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12.1 Biodiversity Values

12.1.1 Loss of Outstanding Biodiversity Values

Many submissions have noted that Hummock Hill Island supports outstanding biodiversity values including Endangered regional ecosystems, threatened species habitat, important areas for migratory shorebirds and world heritage values. The EIS comprehensively documented these values (Section 14).

To place the biodiversity values of Hummock Hill Island in context, the following is noted:

- a very low diversity of amphibians, reptiles and mammals has been recorded from Hummock Hill Island across four baseline ecological surveys;
- Hummock Hill Island supports terrestrial ecosystems types that are present on the adjacent mainland;
- a very low diversity of threatened species has been positively recorded from Hummock Hill Island in comparison to that recorded from surveys on the adjacent mainland. This is particularly obvious in the threatened flora. For example, large populations of the Endangered species Cycas megacarpa known from many sites in the locality but absent from Hummock Hill Island;
- there are low levels of endemism in the flora of the continental Islands of the Great Barrier Reef Marine Park, with only three endemic species across the entire area of a total of 2195 species known from the continental Islands. The vast majority of the continental Island flora (99.86%) is also represented on the mainland; and
- most of the values identified for the GBRWHA against the World Heritage Area listing criteria relate to the marine ecosystem, in particular the large number and biological and geomorphological diversity of coral reefs, the geomorphological and biological interconnectivity of reefs and islands, north-south marine biodiversity gradients, spectacular reef and island seascapes, and the presence of key habitats for species of conservation significance. The world heritage values are not related to the spectacular terrestrial biodiversity values.

Nevertheless, areas of highest biodiversity value have been avoided through responsive design. The HHI Development layout has been designed to minimise impacts and provide setbacks to sensitive marine habitat, avoid Endangered regional ecosystems and threatened species habitat and conserve a representative suite of vegetation types.

12.1.2 Inclusion within a National Park

A range of submissions have suggested that Hummock Hill Island should be included within a National Park. A large proportion of Hummock Hill Island is already held by the Queensland Government and opportunities exist for those areas to be declared protected areas under the *Nature Conservation Act 1992*.

There is a misconception evident in the submissions that Hummock Hill Island is a pristine island which has been subject to limited human influence. This is not the case, Hummock Hill Island has been subject to grazing uses for many years. Whilst some areas hold significant nature conservation value, others have been compromised by land clearing and weed invasion.

Wild Cattle Island National Park provides protection to a range of habitat types also present on Hummock Hill Island and to that end these habitats are already protected in the local conservation network. The dominant vegetation types on Hummock Hill Island are well protected within National Parks at the sub-regional and regional level, as discussed in the EIS. Furthermore, those parts of Hummock Hill Island subject to the Special Lease have been consistently overlooked by the Queensland Government as suitable for inclusion within the National Park Estate.

Submitters noted that Hummock Hill Island should be protected to allow future generations to enjoy the natural assets of the area.

The Proponent proposes to have the undeveloped parts of the island (84% - which includes the undeveloped parts of Special Lease area and Unallocated State Land) declared as Nature Refuge and protected under a formal agreement with the government agencies.

One submission suggested that Hummock Hill Island should be made into a National Park to complete a Bioregional Corridor which stretches from Wild Cattle Island to Eurimbula National Park. The underlying assumption here is that the connectivity values of Hummock Hill Island will be compromised by the proposed HHI Development, and this is not the case.

12.1.3 Loss of Species Diversity

The likely loss of individual species from Hummock Hill Island has been raised by several submissions to the EIS.

Whilst it is conceded that individual species may be lost from the HHI Development area (16% of Hummock Hill Island's total area) due to modification of habitat, local extinction of species is highly improbable. Large areas of remnant vegetation will remain intact within the development boundary. Extensive areas of remnant vegetation will remain surrounding the HHI Development area and on surrounding State Lands as discussed in Section 14.2 of the EIS.

Large areas of remnant vegetation will be retained within the development footprint to promote ecological connectivity on Hummock Hill Island. The Proponent proposes to have the undeveloped parts of the island (84% - which includes the undeveloped parts of Special Lease area and Unallocated State Land) declared as Nature Refuge and protected under a formal agreement with the government agencies. The HHI Development boundary will be fenced and have a barrier to prevent vehicular access and uncontrolled pedestrian access to the Nature Refuge. The conserved areas will be maintained, protected and enhanced through a management contract between the Proponent and an appropriate environmental management company who will also be contracted to manage the offset areas. The Proponent propose the Gladstone Regional Council impose a special area environmental levy on land owners to cover the cost of theses environmental services.

12.1.4 Comparison with Whitsunday Islands

There was some criticism of the comparison drawn in the EIS between Hummock Hill Island and other Continental Islands of the Great Barrier Reef WHA. Whilst direct comparison across bioregions may not be practical in some respects, comparison between continental islands is more scientifically valid than comparison between Continental Islands and mainland ecosystems. Moreover, the comparison intended to discuss the uniqueness of Continental Islands and it is abundantly clear that these islands support few endemic species and are, in fact, remarkably similar to the mainland ecosystems of the same bioregions.

12.1.5 Suitability of Balance Areas for Wildlife

One submission questioned the ability of wildlife to shift from the HHI Development area to balance areas following vegetation clearing and also suggested that if balance areas were suitable for the wildlife they would already occupy those areas.

It is very likely that those species to be displaced by development already utilise the balance areas. As patterns in fauna distribution are not determined by the lease area or the HHI Development boundary, their responses to habitat loss will be based around availability of resources in the balance areas. The HHI Development area contains no habitat types which are not well represented in the balance areas, and as such, it is envisaged that the suite of species displaced by development will be accommodated by conserved areas.

12.2 Impact of Introduced Pests

12.2.1 Weeds

The potential for introduction of weeds has been raised in many submissions. As Hummock Hill Island had been used for many years for cattle grazing, many significant weed species are already present, including Lantana (*Lantana camara*) and Groundsel (*Baccharis halimifolia*).

The establishment of tourist and residential development on Hummock Hill Island does have the potential to introduce a variety of suburban weed species, however, this process can be effectively managed.

A Weed Management Plan will be developed for construction activities to limit weed spread during the most vulnerable stages of development, particularly when major earthworks are carried out. In the long term, the Special Area environmental levy will be used to fund weed control works within and adjacent to the HHI Development area. Details of the approach to Weed Management are provided in the Environmental Management Plans (Section 17.4.5 and 17.5.4 of the Supplementary Report).

