overloaded.
- Waste audits to monitor generation of refuse and recyclable waste, reporting to any mismanagement of procedures and steps to improve reduce, reuse and recycle.

Wastewater collection and treatment to ensure that the general obligations of the Environment Protection (Water Quality) Policy 2015 are met.

Objective:

- Ensure wastewater is appropriately collected and treated to comply with the Environment Protection (Water Quality) Policy 2015.

Management Strategy:

- Pumping stations will be provided near each building on the hotel site to connect to the mains pumping station
- A connection to the reticulated sewer system will be provided at the hotel site, with one common sewer pumping station proposed
- All pumping stations will be regularly maintained and inspected
- Flow rates will be measured in waste pipes as part of maintenance strategy

Performance Criteria:

- All wastewater facilities are free from leaks
- No air pollution as a result of wastewater facilities
- Flow rates achieve a sewer cleansing velocity of 0.8m/s

Monitoring:

- Undertake regular visual inspections of wastewater pipes, stations and connections to common sewer pumping stations to check for leaks
- Undertake flow measures and air quality tests as necessary

Emergency and evacuation procedures including a Fire Management Plan, prepared in consultation with the Country Fire Service.

Fire safety is of paramount importance to the successful operation of the Hotel Resort. Discussion with the County Fire Service are ongoing.

Objective:

- To ensure that appropriate measures are taken to minimise the threat from fire to persons, property and the environment.

Management Strategy:

- Appoint an OH&S Officer, with all staff being inducted in safety matters and fire emergency response.
- Designated emergency vehicle access routes (these may also be used for guest and staff access through the site)
- Inspection and maintenance of emergency vehicle access routes
- Inspection and maintenance of all on-site fire fighting equipment, including all hydrants
- Maintenance of firebreaks within vegetation
- Storage of fuels, oils and chemicals within designated areas
- Maintenance and refuelling of hotel vehicles, such as buggies, tractors and landscaping machinery, to take place in designated area within the services block at the eastern corner of the hotel site
- Storage, refuelling, maintenance and operation of machinery will be undertaken to standards that eliminate the potential for heat and sparks to start fires. Refuelling areas will be attended whilst refuelling is in progress.
- Areas of vegetation abutting neighbouring properties will be managed to maintain a minimum fire fuel condition during fire danger period.

Performance Criteria:

- A Fire Management Plan will be prepared in conjunction with the County Fire Service. It is expected that this will include a strategy for fire emergency response, as well as maintenance requirements for on-site fire fighting equipment. This will also outline alarm and equipment testing procedures.

Monitoring:

- Conduct regular inspections to ensure that all fire-fighting equipment is serviceable.
- Conduct visual inspections of the site and control structures (e.g. silt and oil separators, bunding, level of fuel build-up in vegetated areas) to ensure that the performance requirements are met and to identify any non-conformance.
- Conduct visual inspections of emergency vehicle tracks to ensure they are kept clear and serviceable.

FLORA: Ongoing environmental protection and sustainability measures.

Objective:

- Enhance the biodiversity values through the gradual removal of weeds, protection of areas of erosion and gradual re-vegetation of disturbed sites with native species

Management Strategy:

- The re-vegetation of disturbed sites must be recognised as a long-term objective.
- Re-vegetation is proposed to commence prior to construction and continue through the hotel's operation
- Plants will be grown on-site, associated with the Garden Lodge, to propagate locally native species for use in the re-vegetation plan
- The proponent aims to work with local landscapers alongside the DEWNR to establish the - continued programme of revegetation
- Where possible propagation will be collected from the local landscape. All collection of plant propagation material shall only be done by persons who have a permit to collect native flora, or where such collection is permitted (e.g. outside Crown reserves, not involving threatened flora)
- Run-off from higher nutrient areas such as tees & greens will be directed away from areas of remnant vegetation.

Performance Criteria:

- Fulfilment of proposed landscaping plan

FAUNA: Ongoing environmental protection and sustainability measures.

Objective:

- Minimise impacts on protected species, notably the Black Glossy Cockatoo
- Provision and protection of new breeding and feeding habitats for the Black Glossy Cockatoo

Management Strategy:

- Personnel training to ensure best practice by operational staff to ensure minimal disturbance to habitats
- Education of guests through conservation lodge to ensure minimal disturbance
- Provision of collars to nesting trees as necessary

Performance Criteria:

- As a minimum maintain a stable population; the desired performance resulting in an increased population

Monitoring:

- Bird counting in association with the Black Glossy Cockatoo recovery programme

infraPlan

Traffic Impact Statement
Holiday Resort, American River

September 2016

Project Details	Traffic Impact Statement Holiday Resort American River, Kangaroo Island
Client	Paul Mercer City & Central Developments (CCD) Hotel and Resorts LLC 44 Church Terrace Walkerville SA 5081
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Last saved	7/10/2016 11:04:50 AM

Document Control					
Name:	**IP15.022_American River Holiday Resort_Traffic Assessment_R2**				
Version	**Author**	**Date**	**Reviewer**	**Date**	**Notes**
0	AK	16.07.15	GB	30.07.15	Issued for review and information
1	AK	10.05.16	JE	13.05.16	Draft for Planning Submission
2	AK	05.09.16	JE	06.09.16	Amended report for planning submission

Contents

1 Introduction

InfraPlan have been engaged by City and Central Development (CCD) Hotel and Resorts LLC to prepare a traffic impact statement (TIS) for the proposed development of a holiday resort in American River, Kangaroo Island. The proposed resort will be able to accommodate in excess of 600 guests onsite.

In preparation of this traffic impact statement infraPlan have undertaken the following tasks:

- Technical assessment of the layout and operation of the resort and ferry terminal
- Detailed engineering analysis of the likely traffic generation of the proposed development and its impact on the surrounding road network; and
- Recommendation of any changes to ensure adequate performance of the surrounding road and traffic network in the presence of the new facility.

We have referred to the following documents during this assessment:

- Kangaroo Island Council Development Plan – consolidated February 2014
- Department of Planning, Transport and Infrastructure, SA (DPTI) – Trip Generation Rates for Assessment of Development Proposals
- Roads and Maritime Services (RMS) – formerly known as Roads and Traffic Authority (RTA) - Guide to Traffic Generating Developments (herein referred to as the RTA Guide)
- Building Code of Australia
- Australian Standards AS2890.1-2004 Off-Street Car Parking
- Australian Standards AS2890.6 Off-street Car Parking for People with Disabilities.

AutoCAD drawing *004_36_160421_OverallPlan_Simple* prepared by PARTI Architecture & Design has been referred to in providing the advice contained within this report. Additionally, infraPlan have referred to *004_19 160212 Proposal* prepared by PARTI Architecture & Design.

CAD drawing and the Proposal have been referred to in this report.

2 Existing Conditions

Kangaroo Island is one of the most popular tourist destinations in Australia. According to Tourism Research Australia (TRA) an estimated 123,000 visitors (per year) visited Kangaroo Island in 2012-14. An estimated 27% (33,000) or every 1 out of 4 visitors to KI were international visitors. Visitors to Kangaroo Island spent an average 4.1 nights on the island[1].

As per Regional Tourism Profile DECEMBER 2012 – 2014, Hotels, motels and serviced apartments (with 15+ rooms) were observed to operate at an average 40% occupancy during off-peak (May - September) period and an average 67% occupancy during peak (October - April) period[2].

2.1 Access to Kangaroo Island

Kangaroo Island is accessible via sea and air. SeaLink ferry service between Cape Jervis (mainland SA) and Penneshaw (Kangaroo Island) is the only sea link capable of transferring people and vehicles. The existing ferry service also provides for transport of goods to/from Kangaroo Island.

SeaLink operates 3 daily return services from Cape Jervis to Penneshaw, with additional services offered to meet peak demand during the holiday season. SeaLink offers 2 morning return services and 1 evening return service during the off-peak season. SeaLink operates 9 to 12 return services depending on demand during peak season. The largest of SeaLink's Kangaroo Island ferries has a vehicular capacity of 55 cars or 42 cars and 4 coaches[3].

A coach service is also available for tourists/visitors not travelling by personal/rental car. Twice daily return coach services are offered that connects with morning and afternoon ferry services to/from Cape Jervis. This coach service connects Kingscote, American River and Penneshaw with additional stops en-route.

Regional Express (REX) is the only service provider of air travel between Adelaide and Kingscote. REX currently operates 3 daily return services on weekdays and 2 daily return services on weekends. During weekdays 2 morning services and 1 evening service are offered. Over the weekend 1 morning service and 1 evening service are on offer.

2.2 Surrounding Road Network

2.2.1 American River Road – Buicks Drive

As per the Kangaroo Island Council Development Plan (adopted in February 2014), American River Road is classified as a Secondary Arterial Road.

American River Road is under the care and control of Department of Planning, Transport and Infrastructure (DPTI).

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[1] Tourism Region Profiles 2013-14; Kangaroo Island, South Australia (http://tra.gov.au/Tourism_Region_Profiles/Region_profiles/index.html)

[2] Regional Tourism Profile December 2012 – 14 http://www.tourism.sa.gov.au/assets/documents/Kangaroo_Island.pdf

[3] Onboard SeaLink's Ferries, SeaLink Travel Group, https://www.sealink.com.au/kangaroo-island-ferry/whats-onboard/ viewed 6th September, 2016

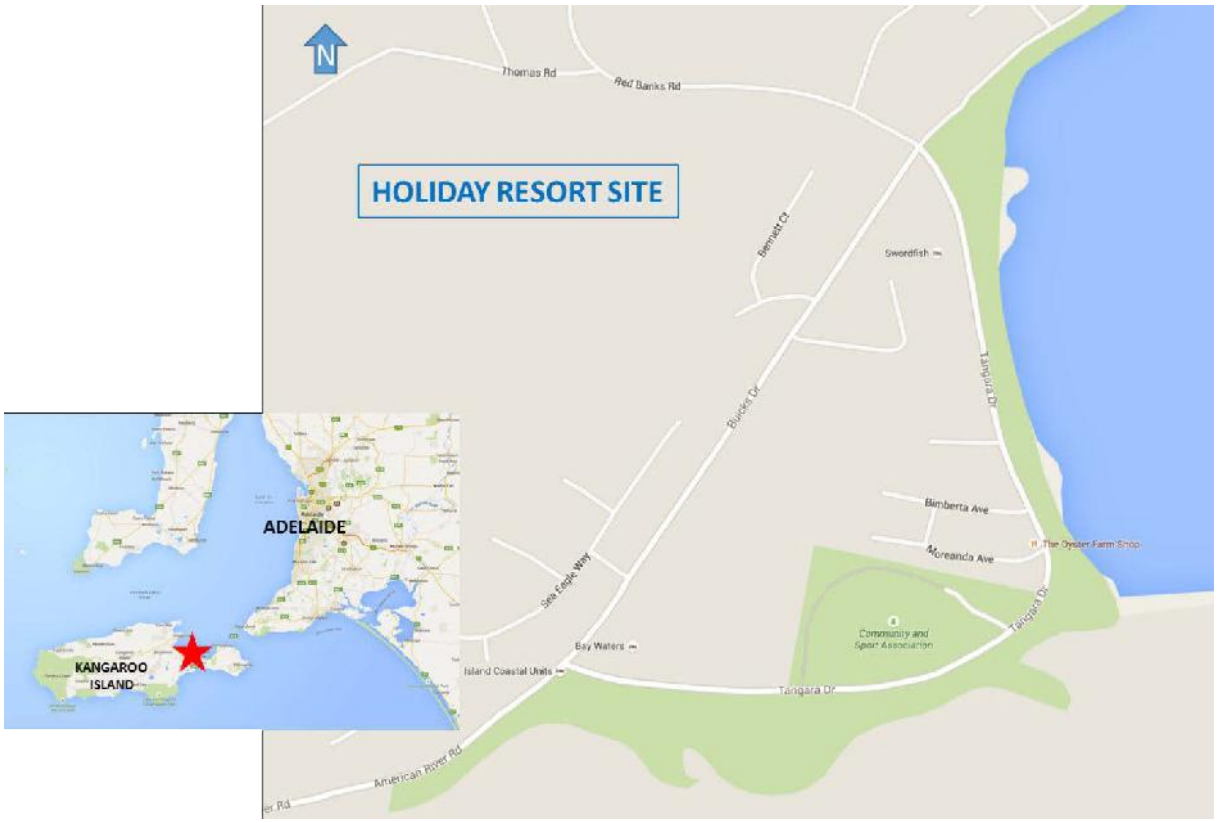


Figure 1: Site Location and Vicinity Map

The only available traffic data for Departmental roads in the American River area was collected on February 2, 2012 on the Muston Hill - American River Road, approximately 1.3 km south west of the Tangara Drive junction. The statistical data shows an Average Annual Daily Traffic count of 470 with 8% of this being heavy vehicle traffic. The weekday Average Daily Traffic volumes are slightly higher at 497 (8% HV) and peak traffic is shown to be in the late morning, around 11 am to 12 noon.

The traffic count location is likely to have captured the tourist traffic to/from American River albeit missing out some daily commuter traffic as it lies outside of the township limits of American River.

An average of 45 vehicles (20 to, 25 from American River) were estimated during the morning peak hour at the count location. An average of 40 vehicles (25 to, 15 from American River) were estimated during the afternoon peak hour at the count location.

	Daily	AM Peak	PM Peak
American River Road (Feb-15)	470	45 (11am - 12pm)	40 (5 - 6pm)

Thomas Road is unsealed and functions as a local access road providing access to properties along its length. Thomas Road terminates approximately 1.3 km west of Red Banks Road.

Red Banks Road is a two-lane sealed local access/rural road providing access to residential and agricultural properties along its length.

