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17. Environmental Management Plans

17.1 Introduction

A number of submissions were received in relation to the Draft Environmental Management Plan (EMP). The submissions mostly raised issues regarding the commitment of the Eaton Place Pty Ltd (the Proponent) to implement the measures within the EIS and the discrepancies between the EIS and the EMP.

This chapter provides an update of the Draft EMP presented in the EIS, including further Proponent commitments.

17.2 Environmental Management

A number of recommendations have been made in the Environmental Impact Statement (EIS) and the Supplementary Report in relation to the management of environmental impacts during the construction and operation of the Hummock Hill Island Development. These recommendations will require actions to be taken during the design, construction and operational life of the HHI Development and associated infrastructure.

In order to ensure that these recommendations are implemented, a Draft EMP has been developed for the project. An outline of the Draft EMP is provided in this Supplementary Report to demonstrate the commitment of the Proponent to ensuring that the recommendations of this EIS are implemented. Environmental management practices and strategies for individual project elements are described in **Section 17.4**.

17.3 Purpose

EMPs are a medium for integrating and implementing the environmental management commitments, conditions, and statutory requirements that the Project may or must observe.

The commitments made in the EMP are not necessarily wholly or only the conditions placed on the Project. The EMP, in conjunction with the EIS form the basis for the Coordinator-General's (CG) Report in which conditions will be identified for the recommendation of approval, or otherwise, of the Project. The EMP forms a basis for consultation and negotiation of outcomes of the Project.

The conditions set by the CG will be supplemented by conditions attached to specific approvals under State legislation. It is these conditions, in conjunction with the implementation of the EMP that will create the basis for the sustainable implementation management of the Project.

The Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP) respectively, are dynamic documents as they incorporate continuous improvement. Each plan will be updated to incorporate further information, approval conditions, and changes in environmental management procedures in the light of ongoing monitoring results, new techniques, and relevant legislative requirements.

17.3.1 Environmental Requirements and Obligations

The Draft EMP is devised to ensure that identified environmental impacts relating to the Project construction and operation are avoided or minimised. In this regard, the Draft EMP may refer to

environmental legislation, controls, standards and guidelines relevant to impact mitigation and avoidance. The Draft EMPs also require that, wherever possible, works related to site development meet environmental expectations of the local and broader community.

A list of applicable legislation is identified in this section. The Project environmental management representative will hold copies of relevant legislation, guidelines and standards on site during construction.

17.3.1.1 Commonwealth Legislation

Commonwealth legislation relevant to the Project and the Draft EMP includes:

- *Environment Protection and Biodiversity Conservation Act 1999*; and
- *Native Title Act 1993*.

17.3.1.2 Queensland Legislation

Queensland legislation relevant to the Project and the Draft EMP includes:

- *Environmental Protection Act 1994 (EP Act)*

The EP Act is the umbrella legislation for the regulatory management of the environment in Queensland. The EP Act is based on self-regulation and duty of care that places the responsibility for protection of the environment on all persons during the conduct of all activities.

The Act provides for the licensing of Environmentally Relevant Activities (ERAs) and the granting of development approvals and registration certificates for the operation of regulated activities. The Act also provides the power to administering authorities to order actions be taken to improve environmental management performance, conduct audits and environmental evaluations of activities, approval of environmental management programs and impose penalties or prosecute persons for non-compliance within the requirements of the Act.

The EP Act is the primary legislative environmental tool in Queensland. This Act also allows for the preparation of Environmental Protection Policies (EPPs). The following EPPs have been proclaimed:

- *Environmental Protection (Water) Policy 1997;*
- *Environmental Protection (Noise) Policy 1997;*
- *Environmental Protection (Air) Policy 1997; and*
- *Environmental Protection (Waste Management) Policy 2000.*

17.3.1.3 Other State Legislation

The EIS has been prepared under the provisions of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Relevant information in the EIS is then used to support applications for permits, licenses and approvals. In addition to the EP Act other major legislation relevant to the Project includes:

- *Aboriginal Cultural Heritage Act 2003*
- *Dangerous Goods Safety Management Act 2001*
- *Nature Conservation (Wildlife) Regulation 1994*
- *Queensland Heritage Act 1992*

- *Fisheries Act 1994*
- *Health Regulations under the Health Act*
- *Integrated Planning Act 1997*
- *Land Act 1994*
- *Nature Conservation Act 1994*
- *Soil Conservation Act 1986*
- *Transport Infrastructure Act 1994*
- *Vegetation Management Act 1999*
- *Water Act 2000*
- *Workplace Health and Safety Act 1995*

17.3.1.4 Objectives and Principles

The objectives of the EMP are those embodied in the Intergovernmental Agreement on the Environment (IGAE) and the Principals of Ecologically Sustainable Development (ESD).

The Core Objectives are:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- to provide for equity within and between generations; and
- to protect biological diversity and maintain essential ecological processes and life support systems.

The Guiding Principles are:

- 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;
- the global dimensions of environmental impacts should be recognised and considered; and
- decisions and actions should provide for community involvement regarding issues that affect them.

No objective or principle should dominate others. A balanced approach which takes into account all of these objectives and principles is required to pursue the goal of ESD.

17.3.2 Environmental Responsibilities

17.3.2.1 Management Structure

To achieve the over-arching objective of sound environmental management and deliver the Project with the least possible impact on the local community, a clear implementation and management structure is required.

The proposed structure, regardless of the contractual delivery mechanism adopted for the Project, includes the following roles.

17.3.2.2 Eaton Place Pty Ltd:

- Proponent of the Project;
- regulates the performance of the works;
- acts to facilitate the expression of community views; and
- leaseholder of the land required for the Project.

17.3.2.3 The Proponent:

- administrator of the head agreement or contract to ensure that the contact conditions are met;
- liaise with and coordinate relevant agencies within the Queensland Government, Gladstone Regional Council to provide timely advice to the Contractor for the smooth and efficient delivery of the project;
- ensure that prior to commencement of any work the Contractor/s have obtained all necessary approvals, established and properly briefed community consultative committees and agreed to a schedule of regular meetings with each committee; and
- ensure that the Contractor is operating in accordance with the CEMPs and in compliance with all applicable approvals and licensing.

17.3.2.4 Contractor:

- prepares detailed engineering designs and CEMP;
- obtains all necessary approvals, including development approvals, environmental licenses, workplace health and safety and all other construction-related approvals;
- ensures all designs and construction works are prepared and conducted in accordance with approvals, with the contract, with relevant legislation and regulations, and with local laws; and
- maintains, for the duration of the construction phase, open and effective communications with the communities in the vicinity of the works areas about the construction program, scale, duration and nature of the proposed work, and details of proposed impact mitigation measures.

17.3.2.5 Overall Responsibilities

The following tables provide a summary of the likely responsibilities and accountabilities of various parties who have active roles in the environmental management of the project. The responsibilities have been divided into the construction (**Table 17-1**) and operation (**Table 17-2**) stages. In the case where the operator of the HHI Development is not the Proponent, all conditions of approval are passed on to the operator.

- **Table 17-1 Project Responsibilities - Construction**

Project Responsibilities – Construction	
The Proponent (Eaton Place Pty Ltd)	• Manage the construction process as the Project Proponent; • Provide readily available expertise for the construction project as required; • Receive progress reports on performance by the Contractor for the purpose of acknowledging compliance with contract conditions; • Review the CEMP submitted by the Contractor; • Ensure that the requirements of the Conditions of Contract (Environmental Management) and approved CEMP are included in the contract documentation are implemented; • Review any revisions to the CEMP as required; • Maintain a current copy of the contract and the CEMP containing a record of the completion of planned actions, monitoring records and reports, supplied by the Contractor; and • Initiate audits of environmental performance.

