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The Burrup Peninsula is surrounded on three sides with ocean and is joined to the mainland at the southern end.

From a terrestrial fauna perspective, the peninsula is virtually an island with restricted movement of terrestrial fauna from the mainland onto the peninsula. The influx of individuals or species onto the peninsula is likely to be limited.

Construction activities will result in clearing a significant proportion of both sites. Site A has already been cleared and construction of the infrastructure is currently underway. Some tracks and a small proportion of Site B have already been cleared.

The likely vertebrate fauna assemblage on the Burrup Peninsula which is based on earlier fauna surveys and Western Australian Museum data is shown in Appendices (X - not included).

Of particular interest is the potential for Pilbara Olive Pythons and perhaps Northern Quoll, both of which are listed as conservation significant under the EPBC Act (1999) and the Western Australian Wildlife Conservation Act (1950), to be present.

Clearing of vegetation will almost certainly result in the loss of small resident terrestrial vertebrates, loss of habitat for birds and larger mammals (e.g. kangaroos) and death and injury of individuals on roads and around the infrastructure during and post construction.

Implementation of these fauna management procedures will minimise fauna deaths and injuries during and post construction.
1.2 FAUNA MANAGEMENT PROCEDURE CONSIDERATIONS

The following issues are important considerations in the development of fauna management procedures:

- Clearing of vegetation is likely to kill and injure most of the resident vertebrate fauna unable to rapidly move away;
- Clearing of vegetation is likely to result in the loss of habitat for resident birds that will be displaced during the clearing process;
- Clearing of vegetation is likely to shift larger mammals (e.g. kangaroos, cats) and perhaps a few larger reptiles (e.g. goannas and snakes) out of the area;
- Clearing a high proportion of the vegetation between the beach and the central bitumen road to the east of Site B (running up the spine of the Burrup Peninsula) is likely to result in fragmentation of habitat and limit the movement of individuals through established home ranges;
- Pilbara Olive Pythons are frequently encountered in the area, particularly on the roads at night during the breeding season. The home range of this species is such that it is probable that the territory of numerous individuals will encompass part of the disturbance areas. It is likely that males will move outside of established home ranges during the breeding season;
- The site contains feral cats, and possibly dogs/dingos that predate on small vertebrate fauna, and clearing of vegetation, fragmenting habitat, creating movement barriers may increase predation pressure by these larger predators;
- The three valleys within Site B, which will be partially cleared, currently act as movement corridors for kangaroos and perhaps echidnas, Pilbara Olive Pythons, large goannas and cats. Vegetation clearing and filling in sections of these valleys will displace (and isolate) individuals, some of which may be killed crossing roads and moving out of the area;
- Lights and possibly permanent water may attract insects which may in turn attract insectivorous predators such as bats, Nightjars, etc exposing them to injury by vehicles;
- A few of the larger, less agile flying birds, such as Bustards and Pelicans, can be injured on fencing and power lines;
- Movement of vehicles at night will potentially kill and injure nocturnal reptiles, mammals and birds;
- There are numerous species that can potentially cause injury to on-site personnel, even death, if not appropriately handled and treated (e.g. snakes, spiders, bees); and
- Significant storms are likely to result in stranded turtles, and possibly sea snakes and sea-birds being found along the beach.

1.3 FAUNA IDENTIFICATION

A number of texts are recommended to be used for fauna identification.

It should be noted that the books by Storr et al. (1983, 1990, 1999, 2002) and Tyler et al. (2000) contain dichotomous keys for identifying reptiles and amphibians, whereas the books by Johnstone and Storr, (1998, 2004) and Van Dyck and Strahan (2008) do not contain keys, and the task of identification is therefore more difficult. Even experienced herpetologists have difficulty in identifying numerous species of reptiles and frogs from these texts, and the only sure method is to voucher the specimen with the Western Australian Museum.

Only specimens that are of conservation significance, are potentially a new species or are a significant range extension should be sent to the Western Australian Museum.

The museum should be contacted before the samples are sent to ensure the samples are wanted. These specimens can be frozen and transported in cooler bags when a suitable person is travelling to Perth. Species of conservation significance that are likely to be found in the vicinity of Sites A and B are listed in Table 1.
Table 1. Species of National Significance or Listed under the Wildlife Conservation Notice 20XX.

