Long Island Tourism Development,
Houtman-Abrolhos Islands

Humfrey Land Developments Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 1250
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<table>
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<th>Date</th>
<th>Progress stages</th>
<th>Time (weeks)</th>
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Summary and recommendations

This report provides the Environmental Protection Authority’s (EPA’s) advice and recommendations to the Minister for the Environment on the proposal by Humfrey Land Developments Pty Ltd to develop a tourism resort on Long Island, part of the Wallabi Group, Houtman-Abrolhos Islands (herein referred to as the Abrolhos).

Section 44 of the Environmental Protection Act 1986 (EP Act) requires the EPA to report to the Minister for the Environment on the outcome of its assessment of a proposal. The report must set out:
- The key environmental factors identified in the course of the assessment; and
- The EPA’s recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:
(a) Terrestrial Biodiversity – Vegetation;
(b) Terrestrial Biodiversity – Avifauna;
(c) Terrestrial Biodiversity – Tidal Ponds;
(d) Marine Biodiversity; and
(e) European Heritage.

The following principles were considered by the EPA in relation to the proposal:
(a) The principle of intergenerational equity;
(b) The principle of the conservation of biological diversity and ecological integrity; and
(c) The principle of waste minimisation.

Conclusion

The EPA has considered the proposal by Humfrey Land Developments Pty Ltd to develop a tourism resort on Long Island.

Long Island is a significant seabird site for breeding and resting/feeding within the Abrolhos. It is used by a number of migratory species, including some protected by international treaties. Various surveys have recorded a total of 28 species of avifauna on Long Island, including one Priority Species and 12 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Listed Migratory Species. Of these, 14 species are recorded as breeding on Long Island, including six EPBC Act Listed
Migratory Species. Long Island is believed to particularly important for six species. These species are: White-faced Storm-Petrel, Pacific Gull, Silver Gull, Pied Oystercatcher, Crested Tern and Bridled Tern. The Bridled Tern is also listed under two international migratory bird agreements.

The proposal is likely to impact both in the short and long term on the values of Long Island as a significant breeding habitat. However there remains other important breeding populations of the affected species within the Wallabi Group including nearby Beacon and West Wallabi Islands such that it is considered that the proposal will not impact significantly on populations in the long term. It is the EPA’s view that the proposal can be managed to meet the EPA’s objective provided that the proponent implements adequate visitor management, avifauna-friendly lighting, restricts noise and aircraft appropriately, prevents the introduction of exotic species and monitors the impact on avifauna breeding. These together with adaptive management practices if impacts are detected, are recommended to form elements of the conditions for the Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP).

The vegetation communities of Long Island are not unique and are found elsewhere in the Abrolhos and the coastal mainland. A priority 4 species L. puberulum is likely to be impacted by the proposal however, it is found on other islands within the Wallabi Group and the Easter Group, as well as on other islands along the WA coast. The design of the proposal to include boardwalks will limit the initial impacts of construction and the longer term impacts on vegetation from visitors. Provided the proponent takes all practicable measures to avoid the Priority 4 species, through surveys and appropriate location of boardwalks and infrastructure, in addition to weed prevention/eradication measures, the impacts on the vegetation can be managed.

There are seven tidal ponds on Long Island which support a number of species of molluscs. The proponent indicates that no unique species have been found in the ponds however one species is likely to represent a range extension. For this species, the sediment layer in the pond is considered to be of importance, particularly the fact that it does not dry out at low tide as occurs in other ponds. All infrastructure associated with the development will avoid the tidal ponds, although the main development will surround Tidal Pond 504 and will be adjacent to Tidal Pond 503. The proposal to introduce seawater to Tidal Pond 504 during times of neap tide and low wind to address odour concerns in the resort has the potential to impact the fauna of the pond. The EPA supports the tidal ponds being within an exclusion zone and has recommended the OEMP ensures that the addition of seawater to Tidal Pond 504 is undertaken in a manner which does not disturb the sediments.

The proposal has the potential to impact Benthic Primary Producer Habitat (BPPH), mainly corals, during construction of the jetty, helipad, snorkelling platforms, and wastewater outfall. Ongoing impacts to the BPPH include the wastewater discharges and tourist activities (i.e. snorkelling, SCUBA diving, anchoring). The proponent has conservatively estimated the impacts of the development on the BPPH at approximately 0.49 ha (or 0.01 % of the 50 km² Management Unit) which is below the Cumulative Loss Threshold of 2 % recommended by the EPA. However, the EPA has recommended that further definition of the route of the marine discharge pipelines
and construction methodology needs to be provided in order to ensure construction impacts on BPPH are minimised.

The EPA notes the very low discharge rate of the wastewater outfall and the strong currents in Goss Passage which is likely to ensure that the discharge is well dispersed within 30 metres of the outfall. The proponent intends to manage the proposal in accordance with the State Water Quality Management Strategy. The EPA recommends that an E4 Low Level of Ecological Protection for nutrients and toxicants be assigned to the area within 30 metres of the marine outfall beyond which the E2 High Level of Ecological Protection will apply. The EPA considers that an appropriate monitoring program for water quality and environmental quality indicators is particularly important for this development, especially to ensure that the wastewater outfall discharges meet the E2 and E4 levels of ecological protection.

Long Island has a high heritage value both nationally and internationally through its association with the Batavia shipwreck and mutiny.

The proposed development has the potential to impact Batavia related sites or relics on Long Island during construction and through visitation to other islands. The proponent has undertaken appropriate surveys however, construction activities in particular have the potential to unearth additional relics. The proponent has committed to having a qualified archaeologist on site during major construction activities to ensure that any relics disturbed are recorded and recovered in an appropriate manner.

The EPA notes the gazettal of the Batavia Shipwreck Site and Survivors Camp Area under the EPBC Act as a place on the National Heritage List. The EPA has been advised that the Department of Fisheries (DoF) in cooperation with the WA Maritime Museum (WAMM) proposes to develop management plans and public information for the protection of historic shipwrecks, associated land sites and other sites of heritage value. It is recommended that the proponent’s heritage management initiatives must be to the satisfaction of the WAMM to ensure they are consistent with this overall management strategy for the larger Batavia Shipwreck Site and Survivors Camp Area.

The EPA has provided other advice in relation to the conservation of fauna and flora on the Abrolhos. The EPA supports the DoF (2007) proposed management strategy for the protection of fauna and flora on the Abrolhos and recommends that it identifies those islands that have significant fauna and flora value, and that those islands be managed primarily for their conservation value. Consequently, future tourism development that leads to significant increases in habitation should not occur on those islands that have been identified to have conservation value.

The EPA has concluded that the proposal is capable of being managed to meet its objectives, provided that there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4.1.
Recommendations
The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for a tourism development on Long Island, Wallabi Group, Houtman-Abrolhos Islands, consisting of visitor lodges, staff accommodation, communal facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities.;

2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;

3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA’s objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and

4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions
Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Humfrey Land Developments Pty Ltd to develop a tourism resort on Long Island is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) That the proponent prepare and implement a Construction Environmental Management Plan; and

(b) That the proponent prepare and implement an Operational Environmental Management Plan.
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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the key environmental factors and principles for the proposal by Humfrey Land Developments Pty Ltd to develop a tourism resort on Long Island, part of the Wallabi Group, Abrolhos. The Abrolhos are located approximately 70 km northwest of Geraldton, Western Australia.

The proposal was referred to the EPA by the proponent’s consultants on 29 March 2005 and the EPA subsequently set the Level of Assessment at Public Environmental Review (PER) on 18 April 2005. The PER was released for a public review period of six weeks on 31 July 2006, ending on 11 September 2006.

The waters and islands of the Abrolhos are a Class A Reserve (A20253), vested in the WA Minister for Fisheries and managed by the WA Department of Fisheries (DoF), for the conservation of flora and fauna, for tourism, and for purposes associated with fishing industries. The State Territorial Waters of the Abrolhos are a gazetted Fish Habitat Protection Area under the Fish Resources Management Act 1994. The Register of the National Estate includes several listings for the Abrolhos including the ‘Houtman Abrolhos Islands Reserve’ which recognises the significance of the shipwrecks in the area, the importance of the marine environment and avifauna. In 2006 an area of the Wallabi Group (including Long Island) was gazetted for inclusion on the National Heritage List under the ‘Batavia Shipwreck Site and Survivor Camps Area 1629 – Houtman Abrolhos’.

The proposal is a “Controlled Action” under the provisions of the EPBC Act in relation to National Heritage, Listed threatened species and communities and Listed migratory species, and the proposal will be assessed under the bilateral agreement with the Commonwealth.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 summarises the EPA’s assessment of the proposal against the EPBC Act controlling provisions, Section 6 provides other advice by the EPA, Section 7 presents the EPA’s conclusions and Section 8, the EPA’s Recommendations.

Appendix 5 contains a summary of submissions and the proponent’s response to submissions and is included as a matter of information only and does not form part of the EPA’s report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

Humfrey Land Developments Pty Ltd proposes to develop a tourist resort on Long Island, within the Wallabi Group of the Abrolhos, WA (see Figure 1 for the regional location of the proposal and Figure 2 for the location of Long Island within the Wallabi Group) consisting of visitor lodges, staff accommodation, communal
facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities. (see Figure 3 for the proposed site layout).

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the PER document (MBS Environmental 2006).

Table 1: Summary of key proposal characteristics

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
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<tbody>
<tr>
<td>Location</td>
<td>Long Island, Wallabi Group, Houtman Abrolhos Islands</td>
</tr>
<tr>
<td>Proposal</td>
<td>Tourism development consisting of visitor lodges, staff accommodation, communal facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities</td>
</tr>
<tr>
<td>Proposal Area (terrestrial, including boardwalks)</td>
<td>Not more than 0.89 hectares</td>
</tr>
</tbody>
</table>
| Benthic Primary Producer Habitat Impact Area | Not more than 180 square metres of direct impacts  
Not more than 3700 square metres of indirect impacts  |
| Infrastructure                       | Deep water jetty  
Helipad  
Desalination plant  
Wastewater treatment plant  
Wastewater outfall pipeline (not more than 70 metres long)  
Diesel generators (three of up to ~120 kilovolt-amperes each, including one as a redundancy) |
| Wastewater treatment plant discharge  | Not more than 17 kilolitres per day  
30 milligrams per litre Total Nitrogen  
12 milligrams per litre Total Phosphorus  
200 coliform units per litre  
0.5 parts per million chlorine |
| Desalination plant discharge         | Not more than 35 kilolitres per day potable water produced  
Not more than 45 practical salinity units  
22 degrees Celcius |

The potential impacts of the proposal initially predicted by the proponent in the PER document (MBS Environmental 2006) and their proposed management are summarised in Table 1.6 of the proponent’s document.
Figure 1: Regional location of the proposal (MBS Environmental 2006).
**Figure 2:** The Wallabi Group, Abrolhos (MBS Environmental 2006).
Figure 3: Proposed development (MBS Environmental 2006).
3. **Key environmental factors and principles**

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as air emissions and hazardous materials are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA’s opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

1. Terrestrial Biodiversity – Vegetation;
2. Terrestrial Biodiversity – Avifauna;
3. Terrestrial Biodiversity – Tidal Ponds;
4. Marine Biodiversity; and
5. European Heritage.

The above key factors were identified from the EPA’s consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

(a) The principle of intergenerational equity;

(b) The principle of the conservation of biological diversity and ecological integrity; and

(c) The principle of waste minimisation.

### 3.1 Terrestrial Biodiversity - Vegetation

**Description**

Vegetation mapping of Long Island by Harvey *et al.* (2001) identified 15 vegetation communities. These vegetation communities are found elsewhere in the Abrolhos and the coastal mainland. The central zone of Long Island to be developed is predominantly covered by sparse scrub of *Myoporum insulare* over an *Atriplex* species heath with a mixed species sparse grassland and herbfield (MBS
Environmental 2006). This vegetation community of Long Island will be most impacted, with approximately 27% (or 2.06 ha) disturbed by the development.

One vegetation community present on Long Island has been identified as having conservation significance: the *Atriplex cinera* dwarf shrubland (Harvey *et al.* 2001). Harvey *et al.* (2001) describes this community as significant because “where the soil is deep enough under the *Atriplex*, it is suitable for burrowing seabirds (e.g. shearwaters and petrels) to build nests”. *Atriplex* spp dwarf shrubland is particularly common on Long Island, covering approximately 5.7 ha (or 47.5%) and the proposed development will impact approximately 0.64 ha (or 10%) of this (MBS Environmental 2006).

A total of 38 flora species have been recorded on Long Island comprising 14 families, of which *Asteraceae, Chenopodiaceae* and *Poaceae* constitute 60% of the species. Fourteen of these species are weeds.

The Priority 4 species *Lepidium puberulum* has been recorded on Long Island, near Tidal Pond 504 (MBS Environmental 2006). Priority 4 species are those species which are considered to have been adequately surveyed and which while being rare, are not currently threatened by any identifiable factors. *L. puberulum* is known to occur on two other islands in the Wallabi Group and ten other islands in the Easter Group, as well as other islands along the Western Australian (WA) coast. The proponent has confirmed that it will undertake surveys for *L. puberulum* and there is capacity to modify the placement of facilities such as the boardwalks to limit the impacts on this species.

The proposal has the potential to further introduce weed species to Long Island through increased visitation and shipping, although no ‘landscaping’ will be undertaken. The proponent has prepared a draft Weed Management Plan to minimise the introduction of weeds.

**Submissions**

One submission raised concerns that the significance of the population of *L. puberulum* had not been determined, nor the level of impact on the species as a whole.

**Assessment**

The EPA’s environmental objectives for this factor are to:

- maintain the abundance, diversity, geographic distribution and productivity of native flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge; and
- ensure that native flora are conserved consistent with the *Wildlife Conservation Act 1950* and the EPBC Act.

The EPA notes that the vegetation communities found on Long Island are represented elsewhere in the Abrolhos. The proposal has been designed to include boardwalks to limit the initial impacts of construction and the longer term impacts on vegetation from visitors. The draft Construction Environmental Management Plan (CEMP) states that no vegetation may be cleared, except for the placement of foundations, and
that ‘laydown areas’ (i.e. for the organisation of building materials) will avoid native vegetation at all times. If necessary, plants will be pruned to a minimum height of 250 mm. Therefore, provided the proponent’s management measures are implemented through conditions applied to the construction and ongoing management phases of the development, the proposal is not considered to have a significant impact on vegetation. The EPA has recommended conditions for a CEMP and an Operational Environmental Management Plan (OEMP).

*L. puberulum* is not unique to Long Island or the Abrolhos – it is found on other islands within the Wallabi Group and the Easter Group, as well as on other islands along the WA coast. The impacts on this species can be managed by adequately surveying the locations of *L. puberulum* and locating boardwalks and other facilities so that no plants are disturbed by the development. This can be achieved as an element of the condition for the CEMP.

During the construction phase, the proponent has stated that weeds already established on the Island will be identified and removed/treated. Furthermore, weed prevention procedures will include hygiene checklists for all vehicles and equipment entering Long Island, personnel to inspect clothing/shoes are free of seeds or plant material, and a spring survey to identify any weeds and, if necessary, take eradication measures. During operation, a range of management procedures have been proposed, including, weed education as part of the visitor and staff induction, personal weed hygiene through inspection and having all guests/staff stand on a mat doused with antiseptic solution on arrival (to control pathogens), vehicle and machinery inspection checklist to be completed prior to entering Long Island, and annual spring surveys to locate and if necessary, eradicate, weeds. These procedures are generally consistent with the Department of Conservation and Land Management (CALM (2003)) quarantine guidelines for prevention of weed introduction in offshore environments. The proponent has acknowledged that it has responsibility for monitoring and eradicating weeds in and around the development and the EPA is satisfied that such measures can prevent and if required, manage weed species on the island.

**Summary**

The EPA considers the issue of Terrestrial Biodiversity - Vegetation, including priority flora, has been adequately addressed and can meet the EPA’s objectives for this factor provided that the proponent takes all practicable measures to avoid the Priority 4 species, through surveys and appropriate location of boardwalks and infrastructure, in addition to weed prevention/eradication measures, which will form elements of the conditions for the CEMP and OEMP.

### 3.2 Terrestrial Biodiversity - Avifauna

**Description**

The Abrolhos is regarded as one of Australia’s most significant seabird breeding areas, both in terms of diversity and biomass, with a number of species breeding at the limits of their range.
Long Island is an important seabird site for breeding and resting/feeding within the Abrolhos. It is used by a number of migratory species, including some protected by international treaties. Various surveys have recorded a total of 28 species of avifauna on Long Island, including one CALM Priority Species and 12 EPBC Act Listed Migratory Species (Burbidge and Fuller 2004; Fuller et al. 1994; MBS Environmental 2006; Surman 2006). Of these, 14 species are recorded as breeding on Long Island, including six EPBC Act Listed Migratory Species. The proponent undertook surveys of Long Island in September and December 2005. The surveys recorded 20 of the 26 species previously recorded from Long Island. Two new records, the Sooty Tern and White-faced Storm Petrel were also reported during the surveys (Surman 2006). Species not recorded in the 2005 surveys were mainly migratory waders.

There are three migratory bird international agreements applicable to the proposal: Bonn Convention (this also covers other migratory animals); Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment (or CAMBA); and Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment (or JAMBA).

The relative importance of Long Island breeding populations (based on the size of the colony) within the Abrolhos has been estimated by MBS Environmental (2006), with Long Island believed to particularly important for six species. These species are: White-faced Storm-Petrel, Pacific Gull, Silver Gull, and Pied Oystercatcher (where the Long Island colony is estimated to be the third most important colony within the Abrolhos), and Crested Tern and Bridled Tern (both the fifth most important colony). The only EPBC Act Listed Migratory species out of these particularly important Long Island breeding species is the Bridled Tern, which is a CAMBA and JAMBA listed migratory species, and is also known to be “very to extremely sensitive” to human disturbance with only one egg laid per clutch (Great Barrier Reef Marine Park Authority (GBRMPA) 1997). Table 2 is a list of the avifauna of Long Island and the relative importance of breeding species and Figure 4 is a map of their nesting sites.

Within the Wallabi Group, Long Island is considered to be the third most significant sea bird breeding island in terms of biomass after West Wallabi and Beacon Islands. It is also the second largest breeding colony of Bridled Terns and the third largest colony of Little Shearwaters in the Wallabi Group.

The potential impacts of the development on avifauna are relatively widespread, and include the following:
- construction activities could disturb nesting species or destroy nests (through constructing infrastructure, trampling or clearing vegetation);
- visitors could disturb avifauna and destroy nests or habitat by leaving the boardwalks;
- noise from visitors, helicopters and aeroplanes, jet boats/skis, resort infrastructure (e.g. pumps in WWTP);
- lighting from the resort could disorientate avifauna and cause collisions with infrastructure, in particular, poles or antennas;
- increase in nuisance species, e.g. Silver Gulls, due to feeding by visitors or inappropriate solid waste management;
- introduction of vermin or other non-endemic species could impact avifauna through pre dating on eggs and chicks or through habitat destruction; and
- diesel spills.

There is also the potential to impact avifauna on other islands within the Wallabi Group, through noise and human disturbance and trampling of nests or burrows when on day trips.

The proponent has drafted an Avifauna Management Plan to minimise the impacts above, which includes the use of boardwalks to minimise direct disturbance to nesting sites, and to allow better control of visitors, use of sodium lights which has been demonstrated to reduce the attraction of birds and designated helicopter paths (MBS Environmental 2006).

**Submissions**

Submissions stated that Long Island is a significant seabird site for breeding and resting/feeding, used by a number of migratory species, including some protected by international treaties. The survey undertaken was considered to be too short and did not cover the autumn period when additional breeding populations would be likely. Visitor disturbance, lighting, noise and antennae were listed as having the potential to significantly impact avifauna. It was also commented that the draft management plans were inadequate. Issues related to quarantine and introduction of vermin were also raised.

**Assessment**

The EPA’s environmental objectives for this factor are:

- to maintain the abundance, diversity, geographic distribution and productivity of avifauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge; and
- to avoid impacts on seabirds and their habitats, to meet the requirements of the *Wildlife Conservation Act 1950* and the EPBC Act and to adhere to national and international obligations.

It is the EPA’s view, and the proponent has acknowledged, that Long Island is an important avifauna breeding site both within the Wallabi Group and the Abrolhos. While an autumn survey may have recorded a few other species of avifauna, the EPA considers that there is adequate information, when taking into account previous surveys, to determine how representative the survey was of annual variation and the importance of Long Island as a significant breeding and roosting habitat.

The focus of this assessment is on the breeding avifauna on Long Island, as they are more likely to be impacted by the development. Avifauna utilising Long Island only as a source of food or place of rest are more likely to be able to relocate relatively easily to alternative islands within the Wallabi Group, without significant impact on breeding numbers.

Construction is likely to have a significant short-term impact, and cannot be scheduled to avoid breeding periods for all avifauna known to breed on Long Island (Phase 1 and 2 are estimated to take 12 and 38 weeks respectively). The proponent has stated that an avifauna specialist will mark out nesting sites prior to construction and provide advice on the alignment of trafficking routes, which will result in designated pathways and exclusion zones for all personnel.
Table 2: Avifauna of Long Island (MBS Environmental 2006).

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Breeding</th>
<th>Rank Relative Importance of Long Is. Breeding Colony</th>
<th>Special Status</th>
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</thead>
<tbody>
<tr>
<td>Ruddy Turnstone</td>
<td>Arenaria interpres</td>
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<td>-</td>
<td>Bonn, CAMBA, JAMBA Listed Migratory, Listed Marine Species</td>
</tr>
<tr>
<td>Sanderling</td>
<td>Calidris alba</td>
<td>-</td>
<td>-</td>
<td>Bonn, CAMBA, JAMBA Listed Migratory, Listed Marine Species</td>
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<tr>
<td>Red-necked Stint</td>
<td>Calidris ruficollis</td>
<td>-</td>
<td>-</td>
<td>Bonn, CAMBA, JAMBA Listed Migratory, Listed Marine Species</td>
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<td>Red-capped Plover</td>
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<td>Eastern Reef Egret</td>
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<td>CAMBA Listed Migratory, Listed Marine Species</td>
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<td>Pied Oystercatcher</td>
<td>Haematopus longirostris</td>
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<td>CAMBA Listed Migratory, Listed Marine Species</td>
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<tr>
<td>White-bellied Sea Eagle</td>
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<td>Yes</td>
<td>≈15</td>
<td>CAMBA Listed Migratory, Listed Marine Species</td>
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<td>Welcome Swallow</td>
<td>Hirundo neoxena</td>
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<td>-</td>
<td>Listed Marine Species</td>
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<tr>
<td>Silver Gull</td>
<td>Larus novaehollandiae</td>
<td>Yes</td>
<td>3</td>
<td>Listed Marine Species</td>
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<tr>
<td>Pacific Gull</td>
<td>Larus pacificus georgii</td>
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<td>3</td>
<td>Listed Marine Species</td>
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<td>Bar-tailed Godwit</td>
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<td></td>
<td>-</td>
<td>Bonn, CAMBA, JAMBA Listed Migratory, Listed Marine Species</td>
</tr>
<tr>
<td>Osprey</td>
<td>Pandion haliaetus</td>
<td>Yes</td>
<td>≈37</td>
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</tr>
<tr>
<td>White-faced Storm-petrel</td>
<td>Pelagodroma marina</td>
<td>Yes</td>
<td>3</td>
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<tr>
<td>Pied Cormorant</td>
<td>Phalacrocorax varius</td>
<td></td>
<td>-</td>
<td>CALM Priority 4 Species</td>
</tr>
<tr>
<td>Brush Bronzewing</td>
<td>Phaps elegans</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Grey Plover</td>
<td>Pluvialis squatarola</td>
<td></td>
<td>-</td>
<td>Listed Marine Species</td>
</tr>
<tr>
<td>Spotless Crake</td>
<td>Porzana tabuensis</td>
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</tr>
<tr>
<td>Little Shearwater</td>
<td>Puffinus assimilis</td>
<td>Yes</td>
<td>13</td>
<td>Listed Marine Species, Listed Marine Species</td>
</tr>
<tr>
<td>Wedge-tailed Shearwater</td>
<td>Puffinus pacificus</td>
<td>Yes</td>
<td>≈11</td>
<td>JAMBA Listed Migratory, Listed Marine Species</td>
</tr>
<tr>
<td>Bridled Tern</td>
<td>Sterna anaethetus</td>
<td>Yes</td>
<td>5</td>
<td>CAMBA, JAMBA Listed Migratory, Listed Marine Species</td>
</tr>
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<td>Crested Tern</td>
<td>Sterna bergii</td>
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</tr>
<tr>
<td>Caspian Tern</td>
<td>Sterna caspia</td>
<td>Yes</td>
<td>≈10</td>
<td>CAMBA, JAMBA Listed Migratory, Listed Marine Species</td>
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<tr>
<td>Roseate Tern</td>
<td>Sterna dougallii</td>
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<td>8</td>
<td>Listed Marine Species</td>
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<tr>
<td>Sooty Tern</td>
<td>Sterna fuscata</td>
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<td>-</td>
<td>Listed Marine Species</td>
</tr>
<tr>
<td>Fairy Tern</td>
<td>Sterna nereis</td>
<td>-</td>
<td>-</td>
<td>Listed Marine Species</td>
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<tr>
<td>Grey-tailed Tattler</td>
<td>Tringa brevipes</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Greenshank</td>
<td>Tringa nebularia</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Grey-breasted White Eye</td>
<td>Zosterops lateralis gouldii</td>
<td>Yes</td>
<td>≈8</td>
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</table>

1. This is a rank of the relative importance of the Long Island breeding colony within the Abrolhos, based on the number of breeding pairs. For example, the Little Shearwater breeding colony on Long Island is ranked 13th because there are 12 other islands within the Abrolhos which have been recorded as having higher numbers of breeding pairs of that species. ≈10 means the colony is the equal 10th most important colony (usually applicable where a species only has one breeding pair per island).
Figure 4: Avifauna nesting sites and breeding colonies of Long Island (MBS Environmental 2006).
The draft Avifauna Management Plan (Surman 2006a) includes commitments to reorient burrows that will be impacted by construction, wherever possible, and to use plywood artificial lean-toos to shelter surface nests (particularly Bridled Terns) where vegetation is removed. A log of all altered nests and burrows will be kept and their progress post-alteration will be monitored for a short time. Other measures include acoustic insulation on all generators and machinery/vehicles, and no nocturnal construction or lighting on the Island.

During operation of the resort, activities will most likely impact above-ground nesting species more than burrowing species and the most significant impacts will be from human disturbance, lighting and noise.

The GBRMPA (1997) has described the general effects that human disturbance to breeding seabird populations can have, which include:

- Changes to ideal breeding habitat characteristics;
- Deterrence from settling to breed;
- Desertion of colony site by all or part of a breeding population;
- Increased destruction or predation of eggs;
- Increased mortality of young chicks from predation, exposure, trampling or disorientation; and
- Reduced fledging weight, contributing to lower juvenile survival.

These effects are limited to surface-nesting species, as burrow-nesting species are not affected by human approaches during the day, unless trampling occurs. The most obvious reaction to human disturbance is for birds to fly or walk away from their nest, and the distance at which each species will leave the nest is termed the ‘critical approach distance’ (CAD). The CAD is different for each species, and can be different between colonies of species, particularly where there are differences in the level of human disturbance, i.e. some species in areas that are frequented by humans and associated noise from helicopters will have a much lower average CAD than the same species in a different area that is less disturbed by humans (GBRMPA 1997). This suggests that avifauna can habituate to human disturbance to a certain extent over time, however, the GBRMPA (1997) cautions that even where a bird does not leave the nest when approached, there is evidence that it will become stressed (e.g. increased heart rate).