12.2.2 Pest Vertebrates

Pest vertebrates are already present on Hummock Hill Island, including wild dogs, foxes, House Mouse, Cane Toad, Horse and Cattle. Feral cats are likely to be present, although there are no confirmed records. These pests are currently not managed. The proposed HHI Development presents an opportunity to reduce populations of these species through targeted pest control programs, executed through the perpetual environmental management program for the undisturbed bushland areas to be declared Nature Refuge and funded by the Special Area environmental levy.

It has been suggested that a large influx of tourists with dogs will disrupt the natural environment. Dogs do pose a threat to populations of shorebirds, however, this risk can be managed by establishing a range of use zones on the beach, with designated "no go" areas where dogs are excluded. These issues will be managed through the Environmental Management Plans prepared for the HHI Development (see Section 17.5.4 of this report).

Cats will not be permitted within the proposed HHI Development and therefore pose limited threat to the nature conservation values of Hummock Hill Island. The imposition of registrable covenants over each residential lot prohibiting domestic cats an acceptable means to control this risk. This view is supported by recent case law (see *Krajniw & Ors v Brisbane City Council & Anor* [2008]). In the Krajniw case covenants were proposed to prevent cat ownership in an area of known high conservation value.

12.3 Adequacy of Flora and Fauna Surveys

Submissions have criticised the adequacy of flora and fauna surveys completed for the EIS. The intensity and duration of bird surveys has been specifically criticised .

The EIS presented information obtained from a number of flora and fauna surveys completed between 1992 and 2007 (Section 14.1.1). These surveys have been completed at over 50 flora and survey sites in a variety of seasons and conditions. The level of confidence in the baseline data is high.

It should be noted that studies by Dames and Moore included 54 birds survey sites, CQU included 143 opportunistic fauna survey sites and SKM completed a targeted Migratory Shorebird Survey over 4 days (2 visits to the northern end of Hummock Hill Island and 2 to the southern access point on each day). This is an exhaustive search effort for avifauna and more than adequate to detect a representative suite of avifauna, including threatened species.

This survey effort in conjunction with a comprehensive analysis of habitat attributes against the known preferences of target species should identify the species likely to occur on the island.

12.3.1 Search effort for the Wallum Froglet

Hummock Hill Island has been searched by ecologists on four occasions over a 15 year period and during a range of seasons. Targeted searches of wetter areas have been completed during those surveys. As the species is highly vocal during all months of the year in response to rainfall, it would have been recorded if present.

Moreover, the Wallum Froglet reaches its northern distributional limit on the mainland at Litabella National Park near Bundaberg. It has never been recorded north of that location despite intensive search effort by many observers at many sites. The Litabella National Park population remains questioned (Campbell {ed} 1999). Surveys of apparently suitable habitat in the mainland at Turkey Beach in 2005 revealed the occurrence of large populations of *Crinia parinsignifera*, which is easily confused by inexperienced observers with *Crinia tinnula* (J. Richard, per obs). This observation adds weight to the suggestion that the Litabella National Park population may have been misidentified.

Not only are essential microhabitats for the species lacking on Hummock Hill Island, the area does not lie within the known distribution of the species. Further analysis of impacts is redundant.

12.3.2 Occurrence of Acacia grandiflora

A submission suggested that Hummock Hill Island provides ideal habitat for *Acacia grandiflora*. This species is restricted to a small area around Gayndah, Mundubbera, Coulston Lakes and Proston in the Burnett District (Qld CRA/RFA Steering Committee 1998; QDNR 2000). Whilst it is true that the species is most frequently recorded in association with E*ucalyptus crebra, Corymbia citriodora, C. trachyphloia* and *E. exserta*, Hummock Hill Island is located outside of its known distribution.

12.3.3 Occurrence of Paradelma orientalis

One submission suggested that the 'endangered' species *Paradelma orientalis* is likely to occur on Hummock Hill Island. This species is not considered Endangered under State or Federal biodiversity legislation. It is listed as Vulnerable under the Qld NCA and Commonwealth EPBC Acts.

The submission assumes that because *Paradelma orientalis* is present in the broader locality, in broadly similar habitat types, it will be present on Hummock Hill Island. However, habitat requirements are likely to be quite specific, and related to a suite of microhabitat elements.

The habitat utilised on Boyne Island consists of *Corymbia citriodora*, *Eucalyptus exserta*, *E. clarksoniana*, and *E. crebra* tall woodland with a sparse understorey of *Acacia falciformis*, *Pogonolobus reticulatus*, *Jacksonia scoparia* and *A. conferta*. There is a sparse ground stratum of *Xanthorrhoea latifolia*, *Entolasia stricta* and *Themeda triandra*. The substrate is covered with a dense layer of dry leaf litter. Soils are shallow and very few large rock fragments occur in the area (Tremul 2000). During a ten-year study on Boyne Island, 75% of active specimens were encountered in *Acacia falciformis* trees. (Tremul 2000).

The Regional Ecosystem types on Boyne Island which this species is associated with include RE 12.11.5, 12.11.6 and 12.11.8. None of these RE's are present on Hummock Hill Island, suggesting that at a relatively course level, preferred habitats in this locality are absent.

12.3.4 Occurrence of Red Goshawk

One submission noted that an error has been made in Appendix A3 (EPBC Report) of the EIS in relation to the occurrence of the Red goshawk. The error relates to the comment that the species was unlikely to occur because it was an "Oceanic species". This error is acknowledged. The Red Goshawk is strongly associated with productive riparian woodlands and open forests and requires vast tracts of habitat. Such habitat systems are absent from Hummock Hill Island.

12.3.5 Occurrence of Significant Flora

One submission suggested that *Xylosma ovatum, Cupaniopsis shirleyana* and *Cycas megacarpa* are likely to be present on Hummock Hill Island due to their known occurrence on the mainland around Turkey Beach. The likely occurrence of these species was discussed in Section 14.1.2.4 of the EIS and the conclusions drawn remain applicable.

12.4 Management of Impacts beyond the Development

12.4.1 Management of Public Access

Concern has been expressed in the submissions around the potential for adverse impacts on natural areas outside of the HHI Development footprint.

The Proponent will have the undeveloped parts of the island (84% - which includes the undeveloped parts of Special Lease area and Unallocated State Land) declared as Nature Refuge and protected under a formal agreement with the government agencies. The HHI Development boundary will be fenced and have a barrier to prevent vehicular access and uncontrolled pedestrian access to the Nature Refuge. The conserved areas will be maintained, protected and enhanced through a management contract between the Proponent and an appropriate environmental management company who will also be contracted to manage the offset areas. The Proponent propose the Gladstone Regional Council (GRC) impose a special area environmental levy on land owners to cover the cost of theses environmental services.