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>EPBC Act (1999) Status</th>
<th>Wildlife Conservation Notice 20XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>Dasyurus hallucatus</td>
<td>Northern Quoll</td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rhinonicteris aurantia</td>
<td>Pilbara Leaf-nosed Bat</td>
<td>Vulnerable</td>
<td>Schedule 1</td>
</tr>
<tr>
<td></td>
<td>Mormopterus loriae cobourginna</td>
<td>Little North-western Mastiff Bat</td>
<td>Priority 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Macroderma gigas</td>
<td>Ghost Bat</td>
<td>Priority 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pseudomys chapmani</td>
<td>Pebble-mound Mouse</td>
<td>Priority 4</td>
<td></td>
</tr>
<tr>
<td>Reptiles</td>
<td>Liasis olivaceus barroni</td>
<td>Pilbara Olive Python</td>
<td>Vulnerable</td>
<td>Schedule 1</td>
</tr>
<tr>
<td></td>
<td>Careta caretta</td>
<td>Loggerhead Turtle</td>
<td>Endangered</td>
<td>Schedule 1</td>
</tr>
<tr>
<td></td>
<td>Chelonia mydas</td>
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<td>Schedule 1</td>
</tr>
<tr>
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<td>Eretmochelys imbricata</td>
<td>Hawksbill Turtle</td>
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<tr>
<td></td>
<td>Natator depressus</td>
<td>Flatback Turtle</td>
<td>Vulnerable</td>
<td>Schedule 1</td>
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<tr>
<td></td>
<td>Dermochelys coracea</td>
<td>Leatherback Turtle</td>
<td>Vulnerable</td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>Haliaeetus leucogaster</td>
<td>White-bellied Sea-eagle</td>
<td>Migratory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Merops ornatus</td>
<td>Rainbow Bee-eater</td>
<td>Migratory</td>
<td></td>
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<tr>
<td></td>
<td>Hirundo rustica</td>
<td>Barn Swallow</td>
<td>Migratory</td>
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<td>Charadrius veredus</td>
<td>Oriental Plover</td>
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<td>Gareola matsuturum</td>
<td>Oriental Pratincole</td>
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<td>Tringa nebularia</td>
<td>Common Greenshank</td>
<td>Migratory</td>
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<td>Numenius phaeopus</td>
<td>Whimbrel</td>
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<td>Numenius minutus</td>
<td>Little Curlew</td>
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<td>Arenaria interpres</td>
<td>Ruddy Turnstone</td>
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<tr>
<td></td>
<td>Puffinus pacificus</td>
<td>Wedge-tailed Shearwater</td>
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</tr>
<tr>
<td></td>
<td>Macronectes giganteus</td>
<td>Southern Giant Petrel</td>
<td>Endangered</td>
<td></td>
</tr>
</tbody>
</table>

1.4 SCOPE

These procedures provide:

- details relating to fauna identification;
- details on trapped fauna management;
- details relating to fauna harm avoidance when handling fauna likely to be encountered in Sites A and B;
- details of injury management including the suitability of capture and medical treatment;
- actions to be taken in the case of death of fauna;
- details translocation of fauna;
- fauna handling requirements for site personnel; and
- additional management requirements for fauna species protected under the *Environment Protection and Biodiversity Conservation Act 1999* and *Wildlife Conservation Act 1950*. 
2 CAPTURE AND HANDLING OF FAUNA

2.1 GENERAL PRINCIPLES

The capture, handling and removal of fauna at risk of injury or death or where on-site personnel are at risk is addressed below.

This section commences with some general principles and then discusses the appropriate procedures in four broad taxonomic categories: birds, mammals, reptiles and amphibians.

• On-site personnel should not place themselves or fellow workers at risk of injury or death, to capture, handle or remove fauna from the site.
• On-site personnel that are unsure about the identity or risks associated with capturing, handling or removing fauna from the site should leave the individual alone and call for assistance from the environmental staff.
• Paramedics should be skilled and equipped to handle emergencies associated with fauna scratches, bites and stings.
• Snakes should only be handled as a last resort, and then by people that are experienced and competent to do so.
• It is much better practice to allow fauna to remove themselves from site than to physically capture and translocate individuals.
• Enthanasing fauna should be done using an acceptable method – see details below.
• A register of all dead and injured fauna should be maintained by the environment staff. This register will record the species, date, location, approximate time of death or injury and cause of the injury or death.
• An incident report will be raised to record injury or death of any vertebrate fauna on site. The incident report should be lodged with the site environmental coordinator.

2.2 MANAGEMENT OF TRAPPED FAUNA

Avoiding and preventing fauna becoming trapped on-site is preferable to capturing and translocating individuals.