The proponent has significantly reduced the impact on burrow-nesting species through the use of boardwalks around the development, however, this will be dependent on whether visitors adhere to the resort rules and do not stray onto other areas of the Island. The proposed induction and Visitor Code of Conduct will assist in educating guests about the reasons for keeping to the designated paths. In relation to surface-nesting species, the narrow nature of Long Island means that it will be difficult to allow reasonable approach distances for most species, particularly for Bridled Terns, Caspian Terns, Pacific Gulls, Silver Gulls, Eastern Reef Egrets, Grey White-eyes and Pied Oystercatchers. Most of these species breed during the ‘shoulder’ or ‘low’ tourist seasons, so it will be easier to manage visitor behaviour so as to minimise impact on these breeding colonies. There will be reasonable separation distances to White-bellied Sea Eagles and to the Osprey nest site. Nesting sites of other breeding avifauna were not recorded by Surman (2006b).
While lighting can affect all species that fly after sunset, by causing disorientation which can lead to collisions with infrastructure, it may have the most significant effect on White-faced Storm-Petrels. This species is particularly vulnerable to predation by gulls at dusk and after dark, and has been observed waiting offshore on moonlit nights until a cloud has obscured the moon before flying back to their burrows, possibly because it is more difficult for gulls to detect them in darkness (GBRMPA 1997). Thus, lighting from the development could severely impact the White-faced Storm-Petrel colony on Long Island, which is the third largest colony within the Abrolhos. This could also be true for Little Shearwaters, which are also burrow-nesters and are predated on by gulls. The proponent has stated that the development will utilise seabird friendly light design and management (including the use of Low Pressure Sodium Vapour lighting, low wattage luminaries, directed lighting, tinting windows, and by extinguishing non-essential lighting). It may be necessary to further reduce lighting during the White-faced Storm-Petrel breeding season (October to February), which should be relatively manageable as it is within the low tourist season. Nevertheless, the EPA expects that adaptive management of resort lighting will be utilised where a colony or species is shown through monitoring to be significantly impacted.

Noise will be reduced by utilising sound-proof containers for generators, mufflers on vehicles and speed restrictions for jet skis and boats within 200 metres of islands. In relation to noise from aircraft, flight restrictions will occur during both construction and operation of the development. The proponent has adopted GBRMPA (1997) guidelines, which state that:

- no aircraft to fly across a seabird breeding island at less than 1500 feet altitude (other than when landing);
- no aircraft to fly within 1000 metres laterally of a seabird breeding island (other than when landing);
- helicopter landings and take-offs should occur only between sunrise and sunset; and
- where seaplanes are permitted to operate in the vicinity of breeding seabirds, they are not permitted to land or take-off within 300 metres of the island.

These restrictions will form an element of the OEMP, however the EPA acknowledges that the OEMP will be limited to aircraft movements within the control of the proponent. The GBRMPA (1997) guidelines also state that “helicopter landings and take-offs should only occur on the edge of an island, with the approach being over the sea and the landing site screened from and located at least 300 metres from any surface-nesting site”. While the helipad will be screened from most of the nesting sites, the proponent will not be able to meet the recommended separation distance, with a White-bellied Sea Eagle nest, Bridled Tern, Fairy Tern, Pied Oystercatcher and Silver Gull nesting sites being within 300 metres. All of these species nest above ground, and thus, they could be impacted by helicopter landings and take-offs.

A number of day trips and tours are proposed to surrounding islands within the Wallabi Group, including kayak, jet ski and jet boat tours. The proponent has stated that where guests land on other islands, existing paths will be adhered to. Nevertheless, burrowing species may still be impacted by trampling. The staff and guest inductions will assist in educating visitors about the values of these islands and
encourage their compliance with the Visitor Code of Conduct. The EPA recommends that the proponent engage a suitably qualified consultant to determine any sensitive breeding areas which should be avoided on those islands that will be visited. It may also be worthwhile the proponent discussing the construction of viewing areas or ‘hides’ on these islands with the DoF, to ensure maximum visitor benefit and minimal impact.

Solid waste management will apply during both the construction and operational periods. This will consist of all waste being removed from the island, to be recycled, landfilled, or otherwise disposed of on the mainland. Waste will be kept in covered or sealed bins on the island prior to transport to the mainland. Furthermore, guests or staff will not be allowed to feed avifauna or leave scraps available, which could encourage Silver Gulls.

Vermin and introduced species are a significant threat to avifauna, particularly eggs and chicks. They can result in changes in vegetation, increased disease and increased predation (GBRMPA 1997). Rats are known to predate on White-faced Storm Petrels (GBRMPA 1997), and it can be assumed that other small burrowing species, such as Little Shearwaters, could also be vulnerable to predation by rats. The GBRMPA and CALM both provide guidance as to adequate quarantine procedures for offshore environments. The GBRMPA (1997) recommends training and education programs for staff and visitors, together with measures to ensure all equipment and materials brought to site are inspected, and if necessary, steam cleaned, and that all wastes are stored in covered bins prior to appropriate disposal. CALM (2003) recommends strict inspection, washing down, baiting, labeling and reporting procedures for controlling vermin and weeds in islands off the Pilbara coast, which can also be applied to the Abrolhos. The proponent has proposed procedures which mainly focus on inspection, checklists and written guarantees by suppliers and supply vessels, record keeping and eradication measures. These procedures are not as strict as the CALM recommended protocols, particularly where CALM recommends that vessels be permanently baited with rodenticide baits (e.g. Talon wax blocks), which may be used in conjunction with, but not instead of, traps, while the proponent has only stated that periodic trapping with peanut paste (or similar) will be used at the Broadwater Geraldton Facility (i.e. where food will be stored and prepared) and periodic trapping and baiting/spraying will be used on supply vessels. The EPA expects that permanent baiting (together with the other measures committed to by the proponent) will be undertaken both at the Geraldton facility and on supply vessels. It is acknowledged, however, that non-rodenticide baited traps will be more appropriate on Long Island itself, due to potential issues with avifauna eating poisoned vermin. Labeling of all supplies and luggage transported to Long Island is also believed to be a more appropriate method of ensuring that inspections have been conducted (rather than checklists only), although recording keeping of baiting/trapping etc is also required.

As stated above, there is some evidence of avifauna habituating to human disturbance (GBRMPA 1997). C. Surman (pers. comm.) has also advised that avifauna are more likely to habituate where the human disturbance is consistent and not over irregular periods. Therefore, as this tourism development will result in a continual human presence (although in differing numbers, depending on the season), avifauna on Long Island may be able to adjust to the disturbance. There is also the potential for avifauna to relocate to other islands within the Wallabi Group (either for a short time
or permanently). Many of the islands support large numbers of avifauna, so it is likely that other suitable habitats are available. Notwithstanding this, if significant impacts on avifauna are identified during the construction or operation of the proposal, the EPA expects that adaptive management practices will be implemented to minimise this impact as far as possible.

The developer has also proposed an avifauna monitoring program that will begin prior to construction and continue throughout construction and operation on a tri-annual basis, which will allow a baseline to be established and an assessment of the impacts of construction and operation on avifauna distribution, population size and reproductive success. It is important that appropriate triggers are established to determine an acceptable level of impact, and alternative management options are ready to be implemented when those triggers have been exceeded.

While the proponent has drafted a number of management plans, the EPA has recommended that a CEMP and a OEMP are developed and implemented to cover a number of aspects, including the minimisation of impacts on avifauna, monitoring which will allow for adaptive management in the event of impacts being greater than predicted and, in particular, the revising of quarantine procedures to meet CALM (2003) guidelines.

**Summary**

The EPA considers the issue of Terrestrial Biodiversity - Avifauna, has been adequately addressed and the impacts can be minimised to meet the EPA’s objectives for this factor. The proposal is likely to impact both in the short and long-term on the values of Long Island as a significant breeding habitat however, there remains other significant breeding populations of the affected species within the Wallabi Group including nearby Beacon and West Wallabi Islands such that it is considered that the proposal will not impact significantly on populations in the long-term. It is the EPA’s view that the proposal can be managed to meet the EPA’s objective provided that the proponent implements adequate visitor management, avifauna-friendly lighting, restricts noise and aircraft appropriately, prevents the introduction of exotic species and monitors the impact on avifauna breeding. These together with adaptive management practices, if impacts are detected, are recommended to form elements of the conditions for the CEMP and OEMP.

### 3.3 Terrestrial Biodiversity – Tidal Ponds

**Description**

There are approximately 60 tidal ponds across the Abrolhos. Tidal ponds are depressions or sinkholes in coral rubble, which have subterranean connections to the sea, with pond levels generally rising and falling in relation to the tides (Black and Johnson 1997; Johnson and Black 1998). There are a total of seven tidal ponds on Long Island [numbered by Black and Johnson (1997) with a 5 prefix, e.g. 501; see Figure 5], and while each tidal pond was found to be connected to the sea, the strength of the connection varied between the ponds (Black and Johnson 1997).

Black and Johnson (1997) studied the tidal regimes of the Long Island tidal ponds and found that they also differed from the shore tides in a number of ways: firstly, the
peak tides lagged behind the shore; secondly, the peak tides were all less than that of the shore (except for Pond 501, which probably also gains water through wave action on the shore); and thirdly, all but Pond 506 lagged behind the shore in losing water, with Ponds 504 and 507 holding water even when the shore tide stayed low for several hours. Interestingly, the Long Island tidal ponds were found to be in the upper range for tidal levels and tidal range out of 47 tidal ponds surveyed across the Abrolhos (Black and Johnson 1997). Most of the ponds had a shallow layer of fine sediments on the bottom of the pond, however, only Ponds 501, 504 and 507 had a layer of sediments and did not frequently dry out.

Black and Johnson (1997) also described the molluscs of the Long Island tidal ponds, with 11 species found: one bivalve, two chitons, and eight gastropods. The number of species per pond ranged from three in Pond 502 to seven in Pond 504 (Black and Johnson 1997). Five of the species (cf. Ischnochiton white, cf. Ischnochiton black, Emarginular cf. patula, Melampus luteus, and Onchidium sp.) were considered to be rare on Long Island (i.e. only occurring on one or two ponds) and also scarce, with only one specimen found on some occasions. Three of the species (cf. Arthritica semen, cf. Assiminea, and Zeacumantus diemenensis) showed similar geographic distributions: all are estuarine species that were only previously recorded as far north in WA as about Perth. The Long Island populations could therefore represent a range extension of these species.

Morphological and genetic differences were also found between mollusc species in the ponds and also between the ponds and on the shore of Long Island, (Black and Johnson 1997; Johnson and Black 1997). Two species (Bembicium vittatum and Austrocochlea constricta) exhibited differences in mean shell size between the shore and tidal pond populations, with the tidal pond populations being larger by a number of millimetres. When Johnson and Black (1997) studied the genetic divergence of tidal pond populations on Long Island in the three most abundant gastropod species, they found that most pond populations were significantly different to the paired shore populations. They also found that the level of genetic divergence between pond populations was at least double that between shore populations over the same distance (Johnson and Black 1997). This indicates that genetic mixing between pond populations is much less than between shore populations, probably due to the species (even those with a planktonic larvae stage) generally completing its life cycle within most of the tidal ponds (Johnson and Black 1997). The exception to this is the planktonic larvae species in Ponds 503 and 505, which are shallow and frequently dry out (Johnson and Black 1997). Thus, Johnson and Black (1997) concluded that “the tidal ponds (of Long Island) have important effects on isolation and genetic divergence of local populations”.

The proposed development is adjacent to Pond 503 and surrounds Pond 504. The proponent has noted that during extreme neap tides, Pond 504 fails to flush as thoroughly as it does during higher tides, and that this causes the algae within the pond to start decomposing, causing an offensive odour. Thus, it is proposed that extra seawater be slowly added to the pond during these times (neap tide and low wind). It is estimated that this will occur up to three or four times per month during the calmer months (April – August).
Figure 5: The tidal ponds of Long Island (MBS Environmental 2006)
Submissions
Submissions raised concerns that the proposal to add water to the Tidal Pond 504 would change the ecology of the pond, which could possibly contain species of genetic divergence, due to their isolation. It was recommended that the genetic significance of the fauna in this pond be investigated prior to development and that the impacts should be carefully monitored.

Assessment
The EPA’s environmental objective for this factor is to maintain the integrity, ecological functions and environmental values of the tidal ponds.

All infrastructure associated with the development will avoid the tidal ponds, although the main development will surround Tidal Pond 504 and will be adjacent to Tidal Pond 503. The draft CEMP prepared by the proponent, states that exclusion zones will be set up around all tidal ponds during the construction phase.

The proposal to introduce seawater to Tidal Pond 504 during times of neap tide and low wind has the potential to impact the fauna of the pond. It is imperative that the sediments on the bottom of the pond are not disturbed, as the sediments appear to be important to the molluscs, particularly those that represent a ‘range extension’ of the species (MBS Environmental 2006). Thus, the EPA recommends that the OEMP include measures to ensure that seawater is only introduced in a manner which will cause minimal disturbance, including a maximum flow rate, maximum water level in the Pond, and padlocking and signposting, with only authorised personnel to have access.

Summary
The EPA considers the issue of Terrestrial Biodiversity - Tidal Ponds has been adequately addressed and can meet the EPA’s objectives for this factor provided that the CEMP ensures all tidal ponds are in exclusion zones, and the OEMP ensures that the addition of seawater to Tidal Pond 504 is undertaken in a manner which does not disturb the sediments.

3.4 Marine Biodiversity

Description
The most widespread geomorphological classes surrounding Long Island [as described by Webster et al. (2002)] are ‘drowned doline fields’, ‘complex karst platforms’ and ‘mobile sediment sheets’ (i.e. sand and coral rubble), respectively (MBS Environmental 2006). Webster et al. (2002) describes ‘drowned doline fields’ as being limestone platforms interspersed with deep potholes (i.e. dolines), with high coral cover of generally very rich species diversity. Surrounding Long Island, these consist of deep, shallow reef and branching coral stands of Acropora spp, with the deep stands being the most common (29.1 % of the mapped habitat) and occurring at the bottom of several deep basins on the western side of the Island (MBS Environmental 2006). Shallow Acropora spp. reef habitats were the next most widespread of the drowned doline fields, and were found on the east coast to
approximately 5 metres depth (MBS Environmental 2006). ‘Complex karst platforms’ are described by Webster et al. (2002) as being shallow limestone platforms with shallow dolines, which have a thin margin of live coral, and in some isolated areas the coral formations reach 100% cover. Both the drowned doline fields and complex karst platforms were assessed as having a high sensitivity to physical damage (e.g. from rock lobster pots, jet boat hulls and anchors), while mobile sediment sheets were assessed as having a low sensitivity (Webster et al. 2002).

There are no seagrass meadows found in the waters surrounding Long Island, however there is considerable algal growth (MBS Environmental 2006). In the shallow waters, the most common algae were Sargassum sp., Caulocystis sp. and Turbinaria sp., while Ulva sp. was abundant on the intertidal reef areas (MBS Environmental 2006).

The proponent investigated background marine water quality at Long Island, and found that it is typical of well mixed, ocean waters (MBS Environmental 2006). Nutrient concentrations were generally within the expected range, except for nitrate, nitrite and orthophosphate, which were slightly elevated, possibly due to the breakdown of macroalgae along the shoreline (MBS Environmental 2006).

The construction impacts on BPPH from the proposed development generally relate to the jetty, helipad, snorkelling platforms, and wastewater outfall construction. The jetty and snorkelling platforms will be constructed with steel piles and the helipad with be constructed with either steel piles or anchors (MBS Environmental 2006). The wastewater treatment plant (WWTP) outfall will consist of a pipeline 0.05 metres in diameter and will cross approximately 70 metres of benthic habitat prior to achieving the desired depth of 10 metres in Goss Passage (MBS Environmental 2006). No ports or diffusers are proposed due to the small discharge volume. The desalination plant outfall will be approximately 0.1 metres in diameter and will be placed alongside the WWTP outfall pipeline, although a 1 metre riser will be placed on the end of the pipe, to assist in dispersion (MBS Environmental 2006). Neither the construction methodology nor the exact route for the outfall pipelines has been determined as yet, although they may be laid directly onto the seabed and held in place by rubble/concrete or steel pins (MBS Environmental 2006).

Wastewater discharges will have ongoing impacts to the BPPH. The WWTP is estimated to have a maximum discharge rate of 17 kL/day and have nutrient concentrations of 30 mg/L for Total Nitrogen (TN) and 12 mg/L for Total Phosphorus (TP) (MBS Environmental 2006). The faecal coliform count is expected to be 200 coliform units per litre following chlorination, and there will be a residual chlorine concentration of 0.5 mg/L. Based on modeling with wind conditions of 0.1 knot, it is expected that the discharge will be diluted to 1:10,000 within 20 metres of the point of discharge (MBS Environmental 2006). The desalination discharge will be at a maximum rate of 140 kL/day and will have a salinity of approximately 45 psu (practical salinity units), as compared to an ambient salinity of 35 psu. Modelling has predicted that this will be diluted to background levels (i.e. 1:66) within 4 metres of the outlet. A 30 metre mixing zone for both plant discharges has been proposed to ensure some conservatism with respect to the modelling.
Tourist activities, such as snorkelling, SCUBA diving and boating, also have the potential for ongoing impact on the BPPH through direct collision with corals. To mitigate these impacts, the proponent has designated specific snorkelling and diving areas in water deeper than 1 metre, with shallower areas closed from these activities. Designated swimming areas will also apply. Designated moorings will be located within sandy areas and all resort-associated vessels will be required to use these specific moorings. Additional moorings will also be provided for vessels not associated with the resort.

The impacts on benthic primary producer habitat (BPPH) have been considered in accordance with The EPA’s Guidance for the Assessment of Environmental Factors Benthic Primary Producer Habitat Protection for Western Australia’s Marine Environment - No 29 (EPA 2004). MBS Environmental (2006) has estimated the total impact of the proposed development on the BPPH to be approximately 0.49 ha. This equates to an impacted area of approximately 0.01 % of the 50 km\(^2\) Management Unit, the geographic area defined by the proponent within which the cumulative impacts on biodiversity are determined. Even after taking into account estimates of the cumulative impact of rock lobster fisherman and boating activities, the total impact will be less than 2 % of the Management Unit (MBS Environmental 2006). No losses are expected within the Beacon Island Reef Observation Area (which extends to Long Island).

A draft Marine Management and Monitoring Plan has been prepared by Oceanica Consulting Pty Ltd (2006) on behalf of the proponent, which details an annual water quality monitoring program to determine any impacts from the wastewater outfall and annual coral monitoring around the wastewater outfall, jetty and moorings (those installed by the proponent).

**Submissions**

Some submissions raised queries in relation to the outfall pipeline construction and route and its impact on BPPH. Submissions stated that it was unacceptable to allow such high nutrient wastewater to be discharged to the marine environment and that Goss Passage was an important benthic habitat with great SCUBA diving. Some submissions also raised concerns regarding the adequacy of the monitoring programs associated with the discharge and some queried the need for a swimming pool (in particular, the discharge of the pool water to the marine environment).

**Assessment**

The EPA’s environmental objectives for this factor are:

- to maintain the integrity, ecological functions and environmental values of the seabed and coast; and
- to ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

The EPA’s Guidance for the Assessment of Environmental Factors Benthic Primary Producer Habitat Protection for Western Australia’s Marine Environment - No 29 (EPA 2004) states that proposals should not cause significant direct or indirect loss of BPPH and establishes ‘Cumulative Loss Thresholds’ for different areas. In the case of this proposal, a Cumulative Loss Threshold of 2 % of the applicable Management
Unit applies [i.e. Category C ‘Other designated areas’ (EPA 2004)]. As stated above, the proponent has conservatively estimated the impacts of the development on the BPPH, and has determined that approximately 0.49 ha (or 0.01% of the 50 km² Management Unit). Even with cumulative impacts from rock lobster fishermen and boating activities, it is highly likely that the impact will be less than 2% of the Management Unit. Notwithstanding this, the EPA notes that neither the construction methodology nor the exact route for the outfall pipelines has been determined as yet and accordingly it is appropriate for the CEMP to require the proponent to submit a proposed route and construction method for approval, so as to ensure minimal impact on the BPPH.

The EPA notes the very low discharge rate of the outfall and the strong currents in Goss Passage which is likely to ensure that the discharge is well dispersed within 30 metres of the outfall. The EPA therefore considers that the 30 metre mixing zone proposed by the proponent is reasonable.

The proponent has indicated in the draft Marine Management and Monitoring Plan that it intends to manage the proposal in accordance with the State Water Quality Management Strategy (Government of Western Australia, 2004) and the associated Environmental Quality Management Framework. Of the six Environmental Quality Objectives (EQOs) identified by the EPA (2000) for Perth’s Coastal Waters, all but EQO 6 (Industrial Water Supply) are considered applicable to the Abrolhos region (MBS Environmental 2006). For the Ecological Integrity EQO, the proponent has indicated that a High Level of Ecological Protection (i.e. E2; small changes from natural variation allowed) will be achieved at the edge of the 30 metre mixing zone. The proponent has not proposed a level of ecological protection or any monitoring and management within the 30 metre mixing zone and management is only based on meeting E2 criteria at the boundary. This is inconsistent with the intent of the State Water Quality Management Strategy (Government of Western Australia, 2004). Accordingly, the EPA recommends that an E4 Low Level of Ecological Protection for nutrients and toxicants be assigned to the area within 30 metres of the marine outfall.

The PER (MBS Environmental 2006) does not discuss the spatial allocation of socially based EQOs in relation to the wastewater outfalls. With discharge of human pathogens from the WWTP, there is a possibility that human health-related EQOs (e.g. maintenance of primary contact recreation values and aquatic life for human consumption) could be compromised within a small area immediately surrounding the WWTP outfall. The EPA recommends that as part of the OEMP, the proponent, in consultation with the DoF (as the agency with day-to-day responsibility for the Abrolhos Fish Habitat Protection Area), should spatially define where human health-related EQOs will apply, and present a resultant map showing the spatial allocation of the EQOs to the EPA for consideration. This is addressed as an element of the recommended condition for an OEMP.

The EPA considers that an appropriate monitoring program for water quality and environmental quality indicators is particularly important for this development, especially to ensure that the wastewater outfall discharges meet the E2 and E4 levels of ecological protection. The EPA considers that the draft Marine Management and Monitoring Plan is inadequate in a number of areas (environmental quality indicators, sampling regime and sampling locations). The EPA has recommended that the
OEMP include the requirement to develop a marine monitoring program to address the identified inadequacies.

**Summary**

The EPA considers the issue of Marine Biodiversity has been adequately addressed and can meet the EPA’s objectives for this factor provided that:

1. The marine discharge pipelines are routed and constructed to minimise impact on the BPPH;
2. The E4 Low Level of Ecological Protection is met within the 30 metre mixing zone of the wastewater outfalls and the E2 High Level of Ecological Protection is met at the boundary of the mixing zone;
3. Human-health related EQOs are developed to the satisfaction of the DoF; and
4. A marine monitoring program is developed.

### 3.5 European Heritage

**Description**

Long Island has a high heritage value both nationally and internationally through its association with the *Batavia* shipwreck and mutiny. The *Batavia*, a VOC ship (Dutch East India Company), was shipwrecked on Morning Reef (south of Beacon Island, Wallabi Group) in June 1629. After the ship’s captain (Pelsaert) left the Abrolhos in search of help, a group of survivors led a mutiny, killing 125 people. When Pelsaert arrived with help, he apprehended the mutineers and subsequently conducted their trials, after which nine of the leaders were executed. Long Island was the location of some of the survivor camps, the second largest slaughter, the detainment of all of the mutineers except Cornelisz (the leader), and the hangings of several of the mutineers.

Surface archaeological surveys of Long Island have only yielded a small number of relics, and the location of the occupation, slaughter and gallows sites are still unknown [MBS Environmental 2006; Western Australian Maritime Museum (WAMM) 2001]. A number of significant excavations have been undertaken on nearby Beacon Island and have revealed mass graves (WAMM, 2001).

In 2006 an area of the Wallabi Group including Long Island was gazetted for inclusion on the National Heritage List. Accordingly the proposal is a ‘Controlled Action’ under the provisions of the EPBC Act. The *Batavia* is a gazetted ‘Historic Shipwreck’ under the Commonwealth *Historic Shipwrecks Act 1976*, and is also protected under the WA *Maritime Archaeology Act 1973*. Under this legislation, it is an offence to damage or take relics from the *Batavia*.

The proposed development has the potential to impact *Batavia* related sites or relics on Long Island during construction and through visitation (e.g. by visitors leaving the boardwalks and trampling archaeological sites or through deliberate vandalism). Increased boating and SCUBA diving also has the potential to impact the *Batavia* shipwreck (or other shipwrecks in the area) through tourist activities organised by the proposed resort.
Submissions
Long Island has a high national and international heritage value due to its association with the *Batavia* wreck and mutiny. Submissions stated that the development would impact on these values and will result in the loss of sense of place. The WA Maritime Museum (WAMM) has previously stated that its preferred position is no development on islands of archaeological significance associated with the *Batavia* wreck.

Assessment
The EPA’s environmental objective for this factor is to ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.

Construction activities in particular have the potential to unearth additional relics. As part of the draft CEMP, the proponent has committed to having a qualified archaeologist on site during major construction activities to ensure that any relics disturbed are recorded and recovered in an appropriate manner (MBS Environmental, 2006). Additionally, the staff induction for construction personnel will include heritage issues.

To address the impacts of operation and decommissioning on European Heritage, the proponent intends developing a Heritage Management Plan (HMP) in consultation with the WAMM and the DoF. As the surface archaeological survey did not find a large number of relics, it is unlikely that visitors will come across any. Additionally, the HMP will ensure appropriate protocols are in place with regards to accessing other islands with known heritage values. It is recommended that the heritage management initiatives proposed by the proponent form an element of the OEMP.

Any impacts on ‘sense of place’ from the development are not quantifiable. The proponent has attempted to mitigate the impacts, however, by increasing the awareness and understanding of both resort guests and day visitors about the history of the *Batavia*. The PER (MBS Environmental, 2006) states that all visitors will undergo an induction, a heritage display will be provided with *Batavia* artefacts on loan from the WAMM, and there will be *Batavia*-related guided tours available.

The WAMM (2001) recommended that Long Island (plus Beacon Island, Traitors Island and areas of East and West Wallabi Islands), be protected as a maritime archaeological site under the *Maritime Archaeology Act 1973* and that no building be allowed in archaeologically sensitive areas. The EPA is not aware of any archaeologically sensitive areas having been defined on Long Island at this stage, although the proponent has restricted access to the southern end of the Island, which has not yet been surveyed (MBS Environmental, 2006). The DoF (2001) noted that the Executive Director of WAMM be consulted with regarding any proposals for a tourism development on the Island.

The EPA notes the gazettal of the Batavia Shipwreck Site and Survivors Camp Area under the EPBC Act as an inclusion of a place in the National Heritage List. The EPA has been advised that the Department of Fisheries (DoF) in cooperation with the WA Maritime Museum (WAMM) proposes to develop management plans and public information for the protection of historic shipwrecks, associated land sites and other sites of heritage value. It is recommended that the proponent’s heritage management
initiatives must be to the satisfaction of the WAMM to ensure they are consistent with this overall management strategy for the larger Batavia Shipwreck Site and Survivors Camp Area.

Summary
The EPA considers the issue of European Heritage has been adequately addressed and can meet the EPA’s objectives for this factor provided that a CEMP ensures that a qualified archaeologist is on site during major construction activities to ensure that any relics disturbed are recorded and recovered in an appropriate manner. The OEMP shall address protocols and procedures required to manage access to other islands and heritage sites with known heritage values. It is recommended the proponent’s heritage management initiatives must be to the satisfaction of the WAMM to ensure they are consistent with this overall management strategy for the larger Batavia Shipwreck Site and Survivors Camp Area.

3.6 Environmental principles
In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the Environmental Protection Act 1986. Appendix 3 contains a summary of the EPA’s consideration of the principles.

4. Conditions and Commitments
Section 44 of the Environmental Protection Act 1986 requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations for conditions as it sees fit.

4.1 Recommended conditions
Having considered the proponent’s commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Humfrey Land Developments Pty Ltd to develop a tourism resort on Long Island is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) That the proponent prepare and implement a Construction Environmental Management Plan; and

(b) That the proponent prepare and implement an Operational Environmental Management Plan.

5. EPBC Act Controlling Provisions
This proposal has been deemed to be a ‘Controlled Action’ under the EPBC Act on the grounds of National Heritage, Listed threatened species and communities and Listed migratory species, and as such, is being assessed in accordance with the
bilateral agreement with the Commonwealth Department of Environment and Water Resources.

The EPA has assessed the proposal against each of the controlling provisions as described below:

- **National Heritage** – as discussed in section 3.5, the EPA considers that the impacts on Batavia-related relics have been adequately minimised, provided that the CEMP and OEMP address the issues of construction uncovering relics, and visitor education and management. It is accepted that there will be impacts on ‘sense of place’, however they are not quantifiable. The OEMP will address this issue in part through the education of visitors about the Batavia. The EPA is advised that the DoF in cooperation with the WAMM will prepare management Plans and public information for the protection of historic shipwrecks, associated land sites and other sites of heritage value. It is recommended that the proponent’s heritage management initiatives should be consistent with this overall management strategy for the larger Batavia Shipwreck Site and Survivors Camp Area.