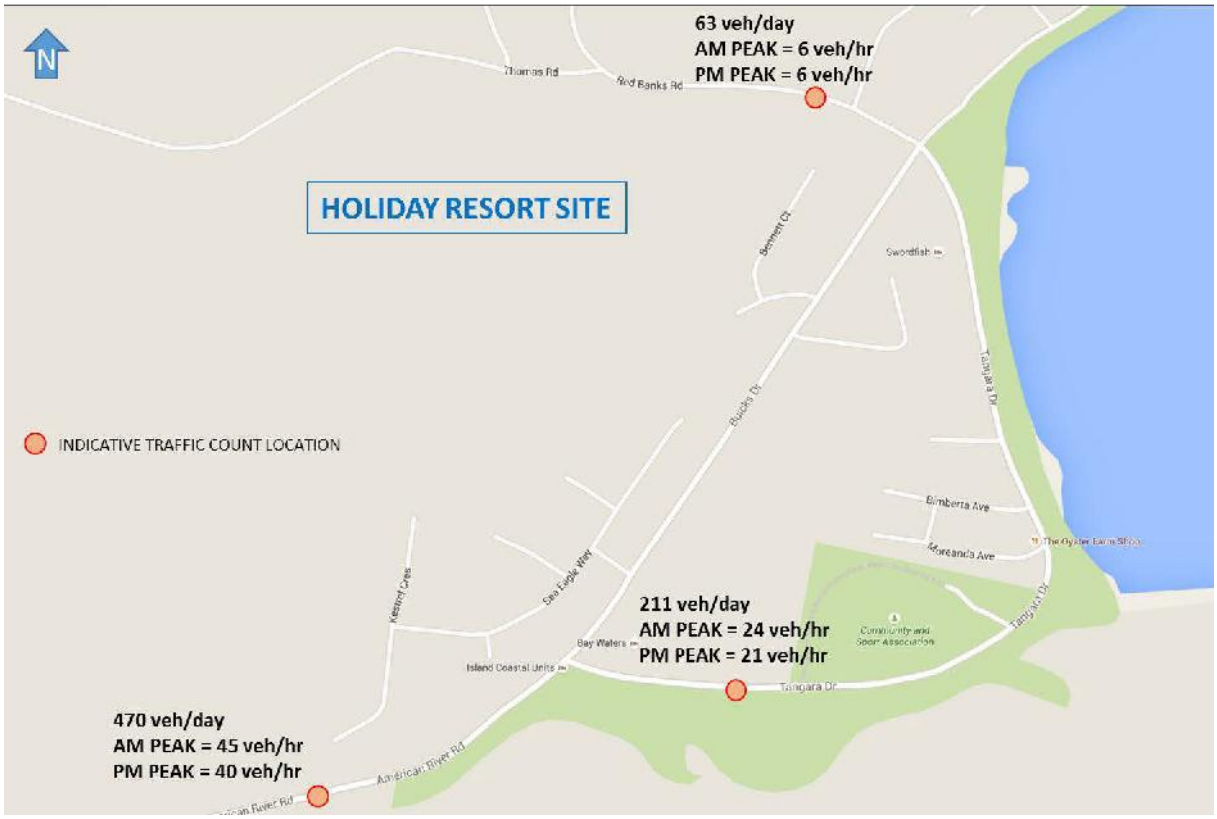


Figure 2: Traffic Counts Summary

2.2.2 Tangara Drive

As per the Kangaroo Island Council Development Plan (adopted in February 2014), Tangara Drive can be classified as a *Local Access Road*.

Most recent traffic counts for Tangara Drive available from KI council were recorded in March 2014.

	Daily	AM Peak	PM Peak
Tangara Drive (Mar-14)	211	24 (11.30am - 12.30pm)	21 (12-1pm)

Up to 18% of heavy vehicles/day were observed to use Tangara Drive.

2.2.3 Red Banks Road

As per the Kangaroo Island Council Development Plan (adopted in February 2014), Red Banks Road can be classified as *Local Access Road*.

Most recent traffic counts for Red Banks Drive available from KI council were recorded in February 2015.

Count Location	Daily	AM Peak	PM Peak
Red Banks Drive (Feb-15)	63	6 (7-8am)	6 (4-5pm)

Up to 47% of the total vehicles observed to use Red Banks Drive were classified as heavy vehicles. Heavy vehicles include mini buses, small trucks and caravans etc. A higher percentage of heavy

vehicles (mini bus and caravans) is deemed acceptable for a tourist destination like Kangaroo Island and American River where visitors often take such vehicles and spend multiple days/nights.

2.3 Key Intersections

2.3.1 Long View Road – Thomas Road junction

Long View Road junction with Thomas Road with is unsignalised under existing conditions. Long View Road provides access to residential properties along its length and terminate at the junction with Red Banks Road. No turning movement counts at the subject location are available at the subject location. Based on available traffic volumes on Red Banks Road (Feb-15), Thomas Road (east) and Long View Road were assumed to carry approximately 15-20 vehicles per day.

No residences have access off of Thomas Road west of Long View Road. Thus Thomas Road west of Long View Road is assumed to carry negligible traffic (less than 10 vehicles per day).

Based on Google (Street view) review, trees present near the junction may partially block sightlines when entering/exiting Thomas Road (west). It is recommended that detailed assessment of the subject junction be undertaken at the detailed design stage.

2.3.2 Thomas Road – Red Banks Road junction

Thomas Road junction with Red Banks Road is unsignalised under existing conditions. No turning movement counts at the subject location are available. Based on available traffic volumes on Red Banks Road (Feb-15), Thomas Road was assumed to carry approximately 20-25 vehicles per day.

Potential sightline issues near the subject junction were identified based on Google (Street view) review. A site visit and detailed assessment at a later stage is recommended.

2.3.3 Bayview Road – Red Banks Road junction

Bayview Road junction with Red Banks Road is unsignalised under existing conditions. No turning movement counts at the subject location are available. Based on available traffic volumes on Red Banks Road (Feb-15) just west of Bayview Road, Bayview Road was assumed to carry approximately 15-20 vehicles per day.

It should be noted that Bayview Road, approximately 900m long runs between Red Banks Drive and Scenic Drive. It provides access to residences along its length and not envisaged to have a significant increase in future traffic.

2.3.4 Buicks Drive/Scenic Drive – Red Banks Road/Tangara Drive intersection

Buicks Drive/Scenic Drive – Red Banks Road/Tangara Drive intersection is unsignalised, sign controlled under existing conditions. No turning movement counts at the subject location are available.

Based on available traffic volumes on Red Banks Road (Feb-15), Tangara Drive (Mar-14) and American River Rd (Feb-12), an estimated 40-45 vehicles are assumed pass through the subject intersection during peak hour.

Desktop (Google Street view) review indicated clear sightlines were deemed available at the subject intersection.

2.3.5 American River Road/Buicks Drive – Tangara Drive junction

Tangara Drive junction with American River Road/Buicks Drive is unsignalised, sign controlled junction under existing conditions. No turning movement counts at the subject location are available.

Based on available traffic volumes on Tangara Drive (Mar-14) and American River Rd (Feb-12) approximately 40-45 vehicles were assumed to pass through the subject intersection during peak hour.

Based on Desktop (Google Street view) review no sightline issues were identified at the subject junction.

Available traffic counts are included in Appendix A.

2.4 Development Site Access

2.4.1 Development Site

The proposed development site is located south of Thomas Road and Red Banks Road, and west of residences along Buicks Drive. The subject site is largely unoccupied with only one residence and is accessed from Red Banks Road. Existing vehicular access to the site is located approximately 225m west of the Buicks Drive/Scenic Drive intersection.

2.5 Crash Data

Crash data obtained from DPTI shows a single accident recorded during the last 5 years. It occurred at the junction of American River Road and Tangara Drive. The accident was a rear end incident, occurring when a vehicle travelling north east slowed to make a right hand turn to Tangara Drive and was struck by a vehicle from behind. This incident resulted in property damage only. No injury or loss of life resulting from a motor vehicle accident has been recorded on American River Road in the last 5 years.

3 Development Proposal

3.1 Holiday Resort Site

The proposed holiday resort ("the Resort") site is situated southwest of the American River Township on elevated ground, overlooking the existing wharf to Pelican Lagoon. The Resort site is approximately 32 hectares of undeveloped land, formerly home to the American River Golf Course. The site is bordered by Thomas Road and Red Banks Road to the north, residential areas to the east and southeast and undeveloped agricultural lands to the south, west and northwest. The most elevated part of the site is the central northern portion along Thomas Road. The site falls to the southeast toward the coast and to a temporal creek in the south western portion of the site which flows to the southern boundary and drains to Pelican Lagoon.

The site has largely been clear of large trees and shrubs with isolated outcrops remaining along the northern and eastern boundaries and a single large outcrop in the elevated centre of the site. A dry earthen dam is visible in the north western corner of the site; no other water storage bodies are apparent. Two small structures are visible in aerial images in the north eastern corner. These appear to have been associated with the former Golf Course.

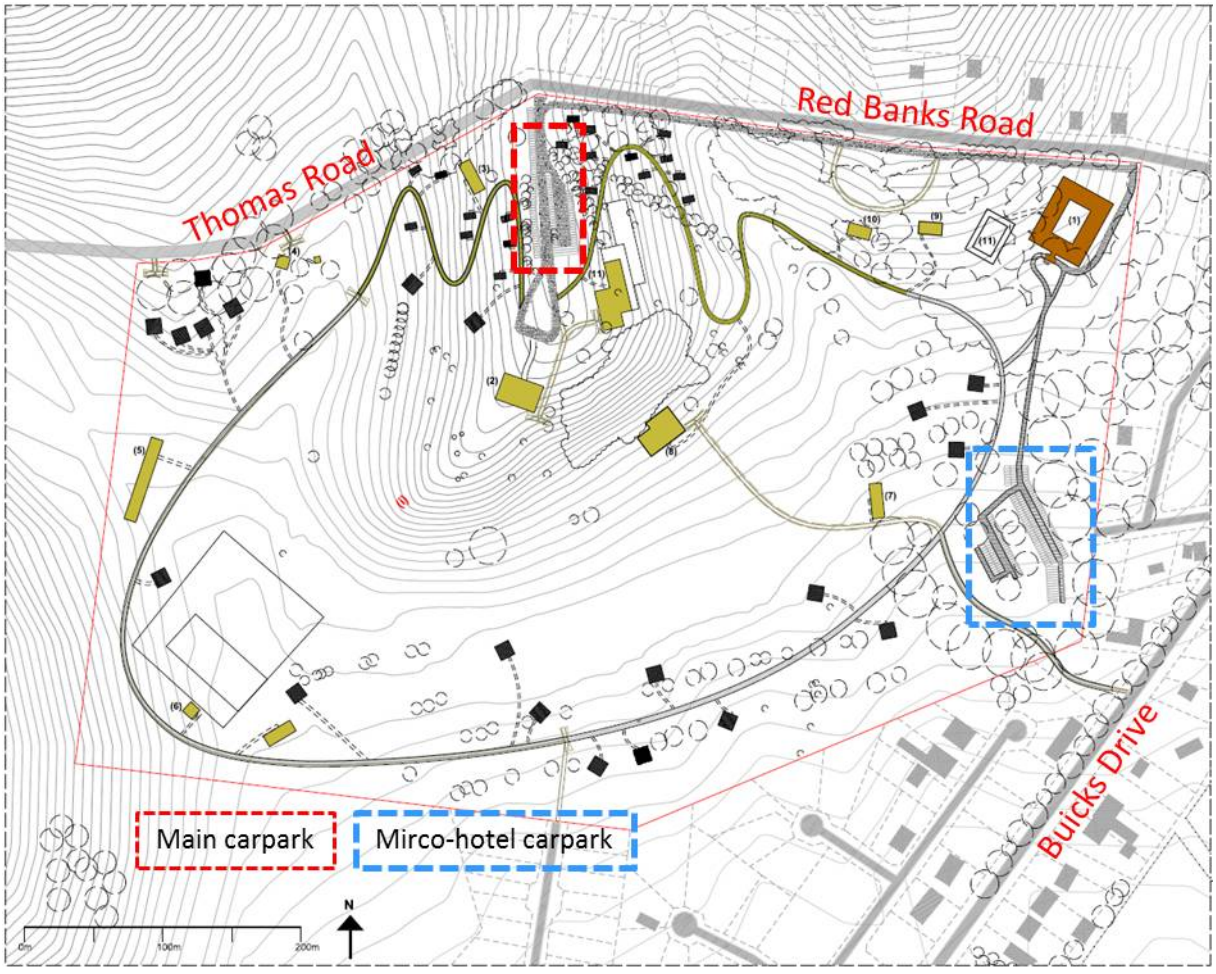


Figure 3: Proposed Holiday Resort development layout (indicative)

The proposed resort development consists of 323 room accommodation as listed below:

- 108 room main hotel (216 guests)
- 115 room micro-hotel (230 guests)
- 20 Cottages with 4 single bedroom units (total 80 rooms, 240 guest)
- 20 Cabins with 1 bedroom (total 20 rooms, 40 guests)

Cottages have 4 single bed units; 2 each on ground and first level. Units on ground level can accommodate up to 4 guests per unit and units on first level can accommodate 2 guests per unit. Thus each cottage can accommodate up to a maximum of 12 guests.

Cabins and hotel rooms can accommodate 2 guests per bedroom.

The proposed main hotel will be located near main reception accessible from main vehicular access from Thomas Road.

The proposed micro-hotel will be located in the north-eastern corner of the development site and will be accessible from a secondary access from Red Banks Road.

Main carpark with 75 carparks are proposed for the resort guests including 5 long spaces for caravans, buses and vehicles with trailers near the main reception area accessible from Thomas Road. Space for additional parking (if deemed necessary during peak period) is available adjacent to the proposed car park.

A second parking area for 200 guest vehicles and 50 staff is proposed to the south of the micro-hotel in the north-eastern corner of the development site.

3.2 Access to Development Sites

3.2.1 Holiday Resort – Main Access

The proposed holiday resort site is located south of Thomas Road and Red Banks Road, and west of the residences along Buicks Drive. A vehicular access (main access) to the resort site will be located approximately 250m west of Thomas Road junction with Red Banks Drive.

The proposed main vehicular access is envisaged to be two-way access allowing for simultaneous entry/exit from the resort.

3.2.2 Holiday Resort – Micro-hotel Access

A second access to the resort site is proposed from Red Banks Road. The proposed micro-hotel access will be located approximately 250m west of the Buicks Drive/Red Banks Road intersection.

This access will provide direct connection to the micro-hotel located in the north-eastern corner of the development site.

3.2.3 Holiday Resort – Emergency Access

Emergency vehicles (Fire, Ambulance etc.) will be able to access the proposed development site from four directions as listed below:

1. Main access to the development from Thomas Road

2. Secondary access from Red Banks Road (near micro-hotel in the north-east corner)
3. Proposed electro-car access from Buicks Drive
4. Proposed emergency access connection to Kestrel Crescent

Emergency access routes to different parts of the proposed resort are included in Figure 4 below.

Figure 4: Emergency Access to Resort Site

3.2.4 Waste Management

It is proposed that each lodge will have dedicated refuse and recycling collection on a daily basis, being delivered to a centralised collection site in the Back of House services within the micro-hotel building in the north-eastern corner of the site. From here, collection by a licensed contractor or the council (to be determined in ongoing discussions) will take place.

