LONG ISLAND TOURISM DEVELOPMENT, ABROLHOS ISLANDS, WESTERN AUSTRALIA:

CONSTRUCTION MANAGEMENT PLAN

JULY 2006

PREPARED FOR

HUMFREY LAND DEVELOPMENTS

BY

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1. INTRODUCTION

1.1 BACKGROUND

This Construction Management Plan (CMP) forms part of the Public Environmental Review (PER) assessed by the Environmental Protection Agency (EPA) and represents the environmental commitments made by Humfrey Land Developments (HLD) in relation to minimising environmental impacts during the construction phase of the Long Island Tourist Resort (‘the resort’) at the Houtman Abrolhos Islands (‘the Abrolhos’).

HLD has committed in the PER to implement the CMP as follows:

Table 1: CMP Implementation

<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Objective</th>
<th>Action</th>
<th>Timing</th>
<th>Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Construction Activities</td>
<td>To manage and minimise the potential impacts of construction activities upon the environment</td>
<td>Implement the Construction Management Plan, which includes: • Induction of all personnel. • Management of access, clearing and disturbance, noise, light and dust impacts. • Minimising impacts to avifauna, other fauna, Priority flora species, benthic habitat, water quality, potential land and marine heritage sites and landforms. • Provision of control measures and temporary facilities. • Details of appropriate storage and containment of hydrocarbons and dangerous substances. • Procedures to prevent introduction of weeds and vermin.</td>
<td>During construction</td>
<td>CALM, Department of Fisheries</td>
</tr>
</tbody>
</table>

1.2 PURPOSE AND OBJECTIVES

The EPA’s objective is to manage and minimise the potential impacts of construction activities of the resort upon the environment of Long Island and the Abrolhos.

This CMP describes specific procedures to be adopted by HLD and the Construction Contractor to manage construction and meet statutory environmental requirements.

At the completion of construction of the resort, the site will be handed over to the Operator (Broadwater Hospitality) in as close to its natural state as at commencement of construction as
possible, and free of any evidence of the presence of construction activities (other than the competed resort facilities).

HLD expects that the construction personnel will be aware of the need to minimise the impact on both the terrestrial and marine environments during the construction phase of the resort, through the implementation of the procedures set out in Section 5 of this CMP. These procedures apply to the entire island and surrounding marine environment, as well as the construction site.

### 1.3 SITE LAYOUT

The conceptual design of the resort (Figures 1 and 2) will include the following land-based infrastructure:

- Northern boardwalk and beach gazebos;
- Resort area; and
- Southern boardwalk.

The following marine-based infrastructure will also be constructed:

- Helipad;
- Jetty;
- Boat moorings; and
- Swimming platforms.

The conceptual design is organised on a north-south axis with the staff accommodation and service units located at the southern end of the site and the visitor accommodation at the northern end (Figure 1). All the facilities are linked via a network of raised boardwalks across the site. Interconnection of site services will be achieved by running all service conduits suspended below the boardwalks. Boardwalks will extend to the northern tip of the island and south of the resort as far as the helipad (see Figure 2).

The jetty is located outside the southern end of the site in deeper water, in the bay close to the island’s western shore. The helipad is also located to the south of the resort. These facilities will be accessed via a raised boardwalk.

### 1.4 AREA OF DISTURBANCE

The main area of disturbance will be within the central third of Long Island, identified by the Department of Fisheries as the Development Zone for the tourism development. Minor areas of disturbance are also expected to occur to the north and south of this area associated with the construction of the boardwalks, beach gazebos, and access to the jetty and helipad. There will also be some disturbance in the waters surrounding Long Island due to the construction of the jetty, helipad, moorings, swimming platforms and uptake and outlet pipes for the desalination and wastewater systems.
The total footprint of the tourist development on Long Island, including the jetty and helipad is approximately 0.89 hectares. Of this, 0.64 hectares occurs within the main development area. Table 2 specifies a breakdown of the total area of disturbance.

Table 2: Total Area of Disturbance

<table>
<thead>
<tr>
<th>Footprint of Resort Infrastructure</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within development zone.</td>
<td>0.64ha (does not include the northern and southern boardwalks)</td>
</tr>
<tr>
<td>Outside development zone:</td>
<td>750m long by 1.5m wide: 0.11ha.</td>
</tr>
<tr>
<td>• Northern boardwalk to diving/swimming platforms and beach gazebos.</td>
<td>470m long by 2.5m wide overall, but 3.0m wide at the jetty and up to 4.5m wide at key turning points: Approx. 0.14ha.</td>
</tr>
<tr>
<td>• Southern boardwalk to jetty and helipad.</td>
<td>420m² (approx).</td>
</tr>
<tr>
<td>• Jetty (over water).</td>
<td>64m² (approx) + area of boardwalk (90m²).</td>
</tr>
<tr>
<td>• Helipad (over water).</td>
<td></td>
</tr>
<tr>
<td>Services unit compound area.</td>
<td>448m².</td>
</tr>
</tbody>
</table>

1.5 ELEMENTS OF CONSTRUCTION PHASE

1.5.1 Construction Contractor

HLD has selected Crothers Construction Pty Ltd (Construction Contractor) to carry out the construction, commissioning and maintenance of the resort. The Construction Contractor has extensive experience in building both commercial and residential projects in the Midwest and Gascoyne regions. A detailed profile for Crothers Construction Pty Ltd is provided as Appendix 1.

1.5.2 Construction Personnel

The construction personnel will comprise an estimated 35 workers on site and 65 in Geraldton. An agreement has been reached with the local rock lobster fishers such that construction workers may be accommodated in the fisher’s huts on nearby islands and ferried by boat to the island daily. Additionally, construction workers may be accommodated on large boats (approximately 25 metres length) during the rock lobster fishing season.

Long Island specific inductions will be undertaken in Geraldton prior to site establishment to inform the construction personnel of the specific environmental, heritage and safety aspects of Long Island and the required behaviour to ensure the site is unnecessarily impacted on by construction activities. The content of the Construction Environmental Induction is detailed in Appendix 2.

All personnel will be required to sign an acknowledgement certifying that they have attended and understood the induction, and agree to abide by the Construction Environmental Induction.
1.5.3 Construction Phases and Timing

Construction will commence as soon as the necessary approvals are received. The construction will be undertaken in two phases: Forward works (Phase 1), which will comprise the construction of the jetty, southern boardwalk, helipad and services compound; followed by the main resort construction (Phase 2). Activities that generate turbidity will not occur over predicted coral spawning periods.

The Construction Contractor has scheduled construction activities over 48 weeks, including the first 9 weeks for design and documentation (off-site), with site establishment beginning on Week 10. Phase 1 forward works will begin in Week 12.

Appendix 3 details the full construction schedule.

1.5.4 Building Logistics

The most important factor in constructing the resort will be respecting the environmental considerations while effectively addressing the logistics of co-ordinating supplies, materials, accommodation and tradesmen on Long Island, noting that there are no existing facilities.

The resort will be constructed by a pre-fabricated and modular design off site where possible to minimise disturbance to the island environment. Materials will be pre-cut and/or pre-fabricated in Geraldton to reduce the need for extra materials, minimise packaging and avoid wastage.

During the Phase 1 construction of the jetty and helipad, a vessel will tow a medium sized barge to Long Island and position the barge over the jetty site. The barge will be equipped with screw piling equipment and will transport the steel piles, deck support structure and precast concrete deck panels. Once the jetty is completed an off shore oil rig tender vessel and Abrolhos Islands carrier boats will be used to transport building material and equipment to Long Island and discharge on to the jetty using a jetty mounted crane.

Acknowledging the importance of minimising environmental impacts during construction, the Abrolhos Islands’ geographic location and the project’s logistics, it is essential that a multi-purpose machine be provided to assist all trades to carry out their tasks efficiently and safely. A Manitou All Terrain 4WD Telescopic Handler has been selected for on island logistics. Appendix 4 details vehicle specification data. The Manitou has three functions including the forklift, loader – bucket and crane which may be stationary or mobile and has many features to minimise impact on Long Island’s flora and vegetation including:

- All four wheels turn together to eliminate scuffing while turning.
- Clearance above ground.
- Extendable boom.
1.5.5 Access Pathways
During site establishment, designated tracks will be marked which will have the least impact on vegetation. Where possible, these tracks will follow the alignment that will be used for the boardwalk. The Manitou will be the only vehicle used on the island during construction and will not be permitted to move without restraint around the island. The southern boardwalk between the jetty and resort will be constructed during Phase 1 of construction once the heavy items for the services compound have been placed in position. The boardwalk will then be used for all other construction. Temporary use of un-vegetated coral rubble surfaces will be required to store heavy materials during the move from the jetty to the central construction site.

1.5.6 Power Supply
Portable generators fitted with acoustic insulation to minimise noise will provide power supply for tools and other equipment. A small amount of diesel fuel will be stored on Long Island to power these generators. Compressors will also be used for compressed air power tools.

1.5.7 Water Supply
A skid mounted desalination plant will be installed during Phase 1 of construction. Water will be stored in a 10,000 litre skid mounted storage tank on site for distribution throughout the construction site. Drinking water will be supplied in bottles for workers.

1.5.8 Containment and Removal of Waste
The Construction Contractor will use open skip bins (with canvas covers) to transport building waste from Long Island. Skip bins will be transported to and from Long Island by carrier boats. The Manitou will transport them around the construction site.

All construction personnel will be instructed to maintain a clean site at all times. All solid waste will be transported to Geraldton and no burying of waste during construction (or at any time) will be permitted. Hazardous materials will be used, stored and disposed of in line with specific procedures as outlined in Section 5.

1.5.9 Foundations
The resort buildings and boardwalks will be raised on piled supports approximately 500 millimetres above the ground. The supports will be constructed of either a compact steel piling system or concrete using minimal sized footings.

Concrete pad footings will be used for all utility areas such as the services compound and access points to this area, additionally concrete footings will also be used for all other areas that will serve as emergency assembly areas during extreme weather events.

While preliminary designs for the communal areas and accommodation structures have been based on the use of in situ concrete isolated pad footings or strip footings, an alternative
compact steel piling system has also been assessed for its suitability and may also be used in construction.

The foundation system for the jetty will consist of driven steel piles. This type of foundation system is required due to the serviceability and ultimate load requirements of the jetty. The piles used to support the jetty will be approximately 450 millimetres in diameter and will have “teeth” on the end to be driven into the seabed. These piles will be rotated into the seabed to a depth of three to four metres using a barge.

**1.5.10 Services Compound**

During the construction phase, this area will be built during Phase 1 to provide an area for materials laydown, skip bins, generator site and bunded storage for any hazardous materials used during construction.

**1.5.11 Reticulation of Services**

All piping and cabling for the resort will run below the boardwalk. The exact method to be used to attach the pipes and cabling to the underside of the boardwalk has yet to be determined. Detailed design and construction drawings for the boardwalk will be completed prior to construction starting which shall indicate how services are to be connected to the boardwalk.
2. IMPLEMENTATION/RESPONSIBILITIES

The Construction Manager is the primary person responsible for implementation of the CMP through the supervision of construction personnel and the administration of the construction contract(s).

The following lists the individuals responsible for the different aspects of construction, management, services and advice for the project:

<table>
<thead>
<tr>
<th>Position</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLD Project Manager</td>
<td>Barry Humfrey</td>
</tr>
<tr>
<td>Construction Manager</td>
<td>David Crothers</td>
</tr>
<tr>
<td>Construction Supervisor</td>
<td>TBA</td>
</tr>
<tr>
<td>Safety Officer/Systems Manager</td>
<td>TBA</td>
</tr>
<tr>
<td>Lead Environmental Consultant</td>
<td>MBS Environmental</td>
</tr>
<tr>
<td>Archaeologist</td>
<td>TBA</td>
</tr>
<tr>
<td>Avifauna (seabird) specialist</td>
<td>Dr Chris Surman</td>
</tr>
</tbody>
</table>

The personnel listed above will have specific responsibilities in relation to the development and implementation of the CMP as outlined in Table 3 below.

### Table 3: Responsibilities During the Project

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| Lead Environmental Consultant   | • Prepare a CMP and environmental induction content for the project.  
• Ensure CMP is developed in compliance with PER commitments and the requirements of relevant regulatory conditions.  
• Provide advice in relation to site environmental issues and management. |
| HLD Project Manager              | • Liaise with Construction Manager to ensure that all construction activities are progressing in line with commitments and the requirements of relevant regulatory conditions. |
| Construction Manager             | • Be aware of all procedures that require action or supervision by person acting in Construction Manager position.  
• Ensure management and mitigation measures outlined in the CMP and other regulatory requirements are implemented.  
• Liaise with Site Construction Supervisor and experts on construction impact issues and minimisation/management.  
• Ensure appropriate corrective or remedial action is taken to address all environmental hazards and incidents reported by personnel or contractors.  
• Participate in compliance inspections undertaken by HLD. |
| Construction Supervisor          | • Be aware of all procedures that require action or supervision by person acting in Construction Supervisor position. |
Personnel | Responsibilities
--- | ---
Personnel | • Ensure all personnel and contractors participate in the site induction prior to commencing work on the project.
• Ensure all personnel are aware of the commitments made in the CMP and any other relevant regulatory requirements and construction will be undertaken in compliance with these.
• Conduct project meetings regularly during the construction period to review actions arising from previous inspections, current status of tasks and schedule of upcoming tasks.
• Conduct monitoring of the project area in accordance with the requirements of the CMP and other Management Plans.
• Notify relevant regulatory authorities if serious environmental incidents occur as soon as practicable.
• Liaise with regulatory authorities/experts as required during construction.
• Prepare, implement and oversee Crothers Construction Management System Manual, including external consultants.

Safety Officer/Systems Manager | • Be aware of all procedures that require action or supervision by person acting in Safety Officer/Systems Manager position.
• Conduct monitoring of the project area in accordance with the safety requirements of the CMP and other Management Plans.

All Personnel | • Follow correct CMP procedures.
• Avoid restricted and sensitive areas.
• Report any environmental incidents to the Construction Supervisor.
• Provide assistance in implementing and maintaining impact minimisation programs when requested by the Construction Supervisor.

Archaeologist | • Provide on-site supervision during major excavation.
• Provide advice in relation to chance finds or damage to artefacts.

Avifauna Specialist | • Provide advice and on-site supervision as required in relation to seabird behaviour, breeding and location of nesting sites.
3. **Relevant Legislation, Policies and Strategies**

There are a number of State and Commonwealth Acts and Regulations that are pertinent to the construction, operation and decommissioning of the resort. Relevant legislation is listed in Appendix 6 and includes a range of State and Commonwealth policies and guidelines pertinent to the proposal.

A summary of legislation relevant to the construction phase of the resort is listed in Table 5.