- **Listed threatened species and communities** – as noted in Appendix 3, the EPA considers that the impacts of the proposal on the Australian Sea Lion will be not be significant. Long Island is not used for breeding by Sea Lions. The boardwalks around Tidal Pond 503, which is used by Australian Sea Lions as a haul-out area, will be raised to 2 metres to allow Sea Lions to move freely from one side of Long Island to the other, and to ensure that visitors to do not approach too close. However, it is acknowledged that Sea Lions may no longer use this area into the future. When conducting day trips to other islands within the Wallabi Group, the proponent will not allow visitors to land and a 200 metre separation distance will apply, on islands where Sea Lions are present.

- **Listed migratory species** – as discussed in section 3.2, the EPA considers that the proposal is likely to impact both in the short and long term on the values of Long Island as a significant breeding habitat however, there remains other significant breeding populations of the affected species within the Wallabi Group including nearby Beacon and West Wallabi Islands such that it is considered that the proposal will not impact significantly on populations in the long term. The EPA’s recommended conditions will also assist in minimising the impact to avifauna on Long Island, including requirements for monitoring and adaptive management practices where impacts are detected.

### 6. Other Advice

Submissions raised concerns that the process conducted by the DoF in determining preliminary sites for the development of the proposal appears to have discounted islands within the Abrolhos that were already inhabited by rock lobster fishermen. The perception is that this led an increase in environmental impacts by extending human disturbance to previously un-impacted islands. The EPA acknowledges that there are difficulties in co-locating uses. However, this assessment has also highlighted that on islands where increases in permanent or semi-permanent habitation is to occur, it is likely to significantly increase the risks to fauna and potentially flora. The EPA notes the DoF (2007) has prepared *Management of the Houtman Abrolhos System – A draft review 2007 – 2017*. In this review the
management strategy proposed in relation to flora and fauna (No. 23) is to “develop and implement a management plan for the protection of flora and fauna and their habitats, incorporating a strategic monitoring and research plan”. The EPA supports the need for this strategy to be implemented in order to identify those islands that have significant fauna and flora value and have in place management that has the objective of maintaining these conservation values.

Future tourism development that leads to significant increases in habitation should not occur on islands to be managed for conservation.

7. Conclusions
The EPA has considered the proposal by Humfrey Land Developments Pty Ltd to develop a tourism resort on Long Island.

Long Island is a significant seabird site for breeding and resting/feeding within the Abrolhos. It is used by a number of migratory species, including some protected by international treaties. Various surveys have recorded a total of 28 species of avifauna on Long Island, including one Priority Species and 12 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Listed Migratory Species. Of these, 14 species are recorded as breeding on Long Island, including six EPBC Act Listed Migratory Species. Long Island is believed to particularly important for six species. These species are: White-faced Storm-Petrel, Pacific Gull, Silver Gull, Pied Oystercatcher, Crested Tern and Bridled Tern. The Bridled Tern is also listed under two international migratory bird agreements.

The proposal is likely to impact both in the short and long term on the values of Long Island as a significant breeding habitat. However there remains other important breeding populations of the affected species within the Wallabi Group including nearby Beacon and West Wallabi Islands such that it is considered that the proposal will not impact significantly on populations in the long term. It is the EPA’s view that the proposal can be managed to meet the EPA’s objective provided that the proponent implements adequate visitor management, avifauna-friendly lighting, restricts noise and aircraft appropriately, prevents the introduction of exotic species and monitors the impact on avifauna breeding. These together with adaptive management practices if impacts are detected, are recommended to form elements of the conditions for the Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP).

The vegetation communities of Long Island are not unique and are found elsewhere in the Abrolhos and the coastal mainland. A priority 4 species L. puberulum is likely to be impacted by the proposal however, it is found on other islands within the Wallabi Group and the Easter Group, as well as on other islands along the WA coast. The design of the proposal to include boardwalks will limit the initial impacts of construction and the longer term impacts on vegetation from visitors. Provided the proponent takes all practicable measures to avoid the Priority 4 species, through surveys and appropriate location of boardwalks and infrastructure, in addition to weed prevention/eradication measures, the impacts on the vegetation can be managed.
There are seven tidal ponds on Long Island which support a number of species of molluscs. The proponent indicates that no unique species have been found in the ponds however one species is likely to represent a range extension. For this species, the sediment layer in the pond is considered to be of importance, particularly the fact that it does not dry out at low tide as occurs in some other ponds. All infrastructure associated with the development will avoid the tidal ponds, although the main development will surround Tidal Pond 504 and will be adjacent to Tidal Pond 503. The proposal to introduce seawater to Tidal Pond 504 during times of neap tide and low wind to address odour concerns in the resort has the potential to impact the fauna of the pond. The EPA supports the tidal ponds being within an exclusion zone and has recommended the OEMP ensures that the addition of seawater to Tidal Pond 504 is undertaken in a manner which does not disturb the sediments.

The proposal has the potential to impact Benthic Primary Producer Habitat (BPPH), mainly corals, during construction of the jetty, helipad, snorkelling platforms, and wastewater outfall. Ongoing impacts to the BPPH include the wastewater discharges and tourist activities (i.e. snorkelling, SCUBA diving, anchoring). The proponent has conservatively estimated the impacts of the development on the BPPH at approximately 0.49 ha (or 0.01 % of the 50 km$^2$ Management Unit) which is below the Cumulative Loss Threshold of 2 % recommended by the EPA. However, the EPA has recommended that further definition of the route of the marine discharge pipelines and construction methodology needs to be provided in order to ensure construction impacts on BPPH are minimised.

The EPA notes the very low discharge rate of the wastewater outfall and the strong currents in Goss Passage which is likely to ensure that the discharge is well dispersed within 30 metres of the outfall. The proponent intends to manage the proposal in accordance with the State Water Quality Management Strategy. The EPA recommends that an E4 Low Level of Ecological Protection for nutrients and toxicants be assigned to the area within 30 metres of the marine outfall beyond which the E2 High Level of Ecological Protection will apply. The EPA considers that an appropriate monitoring program for water quality and environmental quality indicators is particularly important for this development, especially to ensure that the wastewater outfall discharges meet the E2 and E4 levels of ecological protection.

Long Island has a high heritage value both nationally and internationally through its association with the Batavia shipwreck and mutiny.

The proposed development has the potential to impact Batavia related sites or relics on Long Island during construction and through visitation to other islands. The proponent has undertaken appropriate surveys however, construction activities in particular have the potential to unearth additional relics. The proponent has committed to having a qualified archaeologist on site during major construction activities to ensure that any relics disturbed are recorded and recovered in an appropriate manner.

The EPA notes the gazettal of the Batavia Shipwreck Site and Survivors Camp Area under the EPBC Act as a place on the National Heritage List. The EPA has been advised that the Department of Fisheries (DoF) in cooperation with the WA Maritime Museum (WAMM) proposes to develop management plans and public information
for the protection of historic shipwrecks, associated land sites and other sites of heritage value. It is recommended that the proponent’s heritage management initiatives must be to the satisfaction of the WAMM to ensure they are consistent with this overall management strategy for the larger Batavia Shipwreck Site and Survivors Camp Area.

The EPA has provided other advice in relation to the conservation of fauna and flora on the Abrolhos. The EPA supports the DoF (2007) proposed management strategy for the protection of fauna and flora on the Abrolhos and recommends that it identifies those islands that have significant fauna and flora value, and that those islands be managed primarily for their conservation value. Consequently, future tourism development that leads to significant increases in habitation should not occur on those islands that have been identified to have conservation value.

The EPA has concluded that the proposal is capable of being managed to meet its objectives, provided that there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4.1.

8. Recommendations
The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for a tourism development on Long Island, Wallabi Group, Houtman-Abrolhos Islands, consisting of visitor lodges, staff accommodation, communal facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities.

2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;

3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA’s objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and

4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.
Appendix 1

List of submitters
Organisations:

Conservation Council of WA
Department of Environment and Conservation (WA)
Department of Environment and Heritage (Commonwealth)
Department of Fisheries (WA)
Department of Health
Department of Indigenous Affairs (WA)
Department for Planning and Infrastructure
Friends of the Abrolhos Inc.
Heritage Council of WA
Midwest Development Commission
Northern Agricultural Catchment Council
WA Museum

Individuals:

Dr Andrew Burbridge
Mr Kevin Coate
Mr Paul Robb
Mr Russell Speed
Ms Emily Stoddart
Mr Bill Thomson
Appendix 2

References


Appendix 3

Summary of identification of key environmental factors and principles
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<th>Preliminary Environmental Factors</th>
<th>Proposal Characteristics</th>
<th>Government Agency and Public Comments</th>
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<tr>
<td><strong>BIOPHYSICAL</strong></td>
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<tr>
<td>Vegetation</td>
<td>Total footprint of the development is approx. 0.89 ha (about 7.5% of Long Island). The development will impact approx. 10% of the most significant vegetation community, <em>Atriplex cinera</em> dwarf shrubland, which covers approximately 47.5% of Long Island and may be used by burrowing bird species in areas of sufficiently deep sand. 14 weed species are recorded to be widespread on Long Island. The Priority 4 species <em>Lepidium puberulum</em> has been recorded, near Tidal Pond 504. The proponent has stated that it will attempt to minimise impacts on this species through marking each individual prior to construction and avoiding where possible.</td>
<td>One submission raised concerns that visitors could add to the destruction of terrestrial vegetation by wandering off boardwalks. Introduction of weed species was also raised as an issue. One submission raised concerns that the significance of the population of <em>L. puberulum</em> had not been determined, nor the level of impact on the species as a whole.</td>
<td>Considered to be a relevant environmental factor and is discussed in section 3.1 ‘Vegetation’.</td>
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<tr>
<td>Terrestrial biodiversity - Avifauna</td>
<td>Various surveys have recorded 28 species of avifauna on Long Island, including one CALM Priority Species and 12 EPBC Act Listed Migratory Species. Of these, 14 species are recorded as breeding on Long Island, including six EPBC Act Listed Migratory Species.</td>
<td>Submissions stated that Long Island is a significant seabird site for breeding and rest/feeding, used by a number of migratory species, including some protected by international treaties. The survey by Dr Surman was considered to be too short and did not cover the autumn period when additional breeding populations would be likely. Visitor disturbance, lighting, noise poles and antennae were listed as having the potential to significantly impact avifauna. It was also commented that the draft management plans were inadequate. Issues related to quarantine and introduction of vermin were also raised.</td>
<td>Considered to be a relevant environmental factor and is discussed in section 3.2 ‘Terrestrial Biodiversity - Avifauna’.</td>
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<tr>
<td>Terrestrial Biodiversity – Tidal Ponds</td>
<td>Seven tidal ponds have been recorded on Long Island, with the development adjacent to Pond 503 and surrounding Pond 504. Tidal Ponds support a range of mollusc and algae species, and migratory waders and sea lions are known to use the tidal ponds on Long</td>
<td>Submissions raised concerns that the proposal to add water to the Tidal Pond 504 would change the ecology of the pond, which could possibly contain species of genetic divergence, due to their isolation. It was recommended that the genetic significance of the fauna in this pond be investigated prior to development and that the impacts should be carefully monitored.</td>
<td>Considered to be a relevant environmental factor and is discussed in section 3.3 ‘Terrestrial Biodiversity – Tidal Ponds’.</td>
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<td><strong>Island for resting/feeding.</strong></td>
<td>It is proposed that seawater be added to Pond 504 during times of extreme neap tide when the algae may begin to decompose, which causes undesirable odours. 11 mollusc species have been recorded in Pond 504, and there are suggestions that the ponds represent a ‘range extension’ for the species and that there may be some genetic divergence between ponds, and between pond and shore populations on Long Island.</td>
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<td><strong>Marine Biodiversity – Benthic Primary Producer Habitats</strong></td>
<td>The proponent estimates that approx. 174 m$^2$ of direct losses (i.e. from jetty and wastewater discharge pipeline construction) and 3682 m$^2$ of indirect losses (i.e. from wastewater discharge, shading from jetty and helipad) to the Benthic Primary Producer Habitat (BPPH). The potential impacts are less than the 2 % threshold (as recommended in EPA Guidance Statement No. 29 Benthic Primary Producer Habitat Protection for Western Australia’s Marine Environment) for the Management Unit, taking into account fishing impacts. No losses are expected within the Reef Observation Area.</td>
<td>Submissions raised queries in relation to the outfall pipeline construction and route and its impact on BPPH.</td>
<td>Considered to be a relevant environmental factor and is discussed in section 3.4 ‘Marine Biodiversity’.</td>
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<tr>
<td><strong>Marine Biodiversity – Sea Lions</strong></td>
<td>Australian Sea Lions (<em>Neophoca cinerea</em>) use Long Island, particularly near Tidal Pond 503 (which is adjacent to the development), as a haul out area. The boardwalk near Tidal Pond 503 will be raised to approximately 2 metres to allow sufficient separation between visitors/staff and sea lions and allow sea lions to move across the island. However, it is acknowledged that Sea Lions may no longer use this area into the future. Day tours will not land on</td>
<td>One submission raised concerns that there is no description of the potential impact the resort will have on the Australian Sea Lion, and also that no monitoring had been proposed.</td>
<td>The proponent has stated that Sea Lions will be monitored by staff and information recorded in a logbook. This information will be provided to the DoF on an annual basis. Factor does not require further EPA evaluation.</td>
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<td>islands, and a 200 metre separation distance will apply, where Sea Lions are present. The Australian Sea Lion is a ‘Listed Marine Species’ and is considered ‘Vulnerable’ under the EPBC Act. It is also a ‘Specially Protected Fauna’ under the Wildlife Conservation Act 1950.</td>
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<td>Coastal Processes</td>
<td>Long Island is a very narrow, low-lying island. The proposed infrastructure will be raised 500 mm off the ground, which will create an elevation of at least 2.5 m above mean sea level, which is the recommended elevation to avoid damage by storm surges (one in 25 year storm surge), however it also allows for 0.5 m factor of safety (M.P. Rogers and Associates 1997). This factor of safety will allow for some sea level rise as a result of climate change. Visitor accommodation will be constructed to withstand extreme events unoccupied, while staff facilities will be constructed to Australian Standards for occupancy during extreme events. Emergency evacuation procedures are also proposed.</td>
<td>Submissions raised concerns relating to rising sea levels and storm surges. A small number of submissions also stated that they believed the resort did not comply with setback requirements in the State Coastal Planning Policy 2003. One submission stated that the proposed jetty may impact coastal processes.</td>
<td>Erosion/accretion is likely to be minimal on a coral reef island. Storm surges and climate change have been adequately accounted for and evacuation procedures will be developed (the EPA expects these will be to a similar standard as, or adopt, the Western Australian State Emergency Service Abrolhos Islands Tropical Cyclone Plan). Factor does not require further EPA evaluation.</td>
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<tr>
<td>POLLUTION</td>
<td>Marine Water Quality</td>
<td>WWTP will produce a maximum 17 kL/day of treated wastewater with nutrient concentrations of 30 mg/L Total Nitrogen and 12 mg/L Total Phosphorus. Modelling indicates that a dilution of 1:10 000 is achievable within 20 m of the outfall and therefore, the proponent has suggested a 30 m mixing zone, after which it is predicted the water quality will be at background levels. The desalination plant, at maximum capacity, will discharge</td>
<td>Submissions stated that it was unacceptable to allow such high nutrient wastewater to be discharged to the marine environment and that Goss Passage was an important benthic habitat with great SCUBA diving. Some submissions raised concerns regarding the monitoring programs associated with the discharge and some queried the need for a swimming pool.</td>
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<td>Approximately 140 kL of hypersaline wastewater. Antiscalant chemicals will be added to the desalination plant. If emptied or backwashed, the swimming pool water will be passed through the WWTP prior to discharge.</td>
<td>Submissions raised queries as to why diesel generators were being used as the main power supply, instead of more environmentally-friendly options.</td>
<td>The proponent has advised that renewable energy options and liquefied natural gas (LNG), were investigated, however, were assessed as being unfeasible for a number of reasons. Diesel power generation was chosen due to its reliability, and also because the diesel supply and refueling infrastructure is readily available at the Abrolhos. The air emissions from this proposal are unlikely to significantly impact on the air quality on Long Island or the Abrolhos. Factor does not require further EPA evaluation.</td>
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<tr>
<td>Air and Greenhouse Emissions</td>
<td>Diesel generators, supplemented by some liquefied petroleum gas (LPG) and solar energy, will supply power for the development. Two ~120 kVA output generators will be used as primary power generation, with a third generator for extra redundancy. Air emissions will include carbon dioxide, carbon monoxide, oxides of nitrogen and particulates.</td>
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<td>Non-Chemical Emissions – Noise</td>
<td>Noise emissions will result from the diesel generators, wastewater treatment and desalination plants, vehicles, visitor activities and movement, planes, helicopters, boats and jet skis. Management will include sound proof containers for the generators, the use of electric pumps within compounds for the WWTP and desalination plants, noise reducing mufflers on vehicles, flight paths and times will be restricted, and jet skis and boats will be speed restricted within 200 m of islands.</td>
<td>Concerns were raised regarding noise emissions from the diesel generators and jet boats/skis.</td>
<td>The impact of noise on avifauna is considered to be a relevant environmental factor and is discussed in section 3.2 ‘Avifauna’.</td>
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<td>Non-Chemical Emissions – Lighting</td>
<td>Lighting within the development has the potential to disorientate avifauna and lead to collisions with objects. Lighting is proposed to be downcast, directed, low wattage, and yellow (sodium vapour) lighting will be used where possible. Lighting will be minimised where possible, and tinted glass will be used.</td>
<td>Submissions were concerned with the impacts of lighting on avifauna.</td>
<td>The impact of lighting on avifauna is considered to be a relevant environmental factor and is discussed in section 3.2 ‘Avifauna’.</td>
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<tr>
<td>Solid Waste</td>
<td>All solid waste will be stored in specific mobile garbage bins and transported to the mainland for recycling/disposal as appropriate. Solid waste will be minimised as far as practicable.</td>
<td>Submissions raised solid waste and recycling as issues for the proponent to consider. One submission stated that sludge from the WWTP had not been considered.</td>
<td>No solid waste is to be disposed of on Long Island.</td>
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<tr>
<td>Hazardous Materials</td>
<td>Approx. 370 L/day diesel will be required for the generators during peak times. Total of 2500 L will be stored on site in self-bunded storage tanks and augmented with spill kits. Double sheathed pipes will be used for transporting diesel from vessels to the storage tanks.</td>
<td>Submissions stated that the use of solar energy would reduce the risk of hydrocarbon spills.</td>
<td>Chemicals to be transferred and stored in accordance with Australian Standards.</td>
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**SOCIAL SURROUNDINGS**

| Aboriginal Heritage | A search of the DIA Register and consultation with Native Title claimants in the region has not revealed any Aboriginal heritage sites in the Abrolhos. Neither Long Island nor the Abrolhos is part of the Yamatji Native Title Claim Area. The proponent met with each of the coastal claimant working groups to determine if there were any concerns. None of the groups indicated any concerns with the development, and thus a archaeological survey was not undertaken. | Department of Indigenous Affairs recommended that an archaeological survey be conducted of Long Island by the proponent. | The proponent has advised that Long Island is a coral island formed from reefs in the last 5,000 years and was never joined to the mainland. A search of the DIA Register and consultation with Native Title claimants in the region has not revealed any Aboriginal heritage sites in the Abrolhos. |

<p>| European Heritage | Long Island has a high national and international heritage value through its | Submissions stated that the development would impact on the important heritage values of Long Island and would result in the | Considered to be a relevant environmental factor and is |</p>
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<td>association with the <em>Batavia</em>. Long Island was the location of some of the survivor camps, the second largest slaughter, the detainment of most of the mutineers, and the hangings of several of the mutineers. Archaeological surveys of Long Island have only revealed a small number of relics, and the location of the occupation, slaughter and gallows sites are still unknown. These sites could be damaged during construction and also through visitor activity. The <em>Batavia</em> wreck could be impacted through increased visitation.</td>
<td>loss of sense of place. The WAMM has previously stated that its preferred position is no development on islands of archaeological significance associated with the <em>Batavia</em> wreck.</td>
<td>discussed in section 3.5 ‘European Heritage’.</td>
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</tr>
<tr>
<td>Visual Amenity</td>
<td>The architecture of the proposed development is single story buildings ('stylised fishing shacks') on elevated boardwalks.</td>
<td>One submission stated that being the only continuously lit facility in the Wallabi Group will decrease the landscape value to other users and reduce the darkness of the night sky.</td>
<td>Impact on visual amenity is not considered to be significant. Factor does not require further EPA evaluation.</td>
</tr>
<tr>
<td>Access to the Abrolhos</td>
<td>Some people may perceive that access to Long Island by non-paying visitors is no longer available. The proposal includes a day pavilion (with interpretive signage, kiosk, dive shop) which can be accessed by all. Access to the rest of the resort will be controlled. Access to other Abrolhos Islands will not be impacted by the proposal.</td>
<td>No submissions.</td>
<td>Factor does not require further EPA evaluation.</td>
</tr>
<tr>
<td>OTHER</td>
<td>The proponent has committed removing all infrastructure, unless otherwise agreed with appropriate agencies, if the lease is not renewed. The current lease is for 21 years, with the option for another 21 years and the potential for a third 21 year period. If necessary, re-establishment of vegetation will use local species and marine experts will be consulted regarding assisted reinstatement of benthic primary</td>
<td>No submissions.</td>
<td>As the need for decommissioning and rehabilitation is linked to whether the lease is renewed or not, the EPA recommends that the DoF and the Minister for Fisheries considers including decommissioning and rehabilitation conditions as part of the Tourism Lease. Factor does not require further EPA evaluation.</td>
</tr>
</tbody>
</table>
Eco-tourism principles

The development will use solar power to augment primary power supply as far as practicable. Rainwater storage was not feasible.

Submissions raised concerns that the proposal is for an eco-tourism resort, however diesel generators will be used as the main power supply and a desalination plant will be used for water supply. It was suggested that renewable energy should be used with diesel as a back-up, which would have the added benefit of a lower risk of diesel spills. Submissions also suggested that rainwater should be utilised as a first option, with desalination to make up the rest.

While the use of renewable energy sources as primary power supply and use of rainwater would have been preferable, the impact is not considered to be significant.

Factor does not require further EPA evaluation.

Management and regulation

The DoF, on behalf of the Minister for Fisheries, manages the Abrolhos Islands Reserve. The Tourism lease required by the proponent is granted by the Minister for Fisheries.

Submission raised concerns that there isn’t adequate government management (e.g. a land management plan) and regulation of the Abrolhos. Some stated that a more appropriate agency, rather than DoF, should be established, similar to the Rottnest Island Authority. Concerns regarding compliance and monitoring, in relation to the proposed development, by government agencies were also raised.

The overall management and regulation of the Abrolhos is not part of this proposal, however, the EPA has provided “other advice” in relation to future tourism at the Abrolhos and the conservation of islands that are currently not impacted.

Factor does not require further EPA evaluation.

PRINCIPLES

<table>
<thead>
<tr>
<th>Principle</th>
<th>Relevant Yes/No</th>
<th>If yes, Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The precautionary principle &lt;br&gt; where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. &lt;br&gt; In application of this precautionary principle, decisions should be guided by – &lt;br&gt; (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and &lt;br&gt; (b) an assessment of the risk-weighted consequences of various options.</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>2. The principle of intergenerational equity &lt;br&gt; the present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</td>
<td>Yes</td>
<td>The EPA considers that the most significant impact of the proposal will be on avifauna, and the proponent has designed the resort so that the impact of human disturbance will be minimised through the use of boardwalks and raised buildings (except the services compound), among other management measures.</td>
</tr>
</tbody>
</table>
Additionally, the proponent has committed to decommissioning the resort and rehabilitating the impacted areas if the lease is not extended.

Therefore, the proposal is not considered to have an unacceptable impact on the health, diversity or productivity of the environment.

3. The principle of the conservation of biological diversity and ecological integrity

*Conservation of biological diversity and ecological integrity should be a fundamental consideration.*

<table>
<thead>
<tr>
<th>Yes</th>
<th>In considering this proposal, the EPA notes that:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- the proponent will take all practicable measures to avoid the Priority 4 species <em>L. puberulum</em> through surveys and selective placement of boardwalks and other infrastructure;</td>
</tr>
<tr>
<td></td>
<td>- the proponent will not clear more than 30% of any one vegetation community that occurs on Long Island;</td>
</tr>
<tr>
<td></td>
<td>- a range of management measures are proposed to mitigate the impact on avifauna;</td>
</tr>
<tr>
<td></td>
<td>- that the proposal is unlikely to impact Australian Sea Lions.</td>
</tr>
</tbody>
</table>

Therefore, the proposal is not considered to represent an unacceptable impact on the conservation of biological diversity and ecological integrity.

4. Principles relating to improved valuation, pricing and incentive mechanisms

- Environmental factors should be included in the valuation of assets and services.
- The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.
- The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.
- Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.

<table>
<thead>
<tr>
<th>No</th>
</tr>
</thead>
</table>

5. The principle of waste minimisation

*All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*

| Yes | In considering this proposal, the EPA notes that the proponent intends on reducing waste being brought to the resort, and that all waste will be returned to the mainland to be recycled where possible, or otherwise disposed of. While the use of renewable energy and rainwater/recycling of water would have been preferable, it is noted that it was not generally practical for this proposal. |
Appendix 4

Recommended Environmental Conditions
RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

LONG ISLAND TOURISM DEVELOPMENT,
HOUTMAN-ABROLHOS ISLANDS.

Proposal: The construction and operation of a tourism development on Long Island, Wallabi Group, Houtman-Abrolhos Islands, consisting of visitor lodges, staff accommodation, communal facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities.

Proponent: Humfrey Land Developments Pty Ltd

Proponent Address: PO Box 1917 GERALDTON WA 6531

Assessment Number: 1559

Report of the Environmental Protection Authority: Bulletin 1250

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in Schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for the Environment under sections 38(6) or 38(7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer of the Department of Environment and Conservation (CEO) of any change of the name and address of the proponent for the serving of a notice or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.
4 Compliance Reporting

4-1 The proponent shall submit to the CEO environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO to report more frequently.

4-2 The environmental compliance reports shall address each element of an audit program approved by the CEO and shall be prepared and submitted in a format acceptable to the CEO.

4-3 The environmental compliance reports shall:

1. be endorsed by signature of the proponent's chief executive officer or a person, approved in writing by the CEO, delegated to sign on behalf of the proponent's chief executive officer;
2. state whether the proponent has complied with each condition and procedure contained in this statement;
3. provide verifiable evidence of compliance with each condition and procedure contained in this statement;
4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;
5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;
6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance;
7. review of the effectiveness of all corrective and preventative actions taken; and
8. describe the state of implementation of the proposal.

4-4 The proponent shall make the environmental compliance reports required by Condition 4-1 publicly available in a manner approved by the CEO.

5 Construction Environmental Management Plan

5-1 Prior to undertaking any ground-disturbing activities, the proponent shall prepare a Construction Environmental Management Plan to the requirements of the Minister for the Environment.

The objectives of this Plan are to:
- Effectively manage the construction activities so that the environmental values of the area are not significantly adversely affected; and
- Effectively manage the construction activities so that the heritage values of the area are not significantly adversely affected.

This Plan shall address the following:
1. Vegetation survey of the Long Island development area (see Figure 1) to locate all occurrences of *Lepidium puberulum* and procedures, including maps, to avoid disturbance to this species during construction as far as practicable;
2. Avifauna-friendly lighting design;
3. Establishment of an Avifauna Monitoring Program, which will include an autumn baseline survey to be implemented prior to any ground-disturbing activities and
regular monitoring during construction activities, to allow determination of impacts of the development on avifauna;

4. Procedures, including maps and utilising the avifauna breeding site data from the baseline survey referred to in Item 3 above and Surman, C. A. (2006) *Field Survey of Avifauna at Long Island, Wallabi Group, Houtman Abrolhos, September and December 2005*, unpublished report prepared for MBS Environmental by Halfmoon Biosciences, indicating how impacts on avifauna breeding sites will be avoided or otherwise minimised;

5. Quarantine procedures to prevent the introduction of, monitor for and eradicate if necessary, exotic species (flora and fauna) during construction activities, to a standard that meets or exceeds Department of Conservation and Land Management (2003) *Quarantine Protocol: Charter Vessel Operators*, Department of Conservation and Land Management, Western Australia, guidelines.

6. Procedures to exclude all Tidal Ponds (see Figure 2) from construction activities;

7. Procedures to undertake surveys of the Benthic Primary Producer Habitat in order to determine the extent of Benthic Primary Producer Habitat to be impacted by construction activities and description of construction methodologies and provision of maps to scale, or other survey information, that demonstrates the avoidance of significant impacts on Benthic Primary Producer Habitat.