12.4.2 Tenure and Management of Balance Areas

Several submitters suggested that the Proponent is unable to guarantee the integrity and protection of areas outside of the HHI Development and furthermore that mitigation strategies are poorly developed. One submission suggested that the Proponent and regulatory agencies will be unable to prevent environmental vandalism such as tree clearing.

The undeveloped area of Hummock Hill Island will be conserved. The conserved areas will be maintained, protected and enhanced through a management contract between the Proponent and an appropriate environment management company such as Greening Australia (GA). The contract will be for a period of 30 years. As part of the contract the environmental management company will run regular community development and information programs to engage the people living on and using, Hummock Hill Island in natural resources protection and management. The environmental management company will also undertake fire, weed, pest and bushland management, track maintenance, litter collection and community education/extension roles.

It is intended that a permanent site manager be employed to supervise all vegetation management works across the balance areas.

In effect, the balance areas will be managed as though they were a conservation reserve. A range of planning and management mechanisms which have been well tested and are known to be effective will be implemented to conserve biodiversity values.

12.4.3 Use of Regional Ecosystem Mapping to determine development boundaries

One submission suggested that the principle of avoiding Endangered Regional Ecosystems was fundamentally flawed. This is based on the view that the master planning process should have responded to ecosystems, not "legislative artefacts of our environmental protection laws".

The footprint of the development has been refined to avoid areas of endangered regional ecosystems and areas of habitat for species such as the black breasted button quail. The use of regional ecosystems has a basis for defining development footprints is a well accepted method of

avoiding impacts on areas of environment value. The Proponent's commitment to managing undeveloped areas of Hummock Hill Island will protect remnant vegetation and habitat.

The project has a commitment to the management of vegetation and habitat outside the development footprint, with the specific purpose of mitigating the impact of the development on the Island's environment. Vegetation offsets will be located on Hummock Hill Island, further committing the Proponent to the management of the Island's natural values.

12.4.4 Wetlands

One submission raised the matter of impacts of the project on wetlands and the fact that while wetlands may not be within the development footprint, it is likely that impacts will occur.

The Proponent has developed a stormwater management system that treats stormwater in a series of purpose built wetlands, detention basis and treatment systems, with the purpose of ensuring that untreated runoff from the project does not enter wetlands outside the project site. The stormwater management system will collect and treat water before it leaves the site. It is also planned to reuse treated water from the development to be used to irrigate areas such as the airstrip and golf course. This approach will reduce the volume of water used by the HHI Development and maximise the use of water, thereby limiting overall impact and reducing associated waste.

12.5 Protection of Littoral Scrub and Beach Habitats

Development has been excluded from the Littoral Vine Scrub and Beachfront habitats in an effort to protect a range of values. These areas will be subject to access restrictions, including fences and bollards to prevent egress of persons and vehicles. These restrictions will be enforced by the maintenance team.

12.6 Impact on Fauna Corridors

The successful, sustained and long term movement of fauna and flora between patches of habitat is dependent on key design principles being adopted when planning for development or a change in land use. Careful consideration of the design and location of fauna corridors has resulted in amendments to the HHI Development layout.

The following principles have been applied in the design of wildlife corridors on the HHI Development area:

- in general, wider corridors are used by a wider range of fauna types and remain more effective over time;
- an ecological corridor must provide sufficient area and types of habitat suitable for the full range of fauna species that inhabit or move through the local area;
- where the provision of service infrastructure and other intrusions is necessary, a common disturbance corridor or easement should be used where possible; and
- corridor widths must take edge effects into account. If penetration by edge effects is for example, 10 metres, then a corridor would need to be substantially more than 20 metres wide to compensate for the disturbance on its edges.

The corridor network across the HHI Development area seeks to retain vegetated corridors of at least 300m in width in key locations and a minimum of 100m in all areas of remnant vegetation.

12.6.1 Impacts of Fragmentation

As noted in the EIS (Section 14.2), Hummock Hill Island is currently characterised by a relatively contiguous vegetation cover, with limited clearing of vegetation in some areas. Portions of the island which have been historically cleared and/or grazed have lower connectivity value for some fauna groups. For example, where the understorey has been damaged through grazing, connectivity is reduced for small mammals which depend on a high level of groundcover as protection from predators.

Potential habitat fragmentation of individual species populations and currently interconnecting patches of remnant vegetation can occur through the introduction of roads, buildings, cleared areas and miscellaneous infrastructure unless mitigated during Master Planning.

Habitat fragmentation typically reduces the formerly more continuous natural distribution of a species to a series of smaller and more isolated populations that occur in smaller and more isolated habitat patches. Such populations are often exposed to a range of additional processes that may threaten their viability, such as changes to disturbance regimes, environmental conditions and interactions with other species.

The approach to habitat fragmentation has been to design the proposal around the need to maintain a high level of connectivity. The proposed HHI Development footprint has been amended as follows:

- a fully vegetated corridor of at least 300m in width will be conserved to allow fauna dispersal from east-west across Hummock Hill Island through the old grazing lease. This corridor is in conflict with development at one single point where it crosses the major access road to the resort precinct. It is intended that a major fauna crossing be established at this point, including an underpass or land-bridge and extensive exclusion fences along section of road that pass through vegetated areas to prevent fauna entering the roadway; and
- corridors of at least 100m in width will be retained around the entire perimeter of the HHI Development footprint.

Submissions have stated that habitat fragmentation will threaten Hummock Hill Island's endangered flora and fauna. A review of the ecological requirements of the threatened species known to occur on Hummock Hill Island indicates that none are particularly prone to habitat fragmentation. All are either birds or bats, are highly mobile and have the capacity to fly over cleared or developed lands.

12.7 Extent of Vegetation Clearing

12.7.1 Clearing within the HHI Development Footprint

The HHI Development footprint has been revised to reduce impacts on endangered regional ecosystems, increase the width of fauna corridors, increase buffers to tidal lands, wetlands and waterways.

A number of submissions raised the issue of the project's impact on the areas of vegetation retained within the development boundary.