Project Responsibilities – Construction	
Contractor	• Develop CEMP in accordance with the approved Draft EMP submitted with the EIS; • Maintain a master copy of the CEMP containing a record of the completion of planned actions, monitoring records, and reports which are made available during audits; • Appoint independent facilitators to convene the community consultative committees, establish the committee terms of reference, facilitate meetings and pro-actively work to ensure efficient but comprehensive communication between the committee and other parties takes place; • Obtain all necessary statutory approvals and licences and ensure that conditions of licences/approvals/permits are met; • Provide copies of the CEMP to the relevant project staff having responsibilities defined in the CEMP; • Provide training to all relevant project staff; • Maintain a record of all training undertaken by all project staff, detailing the type and purpose of the training; • Undertake regular monitoring in relation to environmental management issues and ensure that monitoring results are made available to the Proponent and the community consultative committees; • Ensure corrective actions arising from self-assessments and external audits are completed, and in accordance with the CEMP; • Notify the Proponent and any relevant State agency of any environmental incidents and maintain a record of events relating to the environmental incidents including any remedial action taken; • Ensure there is adequate and accurate identification and reporting of any non-conformances and any other environmental issues that may arise during construction; • Provide relevant and timely information about construction activities that may impact on the relevant stakeholders and consult with individuals that may be directly impacted by construction activities, as required, to ensure direct project impacts are being managed; • Ensure that environmental protection measures are implemented in accordance with CEMP; and • Undertake regular management reviews of the CEMP, either at scheduled intervals, or on the identification of a system failure.

- **Table 17-2 Project Responsibilities - Operation**

Project Responsibilities – Operation	
The Proponent (Eaton Place Pty Ltd)	• Review the OEMP prepared by the Contractor; and • Undertake periodic reviews and audits of the operator's performance where required.
Operator (to be determined)	• Prepare an OEMP for the project consistent with the conditions of any applicable approvals and requirements; • Continuously monitor the environmental performance of the Project during operation and provide regular reports on performance to the Proponent; • Report to the Proponent on incidents of non-compliance; and • Ensure the Project is operated safely and with good environmental management practices at all times.

17.3.3 Competence, Training and Awareness

The EMP will only be successful where all those responsible for its implementation and review are thoroughly conversant with its content, interpretation and performance measurement. The Proponent is committed to providing training for its site workforce and ensuring that the contractual arrangements with the contractor specify the need for adequate training to be provided to all contracted members of the workforce.

Staff involved in environmental monitoring will be trained and competent in the operation, calibration and maintenance of the equipment. Sampling staff will also be trained and competent in sample collection, handling, storage and transport methodologies and techniques.

Records of staff training will be auditable and available for inspection, on request.

17.3.4 Documentation, Communication and Complaints

Documentation and Environmental Records

Adequate records must be maintained to demonstrate compliance with the both the CEMP and OEMP. These records should be available at all times and readily accessible for independent inspection and audit by the relevant authorities. This includes:

- contract documents;
- statutory permits and licences;
- reports;
- monitoring data results;
- environmental audits and reviews;
- environmental training records;
- details of non-conformance reports;
- complaints register;
- inspection, calibration and maintenance activity; and
- corrective action reports.

The following documents must be readily accessible for personnel to carry out the activities associated with the project:

- a copy of the CEMP;
- copies of environmental checklists and forms required by the CEMP;
- copies of relevant work instructions and procedures;
- Material Safety Data Sheets (MSDS) for any chemicals stored or used on the site; and
- copies of permits, approvals and attached conditions.

Modifications to the records keeping system shall be done to ensure it is effective and efficient for all levels of employees involved to ensure compliance with the requirements of the CEMP.

Internal Communication

Environmental protection should be achieved through clear and concise internal communications, which will be subject to periodic audits to ensure that the communication structure is performing adequately and all actions are performed and recorded. The audits should also provide for follow-up on specific or corrective actions raised during previous audits to ensure responses are complete.

The CEMP will be held in a prominent location and will include at the start of the document a list of the names, affiliations, phone numbers and fax numbers (including after hours numbers where necessary) of the people within the designated environmental management reporting structure.

The Contractor will submit the following as part of their Monthly Report to the Proponent containing a summary of:

- works undertaken;
- monitoring results;
- compliance with approvals, licences and the CEMP;
- complaints; and
- corrective actions and contingency, and success of implemented measures.

Significant communications, including all reports, incident forms and complaints will be documented and kept up to date.

External Communication

To ensure external communication is timely and transparent, only nominated personnel should be involved in consultation with external bodies on environmental issues. The Project Manager is responsible for nominating all staff members responsible for external communication. The Project Manager may also invite personnel to attend meetings with agencies and the community consultative committees.

Any incidents and environmental harm during construction works or operation of the HHI Development will be reported to the Department of Environment and Resource Management (DERM) or other relevant agency as soon as possible (as per Section 320 of the EP Act).

Complaints and Responses

The environmental management process managed by the Contractor is to include a procedure for receiving and acting upon complaints. Attention to complaints should be carefully managed, prompt and effective, and should form a key part of the environmental reporting mechanism. Responsibility for maintaining the complaints procedure will rest with the Contractor.

While the CEMP and OEMP would establish the procedure for complaints, basic requirements will include:

- a procedure for receiving and responding to complaints which is acceptable to the Proponent, the CG and the DERM;
- the Contractor maintaining, during the construction phase, a complaints telephone service (24hr / 7 days Customer Contact number);
- a process for registering and handling all complaints received in terms of:
    - time and date of complaint;
    - the identity of the complainant and the recorder of the complaint;
    - the specific action or activity causing the complaint;
    - whether environmental compliance requirements are being met;
    - the action taken to address the complaint if necessary;
    - a database for tracking of complaints and actions taken in response;
    - immediate communication of the complaint to the contractor;
    - details on how the action taken is to be communicated to the complainant and the Proponent and the Contractor;
    - feedback to the complainant and the Proponent, the CG as required and the DERM within a specified time period;
    - any subsequent remedial action required to avoid cause for future complaints if relevant;
    - regular reporting to the CG and the Proponent on complaints and corrective actions; and
    - monitoring and auditing of the complaint handling system.

Other informative resources are also to be accessible by external stakeholders via the Proponent website that would also offer feedback forms for complaints and grievances.

17.3.5 Monitoring

Measuring, monitoring and evaluating will be key activities of each element within the EMP. Monitoring shall mean the setting in place and operation of various procedures to monitor, measure and record the level of impact on the environment during the execution of the project.

The monitoring of environmental impacts shall be carried out in accordance with the monitoring requirements for each element throughout the EMP, relevant legislation and the conditions of any permit, where relevant.

Monitoring procedures will be developed in accordance with standard protocols and the requirements of the Department Employment, Economic Development and Innovation (DEEDI),

DERM, and other relevant agencies as appropriate. All equipment used for environmental monitoring will be calibrated and maintained to the standards recommended by the supplier/manufacturer. Records of calibration and maintenance for each piece of monitoring equipment will be held on site.

Environmental monitoring samples, if taken, will be sent for analysis to a National Association of Testing Authorities (NATA) registered laboratory where applicable. All records of laboratory analysis results and quality assurance will auditable and available for inspection, on request, by regulatory agency officials or their representatives.

Environmental monitoring requirements for each phase of the HHI Development are detailed within **Section 17.4**.

17.3.6 Auditing

Aspects of the Project with a potential for environmental impact will be subject to periodic environmental audits. The audit objectives will be to verify compliance with applicable Commonwealth, State and Local government environmental permits, approvals and regulations issued for the Project.

The audit will also seek to verify the suitability of the EMPs outlined in this CEMP (**Section 17.4**).

Each audit will be internally reviewed by the Project Manager and all recommendations / actions raised will be addressed. Copies of audit reports and details of corrective actions will be made available to Commonwealth, State and Local Government as they are published.

17.3.7 Reporting

Monthly environmental summary reports will be produced for the duration of the works. Copies of the reports shall be held on site and will be available for relevant regulatory agency inspection, on request. The report shall include, but is not limited to the following:

- record of inspections;
- a list of any performance criteria that have not been met, the corrective action taken and a description of the magnitude of any possible environmental impact;
- a register of complaints detailing:
  - origin of the complaint;
  - complaint investigation (personnel, date and summary of action/s taken); and
  - response to actions and suggested changes to practices or procedures.
- results of any surveys carried out;

17.3.8 Non-compliance and Corrective Actions

The monitoring and reporting will incorporate continual improvement in requirements identified through a non-compliance and corrective action procedure. These will be nominated in the Project's quality procedures and EMPs, and should specify methods for recording and reporting non-conformances and ensuring that corrective actions are implemented to rectify the problem.