It is understood that a detailed waste management plan will be prepared at the detailed design stage.

3.2.5 Pedestrian and Electro-car Link

It is understood that the developer is pursuing options with council for a pedestrian and electro-car link between the resort and waterfront. This link (shown in red in Figure 5) would require granting of access through Council reserve land located west of Buicks Drive and along the north-eastern boundary of the community garden & oval located north of Tangara Driver and east of Buicks Drive.

This link would result in lower vehicular traffic and safer pedestrian movements as pedestrians and electro-cars will be required to cross Buicks Drive and Tangara Drive only once while travelling off-line for the majority of their travel between the resort and waterfront.

An alternative link (blue in Figure 5) will also require granting of access through the Council reserve land. This route continues along Buicks Drive for a distance of 75m, Trethewey Court, through private property (to be acquired), then crossing Tangara Drive before reaching the wharf from the north side.

The proposed pedestrian and electro-car link options are included in Figure 5 below.

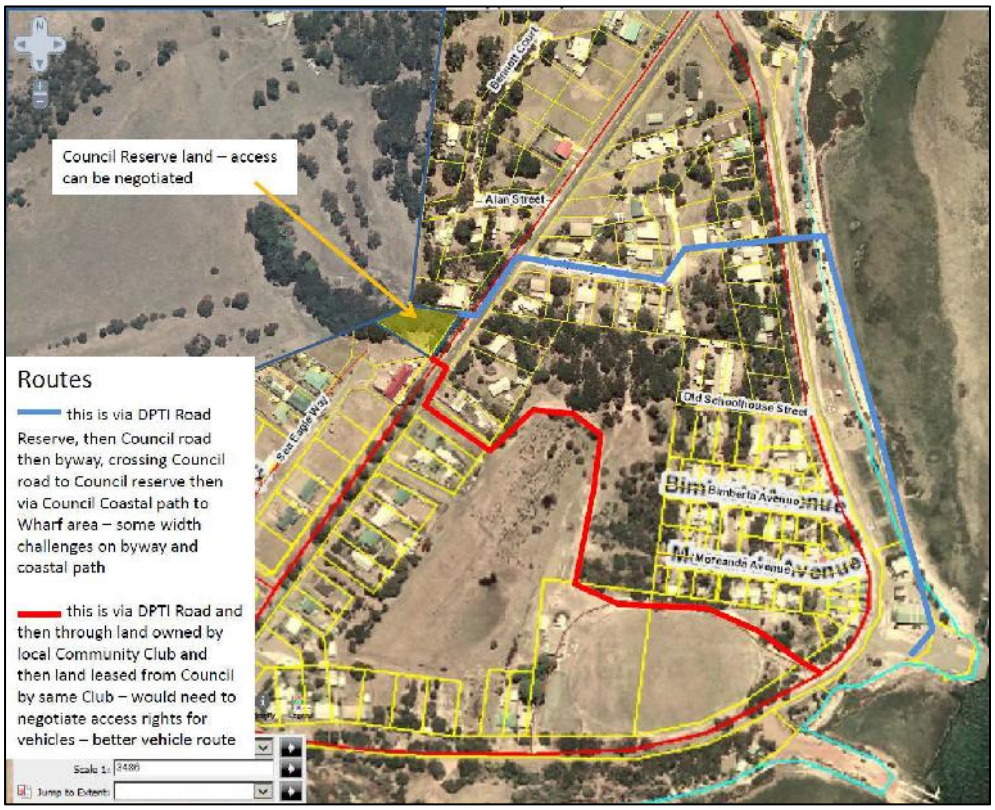


Figure 5: Proposed pedestrian and electro-car link between resort and American River waterfront

3.3 Development Summary

The proposed development details have been summarised below:

- A total 323 rooms available for guest accommodation
- 108 room main hotel, 115 room micro-hotel, 20 cottages (80 rooms) and 20 cabins (20 rooms)
- 75 car parks for resort guests near main entrance
- 200 car parks for micro-hotel/resort guests
- 50 car parks for staff
- A mix of local and non-local (mainland SA) staff envisaged
- Electro-cars (buggies) for transfers between resort lounge and guest accommodation (rooms/cottages/cabins)
- Electro-cars (buggies) also available for transfer between resort and waterfront
- Coach service – connecting ferry terminal, resort and key tourist destinations

4 Traffic Generation

4.1 Holiday Resort

Limited Standards or Guidelines are available to estimate traffic generation and parking demand for Holiday Resorts such as this. Projection data generally relates to resorts co-located with tourist attractions, such as amusement parks and therefore does not apply in this instance.

4.1.1 DPTI Trip Generation Guidelines

The Department of Planning, Transport and Infrastructure publication "Trip generation rates for the assessment of development proposals", September 2013 provides ready to use trip generation rates for various land uses. However, no trip generation rates for a holiday resort were available in the DPTI publication.

The land-use 'Tourist Hotel', (DPTI) is the most relevant land use however operational characteristics of a holiday resort are significantly different to tourist hotels.

A tourist hotel is a building(s) substantially used for the accommodation of tourist.

Trip rates quoted in the Department of Planning, Transport and Infrastructure's report Trip generation rates for assessment of Development, 2013, states that "*research indicated a large variance in the traffic generation of hotels. This variation is due to such factors as the location and age of the building, its internal design, the provision of live music and other such facilities, etc.*"

The proposed holiday resort is located in what can be termed as a remote location, on an island accessed only by sea and air. Thus vehicle trips to/from the subject development is constrained by the carrier capacity (i.e. sea ferry – both existing and proposed).

4.1.2 RTA Trip Generation Guidelines

Roads and Maritime Services (formerly known as Roads and Transport Authority – RTA) Guide to Traffic Generating Developments (2002) is a technical resource widely used by traffic engineers and transport planners in Australia to estimate traffic generated by a proposed development.

However, no trip generation rates for a *holiday resort* were readily available in the RTA guide.

4.1.3 ITE Trip Generation

The trip Generation handbook published by Institute of Traffic Engineers (ITE) USA, provides statistical models and trip generation rates for various land uses. Although published in the USA, this handbook (Edition 9) can be referred as a reference in absence of local data/ready to use trip rates.

Land use code 330 – Resort Hotel can be considered as the relevant land use.

Resort Hotels provide sleeping accommodations, restaurants, cocktail lounges, retail shops and guest services. Resort Hotels cater to the tourist and vacation business, often providing a variety of recreational facilities rather than convention and meeting business. Resort Hotels are normally located in suburban or outlying locations on larger sites than conventional hotels.

The following trip generation rates are available for estimating trips generated from a resort hotel using "Rooms" as the variable:

AM Peak Hour (between 7 and 9 am)	PM Peak Hour (between 4 and 6 pm)
T = 0.31 trips/hr 72% entering; 28% exiting	T = 0.42 trips/hr 43% entering; 57% exiting

With 323 rooms available for guest accommodation at the proposed holiday resort, peak hour trip generation estimates are as below:

AM Peak Hour	PM Peak Hour
100 trips 72 entering; 28 exiting	136 trips 64 entering; 72 exiting

Thus the proposed holiday resort, when assessed using ITE Trip generation rates, is estimated to generate 100 trips during the morning peak hour and 136 trips during the afternoon peak hour.

The proposed holiday resort provides for sleeping accommodation, specialty restaurants, cocktail lounges, spa & fitness facilities and guest services. While no retail shops are proposed on-site, existing retail/café shops in American River area are envisaged to cater for shopping and dining needs of the tourists.

ITE Trip generation does not provide for seasonal variations observed at an isolated tourist destination such as Kangaroo Island.

It is worth noting that the proposed resort will be located on Kangaroo Island with limited vehicle transfer capacity between mainland SA and Kangaroo Island. Thus the overall trip generation is likely to be much lower than estimated using ITE trip generation rates. Connectivity to mainland SA (for transporting of vehicles) will be a key constraint in overall vehicular traffic generation to/from the proposed resort.

4.1.4 Trip Generation based on room occupancy and connectivity

The existing access points to Kangaroo Island are by sea (via SeaLink ferry to Penneshaw) and by air (via Kingscote airport). Thus, the majority of visitors to the proposed holiday resort arriving in a motor vehicle are expected to arrive/leave by the existing ferry service at Penneshaw.

Visitors to the resort will have the option to use the existing SeaLink service from Penneshaw or air travel (with car rental or taxi) from Kingscote airport. Thus the traffic movements to/from the subject development are likely to be spread across the day as there are no particular time constraints resulting in peak period activities other than check-in/check-out times.

Other peaks may occur around evening meal times and at the close of businesses however, these drivers are somewhat variable and so will result in peak spreading.

As mentioned previously the average occupancy of hotels on Kangaroo Island ranges between 40% during off-peak season (winter) to 67% during peak season (summer). Assuming 40% and 80% capacity for the proposed resort during off-peak and peak seasons respectively, the total person and vehicular trips likely to be generated from the proposed holiday resort were estimated as shown in Table 1.

Table 1 Traffic Generation Estimate using average room occupancy at the resort

	40% occupancy	80% occupancy
Total Rooms = 323		
Occupied rooms	129	258
No. of persons (assumed 2 per room)	258	518
Room Turnover rate:		
- 1/3rd arrive on a given day	43	86
- 1/3rd leave on a given day	43	86
Average occupancy per vehicle (assumed)	2	2
No. of veh trips		
Veh entering (assuming 2 person/veh)	43 (86 persons)	86 (172 persons)
Veh exiting (assuming 2 person/veh)	43 (86 persons)	86 (172 persons)
Other trips (tourist activities) – 2/3 of occupied rooms	86	172
Daily Trips	172	344

The way check-out times are usually scheduled before check-ins begin, negligible vehicular movements associated with check-out and check-in are likely to overlap. Therefore, peak hour traffic movement is estimated to be approximately 43 vehicles during average off-peak operations and 86 vehicles during peak operations.

As shown in Table 1 above, a total 172 daily vehicular trips are likely to be generated by the proposed resort associated with check-in & check-outs and other tourist activities during average operations. Similarly, up to 344 daily trips are likely to be generated by the proposed resort associated with check-in & check-outs and other tourist activities during peak operations.

The peak hour and daily trip generation estimates presented above are conservative as it assumes that everyone staying at the resort is arriving in a private vehicle with a low occupancy. These estimates do not include tourists not travelling in a private vehicle, using ferry services and coach/tour bus service for travel. In reality the total number of vehicles transported to Kangaroo Island is constrained by the existing SeaLink ferry service.

As mentioned in above, if two thirds of occupied rooms are assumed to generate other tourist activities i.e. shopping, dining, recreational/tourist activities, then up to 344 *person trips* will be generated by the resort during peak period.

Some of these person trips will be in private vehicles (used to arrive at the resort), some will be in coach services offered by the resort and the remaining will be expected to use electro cars for transport between the resort and American River township.

Assuming a majority of these person trips being on a coach service or on electro-cars the overall daily trip generation would be lower than the estimated.

4.1.5 Trip Generation Summary for Holiday Resort

The existing SeaLink service provide the only means for transporting a private vehicle from/to mainland SA. Thus restricting vehicular trip generation at the ferry terminal. Coach/tour bus services are available for tourists not travelling in a private vehicle.

- Using ITE trip generation guidelines, the proposed resort, with 323 room capacity, was estimated to generate 100 morning peak hour trips and 136 afternoon peak hour trips
- Using room occupancy, the proposed resort is estimated to generate between 43 and 86 trips during off-peak and peak seasons respectively

In reality the overall trip generation to/from the resort site is anticipated to be much lower than the above estimates and spread over a longer duration rather than typical morning/afternoon peak periods for the following reasons:

- The existing coach service between the Penneshaw SeaLink terminal and American River & Kingscote is anticipated to cater to some of the travel demand generated by the proposed resort.
- The proposed holiday resort has plans to provide a shuttle service for tourists that will offer transfers between the Kingscote airport and the resort – offering viable transport options for tourists visiting Kangaroo Island without a private/own vehicle.
- The proposed holiday resort has plans to arrange for day tours to key tourist attractions on Kangaroo Island (operator, route, frequency and capacity to be determined at later stage)
- Assumed 1/3rd turnover for rooms on any given day is conservative as tourists are anticipated to stay for multiple nights (3-4 nights on average), thus the actual turnover figures would be lower than assumed.
- Assumed vehicle occupancy of 2 persons/vehicle is deemed to be on the lower side as families (2 adults + 1 or 2 children) and friends traveling together would result in a higher average vehicle occupancy. This is likely to result in lower vehicular traffic to/from the resort.
- Constraints on vehicle carrying capacity of the existing SeaLink service restricts the total number of vehicles entering/leaving Kangaroo Island each day. Thus the overall trip generation to the proposed holiday resort is to an extent dependent on the existing ferry capacity and frequency.

Based on the trip generation assessment presented above, the proposed holiday resort is considered to generate up to 75 vehicular trips (off-peak season) and 105 vehicular trips (peak season) during the two-hour peak period coinciding with the ferry service. It is further assumed that the majority of these trips would be generated by the Penneshaw ferry terminal and the remaining trips would be local i.e. to other destinations on Kangaroo Island including to/from Kingscote Airport.

Above trip generation estimates present an average of the two figures estimated using ITE trip generation guidelines and an understanding of occupancy levels of hotels/resorts on Kangaroo Island.

5 Traffic Impact

The proposed development, by virtue of generating additional traffic, is likely to impact the surrounding road network. The extent of this impact (if any) and measures required to mitigate this impact are discussed below.

5.1 Key Intersections

5.1.1 Long View Road – Thomas Road junction

Under the existing conditions minimal traffic was estimated to pass through the Long View Road / Thomas Road junction.

The proposed holiday resort is estimated to generate up to 75 vehicular trips during the two-hour period associated with each ferry service. The proposed development traffic will result in a significant increase in traffic using Red Banks Road and Thomas Road.

It should be noted that the existing traffic passing through this junction during the peak hour is estimated to be less than 10 vehicles. Thus the overall traffic post development will still be far lower than the junction capacity.

Thus the proposed development is not envisaged to impact adversely on Long View Road/Thomas Road junction.

5.1.2 Thomas Road – Red Banks Road junction

Under the existing conditions minimal traffic was observed to pass through the Thomas Road / Red Banks Road junction.

The proposed holiday resort is estimated to generate up to 75 vehicular trips during the two-hour period associated with each ferry service. The proposed development traffic will result in a significant increase in traffic using Red Banks Road and Thomas Road.