Preventative strategies include:
• Implementing a fauna trapping and translocation program prior to clearing of vegetation and removing rock piles;
• Implementing an Environmental Permit (EP) system that requires prior approval for all on-site developments, including vegetation clearing, removing rock piles, construction of new roads, digging of trenches, driving on-site at night and having uncovered free-standing water on-site. The on-site Environmental Coordinator before issuing an EP, will investigate and ensure that all reasonable strategies are put in place to minimise fauna being injured or caught as a result of construction and site utilisation activities;
• Addressing fauna related issues in the staff induction program;
• Implementing a reporting system for ‘unusual’ fauna seen on-site;
• Implementing an incident reporting system to record all fauna injuries and deaths of fauna on, or near the site. The operation of this system to be explained during inductions;
• Ensuring all incident reports relating to fauna be passed to the Site Environmental Officer, who will record the incident, and recommend remedial action to the on-site manager; and
• Requiring trenches and holes likely to trap fauna to have temporary ramps to the surface to enable fauna (particularly large mammals, goannas and snakes) to leave of their own accord.

Removal of trapped fauna should be done with care. The safety of staff is paramount and staff should not be put at risk catching or removing fauna.

Removing fauna from a trench or hole can be problematic, as manoeuvrability in a trench or hole is restricted, therefore the capacity to avoid being bitten or scratched is reduced.

A flat bottom snake bag is probably the best tool to catch and remove all reptiles, mammals, frogs and birds caught in trenches and holes.

An extension handle will assist in capturing animals in deep trenches. Two snake bags can be very useful, as it enables two people to corner and catch fauna a little easier.

Trapped vertebrate terrestrial fauna should be translocated to a predetermined site (see Section 2.6).
2.3 MANAGEMENT OF INJURED FAUNA

Following capture, a reptile, mammal, bird or amphibian may be;

• stunned, and released after it recovers;
• translocated to another site;
• die from its injuries or subsequent illness;
• given to an approved animal carer for rehabilitation and release;
• given to the local veterinarian; or
• euthanased.

Occasionally, fauna are temporarily stunned by a collision with a vehicle, power line, fence, etc. Many unconscious animals recover and can be released without any ill effects.

Before an animal is released, it should be obvious that it is ready and capable of surviving unaided in its natural habitat. If in doubt, the animal should be check by a veterinarian.

Fauna should not be released if they are incapacitated and not likely to survive in the wild. Incapacities include, but are not limited to, being vision impaired, having an amputated or broken limb(s), bleeding or having a substantial open wound. If in doubt seek veterinarian advice.

Veterinarians have a responsibility to relieve pain and suffering of native fauna, and will take any fauna that is injured on-site.

A list of veterinarians in the vicinity of the site is contained in Appendix 2 (not included).

Registered animal carers are volunteers who have undergone a training program and are willing and able to care for and rehabilitate native fauna. Many of these carers specialise in a group of fauna.

A list of local animal carers and their contact details is contained in Appendix 3 (not included). This list is updated each year, and a revised list should be sourced from the Community Involvement Unit, Department of Environment and Conservation about July each year.

Euthanasia may be a difficult task for some personnel. Where possible a veterinarian should be consulted regarding the decision to euthanase, however, this is not always possible or practical as an animal can be in obvious pain and distress, and transferring it to a veterinarian will prolong its agony.

Chemical overdose, the preferred method of euthanasia for most classes of fauna, must only be carried out by a veterinarian or persons authorized by the Veterinary Surgeons Board under the supervision of a veterinarian.

The DEC has a formal agreement in place with an approved group to provide a professional service to euthanase injured large fauna on request. These volunteers abide by a Code of Conduct developed collectively by DEC and volunteers.

There are a range of issues to be considered in determining acceptable methods for euthanasing fauna, these are discussed below (Reilly, 2001):

• Death without signs of panic, pain or distress;
• Minimum time to loss of consciousness;
• Reliability and reproducibility;
• Simple relatively maintenance-free mechanical equipment;
• Minimal environmental impact through contamination;
• Minimal emotional effects on the observer and operator;
• Safety for operators and observers.


The Department of Environment and Conservation has provided advice to its staff on euthanasing fauna in the field. This information has been included in Appendix 4 (not included).

When euthanasia has to be undertaken at short notice, or staff required to euthanase fauna may be unskilled, and/or the equipment required for a number of procedures is not readily available, it is recommended that Blunt Force Trauma be used as the on-site procedure. This is done by a single blow to the skull with sufficient force as to render the animal immediately unconscious and preferably stopping all brain function immediately. For reptiles and amphibians, the brain should be destroyed. This may require a couple of blows. For mammals and birds it should be followed by exsanguination (total loss of blood). This can be achieved by decapitation (removing the head). Euthanasia can be an aesthetically unpleasing task and upsetting for staff undertaking the procedure.