17.4 Draft Construction Environmental Management Plan

There are a number of activities taking place during the construction phase of the HHI Development which have the potential to impact on environmental values in the area. These are:

- vegetation clearing within the project footprint;
- upgrade of external (mainland) road network including Foreshores Road and Clarks Road;
- construction of bridge over Boyne Channel;
- construction of internal road network – Trans-Island Boulevard and associated services;
- installation of power supply – external, above ground powerlines, 12 km;
- construction of minor road network (collector and access streets);
- installation of gas supply – external, 16.5 km;
- installation of power supply – internal (underground);
- installation of water and wastewater reticulation infrastructure;
- installation of gas reticulation infrastructure;
- construction of water and wastewater treatment plants, evaporation pond (18,500m^2);
- construction of boat ramp – Colosseum Inlet;
- construction of boat ramp – Boyne Channel;
- construction of associated boat/trailer parking; and
- construction of Golf Course.

The environmental elements addressed in this Draft EMP in relation to environmental management controls for these activities are:

- coastal management;
- water management (including hydrology and water quality);
- geology and soils (including Acid Sulphate Soil);
- sediment and erosion control;
- land contamination;
- terrestrial flora and fauna management (including pest and weed control);
- cultural Heritage;
- air quality;
- noise and vibration;
- hazard and risk;
- social and economic; and
- waste management.

The CEMP is to incorporate sub-plans that comply with the relevant industry standards for environmental management and must include at least:

- Soil and Water Management Plan including an Erosion and Sediment Control Plan;

- Acid Sulphate Soil Management Plan;
- Emergency management plan;
- Weed Management Plan;
- Pest Management Plan;
- Vector Management Plan;
- Air Quality Management Plan
- Noise and vibration management plan;
- Cultural Heritage Management Plan;
- Waste Management Plan;
- Asbestos Management Plan;
- Bushfire Management Plan;
- Bird and Animal Hazard Management Plan;
- Road-use Management Plan;
- Golf Course Management Plan including an integrated Pest Management Plan and Turf Management Plan;
- Topsoil Management Plan
- Roadside Wildlife Management Plan; and
- Beach and Foreshore Management Plan
- Traffic Management Plan;
- Other Management Plans necessary to achieve the environmental objectives and performance criteria.

17.4.1 Draft Environmental Management Plan Outline

Overview

The Draft EMP is presented within the EIS, on the understanding that detailed EMPs for construction and operation, as well as relevant environmental plans are to be prepared by the Contractor and reviewed by the Proponent and either an appropriate environmental management company or DERM or State agency exercising its powers under legislation. The detailed EMPs for construction and operation will need to include, but not be limited to, mitigation measures that address the Environmental Objectives and Performance Criteria of this Draft CEMP and any conditions imposed either by the CG evaluation report or other agencies under other approvals. They will also need to refer to expressed community issues as identified in the EIS and any Supplementary Report.

Planning for Ecologically Sustainable Development

The Project will pursue the achievement of the following overall objectives for ESD during the design, construction and operational stages of the Project, specifically through the following measures:

- adopt and integrate good management practices for design, construction and operation of all aspects of the Project including:
  - energy efficient measures (e.g. power demand management during construction, natural lighting and ventilation in appropriate locations);

  - waste minimisation, management and recycling;
  - wise use and re-use of natural resources (e.g. building materials, rock and other spoil);
  - avoidance or minimisation and mitigation of impacts on ecological processes and habitat values adjacent to construction works (e.g. waterways and forests);
  - seek to achieve community benefits (e.g. re-establishment of recreational areas);
- comply with all applicable laws, regulations, standards and guidelines for protection of the environment;
- adopt best management means available to prevent or minimise adverse environmental impact;
- describe incident response protocols and procedures; and
- provide project employees and contractors with adequate and contemporary training in safety, hazard and risk management and environmental procedures.

Implementation

The CEMP and OEMP demonstrate how potential impacts may be addressed during the construction and operational phases of the Project. The preparation of specified actions, strategies and recommendations implemented through each EMP includes:

- Recommendations made in the EIS to minimise identified environmental impacts.
- Good practice environmental management.
- General content requirements of international standard ISO 14001.
- Management and responsibility for performance.

An outline of how each EMP element is considered and presented is shown in **Table 17-3**.

Table 17-3 Outline of EMP Tables

EMP Component	Description	Example
Environmental Element	The aspect of the environment requiring targeted environmental management.	Terrestrial Flora
Environmental Objective	A short description of the high level aim of the project with respect to this environmental element.	Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.
Performance Criteria	The performance criteria are results contributing to the overall objectives. This provides a benchmark against which management performance can be evaluated. Where possible these criteria should be measurable and monitored to assess level of achievement.	Retained vegetation is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from the construction area.
Mitigation Measures	The management actions to be undertaken to achieve the objectives of the plan. Mitigation measures may include a wide range of measures such as, but not limited to, changes in work procedures and practices, physical interventions to separate or buffer from predicted construction impacts, physical containment measures, and plans/procedures to minimise impacts. Such measures must be	▪ Identify clearing exclusion zones. ▪ Minimise damage to retained vegetation. ▪ Implement sediment and erosion control measures.

EMP Component	Description	Example
	directed to achieving the Environmental Objectives and Performance Criteria, the statutory requirements, and must be consistent with the conditions of an approval from the CG.	
Monitoring	Establishes the parameter to be monitored, the type and frequency of monitoring.	Contractor to monitor vegetation clearance and earthworks and periodic monitoring of vegetation and sediment and erosion control devices.
Reporting	Purpose and frequency of reporting to demonstrate achievement of the environmental objectives and satisfaction of the performance criteria. The distribution of reports when generated.	Monthly Construction Report
Responsibility	The responsible entity for undertaking the activities and actions that has to be implemented.	Contractor
Corrective Action	This section establishes the corrective action that must be implemented if performance indicators are not achieved. It also provides guidance for contingency actions.	Rehabilitate areas if cleared within the exclusion zones

17.4.2 Coastal Management

Construction impacts within the coastal areas of Hummock Hill Island are likely to be direct from construction activities of the access bridge and public boat ramp in Boyne Creek and Colosseum Inlet. Remaining construction impacts are likely to be indirect as a result of upstream activities within ephemeral watercourse catchments that discharge to the estuarine environment.

Environmental Objective – Coastal Management Minimise environmental impact by managing construction aspects within the coastal zone	
Performance Criteria	• Manage and mitigate the impacts of spoil removal, haulage and placement in spoil retainment areas. • Manage and mitigate the risks of soil erosion impacts from all work areas where vegetation is removed or the soil disturbed during construction works.
Mitigation Measures	**Erosion and Sediment Control** • Implementation and maintenance of the Land Erosion EMP. • Develop and implement erosion and sediment control plans in accordance Construction works for public boat ramps and bridge abutments will utilise silt curtains to contain sediment and potential contaminants that can be released during construction. • A minimum 10 m buffer will be maintained on all ephemeral watercourses that help to reduce pollutant loads to adjacent marine waters derived from surface runoff. **Disturbance of Acid Sulphate Soil** • Implementation and maintenance of the Acid Sulphate Soil EMP. **Contamination** • Implementation and maintenance of the Land Contamination EMP.

Environmental Objective – Coastal Management Minimise environmental impact by managing construction aspects within the coastal zone	
	• Inclusion of gross pollutant traps in ESCP plan. • Litter education program for construction workers during induction. • Provision of waste facilities in all break-out areas to discourage littering. • Use of non-persistent herbicides and pesticides within the HHI Development area, their storage. • Handling and application of herbicides and pesticides to minimise/eliminate potential leaching during construction activities. • Oil containment booms and oil spill recovery equipment available when working on or near water. **Direct loss of Habitat in Boyne Creek** • Minimisation of native vegetation clearance. • Avoidance of rare and endangered species/habitats. **Hydrodynamics and Tidal Flows** • Construction of a temporary access jetty within Boyne Creek for construction access will incorporate H-Sections and steel decking resulting in minimal impact to hydrodynamics.
Monitoring	• Regular inspection of sediment and erosion control structures and measures. In wet weather or when using large quantities of water in construction works more frequent monitoring may be necessary. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Monthly Report prepared and submitted to Eaton Place Pty Ltd to include details of monitoring results, audits, training and incidents. • Immediate reporting to site supervisor/construction contractor of any incident, spill or release of materials to the environment. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Site Supervisor/Construction Contractor
Corrective Action	• Timely rehabilitation. • Appropriate control measures implemented where unacceptable sediment or erosion is identified or may occur. • Necessary corrective action implemented following incident or complaint. • The Contractor will ensure that all appropriate personnel undertake adequate environmental awareness and training covering the requirements of the CEMP regarding soil management and erosion control. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.3 Water Management

17.4.3.1 Hydrology

Potential physical and hydrodynamic impacts to ephemeral creeks identified within the project footprint during construction may include:

- Impact to riparian vegetation from development precincts.
- Culverts and crossings may impact creek hydraulics and fauna passage.
- Changed hydrodynamics including reduced time of concentration (t_c) and increased peak discharge (Q_y) due to receipt of concentrated flows from cleared areas.