It should be noted that the existing traffic passing through this junction during the peak hour is estimated to be less than 10 vehicles. Thus the overall traffic post development will still be far lower than the junction capacity.

Thus the proposed development is not envisaged to impact adversely on Thomas Road / Red Banks Road junction.

5.1.3 Buicks Drive/Scenic Drive – Red Banks Road/Tangara Drive intersection

Under the existing conditions approximately 40-45 vehicles were estimated to pass through the Red Banks Road / Tangara Drive intersection with Buicks Drive.

The proposed holiday resort is estimated to generate 75 vehicular trips during the two-hour period associated with the ferry service. The proposed development traffic will result in significant increase in traffic using Red Banks Road / Tangara Drive and Buicks Drive.

It should be noted that the existing traffic passing through this junction is estimated to be well below intersection capacity. The overall traffic post development will still be lower than junction capacity.

Thus the proposed development is not envisaged to impact adversely on Red Banks Road / Tangara Drive intersection with Buicks Drive.

5.1.4 American River Road / Buicks Drive and Tangara Drive junction

Under the existing conditions approximately 40-45 vehicles were observed to pass through American River Road / Buicks Drive and Tangara Drive junction.

The proposed holiday resort is estimated to generate up to 75 vehicular trips during the peak hour coinciding with the ferry service. Minimal traffic to/from the proposed resort is expected to pass through this junction as it is located away from preferred travel route to/from the resort.

It should also be noted that the existing traffic passing through the subject junction is estimated to be well below the junction capacity. Thus the overall traffic post development is envisaged to be lower than the junction capacity.

The proposed development is not considered to impact adversely on American River Road / Buicks Drive and Tangara Drive junction.

Overall the proposed resort traffic is likely to spread over multiple hour period and unlikely to impact adversely on the surrounding road network.

6 Parking and Access

The Kangaroo Island Council Development Plan provides parking requirements for various land uses. Land uses relevant to the proposed development are:

Land Use	Car parking requirement	No. of rooms/ floor area	Parking spaces required
Motel (holiday resort)	1 per 3 guest rooms plus 1 per 15 square metres of total floor area of restaurant if provided.	323 rooms 400 m^2 restaurant/bar	107 + 0 = 107 parking spaces

Restaurant/bar area proposed as part of the resort are considered as ancillary facilities to the resort operations and not deemed to attract new traffic other than resort guests.

6.1 Holiday Resort - guests

There are a total 75 car parking spaces including 5 long vehicles (i.e. coach bus, cars with trailers, caravan etc.) parking spaces proposed for the holiday resort visitors near the main entrance/reception area. An additional 200 space parking area is proposed near the micro-hotel.

The proposed 275 space parking provision is consistent with Council requirements.

It should be noted that the proposed land use 'holiday resort' is significantly different in characteristics and operations compared to motel. A motel is generally used for a short stay usually 1-2 nights and accessed primarily by guests with private vehicles whereas a holiday resort will usually have longer staying customers (multiple nights) and fewer private vehicles.

The proposed restaurant/bar facility is aimed at serving primarily resort customers so is not deemed to attract new traffic other than resort guests. Hence it is deemed that no parking for restaurant customers will be required.

6.2 Holiday Resort – on-site staff parking

The development proposal includes 50 on-site parking spaces for staff. On-site staff parking will be located within the additional parking area near the micro-hotel and will be tandem-type parking. Tandem parking is not deemed to be an issue considering staff will be working in shifts and will have the opportunity to communicate with other staff to access/retrieve their vehicle.

The proposed 50 space staff carpark is deemed sufficient.

6.3 Parking for people with disabilities

The Kangaroo Island Council development plan (Feb-2014) states that,

Development should provide off-street vehicle parking and specifically marked disabled car parking places to meet anticipated demand in accordance with *Table KI/2 – Off-Street vehicle parking requirements*.

However, no rates for parking for people with disabilities were provided in Table KI/2 of the KI development plan.

In absence of the availability of these parking rates, we have referred to the Building Code of Australia (BCA).

6.3.1 Holiday Resort

The number of car parks to be designated for people with a disability (from the Building Code of Australia) is proportionate to the number of hotel accommodation units with access for people with a disability.

Hotel accommodation units for persons with disability (of total 208):

5 (first 100 units) + 8 (1 for every 30 units or part thereof in excess of 100) = 13 car parks.

And therefore it is recommended that 13 car parks for people with a disability be provided. These accessible car parks should be located close to the main entrance to the reception area.

6.4 Emergency Vehicle and Waste Collection

It is recommended that emergency vehicle and waste collection vehicle access points be designed to relevant Australian Standards.

7 Conclusions

Based on the analysis presented in this report, the following can be concluded in relation to the proposed holiday resort in American River, Kangaroo Island:

- The proposed development will provide 323 bed accommodation – *holiday resort* in American River,
- 108 room main hotel, 115 room micro-hotel, 20 cottages (each with 4, single bedroom units) and 20 cabins (each with 1 single bedroom units) are proposed as part of the resort accessible via new access from Thomas Road,
- 75 off-street parking spaces have been proposed for resort guests/visitors near main access to the development from Thomas Road; an additional 200 space parking area is provided near the micro-hotel. This is deemed sufficient to meet the average demand generated by the resort,
- Additional space (land) is available adjacent to the proposed car park for additional parking during peak summer period if deemed necessary,
- The resort guests will be able to use electro-cars (electric buggies) for transfer between the reception area and their cottages/cabins,
- An estimated 100-150 staff will be required to support average occupancy at the resort site. During the peak summer period up to 200 staff may be required to support peak demand,
- A mix of local and non-local (mainland SA) staff is envisaged to support resort operations,
- A 50 space carpark is proposed for the staff. Non-local (mainland SA) staff are expected to use ferry services to commute from/to mainland SA,
- Staff trips are not envisaged to coincide with the surrounding road network and resort peak traffic periods,
- Existing traffic counts indicate up to 45-50 trips passing through key intersections within the immediate vicinity of the proposed resort,
- An estimated 75 trips by the proposed resort over the two-hour period coinciding with each ferry service are not estimated to adversely impact the surrounding road network,
- The vehicular capacity of the largest of SeaLink's Kangaroo Island ferries is 55 cars (or 42 cars and 4 coaches) which will restrict the number of private vehicles used by visitors to the American River Resort and thereby reduce the overall number of vehicle trips per day.

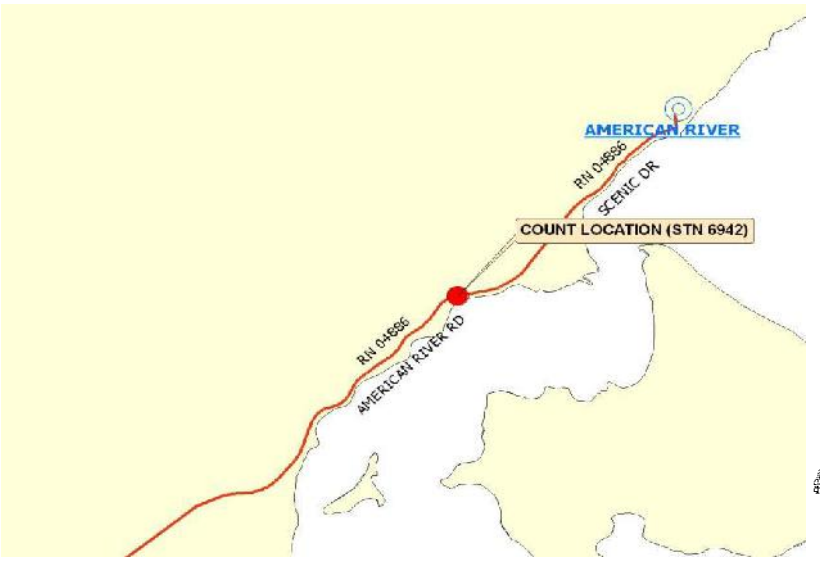
If you have any questions or would like to discuss any aspect of this report please contact us to discuss further.

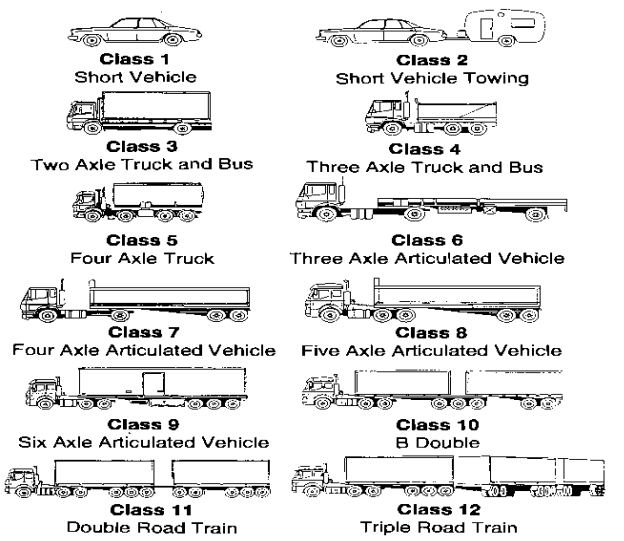
Appendix A

Location Details **Meter Type** MetroCount

Road No.	4886	**Road Name**	MUSTON HILL - AMERICAN RIVER K.I.
Location	6.7km northeast of RN 4883 (Kingscote - Penneshaw)		View Location in Google Maps
			Imagery may not be current
RRD	6.7	**Locality**	American River

Site	6942
AMG	QA491356





Count Period : Monday 20/02/2012 to Sunday 26/02/2012 inclusive

Count Summary

5 Day Average Daily Traffic (two way)	497	Heavy Vehicles (two way) 5 day average	40
7 Day Average Daily Traffic (two way)	474	Heavy Vehicles (two way) 7 day average	36
Est AADT (Annual Average Daily Traffic)*	470	7 Day Average Heavy Vehicle content	8%

COMMENTS: *No seasonal factor applied

Totals by AUSTROADS Vehicle Classification (Dominant vehicles shown in diagram above)

Two Way Traffic NB. Bin 13 contains unclassifiable vehicles

Date		1	2	3	4	5	6	7	8	9	10	11	12	13	Total
20/02/2012	Mon	516	6	33	3	4	0	7	0	0	0	0	0	0	569
21/02/2012	Tue	417	14	35	1	2	3	4	2	0	0	0	0	0	478
22/02/2012	Wed	401	7	23	1	2	3	3	0	0	0	0	0	0	440
23/02/2012	Thu	438	16	30	0	2	2	2	2	0	0	0	0	0	492
24/02/2012	Fri	450	19	25	2	6	1	3	0	0	0	0	0	0	506
25/02/2012	Sat	379	25	20	0	0	0	4	0	0	0	0	0	0	428
26/02/2012	Sun	362	13	24	2	0	0	1	2	0	0	0	0	0	404
5 day Ave		***444***	***12***	***29***	***1***	***3***	***2***	***4***	***1***	***0***	***0***	***0***	***0***	***0***	***497***
7 day Ave		***423***	***14***	***27***	***1***	***2***	***1***	***3***	***1***	***0***	***0***	***0***	***0***	***0***	***474***

North Bound

Date		1	2	3	4	5	6	7	8	9	10	11	12	13	Total
20/02/2012	Mon	255	5	18	2	2	0	3	0	0	0	0	0	0	285
21/02/2012	Tue	210	7	17	1	1	2	1	1	0	0	0	0	0	240
22/02/2012	Wed	205	3	10	0	1	2	1	0	0	0	0	0	0	222
23/02/2012	Thu	221	7	15	0	1	2	0	1	0	0	0	0	0	247
24/02/2012	Fri	220	10	12	1	3	1	1	0	0	0	0	0	0	248
25/02/2012	Sat	190	13	10	0	0	0	2	0	0	0	0	0	0	215
26/02/2012	Sun	177	5	12	1	0	0	1	1	0	0	0	0	0	197
5 day Ave		***222***	***6***	***14***	***1***	***2***	***1***	***1***	***0***	***0***	***0***	***0***	***0***	***0***	***248***
7 day Ave		***211***	***7***	***13***	***1***	***1***	***1***	***1***	***0***	***0***	***0***	***0***	***0***	***0***	***236***

South Bound

Date		1	2	3	4	5	6	7	8	9	10	11	12	13	Total
20/02/2012	Mon	261	1	15	1	2	0	4	0	0	0	0	0	0	284
21/02/2012	Tue	207	7	18	0	1	1	3	1	0	0	0	0	0	238
22/02/2012	Wed	196	4	13	1	1	1	2	0	0	0	0	0	0	218
23/02/2012	Thu	217	9	15	0	1	0	2	1	0	0	0	0	0	245
24/02/2012	Fri	230	9	13	1	3	0	2	0	0	0	0	0	0	258
25/02/2012	Sat	189	12	10	0	0	0	2	0	0	0	0	0	0	213
26/02/2012	Sun	185	8	12	1	0	0	0	1	0	0	0	0	0	207
5 day Ave		***222***	***6***	***15***	***1***	***2***	***0***	***3***	***0***	***0***	***0***	***0***	***0***	***0***	***249***
7 day Ave		***212***	***7***	***14***	***1***	***1***	***0***	***2***	***0***	***0***	***0***	***0***	***0***	***0***	***238***

Location Details

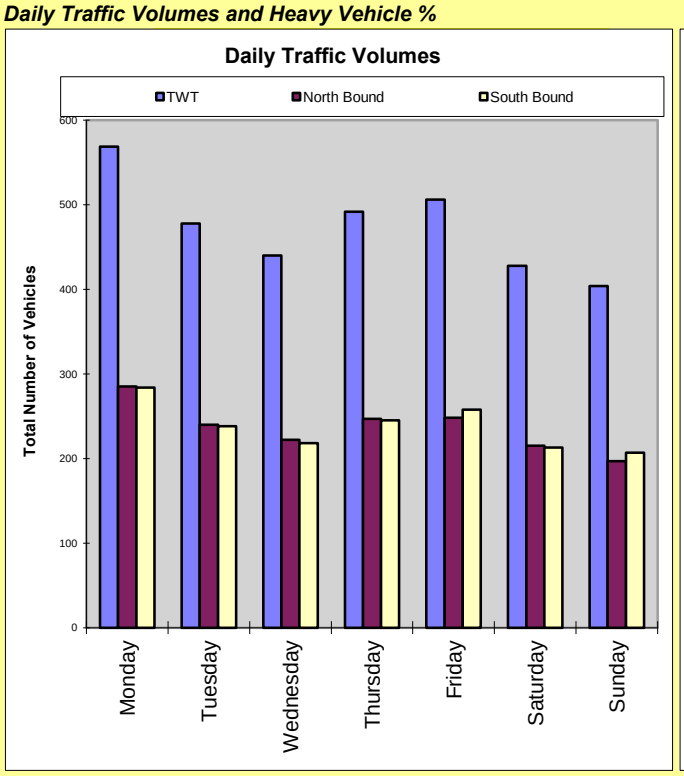
Road No. 4886 **Road Name** MUSTON HILL - AMERICAN RIVER K.I.