<table>
<thead>
<tr>
<th>Area</th>
<th>Relevant Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical environment</td>
<td>EPBC Act 1999</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection Act 1986</td>
</tr>
<tr>
<td></td>
<td>Wildlife Conservation Act 1950</td>
</tr>
<tr>
<td></td>
<td>Fish Resources Management Act 1994</td>
</tr>
<tr>
<td></td>
<td>Land Administration Act 1997</td>
</tr>
<tr>
<td></td>
<td>Bush Fires Act 1954</td>
</tr>
<tr>
<td>Heritage</td>
<td>EPBC Act 1999</td>
</tr>
<tr>
<td></td>
<td>Heritage Act 1990</td>
</tr>
<tr>
<td></td>
<td>Australian Heritage Commission Act 1975</td>
</tr>
<tr>
<td></td>
<td>Australian Heritage Council Act 2003</td>
</tr>
<tr>
<td></td>
<td>Commonwealth Historic Shipwrecks Act 1976</td>
</tr>
<tr>
<td></td>
<td>Protection of Moveable Cultural Heritage Act 1986</td>
</tr>
<tr>
<td></td>
<td>Aboriginal Heritage Act 1972</td>
</tr>
<tr>
<td></td>
<td>Maritime Archaeology Act 1973</td>
</tr>
<tr>
<td></td>
<td>Museum Act 1969</td>
</tr>
<tr>
<td>Pollution</td>
<td>EPBC Act 1999</td>
</tr>
<tr>
<td></td>
<td>Fish Resources Management Act 1994</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection Act 1986</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection (Noise) Act 1997</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection (Sea Dumping) Act 1981</td>
</tr>
<tr>
<td></td>
<td>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</td>
</tr>
<tr>
<td></td>
<td>Pollution of Waters by Oil and Noxious Substances Act 1987</td>
</tr>
<tr>
<td>Health and safety</td>
<td>Occupational Health and Safety Act 1984</td>
</tr>
<tr>
<td></td>
<td>Bush Fires Act 1954</td>
</tr>
<tr>
<td></td>
<td>Dangerous Goods (Transport) Act 1998</td>
</tr>
<tr>
<td></td>
<td>Dangerous Goods (Transport) (General) Regulations 1999</td>
</tr>
<tr>
<td></td>
<td>Dangerous Goods (Transport) (Dangerous Goods in Ports) Regulations 2001</td>
</tr>
<tr>
<td></td>
<td>Explosives and Dangerous Goods Act 1961</td>
</tr>
<tr>
<td></td>
<td>Explosives and Dangerous Goods (Handling and Storage of Dangerous Goods) Regulations 1992</td>
</tr>
</tbody>
</table>
4. **ENVIRONMENTAL CONSIDERATIONS**

4.1 **POTENTIAL IMPACTS**

The following aspects have been identified as having the potential to be impacted by the construction phase and will therefore require management and mitigation procedures as outlined in this CMP.

The environmental assets of greatest value that could potentially be impacted are:

- Seabirds and seabird breeding areas
- Marine environment, including tidal ponds
- Cultural heritage

Other factors identified include:

- Terrestrial flora and vegetation
- Terrestrial fauna (non-bird), including Australian Sea Lion (*Neophoca cinerea*)
- Landforms and soils (e.g. erosion and compaction)
- Other islands (construction worker recreational and living impacts)
- Pollution
- Air quality
- Marine water quality
- Waste disposal
- Contamination by hazardous materials.

4.2 **CONSTRUCTION ENVIRONMENTAL FACTORS**

Long Island is formed of free-draining, unconsolidated coral rubble and sands overlying mostly porous coral framestone and rudstone formation. Nestled between storm ridges within the mid-portions of the island are deposits of sand, which form low dunes. The following substrate categories form the basis of constraints developed for the construction activities that are to occur within the development area. Each substrate type contains particular flora and fauna features and the levels of use by construction personnel are highlighted in the construction maps to ensure sufficient protection from the potential impacts of construction activities.

4.2.1 **Coral Rubble Substrate - Western Third of Development Site**

4.2.1.1 **Vegetation**

The western third of the development area is composed of coral rubble and contains native species including sparse dwarf scrub of *Myoporum insulare* and *Nitraria billardierei* over Spinifex *longifolius* grassland. The introduced (weed) species *Urospermum picroides* is
common. The vegetation adjacent to the southern boundary of Tidal Pond 504 is native dwarf
scrub of *Threlkeldia diffusa* over a *Sarcocornia quinqueflora* and *Scaevola crassifolia*
succulent mat. The eastern coastal third of the development area is also composed of coral
rubble and contains dwarf scrub of *M. insulare* and *Olearia axillaries* over a *S. longifolius*
open grassland.

The CALM Priority 4 species *Lepidium puberulum* was located within this area on the
northern side of Tidal Pond 504.

### 4.2.1.2 Fauna

Burrowing seabirds are uncommon in the areas dominated by coral rubble substrate. However, several seabird species may potentially nest amongst the coral ridges, including
Crested Terns, Roseate Terns and Fairy Terns, the latter two species preferring the peak of
older coral ridges where finer coral rubble is located. Bridled Terns nest under any object that
provides some shading and camouflage, particularly favouring the dense cover afforded by the
occasional larger shrubs of *M. insulare* and *N. billardierei*. Silver Gulls also nest amongst
these species, as well as the small areas of the dwarf scrub *Olearia axillares* over *Spinifex
longifolius* grassland.

Tidal Pond 504 may provide feeding habitat and shelter for the small numbers of migratory
waders that visit Long Island as well as the residential Red-capped Plover. Pacific Gulls often
construct nests of brown algae usually overlooking the sheltered western shore. Pied
Oystercatchers may construct a nest consisting of a well concealed cryptic nest scrape located
a few metres from the waters edge.

A single species of skink is found on Long Island and was observed living under slabs of coral
rubble or in vegetation litter. On the western shore north of the development zone near Tidal
Pond 503, there is a haul out beach frequented by Australian Sea Lions.

### 4.2.1.3 Construction

The western coastal third of the development area will be the site for the communal buildings,
swimming pool and two guest lodges. The southern part of this area will be used for laydown,
stockpiling excavation cuttings and will be the site of the staff quarters and services
compound. The eastern coastal third of the development area will not be subject to any
construction activities other than the laydown of the wastewater discharge pipe into Goss
Passage.

### 4.2.2 Sand and Sand/Coral Substrate - Central Third of Development Site

#### 4.2.2.1 Vegetation

The central third of the development site consists of low sand dunes dominated by sparse
scrub of *M. insulare* over an *Atriplex* spp heath with mixed sparse grassland and *Senecio
lautus* [sic] herbfield.
4.2.2.2 Fauna
Little Shearwaters and White-faced Storm-petrels nest in deep burrows in all sandy areas of the island and the sparse scrub occurring in the central third of the development site forms an important habitat for burrowing seabirds that burrow into the sand underneath A. cinerea, where it is deep enough. Burrows are excavated in open sandy areas as well as below dense woody shrubs of M. insulare and N. billardierei. Bridled terns and silver gulls may also nest throughout the sandy areas. Crested Terns prefer expanses of flat areas with finer coral rubbles and sand, typical of those areas found to the north of Tidal Pond 504. The single pair of Caspian Terns nest on shell grit and finer coral sand adjacent to the extensive Samphire Sarcocornia quinqueflora just north of Tidal Pond 503, which is to the north of the development area.

The species of skink may occur in this part of the development area residing in vegetation litter.

4.2.2.3 Construction
The staff quarters, boardwalk, guest lodges and day visitor’s pavilion will be built on raised foundations within the central third of the development site.

4.3 CONSTRAINT MEASURES TO BE ADOPTED
Constraints are required to reduce the potential impacts of construction activities on vegetation, flora and fauna within the development site and while building northern and southern ancillary infrastructure (i.e. boardwalks, beach gazebos, jetty, and helipad). Zones of sensitivity predominately defined by vegetation communities and underlying landforms have been determined and need to be accessed correctly. Some loss of vegetation is inevitable as clearing will be required during construction of the resort. However, by raising the buildings and boardwalk off the ground and using minimal footings the amount of vegetation cleared will be kept to a minimum.

Restricted or no access areas on Long Island during the construction phase include:
- Tidal ponds
- Sensitive landforms
- Areas of bird breeding activity
- Southern area of Long Island (south of helipad)
- Beach north of the development site (near Tidal Pond 503) when Australian sea lions are present
- General areas not used for construction activities
- Marked areas relating to CALM Priority 4 flora species Lepidium puberulum.
- Other areas as appropriate (e.g. for safety reasons).

The substrate zones outlined in Section 3.2 have been identified within the development site to assist in the design of construction maps to guide the Construction Contractor and
construction personnel throughout the construction phase. Prior to their construction, the
alignment of the boardwalks will be used as the main trafficking routes on Long Island. The
central and southern boardwalks will be high use areas and the northern boardwalk alignment
will be a moderate use area.

Figures 3, 4 and 5 provide the construction maps for the central development site, southern
and northern ancillary infrastructure sites, respectively, taking into account the constraints
described in Sections 3.3.2 to 3.3.5.

It is essential that the construction maps are viewed in conjunction with the procedures
outlined in Section 5 of this CMP.

4.3.1 Land Use Definitions
The following describes the land usage constraints required to be followed during the
construction phase. These land usage types form the basis of Figures 3, 4 and 5.

4.3.1.1 High Use
High use areas (marked orange) are full access areas for personnel and allow for heavy
Manitou use along the central and southern boardwalk alignments. High use areas will also be
used for equipment laydown, excavations cutting stockpile, concrete production, site of the
services compound and installation of the wastewater discharge outlet pipe.

4.3.1.2 Moderate Use
Moderate use areas (marked yellow) are full access areas for personnel and allow for limited
Manitou use. Moderate use areas include the sites for all raised buildings, the northern
boardwalk and northern beach gazebos.

4.3.1.3 Low Use
Low use areas (marked light brown) are restricted access areas and should be used for
temporary laydown of light equipment (including scaffolding and materials specifically
required at that location) if required. Personnel should not enter these areas unnecessarily.

4.3.1.4 No Access
Areas marked in purple are not to be accessed by personnel at any time.

4.3.2 Land Use Constraints during Construction Phase
4.3.2.1 Development Area - Coral Rubble Zones
Please refer to Figure 3. The laydown, services compound, stockpiling and building approach
sites within the western coral rubble zone of the development site are High Use areas. The
areas marked out for building sites are Moderate Use areas and will only be accessed when
installing building foundations.
The Construction Contractor will identify and remove/treat weeds within these areas and the extent of native vegetation cover is to be delineated and avoided. No vegetation may be cleared or removed other than for the placement of foundations and any tall shrubs shall be pruned to a minimum height of 250mm. Any trafficking routes should follow bare ground to avoid vegetation where possible.

During site establishment, a survey to locate all individuals of the Priority 4 species *Lepidium puberulum* should be carried out and individuals shall be marked out and avoided.

The laydown areas are to avoid native plants at all times. The excavation cuttings stockpile area must be placed over bare coral rubble areas and is to be landscaped so that stockpile conforms to the surrounding landscape.

The western shoreline and coral rubble areas outside of the individual building sites, stockpiling and laydown areas are **Low Use** areas.

Tidal Pond 504 within the western coral rubble zone and the entire coral rubble zone on the eastern side of the development site including Tidal Pond 503 are strictly **No Access** areas, apart from the laying down of the outlet pipe for wastewater discharge into Goss Passage in the south of the eastern coral rubble zone.

### 4.3.2.2 Development Area - Sand and Sand/Coral Zones

Please refer to Figure 3. The site for the central boardwalk and building approaches constructed in the sand and sand/coral zone that lies within the central third of the development site are **High Use** areas. The areas marked out for the individual building sites are **Moderate Use** areas and will only be accessed when installing building foundations.

The Construction Contractor will identify and remove/treat weeds within these areas and the extent of native vegetation cover is to be delineated and avoided. No vegetation may be cleared or removed other than for the placement of foundations and any tall shrubs shall be pruned to a minimum height of 250mm. Prior to site establishment and during the implementation of the monitoring programme, the Avifauna specialist will mark out nesting sites and provide advice on the alignment of the trafficking routes. Any trafficking routes must be marked out to avoid vegetation and temporary matting is to be used along designated trafficking routes.

During site establishment, a survey to locate all individuals of the Priority 4 species *Lepidium puberulum* should be carried out and individuals shall be marked out and avoided.

The sand and sand/coral areas outside of the central boardwalk alignment, building approaches and building sites are **Low Use** areas.

### 4.3.2.3 Southern Ancillary Infrastructure

Please refer to Figure 4. The southern boardwalk alignment will be a **High Use** area. There is a temporary laydown area set aside in coral rubble on the western side of the island adjacent to the southern development zone boundary. Two more temporary laydown sites are situated at the end of the jetty and helipad. All laydown sites are **High Use** areas. The remainder of the island south of the development zone are strictly **No Access** areas at all times.
4.3.2.4 Northern Ancillary Infrastructure

Please refer to Figure 5. The northern boardwalk alignment and beach gazebo sites will be **Moderate Use** areas, with limited use of the Manitou. There is a temporary laydown area set aside in coral rubble. The remainder of the island north of the development zone is strictly **No Access** areas at all times.

4.3.3 Procedures

In order to manage the potential impacts of the construction phase of the resort listed in Section 3.1, HLD has adopted specific procedures to minimise, manage or avoid those impacts. These procedures are to be implemented by the Construction Contractor and followed by all personnel involved in the construction of the resort, as relevant to the specific task being carried out.

Table 4 summarises the procedures that are outlined in Section 5 of this CMP.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heritage</td>
<td>Heritage Management Procedure</td>
</tr>
<tr>
<td>Physical environment</td>
<td>Avifauna Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Non-Bird Fauna Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Vermin Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Terrestrial Flora, Vegetation and Clearing Procedure</td>
</tr>
<tr>
<td></td>
<td>Weed Prevention and Containment Procedure</td>
</tr>
<tr>
<td></td>
<td>Procedures to Achieve Weed Management for a New Weed Occurrence Procedure</td>
</tr>
<tr>
<td></td>
<td>Marine Environment Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Land Forms and Tidal Ponds Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Fire Management Procedure</td>
</tr>
<tr>
<td>Pollution</td>
<td>Air Emission Reduction Procedure</td>
</tr>
<tr>
<td></td>
<td>Dust Suppression Procedure</td>
</tr>
<tr>
<td></td>
<td>Noise Pollution Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Lighting Management Procedure</td>
</tr>
<tr>
<td></td>
<td>Waste Procedure</td>
</tr>
<tr>
<td></td>
<td>Hazardous Materials on Construction Site Procedure</td>
</tr>
<tr>
<td></td>
<td>Storage of Hazardous Materials on Site Procedure</td>
</tr>
<tr>
<td></td>
<td>Storage and Disposal of Hazardous Waste Procedure</td>
</tr>
<tr>
<td></td>
<td>Spill Response Procedure</td>
</tr>
</tbody>
</table>

Additionally, the Construction Contractor will implement the works in accordance with its own environmental and occupational health and safety policies and will include work method statements, project management plans, site safety, emergency response procedures, quality objectives, project position descriptions and report forms.
4.3.4 Activities and Procedures Matrix

A matrix has been developed (Appendix 5) to allow personnel to identify which procedures should be followed when carrying out each major construction activity including pre-construction in Geraldton, transport, site establishment and onsite construction. All procedures referred to in the matrix are provided in Section 5 of this CMP.
5. **ENVIRONMENTAL MANAGEMENT PROCEDURES**

This section contains each procedure that is to be followed and implemented prior to and during the construction phase of the resort. These procedures include the induction of all personnel so they can understand and implement practices that will minimise adverse impacts from the construction on the local and surrounding environment.

5.1 **HERITAGE**

An area of the Wallabi Group (including Long Island) was recently included on the National Heritage List and Long Island has a high heritage value both nationally and internationally through its association with the *Batavia* wreck and mutiny. The Wallabi Group also possesses sites of cultural and heritage value associated with the *Batavia* and other shipwrecks (e.g. the *Hadda*), the fishing industry, guano mining and military use during World War II.