Environmental Objective - Hydrology Maintain environmental flows within the Mary River and tributaries throughout construction.	
Performance Criteria	• All legislative criteria are met throughout construction.
Mitigation Measures	**Ephemeral watercourse hydraulics** • Culverts and crossings will be designed in accordance with Road Drainage Manual (Main Roads, 2002) with a 30% climate change buffer in the relevant calculation of discharge (Q). **Ephemeral watercourse hydrodynamics** • Construction of a temporary access jetty within Boyne Creek for construction access will incorporate H-Sections and steel decking resulting in minimal impact to hydrodynamics. **Fauna passage** • Culverts and crossings will be designed in accordance with Road Drainage Manual (Main Roads, 2002) with incorporation of fauna passages of appropriate height and including dry passage ways for fauna. **Riparian vegetation** • Maintenance of required riparian vegetation buffer as per Acceptable Solution S.3.1-d in the Regional Vegetation Management Code. • Riparian buffer zones will be marked as no clearing zones. • Crossings will be constructed in accordance with the Road Drainage Manual (Main Roads, 2002).
Monitoring	• A visual inspection of the construction site is to be undertaken during and after rainfall to ensure that mitigation measures are in place and no major erosion is occurring. Additional monitoring may be required to determine the extent of stormwater runoff after pulse events. • Auditing of this EMP conducted quarterly (internally) and annually (externally).
Reporting	• In the event that flows are impeded by construction works, the following organisations are to be notified immediately: • Department of Environment and Resource Management • Great Barrier Reef Marine Park Authority. • Eaton Place Pty Ltd.
Responsibility	Site Supervisor/Construction Contractor
Corrective	• Rehabilitation will be conducted on areas where unacceptable flow conditions have

Environmental Objective - Hydrology Maintain environmental flows within the Mary River and tributaries throughout construction.	
Action	occurred. • The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding environmental flow requirements. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.3.2 Water Quality

Potential water quality impacts to ephemeral creeks from construction activities may occur from the following sources:

- Construction works and in particular land clearing and associated earthworks increasing suspended sediment.
- Construction litter entering receiving waters.
- Potential impacts from plant maintenance such as refuelling and general site activities.
- Nutrient increases from rehabilitation and irrigation of disturbed, turfed and green spaces.
- Weed control chemicals used during rehabilitation.

Environmental Objective – Water Quality To preserve water quality of groundwater and the freshwater courses/gullies existing on Hummock Hill Island and maintain the Environmental Values (EVs), including compliance with local Water Quality Objectives (WQOs) during the construction phase.	
Performance Criteria	• No discharge of materials through stormwater runoff from construction areas, with particular regard to suspended sediments, fuels, chemicals, and oils. • No waste materials (general and construction rubbish etc) entering waterways from construction areas. • A program must be implemented to monitor and treat aquatic weeds and other pest species that may enter the waterways including the estuary and coastal zones from a work site. • No uncontrolled or untreated release of water or sediment from a work site.
Mitigation Measures	• Conduct Quarterly WQ monitoring and develop sub-regional WQO and maintain WQ in dams, estuaries and coastal waters within the 20th and 80th percentile of background conditions. **Sediment and Erosion Control** • Implementation and maintenance of the Land Erosion EMP. • Minimise size of cleared areas, minimise time soils are exposed, reduce and control surface flows and suspended sediment from cleared areas. • Maintenance of 50% of vegetation on low density lots. • Use of WSUD treatments to reduce suspended sediment and nutrient loads.

Environmental Objective – Water Quality To preserve water quality of groundwater and the freshwater courses/gullies existing on Hummock Hill Island and maintain the Environmental Values (EVs), including compliance with local Water Quality Objectives (WQOs) during the construction phase.	
	Contamination • Implementation and maintenance of the Land Contamination EMP. • Inclusion of gross pollutant traps in ESCP plan. • Litter education program for construction workers during induction. • Provision of waste facilities in all break-out areas to discourage littering. • Use of non-persistent herbicides and pesticides within the HHI Development area, their storage. • Handling and application of herbicides and pesticides to minimise/eliminate potential leaching during construction activities.
Monitoring	• A Water Quality Monitoring Plan will be developed prior to construction to establish sub-regional Water Quality Objectives (WQO) in accordance with the Queensland Water Quality Guidelines (QWQG) (2006) and will consider the GBRMPA Draft Interim Marine Water Quality Guidelines (as yet unpublished). • Conduct surface water quality monitoring at discharge points from the construction site to evaluate the effectiveness of the proposed mitigation measures and provide triggers for implementation of additional control measures. • In the event that an unplanned spill or incident occurs within the construction area or as part of associated activities of the HHI Development, targeted water quality monitoring will be carried out up and down stream to determine potential impacts from the event. • A visual inspection of the construction site is to be undertaken during and after rainfall to ensure that mitigation measures are in place and no major erosion is occurring. Additional monitoring may be required to determine the extent of stormwater runoff after pulse events. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Immediate reporting to site supervisor/construction contractor of any incident, spill or release of materials to the environment. • Incidents, complaints and any (potential) environmental harm reported to regulatory body/ies where required.
Responsibility	▪ **Site Supervisor/Construction Contractor**
Corrective Action	• Contaminated waters (elevated turbidity, suspended solids etc) observed flowing from the construction site into Hummock Hill Island's Catchment, will be identified and the appropriate action taken by the Environmental Adviser. • Adverse impacts to downstream water quality shall be reported to the DERM and any impacts to potable water supply off-takes, reported to the relevant local administering authorities. • Rehabilitation will be conducted on areas where unacceptable sedimentation has occurred.

Environmental Objective – Water Quality To preserve water quality of groundwater and the freshwater courses/gullies existing on Hummock Hill Island and maintain the Environmental Values (EVs), including compliance with local Water Quality Objectives (WQOs) during the construction phase.	
	• The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding water quality management, sediment and erosion control and spill management procedures. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.3.3 Groundwater

Groundwater discharge zones identified for the HHI Development have a natural tendency for waterlogging and possibly increased salinity. Clearing of vegetation during construction works in these areas may increase water logging of soils. Vegetation lowers the water table and reduces evaporation at the soil surface through evapotranspiration. Management of potential water logging issues in groundwater discharge zones is dealt with in the groundwater management sub–plan below.

Environmental Objective – Groundwater Impact Management	
Performance Criteria	• Minimisation of impacts on groundwater quality by ensuring all practical measures have been taken to prevent contamination as a result of construction activities. • Adequate monitoring and management of groundwater levels throughout the dewatering program.
Mitigation Measures	**Lagoon Construction** • Perform lagoon construction during winter months when lower groundwater levels are likely to be lower as a result of lower rainfall. • Groundwater will be artificially recharged with water from the lagoon dewatering process through perimeter recharge trenches or surface irrigation in the immediate vicinity. **Ground Disturbance** • Proposed hardstand areas and building footprints will be minimised to reduce potential changes to soil permeability and porosity. Where applicable such as in Qb3 areas permeable paving may be used for parking areas. • Clearing of vegetation of upslope recharge areas and slope break discharge areas and will be minimised with maximum maintenance of existing vegetation in low density lots and golf course buffer strips (refer to Section 5.2.2). **Contamination** • Implementation and maintenance of the Land Contamination EMP. • Implementation and maintenance of the Acid Sulphate Soil EMP. • Groundwater contamination will be assessed as part of a Contaminated Land Investigation.