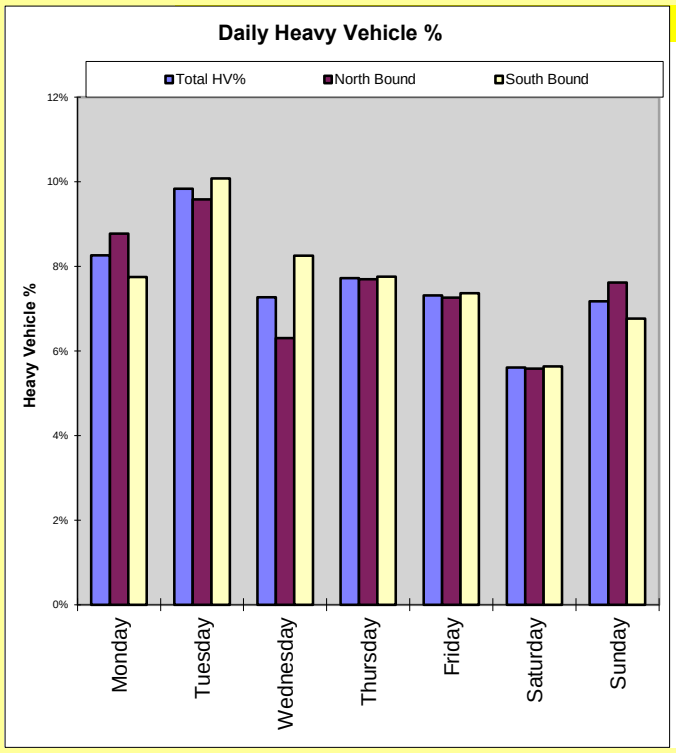
Location 6.7km northeast of RN 4883 (Kingscote - Penneshaw)

Site	**6942**
AMG	**QA491356**

RRD 6.7

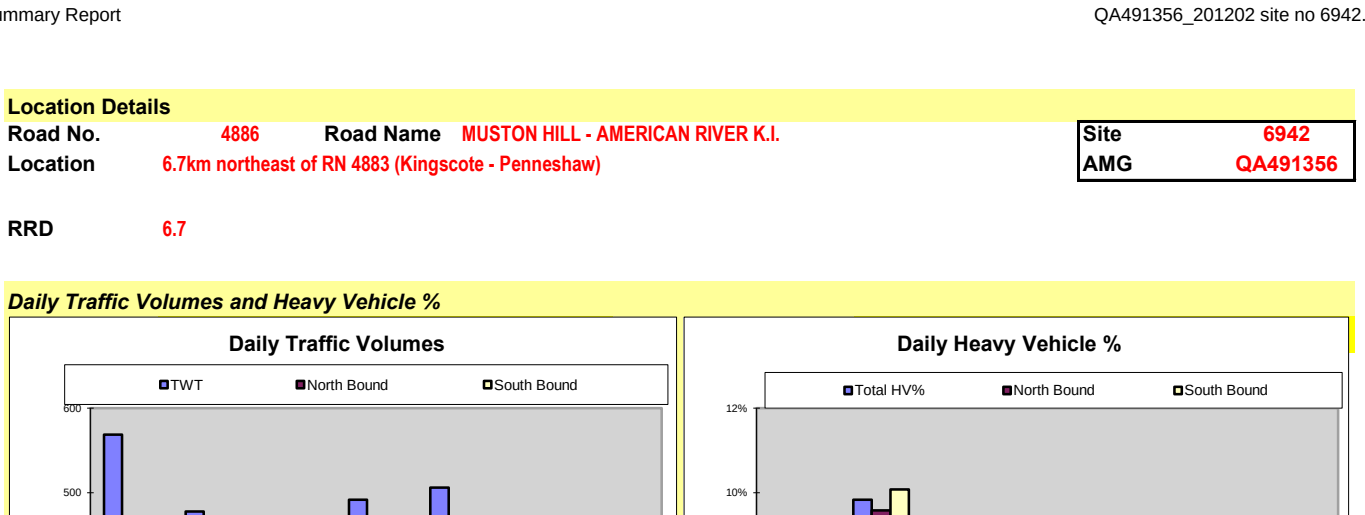
Daily Traffic Volumes and Heavy Vehicle %





Breakdown of classifications by broad groupings

Cars and Cars Towing - 1&2 , Rigid HVs - 3,4 & 5, Articulated HVs - 6,7,8 & 9, B-Doubles - 10 , Double Road Trains or MAD 25m Combination Vehicles - 11.



Temporal Distribution For Average Weekday and Average Weekend Traffic

Note: Please see page 1 for disclaimer.

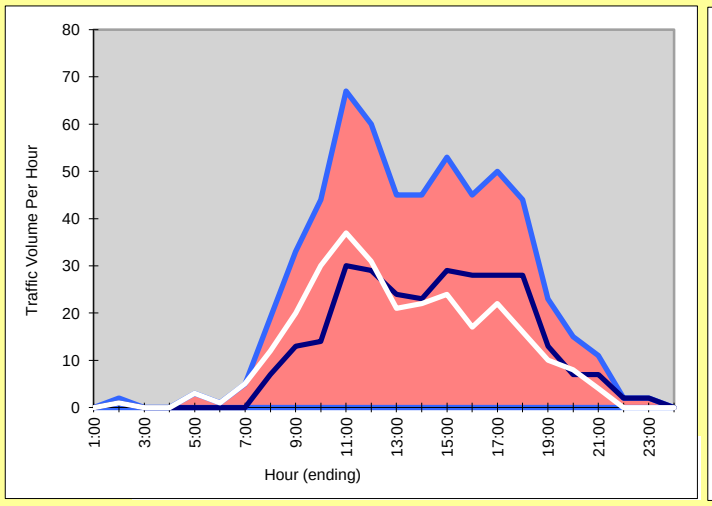
Daily Temporal Distributions

MUSTON HILL - AMERICAN RIVER K.I.

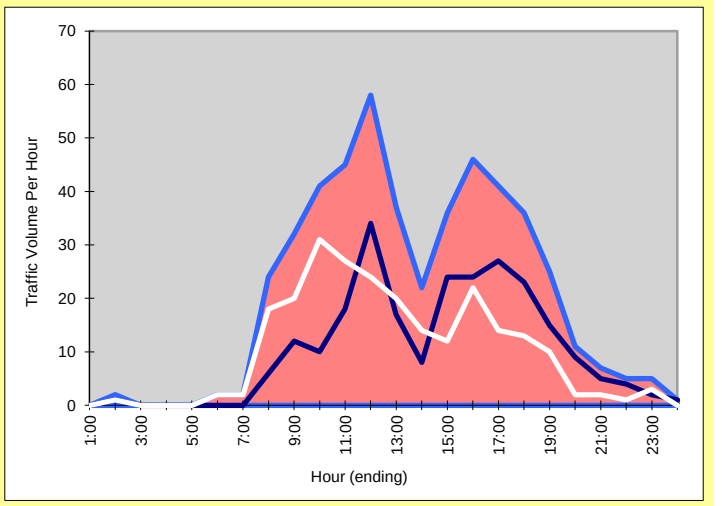
6.7km northeast of RN 4883 (Kingscote - Penneshaw)

Site 6942
AMG QA491356

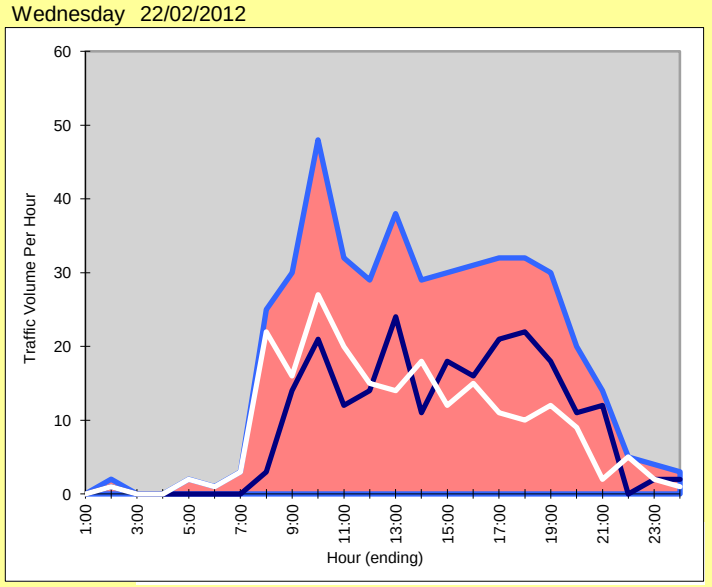
Monday 20/02/2012



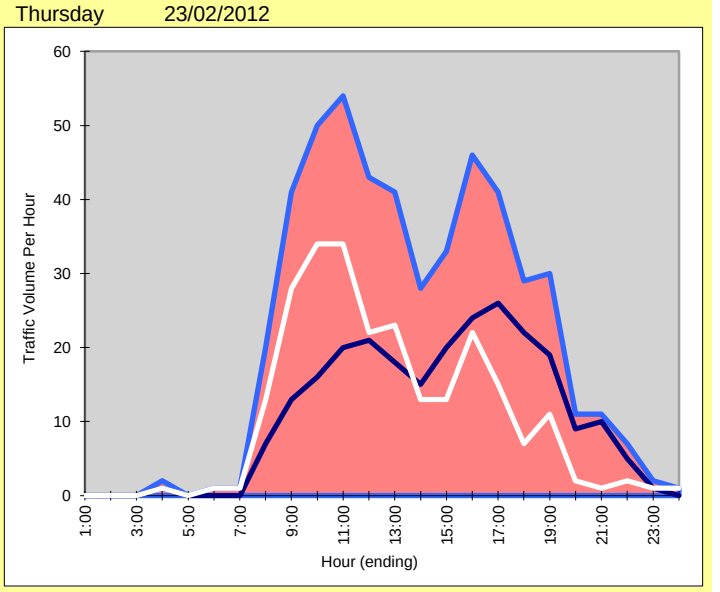
Tuesday 21/02/2012



Wednesday 22/02/2012



Thursday 23/02/2012



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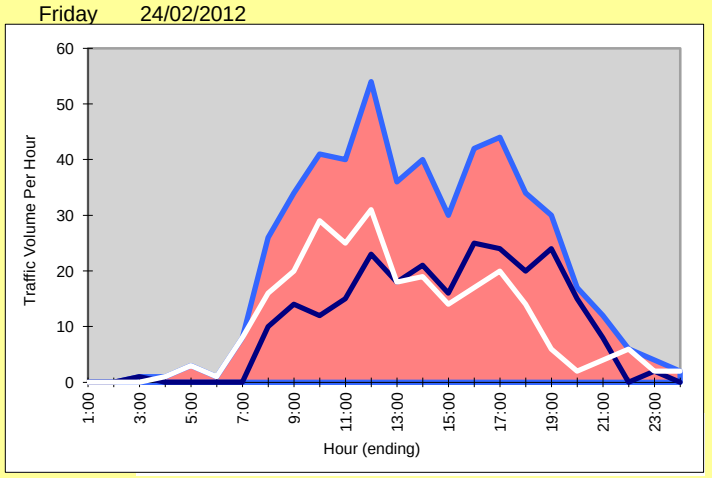

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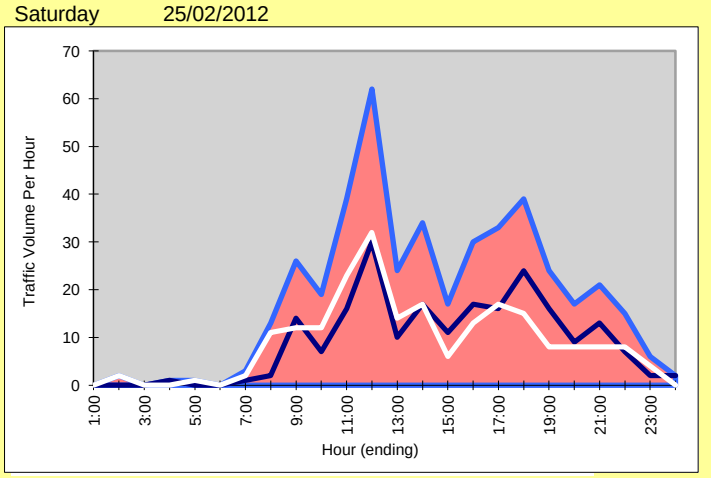
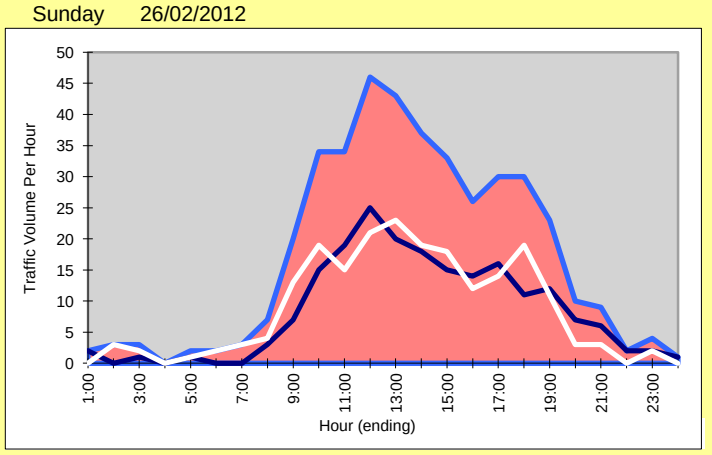


Sunday 26/02/2012



Count Summary

7 Day Average Daily Traffic (two way)	474
5 Day Average Daily Traffic (two way)	497
Est AADT (Annual Average Daily Traffic)*	470

Legend

Total Traffic	
North Bound	
South Bound	

Note: Please see page 1 for disclaimer.