Deciding on what happens to injured animals calls for a judgement to be made. This decision is best made by somebody familiar with native fauna, e.g. Site Environmental Coordinator. A Decision Chart outlining the options for dealing with injured or dead fauna located on site is provided. This chart deals with all fauna other than live Pilbara Olive Pythons. Live Pilbara Olive Pythons should be translocated to another suitable site, unless injured.

2.3.1 Birds.

Birds can be injured or die on-site because of collisions with vehicles and power lines, may be poisoned mostly from drinking contaminated water or drown when drinking in steep sided containers.
Occasionally, exhausted sea-birds will be washed up on the shore after storms or oil spills at sea. Injured birds should be approached with caution as they can bite and scratch.

Injured birds that are semi-mobile are best caught by throwing a blanket, sheet, coat, etc over the animal and then gently grabbing them. Injured birds are best placed in a large cotton, calico or linen bag and then taken to a place where it is quiet and cool.

2.3.2 Mammals.

Mammals can be injured or die on-site because of collisions with vehicles and fences, are poisoned mostly from drinking contaminated water and drowned when drinking in steep sided containers.

Injured mammals, particularly large mammals (e.g. kangaroos) should be approached with caution as they can bite, kick and scratch, and injuries can be serious requiring medical treatment. Small injured mammals that are semi-mobile are best caught by gloved hand, a bag or a flat bottomed snake bag. Small mammals can bite the handler through a calico or linen bag.

The District Wildlife Officer from the Department of Environment and Conservation should be contacted and consulted, if large injured mammals are to be caught and removed from site. Contact numbers are contained in Appendix 3 (not included).

All small caught mammals should be kept in a calico or linen bag, in a warm (~25-30°C) dark location away from noise.

2.3.3 Reptiles

Reptiles can be injured or die on-site because of collisions with vehicles or drowned when drinking in steep sided containers. Infrequently, sea-snakes may be washed ashore after major storms.

Injured reptiles can be temporarily stunned or may ‘play dead’, and then come ‘alive’ without notice. Dead or dying venomous snakes can inflict a serious and potentially fatal bite, and therefore should not be handled by anyone without appropriate training and skills. Reptiles can bite the handler through a calico or linen bag, particularly venomous snakes.

All snakes and large goannas should be approached with caution as they can bite and scratch. Injured reptiles that are semi-mobile are best caught by the unskilled using a flat bottom ‘snake bag’, or by experienced personnel by hand.

When capturing all lizards and pythons by hand, it is best done immediately behind the head on the neck with the fingers. Caution must be exercised with snakes, as some snakes are able to dislocate their jaw and manoeuvre the teeth to a position to bite the holder. It is safer not to handle snakes. They can be easily transferred from a snake capture bag to a calico bag without being handled.

Injured reptiles are best placed in a large calico or linen bag and then taken to a place where it is quiet and cool.

Venomous snakes should be double bagged and have a highly visible tie (i.e. flagging tape) tied to the outside to identify that the animal inside is venomous.

Management procedures are discussed below.

2.3.4 Amphibians.

Amphibians (frogs) can be injured or die on-site because of collisions with vehicles or being poisoned in contaminated water. All dead amphibians should be reported using the site incident report procedures. The Site Environmental Coordinator should also be advised immediately so that the amphibian can be identified. Injured amphibians can be captured by hand. They are best held in a small plastic container (e.g. lunch box) that contains layers of wet paper. A few small holes are required to provide the necessary circulation of air.

A couple of the arid-adapted frogs produce a white secretion through their skin that can make the eyes sting and sore. Washing hands after handling frogs is therefore strongly recommended.
2.4 MANAGEMENT OF DEAD FAUNA

2.4.1 Birds.
All dead birds should be reported using the site incident report procedures. The Site Environmental Coordinator should also be advised immediately so that the bird can be identified.

Dead birds should be placed in a sealed plastic bag and frozen if they are to be identified at a later date. The death of all avian fauna should be recorded in the register of injured and dead fauna maintained by environment staff.

2.4.2 Mammals.
Dead mammals should be placed in a sealed plastic bag and frozen if they are to be identified at a later date. The death of all mammals should be recorded in the register of injured and dead fauna maintained by environment staff.

2.4.3 Reptiles.
All dead reptiles must be reported using the site incident report procedures. The Site Environmental Coordinator should also be advised immediately so that the reptile can be identified. Dead reptiles should be placed in a sealed plastic bag and frozen if they are to be identified at a later date. The death of all reptiles should be recorded in the register of injured and dead fauna maintained by environment staff.