Environmental Objective – Groundwater Impact Management	
	• Any groundwater contamination discovered during contaminated land investigations will be remediated as part of proposed remediation works required to satisfy DERMthat the land is suitable for its intended use. • Investigations and remediation will be conducted with reference to the Draft Guidelines for Assessment and Management of Contaminated Land in Queensland (1998). • Persistent chemical based pesticides will not be used on a wide scale during re-vegetation and landscaping establishment. Slow release organic fertilisers will be used as required by AGCSA.

Monitoring	• Groundwater monitoring program carried out to assess any changes in groundwater levels and in accordance with approval conditions.
	• Specific groundwater monitoring points may include:
	  • During any dewatering activities during the lagoon construction to monitor recharge performance and potential changes in groundwater quality.
	  • In the vicinity of proposed effluent disposal areas to ensure land irrigation of treated effluent does not result in mounding, salinisation or contamination.
	  • In the vicinity of proposed effluent disposal areas to ensure land irrigation of treated effluent does not result in mounding or contamination.
	  • Adjacent any proposed bulk chemical storages.
	• An investigation of existing groundwater contamination in the vicinity of the dip site will be undertaken. If groundwater contamination is identified opportunities for remediation as part of site development may improve groundwater quality and reduce potential risks to human health and the existing environment.
	• A groundwater monitoring will be undertaken on a quarterly basis in the vicinity of proposed effluent disposal areas prior to development. Data recovered during monitoring would serve to characterise existing quality and allow for the determination of potential groundwater impacts during the operational phase.
	• A groundwater monitoring program carried out during any dewatering activities for the lake construction to monitor recharge performance ant potential changes in groundwater quality.
	• Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).

Reporting	• Monthly Report prepared and submitted to Eaton Place Pty Ltd to include details of monitoring results, audits, training and incidents. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	▪ **Site Supervisor/Construction Contractor**
Corrective Action	• Significant changes to groundwater levels outside of the zone of influence investigated and the appropriate action taken by the Construction Manager. • Groundwater Quality Monitoring Programme introduced in the event that any significant spill may affect the groundwater. • The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding

Environmental Objective – Groundwater Impact Management	
	groundwater monitoring and storage and handling of hazardous substances. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring.

17.4.4 Land Management

17.4.4.1 Land Erosion

Potential disturbance to land, and in particular clearing of vegetation may lead to exposure of erosion prone soils. Loss of cover, disturbance of surface soils and exposure of sub-soils will typically result in erosion and sedimentation. Erosion of these soils result in releases of fine sand and clay particles and suspended sediment materials to local drainage lines and streams. Sedimentation of the waterways results in the deterioration in water quality and aquatic habitat values and, in more severe cases, effects on flows and flooding characteristics of these watercourses. Sedimentation will also impact on marine water quality and habitat values in the adjacent World Heritage Area. Specific details of erosion hazards and impacts during construction are dealt with in the erosion management sub – plan below.

Environmental Objective – Erosion Management **Minimise environmental impact by preventing soil loss and erosion.**	
Performance Criteria	• Manage and mitigate the impacts of spoil removal, haulage and placement in spoil retainment areas. • Manage and mitigate the risks of soil erosion impacts from all work areas where vegetation is removed or the soil disturbed during construction works. • To develop an Earthworks Strategy that will schedule disturbance and minimise risk during the wet season. • To implement and maintain effective erosion and sediment control measures. • To minimise the extent of disturbed land at any one time. • To minimise the impact of construction activities on surface and groundwater quality.

Mitigation Measures	• Develop a soil and water management plan including Erosion and Sediment Control Plans (ESCPs), which complies with Erosion and Sediment Control Guidelines for Queensland Construction Sites (Witheridge and Walker, 1996) which include measures such as:
	  • Consider construction sequence and timing to minimise exposure to rain and ephemeral stream flows.
	  • Minimise areas of disturbance, particularly of dispersive material.
	  • Ensure suspended sediment levels in waters discharged are no, or marginally, higher than in receiving waters.
	  • Employ progressive site clearance and site rehabilitation techniques.
	  • Utilise sediment barriers and sedimentation ponds.
	  • Protect stockpiles of soil material with quick-growing grass species.
	  • Protect areas from excess run-on flows.
	  • Shape landforms to take account of the erodibility of soil materials used.

Environmental Objective – Erosion Management **Minimise environmental impact by preventing soil loss and erosion.**	
	• Protect significant vegetation within the riparian zone for as long as possible. Employ revegetation guidelines outlined in Abernethy and Rutherfurd (1999) and Rutherfurd et al. (2000), including using vegetation species common locally and appropriate to the soil materials. • Rapid revegetation of disturbed areas. • Diverting uncontaminated run off away from cleared/contaminated areas. • Controlling runoff through sedimentation dams, drains and disposing to stable drainage lines. • Bunding stockpiled material. • Remove of loose, surplus excavated sand, gravel and clays to prevent excessive erosion. • Confining traffic to defined roads and access tracks. • Compacting high traffic areas. • Excavations backfilled and covered with topsoil. • Undertaking of erosion risk assessment to identify flow paths, suitable stockpile locations, soil cover type, and soil stability. • Work will be scheduled to ensure that any temporary erosion control works are in place by the end of work each day, especially before weekends, if rain is imminent or when permanent erosion control works are not in place. • Construction activities must be scheduled so that work in sensitive areas can be completed and rehabilitated as quickly as reasonably possible. • Construction of access roads with suitable scour protected and drainage for heavy vehicles. • Remediate bare areas as soon as practicable by backfilling, covering with topsoil and revegetating, hydroseeding or hydromulching. Rehabilitation work will be undertaken to coincide with vegetation growth periods and involve the use of appropriate sterile species (e.g. rye or millet). • Undertake finishing and landscaping requirements for on-going sediment and erosion control around the worksites following construction. • During site stripping or excavation, topsoil will be stockpiled where appropriate for later rehabilitation or landscaping works. • Stockpiled topsoil will be used as soon as practicable to limit the deterioration in biological activity. For the same reason, stockpile heights will not exceed two metres. • Ensure sufficient materials to appropriately implement erosion and sediment strategies on site at all times. These materials may include but are not limited to: rip rap, geotextiles, silt sausages, silt fences, sand bag check dams and coir logs. • Undertake re-shaping/contouring of the land surface and batters to minimise slope changes and angles to reduce the potential of mass movement or failure where practicable. • Manage and minimise concentrated runoff to ensure that flow shear force doesn't exceed the resistance of soil. This may be achieved via implementing drainage management measures and maintaining vegetative cover.

Environmental Objective – Erosion Management **Minimise environmental impact by preventing soil loss and erosion.**	
	• Add environmentally benign chemicals to sediment basins to aid flocculation and settling (subject to Environmental Protection Agency approval) prior to disposal if sediment basins are incapable of removing and settling out suspended matter effectively and standards for suspended solids contents are exceeded. • Discharge runoff, diverted and turbid water collected from interceptor drains and excavations within the construction areas into sedimentation traps and detention basins. • Sedimentation basins must be designed for a 24 hour storm event of a return period of 1 year for sediment retention and a one hour storm event of a return period of 100 years for flow. They are to be inspected and cleaned out on a regular basis and managed to ensure the required retention capacity is maintained.
Monitoring	• Regular inspection of sediment and erosion control structures and measures. In wet weather or when using large quantities of water in construction works more frequent monitoring may be necessary. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Monthly Report prepared and submitted to Eaton Place Pty Ltd to include details of monitoring results, audits, training and incidents. • Immediate reporting to site supervisor/construction contractor of any incident, spill or release of materials to the environment. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Site Supervisor/Construction Contractor
Corrective Action	• Appropriate control measures implemented where unacceptable sediment or erosion is identified or may occur. • The erosion and sediment control plans will be amended to account for changes in site conditions or treatment methods in the case of the failure of a device. • Necessary corrective action implemented following incident or complaint. • The Contractor will ensure that all appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding soil management and erosion control. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.4.2 Acid Sulphate Soils

Two areas of potential acid sulphate soils have been identified within Lot 3. Construction activities for the Boyne Creek boat ramp and bridge are may directly disturb PASS soils due to excavation activities for bridge abutments and bored piers. Construction activities within the relict beach ridge system will trigger requirements for an ASS Management Plan on the basis of potential excavation and/or filling activities, even though the potential for PASS to be present is considered low.