8. Establishment of appropriate social Environmental Quality Objectives, including spatially defining areas to be designated S2, S3 and S4 (i.e. areas not safe for fishing/aquaculture, primary contact recreation or secondary contact recreation respectively; as defined in reference at foot of condition) for the area surrounding the wastewater treatment plant outfall, on advice of the Department of Fisheries;

9. Establishment of a Marine Monitoring Program, including coral health monitoring and marine water quality monitoring, to set baselines and measure compliance against the wastewater treatment plant and desalination plant discharges meeting the E4 Low Level of Ecological Protection (as defined in reference at foot of condition) within the 30 metre mixing zone of the wastewater outfalls and the E2 High Level of Ecological Protection (as defined in reference at foot of condition) at the boundary of the 30 metre mixing zone of the wastewater outfalls and the Social Environmental Quality Objectives defined in accordance with Item 8 above; and

10. Procedures to identify, record and appropriately recover European Heritage artefacts uncovered during construction, including having a qualified archaeologist onsite during all ground-disturbing construction activities.

Note: Environmental Protection Authority (2000) *Perth’s Coastal Waters – Environmental Values and Objectives. The Position of the EPA – a Working Document*. Environmental Protection Authority, Perth, Western Australia

5-2 The proponent shall implement the Construction Environmental Management Plan required by Condition 5-1.

5-3 The proponent shall make the Construction Environmental Management Plan required by Condition 5-1 publicly available in a manner approved by the CEO.

6 **Operational Environmental Management Plan**

6-1 Prior to commencement of operations, the proponent shall prepare an Operational Environmental Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.
The objectives of this Plan are to:

- Effectively manage the operation of the proposal so that environmental values in the area are not significantly adversely affected; and
- Effectively manage the operation of the proposal so that the heritage values of the area are not significantly adversely affected.

This Plan shall address the following:

1. Visitor Code of Conduct, including minimising human disturbance to avifauna and European Heritage artefacts;
3. Continued implementation of the Avifauna Monitoring Program established in accordance with Condition 5-1 Item 3 throughout the operation of the proposal;
4. Establishment of avifauna population distribution, size and reproductive success trigger values and contingencies for adaptive management practices should these triggers be exceeded;
5. Quarantine procedures to prevent the introduction of, monitor for and eradicate if necessary, exotic species (flora and fauna) throughout the operation of the proposal, to a standard that meets or exceeds Department of Conservation and Land Management (2003) *Quarantine Protocol: Charter Vessel Operators*, Department of Conservation and Land Management, Western Australia, guidelines;
6. Procedures for managing the addition of seawater to Tidal Pond 504 (see Figure 2), including the establishment of a maximum flow rate, maximum water height within the Pond, padlocking of control systems, signposting and access to be by authorised personnel only;
7. Continued implementation of the Marine Monitoring Program established in accordance with condition 5-1 Item 9 throughout the operation of the proposal;
8. Contingencies for where the Marine Monitoring Program indicates that the proposal is not meeting the Ecosystem Health Environmental Quality Objectives described in condition 5-1 Item 9; and
9. Procedures, developed in consultation with the Western Australian Maritime Museum and the Department of Fisheries, to address the ongoing impacts of the proposal on European Heritage values.

Note: “commencement of operations” means for the purposes of this document, post-significant construction activities such that the facility can now be utilised by staff and/or visitors.

6-2 The proponent shall implement the Operational Environmental Management Plan required by Condition 6-1.

6-3 The proponent shall make the Operational Environmental Management Plan required by Condition 6-1 publicly available in a manner approved by the CEO.

Notes
1. Where a condition states "on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.

3. The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.
The Proposal (Assessment No. 1524)

General Description

The proposal is for a tourism development on Long Island, Wallabi Group, Houtman-Abrolhos Islands, consisting of visitor lodges, staff accommodation, communal facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities.

Summary description

A summary of the key proposal characteristics is presented in Table 1.

Table 1 – Summary of the Key Proposal Characteristics

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Long Island, Wallabi Group, Houtman-Abrolhos Islands</td>
</tr>
<tr>
<td>Proposal</td>
<td>Tourism development consisting of visitor lodges, staff accommodation, communal facilities, boardwalks and gazebos, a swimming pool, deep water jetty, helipad, wastewater treatment plant, desalination plant and other maintenance/service facilities</td>
</tr>
<tr>
<td>Proposal Area (terrestrial, including boardwalks)</td>
<td>Not more than 0.89 hectares</td>
</tr>
</tbody>
</table>
| Benthic Primary Producer Habitat Impact Area | Not more than 180 square metres of direct impacts  
Not more than 3700 square metres of indirect impacts |
| Infrastructure                               | Deep water jetty  
Helipad  
Desalination plant  
Wastewater treatment plant  
Wastewater outfall pipeline (not more than 70 metres long)  
Diesel generators (three of up to ~120 kilovolt-amperes each, including one as a redundancy) |
| Wastewater treatment plant discharge         | Not more than 17 kilolitres per day  
30 milligrams per litre Total Nitrogen  
12 milligrams per litre Total Phosphorus  
200 coliform units per litre  
0.5 parts per million chlorine |
| Desalination plant discharge                 | Not more than 35 kilolitres per day potable water produced  
Not more than 45 practical salinity units  
22 degrees Celsius |

Figures

Figure 1 - Proposal site plan (Figure 3 above).  
Figure 2 - Tidal Ponds of Long Island (Figure 5 above).
Appendix 5

Summary of Submissions and Proponent’s Response to Submissions
Long Island Tourism Development,
Abrolhos Islands Western Australia

Final Response to Submissions and Proposed Amendments to PER (No. 1559)

October 2006

Prepared for:

Prepared by:
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West Perth  WA  6005

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Fax: (08) 9226 3177
Email: info@mbsenvironmental.com.au
Web: www.mbsenvironmental.com.au
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1. **ABROLHOS ISLANDS REGULATORY PROCESS**

**RAISED BY: CONSERVATION COUNCIL (SUBMISSION 6)**

1. The proponents for the Long Island Tourism Development have been comprehensive in dealing as far as possible with the environmental issues raised with respect to the installation of tourism facilities on Long Island and within the Wallabi Group. However, there are a number of unresolved issues that relate to the weak regulatory framework for the Abrolhos with respect to the environmental management of the islands and of a tourism industry.

Response: These concerns are noted. This is an issue for the Department of Fisheries (DoF) and the WA Government. It is beyond the scope of this Public Environmental Review (PER).

2. Despite repeated urging from the Conservation Council and others the Abrolhos Islands still does not have a management plan for the terrestrial environments (islands) with appropriate zoning, regulatory instruments or compliance services. This of course reflects the priorities and capabilities of an agency with its core business being the regulation of commercial and recreational fishing and aquaculture. Unfortunately the government of Western Australia is pressing to establish a tourism industry at the Abrolhos before establishing an appropriate management system. This is akin to the normal fisheries approach of allowing pressures on resources (eg. fish) to develop before implementing controls or limits on exploitation. Such an approach for limited ecosystems such as small islands is most undesirable.

Response: See response 1-1. Notwithstanding, it is considered that the design and management of the resort based on extensive studies conducted by Humfrey Land developments (HLD) make this resort an environmentally acceptable prospect.

3. There would appear to be a number of environmental management measures associated with this development that (despite the undertakings of the proponent) require action by government for effective implementation. These include:
   - A comprehensive land management plan with appropriate zoning to protect vulnerable plant and animal populations and to provide for visitation where appropriate. Such a plan would also have to prescribe off-island infrastructure such as moorings, jetties etc and designate acceptable flight paths and landing areas for aircraft (particularly helicopters and flying boats that are a major seabird disturbance risk).
   - Quarantine measures to prevent the introduction to, and secondary dispersal of, exotic organisms to the islands by visitors.
   - Appropriate regulations to support the zoning scheme and quarantine measures in the management plan.
   - Sufficient compliance resources to enforce the regulations.
   - A certification system for proposed “ecotourism” products for the Abrolhos including services provided from the Long Island Tourism Development.
   - A comprehensive surveillance monitoring program for seabirds and island ecosystems to provide the context for assessing the project-specific monitoring outcomes.
Response: See responses 1-1 and 1-2. The conditions of approval for the project through the PER process and the Tourism Licence to be issued to HLD will provide the necessary controls to ensure effective implementation and management of the resort.

4. Many of these requirements were outlined with respect to seabird conservation in the Abrolhos Seabird Management Strategy.
Response: See response 1-1. Notwithstanding, it is considered that the design and management of the resort takes into account aspects of this strategy where relevant.

RAISED BY: SUBMISSIONS 8 AND 14, MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)
5. Ideally tourism development at the Abrolhos should be undertaken by government with a structure modelled on the Rottnest Island Management Authority.
Response: These concerns are noted. This is an issue for the DoF and the WA Government. It is beyond the scope of this PER.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)
6. The Resort will cause a significant increase in overall visitors to the Abrolhos (bringing more visitors to the Abrolhos than the current numbers of crayfishing families and friends who visit during the A-Zone season). The Department of Fisheries have instigated this tourism development process, and they will need to significantly increase their presence and efforts in managing and policing impacts of tourists.
Response: This point is noted. This is an issue for the DoF and the WA Government.

7. The extra public moorings likely to be installed by the Department of Fisheries will further add to the volumes of boat traffic and associated noise pollution and potential damage to benthic habitat. What extra management provisions is the Department planning to implement to mitigate this concentration of tourist effort and impact?
Response: This is an issue for the DoF and the WA Government.

RAISED BY: SUBMISSIONS 8 AND 14
8. On page 81 of the PER document it is stated that a management plan to protect and conserve the site has not been developed. This yet to be developed plan is required prior to further consideration of tourism development on Long Island.
Response: The design and operation of the resort is based on information and plans available to date. Page 81 refers to the Heritage Management Plan for the National Heritage Listed place and is to be developed by the WA Government in consultation with Department of Environment and Heritage (DEH). It is our understanding that this is in the preliminary stages of development. The resort’s own heritage plan is called the “Long Island Resort Heritage Management Plan”. This is being prepared by the WA Maritime Museum (WAMM) on behalf of HLD and this will be done in consultation with the Heritage Council of WA. The Long Island Resort Heritage Plan will be consistent with the Heritage Management Plan as the plan is to be developed by WAMM in cooperation with DoF.
2. **PROJECT DESCRIPTION**

2.1 **LONG ISLAND SITE SELECTION PROCESS**

**RAISED BY: CONSERVATION COUNCIL (SUBMISSION 6)**

1. Long Island is unlikely to have been the preferred site for this or any other developer as it is a particularly exposed, narrow island consisting of coral rubble. The absence of sandy or planar limestone areas for construction makes it challenging from an engineering perspective and reduces the amenity values for visitors. The lack of space makes it difficult to establish sufficient distance between visitors and breeding seabirds increasing the risk of disturbance effects and reducing opportunities for developing habituation responses. The site also intrudes on the landmarks of the Batavia historical complex.

Response: The Minister for Fisheries and the Abrolhos Islands Consultative Council (AICC) /Abrolhos Islands Management Advisory Committee (AIMAC) have been considering a small scale, land based tourism site on Long Island since 1994. The site selection process has been discussed in detail in section 3.2.1 of the PER. The process through which Long Island was short-listed as the preferred island for development involved all relevant regulatory authorities. The DoF has recommended that islands already inhabited be avoided due to potential incompatibility between fishers and tourists.

Following the site selection process the DoF requested HLD to submit a proposal to develop a resort on Long Island. The resort has been designed to a high level of engineering and amenity standards to address all engineering and amenity aspects associated with the island. The design and operation of the resort has taken into account the impact of visitors on breeding seabirds and heritage issues which are discussed further in sections 7.4.2.3 and 8.2.3 respectively.

2. The selection of Long Island for this development appears to be based on criteria other than land capability, particularly the intransigence of the Rock Lobster Fishery with respect to having tourism facilities on the occupied islands and the intention of DoF to establish a new base in the Wallabi Group (subsidised by the private sector).

Response: Refer to response 2.1-1. Long Island was chosen for a variety of ecological and cultural reasons outlined in Section 3.2.1.1. The DoF’s choice of island on which to build a facility is out of the control of HLD and not a matter for this PER.

**RAISED BY: DEC (SUBMISSION 12)**

3. The principal issue is whether the proposed development is environmentally acceptable on an island of significant biodiversity conservation value that has no current infrastructure or identified significant impacts on biodiversity. Notwithstanding the various planning documents pertaining to the Abrolhos Islands, it is considered that the PER should examine and report on the relative biodiversity impacts of a similar development on other islands in the Abrolhos as alternatives to Long Island. Other locations, and particularly those that have been significantly disturbed in the past or include sites of current habitation, may have a significantly lesser impact on biodiversity and be environmentally more acceptable. The significance of the proposed change from a largely pristine island to
a tourist resort island is not considered in any detail in the PER and alternative islands for resort development have not been discussed.

Response: In short-listing Long Island, the AICC Working Group specifically noted that the interests of rock lobster fishers and tourism operators would be largely incompatible. This working group included representatives of representatives of Department of Conservation and Land Management (CALM) (which has now become Department of Environment and Conservation (DEC)). This AICC process excluded most or all of the islands which could have been considered to be significantly disturbed in the past. Notwithstanding the important bird colonies, the use of the words “Largely Pristine” needs to be addressed. It should be noted that Long Island contains significant weed populations and has been visited by tourists in an uncontrolled manner for many years. Of the remaining uninhabited islands, Long Island was considered through the short-listing process to have the preferred attributes for a tourism development with potentially lower impacts compared to those such as East Wallabi Island. The site selection process is described in section of 3.2.1 of the PER.

4. The appropriateness of the use of a relatively undisturbed, uninhabited island of significance to biodiversity conservation as a base for a resort operation has not been questioned. Development of tourism facilities on other areas within the Abrolhos system, such as some of the inhabited islands, would have significantly less impact on biodiversity conservation values. There should be a review that considers the possible alternatives across the Abrolhos in terms of relative biodiversity and environmental impacts of such a development.

Response: See response 2.2.1-3 above. A review considering alternative islands across the Abrolhos was conducted by the AICC Working Group, which included representatives from CALM (now DEC). This review took into account environmental, social and economic considerations.

RAISED BY: SUBMISSIONS 8 AND 14

5. Long Island has extremely important historic cultural significance. Its significance in the events that unfolded following the wreck of the Batavia is well documented. It could be considered an act of desecration to knowingly plaster a tourism development all over the place where so many shocking murders and executions took place. How would many Australians feel about building a five star resort hotel on the beach at Gallipoli?

Response: The historic cultural significance of the island is discussed in detail in the PER. Development of the resort on Long Island will ensure an increased awareness and understanding of the important historical events associated with the Batavia. The resort will not disturb any archaeological artefacts associated with the Batavia and will provide a level of control to access where previously there was none.

6. Long Island is also a particularly environmentally sensitive island adjacent to the deep channel of Goss Passage. Disposing treated effluent into Goss Passage poses an unacceptable environmental risk. Regardless of safeguards, disposal of wastewater into Goss Passage provides a conduit for untreated sewage or chemicals to be perhaps even unwittingly discharged.

Response: The discharge consists of very small volumes of treated wastewater which will be rapidly diluted within strong currents of Goss Passage. Proposed quality of discharge is well above the standard of existing practices in the region.
With regard to raw sewerage spills this is highly unlikely as the tanks are sealed, the system is run under a vacuum so if there is a leak air will flow into the pipes rather than sewage spilling out of the conduits. This type of leak will be identified by the control system as a drop in suction. The initial collection tanks which are gravity fed are also sealed.

7. Long Island is a particularly narrow island. Any proposed development on Long Island breaches the set-back requirements of the State Coastal Planning Policy. The proponent appears to have completely overlooked requirements to comply with the policy introduced in April 2003.

Response: To the best of our knowledge there is no legal statutory role for the Western Australian Planning Commission or the Minister for Planning considering land use and development on these islands. That power rests with the DoF who ultimately will be responsible for approving development in a form which they believe meets relevant policies and guidelines of government. The DoF have provided the development zone and design constraints within which to locate and operate the resort on Long Island.

RAISED BY: SUBMISSION 17

8. The site selection process appears to have been conducted with a questionable lack of transparency and of broad public and expert consultation.

Response: Consultation conducted by DoF/AIMAC during the site selection process was conducted in a transparent manner and involved extensive public consultation such as through local and state newspapers and acknowledged in Fisheries Management Paper 146 Sustainable Tourism Plan for the Houtman Abrolhos Islands (February 2001). Section 6.2.1 of the PER addresses the consultation process as conducted by DoF/AIMAC.

9. Is Long Island an appropriate site for this resort development? The Inventory of Land Conservation Values of the Houtman Abrolhos Islands 2003 lists Long Island as having ‘High’ conservation significance, for its heritage values in particular. Further reasons for the inappropriateness of such a tourism development on Long Island: the largely undisturbed condition of the natural values of Long Island (in comparison with fisher-inhabited islands, guano mined sites, and East Wallabi Island), and the loss of opportunity to develop, celebrate and interpret the historical heritage and sites associated with the wreck, mutiny and massacres of the Batavia for the wider Australian and international public at large (see ‘Issues’ in Section 4.1.1 ‘National Heritage List’).

Response: Selection of Long Island for the resort development is discussed in responses above. Development of the resort on Long Island will ensure an increased awareness and understanding of the important historical events associated with the Batavia. The resort will not disturb any archaeological artefacts associated with the Batavia and will provide a level of control to access where previously there was none.

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)

10. The DoF supports the proposal to develop ecotourism facilities on Long Island. A facility designed and operated in a way that ensures low environmental impact, while allowing visitors to experience and appreciate the unique and rich marine environmental and historical values of the area, is a very appropriate and sustainable use of this location.

Response: Noted.
RAISED BY: NORTHERN AGRICULTURAL CATCHMENTS COUNCIL (SUBMISSION 15)

11. As outlined in the PER document, Long Island is an extremely significant location to the Australian (and international) community, due both to its environmental condition and its historical association with the Batavia shipwreck and mutiny. This justifies the inclusion of the region (including Long Island) on the National Heritage List (NHL).
Response: The significance of the heritage values of Long Island and its inclusion on the National Heritage List (NHL) is noted in the PER.

12. The proposed development, despite the comprehensive environmental management planning and review undertaken through the PER process, will physically disturb the present environmental condition of parts of the island.
Response: The environmental impacts associated with the resort are identified in the PER and have been minimised and mitigated through the design and operation of the resort as described in the PER.

13. The high number of people (up to 70 staff and overnight visitors) on such a small island is likely to impact on the island environment through on-going day-to-day activities. While the environmental management measures described in the PER document appear stringent and well thought out, human activities associated with the resort are still likely to impact on the existing island environment. Of particular concern are possible disturbance of sea lions, sea birds and terrestrial vegetation by visitors. The low staff-to-visitor ratio (10/60+) is unlikely to allow comprehensive staff monitoring of visitor activities.
Response: Design and operation of the resort has taken into account potential impacts on sea lions, seabirds and terrestrial vegetation by visitors. The physical and operational measures will allow the staff to manage and control activities and movements of visitors around the island. The use of boardwalks on other remote coastal areas have been found to direct the majority of foot traffic to points of interest thereby effectively reducing uncontrolled foot traffic in other areas. Movement of resort visitors outside of Long Island is strictly controlled by the activities offered by the operator. The number of staff is in keeping with the DoF requirements for running and management of the resort and is considered by the Operator to be appropriate, taking into account experience on other island resorts.

14. The proposed resort development will reduce the Natural Heritage Value of the Natural Heritage Listed site, regardless of environmental management measures put in place. NACC does not believe that the construction of a 60-bed tourist resort on one of Australia’s most historically significant sites would not reduce the Natural Heritage Value of that site.
Response: The heritage values of Long Island are discussed in Section 4 below.

2.2 TYPE OF DEVELOPMENT

2.2.1 Alternative Scales of Development/Island Choices
RAISED BY: SUBMISSION 1
1. The AICC recommended that the maximum development size be 40 visitors but that this was increased to 60 without any apparent justification. If the development is approved on
Long Island, a 50% larger size will clearly have a greater impact on biodiversity. A larger size on Rat Island or another low-value island may not be an issue.

Response: HLD completed a viability study that demonstrated that to be economically viable, a resort would need to accommodate up to 60 guests. The process adopted by AICC is beyond the scope of this PER. The issue of Rat Island is addressed below in response 2.2.1-11.

RAISED BY: SUBMISSION 20
2. The proposed scale of the facility would be better for all concerned if a Floating facility was employed.

Response: The final proposal to develop a land-based facility on Long Island is based on the “Request for Proposals, Land Based Tourism Development at the Houtman Abrolhos Islands - August 2004” issued by the DoF. HLD considers a land-based facility as the most appealing to tourists.

RAISED BY: SUBMISSION 17
3. Alternative types of tourism development should have been pursued that entailed less overall impact on the natural and cultural conservation values of the Abrolhos, namely moored accommodation facilities, as permitted in the Sustainable Tourism Plan for the Houtman Abrolhos Islands 2001.

Response: See response 2.2.1-2 above.

RAISED BY: NORTHERN AGRICULTURAL CATCHMENTS COUNCIL (SUBMISSION 15)
4. There is no justification given within the PER for the choice of development of a land-based tourist facility at the Abrolhos Islands. While other tourism types (including charter boats and moored accommodation facilities) were identified as possible tourism opportunities for the Abrolhos Islands, the suitability of these types of tourism ventures and reasons for the preferential development of shore-based facilities have not been discussed.

Response: See response 2.2.1-2 above. Notwithstanding, it is understood that moored or charter boat operations may still be considered by DoF in conjunction with other tourism operators in the future.

RAISED BY: SUBMISSIONS 8 AND 14, MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)
5. A superior alternative choice of island is East Wallabi Island. East Wallabi Island has an existing airstrip which provides a heli-pad, existing deep water jetty, has considerably more elevation than other islands in the Abrolhos group and an ideal location for the proposed tourism development is overlooking Turtle Bay. The development can be set back to comply with the State Coastal Planning Policy in an elevated location. The beach at Turtle Bay is sheltered.

Response: This island was not selected as, according to the DoF, it was unsuitable for the following reasons (Sustainable Tourism Plan for the Houtman Abrolhos Islands – 2001):
- The island has a very high conservation value, particularly since it has never been occupied by fishers.
- A fossil site at one end of the bay is of international significance.
- Turtle Bay itself has extensive beds of seagrasses – habitats which are key nursery areas for rock lobster and fish.
- The bay is exposed during northerly conditions and therefore does not provide an all weather anchorage.

In the “Request for Proposals, Land Based Tourism Development at the Houtman Abrolhos Islands - August 2004” issued by the DoF two islands were short-listed for land-based development. These were Long Island and Little Roma Island. Little Roma was not selected for the reasons stated in the PER (section 3.2.1.2).

6. Locating tourism development on East Wallabi Island also provides the opportunity to dispose of treated wastewater into a land septic system.

Response: See response 2.2.1-5 above.

7. There are existing public moorings in Turtle Bay and much of the bay has a sandy seabed providing good holding for anchors and anchoring has minimal impact on the seabed.

Response: See response 2.2.1-5 above.

8. Less sea travel and therefore reduced environmental and heritage impacts. In addition the higher topography of East Wallabi affords more protection from the prevailing southerlies and is less likely to be impacted by storm surges and rising sea levels.

Response: See response 2.2.1-5 above.

RAISED BY: SUBMISSION 17

9. Alternative sites should have been investigated further, in particular, East Wallabi Island, as it already possesses supporting infrastructure (airstrip, helipad, composting toilets, public jetty), and as its size can accommodate tourism development in conjunction with, and without loss of, continued recreational use and amenity; and the protection of East Wallabi Island vegetation communities.

Response: See response 2.2.1-5 above.

RAISED BY: SUBMISSION 1

10. Site selection was based almost completely on a view that lobster fishers and tourists should not occupy the same island, with ready access to deep water being a secondary consideration. The AICC view that fishers and tourists should not occupy the same island effectively ruled out almost all of the islands in the Houtman Abrolhos that have already suffered significant disturbance by humans.

Response: This is noted. The selection of Long Island also included environmental impacts and tourism requirements.

11. Rat Island in the Easter Group should be considered as it has an airstrip and a helipad, its natural environment has been greatly damaged by guano mining, and rats and cats (now eradicated) have destroyed those seabird breeding colonies left after mining removed almost all topsoil. Professional fishers’ huts occupy only a small part of the island. Rat Island is close to the spectacular seabird colonies on Wooded, Morley and Leo Islands, which could be visited on a short-term, properly managed basis. Pelsaert Island in Pelsaert Group could also be visited on the same basis. Rat Island would provide most attributes of a preferred site listed on page 54 of the PER, with the exception of the nearby location
of the Batavia wreck and associated historic sites. (The Batavia wreck could still be visited by boat.) It has a shorter travel time from Geraldton than Long Island. Easter Group has many attractions, including excellent diving and fishing, popular surfing sites and high-density seabird breeding aggregations. A site near the northern end of Rat Island would be physically separated from the fishers’ huts. Other islands could also be suitable.

Response: In the “Request for Proposals, Land Based Tourism Development at the Houtman Abrolhos Islands - August 2004” issued by the DoF two islands were short-listed for land-based development. These were Long Island and Little Roma Island. Little Roma was not selected for the reasons stated in the PER (section 3.2.1.2). In addition, Rat Island was not considered a suitable choice for a resort development on account of the extremely rocky topography, a lack of deep water mooring opportunities and the difficulty of constructing a jetty at the site.

2.2.2 Carrying Capacity

RAISED BY: SUBMISSION 17

1. It is stated on page 163 that the annual number of guests will be approximately 5,275. This figure is comparable to the number of tourists (commercial and de facto) visiting the Abrolhos Islands currently (unpublished report Stoddart 2006).

Response: Noted.

2. This section of the PER does not adequately address the question of Carrying Capacity. Instead, the annual number of guests anticipated is reported, as is the number of tourists currently visiting the Abrolhos Islands. No attempt is made to quantify the tourist Carrying Capacity of Long Island or of the surrounding island sites likely to be visited by resort guests. Likewise, no attempt is made to determine whether the increase in visitor numbers to Long Island and surrounding day-visit sites caused by the development of the resort will fall within or above pre-determined Tourist Carrying Capacities.

Response: The resort has been designed to provide for up to 60 guests and 10 staff plus day visitors. All the needs and activities of these people whilst on the island will be provided by the facilities and services offered by the resort and will not rely on the resources of the island or that of the surrounding islands. The impacts associated with the resort development and activities on surrounding islands has been identified and assessed in the PER.

3. The development of the resort would therefore double the number of visitors to the Abrolhos Islands, and this would pose a significant increase in the resource utilisation of the Abrolhos Islands by the tourism sector. In the absence of any formal or rigorous determination of Tourist Carrying Capacity, or quantification of visitor impacts, this increase cannot be regarded as sustainable.

Response: Refer to response 2.2.2-2. The increase in the number of visitors to the Abrolhos Islands associated with the Long Island Resort will be strictly managed by the operator and it is not considered that this visitation will utilise additional resources of the Abrolhos Islands other than those that are provided by the resort and by supporting operators. The Long Island Resort and its activities are therefore considered to be sustainable within the context of the proposal as contained in this PER.
2.2.3  Tourism Issues

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

1. Tourism is a strong focus of future economic development in the Mid West region with the development of tourism at the Abrolhos Islands, the Mid West’s tourism jewel, a high priority. There is little doubt that a low impact operation such as that proposed at Long Island will attract numerous visitors and ensure their activities are managed in line with the Islands high environmental and heritage value. Currently many people visit the Islands but their activities are difficult to manage.
Response: Noted.

2. The development of tourism at the Islands will also add a world class product to the offerings of the Mid West, resulting in increasing visitor numbers and providing a general stimulus to tourism in the region. Its importance to the development of the Mid West region cannot be overstated.
Response: Noted.

3. The Commission has had an involvement with the development of tourism at the Islands since the mid 1990’s and has also been aware of the efforts of Humfrey Land Developments (HLD) to establish a tourism operation there. In addition, the Commission has enjoyed a good working relationship with HLD for over ten years in their principal capacity as land developers. HLD have always been a highly professional organisation which acts with integrity. It has a strong history of working in harmony with the local community to deliver high standard products. The Commission is confident that should final approval be provided (and we expect it will), HLD will deliver an environmentally sound, quality product that will be enjoyed by visitors for many years to come.
Response: Noted and HLD looks forward to working together with the Commission for successful tourism in the Mid West.

4. The Commission fully acknowledges that the financial viability of any new tourism development is critical. While we support low impact high value tourism, we would also encourage any initiatives that allow the broader population access to the Islands.
Response: It should be noted that day visitors will be welcomed at the resort and interpretive information and kiosk facilities will be provided.