2.4.4 Amphibians.
Dead amphibians should be placed in a sealed plastic bag and frozen if they are to be identified at a later date. The death of all amphibians should be recorded in the register of injured and dead fauna maintained by environment staff.

2.5 REPORTING DEATH / INJURY TO FAUNA OF CONSERVATION SIGNIFICANCE

Should any species of conservation significance be found dead or injured, then Xcorporation has a responsibility to advise the Department of Environment and Conservation (DEC).

The following information should be recorded about each individual:

- Species, sex (if able to be determined), age (estimate; hatchling, juvenile, adult);
- Date found;
- When and where found;
- Name/address/phone number of contact person;
- If injured, the presenting injury/problem;
- Any permanent identification details (e.g. band, microchip);
- Record of who in DEC was notified, when and by what method (phone, fax or e-mail);
- Final disposition:
  • released (including date, time and location)
  • transferred to whom (carers name and address); or
  • died, euthanased (disposal of carcass - DEC or buried/incinerated).
2.6 TRANSLOCATION OF PILBARA OLIVE PYTHONS

Pilbara Olive Pythons are present on site. They are active at night and males are particularly active during the mating season (June to August) when they go searching for females and will move outside their home ranges.

Pilbara Olive Pythons can inflict severe wounds and should only be handled by people experienced to do so.

During the construction phase it is best that they be caught and translocated from the site, as it is likely they will continually turn up on the roads and around the construction area and are in danger of being injured or killed.

Pilbara Olive Pythons should be caught with a snake bag and translocated to a predetermined off-site location.

A zoologist, knowledgeable in terrestrial vertebrate fauna, should be asked to advise on a suitable site(s) for translocating Pilbara Olive Pythons that are found on site.
3 PERSONAL SAFETY WHEN HANDLING FAUNA

3.1 FAUNA HANDLING TRAINING

Experience and on-the-job training is the most suitable way to learn how to capture and handle fauna, as it varies appreciably among species and the size and aggressiveness of individuals.

It is therefore recommended that site environmental staff and a small number of other people that are interested in handling fauna be involved in the terrestrial fauna trapping and relocation program that should occur before the site is cleared.

In addition, the environmental staff and a small number of selected staff should be given the chance to participate in a snake handlers’ course. Skills learnt in this course will give these people confidence in removing Pilbara Olive Pythons found on site.

3.2 DISEASES AND IRRITATIONS

Some fauna are known to carry diseases, while others excrete substances that can irritate the skin or burn the eyes.

Basic principles of personal and equipment hygiene should therefore be followed at all times to minimise the risk of exposure to disease and infections.

A zoonotic disease is a disease that humans can catch from animals. Some of the zoonotic diseases include:

- Reptiles – Salmonella, Mycobacterium and Cryptoporidium
- Birds – Salmonella, Psittacosis and Mycobacterium.
- Mammals – Salmonella, Ringworms, Sarcoptic mange, Toxoplasmosis.
- Bats – Lyssa, Menangle and Hendra Virus.

Native mammals often have fleas, and mammals, reptiles and birds can have ticks.

3.3 BITES AND SCRATCHES

Bites and scratches have a real potential to become infected.

Goannas and pythons feed on carrion and carry a range of bacteria on their teeth and in their mouth.

A bite can very quickly turn septic. All bites and scratches from fauna should be reported in an incident report and the wound treated by the on-site paramedic.

Washing hands after handling native fauna should routinely occur. Bags used to hold fauna should be washed before being used again.

3.4 BEE STINGS AND ALLERGIC REACTIONS

Clearing vegetation can disrupt introduced bee hives. Disrupted bees can become aggressive. Some people are particularly sensitive to bee stings.

Usually a bee sting produces a painful, itchy swelling which may be bothersome for a few days. However, some people will have a more severe reaction. This can range from generalised painful swelling of a whole limb (arm or leg) for a week or more, to a reaction affecting the whole body causing restriction of breathing and even death.

People known to have a severe reaction to bee stings should either not work in places where a bee sting is likely or seek medical advice and carry an epi-pen if appropriate and tell their work colleagues of their condition and what action should be taken if they are stung. See Appendix 1 (not included) for additional information.
4 REFERENCES


**Appendix A - Bee stings**

**Appendix B - List of local veterinarians**

**Appendix C - List of local animal carers**

**Appendix D - Table of euthanasia techniques for field conditions**