Environmental Objective – Acid Sulphate Soil (ASS) Management	
Performance Criteria	• Accurate identification of ASS to minimise the potential for inappropriate material handling. • Treatment of disturbed ASS to minimize the potential environmental harm. • To minimise the potential for environmental harm of discharges from ASS impacted surface to surface water and/or leachate form the site. • To minimize the potential for environmental harm from discharging of impacted groundwater from the site. • To prevent any net increase in existing soil acidity due to oxidation of in-situ or excavated materials. • To ensure there is no direct or indirect release of runoff waters or leachate that do not meet the established water quality parameters.

Mitigation Measures	• Identification of Potential Acid Sulphate Soils (PASS) and ASS in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulphate Soils (ASS) in Queensland 1998.
	• Preparation and implementation of an ASS Management Plan (ASSMP) that addresses at least the following matters:
	  • Minimising the disturbance of PASS and ASS.
	  • Neutralisation of excavated soils with pure fine agricultural lime (CaCO3) at the nominated rate outlined in Table 4 of the SPP 2/02 Guideline.
	  • Application of lime to open excavation faces.
	  • Storage of excavated PASS material in a dedicated bunded area to capture stormwater flowing from stockpiles.
	  • Re-use of neutralised soils as general fill (pending geotechnical assessment).

Monitoring	• Laboratory testing of soils using a NATA accredited laboratory to assess the potential net acidity through acid base accounting. • Water quality testing to meet the established water quality parameters. • Neutralising agents are of sufficient quantity and quality to neutralize potential acidity. • Validation sampling will be repeated on the lime treated material until satisfactory results are obtained. • Water quality potentially impacted by ASS will be monitored regularly during the construction period, particularly following substantial rainfall events.
Corrective Action	If performance targets are not being met as indicated by the validation testing of treatment and water quality testing: • Is the ASSMP effectively implemented? If not, ensure compliance with ASSMP. • Does the plan need to be changed? (i.e. due to changed procedures) If yes, then ensure that ASSMP is changed and changes appropriately communicated to relevant personnel.
Responsibilities	Site Supervisor/Construction Contractor
Reporting	Monthly Report prepared and submitted to Eaton Place Pty Ltd to include details of monitoring results, compliance checks and corrective actions.

17.4.4.3 Land Contamination

Historical activities conducted around the former homestead included a number of potentially contaminating activities as described in Section 3.1.2.5 of the EIS. The scale of soil and groundwater contamination may not be widespread due to the limited volumes of hazardous contaminants used. Potential areas of impact may be limited to areas of initial contamination.

Land contamination issues and their management are outlined in the land contamination management sub-plan below.

<table>
<tr><td colspan="2">Environmental Objective – Land Contamination (Spills, Clean Up, Fill and Asbestos)
• Prevention of spills from occurring at project site.
• Contain, clean up and, if necessary, remediation of any spills that do occur.
• Recognition and remediation, where necessary, land contamination having resulted from historical activities such as cattle dip operations, fuel storage and building material application (asbestos).</td></tr>
<tr><td>Performance Criteria</td><td>• All fill used on site is ‘inert’ and must be free from contaminants.
• Containment of all spills involving materials that may cause environmental and effective cleaned up and measures taken to prevent the incident from recurring.
• All contaminated land is remediated to the extent necessary to allow the relevant land use of the development.</td></tr>
<tr><td>Mitigation Measures</td><td>Chemical Storage, Spills and Clean Up
• Chemical storage will comply with Australian Standards and Material Safety Data Sheets (MSDS) requirements. MSDS for products kept on site will be readily available to employees and contractors.
• Smaller quantities of chemicals, fuels and oils will be stored in self bunded pallets, within a bunded area in the workshop, or in a bunded container on the site. Bulk quantities of fuel will be stored in double skinned tanks (self bunding).
• Waste products (e.g. oil/water separator waste, sludges and residues), will be contained within weatherproofed, sealed and bunded areas to ensure stability of the waste containment receptacles and prevent any leakages or spills causing environmental harm to soils, surface water or groundwater. Regular inspections will be carried out of the tanks, bunds and storage areas to ensure integrity.
• Contaminated sites within the study area could be managed by:
  • Option 1 - Do nothing (contaminated site left unmanaged).
  • Option 2 - Decommissioning of Underground Storage Tanks (in – situ abandonment of USTs).
  • Option 3 - Removal of Underground Storage Tanks (USTs).
  • Option 4 - Capping of contaminated sites (in-situ management of contamination).
  • Option 5 - Excavation and off-site disposal to contaminated soil management facility.
  • Option 6 - Excavation and on-site entombment to a suitable location, and management within the study area.
• Obtain an approval and a disposal permit by the DERM (Contaminated Land Unit) for the</td></tr>
</table>

Environmental Objective – Land Contamination (Spills, Clean Up, Fill and Asbestos) • Prevention of spills from occurring at project site. • Contain, clean up and, if necessary, remediation of any spills that do occur. • Recognition and remediation, where necessary, land contamination having resulted from historical activities such as cattle dip operations, fuel storage and building material application (asbestos).	

	removal of contaminated soil, in accordance with the Environmental Protection Act 1994.
	• Remove contaminated soils in accordance with an DERM approved Remediation Action Plan (RAP).
	• Prepare and implement procedures for the remediation of contaminated soil spills that may occur during transport.
	• Standard procedures for the storage, handling, disposal and spill response for potentially hazardous waste materials will be described in an Emergency Management Plan.
	• In the event of a large spill, sites will be investigated, managed and remediated in accordance with the requirements of the contaminated land provisions of the EP Act and the QLD DERM Draft Guidelines.
	• If during any site earthworks or excavation, offensive or noxious odours and/or evidence of gross contamination not previously detected is observed, site works are to cease in that area and action taken to immediately abate the environmental harm. The area will be isolated through high – visibility fencing and appropriate signage so that other activities may continue elsewhere within the remediation site without representing additional risks.
	Fill
	• Ensure that any fill material brought on to the site meets the requirements of:
	  • National Environmental Protection (Assessment and Site Contamination) Measure.
	  • Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (1998).
	• All fill material must be virgin excavated natural material (soil, aggregate etc).
	• Ensure that the site source of the imported fill is not listed on the EMR/CLR Register.
	• Conduct visual inspections of the imported fill material to ensure that it contains no waste material.
	• Obtain documentation from the fill provider, which must contain the following:
	  • Date of arrival on site.
	  • Volume/ quantity of fill material.
	  • Provider.
	  • Source of fill material.
	  • Documentation that the site of the fill material is not listed on the EMR/ CLR.
	Asbestos
	• Qualified person to inspect buildings and services for presence of asbestos.
	• Licenced/qualified contractor to remove asbestos where found.
	• Create and maintain an asbestos register for any asbestos found during construction.
	• Implement procedures to minimise exposure risks during asbestos removal.

Monitoring	• Preparation and supply to the DERM of a validation report, demonstrating that the

Environmental Objective – Land Contamination (Spills, Clean Up, Fill and Asbestos) • Prevention of spills from occurring at project site. • Contain, clean up and, if necessary, remediation of any spills that do occur. • Recognition and remediation, where necessary, land contamination having resulted from historical activities such as cattle dip operations, fuel storage and building material application (asbestos).	
	Remedial Action Plan (RAP) has been successfully implemented. • Recording of any spills that occur as an incident, as well as the follow up actions, any results and reporting to authorities. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Any environmental incidents involving spills recorded including time of incident, persons involved, details of incident, mitigation measures and actions taken to minimise the probability of recurrence. Immediate reporting to the site supervisor/construction contractor of any significant spills or potential risk of spills. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	▪ **Site Supervisor/Construction Contractor**
Corrective Action	• Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding waste management, spill procedures and the storage and handling of hazardous substances and materials with the potential to cause environmental harm. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.5 Terrestrial Flora and Fauna

17.4.5.1 Terrestrial Flora

Commonwealth Department of the Environment, Water, Heritage and the Arts Resources Database records revealed five flora species and ten fauna species considered Endangered or Vulnerable are possible occurrences in the site locality. Wildnet records revealed that six (6) species considered Endangered, Vulnerable, Rare are known from the search area. Management of potential impacts on the identified terrestrial flora within the HHI Development area is outlined below.