2.3 OPERATIONAL RESORT SERVICES

2.3.1 Swimming Pool

RAISED BY: WA MUSEUM (SUBMISSION 5)

1. Why is a swimming pool required? The only acceptable swimming pool would be a flow through sea water system.
Response: A swimming pool is part of guests’ expectations for a resort of this standard. Most new pools in Australia are saltwater pools (about one sixth to one eighth the salinity of seawater, rather than ‘freshwater’, with the chlorine necessary for pool hygiene generated electrolytically from the saltwater. It is not necessary to provide a flow through sea water system as the rapid initial dilution and buoyant nature of the
discharge (when discharged through wastewater pipeline) is unlikely to have any adverse environmental impact.

2. Discharge of swimming pool water – fresh or salt?
Response: Discharge of the swimming pool will pass through the wastewater treatment plant (WWTP), and hence yield a freshwater effluent.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)
3. Will the discharged swimming pool water be stripped of chlorine during its treatment, prior to release into the Abrolhos waters?
Response: Chlorine will be removed from swimming pool water, prior to discharge. See PER Section 3.6.8. The discharge from the swimming pool filters and the pool itself (during maintenance periods) is proposed to be passed through the WWTP, the water cannot enter the WWTP in a highly chlorinated state (chlorine levels cannot be much higher than regular town scheme water) as the various bacterial organisms in the WWTP are destroyed by high chlorine levels.

2.3.2 Power Generation

RAISED BY: WA MUSEUM (SUBMISSION 5)
1. Diesel Power – why this type of power when alternatives are preferable i.e. wind, solar. See 1.3.1 wind speeds. Emissions from diesel power generators are of concern along with noise pollution.
Response: See PER Section 3.6.4.2 for a discussion on the suitability of wind power and solar power for Long Island. Diesel generators will be based in soundproof containers with acoustic insulation to reduce noise levels.

Both solar and wind power were considered during the early stages of preliminary designs. Wind power was not utilised due to the impacts on the surrounding ecosystem, as well as aesthetics. A wind turbine to supply the facility would have to be large, which would clash with the surrounding natural environment. Also a turbine such as this requires a substantial deep footing, in order to withstand the wind loads acting on the structure. Wind power generation would also significantly interfere with the bird population on the island, leading to many collisions. This is further discussed in Section 3.6.4.2 of the PER.

Solar photo-voltaic cells (PV) were also considered due to the area’s inherently large amount of sunshine. However when calculations were conducted to assess the number of PV cells required, the resultant quantity (by area) was too large given the roof space available and the general limitations of the development area. This was compounded by the fact that in order to use PV as the primary source of electricity the cost when compared to more conventional sources was 10 times larger. This is further discussed in Section 3.6.4.2 of the PER. Buildings have been designed to maximize Environmental Sustainable Design including passive solar heating and cooling and daylighting strategies (PER section 3.4.1). PV cells will be used as much as possible in the design of the resort to augment primary power supply (PER section 7.6.1.5). Additionally both forms of energy if used would require a significant bank of conventional lead acid batteries, in order to regulate the power and ensure supply during night in the case of solar.
RAISED BY: SUBMISSION 8, 14 AND 17

2. The PER document contains much rhetoric about nature based tourism yet proposes diesel power generation and a desalination plant. The proponent should be required to implement solar and/or wind power generation and rainwater collection from the considerable roof area proposed. Back-up diesel power generation may be required together with a reduced capacity desalination plant. However if primary power generation is solar and rainwater is collected then the use of diesel is minimised which reduces the risk of spills either in transport or onsite.

Response: Refer to response 2.3.2-1. The use of rainwater as a water supply is discussed in the PER (Section 3.6.3.2). Rainwater as a water supply option is unreliable, would require the need for supplementary water supplies and would require large storage tanks which is not feasible for resort requirements. Desalination of seawater was considered a feasible, low impact water supply option, which would meet the operational requirements of the resort similar to those operating on other islands within Australia.

3. Rainwater could supply significant water sources during periods of lower occupancy, and would reduce the reliance on a diesel generator-powered desalination plant. The proposed resort needs to establish highest standards of benign, sustainable design and resource consumption.

Response: See response 2.3.2-1.

RAISED BY: SUBMISSION 17

4. Solar power generation should be integrated into the power supply infrastructure of the proposed resort, as a secondary source (in acknowledgment of the barriers to its use as the primary power source). At times of low occupancy and therefore low energy requirements, solar power systems could be reverted to. The use of solar cells to heat shower water does not require significant storage banks of conventional lead batteries. Again, the proposed resort needs to establish highest standards of benign, sustainable design and resource consumption.

Response: Refer to response 2.3.2-1.

5. The proponents state that “Photo-voltaic (solar) energy will be used as much as possible to augment primary power supply” (page 206). The proponent’s use or non-use of solar energy as a power source needs to be clarified.

Response: Refer to response 2.3.2-1.

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)

6. Given the stated intention to develop an ecotourism facility it is disappointing that the proponent has determined that a diesel-fuelled generator is the only practical option for electrical power supply. The use of diesel introduces the potential for hydrocarbon spills on the Island and the adjacent waters. The generator will also produce noise and fumes, and is of course a source of greenhouse gases. It may be expected that tourists looking for an ecotourism experience would appreciate the use of a more sustainable power source. The PER discusses the use of solar photo-voltaic cells (on page 65, section 3.6.4.2) but concludes that practical difficulties and higher cost made the cells unsuitable. However the DoF has successfully used photo-voltaic cells at the Saville Kent research facilities on Rat Island, where PV cells are the main source of power and diesel is used as a backup. This reduces the use of diesel and therefore reduces the quantity of diesel that is transferred
ashore and stored. With less diesel fuel transferred ashore the environmental risk of hydrocarbon spills is proportionally reduced.

Response: Nowhere in the PER does it state that the Long Island Resort will be developed as an ecotourism facility. The selection of diesel fuelled generators as the only practical option for electrical power supply was not considered to the exclusion of alternative sources such as wind and solar. The only feasible option for a resort of this size and nature is diesel power as discussed in the PER and in our response of 2.3.2-1. The use of hydrocarbons and management of potential spills is discussed in the PER (Section 7.6.8) and in the Oil Spill Environmental Management Plan (PER Appendix 7). Diesel will be stored within self-bunded storage tanks fully augmented with spill kits. Additionally standard ducting used for pumping fuel from diesel supply vessels into the shore based storage tanks (which already have spill/leak prevention redundancies built in as standard) would be double sheathed as an additional spillage risk mitigation measure. Generators will be based in sound proof containers with acoustic insulation to reduce noise levels. Power generating equipment will be regularly maintained and serviced to manufacturers’ specifications to ensure efficient running of equipment and optimum fuel consumption thereby minimising greenhouse gas emissions.

The DoF Saville Kent Research Facility on Rat Island provides an intermittent power supply for visitors and staff using self catering facilities at the island. The Long Island Resort requires continuous and reliable power which cannot simply be compared with the power supply serving the Saville Kent Facility.

7. The proponent may be able to enhance the economic viability of using photo-voltaic cells by exploring whether the project is eligible for any of the grants or subsidies provided by Government through the Sustainable Energy Development Office (SEDO). The SEDO website includes the following “The Remote Area Power Supply Program provides rebates for small-scale renewable energy power systems used instead of fossil fuel based power systems in off-grid areas (outside of the South West and Pilbara electricity grids). Rebates are available for systems serving Aboriginal communities, pastoral stations, tourist operations, other businesses and individual households”.

Response: Solar power as the primary power source is not feasible for the power requirements of the resort. Subsidies and rebates for use of solar power as a supplementary power supply will be investigated.

8. It is recommended that the proponent make full use of photo-voltaic cells for electrical power generation at Long Island and seek advice as to the eligibility of the project to receive support under the “Remote Area Power Supply Program” and any other applicable Government grants or subsidies.

Response: See response 2.3.2-7.

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

9. Every encouragement should be offered to ensure sustainability principles are applied to the maximum extent possible. This includes maximising the use of renewable energy (ie. solar) as well as collecting rain water to reduce dependence on desalination.

Response: See responses 2.3.2-1 (Solar and wind power) and 2.3.2-2 (rainwater).

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)

10. Which vessel will be contracted to re-fuel the Resort’s fuel tanks?
Response: HLD has been approached by existing operators wishing to discuss possible contracts with the resort. These discussions are not finalised and are not considered a part of the PER process.

11. What is the availability of a vessel suitable for these tanks, as the carrier boats will be occupied servicing the fisher communities during the A-Zone fishing season?
Response: See response 2.3.2-10.

2.3.3 Solid Waste Disposal
RAISED BY: WASTE MANAGEMENT BRANCH DEC (SUBMISSION 7)
1. The banning of certain products eg plastic bags to be considered to help reduce the potential impact of creating a litter problem on and around the island.
Response: It is not considered practical for this ban to be imposed. There will inevitably be some plastics required by the resort in order to function to a level acceptable to the paying guests. The importance of appropriate disposal of solid wastes will be emphasised in the inductions for staff and guests. Notwithstanding, on the whole guests are not expected to be travelling with plastic shopping bags.

2. Support for the safe removal and disposal of all solid waste from the Island.
Response: Noted.

3. All solid wastes should be separated into recyclable and non-recyclables and returned to the mainland for reprocessing or disposal at a licensed landfill.
Response: Noted as discussed in PER Sections 3.4.1.6, 3.6.2 and Table 7.15.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)
4. Which vessel will be contracted to remove the wheelie bins containing waste products from Long Island and back to the mainland?
Response: HLD has been approached by existing operators wishing to discuss possible contracts with the resort. These discussions are not finalised and are not considered a part of the PER process.

2.3.4 Boardwalk
RAISED BY: WASTE MANAGEMENT BRANCH DEC (SUBMISSION 7)
1. Support for the use of recycled plastic lumber in place of timber where possible.
Response: Noted.

2.3.5 Jetty
RAISED BY: DEC (SUBMISSION 12)
1. Given that the piled jetty will be sited within the littoral zone, it is considered appropriate for a proponent to submit a coastal geomorphological report on the potential effects that the placement of such a structure may have on the local coastal processes (especially sand migration). It is recommended that the proponent undertake such a study to demonstrate
that the location of the jetty will be optimised with respect to potential impacts on benthic habitat. Jetty quarantine measures should also be developed.

Response: The location and design of the jetty has taken into account the coastal geomorphology of Long Island to determine the suitability of the placement of infrastructure (PER Section 7.7.3 and Appendix 13 (Oceanica 2006)). The location of the jetty has been determined with the aim of reducing impacts on benthic habitat, and a site supervisor will ensure it is positioned correctly. The PER (page 188 of section 7.3.2) discusses the direct and indirect loss/damage of benthic habitat, comprising predominantly branching Acropora spp. stands and coral rubble with interstitial sand, associated with the construction and operation of the jetty. The use of an open piled structure is not anticipated to have any impact on sand migration as wave action will be able to move sediment through the structure unimpeded.

RAISED BY: SUBMISSION 4
2. The PER fails to address potential impacts of the jetty on coastal processes. Impacts are likely to be significant and continuous, considering the fragile nature of the island.
Response: See response 2.3.5-1.

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)
3. The DoF has experience in operating and maintaining facilities on the Abrolhos Islands over many years. In the light of this experience the Department raises concerns with respect to the suitability of building the foundation system of the jetty with driven steel piles (Section 3.6.12 page 71, 3rd paragraph). It is understood that the geology of Long Island, consisting as it does of relatively loose coral rubble, is unlikely to provide sufficient support for steel piles and that a jetty constructed in this way may be unable to withstand extreme weather conditions. Movement of the jetty or damage to its structure also has the potential to damage the pipes that are used to transport fuel oil to shore. This increases the potential for an oil spill to the environment.
Response: The PER (Section 3.6.12) states that the design and construction of the jetty will need to be very secure so as to withstand extreme weather conditions and to accommodate loads from the supply and passenger vessels. The foundation system will be designed by a specialist engineer and will take into account actual founding conditions encountered once a drilling rig is on site. Steel piles are the preferred founding system unless drilling indicates otherwise. The design of the jetty and its foundations will be secure so that any movement is within acceptable design and operational tolerances thereby ensuring no damage to service pipes.
4. It is recommended that the proponent consider alternatives to the use of driven steel piles to support the jetty, and in any event demonstrate that the design of the jetty is appropriate to the geology of Long Island.
Response: DoF will be kept updated on materials to be used in construction.

2.3.6 Mosquitoes

RAISED BY: DEPARTMENT OF HEALTH (SUBMISSION 13)
1. The components of the development infrastructure described in the PER that will require appropriate location, design and management to minimise the potential for mosquito breeding include:
   • The wastewater processing unit;
• Water storage facilities for wastewater/stormwater overflow (including backwash from the swimming pool).
• Alterations of topography that enhance retention or impoundment of rainwater and runoff, or that promote scouring; and,
• Any other water holding infrastructure that may not be specifically outlined (e.g. water storage tanks for potable water, pipeline leakage, etc).

Response: The wastewater processing unit will be a sealed tank with no stagnant water. There is no stormwater collection system proposed and run off will drain via direct seepage into the highly permeable ground. Water storage tanks will be sealed for hygiene purposes and water within tanks will not be stagnant. Significant earthworks are not proposed and will not provide impoundment of rainwater or scouring.

2. Information about mosquito management and guidelines for appropriate design and maintenance of storm and wastewater infrastructure can be obtained from the Mosquito-Borne Disease Control Branch of EHD.

Response: Noted.

2.3.7 Drinking Water

RAISED BY: DEPARTMENT OF HEALTH (SUBMISSION 13)

1. The proponents are advised that they are required to develop a Drinking Water Quality Management Plan to be submitted to the Department of Health. This plan must demonstrate compliance with the 2004 Australian Drinking Water Guidelines. Further information can be obtained from the Drinking Water Quality branch of EHD.

Response: Noted.

2.3.8 Induction Process/Staffing

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)

1. It is recommended that the site induction for construction workers include a description of relevant Fisheries regulations.

Response: This will be included in the construction worker’s induction plan.

RAISED BY: WASTE MANAGEMENT BRANCH DEC (SUBMISSION 7)

2. Inclusion of waste management and recycling programs for staff to participate and provide suggestions on better management.

Response: This will be included in the staff induction plan.

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

3. The 10 staff proposed to be responsible for hotel duties will also police day visitors, perform the role of CALM wildlife officers, tour guides and a myriad of other non-hotel related duties. Training, prior to taking up positions as well as ongoing on the job training, will be essential for personnel to undertake all these activities effectively. At a time when Western Australia is experiencing skill shortages, it may be prudent for HLD to develop a pool of suitably qualified staff to ensure it always has the appropriate staffing levels in place.

Response: Noted.
2.3.9 Boat Moorings

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)

1. The DoF supports the use of well-designed moorings so as to avoid coral damage by anchor and chain. It is noted that the PER includes on page 71 the following, “The moorings would be constructed to the design currently used on all Department of Fisheries public moorings, which involves securing the mooring to the seabed with pins rather than anchors.” However the technique used by the DoF involves the use of divers. It is noted that the proponent wishes to set moorings in deeper water including a mooring in 24 meters of water. The technique used by the DoF needs to be reviewed to see if it is suitable and can be safely installed by divers at these greater depths. If not then an acceptable alternative should be developed.

Response: Noted.

2. It is recommended that work is carried out to design a safe and effective method for constructing minimum swing moorings in the deep waters on the west of Long Island.

Response: Noted.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)

3. The likely elevation of boat use and tourist presence in the reef areas surrounding the Resort is increased by the placement of extra Resort-use only moorings in the blue holes west of Resort site. How will the use of these moorings be managed to reduce impacts? Will there be a booking system? What are the guidelines for use?

Response: Boat moorings may be installed by HLD to the west of Long Island in order to provide safe anchorage for resort boats to Long Island and to avoid coral damage by anchor drops. These would be private moorings only for approved vessels’ use and maintenance will be carried out by the resort. Any other moorings to be installed in this area are at the discretion of the DoF who would be responsible for maintenance and allocation. Only moorings that HLD will own and operate will be for their exclusive use.

4. Will a specialised mooring be installed to enable a larger carrier boat-style vessel to moor without causing significant anchor and chain damage?

Response: The jetty described in the PER (section 3.6.12) will have a berthing face of 30 metres in length to accommodate the largest vessels servicing the island, which may be 25 metres in length. This area will be eight metres wide to allow for unloading of equipment. This deck will be accessed via a 30 by six metre walkway. The length of the jetty needs to be 30 metres to allow access to deep water. This deep water will prevent damage to corals caused by the wash of the boats. Figure 8 in the PER shows a conceptual figure of the jetty and helipad.

2.3.10 CLIMATE CHANGE, STORM AND EMERGENCY ISSUES

2.3.10.1 Sea Level Rise

RAISED BY: SUBMISSIONS 8 AND 14

1. The proponent has failed to consider the impacts of climate change and the consequences of rising sea levels. A recent Australian Government report (March 2006) notes that estimates of sea level rise by 28 – 34 cm by 2100 do not take into account the implications
of recently observed increase in the flow rate of several large Greenland glaciers (Steffan, W. (2006) Stronger evidence but new challenges: climate change science 2001-2005, Department of the Environment and Heritage, Australian Greenhouse Office, Australian Government). Alarming recent predictions that the Greenland ice cap could disappear within 30 years causing metres of sea level rise could mean that Long Island becomes submerged reef before the end of the first proposed lease period.

Response: The resort design is based on a coastal vulnerability assessment of Long Island by M. P. Rogers and Associates (Section 4.7.1.4 of the PER) and is to have finished floor levels of at least 2.5 metres above Mean Sea Level (MSL). The minimum level required by DoF in their request for submissions is 2 metres or greater above MSL. Sea level change associated with predicted climatic changes over time and the impact of such changes is discussed in the PER (Section 4.7.1.5). More recent predictions of sea level rise associated with global warming are noted and in the event that such levels occur in the timeframes suggested, this will not only be a concern for the Long Island Resort but for all existing and proposed coastal developments worldwide.

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

2. It is well documented that due to global warming, sea levels are rising. It is of concern that Long Island is a low-lying island surrounded by partly submerged reefs.

Response: Refer to response 2.3.10.1-1.

RAISED BY: SUBMISSION 17

3. The PER acknowledges the suite of threats to “the stability and configuration of Long Island” (p.116) posed by global climate change, namely, changes in: sea level, “sea temperature; storm frequency/intensity; and direction and intensity of prevailing winds and waves”. Moreover, the PER acknowledges the “relatively low elevation of Long Island” (p.116). Given the potential significance and scale of these climate change induced threats, is the selection of Long Island appropriate, over alternative sites of higher elevation and more consolidated geomorphology?

Response: Refer to response 2.3.10.1-1.

2.3.10.2 Storm and Emergency Events

RAISED BY: NORTHERN AGRICULTURAL CATCHMENT COUNCIL (SUBMISSION 15)

1. The low-lying topography of Long Island, (being generally flat and about 2-3 m above mean sea level - PER Section 1.3.3), is likely to render the island and any infrastructure associated with the tourist resort susceptible to damage from possible future storm surge events. While the PER document outlines emergency evacuation procedures (section 3.8.2), and mentions that buildings and structures on the island will be designed to meet Australian standards AS 1170.2 (Australian Standards: Structural Design Actions - Part 2: Wind Actions) (section 3.8.1), it makes no mention of the potential impacts of storm surge events, which could be associated with extreme winter storms, tropical cyclones, or tsunamis.

Response: Surge inundation was assessed by M. P. Rogers and Associates (1997) and is discussed in the PER (Section 4.7.1.4). The resort and emergency evacuation procedures will be designed to take into account the risk of storm surge.
RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)

2. Given the scenario of a cyclone evacuation during the rock lobster A-Zone season (which aligns with the peak tourism season), the capacity of the available helicopter and fixed wing air services to complete a full evacuation of fishers and tourists needs to be determined, and perhaps alternatives need to be investigated.

Response: Noted. Evacuation procedures will be further addressed by the resort operator’s emergency procedures which are not considered a matter for this PER.

3. Will the Long Island Tourist Resort be engaging the services of Silver Chain, and if so, how will it contribute to the funding of this service?

Response: The resort operator will be considering a number of support services including those of Silver Chain. The selection and funding of these service providers are not yet finalised and are not considered a part of the PER process.

4. What provisions for medical treatment of Resort guests and Day Visitors have been planned for?

Response: The resort operator will provide the appropriate level of medical and first aid services required for remote resorts of this nature. Resort staff will be given emergency response and first aid training. The medical treatment to be provided by the resort has not yet been finalised and is not considered a part of the PER process.

Emergency evacuation will be via helicopter and/or aeroplane, utilising the airstrip on East Wallabi Island. It is intended that non-critical evacuations will be transported via boat to the airstrip, while critical evacuations will be via helicopter direct from the island. The helipad will have the capacity to receive Medivac helicopters and as such will provide a useful emergency facility for the surrounding area.

2.4 OPERATIONAL TOURIST ACTIVITIES

2.4.1 Visitor Activity Issues

RAISED BY: SUBMISSIONS 8 AND 14

1. There are no specifications on the proposed Visitor Activity Management Plan which lacks a quantitative element and does not contain any measure of impact. It is unclear how 10 staff will be able to manage the behaviour of 60 overnight guests and day visitors. Indeed the proponent seems to intend subcontracting responsibility (e.g. to charter operators) and doesn’t address how they are going to implement management policies.

Response: Tourism and recreational activities and management and mitigation measures are discussed in the PER (Sections 5.2.2, 7.3.3.2 and 8.3.4). The Visitor Activity Management Plan as presented in the PER (Appendix 5) provides details of how the resort operator will manage activities such that guests are able to appreciate the natural beauty of the area without degradation or over population of the Abrolhos Islands.

Design and operation of the resort has taken into account potential impacts on the environment by visitors. The physical and operational measures will allow the staff to manage and control activities and movements of visitors around the island. Movement
of resort visitors outside of Long Island is strictly controlled by the activities offered by the operator. The number of staff required for running and management of the resort has been established through consultation with the Operator, taking into account experience on other island resorts.

2. Another issue that needs to be quantified and addressed is the frequency of visits to other islands. For example, it may only be appropriate to visit some islands once a week if a higher visit frequency is likely to cause disturbance.

Response: Guided tours operated from the resort will visit islands during seasons when surface nesting birds and Osprey are not nesting. Studies (Barter (2004)) have concluded that sea birds can become acclimatised to predictable human behaviour such that visitation during low sensitivity periods would cause disturbance of a temporary nature only. If sea lions are present, guests will not be permitted to land on the islands to minimise disturbance to sea lions and to maintain personal safety.

The Avifauna Management Plan (Section 4.4.1 of Appendix 4) discusses day visits to other islands and the adoption of seasonal closure based on avifauna and sea lion sensitivity.

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

3. Long Island is a breeding ground for the Ospreys and White Crested Seagulls. The Abrolhos Islands Planning Strategy recommended that access to bird breeding areas should be restricted during breeding season.

Response: We are not familiar with the name “White Crested Seagulls” and do not believe this bird exists. Presumably the respondent is referring to the Silver Gull Larus novaehollandiae, which does breed on Long Island. No direct observations exist to show that Osprey nest on Long Island although data collected by Burbidge and Fuller (2004), Surman (2005), Kirsten (2003) and unpublished notes by Coate (2005) suggest that it does so intermittently. For example, there was no evidence of Osprey nesting on Long Island during 2005, although there were three old disused nest sites. A pair of Osprey was observed nesting on Wann Island nearby. With respect to the two species outlined above, the Avifauna Management Plan (Appendix 4) advocates that activities on Long Island and other islands (Sections 4.4.1 & 4.4.2) that nesting activity of seabirds be monitored and seasonal closures/access to islands be undertaken to reduce disruption to breeding activity.

4. The Planning Strategy also recommended that restriction of flight paths for fixed wing and rotary aircraft during breeding seasons should be investigated in consultation with the Department for Planning and Infrastructure.

Response: Currently there is no formal legislation restricting the movements of fixed or rotary aircraft at the Houtman Abrolhos. Rotary winged aircraft continue to land at fixed sites during the rock-lobster fishing season, however one operator conducts “Eco-tours” that involves the unregulated landing of a large helicopter on islands that may or may not have breeding seabirds. In the case of the Long Island Development, the proponent has undertaken to manage aircraft movement with respect to avifauna. The PER (Section 7.4.2.3) and the Avifauna Management Plan (Appendix 4) states that it will follow those guidelines established by the GBRMPA, i.e. that there will be no overflight
of seabird breeding islands, day light flights only, lateral approach of no less than 1000m except during takeoff and landing, as well as regular flight paths and flight times.

RAISED BY: DEH (SUBMISSION 10)

5. Page 75: 3.7.6 should specify the times when the tours will not be run (i.e. when the Osprey are nesting). Provide details of the other surface nesting birds and the times they are nesting.

Response: This is provided in the PER Section 3.7.6 where reference to the Avifauna Management Plan (Appendix 4) is made. Seasonal closure of those islands is also provided in Table 1, Appendix 4, and Table 12, Appendix 5. Figure 1 in Appendix 4 indicates the breeding activity and timing of all seabirds found in the area. However, as there may be annual or individual variation in the timing of breeding, up to the minute assessment on breeding activity will be made prior to committing to visitor activities, by resort staff.

6. Avifauna Management Plan (Appendix 4) Page 14: Table 1 – this table is not consistent with the main report on page 75 with regard to visitor activities and nesting birds at Second Sister and Dick. On page 75 the Main Report states that ‘… tours will visit islands such as Dick Island and Second Sister during seasons when surface nesting birds and Osprey are not nesting…’. However, Table 1 appears to indicate that there will be no kayak or jet ski tours for Second Sister and Dick Island. It also indicates that seasonal closures will not occur on Second Sister for the periods when Osprey and other surface nesting birds are nesting and that Dick Island will only be closed for Osprey nesting, omitting other surface nesting birds. Clarification is required.

Response: Section 4.4.1 in the Avifauna Management plan states “As part of the planned visitor activities for guests at Long Island, escorted day trips utilising watercraft such as jet skis are planned to be undertaken to other islands”. This section should include at the end of this sentence (see Table 1) “The activities outlined in Table 1 are those activities undertaken after arrival at the island via jet ski or kayak.” For clarification purposes, Second Sister should be listed as seasonally closed due to Ospreys, but this was omitted as the activity outlined i.e. “Surfing” did not involve landing on this island, or approaching within any distance likely to disturb nesting Osprey. For the sake of clarification, the Table should be altered to include YES as seasonal closure for Second Sister. Similarly, “other surface-nesting seabirds” should be added for clarity for Third Sister and Dick Island. Finally, under the activity column kayak and jet ski should be added to the existing activities.

7. Visitor Activity Management Plan (Appendix 5) Page 5: Table 1, Step 3 should list what constitutes ‘…active and reasonable steps…’

Response: These steps are described in detail in Sections 4.1.2.1, 4.1.2.2 and 4.1.2.3 of Appendix 5. Please also refer to the response below for 2.4.1-13 with respect to boardwalks.

8. Page 15: 4.8.2.1 ‘…when surface nesting birds and Osprey are not nesting.’ Remove the ‘not’. This section should also specify the times when Osprey are nesting and provide details of the other surface nesting birds and the times they are nesting.

Response: Reference the Avifauna Management Plan, Figure 1. The word “not” has been removed. Also to insert: “Seabird nesting activity will be monitored regularly by
staff, with reference to the data compiled in the Avifauna Management Plan (Surman 2006) and Surman, C.A. (2006a). *Field Survey of Avifauna at Long Island, Wallabi Group, Houtman Abrolhos, September and December 2005.* If Osprey or other seabirds continue to nest outside predicted times, visitor activities to these areas will be curtailed accordingly.”

9. Page 21: Table 12, is not consistent with the main report on page 75. On page 75 the Main Report states that ‘… tours will visit islands such as Dick Island and Second Sister during seasons when surface nesting birds and Osprey are not nesting…’. However, Table 12 appears to indicate that there will be no kayak or jet ski tours for Second Sister. It also indicates that seasonal closures will not occur on Second Sister for periods when Osprey and other surface nesting birds are nesting and that Dick Island will only be closed for Osprey nesting, omitting other surface nesting birds. Clarification is required.

Response: Refer to response 2.4.1-6. Table 12 has been amended to be consistent with Table 1 in the Avifauna Management Plan (Appendix 4), and the PER on page 75.