In the EIS the area quoted as being impacted by the project was based on the direct impact of development, roads, infrastructure and open space (ie the development footprint). Large areas of remnant vegetation will be retained within the development footprint to promote ecological connectivity on the island. The area of vegetation enclosed by the development boundary is presented in **Table 12-2**. **Table 12-2** lists the regional ecosystems affected, its status under the *Vegetation Management Act 1999*, whether the regional ecosystem provides essential habitat and the area of the regional ecosystem affected. The Proponent has used this table as the basis for securing offsets for the project.

Table 12-1 Vegetation Areas within the Development Boundary

RE	Vegetation Management Status	Essential Habitat	RE Affected Ha
12.3.10/12.3.3	Endangered - Dominant	Yes	8.915
12.3.3	Endangered - Dominant	Yes	4.039
clear	Non-remnant / regrowth	No	54.572
regrowth	Non-remnant / regrowth	No	2.032
12.1.2	Not Of Concern	No	0.453
12.1.3	Not Of Concern	No	0.107
12.12.7	Not Of Concern	No	86.415
12.2.11	Not Of Concern	No	134.882
12.2.14	Not Of Concern	No	0.091
12.12.12	Of Concern - Dominant	Yes	195.136
12.12.19	Of Concern - Dominant	No	0.286
12.12.28	Of Concern - Dominant	No	0.149
12.12.8	Of Concern - Dominant	No	5.461
12.2.11/12.1.1	Of Concern - Sub-dominant	No	25.425
12.2.11/12.2.2/12.2.11	Of Concern - Sub-dominant	No	0.103
Total Area of Development Boundary			**518.068**

One submission suggested that RE 12.3.10 is unique to Hummock Hill Island and "does not exist anywhere else in this form" due to the associated geology. It was acknowledged in the EIS (Section 14.1.2.1) that "RE 12.3.10 is restricted in its occurrence in SEQ, and is generally restricted to the overlap zone between SEQ and the Brigalow Belt Bioregion."

A total of 164.48 ha of RE 12.3.10/12.3.3 is present on HHI. The Project will only require the clearing of 8.9 ha of this regional ecosystem. Additional details are provided in **Section 12.8** below.

One submission raised the matter of cumulative impact of the clearing associated with the HHI Development project in the context of other major projects in the Gladstone region.

Significant areas of the vegetation shown in **Table 12-2** will not be cleared and remain an important part of the landscape and park areas of the HHI Development. DERM has advised the Proponent all threatened regional ecosystems within the development boundary will need to be offset under the DERM's Policy for Vegetation Management Offsets. The total areas of vegetation within the development boundary are provided in **Table 12-2**.

Considerable progress has been made in identifying and the locating appropriate vegetation offsets and negotiations are proceeding with landowners. The Proponent has identified 603 ha of non-remnant vegetation to satisfy the Policy for Vegetation Management Offsets. The offsets are located both on Hummock Hill Island and on the nearby mainland. The Proponent has also committed to the management of undeveloped areas of the Island, as a contribution to ongoing stewardship to the Island's environmental value. The Proponent proposes to have the undeveloped parts of the island (84% - which includes the undeveloped parts of Special Lease area and Unallocated State Land) declared as Nature Refuge and protected under a formal agreement with the government agencies.

The Policy for Vegetation Management Offsets provides a mechanism for particular development to proceed while ensuring long-term conservation of remnant regional ecosystems. The Proponent's commitment to negotiating an offset agreement under policy minimise the rise of cumulative impacts from this Project.

12.7.2 Clearing for Firebreaks

All firebreaks will be located within the HHI Development boundary and the area of firebreaks have been included in the area of vegetation affected by the project listed **Table 12-1**. All buildings and infrastructure will be set back an appropriate distance from the HHI Development boundary to accommodate firebreaks.

12.7.3 Clearing for Linear infrastructure

Vegetation clearing within the current Clarks Road Reserve will be required to accommodate linear infrastructure, including the access road, gas pipelines and powerlines. The total area of vegetation to be cleared, based on current regional ecosystem mapping is approximately 38 ha. This is comprised of the following regional ecosystem types:

- Regional Ecosystem 12.3.3;
- Regional Ecosystem 12.12.12; and
- Regional Ecosystem 12.12.7.

The total width of clearing will not exceed 40 m will be contained entirely within the existing road reserve.

12.7.4 Clearing for Boat Ramps and Associated Infrastructure

One submission raised the issue of associated vegetation clearing for the proposed boating facilities. Currently, boating facilities are still in a preliminary design phase. Figures describing the amount of vegetation to be cleared are still approximations and will not be finalised until the detailed design phase.

Current estimates show that Colosseum Inlet boat ramp will require a total cleared area of 0.6 ha of not of concern RE 12.2.11, with 0.4 ha taken by the car parking facilities. The road to the boat ramp will require approximately 4 ha of 12.2.11. Boyne Creek ramp will require approximately 0.7 ha of not of concern RE 12.1.3, with the car park covering an area of 0.6 ha. As previously discussed final figures will be provided as part of the detailed design phase and will include the area of cleared vegetation required for the connecting road to Colosseum Inlet.

12.8 Vegetation Management Act

12.8.1 Offset Proposal

The HHI Development will require clearing of vegetation. As such, the Proponent has opted to provide an offset in accordance with the DERM's Policy for Vegetation Management Offsets (the Offset Policy). The Offset Policy sets targets for the condition, area, configuration and status of vegetation offsets, and the Compensatory Habitat Strategy seeks to meet these targets.

The Proponent is committed to provide an offset in accordance with the DERM's Policy for Vegetation Management Offsets (described in **Table 12-2** below). The Proponent has identified 602.8 ha of non-remnant vegetation to satisfy the Policy for Vegetation Management Offsets. The offset areas will be maintained, protected and enhanced through a management contract between the Proponent and an appropriate environmental management company. The offset areas will continue to be managed until the areas reach remnant status.