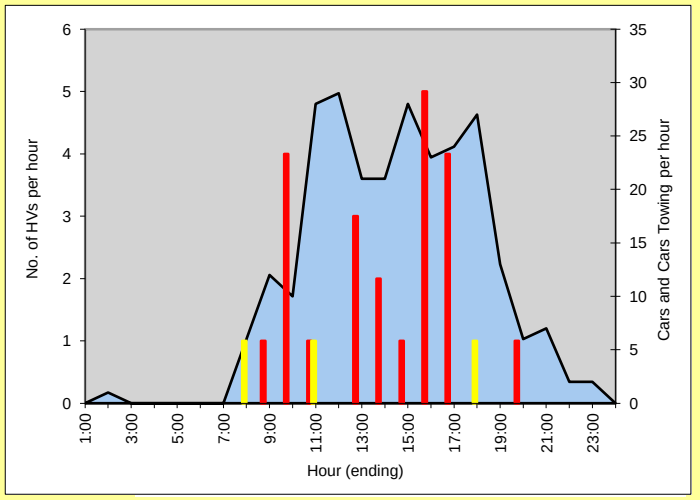
Directional Daily Temporal Distributions of Vehicle Classification Groups

Site 6942

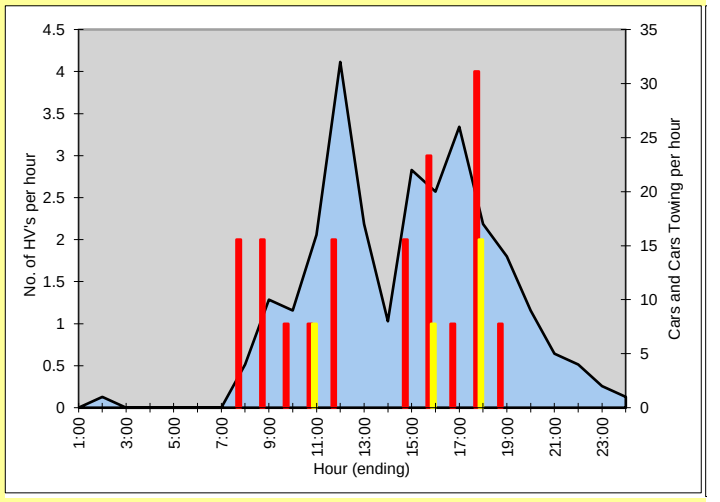
MUSTON HILL - AMERICAN RIVER K.I. ***North Bound*** **AMG QA491356**

6.7km northeast of RN 4883 (Kingscote - Penneshaw)

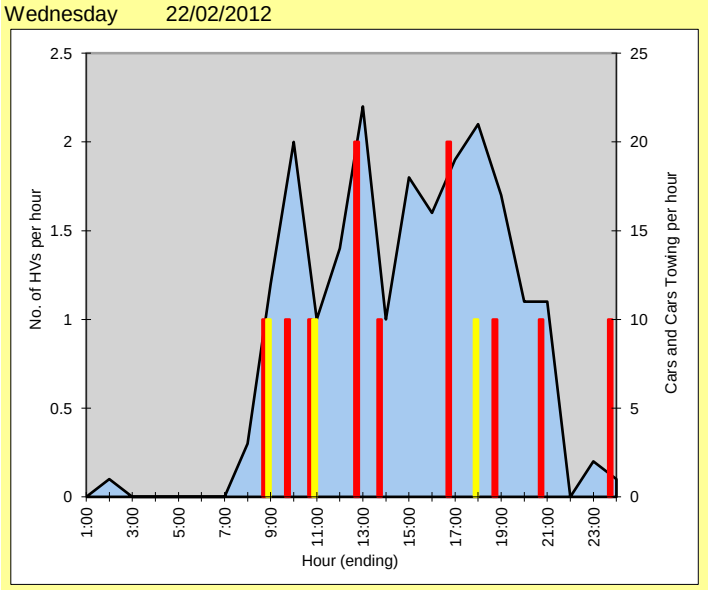
Monday 20/02/2012



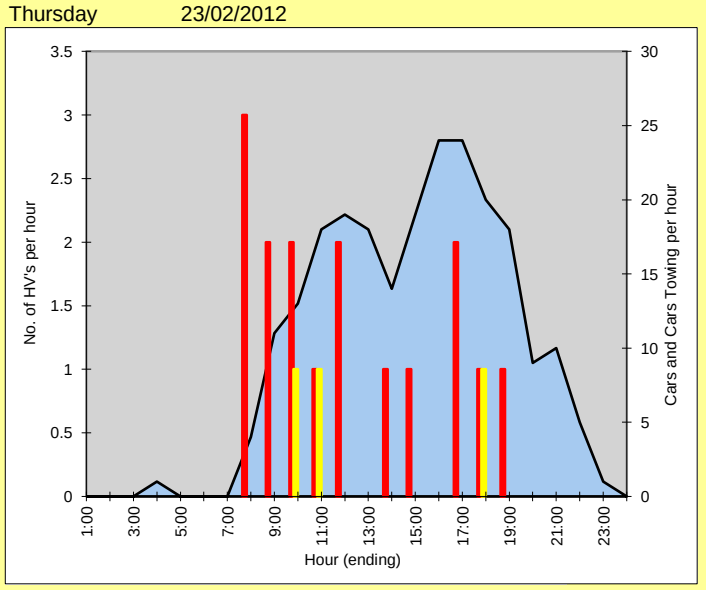
Tuesday 21/02/2012



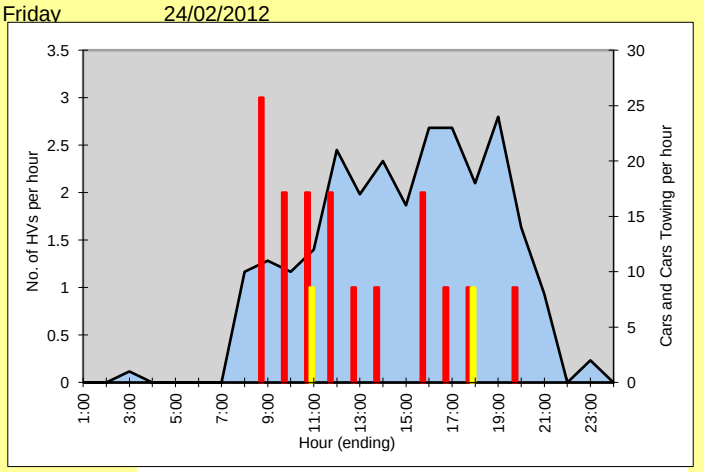
Wednesday 22/02/2012



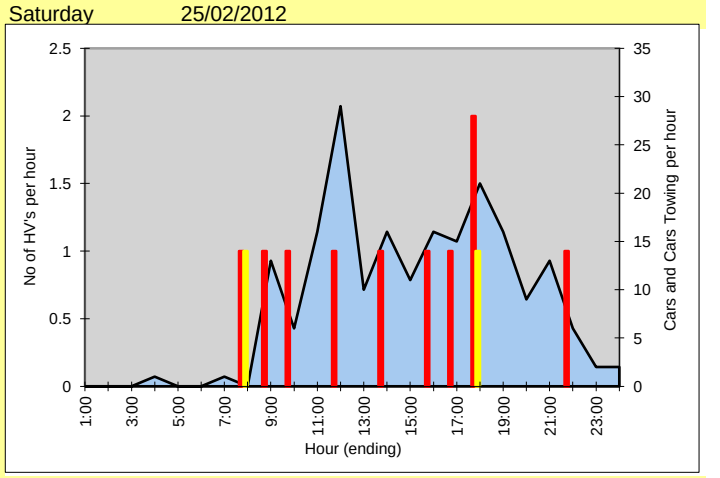
Thursday 23/02/2012



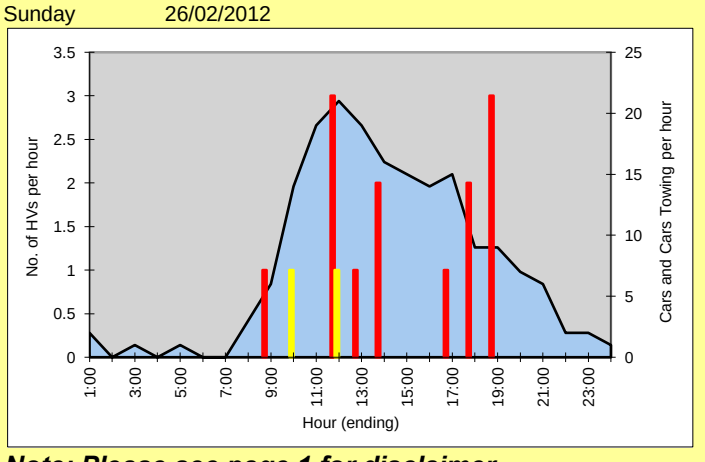
Friday 24/02/2012



Saturday 25/02/2012



Sunday 26/02/2012



Count Summary

7 Day Average Daily Traffic (two way)	474
5 Day Average Daily Traffic (two way)	497
Est AADT (Annual Average Daily Traffic)*	470

Legend

Cars and Cars Towing	
Rigid HV's	
Articulated	
B - Doubles	
Road Train or MADs	

Note: Triple Road Trains are not plotted

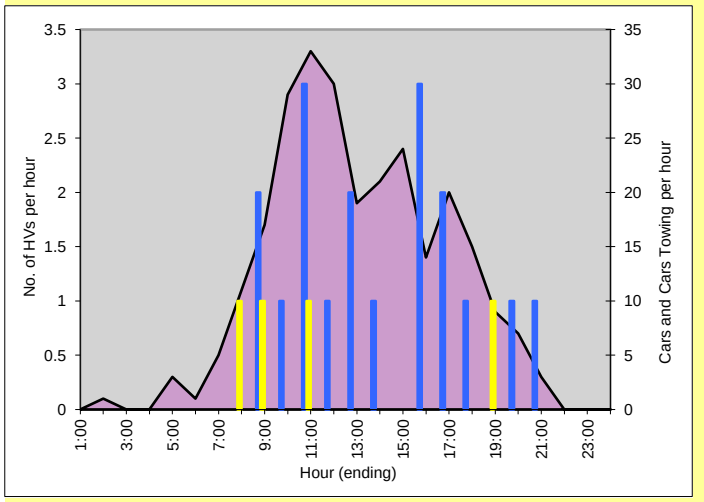
Note: Please see page 1 for disclaimer.

Directional Daily Temporal Distributions of Vehicle Classification Groups **Site 6942**

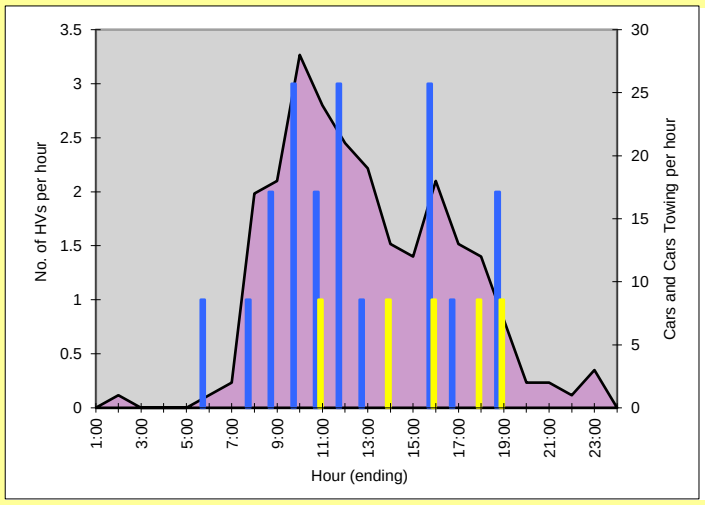
MUSTON HILL - AMERICAN RIVER K.I. ***South Bound*** **AMG QA491356**

6.7km northeast of RN 4883 (Kingscote - Penneshaw)