Heritage sites could be damaged during the construction of the resort. Construction personnel may potentially discover or damage an artefact during building activities on Long Island and the surrounding waters. The following procedure (Table 6) is designed to manage potential heritage issues during the construction phase.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement the Construction Environmental Induction for all construction personnel, including heritage management issues.</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure that the Heritage Management Plan is available for all construction personnel prior to the beginning of the construction phase.</td>
</tr>
<tr>
<td>3.</td>
<td>Notify the Construction Supervisor when any major excavation activities (such as laying of foundations for services compound and digging pipe trenches) will take place to allow an archaeologist to be brought to site on a watching brief.</td>
</tr>
<tr>
<td>4.</td>
<td>The archaeologist shall ensure that any artefacts potentially disturbed by construction are recorded and recovered following correct WA Maritime Museum protocols and procedures.</td>
</tr>
<tr>
<td>5.</td>
<td>Personnel will not remove any artefacts found during construction, but will leave them in situ, mark out the area, make a GPS record of site and report them to the site archaeologist or Construction Supervisor.</td>
</tr>
<tr>
<td>6.</td>
<td>Any metal, timber, ceramic or human skeletal materials found on Long Island or in the surrounding waters will be considered to be artefacts until proven otherwise by the archaeologist.</td>
</tr>
<tr>
<td>7.</td>
<td>Personnel will be prohibited from traversing the unsurveyed southern area of Long Island (except where necessary for construction) and any other ‘no access’ areas to avoid damage to potential heritage areas (e.g. executions site).</td>
</tr>
</tbody>
</table>

Table 6: Heritage Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement the Construction Environmental Induction for all construction personnel, including heritage management issues.</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure that the Heritage Management Plan is available for all construction personnel prior to the beginning of the construction phase.</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
<td>6.</td>
<td>Any metal, timber, ceramic or human skeletal materials found on Long Island or in the surrounding waters will be considered to be artefacts until proven otherwise by the archaeologist.</td>
</tr>
<tr>
<td>7.</td>
<td>Personnel will be prohibited from traversing the unsurveyed southern area of Long Island (except where necessary for construction) and any other ‘no access’ areas to avoid damage to potential heritage areas (e.g. executions site).</td>
</tr>
<tr>
<td>Step</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8.</td>
<td>Any personnel visiting the <em>Batavia</em> wreck site or other site of Heritage significance will not disturb any artefacts on the site and will be made aware of the requirements and penalties associated with the <em>EPBC Act 1999</em> and the <em>Historic Shipwrecks Act 1976</em>.</td>
</tr>
</tbody>
</table>

### 5.2 Physical Environment

#### 5.2.1 Avifauna

Long Island has a large and diverse bird life, including visits from species of conservation significance and 12 species that regularly breed on the island. Birds are an important part of the natural environment of the island and construction activities have the potential to impact on avifauna by:

- Alteration of bird habitat and feeding grounds.
- Disturbing breeding birds, particularly burrow-nesting species.
- Reducing populations of birds on the island.
- Impacting protected bird species.
- Damaging burrow-nest sites.
- Potential injury, disorientation or death associated with collision with equipment and infrastructure.
- Attracting birds to poorly contained rubbish.
- Attraction of birds to vessels associated with the construction.

The time of year when the least amount of breeding takes place is between March and June. Wedge-tailed shearwaters and Little Shearwaters are burrow-nesting species that breed from August to early January and are likely to be most vulnerable during construction activities. However, irrespective of when the construction phase commences, it will at times overlap with the breeding times of some seabirds that use Long Island. Prior to site establishment and during the implementation of the monitoring programme, the Avifauna specialist will mark out nesting sites and provide advice on the alignment of the trafficking routes.

Table 7 sets out the steps taken to minimise potential impacts on avifauna during the construction phase. Please also refer to the Lighting Management Procedure in Table 20.
### Table 7: Avifauna Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement the Construction Environmental Induction for all construction personnel, including avifauna management issues and procedures.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Prior to commencement of construction activities, implement the Avifauna monitoring programme to allow assessment of the impacts of the construction and operation of the resort development on avifauna distribution, population size and reproductive success.</td>
<td>Avifauna Specialist</td>
</tr>
<tr>
<td>3.</td>
<td>Prior to site establishment, the Avifauna specialist will mark out nesting sites and provide advice on the alignment of the trafficking routes.</td>
<td>Avifauna Specialist</td>
</tr>
<tr>
<td>4.</td>
<td>Ensure construction works are coordinated with advice from the Avifauna specialist to reduce disruption of bird breeding cycles, particularly burrow-nesting species.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>5.</td>
<td>Minimise clearing of vegetation and avoid marked nesting sites where possible.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>6.</td>
<td>Any avifauna injured will be housed in a ventilated cardboard box, in a cool, shaded area, until they are able to be transported back to an appropriate hospice for treatment on the mainland.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>7.</td>
<td>A detailed log of all wildlife encounters will be kept including a close out report detailing the fate of disturbed avifauna.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>8.</td>
<td>Follow the Protocol for Wildlife (Bird) Encounter as detailed in the Avifauna Management Plan.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>9.</td>
<td>Mark out and avoid sandy nesting areas other than when constructing foundations.</td>
<td>Avifauna Specialist/Construction Supervisor</td>
</tr>
<tr>
<td>10.</td>
<td>Notify the Construction Supervisor when construction of building foundations will take place in sandy nesting areas to allow Avifauna Specialist to be brought to site to monitor construction activities.</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>12.</td>
<td>Ensure Avifauna Specialist is on site as appropriate to monitor construction activities through the sandy nesting areas and coordinate the location of construction activities around the site to minimise impact on bird breeding.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>13.</td>
<td>All personnel will follow the advice of the Avifauna Specialist with respect to approaching or otherwise impacting on birds or their habitats. Whenever possible, personnel will not approach or otherwise disturb birds.</td>
<td>All personnel</td>
</tr>
<tr>
<td>14.</td>
<td>Personnel will not be permitted to feed the birds. All food scraps will be packaged and removed from the island for disposal on the mainland according to the Solid Waste Management Plan.</td>
<td>All personnel</td>
</tr>
<tr>
<td>15.</td>
<td>Do not enter exclusion zones around Tidal Pond 504, marked breeding areas and other sensitive areas.</td>
<td>All personnel</td>
</tr>
<tr>
<td>16.</td>
<td>Walk only along designated access ways and boardwalks; avoid unnecessary impact to nesting areas.</td>
<td>All personnel</td>
</tr>
<tr>
<td>Step</td>
<td>Description</td>
<td>Responsibility</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>17.</td>
<td>Limit noise emissions generated by construction to the immediate areas of the facilities and do not create a nuisance beyond the boundaries of the resort area.</td>
<td>All personnel</td>
</tr>
<tr>
<td>18.</td>
<td>Ensure acoustic insulation has been used to reduce noise levels associated with generators and noise reducing mufflers on the Manitou.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>19.</td>
<td>The helicopter will follow a fixed route and will approach and leave Long Island over water. The helicopter will not fly between dusk and dawn and will not fly over any islands.</td>
<td>Helicopter Pilot</td>
</tr>
<tr>
<td>20.</td>
<td>Helicopters will approach from the north-west, which is downwind of the prevailing winds, thereby minimising noise levels at the island.</td>
<td>Helicopter Pilot</td>
</tr>
<tr>
<td>21.</td>
<td>Float planes must land at least 300 metres from Long Island and slowly taxi to the jetty.</td>
<td>Float Plane Pilot</td>
</tr>
<tr>
<td>22.</td>
<td>No personnel will reside on Long Island during the construction phase and will return to rock lobster fisher accommodation or boats.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>23.</td>
<td>The Manitou will be the only vehicle used on the island during construction and will be required at all times to follow a designated path that has been previously checked for signs of bird breeding.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>24.</td>
<td>Undertake daily or weekly inspections as required to ensure bird breeding areas are being avoided, noise levels are not impacting on birds. Implement changes or remediation as required (see Avifauna Management Plan).</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>25.</td>
<td>Ensure tri-annual surveys of monitoring sites established for the Avifauna Monitoring programme take place at the appropriate times during the construction period. These will be conducted during Spring/Summer, Autumn and Winter/Spring.</td>
<td>Construction Supervisor/Avifauna Specialist</td>
</tr>
<tr>
<td>26.</td>
<td>Monitor Silver Gull populations during construction phase and take appropriate actions if birds are being attracted to the construction site. If Silver Gulls are concentrated around sites either during construction, an assessment of why they are there should be undertaken. Assessment will be carried out on whether food scraps are being left, or whether some personnel are feeding gulls. Following cessation of the inappropriate activity, gull numbers are expected to normalise.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>27.</td>
<td>Any spills of dangerous substances including oil will be dealt with in accordance with Section 5.3.5 of this document.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

### 5.2.2 Non-Bird Fauna Management Procedure

There are no non-bird terrestrial fauna of conservation significance that occur on the island that may be impacted by construction of the resort.

While Australian Sea Lions (*Neophoca cinerea*) are a species of marine mammal, their use of Long Island as a haul out site and potential impacts resulting from the construction phase needs to be addressed. A haul out site is an area of beach where Sea Lions rest, socialise and regulate body temperature. Table 8 sets out the procedure to minimise the impacts on Australian Sea Lions. The *Wildlife Conservation (Close Season for Marine Mammals) Notice*
1998 under the *Wildlife Conservation Act 1950* prohibits the disturbance and touching of all marine mammals.

One species of terrestrial fauna is found on Long Island, the skink *Menetia greyii*, which is common on the mainland and other islands.

No introduced or vermin species are found on Long Island. If vermin species were introduced to the island ecosystem with building materials or construction personnel it could have profound impacts on the bird life of the island. Table 9 sets out a Vermin Management Procedure that has been established to reduce the risk of vermin related impacts on the island during the construction of the resort.

### Table 8: Australian Sea Lion Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement the Construction Environmental Induction for all construction personnel including issues associated with working in the vicinity of Australian sea lions.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>All personnel to be made aware of the location of the sea lion haul out (resting) area north of the main development site on the west side of the island (near Tidal Pond 503).</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>3.</td>
<td>Do not attempt to move within 10 metres of the sea lion(s).</td>
<td>All Personnel</td>
</tr>
<tr>
<td>4.</td>
<td>Do not walk between the sea lion(s) and the water.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>5.</td>
<td>Do not feed the sea lions(s).</td>
<td>All Personnel</td>
</tr>
<tr>
<td>6.</td>
<td>Move away calmly and immediately if a sea lion approaches.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>7.</td>
<td>When working in the vicinity of the haul-out area, all personnel must maintain a minimum 10 metre distance from sea lions at all times. If this is not possible, attempt to time construction when sea lions are not present.</td>
<td>Construction Supervisor/All Personnel</td>
</tr>
<tr>
<td>8.</td>
<td>Any interaction with sea lions occurring during the construction phase shall be reported immediately to the Construction Supervisor.</td>
<td>All Personnel</td>
</tr>
</tbody>
</table>
Table 9: Vermin Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement the Construction Environmental Induction for all construction personnel, which will include vermin impacts and how to avoid and report potential introduction of vermin to the island.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure all suppliers and boat skippers have carried out vermin inspections and provided a completed checklist guaranteeing vermin free delivery.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>3.</td>
<td>Ensure that, prior to leaving Geraldton, all personnel check all materials, vehicles, machinery, tools and boats used during the construction phase for vermin presence (setting of flour trays and baited traps for rodents, conducting visual inspections, looking for droppings or nesting materials) and complete the relevant checklist.</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>4.</td>
<td>Suppliers bringing in materials will inspect and sign-off on their supplies being free of vermin at time of delivery.</td>
<td>Supplier</td>
</tr>
<tr>
<td>5.</td>
<td>All boat owners/skippers will periodically complete thorough checks of their vessels and supply a written guarantee that their vessel is free of vermin/pests. This will include the need for vessel owners to conduct periodic trapping and visual inspections for signs of vermin on a regular basis.</td>
<td>Boat Owner/Skipper</td>
</tr>
<tr>
<td>6.</td>
<td>If vermin are sighted during construction phase, report sighting to the Construction Supervisor.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>7.</td>
<td>If vermin are sighted during construction phase, identify target fauna as vermin and follow procedure for immediate removal. Investigate the cause of vermin occurrence and implement corrective actions to prevent reoccurrence.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>8.</td>
<td>If vermin are identified on the island or supply areas on the mainland engage an appropriately licensed pest control professionals to eradicate the vermin/pest.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

5.2.3 Terrestrial Vegetation and Flora

Activities associated with the construction of the resort have the potential to cause:

- Temporary or permanent loss of native vegetation that may result in the loss of potential rare flora species.
- Increased wind erosion due to clearing of vegetation and wearing of paths during construction.
- Degradation of seabird nesting habitat through removal of vegetation and trampling.
- Trampling of vegetation during construction.
- Weed introduction by construction workers and equipment.

The Priority 4 species *Lepidium puberulum* occurs on Long Island. CALM describes Priority 4 species as being “species which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors” (WA Herbarium, 2005). It is recommended that these species be monitored every five to ten years. *Lepidium puberulum* was collected from near Tidal Pond 504.
The following procedures (Table 10) are designed to minimise the impact of construction on the vegetation and flora of Long Island.

### Table 10: Terrestrial Flora and Vegetation Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement the Construction Environmental Induction for all construction personnel, which will include the issues associated with vegetation and rare flora on Long Island. Educate all construction personnel to recognise <em>Lepidium puberulum</em>.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure that an environmentally trained consultant visits Long Island prior to commencement of construction to identify and mark individuals of the CALM Priority 4 flora species <em>Lepidium puberulum</em> within the development zone. Ensure that these plants are avoided wherever possible and impacts minimised.</td>
<td>Construction Supervisor/Lead Environmental Consultants</td>
</tr>
<tr>
<td>3.</td>
<td>Check in the Construction map to confirm the proposed area of land to be cleared is within an approved area and will not unacceptably impact on any sensitive or restricted areas.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>4.</td>
<td>Discuss any environmental conditions on the access, clearing, method to be used and location of stockpiles with all persons involved in the earthworks and construction (at the pre-start meeting prior to commencing works).</td>
<td>Construction Manager/Systems Manager</td>
</tr>
<tr>
<td>5.</td>
<td>Ensure all personnel are aware of and use appropriate access and traffic routes, know sensitive areas to be avoided if possible and avoid exclusion zones.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>6.</td>
<td>Survey and clearly mark all access ways, infrastructure alignments, clearing areas and exclusion zones prior to commencement of any construction activities on the island.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>7.</td>
<td>All access ways shall follow the alignment of the boardwalk where possible or be aligned on temporary access over resistant coral rubble surfaces that are devoid of native vegetation.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>8.</td>
<td>Where trampling of vegetation is unavoidable, investigate measures to minimise impact such as the use of placing a rigid mesh over the vegetation to distribute the loads.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>10.</td>
<td>Undertake weekly inspections during the project works to ensure conditions are being complied with. Immediately rectify any non-compliance (report to the Construction Manager).</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
</tbody>
</table>

### 5.2.4 Weed Management Procedures

A number of weed species have been recorded on Long Island and are widespread across the island. To avoid introducing new weed species to the island, prevent transfer of existing weed species to other islands and prevent large infestations of weeds on the construction site the following procedures will be followed as given in Tables 12 and 13.
### Table 11: Weed Prevention and Containment Procedures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All construction personnel working on or near Long Island will be required to undergo a Construction Environmental Induction including the importance of weed prevention, hygiene and recording weed sightings.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure a copy of a vehicle and machinery hygiene checklist is completed and submitted to the Construction Supervisor prior to vehicles or equipment entering or leaving Long Island.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>3.</td>
<td>All Personnel are to ensure shoes/feet and clothing is free of seeds or other plant material prior to entering or leaving Long Island and other islands within the Abrolhos group.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>4.</td>
<td>Report sightings of any new or suspected weed species to the Construction Supervisor.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>5.</td>
<td>Conduct a weed inspection during spring (nominally October). Construction Supervisor to report date and location of any weeds and actions taken to eradicate weeds.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

### Table 12: Procedures to Achieve Weed Management for a New Weed Occurrence

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Identify target plant as a weed using the reference photos in the Weed Management Plan.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Confirm selection of appropriate herbicide for treatment of the weed in consultation with the Lead Environmental Consultant.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>3.</td>
<td>Obtain product label information and read instructions. Obtain correct herbicide and protective clothing.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>4.</td>
<td>Fill the backpack with the correct dose of herbicide, as given in the product label information.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>5.</td>
<td>Add a small amount of dye to the mix to ensure the weeds are marked when they’ve been sprayed.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>6.</td>
<td>Ensure the correct spray setting is on the nozzle depending on what the target weed is and pump spray pack and spray the weeds.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>7.</td>
<td>If contact is made on skin, rinse with water. Wash overall/clothes used during spraying.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>8.</td>
<td>Once spraying of area is complete, record the action ensuring details such as area sprayed, chemical and concentration are included in the file note.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>9.</td>
<td>Take photos of the area once the weeds are dying for reporting</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
</tbody>
</table>
### 5.2.5 Marine Environment

The marine environment is an important element of the natural values of the Abrolhos islands and the resort. Potential impacts on the marine environment during the construction phase have been minimised using design features and by constructing components on the mainland. The potential impacts from construction will mainly be from boat traffic bringing people and materials to the island and construction of the jetty, helipad, swimming platforms, wastewater outflow pipe and desalination intake pipe. These impacts may include:

- Disturbance or loss of benthic primary producer habitats including corals.
- Generation of turbidity and suspended solids by boat propellers and marine construction activities.
- Accidental boat wastewater discharge or minor fuel spill.