Table 12-2 Summary of Minimum Vegetation Offset Requirements

RE	Description	Area (ha)	Multiplier	Offset Area (ha)
12.1.1	Casuarina glauca ± Melaleuca quinquenervia ± mangroves open-forest. Occurs on margins of Quaternary estuarine deposits.	1.270	1.5	**1.905**
12.2.2	Microphyll/notophyll vine forest. Characteristic species include Cupaniopsis anacardioides, Flindersia schottiana, Alectryon coriaceus, Elaeocarpus obovatus, Polyalthia nitidissima, Diospyros spp., Pleiogynium timorense and Mallotus discolor. Melaleuca spp. and eucalypt emergents may be present, e.g. Melaleuca dealbata and Corymbia tessellaris. Occurs on Quaternary coastal dunes and beaches.	0.040	1.5	**0.060**
12.3.3	Eucalyptus tereticornis open-forest to woodland. Eucalyptus crebra and E. moluccana are sometimes present and may be relatively abundant in places, especially on edges of plains and higher level alluvium.	4.930	2	**9.860**
12.3.7	Eucalyptus crebra grassy woodland. Other species such as Corymbia erythrophloia, Eucalyptus exserta, E. tereticornis, C. tessellaris, C. citriodora may be present in low densities or in patches. Mid layer generally sparse but can include low trees such as Acacia bidwillii, Alphitonia excelsa, Allocasuarina luehmannii, Petalostigma pubescens.	86.415	2	**172.830**
12.3.10	Eucalyptus populnea ± E. tereticornis grassy woodland/tall woodland ± patches of Acacia harpophylla and Melaleuca bracteata. Occurs on Quaternary alluvial plains.	8.020	2	**16.040**
12.12.8	Eucalyptus melanophloia, usually with E. crebra ± Corymbia erythrophloia grassy woodland. Other species such as Eucalyptus exserta, E. tereticornis, C. tessellaris, C. citriodora may be present in low densities.	5.460	2	**10.920**
12.12.12	Eucalyptus tereticornis, E. crebra (sometimes E. siderophloia) open-forest to woodland. Other species present can include Eucalyptus melanophloia	195.140	2	**390.280**
12.12.19	Vegetation complex of exposed rocky headlands. Vegetation types include Themeda triandra grassland and wind-sheared shrubland and woodland.	0.290	2	**0.580**
12.12.28	Eucalyptus moluccana ± E. crebra, Corymbia citriodora open-forest or woodland. Occurs on broad ridges and lower slopes on Mesozoic to Proterozoic igneous rocks.	0.150	2	**0.300**
Total Required Offset Area (Ha)		**301.715**		**602.775**

12.8.2 Demonstrated High Level of Community Benefit

Where a project will result in a demonstrated high level of community benefit at a local, regional or state level and identifying the offset would unreasonably delay the development, the DERM will accept specified arrangements that guarantee the securing of a suitable offset prior to the development approval being issued.

These projects must be able to demonstrate a high level of benefit to a local, regional or state community in terms of economic, social, cultural, aesthetic or conservation benefits.The HHI Development will provide a high level of community benefit and this has been demonstrated through the Economic and social impact assessment undertaken for the EIS and cost benefit analysis prepared for this Supplementary Report (**Appendix B2)**.

The CBA demonstrates that the Hummock Hill Island tourist community, as detailed in the Master Plan will provide a net benefit to the State. For every dollar of state cost, the HHI Development will deliver $1.60 of estate benefit.

HHI Development is expected to deliver a range of community facilities which will be accessible to residents of Hummock Hill Island and adjoining communities, who currently lack easy access to these facilities. The community facilities will include a medical centre, emergency services, a public bus service, and a range of recreational facilities.

The construction of the HHI Development will provide an average of 190 jobs over a 20 year period, with a peak employment of 350 people. The indirect employment from construction will include a further 70 people in the region and an additional 40 people at state level. Substantial employment opportunities will also arise from the tourism activity generated by the project. The number of jobs created is expected to rise steadily over the life of the development and is expected to peak at approximately 700 people in 2024.

12.8.3 Offsets as a Compensatory Measure

Submissions have questioned the validity of vegetation offsets as a compensatory measure for the loss of vegetation in the HHI Development area.

The vegetation offset framework set rigorous standards for the selection and management of offset sites. Benefits derived from vegetation offsets include the following:

- the offset strategy will ultimately protect an area of habitat which is otherwise unprotected from clearing at some future point;
- the offset seeks to maintain ecological processes at the sub-regional level;
- the offset area must support an area of vegetation of equal or higher conservation status than the area to be cleared;
- the offset area must obtain ecological equivalence to the area cleared; and
- offset areas will be managed for conservation purposes in the long term and will be legally secured.

12.8.4 Assessment against the Regional Vegetation Management Code

Clearing as a result of the MCU assessed under the NRW Concurrence Agency Policy for material change of use can only occur only where the MCU meets all the performance requirements contained in the relevant code (in this case the Regional Vegetation Management Code for Southeast Queensland, Part S).

NRW have noted that the proposal does not meet six of the performance requirements of the Regional Vegetation Management Code, Part S, namely PR3, 4, 5, 7, 8 and 9.

The proposed HHI Development has been assessed against the relevant Regional Vegetation Management Code below.

Performance Requirement	Acceptable Solution	NRW Comment on EIS	Proposed Solution
PR P.3: Watercourses To regulate the clearing of vegetation in a way that does not cause land degradation, prevents the loss of biodiversity and maintains ecological processes—assessable vegetation associated with any watercourse is protected to maintain— a) bank stability by protecting against bank erosion; and b) water quality by filtering sediments, nutrients and other pollutants; and c) aquatic habitat; and d) terrestrial habitat.	**AS P.3** P.3.1 Clearing does not occur— a) in any watercourse; and b) within 50 metres from each high bank of each watercourse with a stream order 5 or greater; and c) within 25 metres from each high bank of each watercourse with a stream order 3 or 4; and d) within 10 metres from each high bank of each watercourse with a stream order 1 or 2.	The current HHI Development layout indicates that clearing will occur within 10 metres of streams of order 1 in the Open Space/Golf Course and low Density Residential Precincts.	The proposed layout has been amended to ensure that minimum setbacks of 10m are maintained to all 1st order waterways across the development lease area.
PR P.4: Connectivity To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes—areas of remnant vegetation are retained that are— a) of sufficient size and configured in a way to maintain ecosystem functioning; and b) of sufficient size and configured in a way to remain in the landscape in spite of any threatening processes; and c) located on the lot(s) that are the subject of the application to maintain connectivity to remnant	**AS P.4** P.4.1 Where clearing is less than— a) 10 metres wide; or b) 2 hectares; clearing does not— i) reduce the width of remnant vegetation to less than 100 metres; and ii) occur where the width of remnant vegetation is less than 100 metres; OR P.4.2	Clearing within the HHI Development footprint will reduce areas of remnant vegetation to less than 100m. The proposed HHI Development layout isolates patches of 12.2.2 and 12.2.11 and 12.2.14 Regional Ecosystems on the northwestern sections of Hummock Hill Island. A corridor comprising Regional Ecosystems 12.1.2 and 12.1.3 exists on the south-eastern side of the Island. The RE's do not comprise a sufficient linkage to maintain biodiversity and ecosystem	The HHI Development layout has been amended such that a minimum width of remnant vegetation is maintained at greater than 100m around the development boundary, and a 300m wide corridor is maintained through the centre of the HHI Development. The proposed layout has been amended to expand this corridor to 300m in width. This is more than adequate to maintain biodiversity and ecosystem processes.