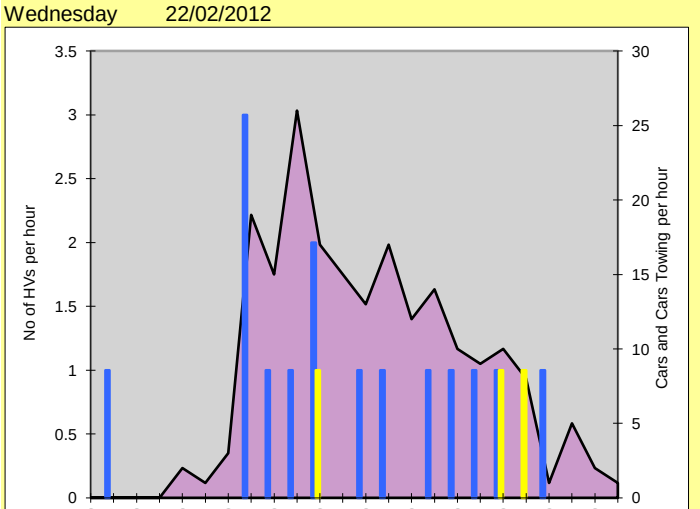
Monday 20/02/2012



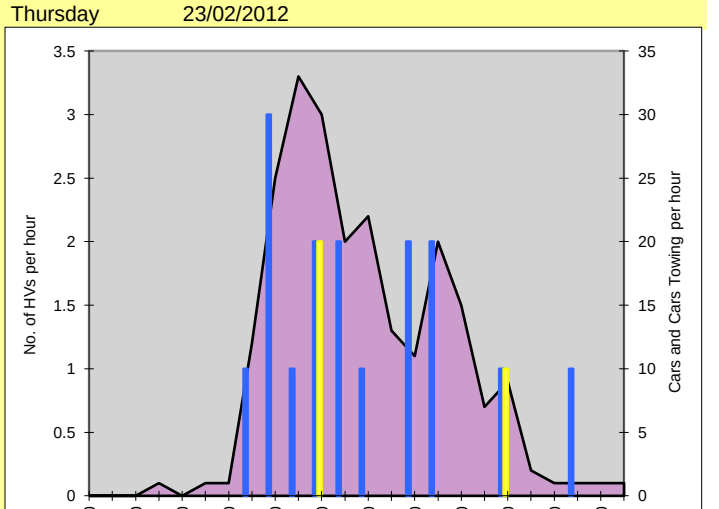
Tuesday 21/02/2012



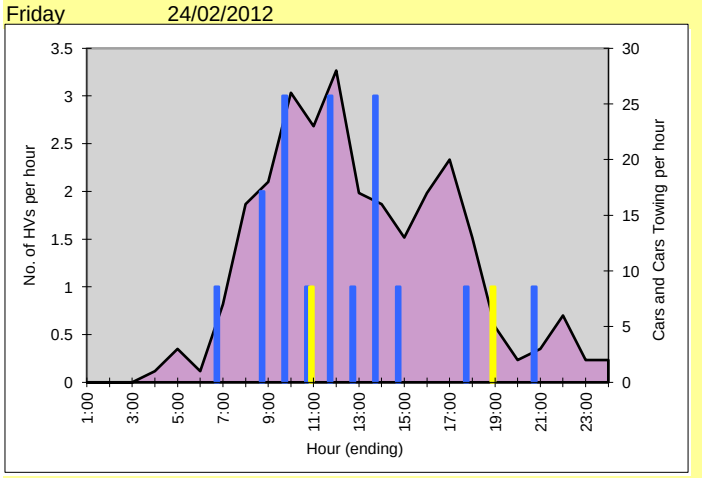
Wednesday 22/02/2012



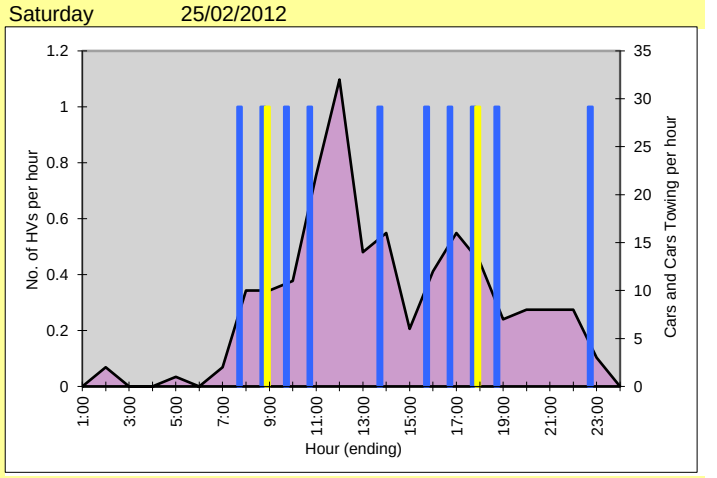
Thursday 23/02/2012



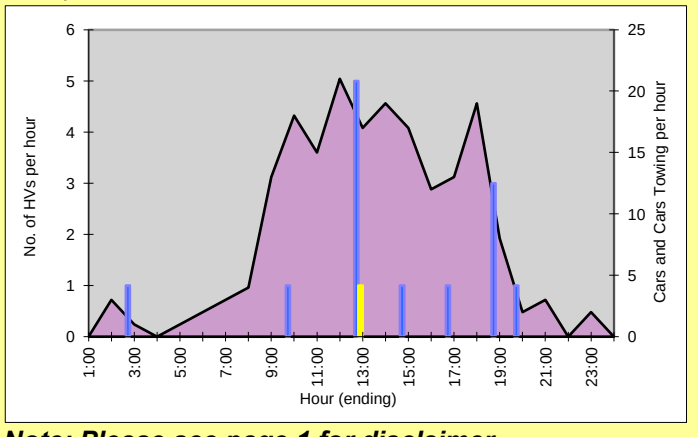
Friday 24/02/2012



Saturday 25/02/2012



Sunday 26/02/2012



Count Summary

7 Day Average Daily Traffic (two way)	474
5 Day Average Daily Traffic (two way)	497
Est AADT (Annual Average Daily Traffic)*	470

Legend

Cars and Cars Towing	
Rigid HV's	
Articulated	
B - Doubles	
Road Train or MADs	

Note: Triple Road Trains are not plotted

Note: Please see page 1 for disclaimer.

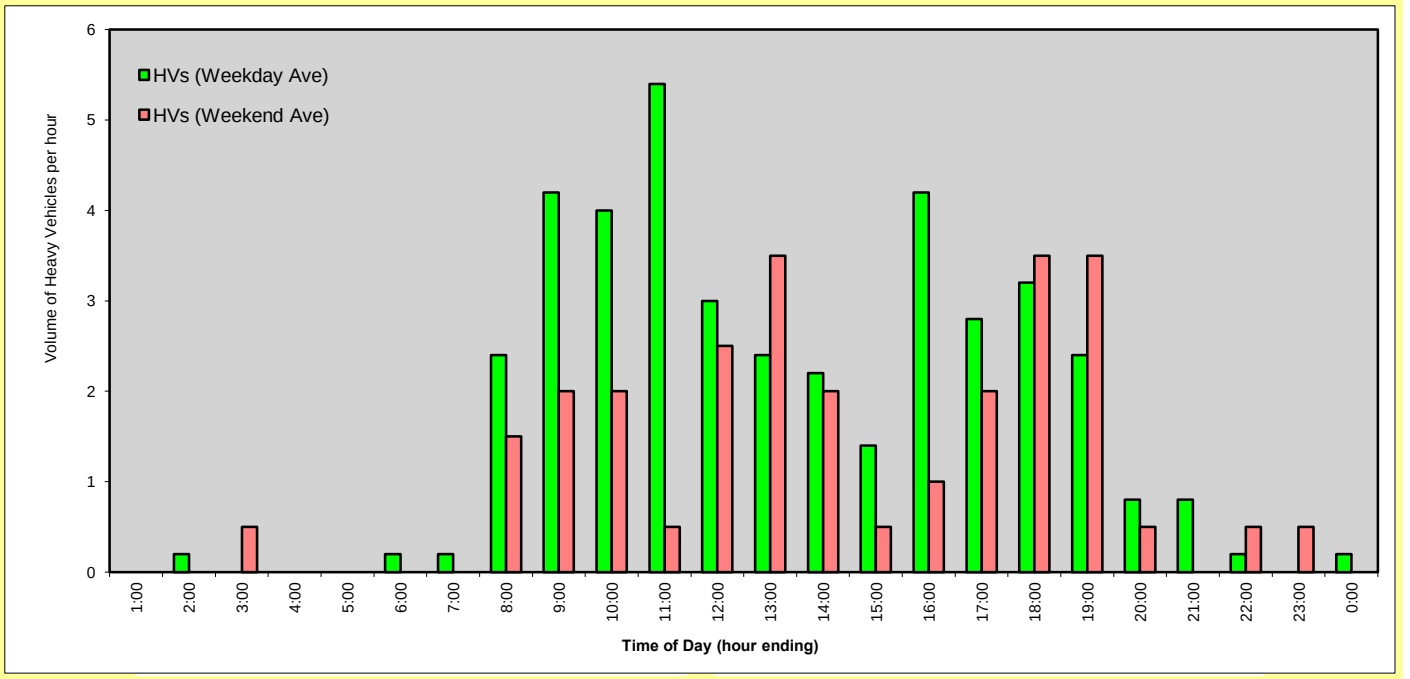
Daily Temporal Distributions

MUSTON HILL - AMERICAN RIVER K.I.

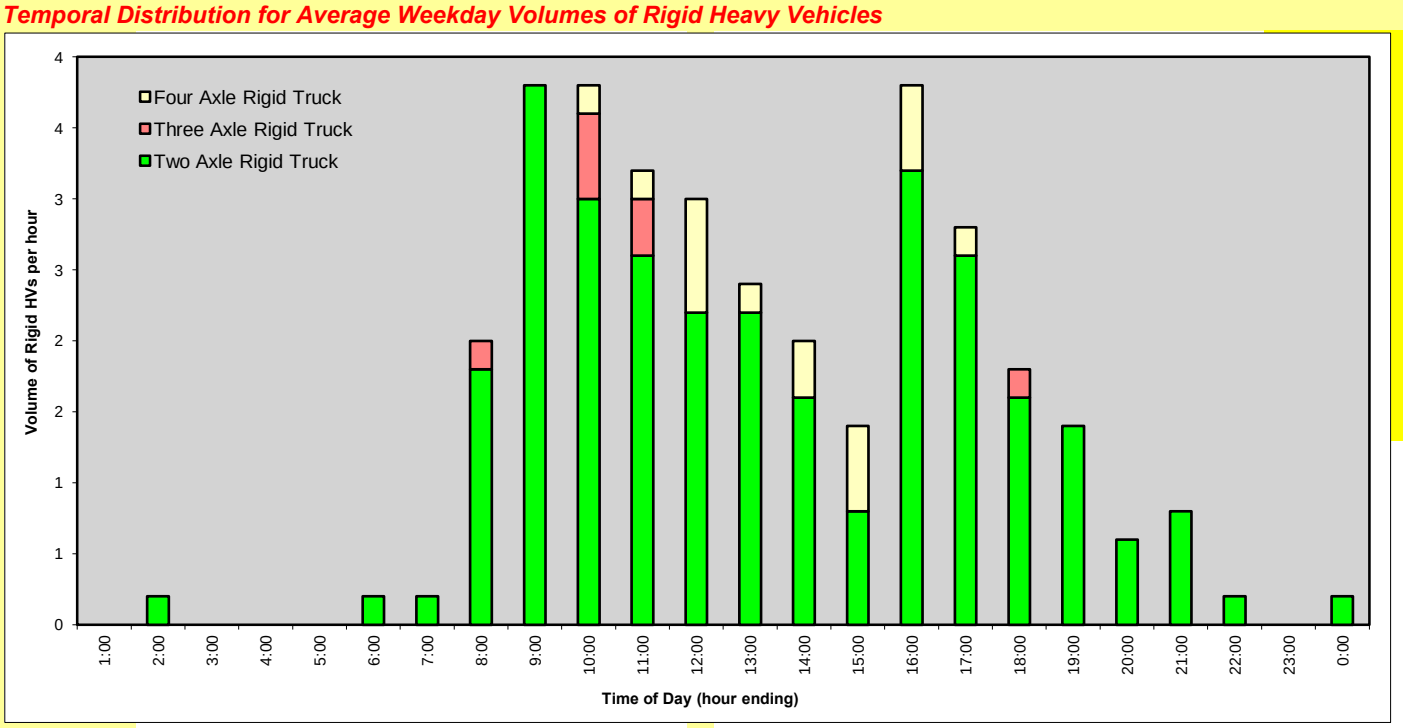
6.7km northeast of RN 4883 (Kingscote - Penneshaw)

Site 6942
AMG QA491356

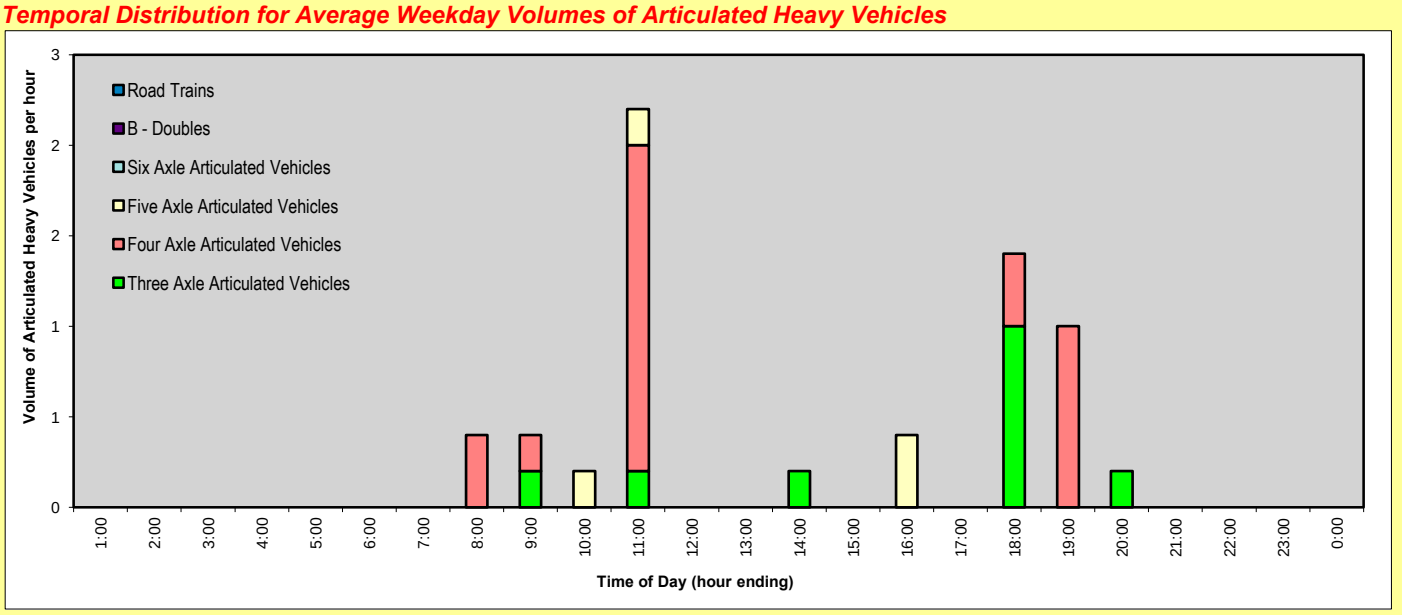
Temporal Distribution for Average Weekday and Average Weekend Volumes of Heavy Vehicles



Temporal Distribution for Average Weekday Volumes of Rigid Heavy Vehicles



Temporal Distribution for Average Weekday Volumes of Articulated Heavy Vehicles



Note: Please see page 1 for disclaimer.