RAISED BY: SUBMISSION 17

10. The PER states on page 163 that the average stay of resort guests is anticipated to be 2.2 nights per guest. This short length of stay will result in a high turnover of guest numbers annually. Each guest is likely to undertake a number of recreational activities (in order to ‘experience’ the Abrolhos Islands) that will impact on the terrestrial and marine values of the Abrolhos Islands.

Response: The visitation of the resort has been conservatively estimated and the design and operation has taken the higher number of recreational activities into account.

11. It is submitted that the resort be required to regulate the minimum length of stay of guests at 2 or 3 nights. This would lower the turnover of guest numbers annually, and therefore lower the rate of recreational activities undertaken, and the associated impacts on natural, heritage and social values of the Abrolhos Islands.

Response: Refer to response 2.4.1-10.

RAISED BY: SUBMISSION 17

12. The land-based accommodation model being proposed by the proponent requires constant supervision of guests on site, to prevent impacts occurring. The proponent proposes to implement a number of Management measures include: induction of guests, signage, interpretive material, the development of a Visitor Activity Management Plan (which details the day visitor and guest inductions, and the behavioural regulations and restrictions required to mitigate impact), the zoning of exclusion areas to control fishing and jet ski impacts. Are these measures adequate? Will they reliably prevent high-impact behaviours? With 10 staff to oversee 60 guests and unknown numbers of day visitors, there is a strong reliance on guest and day visitor voluntary compliance with the regulation and restriction of their activities. The number of resort staff would seem to be too few to effectively supervise guests and police day visitor behaviour to prevent possible impact.

Response: Refer to response 2.4.1-13.
13. This concern applies to impacts associated with birds, other terrestrial fauna, benthic habitat, vertebrate marine fauna, terrestrial conservation areas, noise and landforms and soils.

Response: Impacts on birds associated from visitor activities have been successfully managed on several other islands with limited supervision. On Penguin Island and Lancelin Island the establishment of raised boardwalks has appreciably reduced the impact of visitors upon the surrounding habitat, and therefore the impact upon seabird nesting habitat. In the case of Penguin Island, seabirds have become so accustomed to the established pathways that Bridled Terns, usually wary of intruders, now tolerate the approach of visitors, and nest under or adjacent to such structures. On both these islands there is minimal supervision of foot traffic and visitor activities. On Rottnest Island a raised boardwalk at Cape Vlamingh was constructed in 1993 (Winnit Club) specifically to prevent further disturbance to this fragile nesting area of Wedge-tailed Shearwaters whilst increasing visitor awareness of the species and its habitat. It is intended that the establishment of boardwalks will encourage visitors to keep to the paths, given that the surrounding terrain is particularly uninviting to walk on. Visits to other islands will be limited to small parties and supervised by a guide. It is impossible to guarantee that all visitors will comply, however, given the nature of the development, and its nature-based environmental friendly assets it is unlikely to attract visitors that are unwilling to comply with simple guidelines. The board walks and signage will assist in keeping people restricted to the board walk areas only whereas currently there is no advice or way of protecting the island from uncontrolled visitation.

Other terrestrial fauna, terrestrial conservation areas, landforms and soils will also be afforded protection through the informed, guided utilisation of the raised boardwalks. The use of boardwalks on Penguin Island, Lancelin Island and Rottnest Island has significantly reduced the erosion of substrate or disturbance to vegetation.

RAISED BY: SUBMISSION 17

14. The PER states that “All operators will operate under strict contract conditions with the resort that will include environmental as well as safety and performance standards” (p.77). Details of the contract conditions for tourist operators operating under the Long Island Resort’s Tourist License are not provided. Yet, these conditions are pivotal to any assessment of the proposed development’s broader impacts and environmental sustainability.

Response: The conditions of approval for the project through the PER process and the Tourism Licence to be issued to HLD will provide the necessary controls to ensure effective implementation and management of the resort and approved operators.

2.4.2 Fishing Activities

RAISED BY: HERITAGE COUNCIL OF WA (SUBMISSION 19)

1. The issue of recreational fishing by resort visitors is dealt with in fairly vague terms in the PER (see for instance section 3.7.6 on page 74). This has the potential to draw visitors away from the designated access pathways; ideally the report would address the control of casual recreational fishing in more detail.

Response: PER (Section 7.4.3.4) clearly states “No recreational fishing of any kind will be permitted from the shore of the Island. This will ensure that the resort does not negatively impact the fish fauna of Long Island and this will also enhance snorkelling and diving
experiences for guests. Preventing fishing from the island shore is in keeping with the nature-based, low impact theme of the resort.”

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)
2. Will spear fishing be a recreational activity that is available to guests via a fishing and/or diving charter tour? If so, the significant and damaging impacts of spear fishing must be included in the overall impact of the Resort on the marine environment of the Abrolhos.
Response: The Long Island Resort will not offer spear fishing as an activity. Appropriately licensed tour operators will conduct all boat based dive and snorkel activities. Fishing will be on a catch and release basis, with the exception of one fish per person for personal consumption, and will be conducted within DoF legislation.

2.4.3 Jet Ski Activities

RAISED BY: HERITAGE COUNCIL OF WA (SUBMISSION 19)
1. An important value of the island is the sense of remoteness, quiet and solitude it conveys. The use of jet skis at the resort has a high potential to conflict with that value, notwithstanding the assurances on page 75 of the PER that ‘when jet skis are within 200m of islands they will be required to keep their speed below 5 knots’.
Response: The PER (Section 7.6.2) discusses the potential impacts of noise associated with jet skis and proposes ‘no-go’ areas for jet skis, a minimum approach distance of 200m for ‘closed’ islands and low speed, low noise controls. All jet ski tours will be supervised by a guide with no independent usage permitted. Noise impacts to the local fishing community and residents on Beacon Island are expected to be none or minimal. The design, operation and management of the resort will minimise noise such that it is not expected to have any permanent or adverse impact on fauna. The resort operator will manage and supervise jet ski activities of resort guests such that the nature-based, low impact theme of the resort is not compromised.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)
2. Is there a process for licensing or training guides for the escorted jet ski tours, so as to minimise noise pollution and reef impacts?
Response: Jet ski tours will be operated as outlined in the Visitor Activity Management Plan (Appendix 5) such that noise pollution will be minimised (See response 2.4.3-1) and areas of shallow reef avoided to prevent damage to reef. All resort staff and contractors, including jet ski guides, will be trained and inducted.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)
3. The overall increase in surface-water recreational activities in the Wallabi Group, and the use of vessels for transportation for Resort supplies, will significantly increase noise levels for fishers and other visitors. A limit on the amount of daily boat and jet ski activity could be established to ensure noise levels do not become excessive for other users and wildlife.
Response: Refer to response 2.4.3-1
2.4.4 Environmental Management Issues

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

1. The Commission assumes (and agrees) that HLD, and not the resort managers, has responsibility for the implementation and monitoring of an Environmental Management Plan.

Response: A number of Management Plans have been developed to manage potential impacts of the Long Island Resort during construction, operation and closure. These plans will be implemented by the proponent and by the licensed tourism operator.
3. BIOPHYSICAL ENVIRONMENT

3.1 FLORA AND VEGETATION

RAISED BY: DEC (SUBMISSION 12)

1. The PER does not describe the level of impact on the *Lepidium puberulum* population or its significance in terms of the species. No discussion of the potential for this to be a genetically isolated population that has significance as an outlier.

Response: The PER (Section 4.5.4 and 7.4.1) identifies and discusses the Priority 4 species *Lepidium puberulum* which is known to occur on two other islands within the Wallabi Group as well as a further ten islands within the Easter Group and other islands off the WA coast. 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). To manage the potential disturbance of the species the proponent has undertaken to conduct searches, prior to construction, within the proposed areas of impact and to record populations found such that these may be avoided where possible (Section 7.4.1.5 of PER and Construction Management Plan (Appendix 3)). The species occurs on Eastern and First Sister Islands within the Wallabi Group and is likely to have established from the same genetic source as these and other islands within the group where this species is likely to occur (although not yet recorded).

2. The proponent should provide an assessment of the level of impact on the population and the species from the project.

Response: Refer to response 3.1-1.

3.2 FAUNA

3.2.1 Seabirds

3.2.1.1 Site Selection of Long Island with respect to Seabirds

RAISED BY: SUBMISSION 1, DEC (SUBMISSION 12), TERRESTRIAL ECOSYSTEMS BRANCH, DEC (Submission 3)

1. Site selection is inadequate and the island is of high conservation value. The developer describes a site selection process as being conducted by a committee and the Department of Fisheries; a process and conclusion that apparently has not been subjected to proper environmental impact assessment under the Environmental Protection Act. Effectively, the PER considered only one site for the tourism facility – Long Island.

Response: The Minister for Fisheries and the AICC/AIMAC have been considering a small scale, land based tourism site on Long Island since 1994. The site selection process has been discussed in detail in section 3.2.1 of the PER. The process through which Long Island was short-listed as the preferred island for development involved all relevant regulatory authorities. The DoF has recommended that islands already inhabited be avoided due to potential incompatibility between fishers and tourists.
Following the site selection process the DoF requested HLD to submit a proposal to develop a resort on Long Island. The resort has been designed to a high level of engineering and amenity standards to address all engineering and amenity aspects associated with the island. The design and operation of the resort has taken into account the impact of visitors on breeding seabirds and heritage issues which are discussed further in sections 7.4.2.3 and 8.2.3 respectively.

2. The Houtman Abrolhos, with more breeding species and more breeding individuals than any other WA island or archipelago, is by far the most important seabird breeding area in the eastern Indian Ocean. Seabirds have been recorded breeding on almost every island in the archipelago; however, a few islands are clearly of greater significance than others, with some islands having very few breeding species and individuals.

Response: Noted.

3. AICC considered Long Island to be of lesser value to seabirds compared with other islands in the Wallabi Group. However, Long Island is of considerable significance to seabirds as a breeding site and as a rest area. Table 4.5 of the PER gives an inappropriate ranking to the island in the Abrolhos context. It gives the reader the impression that Long Island may not be a significant breeding site for avifauna.

Response: It is stated clearly in the PER (Section 4.6.1.2) and Avifauna Management Plan (Appendix 4) that “Long Island in the Wallabi Group is the third most significant breeding island after West Wallabi and Beacon Islands, and therefore careful management and monitoring of this natural resource is required.”

Of the populations estimated by Fuller *et al.* (1994) during their island-wide survey of all the island groups, the breeding populations on Long Island are significant in the following way. The Bridled Tern colony on Long Island is the fourth largest for the entire Houtman Abrolhos, representing approximately 10% of the total breeding population. The Little Shearwater colony on Long Island is also significant, as it is the eighth largest of 26 islands, representing 2.5% of the total breeding population. Although there is no recorded population estimate for the colony of Roseate Terns recorded on Long Island, the vulnerable status of these birds in Australia and internationally means that they are of special significance. Based upon species diversity, Long Island is ranked the 2nd most diverse seabird breeding island if all seabirds observed over the years bred at the same time. However, data is deficient for many other islands that have been less intensively surveyed. In terms of biomass, Long Island seabird populations ranked equal 13th within the Abrolhos Group with an approximate total of 1500 birds. The table in the PER ranks each species based on estimates of population sizes and does not diminish the importance of Long Island to some species.


4. The PER incorrectly identifies that only 8 species of birds on the Abrolhos are protected (section 7.4.2.3, page 170). All native and migratory bird species are in fact protected under the *Wildlife Conservation Act 1950*, with the additional identified species being specially protected.

Response: The PER clearly states that these eight species are Declared threatened Species. Reference to this paragraph will be changed to “All native and migratory species
of bird are protected under the Western Australian Wildlife Conservation Act, in addition of these eight species are listed as Declared Threatened Fauna”.

5. Submitter 1 considers Long Island to be of considerable significance to seabirds as a breeding site and rest area. The brief survey by Dr Chris Surman (Appendix 10) recorded 22 species of birds, of which 11 were breeding and an additional species (osprey) was noted as likely to breed. (Six additional species, including one breeding species, have been recorded by previous surveys.) Surman’s survey was short term and did not cover the autumn period when additional breeding records would be likely. Appendix 10 states that Long Island had not previously been listed as a locality for Sooty Tern. Surman found that Long Island has a significant breeding population of White-faced Storm-Petrel, with only two other islands containing larger breeding aggregations.

Response: The survey undertaken by Dr Surman is the first dedicated, systematic survey undertaken by any researcher on Long Island. The surveys were conducted in October and December 2005, and amounted to a total of 48 hours spent on Long Island. All previous observers visiting the island have provided a snapshot of sea bird breeding activity in the past. Notwithstanding, this information has proved invaluable and has been incorporated into the PER as part of the description of the avifauna of Long Island and the potential impacts associated with the development and management of the resort. It is recognised that time limitations prevented a further autumn field visit to Long Island. Even so it is expected that no further breeding records would be added to the list of those observed during the 2005 or previous surveys, but that the significance of Long Island to Silver Gulls would increase given that large numbers of Silver Gulls take advantage of an increase of food availability during the rock-lobster fishing season.

6. The investigations reported in the PER need to be put into context. Dr Surman’s earlier research into seabirds at the Houtman Abrolhos clearly shows that breeding participation and success of some species is related to the strength of the Leeuwin Current, which in turn affects food availability. Surman’s observations in Appendix 10 that for some species, nesting burrows had few eggs or chicks, suggest that 2005 may have been a low breeding participation and success year. Other differences between previously recorded breeding may be between-year differences or indicate long-term changes, eg. Sooty Tern was recorded breeding on Long Island in 1913 but apparently no longer breeds there.

Response: Table 4 in Appendix 10 (Field Survey of Avifauna at Long Island, Wallabi Group, Houtman Abrolhos, September and December 2005. Unpublished report prepared for MBS by Halfmoon Biosciences 33 pp.) shows that occupancy of burrows on Long Island was considerably lower than that recorded for West Wallabi island for the same species in the same year. However, it is acknowledged that there was considerable variation in habitat quality on Long Island, and that there is in some seabird species, considerable variation from one year to the next in reproductive attendance and performance. The data presented provided evidence to estimate the potential breeding population based on burrow densities and surface areas of the colonies in questions.

7. The location of the development in the central third of Long Island will severely impact seabird nesting – see Figure 2 of Appendix 10. Figure 4 shows that almost the entire length of Long Island will be impacted by the project layout with a helipad in the south of the island, then a jetty, the tourism infrastructure in the centre of the island and beach gazebos in the north of the island. All these are connected by boardwalks. All of these are likely to either directly or indirectly severely impact seabird nesting sites.
Response: The largest potential impacts upon seabirds are likely to be those on Bridled Terns and burrow-nesting species. However, the proponent has undertaken to use raised boardwalks, which significantly reduces the size of the footprint of affected areas, and additionally allows for continued nesting under such boardwalks. Experiences elsewhere, (i.e. Penguin Island and Lancelin Island and Rottnest Island) indicate that burrow-nesting birds will return to their burrows even under boardwalks, and that Bridled Terns also utilise the shaded areas as nesting areas. Further evidence of a potential net positive benefit to the breeding of White-faced Storm Petrels, Bridled Terns and Little Shearwaters, is that these species, particularly the latter two species, have successfully colonised areas occupied by rock-lobster fishing camps. Little Shearwaters nest under camps on Big and Little Pigeon, and Bridled Terns nest on numerous islands during part of the rock-lobster fishing season. Impacts to seabirds are potentially greatest during the construction of the facility. Prior to site establishment for construction an avifauna specialist will mark out nesting sites and provide advice on the alignment of trafficking routes and other matters of pertinence.

8. The site selection process should be restarted and subjected to proper environmental impact assessment.
Response: Refer to response 3.2.1.1-1.

9. One matter inadequately covered in the PER is the possible impact of the development on the White-bellied Sea-Eagle (an EPBC Act-listed migratory and marine species). There is a major concentration of this species at West Wallabi Island including surrounding islets; a concentration that is unparalleled throughout the species’ range. The issue with the White-bellied Sea-Eagle is disturbance during breeding, particularly when there are large chicks. Such disturbance can easily result in the death of chicks. It would be difficult to restrict tourists’ activities unless strict conditions are imposed on the operation of the development. Other people in private boats will be attracted to the development and the developer could not control their activities.
Response: It has been recognised that West Wallabi Island is a significant breeding area for the White-bellied Sea Eagle. As part of the proposed management process visits to West Wallabi Island are not planned for this reason. Where White-bellied Sea Eagle nest on small islands elsewhere, historical data and up to the minute observations will ensure that a wide berth is given to such islands. These are discussed in Appendix 4 and 5 of the PER.

10. The issues raised in the above discussion relating to birds should be adequately addressed by the proponent in a supplementary document prior to any final consideration of environmental approval.
Response: The PER (Sections 4.6.1, 7.4.2.3), studies by Surman (Appendix 10) and the Avifauna Management Plan (Appendix 4) discuss the impacts to birds in detail and issues raised in the submissions have been addressed.
3.2.1.2 Level of Impacts on Seabirds

RAISED BY: TERRESTRIAL ECOSYSTEMS BRANCH, DEC (SUBMISSION 3),
DEC (SUBMISSION 12)

1. Table 1.6 Summary of Environmental Factors grossly understates the likely impacts of the project on bird populations and it is unlikely that the stated environmental objectives can be met.

Response: The summary Table 1.1 in Section 1.6 refers to the Avifauna Management Plan in which more detailed impacts upon avifauna can be found. The environmental objectives state “To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels...”. Increased levels of human activity on Long Island throughout the year may result in localised changes in the distribution of nests of some species. However, all species that are found on Long Island, including highly mobile nesters such as Fairy and Roseate Terns, are known to breed successfully on islands at the same time as they are occupied by rock-lobster fishermen where there is no controlled access (Surman pers obs.). Activities on Long Island will facilitate the continued breeding of each species by strict guidelines and careful management of movement. In the longer term it is anticipated that highly conspicuous species such as Bridled Terns will adapt to the changes in habitat in a positive way, and similarly Little Shearwaters are likely to take advantage of any structures that provide shelter, in a similar manner to those that nest on Big and Little Pigeon Islands. Notwithstanding the localised impacts, the management and mitigation procedures outlined in the PER and further documented in the Avifauna Management Plan (Appendix 4) are considered to meet the stated environmental objectives.

2. Section 7.4.2.3 outlines a series of likely impacts particularly on seabirds including EPBC listed threatened and migratory birds and their habitats. This may minimise some impacts caused during construction, but the management strategies are unlikely to prevent significant and continuous impacts.

Response: The management strategies in place for this development are the only active management plans in place for the entire Houtman Abrolhos group. As with other developments elsewhere, careful consideration of the impacts and how best to manage these to keep them to a minimum have been adopted. Similar to proponents in the Oil and Gas and Mining Industries, HLD will continue to monitor impacts against background environmental change, and adjust management practices where applicable. For example, Wedge-tailed Shearwaters continue to breed on at least two islands with large oil and gas installations on the north-west shelf, where their numbers and breeding effort are more greatly impacted by regional environmental change. Similarly, Bridled Terns continue to breed adjacent to the very busy East Wharf on Varanus Island (Surman pers obs.).

3. There will be a continuous impact through lethal and non-lethal bird collisions with man-made above-ground objects such as buildings, windows, jetties, anchored boats, posts, powerlines etc. Many of these impacts cannot be mitigated by design changes or other means. If birds are injured or killed during the breeding season the effect is further compounded by the likelihood that incubating birds or those feeding young are unlikely to raise young if their mate is killed or injured.
Response: Both the PER and the Avifauna Management Plan (Appendix 4) highlight commitments to reducing the likelihood of impacts of avifauna with above ground structures. Experience with lighting on rock lobster fishing islands suggests that the lighting management policy adopted by the development will significantly reduce potential impacts. Section 4.4.3 in the Avifauna Management Plan lists many provisions for reducing light overspill across the development and from moored vessels. In addition, external lighting will utilise low pressure sodium vapour lights (previously demonstrated to have the lowest impact upon many forms of wildlife), or be extinguished seasonally/and or nightly to prevent disorientation during critical fledging periods.

4. Helicopter arrivals and departures, boat activity and other recreational craft such as jet skis are likely to significantly disturb and impact nesting and resting seabirds. These impacts are unlikely to be prevented and the PER fails to adequately address these issues.

Response: Section 7.4.2.3 of the PER, and Appendix 4 address air traffic around Long Island. Air traffic will be regulated according to the recommendations of the GBRMPA (1997), and listed in Section 4.4.5 of Appendix 4. Once flight paths are established, it is predicted that surface-nesting species will acclimatise to the approach of air traffic. This has been observed for Osprey, Bridled Terns, Silver Gulls and migratory waders on Varanus Island (Nicholson, *pers obs.*). Rogers and Smith (1995) found that a closer approach to seabirds over water was possible than by land, indicating that this is both a useful technique (kayaking etc) for viewing nesting birds without causing disturbance. Approaches to islands by vessels at low revs and slow speeds has been used as a method of surveying seabirds on islands without disturbing the birds, and for this reason approaches to all islands by all watercraft is restricted to 5 knots. The Visitor Activity Management Plan (Appendix 5) addresses these impacts through appropriate management measures.

5. Birds are particularly vulnerable to human disturbance as outlined in Appendix 4 where 11 types of disturbance response are listed in section 3.3. Human presence close to breeding colonies will significantly impact on the behaviour of birds and cause eggs and chicks to be left unbrooded or unattended for periods of time. None of the mitigation measures proposed will eliminate this disturbance and the level likely long-term impacts is unknown.

Response: Long-term impacts of human activity on seabird islands suggest that some species are able to adjust to changes in activity adjacent to nesting sites. Potential desertion of eggs or chicks are only likely to occur in surface-nesting species, as burrow-nesting species are to an extent buffered by their return to burrows under the cover of darkness. A recent review of habituation of birds by Barter (2004) found that frequent, regular and predictable patterns of behaviour (human) be established to habituate birds to their presence.

6. Comparative studies of impact levels on other Abrolhos Islands where human activity is associated with breeding seabirds has not been provided so there is no level of confidence that any mitigation proposed will be effective.

Response: Whilst there is little documented evidence of the impacts of humans on seabirds at the Abrolhos, the mitigation proposed in the PER and Avifauna Management Plan is based on the species found on Long Island, and their responses observed elsewhere in Western Australia. Several authors have stated that "interactions between humans and seabirds should be managed through encouraging predictable, regular and
frequent human activity through the use of walkways and interpretative signage” (Dunlop and Rippey 2001, Barter 2004). This is reiterated in Section 3.3 of the Avifauna Management Plan. For clarity, we have added;

Section 4.4.2, paragraph 1:
Recent research on Western Australian Islands with respect to human activities on seabird breeding islands has found that

- Responses to human approach varied between seabird species
- Responses varied over two phases of the nesting cycle, and
- Tolerance increased over time indicating short term habituation.

Furthermore, the conclusions of Barter’s (2004) study were that interactions between humans and seabirds should be managed through encouraging predictable, regular and frequent human activity through the use of walkways and interpretative signage. Other research suggests that habituated birds will themselves move closer to human boundaries implying that negative effects in some cases must be minimal (Dunlop and Rippey (2001)). Given that the Long Island development will keep visitors to set boardwalks, as well as provide interpretative material, it is anticipated that nesting seabirds will habituate to the steady flow of visitors.

Section 4.4.2, paragraph 3, further dot points:
- Utilise temporary screens (e.g. shadecloth) fencing to reduce the visual impact of visitors upon seabirds
- Undertake group tours at regular times
- Outside of the boardwalks and resort area, to maintain recommended distances from nesting birds according to Barter’s (2004) recommendations.

RAISED BY: DEC (SUBMISSION 12)

7. The PER does not adequately consider the total impacts on biodiversity through construction of the facilities and the ongoing permanent disturbance to seabird breeding values and other biodiversity values of the island, should the facilities be constructed.

Response: Refer to Tables 7.4 and 7.5 in the PER. These tables identify potential loss of nesting habitat, and show that up to 6.59% of Bridled Tern habitat, and 20% of burrow-nesting species habitat may be altered by the development. There is difficulty in assessing total habitat loss as two species, Bridled Terns and Little Shearwaters are known to nest under structures elsewhere in the Houtman Abrolhos.

8. It is considered that the PER has inadequately addressed the ongoing cumulative disturbance impacts of the proposed development on significant biodiversity assets in the form of the breeding seabirds, and in particular the breeding migratory birds. Without further analysis it is not possible to determine precisely what these impacts may be, but the risk is that there may be a very significant long-term reduction in the value of the island for seabird breeding. A more thorough examination of these risks and of the relative value of this island for seabirds is therefore required. This should be completed prior to any environmental approval to construct the proposed tourist resort.

Response: The value of Long Island to seabirds is discussed in depth in the PER (Sections 4.6.1.2 & 4.6.1.3), as well as in Appendix 10. Furthermore, see response 3.2.1.2-5 above raised by Terrestrial Ecosystems Branch.
9. The impact of visitors walking on the boardwalk adjacent to nesting species has not been addressed in the document. This requires consideration given the propensity of juveniles of species such as the Pacific Gull and White-bellied Sea Eagle to be flushed from resting (in addition to nesting) areas into the sea.

Response: The Avifauna Management Plan (Appendix 4) addresses potential issues with the single nest of the White-bellied Sea Eagle on Long Island Shoreline nesting species such as Pacific Gulls may be displaced by the proximity of the boardwalk to their current nest sites, or they may acclimatise to the gradual increase in human traffic.

10. The likely effect of the resort on waders has not been addressed in either the PER or the avifauna management plan.

Response: The impact of the resort upon waders is discussed in the PER Section 7.4.2.3. In addition, future references to Table 7.5 of the PER will have the following additions: Table 7.5, pg 174 for migratory waders, insert text: “utilises portions of shoreline, tidal ponds and coral ridges for foraging and shelter”. Insert on pg 173 the extension to the dot point “Increased disruption to foraging and other behaviours in migratory waders from guest activities associated with the development”.

RAISED BY: SUBMISSION 20

11. I urge you to examine the Fisheries report number 44 for its valuable study on bird life at the Southern Group. Long Island has similar population at various time of any year.

Response: This reference is by Fuller and Burbidge (1981) titled “The birds of Pelsaert Island, Western Australia”. It has already been used as a reference in the relevant section.

RAISED BY: SUBMISSION 17

12. Bird impacts: There is a heavy reliance on guest and day visitor compliance with the behavioural controls specified in the Visitor Management Activity Plan, the Inductions, and on signage.

Response: It was recommended by Barter (2004) and Dunlop and Rippey (2001) that the most effective management tool for where humans may interact with seabirds is the utilisation of walkways and interpretative signage. All other islands in Western Australia which have regular human traffic are regulated in a similar manner. An excellent examples of this is the large and increasing breeding population of Bridled Terns on Penguin Island.

RAISED BY: TERRESTRIAL ECOSYSTEMS BRANCH, DEC (SUBMISSION 3), DEC (SUBMISSION 12)

13. The significance of, and likely impact on the EPBC Act-listed migratory marine White-bellied Sea-Eagle is inadequately recognized in the PER.

Response: Management implications for this species is discussed in Appendix 4, Section 4.3.2.6 of the Avifauna Management Plan. The likely impacts of mitigation measures are discussed in this section, after discussions with the Conservation Council W.A.

14. The use of Long Island by migratory waders that are protected by international agreements (JAMBA, CAMBA, Migratory Bird Agreements) is likely to be understated (see page 96). The season of survey was very limited and wader visitation at other seasons could be significantly greater than “a summer feeding location for moderate numbers of waders”.
The spring, early/summer surveys in 2005 showed that most wader usage was associated with ponds at the south end of Long Island. Wader use of other ponds and lagoons at different times of the year could be markedly different and the area proposed for the tourism complex may be very significant at different seasons.

Response: The total available Tidal Pond habitat on Long Island is limited, and thereby reduces the potential numbers of foraging migratory waders that would visit and feed at these areas. Regular spot counts of waders at the large Lesser Noddy Lakes on Pelsaert Island during 10 years of visits to this site to measure Lesser Noddy chicks indicate that between 15-30 waders from 8 species forage along the shore at any one time (Surman per obs). These lakes are abundant in polychaete worms, gastropod molluscs and other marine invertebrates. Similarly, the large Big Lagoon, Pelsaert Island, with extensive tidal sand flats, contained between 60 – 100 waders from 10 species (Surman per obs). The avifauna surveys of Long Island (Appendix 10) therefore do not necessarily underestimate wader use and numbers on Long Island, given that 66 waders were recorded during the December visit, the majority of these were Ruddy Turnstones foraging along various parts of the eastern and western shores.

15. The PER does not adequately consider the potential detrimental impacts of the proposal and associated increased tourism activities on the island in relation to migratory birds and in particular migratory species that breed on the island and are protected nationally under the Environment Protection and Biodiversity Conservation Act 1999 pursuant to the Japan-Australia Migratory Birds Agreement (JAMBA) and China-Australia Migratory Birds Agreement (CAMBA).