Performance Requirement	Acceptable Solution	NRW Comment on EIS	Proposed Solution
vegetation on adjacent properties.	Clearing does not— a) reduce areas of contiguous remnant vegetation to less than 10 hectares; and b) occur in areas of contiguous remnant vegetation that are less than 10 hectares; and c) reduce the width of remnant vegetation to less than 100 metres; and d) occur where the width of remnant vegetation is less than 100 metres; and e) reduce the total extent of remnant vegetation to less than 30%; and f) occur where the total extent of remnant vegetation is less than 30%.	processes. Road reserves with a width of 14-20 metres will reduce the connectivity between areas to the east and west of the development. The EIS does not indicate where fauna friendly crossing points will be located and the linkages are not configured in way that will provide networks for fauna movement and flora habitats.	It is intended that formal road crossing points be established at a number of locations. Ecological infrastructure such as overpasses and exclusion fencing will be installed at these locations.
PR P.5: Soil erosion To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes—the effect of clearing does not result in— a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scalding; and b) any associated loss of chemical, physical or biological fertility—including, but not limited to water holding capacity, soil structure,	**AS P.5** P.5.1 Mechanical clearing only occurs on— a) very stable soils on a slope less than 30%; and b) stable soils on a slope less than 20%; and c) unstable soils on a slope less than 15%; and d) very unstable soils on a slope less than 10%.	Contour mapping and slopes analysis indicates that clearing of assessable vegetation may occur on slopes greater than 30% in the proposed Ridgetop Residential land use area. It is not known whether the installation of services will require the clearing of remnant vegetation. No sediment and erosion plan has been supplied with the EIS.	An Erosion and Sediment Control Environmental Control Plan (ECP) has been prepared (refer Chapter 20 of EIS).

Performance Requirement	Acceptable Solution	NRW Comment on EIS	Proposed Solution
organic matter, soil biology, and nutrients, within and/or outside the lot(s) that are the subject of the application.			
.			
PR P.7: Conserving remnant *endangered* regional ecosystems and *of concern* regional ecosystems To regulate the clearing of vegetation in a way that conserves remnant *endangered* regional ecosystems and remnant *of concern* regional ecosystems—maintain the current extent of *endangered* regional ecosystems and *of concern* regional ecosystems.	**AS P.7** P.7.1 Clearing only occurs in endangered regional ecosystems or of concern regional ecosystems that are not listed in Table 1 and where the clearing within those regional ecosystems is less than— a) 10 metres wide; or b) 0.5 hectares.	The HHI Development footprint indicates that clearing will occur in Of Concern and Endangered Regional Ecosystems in the low density residential, medium density residential, high density residential, golf course and Education/Community precincts. Therefore the EIS does not meet the performance requirement. No offset proposal was supplied with the EIS.	The HHI Development will seek to maintain the current extent of remnant vegetation through the provision of a vegetation offset. The Proponent will secure and manage areas of regrowth vegetation which meet the requirement of the Policy for vegetation offsets. The Proponent will enter into a legally binding agreement to identify and secure the offset.
PR P.8: Essential habitat To regulate the clearing of vegetation in a way that prevents the loss of biodiversity—maintain the current extent of essential habitat.	**AS P.8** P.8.1 Clearing does not occur in an area shown as essential habitat on the essential habitat map.	The EIS and HHI development footprint indicate that clearing will occur in areas mapped as Essential Habitat for the Koala. Therefore the EIS does not meet the Acceptable Solution for this performance requirement.	There are no Koalas on Hummock Hill Island. The Proponent will secure and manage areas of regrowth vegetation which meet the requirement of the Policy for vegetation offsets. These areas will include essential habitat for the Koala.
PR P.9: Conservation status thresholds To regulate the clearing of vegetation in a way that conserves remnant regional ecosystems and prevents the loss of biodiversity—maintain the current extent of regional ecosystems listed in Table 2.	**AS P.9** P.9.1 Clearing in a regional ecosystem listed in Table 2, does not occur unless the clearing is less than— a) 10 metres wide; or b) 2 hectares.	The EIS indicates that there will be clearing of the "Threshold" RE 12.12.7. Details of an appropriate offset have not been provided. Therefore the EIS does not meet the Acceptable Solution for this performance requirement.	The Proponent will secure and manage areas of regrowth vegetation which meet the requirement of the Policy for vegetation offsets.

12.8.5 Property Vegetation Management Plan

NRW (now DERM) requested that a Property Vegetation Management Plan (PVMP) be prepared which shows the following:

- boundary of the area on an image base;
- map showing 5 or more points visible on the map that correspond with identifiable fixed features;
- map Grid of Australia and Zone references for each point; and
- description of features at each point.

A PVMP has been prepared which meets these requirements (**Figure 12-1**).

12.8.6 Incremental Loss of Vegetation

Submissions raised the issue of incremental loss of vegetation, stating that we should not accept the loss of ecosystems.

This view is supported by the Proponent, and a vegetation offset package is currently being developed which will deliver a no net loss outcome at the sub-regional level.

12.9 Buffers to Sensitive Habitats

12.9.1 Marine and intertidal areas

Buffers zones are recognised as a valuable and legitimate planning tool in the development and protection of terrestrial habitats bordering fish habitats. The provision of adequate buffer zones is promoted and recommended within guidelines and policy documents. The DEEDI (previously DPIF) adopted a generic policy position which recommends a minimum buffer width of 100 m (incorporating natural vegetation and other buffer elements) set back from the level of Highest Astronomical Tide (HAT) in tidal areas under the *Fisheries Act 1994*.

The proposed HHI Development layout is located outside the Coastal Management District (CMD) erosion prone areas and is more than 100 m from fish habitat.

12.9.2 Waterways

Buffers to waterways (other than tidal and inter-tidal waterways) were considered in light of the Regional Vegetation Management Code for South-east Queensland. All waterways on the HHI Development area are first order waterways, which require a buffer of at least 10 m (either side of the waterway) to comply with the RVMC. In order to maintain ecological function, proposed buffers to waterways have been set at 30 m across the proposed HHI Development area.