MetroCount Traffic Executive
Daily Classes (Estimated Mass)

DailyClassMass-199 -- English (ENA)

Datasets:

Site:	**[redbanks rd] rural unsealed**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 2
Survey Duration:	15:49 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015
Zone:	
File:	redbanks rd27Feb2015.EC2 (Plus)
Identifier:	DV504A4G MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15315)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**15:50 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (ARX)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 1688 / 1755 (96.18%)

Daily Classes (Estimated Mass)

DailyClassMass-199
Site: redbanks rd.2.0NS
Description: **rural unsealed**
Filter time: **15:50 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 26 January 2015

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu*	0	10	1	3	0	0	0	0	0	0	0	0	14
(%)	0.0	71.4	7.1	21.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	0	34	2	27	2	0	1	1	0	6	0	0	73
(%)	0.0	46.6	2.7	37.0	2.7	0.0	1.4	1.4	0.0	8.2	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	0	20	2	23	0	0	2	2	0	4	0	0	53
(%)	0.0	37.7	3.8	43.4	0.0	0.0	3.8	3.8	0.0	7.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	0	17	2	13	0	0	1	1	0	4	0	0	38
(%)	0.0	44.7	5.3	34.2	0.0	0.0	2.6	2.6	0.0	10.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week

	0	23	1	21	0	0	1	1	0	4	0	0	54
(%)	0.0	42.6	1.9	38.9	0.0	0.0	1.9	1.9	0.0	7.4	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekdays

	0	34	2	27	2	0	1	1	0	6	0	0	73
(%)	0.0	46.6	2.7	37.0	2.7	0.0	1.4	1.4	0.0	8.2	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekend

	0	18	2	18	0	0	1	1	0	4	0	0	45
(%)	0.0	40.0	4.4	40.0	0.0	0.0	2.2	2.2	0.0	8.9	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-199
Site: redbanks rd.2.0NS
Description: **rural unsealed**
Filter time: **15:50 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 2 February 2015

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	0	35	2	29	0	0	2	1	0	0	0	0	69
(%)	0.0	50.7	2.9	42.0	0.0	0.0	2.9	1.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	0	28	3	27	2	0	2	1	0	4	0	0	67
(%)	0.0	41.8	4.5	40.3	3.0	0.0	3.0	1.5	0.0	6.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	0	34	1	29	0	0	0	2	0	7	0	0	73
(%)	0.0	46.6	1.4	39.7	0.0	0.0	0.0	2.7	0.0	9.6	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	0	25	1	24	0	0	0	0	0	8	2	0	60
(%)	0.0	41.7	1.7	40.0	0.0	0.0	0.0	0.0	0.0	13.3	3.3	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	0	28	0	23	1	0	1	0	1	0	0	0	54
(%)	0.0	51.9	0.0	42.6	1.9	0.0	1.9	0.0	1.9	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	0	19	0	15	0	0	1	0	0	0	0	0	35
(%)	0.0	54.3	0.0	42.9	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	0	15	1	10	0	0	1	0	0	4	0	0	31
(%)	0.0	48.4	3.2	32.3	0.0	0.0	3.2	0.0	0.0	12.9	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	0	25	1	22	0	0	1	0	0	2	0	0	54
(%)	0.0	46.3	1.9	40.7	0.0	0.0	1.9	0.0	0.0	3.7	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	0	29	1	26	0	0	1	0	0	3	0	0	63
(%)	0.0	46.0	1.6	41.3	0.0	0.0	1.6	0.0	0.0	4.8	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekend													
	0	17	0	12	0	0	1	0	0	2	0	0	32
(%)	0.0	53.1	0.0	37.5	0.0	0.0	3.1	0.0	0.0	6.3	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-199
Site: redbanks rd.2.0NS
Description: **rural unsealed**
Filter time: **15:50 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 9 February 2015

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	0	34	4	39	1	1	1	3	0	1	0	0	84
(%)	0.0	40.5	4.8	46.4	1.2	1.2	1.2	3.6	0.0	1.2	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	0	40	3	35	0	0	1	1	0	5	0	0	85
(%)	0.0	47.1	3.5	41.2	0.0	0.0	1.2	1.2	0.0	5.9	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	0	35	0	23	2	0	1	0	0	0	0	0	61
(%)	0.0	57.4	0.0	37.7	3.3	0.0	1.6	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	0	46	4	33	1	0	0	2	0	4	0	0	90
(%)	0.0	51.1	4.4	36.7	1.1	0.0	0.0	2.2	0.0	4.4	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	0	25	0	26	0	0	0	0	0	2	0	0	53
(%)	0.0	47.2	0.0	49.1	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	0	23	3	27	1	0	1	2	0	1	0	0	58
(%)	0.0	39.7	5.2	46.6	1.7	0.0	1.7	3.4	0.0	1.7	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	0	31	3	19	1	0	2	0	0	0	0	0	56
(%)	0.0	55.4	5.4	33.9	1.8	0.0	3.6	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	0	33	2	28	0	0	0	1	0	1	0	0	68
(%)	0.0	48.5	2.9	41.2	0.0	0.0	0.0	1.5	0.0	1.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	0	35	2	30	0	0	0	1	0	2	0	0	73
(%)	0.0	47.9	2.7	41.1	0.0	0.0	0.0	1.4	0.0	2.7	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekend													
	0	27	3	23	1	0	1	1	0	0	0	0	56
(%)	0.0	48.2	5.4	41.1	1.8	0.0	1.8	1.8	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-199
Site: redbanks rd.2.0NS
Description: **rural unsealed**
Filter time: **15:50 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 16 February 2015

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	0	37	2	27	0	1	0	3	0	6	0	0	76
(%)	0.0	48.7	2.6	35.5	0.0	1.3	0.0	3.9	0.0	7.9	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	0	37	3	41	0	2	0	1	0	2	0	0	86
(%)	0.0	43.0	3.5	47.7	0.0	2.3	0.0	1.2	0.0	2.3	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	0	24	5	31	0	0	0	2	0	2	2	0	66
(%)	0.0	36.4	7.6	47.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	0	36	2	30	2	1	2	1	0	2	0	0	76
(%)	0.0	47.4	2.6	39.5	2.6	1.3	2.6	1.3	0.0	2.6	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	0	32	1	28	1	2	0	0	0	1	0	0	65
(%)	0.0	49.2	1.5	43.1	1.5	3.1	0.0	0.0	0.0	1.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	0	26	0	24	0	0	0	0	0	0	0	0	50
(%)	0.0	52.0	0.0	48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	0	21	0	21	0	0	0	0	0	2	0	0	44
(%)	0.0	47.7	0.0	47.7	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week

	0	30	1	28	0	0	0	1	0	2	0	0	66
(%)	0.0	45.5	1.5	42.4	0.0	0.0	0.0	1.5	0.0	3.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekdays

	0	32	2	31	0	0	0	1	0	2	0	0	73
(%)	0.0	43.8	2.7	42.5	0.0	0.0	0.0	1.4	0.0	2.7	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekend

	0	23	0	22	0	0	0	0	0	0	0	0	47
(%)	0.0	48.9	0.0	46.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-199
Site: redbanks rd.2.0NS
Description: **rural unsealed**
Filter time: **15:50 Thursday, 29 January 2015 => 10:57 Wednesday, 25 February 2015**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 23 February 2015

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	0	32	3	31	0	0	3	1	0	2	0	0	72
(%)	0.0	44.4	4.2	43.1	0.0	0.0	4.2	1.4	0.0	2.8	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	0	31	3	32	11	0	1	0	0	0	0	0	78
(%)	0.0	39.7	3.8	41.0	14.1	0.0	1.3	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed*	0	6	0	13	0	0	0	1	0	1	0	0	21
(%)	0.0	28.6	0.0	61.9	0.0	0.0	0.0	4.8	0.0	4.8	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	0	31	2	31	5	0	2	0	0	0	0	0	74
(%)	0.0	41.9	2.7	41.9	6.8	0.0	2.7	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	0	31	2	31	5	0	2	0	0	0	0	0	74
(%)	0.0	41.9	2.7	41.9	6.8	0.0	2.7	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekend No complete days.

*** - Incomplete**

MetroCount Traffic Executive
Daily Classes (Estimated Mass)

DailyClassMass-201 -- English (ENA)

Datasets:

Site:	**[Tangara drive] township sealed**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 2
Survey Duration:	9:15 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014
Zone:	
File:	Tangara drive07Mar2014.EC2 (Plus)
Identifier:	T85512SX MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15315)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**9:16 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (ARX)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 6413 / 6415 (99.97%)

Daily Classes (Estimated Mass)

DailyClassMass-201
Site: Tangara drive.2.0NS
Description: **township sealed**
Filter time: **9:16 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 3 February 2014

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed*	3	135	2	24	1	1	1	0	0	0	0	0	167
(%)	1.8	80.8	1.2	14.4	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	5	178	4	34	0	0	1	1	0	0	0	0	223
(%)	2.2	79.8	1.8	15.2	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	0	191	6	34	0	0	1	2	0	0	0	0	234
(%)	0.0	81.6	2.6	14.5	0.0	0.0	0.4	0.9	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	2	183	3	25	0	0	0	0	0	0	0	0	213
(%)	0.9	85.9	1.4	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	2	181	11	35	0	0	1	1	0	0	0	0	231
(%)	0.9	78.4	4.8	15.2	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	2	183	6	31	0	0	0	1	0	0	0	0	224
(%)	0.9	81.7	2.7	13.8	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	2	184	5	33	0	0	0	1	0	0	0	0	228
(%)	0.9	80.7	2.2	14.5	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekend													
	2	181	7	30	0	0	0	0	0	0	0	0	222
(%)	0.9	81.5	3.2	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-201
Site: Tangara drive.2.0NS
Description: **township sealed**
Filter time: **9:16 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 10 February 2014

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	1	168	6	31	3	0	2	1	0	0	0	0	212
(%)	0.5	79.2	2.8	14.6	1.4	0.0	0.9	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	2	207	6	40	0	0	2	1	0	0	0	0	258
(%)	0.8	80.2	2.3	15.5	0.0	0.0	0.8	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	0	173	5	46	0	0	0	2	0	0	0	0	226
(%)	0.0	76.5	2.2	20.4	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	1	164	0	43	0	1	0	1	0	0	0	0	210
(%)	0.5	78.1	0.0	20.5	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	2	230	5	35	3	0	0	0	0	0	0	0	275
(%)	0.7	83.6	1.8	12.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	1	277	9	49	0	0	2	0	0	0	0	0	338
(%)	0.3	82.0	2.7	14.5	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	2	197	4	32	1	0	2	1	0	0	0	0	239
(%)	0.8	82.4	1.7	13.4	0.4	0.0	0.8	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	0	202	4	39	0	0	0	0	0	0	0	0	251
(%)	0.0	80.5	1.6	15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	0	188	3	38	0	0	0	1	0	0	0	0	235
(%)	0.0	80.0	1.3	16.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekend													
	1	236	6	40	0	0	2	0	0	0	0	0	288
(%)	0.3	81.9	2.1	13.9	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-201
Site: Tangara drive.2.0NS
Description: **township sealed**
Filter time: **9:16 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 17 February 2014

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	3	180	4	46	1	0	1	2	0	0	0	0	237
(%)	1.3	75.9	1.7	19.4	0.4	0.0	0.4	0.8	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	3	147	4	36	3	1	1	1	0	0	0	0	196
(%)	1.5	75.0	2.0	18.4	1.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	0	153	3	39	0	0	1	2	0	0	0	0	198
(%)	0.0	77.3	1.5	19.7	0.0	0.0	0.5	1.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	1	138	7	29	0	0	3	2	0	0	0	0	180
(%)	0.6	76.7	3.9	16.1	0.0	0.0	1.7	1.1	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	11	211	0	42	1	0	1	4	0	0	0	0	270
(%)	4.1	78.1	0.0	15.6	0.4	0.0	0.4	1.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	1	151	2	36	1	0	2	1	0	1	0	0	195
(%)	0.5	77.4	1.0	18.5	0.5	0.0	1.0	0.5	0.0	0.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	0	178	1	42	0	0	0	4	0	1	0	0	226
(%)	0.0	78.8	0.4	18.6	0.0	0.0	0.0	1.8	0.0	0.4	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	2	165	2	37	0	0	0	2	0	0	0	0	214
(%)	0.9	77.1	0.9	17.3	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	3	165	3	38	0	0	0	2	0	0	0	0	216
(%)	1.4	76.4	1.4	17.6	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekend													
	0	164	1	38	0	0	1	2	0	1	0	0	210
(%)	0.0	78.1	0.5	18.1	0.0	0.0	0.5	1.0	0.0	0.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-201
Site: Tangara drive.2.0NS
Description: **township sealed**
Filter time: **9:16 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 24 February 2014

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	2	170	2	30	1	2	3	2	0	0	0	0	212
(%)	0.9	80.2	0.9	14.2	0.5	0.9	1.4	0.9	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	0	131	1	37	1	0	1	1	0	0	0	0	172
(%)	0.0	76.2	0.6	21.5	0.6	0.0	0.6	0.6	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	2	143	1	33	3	0	1	1	0	1	0	0	185
(%)	1.1	77.3	0.5	17.8	1.6	0.0	0.5	0.5	0.0	0.5	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	1	128	1	30	0	0	1	2	0	0	0	0	163
(%)	0.6	78.5	0.6	18.4	0.0	0.0	0.6	1.2	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri	2	149	2	33	2	2	1	1	0	0	0	0	192
(%)	1.0	77.6	1.0	17.2	1.0	1.0	0.5	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat	0	134	1	32	0	0	1	1	0	0	0	0	169
(%)	0.0	79.3	0.6	18.9	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun	2	145	10	32	0	0	2	3	0	0	0	0	194
(%)	1.0	74.7	5.2	16.5	0.0	0.0	1.0	1.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week													
	0	142	2	32	0	0	1	1	0	0	0	0	183
(%)	0.0	77.6	1.1	17.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekdays													
	0	143	1	32	1	0	1	1	0	0	0	0	184
(%)	0.0	77.7	0.5	17.4	0.5	0.0	0.5	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Weekend													
	0	139	5	32	0	0	1	2	0	0	0	0	181
(%)	0.0	76.8	2.8	17.7	0.0	0.0	0.6	1.1	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

*** - Incomplete**

Daily Classes (Estimated Mass)

DailyClassMass-201
Site: Tangara drive.2.0NS
Description: **township sealed**
Filter time: **9:16 Wednesday, 5 February 2014 => 13:04 Friday, 7 March 2014**
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 3 March 2014

	1	2	3	4	5	6	7	8	9	10	11	12	
Total													
Mon	2	154	6	39	2	0	1	2	0	0	0	0	206
(%)	1.0	74.8	2.9	18.9	1.0	0.0	0.5	1.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Tue	0	157	1	35	2	0	3	1	0	0	0	0	199
(%)	0.0	78.9	0.5	17.6	1.0	0.0	1.5	0.5	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Wed	0	128	3	35	1	0	2	1	0	0	0	0	170
(%)	0.0	75.3	1.8	20.6	0.6	0.0	1.2	0.6	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Thu	3	139	3	37	0	0	3	0	0	0	0	0	185
(%)	1.6	75.1	1.6	20.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Fri*	0	25	2	10	0	0	1	0	0	0	0	0	38
(%)	0.0	65.8	5.3	26.3	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sat*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													
Sun*	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Average daily volume

Entire week

	1	144	3	36	1	0	1	0	0	0	0	0	190
(%)	0.5	75.8	1.6	18.9	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekdays

	1	144	3	36	1	0	1	0	0	0	0	0	190
(%)	0.5	75.8	1.6	18.9	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	
ESA=0.0, Freight=0.0, Gross mass=0.0kg													

Weekend No complete days.

*** - Incomplete**