Identified (short-term) impacts include:

- Injury and death of flora and fauna during clearing works.
- Potential spread of weeds into cleared and disturbed areas.

The long-term impacts include:

- The loss of remnant and regrowth vegetation as a result of vegetation clearing.
- Fragmentation of the landscape affecting flora connectivity.
- Potential for increased proliferation of exotic species, including weeds and pests.

Management of potential impacts on the identified terrestrial flora within the HHI Development area is outlined below.

Environmental Objective – Terrestrial Flora Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.	
Performance Criteria	• Felled vegetation will be re-used on site wherever possible. • Retained vegetation is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from the HHI Development area. • Weed spread and/or invasion is prevented both within the construction site and in surrounding areas. • Harm to fauna is minimised.
Mitigation Measures	**Vegetation Clearing** • Relevant plans detailing the staging of works, areas to be retained, significant areas of exclusion and other relevant issues shall be provided to the site supervisor / construction contractor and clearing contractor prior to any site preparation activities within the proposed construction area. • Prior to the commencement of any vegetation clearance, the clearing contractor, in consultation with the Construction Manager and Environmental Advisor, to discuss all areas to be cleared on construction plans and in the field. • All areas to be cleared shall be clearly identified on the ground by the Environmental Advisor prior to the commencement of any site preparation activities. Areas to be retained will therefore be clearly identified and no unauthorised access permitted. • Implementation of an on-site Vegetation Clearance Management / permitting system. • Clearing within supratidal salt flats and mangroves will be minimised to the minimum width required to accommodate the road design and storm water controls. Clearing will be conducted in accordance with recommendations within the Wetland Management Profile – Salt marsh Wetlands issued by the Queensland Wetlands Programme. • A 100 m vegetation buffer zone at the salt flats and between HAT and housing within Colosseum Inlet and Boyne Creek will be designated to prevent vehicle access. • No clearing shall occur outside nominated clearing zones. **Identifying a Tree Protection Zone** • All retained trees likely to be impacted upon by development works will be marked prior to construction works. • Prior to establishing a tree protection zone, trees to be protected will be pruned focusing on removal of dead or broken branches. • Construction contractors are prohibited from undertaking any additional pruning as this activity, if not performed properly, can be harmful to the tree. • The following measures are to be taken to protect the tree, in the long term: • Fencing – Secure posts with 1.8m high chain link or equivalent sturdy fencing to be erected, maintained and removed by the contractor to the outer edges of the protection zone.

Environmental Objective – Terrestrial Flora Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.	
	• Trunk protection – 1.8m high palings strapped to the trunk. • Mulching – 100mm of composted mulch cover over the ground within the tree protection zone in order to retain soil moisture and encourage microbial activity. • Irrigation – natural moisture levels will be maintained during construction activities. This may necessitate temporary irrigation of the tree. • Drainage – the natural drainage patterns around the root zone will not be altered. To prevent waterlogging of the tree drip zone, heavy overland flow will be diverted around the tree. • Trees considered suitable for retention must be identified. Within these zones the following activities shall not be permitted: • Storage and mixing of materials. • Vehicle parking. • Liquid disposal. • Machinery repairs and/or refuelling. • Construction site office or shed. • Combustion of any material. • Stockpiling of soil, rubble or debris. • Any filling or excavation including trench line, topsoil skimming and/or surface excavation, unless otherwise approved by the Construction Manager. • Unauthorised pesticide, herbicide or chemical applications. **Minimising damage to retained vegetation** • All activities in areas adjacent to any vegetation to be retained are to be carried out in such a manner as to minimise damage to the vegetation. • Vegetation to be retained is to be clearly identified. Each tree or groups of trees to be retained investigated at the appropriate time by an Ecologist/Arborist. **Trenching and Excavation** • When trenching or excavation is to be undertaken within the root zone of any tree, roots will be severed cleanly rather than torn with a backhoe or other excavation equipment. • All roots are to be exposed first and then cut cleanly with a sharp saw or loppers. • Exposed roots are to be kept moist and covered with hessian for the duration of the exposure. Where roots with a diameter larger than 50 mm are encountered excavation will be undertaken by hand and such roots tunnelled under. **Weed Management** • All mulch produced on site from cleared vegetation and trees specifically exclude material from weed species. Vegetation mulching suitably controlled to avoid contamination. Mulch containing weed species material shall be treated separately and not used on site for regeneration/ revegetation works. • Soil disturbance within retained vegetation must be kept to a minimum to avoid weed recruitment. Areas to be regenerated (weed control) or revegetated completed under strict supervision to avoid unnecessary soil disturbance.

Environmental Objective – Terrestrial Flora Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.	

	• A Weed Management Plan will be prepared for the project. Management measures to prevent the movement of declared weeds to and from the construction site include:
	  • Use of wash-down facilities for vehicles and equipment entering and leaving the Hummock Hill Island construction site and those areas proposed for vegetation clearance.
	  • All machinery, equipment and vehicles shall be certified as "clean" prior to entering the site by trained personnel in accordance with DERM practices.
	  • Weeds are not to be used as mulch for landscaping, but are to be disposed of and burnt to prevent reseeding.
	  • Soil, earth and landscaping material brought onto the site must be from a source that is clean and weed free.
	  • The monitoring of revegetated areas to identify new infestations and eradicate any declared weeds found.
	  • Weed monitoring to ensure that new weed species are not introduced into the immediate development area or surrounding sites.
	Protection of Trees within Construction Zones
	• Prior to commencement of the Works, the applicant shall arrange a pre-start meeting with Council Environmental Assessment Officers or other relevant Council Officer. The applicant shall tag all trees to be retained and shall install all approved protection measures.
	• Contractor to provide fences and/or trunk girdles to prevent unintended physical damage to the root system, trunk or canopy of native vegetation identified for retention, which may be impacted upon by clearing works.
	• Trees deemed to be potentially impacted upon, shall be protected by the application of carpet underlay and/or corrugated iron or some other similar material to encase that trunk of the tree.
	• All works carried out on either foliage or root systems of trees in consultation with a qualified arboriculturist or horticulturist.
	• All works to adhere to the Australian Standards (AS) 4373 – 1996 (Pruning of Amenity Trees). The subject trees are not to be topped nor lopped. Spur climbing of any tree to be pruned will be avoided.
	• Excavate the finish grade by hand and prune exposed roots. Mulch the area immediately after the cut is completed. If the cut causes inadequate soil moisture by redirecting water flow or lowering the water table, add supplemental irrigation. If large grade changes are needed, a retaining wall or crib can be used. Retaining walls allow deep fills and cuts while still protecting the original soil level within the critical root area.
	Sediment and Erosion Control
	• Implementation and maintenance of the Land Erosion EMP.
	Compensatory Habitat Strategy
	• A compensatory habitat strategy is to be developed for the project. The strategy objectives are:

Environmental Objective – Terrestrial Flora Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.	
	• the strategy will seek to comply with the requirements of the Queensland Vegetation Management Act 1999 and associated Codes and Policies. • the strategy will aim to provide tangible conservation benefits at the local and shire wide scale, with an emphasis on threatened species conservation. • The compensatory habitat strategy may involve a combination of the following options: • Providing a Vegetation Management Offset in accordance with the 'Policy for Vegetation Offsets' (DNRW, 2006) for the loss of significant regional ecosystems • Securing advanced regrowth (near remnant) vegetation within and outside the Shire which is representative of the REs and essential habitat to be cleared for the project. The properties will be either be purchased by Eaton Place Pty Ltd or secured via registered covenant. In both cases the properties would be actively managed until such time as they reach remnant status. • Securing REs of equivalent conservation status to those to be cleared for the project within and outside the Gladstone Regional Council area and managing these areas until such time as they meet remnant status. • Strategic purchase of key land parcels which have been identified as key linkages or habitats for EVR taxa at the local, sub-regional or regional scale. • Revegetation and rehabilitation of existing cleared areas of land within the study area, with a view to re-instating pre-clearing vegetation types. **Landscape Planning** • Prepare Landscape Masterplan(s) for the HHI Development prior to construction, dealing particularly with the management of existing vegetation and the design and management of the public areas such as urban or tourist areas as well as infrastructure such as roads. Particular attention will be given to the early establishment of suitable vegetation and the creation of special areas suitable for water based recreation and enjoyment. The Landscape masterplan(s) will detail plant densities, species, schedules and timing will be specified on approved landscape plans. Details on fertilizer and chemical usage will be detailed on specifications attached to the approved landscaping plan.
Monitoring	• Monitoring by Contractor of vegetation clearance, earthworks components and the above Performance Objectives of the proposed works on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted to achieve the specified performance objectives. • Periodic condition monitoring by Contractor of all retained vegetation, with a maximum interval between inspections of one month, addressing the health and vigour of all retained vegetation for one year after the commencement of operational works. • Disturbed areas are inspected monthly for weed growth, with appropriate weed control measures implemented when warranted. • Regular inspection of cleared areas and contractor's methods during clearing to ensure compliance with EMP. • It is intended that the balance areas of the development lease will be managed by a specialist vegetation management contractor (e.g. Greening Australia) under a long term