PSM: 750605
E: 341256.636105422
N: 7345705.71817911

Reference No: 1
Easting: 344141.331
Northing: 7345400.725

PSM: 701743
E: 344132.169016524
N: 7345484.32200944

Reference No: 4
Easting: 346250.964
Northing: 7344326.745

Reference No: 3
Easting: 346062.838
Northing: 7343991.245

PSM: 701354
E: 344913.365777289
N: 7343506.32608229

Reference No: 5
Easting: 345385.848
Northing: 7343349.815

PSM: 700740
E: 347608.985987389
N: 7342721.57613104

Reference No: 2
Easting: 346776.345
Northing: 7340731.452

PSM: 85987
E: 346843.796223704
N: 7340068.63073445

LEGEND

- Reference Points
- Permanent Survey Mark
- Lease Boundary
- Development Boundary
- Preserved Vegetation

Regional Ecosystems Affected By Development

- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Not Of Concern
- Non-remnant

0 0.5 1 2 km

1:30,000 on A3

HUMMOCK HILL ISLAND DEVELOPMENT

Figure 12-1. Property Vegetation Management Plan

Hummock Hill

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12.9.3 Foredune complexes

Submitters expressed concern about potential impacts on foredune complexes as a result of unlawful clearing and encroachment of HHI Development. The development is outside the designated coastal management district which is also the erosion prone area and will ensure that these areas remain undeveloped and are not cleared of vegetation. The Environmental Management Plans prepared for the project (see Section 17.5.4 of this report) make specific reference to the preparation of a foreshore and beach management plan.

12.10 Impacts on Threatened Species

12.10.1 Beach Stone Curlew/Beach Thick Knee

Pairs of Beach Stone-curlews are provided with potential habitat on most beaches within the species' range, including short stretches of muddy sand among mangroves, coralline sands on atolls and prime surf beaches. However, not all apparently suitable beaches support the birds.

There are long established breeding pairs of Beach Stone-curlews at Eurimbulah National Park (between 1770 and Turkey Beach) and Jenny Lind Creek (Middle Island). On the Burnett Coast this species is known to breed at 10 locations (nine of these are on islands of the Great Sandy Straits), with a further 15 pairs known from the region (Milton and Harding 2007).

Substantial numbers of non-breeding birds are present in the region, and were recorded at 18 different roost sites in Miriam Vale Shire alone by Milton and Harding (2007).

A single individual of this species has been recorded on one occasion on the northern Beach of Hummock Hill Island. As the species is largely sedentary at preferred sites, it would be expected that it would have been recorded during subsequent surveys on Hummock Hill Island if indeed, it was reliant on the habitat present. For example, detailed surveys (twice daily over five days) during March 2007 failed to record a single individual of the species. These observations suggest that the individual recorded may have been a transient bird and not a resident.

The species has been recorded at the mouth of Colosseum Inlet, and may make regular use of this area. Restricting vehicular access and controlling pedestrian access to the northern tip of Hummock Hill Island, and the beach which fringes Colosseum Inlet is likely to reduce impacts on this species.

12.10.2 Black-breasted Button Quail

Submissions have expressed concern around potential impacts on the Black-breasted Button Quail. This species is restricted to Littoral Vine Scrub which is located outside of the development area. A variable buffer will be maintained between development areas and the habitat of this species. There will be a fence constructed on the perimeter of the HHI Development which excludes human intrusion into the habitat of the Black-breasted Button Quail. The buffer zone will be managed as part of the Proponent's management of undeveloped areas of the Island which will include weed and pest management, community education and engagement and bush regeneration, with the aim of protecting habitat and limiting impact of the development on these areas. Areas outside the development will be covered by a Nature Refuge to formalise the status and value of these areas.

The buffer zone between the HHI Development and the habitat of the Black-breasted Button Quail will be specifically targeted to reduce fox, dog and feral cat numbers.

Cats, which represent a major threat to this species, will be prohibited within the HHI Development area.

12.11 Mitigation Strategies

12.11.1 Vegetation Management and Rehabilitation

Rehabilitation of disturbed areas will follow the general principles below:

- species utilised will be native to Hummock Hill Island and present in the surrounding landscape;
- planting densities and species composition will be determined by establishing reference sites on Hummock Hill Island, within which structural and floristic information will be measured; and
- all disturbed areas which are to be returned to open space or bushland will be rehabilitated immediately following the cessation of construction works. Rehabilitation methods will vary according to specific site constraints.

12.11.2 Mitigation of Road-strike

One submission expressed concern around the potential for increased road-strike of fauna as a result of the proposed HHI Development, and alludes to an increase in road-kill on Turkey Beach road since it was paved with bitumen.

These are considered legitimate concerns, however, a range of management measures can be implemented to reduce impacts on fauna. Such management measures were specifically addressed in Section 14.3.17 of the EIS. Such management measures include the following:

- provision of formal road crossing infrastructure at key fauna corridor locations and identified major wildlife mortality points;
- installation of reflectors designed to deter wildlife on roadside posts;
- installation of fauna exclusion fencing along roads that pass through vegetated areas; and
- installation of traffic calming devices in strategic locations.

Should the HHI Development receive approval, the preparation of a roadside wildlife management plan should be conditioned.

The effectiveness of these measures is now well known and numerous published accounts in the scientific literature support the view that they are both effective and worthwhile.

12.11.3 Beach and Foreshore Management

Several submissions expressed concern about impacts to turtles and shorebirds from human activity and domestic animals.

In response to these concerns the Proponent is committed to developing and implementing a Beach and Foreshore Management Plan for the management of sensitive areas particularly for turtles and shorebirds. The management plan will include the following management measures:

- no-go zones during breeding/roosting/migration seasons;
- dog restriction areas;
- identification of dune areas requiring restoration, and facilitating community group involvement in the restoration of those areas;
- community education program about what species may be present on Hummock Hill Island and what to look for. This may include noticeboards or signage;
- a community notification mechanism whereby members of the community can notify the Development Environmental Manager about the presence of particular species or destructive activities that may be occurring on the beach and foreshore areas;
- maintenance of fenced areas and access pathways to the beaches and foreshore; and
- monitoring of shorebird and turtle activity on the beaches and foreshore to determine the presence of protected species.

The environmental management company will be responsible for management of this process including community education and awareness programs (see **Section 3.6**)

12.11.4 Monitoring using DERM Guidelines

A submission questioned the proposition that the condition of wetland communities would be monitored using Queensland Herbarium guidelines and requested that the statement be amended to remove misleading information.