The following Marine Environment Management Procedure (Table 13) is designed to minimise the potential for the construction activities to cause the potential impacts on the marine values of the Long Island.
### Table 13: Marine Environment Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All construction personnel will undertake the Construction Environmental</td>
<td>Construction Supervisor/Systems</td>
</tr>
<tr>
<td></td>
<td>Induction, which will include marine environmental issues.</td>
<td>Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Provide designated anchoring areas for boats used during the construction</td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>phase.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A barge will be used for the construction of the jetty. Once the jetty is</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td></td>
<td>built all boats during the construction phase will be secured to the jetty.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There will be no dropping of anchors by construction-associated vessels.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Boats used during construction phase will not discard any waste overboard,</td>
<td>Boat Operators</td>
</tr>
<tr>
<td></td>
<td>including food and fish offal. No vessels will purge bilge water within</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the surrounds of Long Island. Where possible, all vessels will empty bilge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>water in the open ocean.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>All contracted boat operators used during the construction phase will abide</td>
<td>Boat Operators</td>
</tr>
<tr>
<td></td>
<td>by strict environmental performance standards as outlined in part of their</td>
<td></td>
</tr>
<tr>
<td></td>
<td>contracts.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Provide personnel with training on the prevention and handling of sewage</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td></td>
<td>spills into the water from boats during the construction phase.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Transport all dangerous waste and fuel to and from the island in</td>
<td>Construction Supervisor/Boat</td>
</tr>
<tr>
<td></td>
<td>appropriate sealed containers.</td>
<td>Operators</td>
</tr>
<tr>
<td>8.</td>
<td>Minimise impact to benthic habitats by constructing jetty, helipad and</td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>swimming platforms on the mainland and on floating barges.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Where possible, avoid areas of live coral and algae during construction of</td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>jetty pylons, helipad anchors, swimming platforms, intake/outlet pipes and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>moorings. Situate over non-vegetated areas of sand and coral rubble habitat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>as far as possible.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>All personnel to be briefed on the prevention and handling of small fuel</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td></td>
<td>spills into the water during the construction phase. Ensure that spill kits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>are available at appropriate locations on boats, jetty and services area.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Install offshore wastewater pipe into Goss Passage in such a way as to</td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>minimise live reef area damage where possible.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Ensure installation of the uptake pipe for the desalination plant to the</td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>west of the island will avoid coral and algae habitats wherever possible.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Jetty pylons to be rotated into the substrate so as to minimise turbidity</td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>and total suspended solid loads produced during underwater construction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>activities. Activities that generate turbidity will not occur over predicted</td>
<td></td>
</tr>
<tr>
<td></td>
<td>coral spawning periods.</td>
<td></td>
</tr>
</tbody>
</table>

### 5.2.6 Landforms and Tidal Ponds

Long Island is a low-lying relatively flat island generally about two metres above sea level, with a small central portion extending slightly over four metres above sea level. The majority of the island is composed of corals, coral gravel and plate-like cobbles, with sandy beaches and low dunes present in some areas. There are seven tidal ponds scattered across the island.
Tidal Pond 504 is located within the resort development zone and Tidal Pond 503 is north and adjacent to the development zone.

Construction activities may impact on landforms and tidal ponds as follows:

- Over-exploitation of the sandy beaches.
- Potential to increase erosion of the island.
- Compaction of soil and damage to the soil structure.
- Degradation of tidal ponds.
- Disruption to elevated areas potentially associated with *Batavia* mutineer hangings.

**Table 14: Landforms and Tidal Ponds Management Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All construction personnel will undertake the Construction Environmental Induction, which will include landform and tidal pond management issues.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Access paths and other marked out fixed routes are to be strictly adhered by personnel and Manitou operators during construction to minimise degradation of the soil structure.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>3.</td>
<td>Do not enter any area that is marked off for no entry without authority of the Construction Supervisor. Remain on the formalised access pathways at all times.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>4.</td>
<td>Ensure the exclusion zones surrounding all tidal ponds are strictly adhered to during the construction phase.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>5.</td>
<td>Ensure that beach access is restricted to designated areas to minimise erosion.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>6.</td>
<td>Holes and trenches are to have coral rubble material removed and stockpiled separately during any excavation for foundations and pipes.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>7.</td>
<td>On completion of work, ensure that the holes and trenches are backfilled as required and shaped to conform to the natural topography. Stockpiled coral rubble material is to be spread over the final surface.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>8.</td>
<td>Excavated material will be stored in the zone indicated on the Construction Map. This will be made to appear as natural as possible.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>9.</td>
<td>Personnel will be prohibited from traversing the unsurveyed southern area of Long Island (south of the helipad site).</td>
<td>All Personnel</td>
</tr>
<tr>
<td>10.</td>
<td>Ensure that regular inspections are undertaken to monitor impacts of construction activities on the landforms, soil structure and tidal ponds in the development area and access paths.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>
5.2.7 Fire Management Procedure

Wildfires on Long Island have the potential to heavily impact vegetation and bird populations of the island. Fire prevention and quick response are an important part of fire management during the resort construction.

The outbreak of fire on the island could have the following environmental impacts:

- Destruction of vegetation.
- Loss of the CALM Priority 4 species *Lepidium puberulum*.
- Destruction and/or abandonment of seabird nests and burrows.
- Death or injury to fauna unable to escape the fire.

Fire management procedures are given in Table 15.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All construction personnel will undertake the Construction Environmental Induction, which will include fire management issues.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
</tbody>
</table>
| 2.   | All personnel shall be briefed on the procedures to follow if a fire breaks out such as:  
· Marshalling areas.  
· How to raise the alarm.  
· The location and use of fire-fighting equipment. | Safety Officer |
| 3.   | A designated area will be set aside for personnel work breaks. Cigarettes will only be permitted to be smoked in this area. The designated area will be provided with a fire extinguisher at all times. | Construction Supervisor/All Personnel |
| 4.   | Ensure that fire extinguishers are strategically positioned around the working area and appropriate to the nature of the fire that may be generated. Extinguishers will be present at all times where hot work will be undertaken i.e. welding and grinding. | Safety Officer |
| 5.   | High risk activities, such as welding, shall be undertaken during the cooler periods of the day using appropriate guards and not during periods of high winds where possible. | Safety/Construction Supervisor |
| 6.   | Where vegetation around and under buildings represents a fire hazard, it will be trimmed to a minimum height of 100 mm. | |
| 7.   | Ensure that appropriate personnel are briefed in the correct handling and transportation of flammable materials during construction phase. Storage and use of flammable materials (e.g. fuels and oils) to be in accordance with *Australian Standard (AS) 1940-1993 - The Storage and Handling of Flammable and Combustible Liquids*. | Safety Officer/Systems Manager |
5.3 Pollution Management

5.3.1 Air Emissions/Dust management

It is envisaged that there will be minimal dust and other emissions generated by the proposed development. Potential impacts upon the air quality of the area include:

- Dust generated from clearing and construction activities.
- Emissions from generators used during construction.

Procedures to reduce air emissions and manage dust are given in Tables 17 and 18, respectively.

Table 16: Air Emission Reduction Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ensure vehicles and power generating equipment are regularly maintained and serviced to manufacturer’s specifications to ensure efficient running of equipment and optimum fuel consumption, thereby minimising exhaust emissions.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

Table 17: Dust Suppression Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Minimise disturbance of vegetation to reduce the potential for exposed soils to generate dust or be eroded.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>2.</td>
<td>Define and mark access paths between construction areas, ensure all personnel are aware of where they can walk and do not leave these areas.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>3.</td>
<td>Avoid sandy areas other than when constructing foundations.</td>
<td>Construction Supervisor/All Personnel</td>
</tr>
<tr>
<td>4.</td>
<td>Visually monitor dust levels during construction and initiate appropriate dust suppression techniques when required.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>5.</td>
<td>Conduct regular inspections of the project site to ensure dust generation from exposed areas is not excessive. This is especially relevant during periods of strong winds and high temperatures. During these periods, inspections are to be carried out daily.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>6.</td>
<td>Helicopters will approach the landing site from across the water to minimise dust generation.</td>
<td>Helicopter Pilot</td>
</tr>
</tbody>
</table>

5.3.2 Noise

The potential environmental impacts associated with noise production relate primarily to disturbance of wildlife on or near the island. These impacts include:

- Fauna such as birds and sea lions avoiding the island.
- Disruption of bird breeding and habitation in the vicinity of the resort.
disturbance of near shore birds on Long island and other islands due to near shore water based construction and activities.

Noise will be minimised and managed by implementing procedures given in Table 18.

### Table 18: Noise Pollution Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All Personnel will undertake a Construction Environmental Induction, which will include noise impacts on wildlife and outline procedures and noise limitations during the construction period.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Helicopters will operate during the daylight hours only and will follow the designated approach path around the island, landing from the north-west, down wind of the island to minimise noise impact on the island.</td>
<td>Helicopter Pilot</td>
</tr>
<tr>
<td>3.</td>
<td>Flight paths will not be over islands.</td>
<td>Helicopter Pilot</td>
</tr>
<tr>
<td>4.</td>
<td>Implement bird monitoring programme prior to commencement of construction activities to determine if noise is impacting on these animals.</td>
<td>Avifauna Specialist</td>
</tr>
<tr>
<td>5.</td>
<td>Ensure all generators are fitted with noise reducing mufflers and are regularly maintained.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>6.</td>
<td>Ensure generators are based in sound proof containers with acoustic insulation to reduce noise levels.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>7.</td>
<td>Ensure construction is co-ordinated with the Avifauna Specialist to avoid major impacts on breeding birds and to minimise impact of noise on breeding behaviour.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

### 5.3.3 Lighting

Lighting has the potential to disorientate birds, causing them to collide with objects and cause injuries or fatalities. Lighting must be minimised wherever possible as described in Table 19.

### Table 19: Lighting Management Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No construction activities to be undertaken at night. No lights to be left on site at night.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>2.</td>
<td>Vessel operators will ensure all deck lighting apart from navigation lighting is extinguished. No spotlights or other bright light sources will be used at night from moored vessels for fishing purposes.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

### 5.3.4 Waste Disposal

Impacts associated with construction waste disposal relate mostly to lack of knowledge of disposal procedures. The issues associated with a lack of adequate waste disposal during construction activities are:

- Attraction of native fauna species due to presence of alternative food sources and nesting materials. These species may become a nuisance.
- Animal deaths through eating or entanglement in wastes.
- Pollution and a decrease in visual amenity due to inadequate storage, containment or removal of wastes.
- Pollution of the water leading to a reduction of benthic marine species abundance, cover and diversity.
- Pollution of the water leading to decreased amenity.
- Organic matter within wastewater has the potential to act as a food source and attract fish and other marine animals to the site of discharge.
- Contamination of fish stocks and other seafood such that it is unfit for human consumption.

Procedures to minimise impacts from waste disposal are given in Table 20.
### Table 20: Disposal of Waste Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Construction Environmental Induction will include the impacts that poor solid waste management can have on the environment of and surrounding Long Island.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Minimise waste material on the island by prefabrication of buildings and removal of unnecessary packaging on the mainland prior to transport to site.</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>3.</td>
<td>Use large covered bins or skips to store general wastes prior to removal from the Island. These bins shall have attached lids thus enabling containment of the wastes. Solid wastes shall be transported from Long Island to the mainland within these bins or skips.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>4.</td>
<td>All organic (food) waste is to be disposed of immediately into bins with attached lids ensuring that it is contained.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>5.</td>
<td>Store hazardous wastes, as described in the hazardous wastes procedure, in appropriate nominated containers for transport to the mainland.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>6.</td>
<td>All recyclable and non-recyclable waste will be regularly taken in sealed containers to Geraldton for recycling and disposal at the Geraldton-Greenough Regional Council landfill.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>7.</td>
<td>The Construction Supervisor is to ensure waste is disposed of to the appropriate locations on the mainland.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>8.</td>
<td>Inspect the construction site and waste disposal areas weekly to ensure waste management objectives are being met, initiate any necessary remediation of waste disposal problems. Ensure waste is removed to the mainland regularly.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>9.</td>
<td>At no time will any waste be left or buried on the island, including cigarette butts and organic waste.</td>
<td>All personnel.</td>
</tr>
<tr>
<td>10.</td>
<td>During construction wastewater will be captured and contained for transport off the island to the mainland for appropriate disposal.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>11.</td>
<td>Portable toilets will be used during the construction period or until such time as the wastewater disposal system is deemed fully operational.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>12.</td>
<td>No solid wastes shall be permitted to be dumped from boats associated with the construction of the Long Island tourist resort. This will apply to all supply, transport and recreational boats.</td>
<td>Boat Operator</td>
</tr>
<tr>
<td>13.</td>
<td>Sewage generated on board boats shall be disposed of in accordance with the <em>Strategy for Management of Sewage Discharge from Vessels into the Marine Environment</em>, with no disposal of sewage in areas of the Fish Habitat Protection Area that lack satisfactory dilution factors.</td>
<td>Boat Operator</td>
</tr>
<tr>
<td>14.</td>
<td>No vessels shall be permitted to purge bilge water within the surrounds of Long Island. Where possible, all vessels shall be required to empty bilge water in the open ocean.</td>
<td>Boat Operator</td>
</tr>
<tr>
<td>15.</td>
<td>Provide spill kits on board all boats being used to transport fuel and on the jetty. Train construction staff and contract personnel in spill response.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>
5.3.5 Dangerous and Hazardous Substances

These procedures are designed to ensure that the storage and handling of dangerous and hazardous substances does not affect the environment or the health, welfare and amenity of people and nearby land users by meeting statutory requirements and acceptable standards.

There are a number of impacts that can result from the storage and handling of dangerous and hazardous substances. These impacts are:

- Pollution of the marine environment through improper disposal of chemicals.
- Pollution of the marine environment through fuel spills during refilling of bulk supply containers and refuelling of vessels.
- Pollution of the marine environment through accidental spillage as a result of damage to marine vehicles (eg collision with reef).
- Pollution of the terrestrial environment through fuel spills during refuelling of vehicles.
- Pollution of the terrestrial environment through chemical spills as a result of refilling containers from bulk stores.
- Potential for gas leaks from LPG storage and transfer pipes resulting in risk of ignition, fire and explosion.