Response: See also Response to 3.2.1.2-4.

Future references to Table 7.5 pg 174 will include the following text: for migratory waders, “utilises portions of shoreline, tidal ponds and coral ridges for foraging and shelter”. Insert on pg 173 the extension to the dot point “Increased disruption to foraging and other behaviours in migratory waders from guest activities associated with the development”.

RAISED BY: SUBMISSION 1, DEC (SUBMISSION 12)

16. The Crested Tern, *Sternia bergii*, which is listed as breeding on the island and is listed under JAMBA, has not been identified as a JAMBA species in the PER.

Response: Confirm that Crested Tern a JAMBA species. Modified Tables 4.6, and 7.5 in PER to include this species, as well as appropriate text.

RAISED BY: SUBMISSION 4

17.Submitter 4 has worked at the Abrolhos for many years. On these visits meticulous notes and diaries of places visited were kept, including records of wildlife, particularly of the Avifauna. When approached by MBS, I was happy to supply these records and three attached *Landscape Expedition* (run in association with University of Western Australia Extension) Reports No.31, 46 and 66, of which I was involved. After studying the PER they do not appear to have taken full advantage of them, overlooking important bird-breeding data on adjacent islands that is pertinent to Long Island.

Response: All material supplied was used appropriately and incorporated in to the Avifauna Management Plan, sections of the PER, as well as the Seabird Survey report.
18. Long Island is a significant breeding site and an important rest area for a range of seabirds, plus a number of shore-bird species. The PER study acknowledges 12 species of bird breed regularly on Long Island, but does not take sufficient account of the importance of this island to other species such as Roseate Tern and Fairy Tern, that are likely to vary their nesting locations to different islands from year to year. There have been few breeding records kept over the years and I believe breeding occurs there more frequently than indicated. I recorded Roseate Tern breeding on the north end of Long Island on 18/12/1993 in information supplied to MBS, however this event does not appear in the report or Table 4.5 and may have been overlooked.

Response: Roseate Tern breeding on Long Island has not been overlooked. They are listed as breeding previously in Table 4.5 in the PER, as they are in Table 2 in Surman, C.A. (2006). Field Survey of Avifauna at Long Island, Wallabi Group, Houtman Abrolhos, September and December 2005. Unpublished report prepared for MBS by Halfmoon Biosciences. 33 pp. No specific dates are included in these tables as they are a compilation of all records. The occlusion of Coate (2005) data was unintentional, and has not diminished the value of Long Island to avifauna in any way as Roseate Terns were already reported as breeding by other sources. For clarification, we include Coate (2005) as a source in Table 4.5, and Table 2 listed above.

19. Figure 4 shows the proposed development and Figure 16 shows the location of the bird breeding colonies. Comparing these maps it is obvious that the whole island has breeding birds and the whole island will be impacted by development. The PER fails to adequately address these potential impacts.

Response: Refer to Tables 7.4 and 7.5 in the PER. These tables identify potential loss of nesting habitat, and show that up to 6.59% of Bridled Tern habitat, and 20% of burrow-nesting species habitat may be altered by the development. Total habitat loss is likely to have been overestimated as two species Bridled Terns and Little Shearwaters, are known to utilise man made structures as shelter and this has not been factored into the estimates.

20. Breeding populations of Bridled Tern can vary from year to year. On the 3/12/1989 I found them breeding in greater numbers than usual, under shrubbery and coral ledges over much of the island. On 18/12/1993 there were two pairs of Pacific Gulls breeding with four almost fledged young on the western side. Their disused nests were back from the shore-line in the area of development. (My breeding records supplied to MBS, but not noted in Table 4.5).

Response: The respondent has provided no quantifiable evidence of variations in breeding numbers in his report (Coate 2005). Estimates of breeding participation based on very brief visits to islands are prone to error based on the time of year of the visit and the time of day of the visit. Bridled Tern diurnal attendance at nesting sites varies considerably in this way (Nicholson pers comm., Surman pers obs, Garavanta 1991). The surveys conducted as part of this PER were designed to assess thoroughly the potential breeding populations using quantifiable techniques over several days at different times of the year. There has been no omission of data, the Table 4.5 is a summary of breeding species, not a list of breeding events. Again, Pacific Gulls are listed as nesting in greater numbers than previously recorded by other observers in Table 4.5 of the PER.

21. There has been almost no study of migratory waders on the island or the impact to them with a development as proposed. On one brief visit on the 18/3/1989 Coate et al. recorded not only Bar-tailed Godwit and Common Greenshank, but also Grey-tailed Tattler, Ruddy Turnstone, Sanderling as well as Red-capped Plover (my records supplied to MBS environmental). This brief visit indicated that there is much more study required on migratory waders at Long Island and the potential effects the development may have on their well being.

Response: Again, Coate (2005) bird lists were incorporated into the lists in the PER and Seabird Report. Whilst Coate (2005) and others brief visits indicate some use of Long Island by migratory waders, throughout the process of this PER, more than 48 continuous daylight hours were spent observing avifauna on Long Island. In comparison to other areas at the Houtman Abrolhos, and in particular Big Lagoon on Pelsaert Island and Tattler Bay on West Wallabi Island, where hundreds of waders were observed at the same time that only 66 waders (see Table 2, Appendix 10) were observed on Long Island, the majority (36) were Ruddy Turnstones, a common visitor to many islands at the Houtman Abrolhos (Storr et al. 1986). The reports also indicate that the tidal ponds and coral ridges at the southernmost, undeveloped portion of the island, beyond the HLD lease area had the largest aggregation of waders. The impact on migratory birds inclusive of waders is covered in the PER (section 7.4.2.3).

22. Apart from waders, the study period has been far too short to determine numbers of seabirds using the island and the impact of a resort. There is still not enough information known about breeding schedules of some species of seabird at the Abrolhos. In at least two publications (one by Surman and another by Johnson and Storr) cited in the PER, it is said that Fairy Tern, a potential breeder on Long Island, finish breeding by mid February. On a recent Landscape Expedition to the Abrolhos Islands in February-March we found breeding colonies of Fairy Tern, some with freshly laid eggs as late as 2/3/2005 (breeding records attached to my report sent to MBS). A more sustained study is required of breeding schedules before deciding there is no threat to some of the seabirds on Long Island.

Response: Breeding records of Fairy Terns and other non-site faithful seabirds (such as Roseate Terns) have been studied at the Houtman Abrolhos in some detail in the Pelsaert group of islands where Dr Surman spent ten years researching seabird breeding behaviour. Whilst many of these records remain unpublished, data suggests that Fairy Terns peak breeding occurs during January, but in some years as the respondent points out, this may be delayed. Fairy Terns and Roseate Terns may breed at any number of islands, particularly along fine coral ridges in association with Roseate Terns (Fuller et al. 1994). Whilst they were not observed nesting on Long Island in 2005, they may do so in other years. However habitat mapping suggests that the most suitable nesting habitat for this species is found in the southern portion of Long Island (see Appendix 10).

23. In the Landscape Expedition Report No.31 (supplied by me to MBS) on 18/2/1999, nearby Wann Island was cited as having a disused Osprey nest, 44 disused Pied Cormorant nests and about 15 disused Little Shearwater burrows from the previous season. Pied Cormorant in the Wallaby Group depend a great deal on small islands such as Wann Island close to Long Island, Shag Rock close to West Wallaby Island and small rocky islets south of Beacon Island (see Landscape Expedition report No.46) on which to breed. From year to year they may rotate islands. The Pied Cormorant is extremely vulnerable to human intrusion (including helicopters) and will easily abandon nests if disturbed. The
close proximity to a tourist development as proposed would almost certainly affect the future breeding of these birds on Wann Island. The PER fails to adequately address these potential impacts.

Response: Pied Cormorants, like other non-site faithful species (Roseate Terns, Crested Terns and Fairy Terns) are likely to avoid nesting on islands if a perceived threat is observed and relocate to other more suitable areas. Pied Cormorants are particularly sensitive to human disturbance, however if resort activities are managed in a predictable manner as outlined in the PER, then this will increase the probability that previous nesting islands such as Wann Island may still be considered by seabirds. Furthermore, species that rotate nesting sites are unlikely to impact upon other species through competitive displacement for nesting sites.

24. Most of the small islands and islets in close proximity to Long Island contain colonies of breeding seabirds which appear not to be taken into account in the PER, but which could be adversely affected by the development. For example, a small unnamed island north of First Sister Island (Little Shearwater), First Sister Island (150-200 Little Shearwater burrows -1999), Third Sister Island (Roseate Tern and Silver Gull - 12/12/2001). Shag Rock (Pied Cormorant and Bridled Tern), Dick Island (Fairy Tern, Bridled Tern, Pied Oystercatcher and Little Shearwater - 12/12/2001) - these and other islands were listed with breeding information in *Landscope Expedition Report* No.31, No.46 and No.66 (copy of these reports attached to my bird sightings and sent to MBS environmental).

Response: Avifauna on surrounding islands has been assessed in relation to potential visitor activities and their potential impact upon the recorded seabirds nesting there (see Avifauna Management Plan Section 4.4.1, Table 1). Similarly Section 3.7.6 and 7.4.2.3 of the PER also mentions the potential impacts and management practices to avoid these islands if seabirds are present.

25. For the record, Table 4.4: “A Complete List of the Birds of the Houtman Abrolhos”, should also include Little Grebe (*Landscope Expedition Report* No.66).

Response: Duly noted and amended.

### 3.2.1.3 Lighting and Structures

RAISED BY: SUBMISSION 1, TERRESTRIAL ECOSYSTEMS BRANCH, DEC (SUBMISSION 3), DEC (SUBMISSION 12)

1. Significant deaths of seabirds already occur due to impact with structures such as the lighthouses and poles. Many night-flying seabirds are attracted to lights. Anchored boats with lights are a known hazard to seabirds in the Abrolhos. The lighting plan in the PER does not give detail or provide any data to suggest that such a plan will eliminate seabird injury or death. The proponent should be required to demonstrate that a lighting plan would be effective. Poles or radio masts should not be permitted.

Response: Appendix 4, the Avifauna Management Plan, provides a detailed plan for the reduction of the effects on avifauna from lighting. This includes Section 4.3.2.8 Vessel Transfers and Mooring, and Section 4.4.3 Light Management. The PER in section 7.6.3.5 also includes Management and Mitigation measures for lighting. Both the PER and the Avifauna Management Plan highlight commitments to reducing the likelihood of impacts of avifauna with above ground structures. Experience with lighting on rock
lobster fishing islands suggests that the lighting management policy adopted by the development will significantly reduce potential impacts. Section 4.4.3 in the Avifauna Management Plan lists many provisions for reducing light overspill across the development and from moored vessels. In addition, external lighting will utilise low pressure sodium vapour lights, or be extinguished seasonally and nightly to prevent disorientation during critical fledging periods.

2. Lights can also cause confusion in locating breeding sites or resting areas.
Response: This is reported with mitigation measures in Section 4.4.3 of the Avifauna Management Plan (Appendix 4).

RAISED BY: SUBMISSION 4

3. The Rock Lobster season operates from March to the end of June, outside the seabird breeding period, and has little effect on the breeding cycle. However, a year-round tourism development has potential to adversely impact on a significant number of seabirds. For example any structures above ground are likely to cause deaths of seabirds through collisions with buildings, especially at night. A metal pole (Landscope Expedition Report No.66) on Gun Island in the Pelsaert Group has been the cause for innumerable Wedge-tailed Shearwater deaths after colliding with it when returning to their breeding ground. Wires, aerials and TV antennae are all likely to cause deaths, especially on stormy nights when the birds have little control over their flight.
Response: Rock-lobster fishing overlaps with the majority of seabirds breeding at the Wallabi Group, most notably the Wedge-tailed Shearwater, but also the Little Shearwater. (Over 1 million pairs of Wedge-tailed Shearwaters nest on West Wallabi Island). The first three months of the fishing season (March – May) are the most sensitive for breeding Wedge-tailed Shearwaters, and the fledging period in late April is also very sensitive since the abundance of unregulated lighting, power lines and power poles on Big and Little Pigeon Islands provide a hazard to seabirds at close proximity to their breeding island. The bright lights of both islands attract and disorientate numerous shearwaters, and must have an appreciable impact upon fledging young. The adoption of lighting sympathetic to wildlife for the Long Island development, and its distance from West Wallabi, make it less susceptible to disorientating seabirds than the fishing camps on the Pigeon Islands. There is no quantitative data on the numbers of collisions from the Lighthouse at Pelsaert Island, or the pole on Gun Island although it is recognised that collisions increase during new moon, and that the Long Island facility will not include structures that present a collision hazard. Refer also to response 3.2.1.3-1.

4. At night during the breeding season, lighting on boats approaching moorings at a seabird breeding island is another issue of importance that can cause injury or death. In my records to MBS environmental I cite specific occasions where Wedge-tailed Shearwaters, Little Shearwaters and White-faced Storm Petrel returning to their breeding ground have been disorientated by lights from a boat anchored close to a breeding island. They have either collided with the boat or landed on the deck. I feel these situations will arise and have not been adequately addressed.
Response: Appendix 4, the Avifauna Management Plan, provides a detailed plan for the reduction of the effects on avifauna from lighting. This includes Section 4.3.2.8 Vessel Transfers and Mooring, and Section 4.4.3 Light Management. The PER in section 7.6.3.5
also includes Management and Mitigation measures for lighting. Refer also to response 3.2.1.3-1.

3.2.2 Sea lions
RAISED BY: DEC (SUBMISSION 12)
1. The PER identifies Long Island as a significant non-breeding site for the Australian Sea Lion. There is no description of the level of importance this area holds for the population and therefore what potential impact the resort will have on the species. There is also no monitoring proposed to determine the effect on the population.
Response: Refer to the PER (Sections 4.7.5.2 and 7.4.3.4), Construction Management Plan (sections 4.3 and 5.2.2 and Appendix 2, sections 6.2 and 7.2.2) and Visitor Activity Management Plan (sections 4.3, 6.2 and 7.2.2).

The most important islands from a conservation perspective are the islands where sea lions are breeding. The highest concentration of breeding islands is found in the Easter Group. No records have been found of sea lions breeding at Long Island or in the Wallabi Group (Campbell, 2005; Department of Fisheries, 2003).

Given the status of the sea lion and the remnant population in the Abrolhos Islands, the potential impacts due to the development and operation of the resort on sea lions using Long Island as a haulout will be monitored. Sea lion activity at Long Island will be monitored by suitably trained staff and a daily log book of sea lion presence, location, and behaviour maintained. There is scope for individual identification of animals based on scar patterns to be done and to record individual sea lions behaviour over time in response to the development. This will help in determining if habituation is occurring and how many individual animals may be involved. This monitoring information will be submitted annually to the DoF. These monitoring details will be incorporated into the management measures provided in the Construction Management Plan (Appendix 3) and the Staff Induction Plan (Commitment 10.1 of Table 1.2 of PER).

2. The effect of the resort on the Australian Sea Lion through disturbance at a significant haul-out site requires study by the proponent. Upon completion of a report into the significance of the haul-out site, further mitigation may be required and a monitoring plan should be developed.
Response: See response 3.2.2-1.

3.2.3 Vermin/Pest/Quarantine
RAISED BY: SUBMISSION 1, DEC (SUBMISSION 12)
1. The PER understates the biodiversity conservation significance of the lack of introduced rats and mice on the island.
Response: The PER (Section 4.6.2.3) identifies that no land mammal species are found on Long Island (Dr. R. How, WA Museum Pers Comm). No introduced mammal species occur on the island and the PER (Section 4.6.2.4) discusses the occurrence and records of introduced fauna species occurring on other islands in the Abrolhos. The absence of rats and mice on the island is an important factor in the biodiversity of populations of avifauna on Long Island. The PER (Sections 7.4.2) identifies that introduction of vermin
or pest species has the potential to impact on avifauna and the Vermin/Pest Management Plan (Appendix 17) provides strategies to control and minimise the risk of introducing such species to Long Island and ensuring eradication occurs if vermin are detected on Long Island.

2. The Vermin/Pest Management Plan supplied is not sufficient. While some species, such as rats and mice, are of special concern, the plan should cover all possible introductions including plant and animal species native to the adjacent mainland. Much more detail should be required. There is detailed information on island quarantine available via the Gorgon development, from DEC’s island quarantine provisions, from the New Zealand Department of Conservation and from the Charles Darwin Foundation in the Galapagos Islands.

Response: The Vermin/Pest Management Plan (Appendix 17) provides procedures to control animal species being introduced to Long Island. Provision to quarantine all goods being shipped to Long Island, will ensure that both non-native and native Australian species not found on Long Island be intercepted prior to the shipment of goods to the island. The Weed Management Plan (Appendix 16) applies to all phases of the project including construction, operation and decommissioning and provides strategies to control the extensive weed infestation that exists on Long Island and controls to prevent introduction of new weed species. The information sources referred to by DEC will be reviewed and any provisions relevant to the management of vermin/pest species on Long Island will be incorporated into the Vermin/Pest Management Plan and Weed Management Plan.

3. It is certain that rats, mice and other pests will make it to the island in goods or luggage, and even possibly by swimming from vessels. Cats are also a severe risk. An island quarantine centre would be desirable, particularly during construction phase.

Response: Space restrictions preclude the provision of an on-island laydown area that is isolated so that any introduced species are intercepted. There will be a “clean” depot at Geraldton for the receival, inspection, treating (trapping/spraying/brushing/washing) and quarantining of all goods. Vehicles will be steam cleaned and loaded directly from the area. As part of the induction process there will be posters/folders for on site identification and contractual obligations on contractors to meet requirements. In addition to preventative quarantine measures the Vermin/Pest Management Plan provides measures for monitoring and eradication of vermin/pest fauna species in the event that such species are detected.

4. Physical barriers to prevent pests accessing the island from the helicopter and vessel landing areas are also highly desirable.

Response: The design and operation of the resort provides the appropriate controls for the potential introduction of pests for an island resort of this size and nature.

RAISED BY: WA MUSEUM (SUBMISSION 5)

5. If any rats or mice are currently on Long Island they should be eliminated prior to development and stringent protocols put in place to prevent re-introduction.

Response: As stated in the PER (Section 4.6.2.3), no rats or mice currently occur on Long Island.
RAISED BY: DEPARTMENT OF HEALTH (SUBMISSION 13)
6. If there are termites on the island, consider using stainless steel mesh as a means of termite prevention rather than using liquid termiticides. Construction material should be from termite resistant materials in accordance with AS3660.1.2000. The location of wooden structures off the ground is commendable as it will allow ease of inspection and reduce insect pest invasions but also enable ease of treatment if pests should occur. Pest management measures should be designed to reduce dependence on pesticides.
Response: No termites are known to occur on Long Island. Construction will be from termite resistant materials complying with AS3660.1.2000 as appropriate. All pest management measures will take into account the sensitive nature of the Long Island environment.

3.3 TIDAL PONDS
RAISED BY: SUBMISSIONS 8 AND 14
1. The proposal to deliberately interfere and modify the environment of Pond 504 is inconsistent with the nature based aspirations touted by the proponent and should not gain environmental approval.
Response: The introduction of sea water into the tidal pond on days where conditions within the tidal pond are likely to generate a foul smell is considered necessary to maintain the amenity of the resort for guests. The replication of higher tide levels over occasional neap tides will not modify the environment of the pond and is likely to provide a less stressful environment than the lower (natural) tide (M. Johnson, pers. comm.).

RAISED BY: DEC (SUBMISSION 12), MARINE ECOSYSTEMS BRANCH - EPASU (SUBMISSION 18)
2. Tidal Pond 504 is situated within the proposed development area of the resort. Tidal Pond 504 contains 7 species of molluscs. The individual animals found within this pond are significantly larger than those found in nearby shore populations of similar species in other areas. It has been postulated that the molluscs within Tidal Pond 504 are genetically different due to isolation.
Response: No unique species have been found in the ponds (Dr F. Wells DoF pers. Comm.) despite the larger size of individuals to those from nearby shore habitats. The proposal to slowly introduce sea water on occasional days is considered unlikely to affect the molluscs living within the tidal pond (M. Johnson, R. Black and J. Prince pers comm.).

3. The introduction of seawater will impact on the baseline salinity of Pond 504. The impact on the fauna within the pond has not been quantified by the PER.
Response: As stated in the PER (Section 7.6.7.4) the introduction of seawater will create artificial tidal variations in Pond 504 that will not be outside of the existing tidal pond range. The seawater that will be introduced is slightly less saline than the water in the pond and will temporarily change water quality in the pond during these periods. As seawater naturally enters the pond system during high tides and at other times
rainwater enters the pond through surface runoff and incident rain, it is not expected that the intermittent introduction of seawater will adversely affect water quality.

The water quality of tidal pond 504 will be sampled and monitored in accordance with the Long Island Marine Management and Monitoring Plan (Appendix 6).

4. The genetic significance of these fauna (relevant to other lakes on the Abrolhos) should be further investigated by the proponent. The impacts of seawater introduction to Pond 504 should be further explored along with potential mitigation methods (if any).

Response: The PER (Section 4.7.6) states that “the molluscs are showing signs of genetic divergence, with the molluscs in the ponds found to be significantly larger than the individuals found in nearby shore habitats. This is thought to be caused by partial genetic isolation from the shore populations of the same species (Johnson and Black, 1997).” The significance of these fauna and the environmental values of the ponds on Long Island were discussed with leading researchers in the field (PER Section 7.4.4) who were of the view that the mollusc species whose presence in the tidal ponds of the Abrolhos represents a “range extension” for the species are the most unusual of the known species present and therefore perhaps the species of the most interest. As it is considered by these experts that the introduction of sea water to the tidal pond would not adversely affect the species, a study of the genetics of these fauna would not serve any purpose or relevance to the development and operation of the resort.

5. The proponent predicts that adding seawater will provide a “less stressful environment” for pond organisms. Any change in environment is likely to have impact on the ecology of pond 504 and its inherent (unique?) biodiversity.

Response: The PER (Section 7.4.4) discusses tidal pond biodiversity. Dr M. Johnson was of the opinion that the additional sea water slowly introduced on occasional neap tides is likely to provide a less stressful environment than the lower (natural) tide. On this basis the predicted environmental impact on the mollusc species is expected to be minimal.

RAISED BY: SUBMISSION 4

6. The Tidal Pond within the proposed development area of the resort is biologically very diverse and the PER states that the molluscs are genetically different from other known populations due to long-term isolation. It makes this population regionally significant. The resort is likely to impact on the long-term survival of this population and alternatively impact on evolutionary processes.

Response: Refer to responses 3.3-4 and 3.3-5.

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

7. The impact on Long Island’s tidal ponds needs to be carefully and thoroughly monitored.

Response: Refer to responses 3.3-3 and 3.3-5.
3.4 **TERRESTRIAL CONSERVATION AREAS**

**RAISED BY: DEC (SUBMISSION 12)**

1. The PER inadequately considers the terrestrial conservation reserve status of Long Island. As an example, it suggests (Section 1.3.2 on page 2 and again in 4.1.2 on page 81) that the waters surrounding the islands are a Class A Reserve, but fails to identify in that discussion that the island itself is a reserve. This is correctly identified on page 39 (section 2.7.1) but this is not taken into account throughout the rest of the document.

   **Response:** The Abrolhos Islands is an A Class Reserve which includes the waters of the Abrolhos and the islands as stated in section 2.7.1 of the PER. The reference to the waters of the Abrolhos Islands in sections 1.3.2 and 4.1.2 of the PER was not meant to specifically exclude the Islands. Section 7.5.3.1 of the PER clearly states that “the whole of the Abrolhos Islands are an A Class Reserve including the islands themselves”. The PER (section 7.5) discusses potential issues, impact assessment and management and mitigation measures with respect to terrestrial conservation areas and given the low impact nature of the proposed resort and the management procedures outlined within the PER and supporting Management Plans, it is considered that the environmental value of Long Island can be maintained.

3.5 **MARINE ENVIRONMENT**

3.5.1 **Benthic Habitats**

**RAISED BY: WA MUSEUM (SUBMISSION 5)**

1. On the west side of Long Island the honeycomb reef supports a high diversity of hard corals including many fragile plate corals of the genera *Echinophyllia*, *Mycedium* and *Oxypora*. About 40 coral species were recorded on a transect across part of the dissected reef west of Long Island and about 30 species on a transect across the reefs on the east and west sides of the southern third of Long Island during a WA Museum survey in 1978. WA Museum Report to EPA, 1978.

   **Response:** The benthic habitat mapping conducted for this PER was designed to identify habitat types rather than individual species of corals. The Museum report is noted and will be sourced for use as a reference paper during resort operation and for use in interpretive materials.

**RAISED BY: DEC (SUBMISSION 12)**

2. The construction methodology has not yet been determined for the outfall pipes. Assuming an excavator will be employed to ‘trench’ and place overburden on the reef flat (before backfilling), a larger area of impact might be expected. Similar works have resulted in a buffer of 10 metres either side of the 1 metre trench to allow access for plant equipment and personnel. This will vary depending on the installation technique.

   The proponent should provide details of the proposed installation technique and provide a revised figure (if applicable) on the area potentially impacted. Monitoring will need to be adjusted accordingly.

   **Response:** It is proposed to use a mini excavator equipped with a rock breaker for all the excavation requirements. The small width of the pipes (~0.05m & ~0.1m) and trench
(≤ 1 m) will mean that the area of disturbance surrounding the trench will be minimal and it is anticipated that a buffer zone of 3 metres either side of the trench will be the maximum required. It is proposed that the majority of the pipe be pinned directly to the seabed (PER section 3.6.1.4) and that the end of the pipeline will be anchored in place with the use of precast concrete block/rope mats lowered into position from a boat or barge.

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)
3. Survey protocols (including a baseline survey), triggers and management action for the protection of coral in the resort diving area and vicinity of the outlet is described. These provisions are detailed and conservative and should provide adequate protection. However the proponent has not provided sufficient justification to support a trigger level of 25% as opposed to the figure of 20% which is more consistent with best practice (for example the triggers recommended by the EPA for dredging in Dampier).

Response: An initial value of 25% has been set taking into account the lack of knowledge of the mortality rates amongst the actual corals concerned. A trigger level of 20% can be initially adopted however this value will be reviewed on the basis of the first 2 years of monitoring taking into account the mortality rates of the corals.

4. It is noted that there is some pre-existing base line data available (for example Marine Science Associates 2003 Coral Monitoring Studies, Wallaby Group, Houtman Abrolhos Islands). This should be compared with additional baseline surveys carried out prior to the installation of the resort in order to have a robust data set for the analysis of any impact from the resort.

Response: The Marine Science Associates data addresses growth rates of these corals and would be useful to predict recovery but does not cover mortality over time.

5. The trigger value of 20% should apply to management actions to protect corals, and SST and other basic parameters should be collected.

Response: See response 3.5.1-3.

RAISED BY: MARINE ECOSYSTEMS BRANCH - EPASU (SUBMISSION 18)
6. ANZECC suggest using the 20/80%ile of background as an EQG and this is the approach used in the Cockburn Sound SEP. We suggest that the proponent use the median of the data from the test sites compared against the 20%ile of the reference site data instead of the proposed trigger of >25% difference between test and reference sites.

Response: The methodology of comparing a median with an 80%ile (not the 20%ile) is used in the Diver Management Plan (Section 3.2.4 of Appendix A of Appendix 6). This method could be used, although it is likely to be less powerful than the suggested test of means.

RAISED BY: MARINE ECOSYSTEMS BRANCH - EPASU (SUBMISSION 18)
7. We did not note any identification of massive corals in the path of the pipeline. If there are massive corals, and given this is a FHPA, advice should be sought from DoF regarding relocation.

Response: No massive corals were recorded in the path of the pipeline.
8. It is our understanding that the discharge pipe will be laid on the seabed resulting in approximately 55 square meters of Acropora spp. being disturbed/lost. The relocation of Acropora (a relatively fast growing coral) is not likely to be very successful. Recovery via the natural processes of growth and colonisation may take a bit longer but would likely be just as effective in the long run. All attempts should be made to minimise damage when laying the pipeline.

Response: Disturbance of 55m$^2$ of coral assumes loss across a 1m wide corridor along the pipeline – likely to be overestimate if pipes are simply pinned to seabed. A site supervisor (see Marine Management and Monitoring section 3.5.2 below) will ensure that all attempts are made to minimise impacts during construction.

3.5.2 Marine Management and Monitoring

RAISED BY: DEC (SUBMISSION 12)

1. Real time marine monitoring during construction per-se has been discounted by the proponent, but monitoring can be as simple as site supervision of works to ensure impacts are constrained to identified footprints. If an impact occurred beyond that predicted, effort should be made to reduce further impacts or stop works until a solution can be found.