The intention is that the Queensland Herbarium guidelines for assessing BioCondition would be used, with a number of control/reference sites established to determine benchmark data, and the receiving sites monitored to determine trends against the established BioCondition benchmark data over the medium term.

12.11.5 Adequacy of Mitigation

Submissions suggested that the Proponent will be unable to guarantee the integrity and protection of the environment surrounding their development and furthermore that the proposed protection measures are incomplete, poorly specified and lack scientific evidence as to their effectiveness.

Whilst it is difficult to specify some mitigation details at the preliminary approval stage the Proponent will commit to a range of management actions which represent current best practice in the area of environmental management. Such actions will include:

- protection of undeveloped lease areas through statutory covenant, Nature Refuge or other binding mechanism;
- development of weed, pest management and fire management plans to maintain ecological integrity over the longer term; and
- provision of a vegetation offset in the same subregion.

- The mitigation measures presented in Section 14.3 of the EIS represent current best practice.

12.12 Statutory Compliance

12.12.1 Compliance with International Agreements

Submissions have raised the issue of compliance with the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and the Convention on Biological Diversity.

The EPBC Act contains specific provisions which seek to protect species listed under JAMBA and CAMBA, and these provisions have been considered and assessed under the project referral to the Commonwealth Department of the Environment, Water, Heritage and the Arts.

The Convention on Biological Diversity, to which Australia is a signatory, is expressed through National Biodiversity Strategies and Action Plans (NBSAPs). The overall goal of the Strategy for the Conservation of Australia's Biological Diversity (1996) is to protect biological diversity and maintain ecological processes and systems. The objectives of the Strategy allow for sustainable development by encouraging responsible planning and management practices consistent with the conservation of our natural and cultural heritage. These objectives are reflected at regional and local levels through statutory planning instruments. The compliance of the HHI Development with these instruments has been discussed at length in the EIS.

12.12.2 Assessment under the Nature Conservation Act 1992

A single submission suggested that the EIS has dismissed the Proponent obligations under the Queensland *Nature Conservation Act 1992*.

The HHI Development has been designed around the need to conserve the habitat of species listed under the NCA. For example, the development layout has been modified to exclude all habitat of the Black-breasted Button-quail, a vulnerable species and arguably the species of greatest significance in the study area.

The EIS commits the Proponent to a range of management plans and actions specifically designed to ensure the long term viability of populations of significant species (as listed under the NCA) and is therefore consistent with the management intent of the Act.

Impacts on significant fauna known to occur on Hummock Hill Island were addressed in Section 14.2.1.5 of the EIS. Studies have not identified the existence of significant flora species on Hummock Hill Island.

12.13 Impacts on Migratory species

Several submissions expressed concern around potential impacts on migratory species as a result of air strike, recreational disturbance at roost and forage sites and disturbance by dogs.

Four fauna surveys have been completed on Hummock Hill Island and none has recorded significant numbers or diversity of migratory shorebirds on the northern beach, adjacent to the HHI Development. As clearly stated in the EIS, shorebird populations are concentrated on the landward

side of Hummock Hill Island, in association with extensive marine plains and intertidal saltmarshes. There will be no development in this area and no public access.

One submission suggested that the EIS contained contradictory statements regarding the quality of habitat for migratory shorebirds on Hummock Hill Island. The habitat values for Migratory shorebirds were discussed in Section 14.1.1.2 of the EIS and statements made are not contradictory.

A submission presented the results of surveys completed by the Qld Wader Study Group for critical high tide roosts in the Burnett Mary Region. This report has been reviewed and although there were two wader roost sites identified on the beach side of Hummock Hill Island, neither was proximate to the proposed HHI Development.

12.14 Essential Habitat

Submissions expressed concern around the proposed clearing of essential habitat for the Koala and Wallum Froglet. The occurrence of essential habitat was discussed in Section 14.1.2.6. Although neither species is known to occur on Hummock Hill Island, the proposed vegetation offset for the HHI Development will include habitat for the Koala.

Not only is essential habitat for the Wallum Froglet absent from the Hummock Hill Island, it is outside of the known distribution of the species.

12.15 Significant Coastal Dunes

12.15.1 Criteria for Inclusion

Numerous submissions raised the issue of potential impacts on significant coastal dunes and suggested that the EIS had not acknowledged these values (as defined by the State Coastal Management Plan).

The assessment against the SCMP criteria was conducted by Cardno (2007). A significant coastal dune system, under the SCMP is required to have *"a high degree of ecological integrity and biodiversity conservation values, and satisfies all of the following criteria:*

1) it is a good example of a coastal dune system;
2) access to it is limited, and has not compromised its significant ecological values (including level of integrity);
3) it is undeveloped, or relatively undeveloped and any works or structures have not compromised its significant ecological values;

And one or more of the following criteria:

4) it is a system that is in dynamic equilibrium, and contains intact representations of the various dunal zones and various dunal types naturally occurring in that region;
5) for a coastal sand dune system, the various dunal zones are intact or relatively intact (i.e. the zones have not lost more than 5–10 percent of the original existing vegetation cover), particularly in the foredune and in the exposed seaward slopes and crests of secondary and hind dunes;

6) it supports native plants or animals or natural communities that have been identified as being, or are considered to be, endangered or vulnerable at the bioregional level;
7) it supports a significant number of the bioregional populations of any native plant or animal;
8) it is important as a habitat for animals at a vulnerable stage in their life cycles (e.g. migratory species at breeding or nesting stages); and
9) it is of cultural significance.

It was concluded that relict beach ridge systems within the western strandplain of Hummock Hill Island do not appear to meet all the criteria of the SCMP.

Submitters have suggested that the dune systems on Hummock Hill Island satisfy some of the criteria discussed above, including the criteria for dynamic equilibrium, integrity and ecological values and good example of a coastal dune system. One submission suggested that there is no evidence that the vegetation on the coastal dunes has not returned to natural condition.

It remains the view of the Proponent that the dune systems do not satisfy the criteria set out by the SCMP. The dunes have been used for agriculture in the past and evidence of this use is the presence of fencelines, stockyards and tree stumps. While the Proponent does not consider the dunes meet the criteria of significant coastal dunes, a cost-benefit assessment has been prepared and demonstrates that the project generates a significant ($541.1 million) net benefit to the State as shown in **Appendix B2**. The analysis therefore indicates the development of the sand dunes meets the requirements of the SCMP.