Procedures to minimise and manage the use, storage and disposal of hazardous materials are given in Tables 21 and 22, respectively.
### Table 21: Hazardous Materials on Construction Site Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All personnel to undertake Construction Environmental Induction, which will include information about the environmental impacts of hazardous materials, emergency response procedures and use of spill kits.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Minimise the need for hazardous materials to be brought to Long Island. Avoid refuelling activities on or near the island.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>3.</td>
<td>Provide facilities to be used for any hazardous materials required on the construction site. Facilities include: 1. Bunded/contained stores and supply system. 2. Used filter and rag drums 3. Waste oil tank for recycling.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>4.</td>
<td>All Personnel using and storing hazardous materials on the construction site shall submit to the Construction Supervisor the supplier’s hazardous materials management plan. The plan shall include: 1. List of all materials required on site. 2. Relevant licences for storage. 3. Appropriate containers for storage (e.g. self bunded containers or procedure to construct bunding). 4. Follow procedures for handling and reporting of incidents as explained during site induction. 5. Follow procedures for disposal of oil, filters &amp; oily rags as explained during site induction.</td>
<td>All Personnel</td>
</tr>
<tr>
<td>5.</td>
<td>Clearly define and mark suitable locations on site (nominated on the construction plan) to store hazardous materials, such as fuel and oils. The allocated site is to have as a minimum a hardstand area and be bunded to isolate it from local drainage.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>6.</td>
<td>Supply the Safety Manager with a copy of the supplier’s management plan. The original is to be filed in the Hazardous Materials file in the project office.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>7.</td>
<td>Record the lists of substances in the site’s Hazardous Materials Register and incorporate the location of hazardous materials into the site’s Emergency Response Plan.</td>
<td>Safety Manager</td>
</tr>
<tr>
<td>8.</td>
<td>Equip the hazardous material storage area and the jetty with a hydrocarbon spill kit. Train staff in the use of spill kits.</td>
<td>Safety Officer/Construction Supervisor</td>
</tr>
</tbody>
</table>
### Table 22: Storage and Disposal of Hazardous Materials on Site Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ensure all hazardous materials are stored within the nominated areas on the Construction map. All chemicals in liquid form are required to be stored within bunded or contained areas. Consult site environmental licences to obtain specific bund design requirements. Ensure bunds meet requirements of the Australian Dangerous Goods (ADG) Regulations and AS 1940 “Storage and Handling of Flammable and Combustible Liquids” (2004).</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure all chemicals on site are stored according to the ADG segregation requirements.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>3.</td>
<td>Conduct fortnightly inspections of the storage facilities to ensure all materials are stored in the appropriate locations as shown on the construction plan and bunds are intact.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

**Waste Oil /Grease**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Waste oil and grease is not to be disposed of in regular waste receptacles. The person who generates the waste is responsible for disposal to an approved location. These products are ‘Controlled Wastes” under the Environmental Protection (Controlled Waste) Regulations 2001 and require disposal through DoE Licensed waste disposal agents. Waste oil and grease is to be placed in the marked containers and returned to the mainland for recycling.</td>
<td>All Personnel / Construction Supervisor</td>
</tr>
</tbody>
</table>

**Used Filters and Rags**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Used filters and rags are not to be disposed of in regular waste receptacles. The person who generates the waste is responsible for disposal to an approved location. Used filters and oily rags are placed into the appropriate undamaged drums on site during construction for later transport to the mainland for ultimate recycling.</td>
<td>All personnel / Construction Supervisor</td>
</tr>
</tbody>
</table>

**Used Batteries**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Used batteries are not to be disposed of in regular waste receptacles. The person who generates the waste is responsible for disposal to an approved location. Appropriate protective clothing is to be worn when handling batteries. Batteries are transported off site with acid contained.</td>
<td>All personnel / Construction Supervisor</td>
</tr>
<tr>
<td>2.</td>
<td>Batteries do not go to regular land fill facilities on the mainland. Arrangement for batteries to go to a recycling yard in Geraldton.</td>
<td>Construction Supervisor</td>
</tr>
</tbody>
</table>

### 5.3.6 Spill Response

There are a number of impacts that can result from the storage and handling of dangerous and hazardous substances such as pollution of the marine or island environment. Diesel will be used regularly to power generators during the construction process and consideration is given to the possibility of spills on both land and sea. The procedures listed in Table 23 will be implemented to prevent such spills occurring, and to minimise the impact should an accidental spillage occur.
Table 23: Spill Response Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>All personnel to undertake Construction Environmental Induction, which will include information about the environmental impacts of hazardous materials, emergency response procedures and use of spill kits.</td>
<td>Construction Supervisor/Systems Manager</td>
</tr>
<tr>
<td>2.</td>
<td>Become familiar with the management and actions information detailed in the Oil Spill Environmental Management Plan</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>3.</td>
<td>All chemicals and hydrocarbons shall be stored in accordance with AS1940-2004.</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>4.</td>
<td>Ensure diesel is stored in correct area and that refuelling of generators is carried out in a designated area by trained personnel.</td>
<td>Construction Supervisor</td>
</tr>
<tr>
<td>5.</td>
<td>Ensure oil spill kits for spills of up to 50 litres are available on the jetty, helipad, generator refuelling and operation areas.</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>6.</td>
<td>Signage must be provided to mark the refuelling area and list key actions in the event of a diesel spill.</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>7.</td>
<td>Minimise the need for hazardous materials to be brought to Long Island. Avoid boat refuelling activities on or near the island.</td>
<td>Construction Manager</td>
</tr>
</tbody>
</table>
| 8.   | Ensure spill procedure is followed:  
Control - stop the spill/leak at the source  
Contain - Barricade/bund spill to immediate area  
Clean up - remove free liquid, dispose of contaminated absorbents and treat contaminated soil/water  
Replace - restock spill kit used  
Report - notify Construction Supervisor as soon as possible. | All Personnel                         |
| 9.   | Spills over 1 litre of dangerous substances to be recorded in a logbook. The Construction Supervisor will determine the significance of the spill and whether reporting to Authorities such as the EPA is necessary. | All Personnel/Construction Supervisor |
| 10.  | Ensure all soiled equipment and kit is isolated and returned to the mainland for disposal.                                                                                                                   | Construction Supervisor               |
| 11.  | Report the size and extent of the spill directly to EPA, CALM and Department of Fisheries (if a marine spill).                                                                                                  | Construction Supervisor               |
6. **Monitoring and Reporting**

Monitoring and reporting during the construction phase of the project will occur through the following methods.

6.1 **Project Monitoring and Audit**

Regular site inspections will be undertaken by the Construction Supervisor and an audit report completed. Results of the audit reports will be submitted to the Construction Supervisor for action on any items required.

6.2 **Project Meetings**

Regular project meetings will be held, involving HLD personnel, the Construction Supervisor and other Personnel as required. Minutes from these meetings will form part of the reporting system that identifies:

- Actions required to be implemented as a result of past internal audits.
- Proposed activities for the next project period.
- Maintenance of any records required in the CMP.
7. REFERENCES

FIGURES
Figure 1

Conceptual Resort Layout Map

Humfrey Land Developments

Construction Environmental Management Plan

Legend
- Boardwalk
- Pool
- Communal Buildings
- Guest Lodges
- Staff Quarters
- Day Visitors' Pavillion
- Services Compound

Scale 1:1400
Original Size: A4
Grid Specification MGA94 Zone 49
Datum GDA94

Humfrey Land Developments

Conceptual Resort Layout Map

Figure 1
Figure 2

Conceptual Boardwalk Layout Map

Humfrey Land Developments
Construction Environmental Management Plan

Scale 1:6400
Original Size: A4
Grid Specification MGA94 Zone 49
Datum GDA94
APPENDICES
APPENDIX 1

Crothers Construction P/L Profile and Project Highlights
Company Profile

Creative Design and Construction Specialists

- Commercial
- Civil and Industrial
- Refurbishment
- Project Management
- Development

Revised: 29 March 2006
OVERVIEW

Although Crothers Construction Pty Ltd has only been registered since the 14th October 1998, the founder David Crothers has for the past thirty-eight years (18 as a Director with the family company, Geraldton Building Company Pty Ltd) had extensive experience in estimating, quantity surveying, project management and administration, design and construction of projects, refurbishment, manufacturing and building services in the commercial, civil and industrial sectors.

In addition, the company’s Estimating & Technical Support Manager Mr Greg Trevaskis, and Senior Project Manager’s Mr Don Fane and Mr Lester Anderson have had 45, 28 and 37 years experience respectively in the building industry. Site Managers Dennis Carrott, Glenn Mainwaring, Robert Gibbs and Andy Taylor also have had 39, 33, 40 and 33 years experience respectively in the building industry.

Crothers Constructions senior staff and many of their major subcontractors have gained a wealth of experience working with one of Western Australia’s leading construction companies throughout the Midwest, Gascoyne, North West, Kimberley and South-East Asian regions.

Crothers Construction is a design and construction company covering:-

- Commercial, Civil and Industrial Construction
- Project Management
- Commercial Refurbishment
- Development Projects

Crothers Construction is located in its own modern two storey premises within the main commercial precinct of Geraldton, and is equipped with CSSP – Cheops as its financial accounting system. This system also delivers an integrated solution to the application requirements for job costing and contract administration. Cheops is an integrated software system developed for the construction industry.
INCORPORATION:  CROTHERS CONSTRUCTION PTY LTD
14th October 1998 ACN - 084 751 511
ABN - 56 084 751 511

Trading as CROTHERS CREATIVE DESIGN & CONSTRUCTION
29th October 1998 Business Number 0249616U

ADDRESS:  
Street Address:  
160 Chapman Road
GERALDTON WA 6530

Postal Address:  
PO Box 11
GERALDTON WA 6531

REGISTERED OFFICE:  
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1st Floor, 20 Kings Park Road, WEST PERTH WA 6005

TELEPHONE:  
(08) 9964 2700

FACSIMILE:  
(08) 9964 2955

WEBSITE:  
www.crothers.com.au

E-MAIL:  
admin@crothers.com.au

STAFF:  
David Crothers  Managing Director  0409 801 802
Greg Trevaskis  Estimating & Technical Support Manager  N/A
Doug Davies  Systems Manager  N/A
Don Fane  Senior Project Manager  0409 214 436
Lester Anderson  Project Manager  0407 381 733
Sam Gallagher  Graduate  
Dennis Carrott  Site Manager  0419 987 977
Glenn Mainwaring  Site Manager  0417 971 569
Robert Gibbs  Site Manager  0438 218 347
Andy Taylor  Site Manager  0418 939 016
Phil Carter  Site Manager  0427 642 701
Michelle Ford  Office Manager  N/A
Rebecca Crawford  Administration Officer  N/A

DIRECTOR:  
David A Crothers
15 Bayview Street
GERALDTON WA 6530

CAPACITY:  
$25 to $40 million per annum

MEMBERSHIPS:  
• Master Builders Association of WA
• Chamber of Commerce & Industry WA
• Australian Institute of Company Directors
• Builders Registration Board of WA
• Standards Australia

REGISTRATIONS:  
• Builders Registration Number  10576
• Priority Access Number  01302
• Standards Australia Member Number  SP011384
PRINCIPAL ADVISORS

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Mr Simon Read - Director
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BANKERS: National Australia Bank
144 Marine Terrace, Geraldton WA 6530

Contact: Mr David H Dibble – Business Banking Manager
Telephone: (08) 9965 8704
Facsimile: (08) 9921 7947

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Facsimile: (08) 9420 7101

Tydde & Co
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PO Box Y3089, East St Georges Terrace, Perth WA 6832

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Telephone: (08) 9220 4499
Facsimile: (08) 9220 4492

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250 St Georges Terrace, Perth WA 6000

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GRAPHIC DESIGN CONSULTANT The Creative Page
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Telephone: (08) 9227 8485
Facsimile: (08) 9227 2929
ORGANISATION CHART

CORPORATE
Managing Director
DA Crothers

ADMINISTRATION
Office Manager
Mrs M Ford
Administration
Mrs R Crawford

PROJECT MANAGEMENT
Senior Project Manager
DL Fane
Project Manager
LS Anderson
Graduate
S Gallagher

MARKETING & TENDERING
Marketing & Design
D A Crothers
Estimating & Technical Support Manager
G Trevaskis
Graduate
S Gallagher

MANAGEMENT SYSTEMS
Systems Manager
D Davies
Systems Advisor
G Trevaskis
Administration
Mrs M Ford
Mrs R Crawford

SITE MANAGEMENT
Site Manager
D Carrott
Site Manager
G Mainwaring
Site Manager
R Gibbs
Site Manager
A Taylor
Site Manager
P Carter

APPRENTICE TRAINING
B Hughes
M McAulay
D Dhu
ACHIEVEMENTS

Crothers Construction commenced business on 01 February 1999

WA STATE AWARDS

MBA EXCELLENCE IN CONSTRUCTION AWARDS

2004 Certificate of Excellence
Category 4 – An Industrial/Commercial Building
Westnet Office Development, Osborne Park, Perth

2004 Best Practice in Building Sustainability
Category – Over $2 Million
Westnet Office Development, Osborne Park, Perth

2004 Excellence in Energy Efficiency
Category – Commercial Buildings
Westnet Office Development, Osborne Park, Perth

2003 Category Winner
Category – Best State Government Buildings, Regional Western Australia Under $10 Million
Central West College of TAFE, Geraldton Campus – Major Facilities Expansion 2001

2003 Category Winner
Category – Under $5 Million Building Designed for Entertainment, Hospitality or Sports
Perth Hockey Stadium Redevelopment at Curtin University Campus

GERALDTON / MIDWEST REGION AWARDS

2003 WINNER - Midwest Chamber of Commerce & Industry Small Business Award
(Business With Between 5 and 20 Employees)

MBA CONSTRUCTION EXCELLENCE AWARDS

2005 Category Winner
New Commercial Building under $1 Million
New Law Office, 254 Foreshore Drive, Geraldton

2005 Category Winner
Commercial Alterations & Additions – Any Value
2nd Storey Additions at 272 Foreshore Drive, Geraldton

2004 Category Winner
Commercial Building New Construction – Any Value
Nazareth House Nursing Home – Stage One - Lamenier House, Bluff Point, Geraldton

2003 Category Winner
New Commercial Building up to $3 Million
Geraldton Central – Building C
75 Chapman Road, Geraldton

2002 Category Winner
New Commercial Buildings over $1 Million
Batavia Office Development
201 Foreshore Drive, Geraldton

2001 Category Winner
Commercial Alterations & Additions up to $2.5 Million
University Medical Centre Refurbishment, Geraldton

2000 Category Winner
Commercial Alterations & Adds North of 26th Parallel
Country Club Hotel, Kununurra

2001 Category Winner
Commercial Alterations & Additions up to $2 Million
Geraldton Nursing Home
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  Facsimile: (08) 9389-1188

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  Facsimile: (08) 9964 3106

PERSONAL

• Mr AJ (Bert) Pepperell
  (Managing Director of Geraldton Building Company 1959 – 1988)
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  Geraldton WA 6530
  Telephone: (08) 9921 2641
APPENDIX 2

Construction Staff Environmental Induction
LONG ISLAND TOURISM DEVELOPMENT,
CONSTRUCTION MANAGEMENT PLAN:

CONSTRUCTION ENVIRONMENTAL INDUCTION
AND TRAINING CONTENT

MAY 2006

PREPARED FOR

HUMFREY LAND DEVELOPMENTS

BY

MBS ENVIRONMENTAL

4 Cook Street
West Perth WA 6005
Australia
Telephone: (618) 9226 3166
Facsimile: (618) 9226 3177
Email: info@mbsenvironmental.com.au
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Plate 1: *Lepidium puberulum* Growing Near to Tidal Pond 504 on Long Island (October 2005)
1. **INTRODUCTION**

1.1 **PURPOSE OF DOCUMENT**

All construction personnel and contractors will be educated and inducted in the environment and cultural heritage of both Long Island and the wider Abrolhos Islands to increase their awareness of the islands and allow them to perform construction activities in a way that will minimise impact on the local environment.