Response: The Construction Management Plan (Appendix 3) requires the construction supervisor to undertake regular inspections of the construction works to ensure that they comply with the design and that the works remain within the design footprint such that impacts are minimised and are within predictions. The construction supervisor will provide an audit report based on these inspections to the construction manager to ensure compliance and action taken as necessary.

2. The Management Plan should include a site supervision component, including governance and reporting. The Management Plan must also contain methods by which identified impacts can be managed or mitigated during construction.

Response: Refer to response 3.5.2-1. The procedures contained in the Construction Management Plan (Appendix 3) provide methods to deal with incidents or non-compliance as well as reporting of such incidents.

3. Periodic monitoring of sand up and down current of the jetty should be included in the Management Plan. Management techniques such as beach nourishment may need to be considered if impacts occur.

Response: There is a low risk of coastal processes impacts as the jetty will be constructed using open piling (Sections 7.7.3 and 7.7.4). The area within which the jetty is located comprises predominantly branching Acropora spp. stands and coral rubble with interstitial sand and monitoring of sand migration is not considered necessary.
4. SOCIAL ENVIRONMENT

4.1 ABORIGINAL HERITAGE

RAISED BY: DEPARTMENT OF INDIGENOUS AFFAIRS (DIA) (SUBMISSION 2)

1. The proponent has not undertaken an archaeological survey of the Long Island. As this is a major development, I find it unusual that this has not been done along with the consultation of the Native Title groups. It is not known whether or not Aboriginal sites exist on the island, as an archaeological heritage survey has not been undertaken of the land surface. In addition, all impacts to the surface should be monitored for subsurface cultural material. Perhaps the islands were not used by Aboriginal people in the historic past, but this does not mean they were not used in the prehistoric past, as cultural material has been recorded on other islands along WA's coast. These islands were part of the coastline prior to the rise in sea level. The developers have not undertaken an Aboriginal heritage survey. In addition, I would consider that this development could have a potential impact on archaeological sites. As the Guidance Statement No 41 has given as an action "...which may be pertinent to the factor of Aboriginal heritage" is to:

   Undertake an Aboriginal survey (if it is noted from a desk-top review that an adequate survey has not been undertaken for an area to be developed) which should include both consultation with appropriate Aboriginal people, which may include an anthropological survey, and, if necessary, an archaeological survey.

2. The latter has not been undertaken. It should be noted that I did recommend an Aboriginal heritage survey (to include both and ethnographic and archaeological survey of the island).

Response: An archaeological survey has not been completed for the following reasons:

- Contrary to DIA’s submission, Long Island was never joined to the mainland. Cultural material found on other islands on WA’s coast is likely to be from islands that were originally joined to the mainland, prior to the rise in sea-level. As discussed in the PER, Long Island is a coral island that has been composed out of the reef itself within the last 5,000 years and could not have been accessed by people without the use of ocean-going vessels.

- As advised, a search of the DIA Register of Aboriginal Sites was undertaken. To date, there are no Aboriginal sites listed for Long Island.

- In Guidance Statement No. 41, we note the heading “Actions which may be pertinent to the factor of Aboriginal Heritage”. Within this heading, it states that consultation may include an anthropological survey and if necessary, an archaeological survey.

- Contact was made with Yamatji Land and Sea Council as suggested by DIA. Consultation commenced on 21/12/2005 and was concluded on nine months later on 19/09/2006. Yamatji advised that Long Island (indeed the whole of the Abrolhos) is not part of their Native Title Claim area.

- Notwithstanding it was suggested by the Environmental Compliance Officer for Yamatji that we meet with three of the coastal claimant working groups to establish whether or not there were issues of Aboriginal Heritage concern. After these meetings, the working groups may then decide whether there were issues of concern and whether they would like to request the proponent to conduct an ethnographic and archaeological survey of the island. Indeed, it was suggested to HLD that
conducting this survey immediately was an “alternative” rather than waiting months for the meetings with the working parties to be scheduled.

- Given the (perceived) unlikely event of there being issues of Aboriginal Heritage at Long Island, HLD determined to wait for the meetings rather than conduct expensive surveys when they may not be necessary.
- Following the conclusion of the three meetings with the working groups that HLD attended, a resolution was passed by each working group that there were no issues of concern of a cultural nature with the proposed development. Indeed, several of the groups are in discussions with HLD on ways in which they may provide services and benefit from the development.
- A copy of each of these resolutions has been forwarded to DIA and the EPA Service Unit.

For these reasons, it is considered unnecessary to conduct the ethnographic and archaeological survey.

4.2 **EUROPEAN HERITAGE**

4.2.1 **National Heritage List**

RAISED BY: DEH (SUBMISSION 10)

Note: Many of the DEH’s comments below are of an editorial nature. DEH has already made other comments previously (on 20, 22, 27 and 30th of June). These comments were addressed on 18 July 2006 in a letter to the WA EPA. As the PER has been already released as “Final”, these further editorial changes cannot be made to the PER, but will be added where relevant to applicable management plans and noted in this Summary of Submissions.

1. **Main Report** Page 6: 1.4.4 European Heritage. The following information should be provided: The place, Batavia Shipwreck Site and Survivor Camps Area 1629 - Houtman Abrolhos was entered into the National Heritage List for National Heritage values in March 2006. The listed place is 90km north west of Geraldton, comprising an area of 5400 ha, which includes West Wallabi Island, Morning Reef, Long Island and West Wallabi Island. The url for the statement of values is [http://www.deh.gov.au/heritage/national/sites/batavia.html](http://www.deh.gov.au/heritage/national/sites/batavia.html).

Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

2. Page 8: 1.6 Summary of Environmental Factors. Table 1.1: Relevant Environmental Factors for EPA Referral. Existing Environment. Clarify how the projected figure of up to 5,275 guests in a typical year for the Long Island tourism development is obtained.

Response: DEH raised this issue previously and it has been clarified in the text (section 7.3.3) and in our previous response (18 July 2006). The summary table (Table 1.1) is not considered the place for detailed calculations to appear.
3. Page 15: 1.6 Summary of Environmental Factors, Table 1.1: Relevant Environmental Factors for EPA 3rd column, 2nd row, first sentence is incorrect. The supplement to the PER should read: “The Register of the National Estate is kept by the Australian Heritage Council” (the Australian Heritage Commission was replaced by the Australian Heritage Council in January 2004).

Response: Noted.

4. Page 25: Table 1.6, under the European Heritage heading, the ‘Environmental Objective’ should acknowledge the listing of the Batavia Shipwreck Site and Survivor Camps Area 1629 on the National Heritage List under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The last column ‘Predicted Outcome’ should read: “… management procedures should ensure that the National Heritage values and other heritage values … are protected”.

Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

5. Page 26: Table 1.6, under the European Heritage (cont.) heading, the ‘Environmental Management’ for Access Issues should state that the Heritage Management Plan and the Visitor Activity Management Plan will monitor and report on visitor numbers and potential impacts to ensure increased visitation does not impact on Long Island or the National Heritage values of the Batavia Shipwreck Site and Survivor Camps Area 1629 - Houtman Abrolhos National Heritage List place.

Response: HLD will commit to reporting on visitor numbers to the relevant government departments/authorities as advised. This commitment will appear in the Visitor Activity Management Plan and the Long Island Resort Heritage Management Plan.

6. Page 26: 1.6, under the European Heritage (cont.) heading, the ‘Potential Impacts’ – ‘Increased Visitation’ should indicate that Beacon and West Wallabi Islands have National Heritage values.

Response: Heritage values at Beacon Island are acknowledged, “Increased visitation to shipwrecks and sites of heritage value on other islands (e.g. Beacon Island) …”. West Wallabi is not discussed in the summary, as the resort will not conduct any tours to West Wallabi, as mentioned in previous response to DEH comments and in the PER in Table 1.1 and Section 8.3.4.3.

7. Page 28: Tourism and Recreation, ‘Existing Environment’ as noted above, it is not clear why the projected visitor numbers are so low (up to 5,275 per year). Clarification is required.

Response: DEH raised this issue previously and it has been clarified in the text (section 7.3.3) and in our previous response (18 July 2006). The summary table (Table 1.1) is not considered the place for detailed calculations to appear.

8. Page 33: points 11.1 and 11.2 the ‘Objective’ should be: ‘To ensure that the National Heritage values and other cultural heritage are not negatively impacted …”.

Response: This will be noted in the Long Island Resort Heritage Management Plan, when prepared.
9. Page 35: the 6th paragraph should read in the supplement to the PER “… following listing of the Batavia Shipwreck Site and Survivor Camps Area 1629 on the National Heritage List in March 2006 that includes the Wallabi group of Islands …”

Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

10. Page 40: Land Tenure, the 3rd dot point related to tourism licenses should include reference to “… historical and cultural activities including visiting the Batavia wreck site off Morning Reef and other places included in the National Heritage listing for the Batavia Shipwreck Site and Survivor Camps Area 1629. Also, in the following section, 2.7.2 it is noted that existing land uses includes tourists visiting the historic Wiebbe Hayes Trail on West Wallabi Island. In the table on Potential Impacts, increased visitation sites of heritage value on other islands (eg. Beacon Island) are identified. If visitors are not to be taken to West Wallabi Island this should be clearly stated.

Response: The additional advice on tourism licenses is noted. The “Existing Land Uses” section is not considered the best place to discuss the exclusions to visitor activities. This is clearly stated in other section of the document (e.g. Table 1.1 and section 8.3.4.3).

11. Page 42: Table 2.1, under Commonwealth legislation, the Environment Protection and Biodiversity Conservation Act 1999, 2nd paragraph text should read: “… the Batavia Shipwreck Site and Survivor Camps Area 1629 (that include the wreck itself on Morning Reef, sites on Beacon and West Wallabi Islands), were included in the National Heritage List in March 2006 and are protected under the EPBC Act.”

Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

12. Page 42: Table 2.1, under Commonwealth legislation, reference to Australian Heritage Commission Act 1975 is incorrect– this legislation was repealed in January 2004. The reference to the Register of the National Estate should be included under the Australian Heritage Council Act 2003 (the Council is responsible for keeping the Register of the National Estate).

Response: Noted.

13. Page 74: 3.7.5 Heritage Activities, the first paragraph should also note the inclusion of the Batavia Shipwreck Site and Survivor Camps Area 1629 on the National Heritage List under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

14. Page 79: 4.1.1 National Heritage List, 3rd paragraph, first sentence should read: “… the values identified in the gazettal must be protected …”. The last sentence should read: “A person cannot take an action that will have a significant impact on the National Heritage values of a listed place without first referring the proposal to the Australian Government Minister for the Environment and Heritage for a decision.”

Response: Noted.
15. Page 79: 4.1.1 National Heritage List, 4th paragraph, should read: “The National Heritage values of the Batavia Shipwreck Site and Survivor Camps Area 1629 have been identified against the following National Heritage criteria …”.  
Response: Very similar wording has been used in the PER.

16. Page 81: 4.1.1 National Heritage List, last paragraph should read: “Management obligations include a management plan for the listed area to be developed by the WA State Government in consultation with DEH, which is in preliminary stages of development.”  
Response: At the time of finalising the PER (July 2006), the statement in the PER was correct. The preliminary stage of the plan is now noted and will be included in the Long Island Resort Heritage Management Plan.

17. Page 83: 4.1.5 Register of the National Estate (RNE), it must be noted that: “when legislative changes were enacted on 1 January 2004, the Australian Heritage Commission Act 1975 was repealed and the Australian Heritage Commission ceased to exist. The Australian Heritage Council Act 2003 established the Australian Heritage Council which continues the function of compiling and maintaining the RNE. The RNE consists of more than 13,000 places …”.  
Response: Noted.

18. Page 165: 7.3.3.1 Potential Impacts, dot point 3 should read: “… increased number of people participating in tourism activities may lead to environmental degradation and adverse impacts/loss of National Heritage values of the Batavia Shipwreck Site and Survivor Camps Area 1629.”  
Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

19. Page 165: 7.3.3.2 Management and Mitigation Measures, should include in dot point 3: “The development and implementation of a Heritage Management Plan will be undertaken in conjunction with WAMM and WA Fisheries to ensure consistency with the Heritage Management Plan to be developed for the National Heritage List place”. A following dot point should be added to state that a Visitors Activity Management Plan will be developed in conjunction with WAMM and WA Fisheries to manage and monitor visitor access to Long Island and the surrounding area to ensure consistency with the Heritage Management Plan to be developed for the National Heritage listed place.  
Response: The Long Island Resort Heritage Management Plan is already discussed in the PER in Tables 1.1, 1.2, 6.5 and Sections 7.5.3.3, 7.5.4.3, and 8.1.3.4. The Visitor Activity Management Plan was attached to the PER and discussed extensively in the text.

20. Page 202: 7.5.4.1 Potential Issues last dot point should read: “…A section of the Wallabi Group of Islands has recently been included on the National Heritage List (the Batavia Shipwreck Site and Survivor Camps Area 1629) by the Australian Government Minister for the Environment and Heritage due to its association with the historic shipwreck Batavia.”  
Response: Very similar wording used in PER.
21. Page 235: Table 8.2 Management and Mitigation Measures, section 1, 2nd paragraph should note: “A Long Island Heritage Management Plan will be developed in consultation with WAMM and WA Fisheries to ensure consistency with the Heritage Management Plan to be developed for the National Heritage listed place.”
Response: These words have been used at least three times previously in the PER (Table 1.1, Sections 7.5.3.3 and 8.1.3.4).

22. Page 235: Table 8.2 Management and Mitigation Measures, section 2, the 1st paragraph should note: “A visitor Activity Management Plan has been developed, in conjunction with WAMM and WA Fisheries to ensure consistency with the Heritage Management Plan to be developed for the National Heritage listed place, to manage all visitor activities …”.
Response: The Visitor Activity Management Plan was attached to the PER and discussed extensively in the text.

RAISED BY: MIDWEST DEVELOPMENT COMMISSION (SUBMISSION 11)

23. Long Island is on the National Heritage List for its significant maritime heritage values, associated with the Batavia wreck. Every effort must be made to protect these heritage and cultural assets.
Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10.

RAISED BY: SUBMISSION 17

24. The listing on the NHL is for the purpose of protecting the maritime heritage values of the Batavia wreck and associated sites and events. The onus lies with the proponents to demonstrate that there will be no significant impact on these heritage values. Does the proponent achieve this?
Response: See response 4.2.1-23 above.

4.2.2 Fishing Industry Heritage

RAISED BY: HERITAGE COUNCIL OF WA (SUBMISSION 19)

1. The emphasis of the report is on the significance of the islands because of the Batavia story, neglecting another important story which is the history of the local fishing industry. That appears to be tacitly acknowledged in the design of the resort (stylised fishing shacks?); it should be built into visitor interpretation and guidance.
Response: The importance of the Fishing industry is documented in Section 5.1 and 8.3.3. The history of the fishing industry is briefly mentioned in Section 1.4.4. Information will be included in guest interpretive materials.

4.2.3 European Heritage Management

RAISED BY: HERITAGE COUNCIL OF WA (SUBMISSION 19)

1. While we’re happy that the Long Island Resort Heritage Management Plan be compiled principally in consultation with the WA Museum, we would appreciate being kept informed about the document during its preparation (as discussed in the PER on pages 153
and 201). The island-group is in the Council’s current assessment program and hence remains a candidate for entry in the State Register.

Response: The Heritage Council of WA will be consulted on the development of the Long Island Resort Heritage Management Plan.

RAISED BY: SUBMISSION 17

2. The proposed resort will impact the national heritage values of Long Island by the loss of opportunity (according to the current terms of the proposal) to interpret and acknowledge the significant heritage values of the site for the broader non paying Australian and international public. A Visitor Interpretation Centre, developed in tandem with the proposed resort, could achieve this positive outcome. The proponents have not demonstrated how they intend to achieve the following positive impact on the European heritage values of Long Island: “A likely positive impact of the resort is that of increased awareness and understanding of the important historical events associated with the Batavia” (p. 233). Will this impact be on the resorts’ paying guests alone? How will the resort increase this awareness for the wider Australian and international public for whom this site has significant heritage value?

Response: Information on the National Heritage Listed Place and its management is supplied already in the PER at sections 1.3.2, 4.1.1, 7.5.2, 7.5.3, 7.5.4, 8.1.3.2 and Figure 10. With respect to points 1 and 2 above, the Day Visitor’s Pavilion will be available to the broader non paying public and will act as a Visitor Interpretation Centre. It will contain interpretive materials including artefacts on loan from the WA Maritime Museum relating to the Batavia. This is discussed in Tables 1.1, 6.5, 8.2 and Sections 3.4.1.5, 3.7.1, 3.7.2, 8.1.3.4, and 8.2.4.2. As stated in the PER “…(day) visitors will be welcomed into the day visitor pavilion, which will include a kiosk, toilet facilities and interpretive material showcasing the natural and historical values of the island.”

3. Heavy reliance on the induction program, signage and ‘minimal impact’ messages communicated to prevent guests and day visitors physically impacting heritage sites and potential archaeological sites on Long Island.

Response: It should be noted that access to the island and indeed all islands in the Abrolhos is currently totally unregulated and visitors may trample over potential heritage sites unchecked. It is the experience of the resort operator that the type of guests that would be willing to pay and/or make the effort to independently journey to Long Island are only interested in protecting the island’s natural and heritage values. However, should resort guests or day visitors be found to be disturbing the heritage values of Long Island in any way, they will be warned by the Resort Manager. Further infringements will result in the removal of the guest from the island.

HLD recognises that it cannot exercise this level of control over day visitors that are not associated with the resort and that are outside the HLD lease area. Despite the signage and information contained in the day visitor pavilion, it is possible that detrimental behaviour may occur. Should any behaviour be observed that would result in potential disruption to heritage sites, the person will be approached by resort staff and spoken to about the importance of protecting the area. Should the behaviour continue, the DoF would be notified as the controlling authority for the Abrolhos Islands.
RAISED BY: SUBMISSION 4

4. One of the main reasons many of my clients have to visit the Abrolhos Islands, is to see sites associated with survivors of the *Batavia*. Long Island and the connections with the mutiny and subsequent hanging of the ring leaders there, is an integral part of this experience. To walk unimpeded on Long Island and view this isolated wind-swept historic site as it was in 1629, is for many a moving experience which will be lost for ever to future generations of Australians if this development is allowed to proceed.

Response: The historic cultural significance of the island is discussed in detail in the PER. Development of the resort on Long Island will ensure an increased awareness and understanding of the important historical events associated with the Batavia. The resort will not disturb any archaeological artefacts associated with the Batavia and will provide a level of control to access where previously there was none.

4.3 VISUAL AMENITY

RAISED BY: DEC (SUBMISSION 12)

1. The proponent should be required to develop a plan to address impacts on amenity (visual and audible) in consultation with DEC and the Department of Fisheries.

Response: The PER (section 8.2) discusses the impact on visual amenity and provides Views in support of this discussion. The resort has been designed to a high level of engineering and amenity standards which includes designing a resort with a low profile and colouring in keeping with the natural landform and amenity of the existing islands. The DoF has been included in consultations regarding the preliminary designs of the resort and with the proposal to develop a resort on Long Island.

The impact and management of noise generation has been discussed in the PER (Section 7.6.2) and incorporated into the design and operation of the resort and its activities.

The PER, Management Plans and the design and operation of the resort as approved through the PER process is considered more than sufficient to deal with the aspects of visual amenity and noise and the request for additional plans is not warranted.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)

2. While the developers have gone to impressive lengths to reduce the effects of lighting at night on nocturnal shearwaters and other species, the resort will be continuously lit, and the ambient light will reduce the darkness of the night sky for fishers and other visitors. The Resort will be the only continuously lit facility at the Wallabi Group, and there will be a loss of landscape value for other users.

The PER (sections 3.6.6 and 7.6.3) provides detailed discussion on lighting with a specific emphasis on how to manage the impact on birds. Lighting will be managed to minimise any adverse impacts to birds and other fauna on Long Island and this will mean that there will be minimal to no light overspill to affect the night sky for fishers and other visitors.
5. Pollution Management

5.1 Marine Water Quality

RAISED BY: DEPARTMENT OF FISHERIES (SUBMISSION 9)

1. Water samples should be taken at a time when waste water is released (given that waste water is to be released only intermittently during periods of strong tidal movement) so that the sampling will provide information on how effectively the waste water plume is mixed and diluted. It would also be useful if basic data such as sea surface temperature and current velocity is collected at the same time as the water quality data.

Response: Agreed that water samples will be taken during wastewater discharge. Water temperature and surface current velocity (through tracking of drogue) will be recorded during sampling.

2. Water Quality monitoring should be conducted at the time that waste water is being released, and the DoF should be provided with copies of the monitoring results.

Response: DoF will be provided with copies of the monitoring results.

RAISED BY: DEC (SUBMISSION 12)

3. The quality of sewage discharge (proposed by the proponent) to the marine environment is well above that allowed similar coral reef environments. The Great Barrier Reef Marine Park Authority requires the following discharge criteria from sewage outfalls: Total N 5mg/L, Total P 1 mg/L. Values above this were found to impact on the receiving environment and have lead to eutrophication of reef environments adjacent to resorts. Copies of this policy are available at www.gbrmpa.gov.au.

Response: Applications for permission to discharge treated sewage into the GBRMP are assessed using a nutrient load-based approach. This specifies a maximum load of Total Nitrogen and Total Phosphorus that can be discharged into the Marine Park in a given time period. (http://www.gbrmpa.gov.au/__data/assets/pdf_file/7516/sewage_policy.pdf). The GBRMP Authority require concentration limits to be set to avoid acute effects on marine biota. Each discharge is examined on a case-by-case basis that addresses factors such as proximity to sensitive environments, hydrodynamics (which determine how rapidly the sewage is diluted), and national water quality criteria (ANZECC/ARMCANZ 2000).

Tertiary treatment, as mentioned above, is not considered necessary as the very low volume of sewage to be discharged plus high dilution rates will ensure minimal risk of harmful effects on marine biota.

4. The proponent should be required to meet higher standards from commencement commensurate with the conservation status of the island and the surrounding waters.

Response: Refer to response 5.1-3.

5. The proponent has made a commitment to improve water quality discharge should impacts from the sewage outfall be detected during the operational phase of the resort.

Response: Noted.
6. The method(s) by which an improvement in water quality (in sewage effluent) will be achieved, should impacts be detected, must be provided to the managing agencies for consideration.
Response: Should impacts be detected, alternative methods to improve water quality will be provided to the managing agencies

RAISED BY: MARINE ECOSYSTEMS BRANCH - EPASU (SUBMISSION 18)
7. The proposed water quality monitoring program does not look adequate. It is proposed that samples will be collected again prior to the construction phase and then only once a year in autumn.
Response: The water quality monitoring program is considered adequate as the ongoing monitoring will compare data from the impact sites to data from the reference site: the latter site will reflect un-impacted water quality at that point in time. The monitoring is also timed to capture ‘worst-case’ (i.e. peak season) conditions, and there is provision to review the monitoring program after three years.

8. Base line water quality data appear to be based on one batch of surface samples collected from six sites in 2005. These data indicate levels of nutrients that exceed ANZECC/ARMCANZ trigger values. Their value as a base line to determine any future increase in nutrient levels is questionable.
Response: The batch of samples collected in 2005 was not intended to provide a baseline data set. They were collected to provide background water quality for Long Island, for use in the modelling of discharge dilution. Future increases in nutrient levels, related to the operation of the wastewater outlet, will be assessed by comparison of data from impact sites to data from the reference site (see Appendix 6), not to baseline.

9. The use of nutrient concentrations as an indicator of possible nutrient effects is not very useful. Of more importance is the monitoring of benthic communities and the consideration of cause and effect pathways relating to ecological response.
Response: The monitoring of benthic communities (coral growth & mortality) surrounding the wastewater outlet is proposed (see Section 6.3 of Appendix 6).

5.2 WASTEWATER DISPOSAL

RAISED BY: DEPARTMENT OF HEALTH (SUBMISSION 13)
1. The report indicates that there will be an “engineer” on staff but maintenance of the WWTP has not specifically been addressed.
Response: The maintenance technician will be trained by the manufacturer to conduct regular onsite maintenance to avoid the risk of breakdown. Typically since the system relies on the passive means (bacterial agents) to treat the wastewater the primary main areas requiring any sort of maintenance are the pumps and aerators.

2. A number of undertakings regarding wastewater quality and ongoing monitoring (at very long intervals) have been indicated. However, as the wastewater volume generated may not be sufficient to trigger Department of Environment and Conservation works approvals or licensing requirements, it is of concern that there may not be any regulatory controls to ensure this compliance. It is not clear which agency or Local Government will be
responsible for administering approvals on the islands and for overseeing and assessing the proposed monitoring of the ocean discharge and dilution commitments.

Response: The resort will be implemented in accordance with the conditions of approval set by the EPA as part of the PER process and in accordance with the conditions of the tourism license to be issued by the Minister of Fisheries following the completion of the PER.

3. The maintenance of the package treatment plant itself will require quarterly reports to the local government and Department of Health.

Response: Noted.

4. The disposal of sludge from the wastewater treatment plant has not been addressed.

Response: Sludge is proposed to be collected annually. The sludge will then be transported back to the mainland and disposed of as per local council regulations.

RAISED BY: MARINE ECOSYSTEMS BRANCH EPASU (SUBMISSION 18)

5. Nitrogen is likely to be the limiting nutrient and the proposed loads from the outfall are relatively low (~0.5kg/day). It is proposed to position the outfalls approximately 70m from shore in 10m of water on the reef edge. Any impacts are most likely to be downstream of the outfall on the reef edge. The reef edge slopes down steeply into Goss Passage to a depth of 40m where benthic communities are likely to be less abundant and diverse. Consideration could be given to the feasibility of positioning the outfalls further offshore to reduce the likelihood of impacts.

Response: There is no need to position the discharge point further offshore as the plume will be buoyant and unlikely to impact benthic communities greater than 10 metres from the discharge point. The level of dilution at 10 metres is such that the discharge does not reach the water surface (PER Figure 19). Increasing the depth of discharge will not increase dilution, but will cause more corals to be impacted during construction.

6. In relation to the waste minimisation principle, “all reasonable practical measures should be taken to avoid and minimise the waste generation and discharge”. Note the inconsistency relating to the level of protection around the outfall: Section 4.2.1, page 9. “…impact on the marine environment beyond the 30m mixing zone (E4/E2 boundary)….Appendix 6, section 4.1, page 8. “The area inside the mixing zone does not have a defined level of protection…” A level of protection must apply everywhere therefore any conditions of approval should reinforce this.

Response: The waste minimisation principle has been followed. The Long Island Marine Management and Monitoring Plan (Appendix 6) will be amended to replace the wording. The area inside mixing zone has an E4 level of protection.

RAISED BY: WA MUSEUM (SUBMISSION 5)

7. Black waste water – and grey water – what level of treatment is proposed? Goss Passage is a very biodiverse area with great scuba diving and a diverse fauna of benthic species particularly echinoderms that include many rare species. These should not be put at risk from waste water disposal.

Response: The PER (sections 3.6.1 and 7.6.5) describes the level of treatment and the potential impacts on benthic marine species. The design of the treatment system and the
waste water outfall location will ensure that this method of waste water disposal will not have any adverse impacts on the biodiversity of Goss Passage.

RAISED BY: SUBMISSION 4

8. Unacceptable high levels of effluent discharge into coral reef marine environments are likely to lead to eutrophication of these reef environments. It is an unacceptable risk, especially as the proposal is aware of this but merely proposes to take measures to improve the quality of waste water entering the marine environment if this occurs.
Response: Refer to response 5.2-7.

RAISED BY: FRIENDS OF THE ABROLHOS (SUBMISSION 16)

9. Is the choice of the “low flow flush toilet” as the model for the Resort workable, given the calculations of the high frequency of flushes from staff, Resort guest and day visitor toilet use?
Response: The term “low-flow” toilet here refers to the fact that the units are a flushing toilet that uses a low amount of water not that they cannot handle heavy usage rates. Toilets were identified as one of the major sources of water consumption and hence a low flow toilet option offered a significant reduction on the water demand for the facility.

10. Cleaning products used by Resort staff should be phosphate-free and 100% biodegradable to reduce possible impact from discharge of waste water into the Abrolhos waters.
Response: The PER (section 7.6.8.4) states that all dangerous waste and/or chemicals shall not be disposed of via the sewerage system to prevent their eventual release to the marine environment and shall be returned to the mainland for safe disposal. The resort will utilise, wherever available, cleaning products which are biodegradable.