This document outlines the points that will be included in the Construction Environmental Induction.

1.2 **LEGAL COMPLIANCE**

A full list of relevant legislation is supplied in the CMP and in Chapter 2 of the PER main document. Key legislation of particular relevance to the construction phase are:

- **Environment Protection and Biodiversity Conservation Act 1999** (Commonwealth). This legislation protects the environment with regard to matters of National Environmental Significance. The proposed tourist resort on Long Island is subject to approval under the Act.

- **Historic Shipwrecks Act 1976** (Commonwealth). Provides for the protection of historic shipwrecks and all associated artefacts. Both the *Hadda* and the *Batavia* wrecks and associated relics as well as other wrecks in the Abrolhos are protected by this Act.

- **Environmental Protection Act 1986**. The proposed Long Island tourism development is being assessed under this Act.

- **Maritime Archaeology Act 1973**. Provides for the protection and preservation of shipwrecks and all associated relics lost prior to 1900.

- **Wildlife Conservation Act 1950**. Applies to the protection of wildlife in Western Australia. Within the Abrolhos this primarily relates to the native flora and fauna including seabirds, Sea Lions and reptiles.

- **Fish Resources Management Act 1994**. Provides for management and regulation of the Abrolhos Islands reserve and for the establishment and management of Fish Habitat Protection Areas. Includes the management of land and waters of the Abrolhos.

1.3 **CONSTRUCTION COMMITMENTS**

To manage and minimise the potential impacts of construction activities upon the environment and heritage values of Long Island and surrounding environment through adhering to the Construction Management Plan. Humfrey Land Developments (HLD) has committed to the following activities during the construction phase of the project:

- Induction of contractor and personnel.
• Management of access, clearing and disturbance, noise, light and dust impacts.
• Minimising impacts to avifauna, other fauna, Priority flora species, benthic habitat, water quality, potential land heritage sites and landforms.
• Provision of control measures and temporary facilities.
• Details of appropriate storage and containment of hydrocarbons and dangerous substances.
• Procedures to prevent introduction of weeds and vermin.

1.4 **KEY CONSTRUCTION CONTACTS AND SPECIALISTS**

• HLD Project Manager: Barry Humfrey.
• Construction Manger: David Crothers.
• Construction Supervisor: TBA.
• Safety Officer: TBA.
• Lead Environmental Consultants: MBS Environmental.
• Avifauna Specialist: Dr Chris Surman.
• Archaeologist: As advised by WAMM.

1.5 **KEY STAKEHOLDERS**

Key stakeholders that may need to be advised or consulted with respect to environmental issues are:
• Department of Environment.
• Commonwealth Department of the Environment and Heritage.
• Department of Fisheries.
• Department of Conservation and Land Management.
• Western Australian Maritime Museum.
2. **REGIONAL SETTING AND CONSERVATION STATUS**

The Abrolhos Islands are an archipelago of 122 low-lying islands and reefs located approximately 60 kilometres offshore from Geraldton. The Abrolhos are divided into three major groups of islands: the Wallabi, Easter and Southern Groups. Long Island is situated within the Wallabi Group of islands. East Wallabi and West Wallabi Islands, the two largest islands of the Wallabi Group, are located approximately five kilometres to the north-west and seven kilometres to the west of Long Island, respectively. The nearest islands are Beacon Island (one kilometre east), Traitors Island (one kilometre south-east) and Dick Island (two kilometres south).

**Class A Reserve**
The waters of the Abrolhos Islands are a Class A Reserve set aside for the purposes of conservation of flora and fauna, tourism and purposes associated with the fishing industry.

**Fish Habitat Protection Area (FHPA)**
The State Territorial Waters of the Abrolhos Islands are a gazetted Fish Habitat Protection Area (FHPA) for the following purposes:

- The conservation and protection of fish, fish breeding areas, fish fossils or the aquatic eco-system.
- Aquaculture activities.
- The management of fish and activities relating to the appreciation or observation of fish.

**Reef Observation Areas (ROAs)**
All species of fish including molluscs, algae, coral and fish are totally protected in the ROAs, with the exception of western rock lobster, which may be taken by recreational and commercial fishers using pots during the season. Four ROAs have been declared at the Abrolhos. The ROA at Beacon Island includes some of the coral areas to the north of Long Island.

**Register of the National Estate (RNE)**
The Houtman Abrolhos Islands Reserve is listed on the Register of the National Estate (RNE) because of the significance of the shipwrecks in the area, the importance of the marine environment and the bird life of the islands. There are seven shipwrecks and several other areas in the Abrolhos that are all listed separately in the RNE.

**National Heritage List (NHL)**
An area of the Wallabi Group (including Long Island) is now included on the National Heritage List (NHL) under the ‘Batavia Shipwreck Site and Survivor Camps Area 1629 - Houtman Abrolhos’ notice. The inclusion of the site on the NHL means that the values as identified by the Australian Heritage Council must be protected, and it is these values, and not necessarily the entire place itself, that is protected through listing. These values are protected under the EPBC Act 1999 (Department of the Environment and Heritage, 2006, website: www.deh.gov.au/heritage/ national/implications.html).
3. **HERITAGE VALUES**

3.1 **SHIPWRECKS**

There are a number of shipwrecks scattered throughout the Abrolhos Islands. Those that have been found include the *Batavia* (1629), *Zeewijk* (1727), *Hadda* (1877), *Marten* (1878), *Ben Ledi* (1879), *Ocean Queen* (1842) and the *Windsor* (1908). Both the *Batavia* and the *Hadda* are situated close to Long Island.

All of the above mentioned shipwrecks are gazetted Historic Shipwrecks under the Australian Government’s *Historic Shipwrecks Act 1973*. With the exception of the *Windsor*, these wrecks are also protected under the State *Maritime Archaeology Act 1973*. The State Act provides protection for all ships that were wrecked, lost, abandoned or stranded off the coast of Western Australia prior to 1900.

**Hadda**

The *Hadda*, a three-masted barque of 334-tons under the command of John L. Parker had sailed to the Lacepede Islands (off the Kimberly Coast) to take on a load of guano. However, the captain lacked the necessary license and the ship was forced to return to Fremantle without a cargo. On the return journey, unfavourable currents and stormy conditions forced the *Hadda* aground in the Abrolhos on 30 April 1877. The crew was not able to free her and in two days, after the water level reached the wheelhouse, they had to abandon the ship. Captain Parker and his crew of 11 saved all their personal effects and moved to nearby Beacon Island. They remained there until 7 May when favourable seas enabled them to safely travel to Geraldton in their two small boats.

**Batavia**

The history of the *Batavia* shipwreck and mutiny is one of the best-known stories in Australian maritime history. On 4 June 1629, the VOC ship *Batavia* struck Morning Reef, south of Beacon Island. Four days after the wreck the ship’s captain (Pelsaert) and a company of mainly officers and soldiers set out in a ship's boat to seek help from Indonesia. This left 268 people marooned on the islands of the Wallabi Group. A week later the senior officer amongst the survivors and the leader of the impending mutiny, Officer Jeronimus Cornelisz, sent soldier Wiebbe Hayes and a group consisting primarily of soldiers to the High (Wallabi) Islands in search of water. At the same time he shifted 45 people from Beacon Island to nearby Long Island.

The first murders occurred on Beacon Island and soon spread to Long Island. Some survivors managed to escape to the safety of Hayes’ camp and warn him of the situation. The mutineer’s goal was to capture the rescue vessel and use it as a privateer. On 17 September the mutineers launched an attack on Hayes’ camp, which was located on West Wallabi Island. During the fighting the rescue vessel Sardam appeared. The combatants disengaged and Hayes rowed to the ship to warn Pelsaert of the mutineers’ intention. The conspirators were then apprehended. Cornelisz was detained on Beacon Island and the others held on Long Island. After their trials, which Pelsaert conducted, nine of the leaders, including Cornelisz, were executed on Long Island. Of the 268 people Pelsaert left in the islands, 40 had drowned...
while swimming from the wreck, 20 had died from illness and disease and 125 had been the victims of the mutineer’s murders.

3.2 LAND-BASED HERITAGE

Long Island, Beacon Island, Traitors Island and East and West Wallabi Islands are all of high historical value due to their association with the Batavia wreck and mutiny. Beacon Island was the site of the largest slaughter of the mutiny. About 180 people reached the island after the Batavia was wrecked on Morning Reef and were subsequently murdered by the mutineer, Cornelisz and his followers. A small group of people had been marooned on Traitors Island and were also murdered by the mutineers. Cornelisz was imprisoned on Beacon Island while awaiting his trial.

Sites of historic value on West Wallabi Island include Weibbe Hayes’ encampment site and two limestone structures or huts that may have been built by Hayes.

Long Island was the location of the second largest slaughter of the mutiny. Approximately 41 people were murdered here. On Captain Pelsart’s return from Batavia (now Indonesia) with the rescue boat, the mutineers were imprisoned (except Cornelisz who was imprisoned on Beacon Island), tried and several subsequently hanged on Long Island. The exact slaughter and gallows sites have never been located despite several surveys of the Island.

Several archaeological surveys have been conducted on Long Island. In 1967 a Rhenish beardman jug shard was recovered from the northern end of the island. In 2001 a metal detector survey was undertaken by the Western Australian Maritime Museum (WAMM) of the northern third of the Island. This survey located a “morning star” which is a piece of lead sheathing that had been moulded into a ball (and could have been used as a weapon) and three iron fastenings. Several items were also located that originated from the Grundy film set during the filming of the Batavia story in the early 1990s.

In 2005 personnel from WAMM undertook a surface survey of the main development area on Long Island. During the 2005 survey, four artefacts were recovered from along the central ridge of Long Island. The most notable of these is a ship’s fastening, which was found high on the ridge and buried under some coral rubble. It is likely that it could have been used as a weapon during the Batavia mutiny, formed part of the gallows or originated from a piece of ship related driftwood. The other artefacts recovered were a thin square head ferrous nail, a section of twisted ferrous nail and a small piece of nail or wire. There was no conclusive surface evidence found for the location of the gallows or occupation sites. All artefacts found during the survey were relocated to the WAMM in Fremantle.

There are other island-based heritage sites, particularly on West Wallabi Island, which relate to the more recent history of the Abrolhos. West Wallabi Island was the site of guano mining operations during the late 1800s and early 1900s. All that now remains of these operations are the stone foundations of the guano loading jetty on the north side of the island. A rock lobster cannery operated between 1931 and 1933 on West Wallabi Island.
During World War II, an advanced spotting post was maintained on West Wallabi Island. The base was manned by about six aircrew trainees from the Royal Australian Air Force in a round the clock vigil to give radio warning of any enemies approaching the mainland.
4. **ENVIRONMENTAL VALUES**

4.1 **BIRDS**

The Abrolhos Islands are among the most important seabird breeding islands in Australia and support significant breeding colonies of some species. As such, the islands are of international and national significance for bird watchers. Birds are the most significant terrestrial vertebrate fauna present on Long Island.

Twenty-eight species of birds have been recorded on Long Island. Of these, 12 species have been confirmed as breeding regularly: White-breasted Sea Eagle, Osprey, Pacific Gull, Silver Gull, Caspian Tern, Crested Tern, Bridled Tern, Eastern Reef Egret, Pied Oystercatcher, Grey Breasted White Eye, Little Shearwater and White-faced Storm-petrel.

Three species of bird that occur at the Houtman Abrolhos are also listed as Priority Fauna on the CALM Threatened and Priority Fauna Database; the Eastern Curlew, Hooded Plover and Brush Bronzewing. Of these only the Brush Bronzewing has been observed on Long Island. No breeding observations of this species are recorded from Long Island, although this species may visit to feed from time to time.

Two EPBC Threatened Species could potentially be encountered on or near to Long Island: the Lesser Noddy (vulnerable) and the Abrolhos Painted Button Quail (vulnerable).

4.2 **AUSTRALIAN SEA LIONS AND SKINKS**

Although not breeding in the Wallabi Group of islands, Australian Sea Lions (*Neophoca cinerea*) are recorded to use Long Island as a haul-out site. A haul-out site is an area of beach where sea lions rest, socialise and regulate body temperature. On Long Island, sea lions have been known to use the areas on the northern narrow neck of the island adjacent to Tidal Pond 503. The Australian Sea Lion is listed under Schedule 4 (other specially protected fauna) of the *Wildlife Conservation Act 1950*. The *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998* prohibits the disturbance and touching of all marine mammals including Australian sea lions.

Only one other species of terrestrial fauna is found on Long Island, the skink *Menetia greyii*. *M. greyii* is known to live under slabs of coral rubble or in vegetation litter.

No amphibians or land mammal species occur on Long Island. There are currently no vermin species on the island.

4.3 **VEGETATION AND RARE FLORA**

A total of 38 flora species have been recorded on Long Island, comprising 14 families. One Priority 4 species, *Lepidium puberulum*, was recorded within the development zone, adjacent to Tidal Pond 504 (Plate 1). A total of 14 weed species are widespread across Long Island and within the proposed tourism development area.
Fifteen vegetation communities have been mapped and recorded on Long Island. The vegetation of the resort development area is mainly sparse scrub of *Myoporum insulare* over an *Atriplex* species heath with a mixed species sparse grassland and *Senecio lautus* [sic] herbfield.

**Plate 1:** *Lepidium puberulum* Growing Near to Tidal Pond 504 on Long Island (October 2005)

4.4 **MARINE ENVIRONMENT**

The most widespread habitat surrounding Long Island was deep *Acropora* spp. (staghorn coral) ‘stands’, found surrounding and at the bottom of the several deep basins on the western side of the island. Shallow *Acropora* spp. reef, found along the east coast extending out from the island to approximately five metres (Chart Datum) were the next most widespread habitat within the area surveyed, followed by sand and coral rubble, found extending offshore from just below mean sea level around much of the island.
4.5 **LANDFORMS AND TIDAL PONDS**

Long Island is a leeward (eastern) island composed of coral rubble and emergent reef foundations, which are about 5,000 years old.

Long Island is a small island covering approximately 10.5 hectares. It is generally flat, being about two to three metres above mean sea level, with a small central portion extending slightly over four metres above sea level. There are seven tidal ponds scattered across the island. Tidal Pond 504 is located within the resort development zone and Tidal Pond 503 is north and adjacent to the development zone.
5. **Potential Impacts of Construction on Heritage Values**

Land-based heritage could potentially be impacted by construction in the following ways:

- Heritage sites, particularly in areas not yet surveyed, could be damaged during the construction of the resort and through uncontrolled access of workers around the island during the construction.
- Artefacts may be lost or damaged through accidental incidents, souveniring or vandalising.
6. **POTENTIAL IMPACTS OF CONSTRUCTION ON ENVIRONMENTAL VALUES**

6.1 **BIRDS**
Potential impacts on birds include the following:
- Alteration of bird habitat and feeding grounds.
- Disturbing breeding birds, particularly burrow-nesting species.
- Reducing populations of birds on the island.
- Impacting specially protected bird species.
- Damaging burrow-nest sites.
- Potential injury, disorientation or death associated with lighting and collision with equipment and infrastructure.
- Attracting birds to poorly contained rubbish.
- Attraction of birds to vessels associated with the construction.

6.2 **AUSTRALIAN SEA LIONS AND SKINKS**
Impacts on Australian Sea Lions and the skinks of Long Island may include the following:
- Increased presence of humans at Long Island may disturb any Australian Sea Lions attempting to use the island as a haul-out area.
- In addition to disturbance of Sea Lions, there is potential for construction workers to be injured through interaction with Sea Lions.
- During construction there is potential for habitat of the skink to be trampled.

6.3 **NUISANCE SPECIES AND VERMIN**
- Vermin may be introduced during construction phase and may eat bird eggs or chicks leading to reduction in bird numbers on Long Island.
- Development of nuisance species due to additional food supply and inappropriate waste storage (e.g. such as Silver Gulls).

6.4 **VEGETATION AND RARE FLORA**
Activities associated with the construction of the resort have the potential to cause:
- Temporary or permanent loss of native vegetation that may result in the loss of potential rare flora species.
• Increased wind erosion due to clearing of vegetation and wearing of paths during construction.
• Degradation of seabird nesting habitat through removal of vegetation and trampling.
• Trampling of vegetation during construction.
• Weed introduction by construction workers and equipment.
• Loss of vegetation through fire.

6.5 **MARINE ENVIRONMENT**

• Disturbance or loss of benthic primary producer habitats including corals.
• Generation of turbidity and suspended solids by boat propellers and marine construction activities.
• Accidental boat wastewater/bilge discharge or minor fuel spill.
• Potential for construction-associated vessels to transport introduced marine pests to the waters of Long Island.

6.6 **LANDFORMS AND TIDAL PONDS**

• Over-exploitation of the sandy beaches.
• Potential to increase erosion of the island.
• Compaction of soil and damage to the soil structure.
• Degradation of tidal ponds.
• Disruption to elevated areas potentially associated with *Batavia* mutineer hangings.
7. MANAGEMENT STRATEGIES

7.1 HERITAGE VALUES

The following procedures will be adopted by construction workers:

- Read the Heritage Management Plan, which will be available before the commencement of construction activities.
- During any construction work that involves excavation or laying of foundations, a qualified archaeologist will be on site on a watching brief. The archaeologist shall ensure that any relics disturbed by construction are recorded and recovered following correct protocols and procedures.
- Do not remove any potential artefacts found during construction. Leave them where they are and mark out the area. Make a GPS record of site and report them to the site archaeologist (if present) or Construction Supervisor.
- Do not traverse the unsurveyed southern area of Long Island (south of the helipad and jetty) to avoid damage to potential heritage areas (e.g. executions site). Remain on the formalised access pathways at all times.

7.2 ENVIRONMENTAL VALUES

7.2.1 Birds

The following procedures will be adopted by construction workers with respect to birds:

- An Avifauna specialist will be on site during critical periods of construction to provide advice on bird issues. Queries on birds during other periods should be referred to the Construction Supervisor who will contact the Avifauna specialist if needed.
- Minimise clearing of vegetation and avoid marked nesting sites where possible.
- Injured birds unable to be treated on site will be stored in well-ventilated, darkened boxes and returned to the mainland to an appropriate wildlife caring facility.
- Reports must be kept detailing the fate of disturbed avifauna.
- Notify the Construction Supervisor when construction activities will take place in sandy nesting areas to allow qualified personnel to be brought to site to monitor construction activities.
- All personnel will follow the advice of the avifauna expert with respect to approaching or otherwise impacting on birds or their habitats. Whenever possible, personnel will not approach or otherwise disturb birds.
- Personnel will not be permitted to feed the birds. All food scraps will be packaged and removed from the island for disposal on the mainland according to the Solid Waste Management Procedure.
- Do not enter exclusion zones around Tidal Pond 504 and other sensitive areas.
• Walk only along designated access ways and boardwalks, avoid unnecessary impact to nesting areas.
• Contractors operating fishing vessels will be inducted in methods to avoid capture of seabirds with baited hooks.
• Minimise noise emissions at all times.
• Ensure acoustic insulation has been used to reduce noise levels associated with generators and noise reducing mufflers on the Manitou.
• No personnel will reside on Long Island during the construction phase and will return to rock lobster fisher accommodation or boats at the end of each day.
• The Manitou will be the only vehicle used on the island during construction and will be required at all times to follow a designated path that has been previously checked for signs of bird breeding.
• The Construction Supervisor will undertake daily or weekly inspections as required to ensure bird breeding areas are being avoided, noise levels are not impacting on birds and silver gull populations are not concentrated around construction sites. Implement changes or remediation as required.

7.2.2 Australian Sea Lions and Skinks

• When working in the vicinity of the haul-out area, maintain a minimum 10 metre distance from Sea Lions at all times. If this is not possible, attempt to time construction when sea lions are not present.
• Move away calmly and immediately if a sea lion approaches.
• Do not walk between the Sea Lion(s) and the water.
• Do not feed the Sea Lion(s).
• Any interaction with sea lions occurring during the construction phase shall be reported immediately to the Construction Supervisor.
• Avoid known nesting areas of the skink where possible.

7.2.3 Nuisance Species and Vermin

• Construction workers must all read the Vermin/Pest Management Plan, which will be developed prior to construction commencing.
• All suppliers, boat skippers and contractors must carry out vermin inspections and provide a completed checklist guaranteeing vermin free delivery to the Construction Supervisor.
• Workers will check all materials, vehicles, machinery, tools and boats used during the construction phase for vermin presence and complete the relevant checklist prior to leaving Geraldton. This will be done in consultation with the Construction Supervisor and through the setting of flour trays and baited traps to detect the activity of rodents. Spraying for insect pests will be conducted in the Broadwater quarantine facility.
- Workers will conduct visual inspections, looking for droppings or nesting materials.
- Suppliers bringing in materials will inspect and sign-off on their supplies being free of vermin at time of delivery.
- All boat owners/skippers will periodically complete thorough checks of their vessels and supply a written guarantee that their vessel is free of vermin/pests. This will include the need for vessel owners to conduct periodic trapping and visual inspections for signs of vermin on a regular basis.
- If vermin are sighted during construction phase, report sighting to the Construction Supervisor and follow procedure for immediate removal. Investigate the cause of vermin occurrence and implement corrective actions to prevent reoccurrence.
- If vermin are identified on the island or supply areas on the mainland the Construction Supervisor will engage an appropriately licensed pest control professional to eradicate the vermin/pest.
- Personnel will not be permitted to feed the birds. All food scraps and wastes will be packaged and removed from the island for disposal on the mainland according to the Solid Waste Management Procedure. Freshwater sources must not be left open on the island, as these will attract nuisance species.

7.2.4 Vegetation and Rare Flora Management

- The Construction Supervisor will carry out an inspection prior to site establishment commences and record the location of all individual *Lepidium puberulum* with a GPS and tag individuals. All workers must be able to recognise *Lepidium puberulum* (see Plate 1).
- At all times, adhere to designated access ways, infrastructure alignments, clearing areas and exclusion zones.
- An environmentally trained consultant will visit Long Island prior to commencement of construction to identify and mark individuals of the rare flora species *Lepidium puberulum* within the development zone. These plants must be avoided wherever possible and impacts minimised.
- Check in the Construction map and Constraints map to confirm the proposed area of land to be cleared is within an approved area and will not unacceptably impact on any sensitive or restricted areas.
- Attend a pre-start meeting to discuss any environmental conditions on the access, area to be cleared, method to be used and location of topsoil and vegetation stockpiles with all persons involved in the earthworks and construction.
- Discuss any environmental conditions on the clearing, area to be cleared, method to be used and location of topsoil and vegetation stockpiles with all persons involved in the earthworks (at the pre-start meeting prior to commencing earthworks). Provide a copy of the approvals to the earthworks supervisor.
- The Construction Supervisor will undertake weekly inspections during the project works to ensure conditions are being complied with.
7.2.5 Weed Management
To prevent further introductions and spread of weeds on Long Island, the following procedures will be implemented:

- All workers/contractors will complete and submit to the Construction Supervisor a copy of a vehicle and machinery hygiene checklist prior to vehicles or equipment entering or leaving Long Island.
- All workers are to ensure shoes/feet and clothing is free of seeds or other plant material prior to entering or leaving Long Island.
- Report sightings of any new or suspected weed species to the Construction Supervisor, who will follow procedures in Table 11 of the CMP to manage a new weed occurrence.
- Construction Supervisor will conduct weed inspections during spring (nominally October) to report date and location of any weeds and actions taken to eradicate weeds.

7.2.6 Marine Environment
Procedures to minimise impacts on the marine environment are as follows:

- Boats must only be anchored in designated areas over sandy bottom.
- Boats must not anchor on the *Batavia* or any identified wreck site.
- Boats used during construction phase will not discard any solid waste overboard, including food and fish offal.
- Construction vessels will only discharge sewage in areas of the Fish Habitat Protection Area that have satisfactory dilution factors and not within close proximity to any islands.
- No vessels will purge bilge water within the surrounds of Long Island to prevent possible introduction of marine pests. Where possible, all vessels will empty bilge water in the open ocean.
- Relevant personnel will be trained on the prevention and handling of sullage spills into the water from boats during the construction phase.
- Only appropriate sealed containers to be used to transport all dangerous waste and fuel to and from the island.
- Minimise impact to benthic habitats by constructing jetty, helipad and swimming platforms on the mainland and on floating barges as much as possible.
- Where possible, avoid areas of live coral during construction of jetty pylons, helipad anchors, swimming platforms, intake/outlet pipes and moorings. Situate over non-vegetated areas of sand and coral rubble habitat as far as possible.
- All personnel will be briefed by the Construction Supervisor on the prevention and handling of small fuel spills during the construction phase. Spill kits will be available at appropriate locations on jetty and services area.
- Follow advised techniques so as to minimise turbidity and total suspended solid loads produced during underwater construction activities.
- Workers will not be permitted to fish from the shores of Long Island.
7.2.7 Landforms and Tidal Ponds

Procedures to minimise impacts on the island environment are as follows:

- Access paths and other marked out fixed routes are to be strictly adhered by personnel and Manitou operators during construction to minimise erosion and compaction.
- Do not enter any area that is marked off for no entry without authority of the Construction Supervisor.
- Ensure that beach access is restricted to designated areas to minimise erosion.
- Holes and trenches are to have topsoil material removed and stockpiled separately during any excavation in approved locations (see Construction Map attached to CMP) for foundations and pipes.
- On completion of work, the holes and trenches are to be backfilled as required and shaped to conform to the natural topography. Stockpiled topsoil material is to be spread over the final surface.
- Disposal of excavated material will be in the area designated on the Construction Map.
- Do not proceed within exclusion zones surrounding all tidal ponds.
- The southern section of the island will be off-limits to all personnel to prevent disturbance of possible heritage sites.
- Ensure that regular inspections are undertaken to monitor impacts of construction activities on the landforms, soils and tidal ponds in the development area and on/around access paths.

7.2.8 Fire

Procedures to minimise impacts of fire on the island environment are as follows:

- All workers to familiarise themselves with:
  - Marshalling areas;
  - How to raise the alarm; and
  - The location and use of fire-fighting equipment.
- Cigarette smoking during construction will only be permitted in the designated area for personnel work breaks. The smoking area will be provided with a fire extinguisher.
- Where hot work will be undertaken i.e. welding and grinding, extinguishers must be present at all times.
- Where possible, higher risk activities, such as welding, must be undertaken during the cooler periods of the day using appropriate guards and not during periods of high winds.
- Personnel must understand the correct handling and transportation of flammable materials during construction phase. Storage and use of flammable materials (e.g. fuels and oils) to be in accordance with Australian Standard (AS) 1940-1993 - The Storage and Handling of Flammable and Combustible Liquids.
7.3 POLLUTION

7.3.1 Air Emissions
To minimise air emissions, appropriate staff must ensure vehicles and power generating equipment are regularly maintained and serviced to manufacturer’s specifications, minimising exhaust emissions.

7.3.2 Dust
The production of dust is a possibility when construction takes place on sandy areas or during the pulverising of coral rubble. Measures to minimise dust are:

- Workers must minimise disturbance of vegetation.
- Workers must adhere to defined and marked access paths between construction areas.
- Avoid sandy areas other than when constructing foundations.
- Visually monitor dust levels during construction and initiate appropriate dust suppression techniques when required.
- Construction Supervisor to conduct regular inspections of the project site to ensure dust generation from exposed areas is not excessive.

7.3.3 Noise Pollution
Noise will primarily affect the fauna of the island. To minimise noise impacts, workers will implement the following:

- Ensure all vehicles and generators are fitted with noise reducing mufflers and are regularly maintained.
- Ensure generators are based in sound proof containers with acoustic insulation to reduce noise levels.
- Liaise with the site avifauna expert to avoid major impacts on breeding birds and to minimise impact of noise on breeding behaviour.

7.3.4 Lighting Pollution
Lighting has the potential to disorientate birds, causing them to collide with objects and cause injuries or fatalities. Lighting must be minimised wherever possible:

- Minimise construction activities to take place at night.
- No construction activities will take place at night, and no lights will be on the island at night.
- When on vessels at night, ensure all lighting, apart from navigation lighting is extinguished.
7.3.5 Waste Disposal

Inappropriate waste disposal may have impacts on marine and island fauna and also human health issues. Methods to reduce waste-related impacts are as follows:

- Remove unnecessary packaging on the mainland prior to transport to site.
- Use large covered bins or skips (with lids) to store solid wastes prior to removal from the Island. Bins will be divided into recyclable and non-recyclable materials.
- Food waste is to be disposed of immediately into bins with attached lids ensuring that it is contained.
- Store hazardous wastes, as described in the hazardous wastes procedure, in appropriate nominated containers for transport to the mainland.
- The Construction Supervisor will inspect the construction site and waste disposal areas weekly to ensure waste management objectives are being met, initiate any necessary remediation of waste disposal problems.
- Do not leave any waste on the island, including cigarette butts and organic waste.
- Always use the portable toilets supplied.
- Do not dump any solid wastes overboard from boats.
- Workers shall understand the use of spill kits that will be provided on board all fuel-transferring boats and on the jetty (once constructed).

7.3.6 Dangerous and Hazardous Substances and Spill Response

There are a number of impacts that can result from the storage and handling of dangerous and hazardous substances such as pollution of the marine or island environment. The following will be implemented to prevent this occurring:

- Facilities to be used for any hazardous materials include:
  1. Bunded/contained stores and supply system.
  2. Used filter and rag drums or bins. Use these for disposal of oily rags and filters.
  3. Waste oil tank for recycling. Dispose of all used oils in this tank.
- All contractors using and storing hazardous materials on the construction site shall submit to the Construction Supervisor the contractor’s hazardous materials management plan. The plan shall include:
  1. List of all materials required on site.
  2. Relevant licences for storage.
  3. Appropriate containers for storage (e.g. self bunded containers or procedure to construct bunding).
- Disposal of batteries must not be in regular solid waste bins. Used batteries must be transported separately to the mainland with battery acid intact for disposal or recycling at an appropriate location in Geraldton.
Only store hazardous materials, such as fuel and oils in the sites identified on the construction map.

Maintain a record of dangerous substances in the site’s Hazardous Materials Register. Keep records of all deliveries and usage of chemicals and fuels. Keep material safety data sheets easily accessible.

All staff will undergo training in the use of spill kits. In the event of a spill:

- Control - stop the spill/leak at the source.
- Contain - barricade/bund spill to immediate area.
- Clean up - remove free liquid, dispose of contaminated absorbents and treat contaminated soil/water.
- Replace - restock spill kit used.
- Report - notify Construction Supervisor as soon as possible.

Ensure all chemicals on site are stored according to the Australian Dangerous Goods segregation requirements.

The Construction Supervisor will conduct fortnightly inspections of the storage facilities to ensure all materials are stored in the appropriate locations and bunds are intact.
8. **ENVIRONMENTAL INCIDENTS AND REPORTING**

8.1 **POTENTIAL INCIDENTS**

Despite best efforts to develop procedures to mitigate or avoid adverse impacts, there is a risk of incidents occurring during the construction phase. These incidents are those that would require immediate response/reporting, and may include:

- Seabird adult or egg injury or death.
- Adverse interaction with sea lions.
- Damage/discovery of heritage artefacts.
- Accidental damage/unauthorised clearing of rare flora *Lepidium puberulum*.
- Land or marine spills of hazardous materials.
- Fire.
- Introduction of vermin.
- Unapproved discharge of water/liquid/waste to the environment.
- Excessive dust emissions.
- Noticeable gathering of birds (particularly silver gulls) to the construction site.

8.2 **REPORTING**

Environmental reports will be submitted to the Construction Supervisor in the event of the following:

- Near miss environmental incident.
- Fauna injury/death/interaction.
- Unintentional damage/removal of *Lepidium puberulum*.
- Spills over 1 litre of dangerous substances will be recorded in a logbook. The Construction Supervisor will determine the significance of the spill and whether reporting to Authorities such as the EPA is necessary.
- Artefact discovery/damage.
- Fire.
- Occurrence of vermin (insects, rats, mice etc).

Reports will be made in writing within three days of the incident and must include at a minimum:

- The date of the occurrence.
- The nature of the incident.
- The outcome of the incident.
- Remedial action taken if appropriate.
- Procedures put in place by Construction Supervisor to prevent re-occurrence of a similar incident.

The Construction Supervisor will keep a copy of all incident reports on file and forward a copy to the lead environmental consultants. The lead environmental consultants will determine whether the incident warrants reporting to the Environmental Protection Authority or Department of Fisheries and will assist in providing advice on the procedures adopted to prevent re-occurrence.
APPENDIX 3

Construction Schedule
| ID | Task Name                              | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 |
|----|----------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1  | Government approval to proceed - pending|        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 2  | DESIGN AND DOCUMENTATION                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|    | - Infrastructure                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 3  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 4  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 5  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 6  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 7  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 8  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 9  |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 10 |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 11 | SITE ESTABLISHMENT                     |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|    | - Transport                            |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 12 |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 13 |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 14 | MAINLAND CONSTRUCTION                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|    | - Prefabrication                       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 15 |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 16 | ISLAND CONSTRUCTION                    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|    | - Helipad                              |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 17 |                                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 18 | - Wharf                                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 19 | - Compound                             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 20 | - Staff Accommodation                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 21 | - Guest Lodges                         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 22 | - Function Room/Restaurant/Reception   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 23 | - Day Visitors Facility                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 24 | - Board Walk / Gazebos                 |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 25 | - Power Supply                         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 26 | - Water Supply                         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 27 | - Solid Waste & Water Disposal         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 28 | - Swimming Pool                        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 29 | COMMISSIONING                          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 30 | - Signage                              |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 31 | - Rehabilitation                       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 32 | - Demobilisation from site             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 33 | FINAL DOCUMENTATION                    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 34 | MAINTENANCE (12 months)                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |

File name: 05-015 Abrolhos Schedule  Page 1 of 2  Revision Date: Wed 1/03/06  Revision No.: 1
APPENDIX 4

Manitou All Terrain 4WD Telescopic Handler Specification Data
MT 1340 SLT & SLT ULTRA

- Maximum lifting height: 13 m
- Capacity: 4000 kg
- Maximum forward reach: 9.35 m
- Torque converter
- Hydraulic stabilizers
- Frame levelling
MT 1340 SLT/SLT ULTRA

Lifting capacity: 4000 kg at 500 mm from forks heels.
Tipping load at maximum reach: 1740 kg.
Tear out force with bucket to ISO 8313: 7000 daN.

Lifting height: 13 m
Times: unladen/loaded (in s)
Lifting: 11.8/12.3
Lowering: 8.4/7.9
Simultaneous extension 1st and 2nd booms: 17/17
Simultaneous retraction 1st and 2nd booms: 14/13.5
Time unladen (in s): 4.75
Dumper: 4.20

Tyres
440/80-24 T37 158B

Forks (mm)
Length: 1200
Width x thickness: 125 X 50
Maximum distance between forks: 1040
Carrage rotation: 124°

Multidisc brakes - hydraulically assisted on both axles

PERKINS Engine
Type: 1104C.44 Turbo
Capacity: 4 cylinders - 4400 cm³
Power (ISO/TR 14396): 100 HP/74.5 kW at 2200 rpm
Maximum torque: 412 Nm at 1400 rpm
Direct Injection
Water Cooling

Transmission: Torque converter
Electro-hydraulic reversing shift
4 speeds forward and reverse
Maximum travel speed: 25 km/h

Hydraulics
Lifting/lifting pump
Gear type: 260 bars/166 l/min
Flow divider with priority to steering and brakes

Capacities
Cooling system: 18.5 l
Engine oil: 11 l
Hydraulic oil: 126 l
Transmission oil: 16 l
Fuel tank: 135 l

Weight unladen (with forks): 11180 kg
Overall width: 2.43 m
Overall height: 2.59 m
Turning radius (outside wheels): 4.15 m
Overall length: 5.96 m
Ground clearance: 0.50 m
Drawbar pull: 9400 daN

Reach at maximum height: 1.79 m

Under EN 1459
annexe B

MANITOU B.S.A.
BP249 - 44158 ANGENIS CEDEX - FRANCE
TEL: 33 2 40 09 10 11
EXPORT DEPARTMENT FAX: 33 2 40 09 10 97
www.manitou.com

Measures taken in accordance with EC Directives.

ISO 9001:

CE
APPENDIX 5

Activities and Procedures Matrix
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<tr>
<th>Activity/Task/Service</th>
<th>Heritage</th>
<th>Avifauna</th>
<th>Non-bird fauna</th>
<th>Vermin</th>
<th>Vegetation and clearing</th>
<th>Weed prevention</th>
<th>Marine</th>
<th>Land forms and tidal ponds</th>
<th>Fire</th>
<th>Air Emission</th>
<th>Dust</th>
<th>Noise</th>
<th>Lighting</th>
<th>Waste</th>
<th>Handling hazardous materials</th>
<th>Storage of hazardous materials</th>
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<td>Hot work (grinding etc)</td>
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**Construction Activities and Procedures**

**PROCEDURES**
APPENDIX 6

Regulatory and Policy Framework
## Regulatory and Policy Framework

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Title</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commonwealth Legislation</td>
<td>Environmental Protection and Biodiversity Conservation Act 1999</td>
<td>Protects the environment with regard to matters of National Environmental Significance. The proposed tourist resort on Long Island is subject to approval under the Act. Historic shipwreck areas of the Wallabi Group of the Abrolhos have been proposed for inclusion on the National Heritage List under the EPBC Act 1999.</td>
</tr>
<tr>
<td></td>
<td>Australian Heritage Council Act 2003</td>
<td>Establishes the Australian Heritage Council, its roles and responsibilities and matters relating to the Register of National Estate. The Abrolhos Islands are listed on the Register of the National Estate.</td>
</tr>
<tr>
<td></td>
<td>Commonwealth Historic Shipwrecks Act 1976</td>
<td>Provides for the protection of historic shipwrecks and all associated artefacts that have either been Gazetted by the Minister or are mentioned in Schedule 2 of the Act or Article 1 of the Agreement between Australia and the Netherlands Concerning Old Dutch Shipwrecks. Both the Hadda and the Batavia wrecks and associated relics are protected by this Act.</td>
</tr>
<tr>
<td></td>
<td>Protection of Movable Cultural Heritage Act 1986</td>
<td>Provides for the protection of objects that are of importance to Australia, or to a particular part of Australia, for ethnological, archaeological, historical, literary, artistic, scientific or technological reasons.</td>
</tr>
<tr>
<td>Western Australian Legislation</td>
<td>Environmental Protection Act 1986</td>
<td>The proposed Long Island tourism development is being assessed under Part V of the Act. Makes provisions for the prevention, control and extinguishment of bush fires and for diminishing the dangers from bush fires. Under section 28 of the Act the occupier of the land is responsible for extinguishing any bush fires that occur on their land.</td>
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<td></td>
<td>Bush Fires Act 1954</td>
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<td></td>
<td>Conservation and Land Management Act 1984</td>
<td>Established the Department of Conservation and Land Management (CALM), which is responsible for administering the Wildlife Conservation Act 1950 and Regulations 1980.</td>
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<td></td>
<td>Conservation and Land Management Regulations Act 1980</td>
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<tr>
<td>Jurisdiction</td>
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<td>Applicability</td>
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<tr>
<td>Explosives and Dangerous Goods Act 1961</td>
<td>Provides guidance and regulations for the safe handling and storage of dangerous goods.</td>
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<tr>
<td>Explosives and Dangerous Goods (Handling and Storage of Dangerous Goods) Regulations 1992</td>
<td>Provides guidance and regulations for the safe handling and storage of dangerous goods.</td>
<td></td>
</tr>
<tr>
<td>Fish Resources Management Act 1994</td>
<td>Provides for the management of fish resources. Provides for management and regulation of the Abrolhos Islands reserve and for the establishment and management of Fish Habitat Protection Areas.</td>
<td></td>
</tr>
<tr>
<td>Heritage Act 1990</td>
<td>Established the Heritage Council of Western Australia. Encourages and provides for the protection and conservation of places that have significant cultural heritage value to the State.</td>
<td></td>
</tr>
<tr>
<td>Health Act 1911</td>
<td>Provides for the management and regulation of Public Health including sanitation, water supply, restaurants/eating houses, food and drugs.</td>
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<tr>
<td>Land Administration Act 1997</td>
<td>Under the Act the Minister may amend the area or purpose of a Class A Reserve, subject to the provisions of the Act.</td>
<td></td>
</tr>
<tr>
<td>Occupational Health and Safety Act 1984</td>
<td>Sets out the duties and responsibilities of employers and personnel and allows for the regulation and management of occupational health and safety in the workplace.</td>
<td></td>
</tr>
<tr>
<td>Maritime Archaeology Act 1973</td>
<td>Provides for the protection and preservation of shipwrecks and all associated relics lost prior to 1900. Both the Hadda and the Batavia wrecks and relics are protected under this Act.</td>
<td></td>
</tr>
<tr>
<td>Museum Act 1969</td>
<td>Provides for the management of the WA Museum and the preservation of areas and objects of historic interest.</td>
<td></td>
</tr>
<tr>
<td>Wildlife Conservation Act 1950</td>
<td>Applies to the protection of wildlife in Western Australia. Within the Abrolhos this primarily relates to the native flora and fauna including seabirds, marine mammals and reptiles.</td>
<td></td>
</tr>
<tr>
<td>Western Australian Policies and Guidelines</td>
<td>Hope for the Future: The Western Australian State Sustainability Strategy (September 2003).</td>
<td>Illustrates how the State government will respond to the sustainability agenda, outlines the sustainability framework and gives an action plan for sustainability.</td>
</tr>
<tr>
<td>Jurisdiction</td>
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<td>Applicability</td>
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<tr>
<td>EPA Guidance</td>
<td>Environmental Protection of Native Vegetation in Western Australia....</td>
<td>Applies to all proposals to clear native vegetation in Western Australia and aims to protect biodiversity. Key criteria applied include:</td>
</tr>
<tr>
<td>Statements</td>
<td>EPA Position Statement No. 2 (December 2000).</td>
<td>The ‘threshold level’ below which species loss appears to accelerate exponentially at the ecosystem level is regarded as being at the level of 30 percent of the pre-clearing extent of the vegetation type. A level of ten percent of the original extent is regarded as being a level representing ‘endangered’ and should be avoided.</td>
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<tr>
<td></td>
<td>Terrestrial Biological Surveys as an Element of Biodiversity Protection.</td>
<td>Highlights the significance of biodiversity and the need to implement best practice in terrestrial biological surveys.</td>
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<td></td>
<td>EPA Position Statement No. 3 (March 2002).</td>
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<tr>
<td></td>
<td>Towards Sustainability. EPA Position Statement No. 6 (August 2004).</td>
<td>Applies to all proposals. It discusses the concept of sustainability and draws attention to a range of global issues. Discusses sustainability in a number of sectors including natural resource management, transport and sustainable communities.</td>
</tr>
<tr>
<td></td>
<td>Principles of Environmental Protection. EPA Position Statement No. 7 (August 2004).</td>
<td>Applies to all proposals. It discusses the principles of intergenerational equity, the precautionary principle, environmental, economic and social considerations, conservation of biological diversity and ecological integrity.</td>
</tr>
<tr>
<td>EPA Guidance</td>
<td>Draft Environmental Guidance for Planning and Development. EPA Draft Guidance Statement No. 33 (June 2005).</td>
<td>Provides information and advice on the environmental protection and impact assessment processes in the State to assist land use planning and development. Also provides advice on a range of environmental factors to assist in participants in land use planning and development to protect, conserve and enhance the environment.</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>Title</td>
<td>Applicability</td>
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<tr>
<td>Benthic Primary Producer</td>
<td>Protection for Western Australia’s Marine Environment. EPA Guidance</td>
<td>Provides guidance for the protection and maintenance of ecosystem integrity by applying a risk-based environmental protection framework. This includes quantitative cumulative loss thresholds and is linked to the ecological, conservation and social values of the environment.</td>
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<tr>
<td>Title</td>
<td>Statement No. 29 (June 2004).</td>
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<tr>
<td>Guidance Statement for</td>
<td>Management of Mosquitoes by Land Developers. EPA Guidance Statement</td>
<td>Provides guidance for the management of mosquitoes.</td>
</tr>
<tr>
<td>Title</td>
<td>No. 40 (June 2000).</td>
<td></td>
</tr>
<tr>
<td>Terrestrial Flora and</td>
<td>Surveys for Environmental Impact Assessment in Western Australia.</td>
<td>Provides advice on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia’s terrestrial flora and vegetation and their ecosystems.</td>
</tr>
<tr>
<td>Vegetation Surveys</td>
<td>EPA Guidance Statement No. 51 (June 2004).</td>
<td></td>
</tr>
<tr>
<td>Terrestrial Fauna Surveys</td>
<td>for Environmental Impact Assessment in Western Australia. EPA</td>
<td>Provides advice on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia’s terrestrial fauna biodiversity, its habitats and ecosystems.</td>
</tr>
<tr>
<td>Terrestrial Fauna Surveys</td>
<td>Guidance Statement No. 56 (June 2004).</td>
<td></td>
</tr>
<tr>
<td>Implementing Best Practice</td>
<td>in Proposals Submitted to the Environmental Impact Assessment</td>
<td>Provides guidance on what the EPA means by the term ‘best practice’ when used in the EIA process.</td>
</tr>
<tr>
<td>Abrolhos Islands Policies</td>
<td>Management of the Houtman Abrolhos System. Fisheries Management</td>
<td>Outlines the proposed management strategies for the Abrolhos Islands including fisheries management, recreational management and tourism management.</td>
</tr>
<tr>
<td>and Guidelines</td>
<td>Paper No. 117 (Fisheries WA, December 1998).</td>
<td></td>
</tr>
<tr>
<td>Sustainable Tourism Plan for</td>
<td>the Houtman Abrolhos Islands. Fisheries Management Paper No. 146</td>
<td>Outlines the management strategies and proposed directions for tourism development in the Abrolhos Islands.</td>
</tr>
<tr>
<td>Abrolhos</td>
<td>(Fisheries WA, February 2001).</td>
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