Environmental Objective – Terrestrial Flora Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.	
	management agreement for a period of at least 20 years. • It is intended that a permanent site manager be employed to supervise all vegetation management works across the balance areas. • Auditing of the EMP conducted quarterly (internally) and annually (externally).
Reporting	• Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. • Immediate reporting to site supervisor/construction contractor of any incident which contravenes the objectives of the EMP. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	▪ **Site Supervisor/Construction Contractor and Vegetation Management Contractor**
Corrective Action	• Appropriate control measures implemented where unacceptable sediment or erosion is occurring or may occur. • The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding vegetation clearing and weed management. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring. • If deemed necessary by an Arborist a soil injection treatment will be applied to the root zone of any tree that has been adversely affected by a project. The soil injection treatment is a combination of water, nutrients and other agents that promote root growth such as. rooting hormones, humic acids, soil microflora and miycorrhizae. The use of nitrogenous fertilisers must not be used where Phytophthora cinnamomi (root rot fungus) is suspected or known.

17.4.5.2 Terrestrial Fauna

Potential direct and indirect project impacts will occur in the short-term and over the long-term. Short-term impacts are those occurring as a direct or indirect result of construction of the project, whilst long-term impacts will occur over a more extended period of time (in the order of years).

Identified short-term impacts include:

- Injury and death of flora and fauna during clearing works.
- Potential disturbance to fauna from construction activities, noise and vibration.
- Potential traffic related wildlife mortality on roads within and around the project area.
- Potential injury/ death during tree clearing.

The long-term impacts include:

- The loss of habitat as a result of vegetation clearing.

- Fragmentation of the landscape affecting flora connectivity and, thus fauna movement.

Management of potential impacts on the identified terrestrial fauna within the HHI Development area is outlined below.

Environmental Objective – Terrestrial Fauna Ensure that tree clearing and other construction operations are completed in a manner that provides maximum protection of the health and livelihood of native fauna.	
Performance Criteria	• The risk (of injury and death) to fauna is managed and minimised during site clearing operations. • Retained habitat is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from the construction area. • Fauna species continue to utilise the retained habitat area post-development.
Mitigation Measures	**Identification of Habitat Trees** • Habitat trees must be identified prior to the selective clearing operations. (Habitat trees are defined as those trees that provide suitable foraging, refuge and nesting resources for arboreal and avian fauna and micro-bats. These include hollow-bearing trees, trees with fissures, trees with food resources (e.g. pollen, nectar, foliage, arthropods). Larger, old growth trees are also considered to be habitat trees as they are likely to provide greater amounts of foraging resources, cover, and a high number of potential hollows. Dead (stag) trees are also regarded as important habitat trees as they provide roosting and nesting resources.) • Once this has been completed, clearing must be conducted using a staged approach where the smaller non-habitat trees are removed in the first stage with the larger remaining habitat trees removed three to five days after the initial clearing. (This staged method provides a disturbance stimulus and provides fauna with time to leave the site thus maximizing the chances of fauna survival while reducing the need for human intervention for translocation or rescue purposes). **Removal of Tree Hollows** • If any denning, roosting or nesting animals are observed within hollow limbs, but cannot be readily removed by an ecologist, it is recommended that, where appropriate, the hollow end of the limb is blocked with porous material and a chainsaw be used to remove the limb. The limb will then be relocated to a suitable place, determined in consultation with QPWS and the hollow end unblocked at an appropriate time of day to minimise fauna predation. In the case that a colony of microchiropteran bats are located, then the roost will either be felled at night (once bats have vacated) or the entry points shall be blocked, and the roost will be moved to an appropriate area of vegetation to be retained on or adjacent to the site. • Hollow logs must not be mulched until inspected by a qualified Ecologist. • As many hollow logs as possible relocated to areas within an approved Conservation Open Space Area as habitat features. **Removal of Fauna** • Assessment of the site for wildlife will be undertaken by an appropriately qualified person (i.e. accredited by QPWS for capture and release) at least 14 days prior to pre-start meetings for construction. After the pre-start meeting, the 'spotter catcher' shall

Environmental Objective – Terrestrial Fauna Ensure that tree clearing and other construction operations are completed in a manner that provides maximum protection of the health and livelihood of native fauna.	

	provide a plan to Gladstone Regional Council indicating the broad range of fauna expected in the site, the proposed method of operation, and any expected constraints. All operational works involving habitat removal are to be supervised until satisfied that native fauna have been suitably relocated, and shall instruct the contractor when no further action is required. Gladstone Regional Council will confirm with the appointed person that no habitat removal occurred without supervision shall be present to inspect the trees and relocate remaining fauna.
	• Prior to tree removal, an appropriately qualified ecologist attempt to "flush out" any denning or nesting animals not observed during the initial hollow inspection. This may involve hitting target trees with a sledgehammer or another similar technique. Following felling, a second inspection of the relevant trees carried out to relocate fauna disturbed by the clearing process or remaining within the felled timber to a suitable location determined in consultation with QPWS.
	• The actual felling of the habitat trees conducted in a manner that will maximise the chances of survival for any fauna remaining within the tree hollows. This involves pushing rather than cutting, and cushioning the tree fall with other felled timber and foliage.
	Compliance with the Code of Practice
	• The program undertaken in compliance with Queensland Parks and Wildlife Service (QPWS) guidelines and the Draft Queensland Code of practice for the welfare and management of wild animals affected by land-clearing and the modification or destruction of wildlife habitats and wildlife spotter/catchers.
	Care of Injured Fauna
	• All injured animals immediately removed and taken to an appropriately qualified veterinary surgeon. Any orphaned or injured native fauna discovered at a later stage during operational works immediately reported to the QPWS.
	Night Lighting
	• Develop and implement a lighting plan reduce potential light interference for nesting turtles. The plan will incorporate the following measures outlined by Witherington and Martin (1996), such as:
	  • Eliminating unnecessary light sources such as decorative lighting, flood lighting of footpaths beach access lighting.
	  • Use of low wattage directional lighting (directed away from nesting beaches).
	  • Use long wavelength lighting sources such as low-pressure sodium vapour lighting.
	  • Use of shields on lights visible from beaches.
	  • Use of recessed directional lighting to reduce light spillage.
	  • Use of low pole mounted or waist height and shielded lighting on beach access and public pathways.
	  • Place lights behind natural screens such as trees.
	  • Use of motion triggered switches and timers on outdoor security lighting.
	  • Installation of tinted windows on houses facing the main beach.

Environmental Objective – Terrestrial Fauna Ensure that tree clearing and other construction operations are completed in a manner that provides maximum protection of the health and livelihood of native fauna.	

	• Rehabilitation of low screening vegetation below headland housing to block lights visible from beach level whilst maintaining views.
	• Educating house owners of the potential impacts from household lighting during nesting season, such as the use of flyers during nesting season
	Pest Control
	• Develop and implement a Pest Management Plan for the control of wild dogs, foxes, cane toad, horse and cattle on the lease area held by Eaton Place Pty Ltd.
	• A Vector Management Plan will be developed and implemented which addresses at least the following matters:
	  • breaks in any continuous vegetation lines leading to residential areas;
	  • roadway embankment construction will be designed to eliminate (if possible) any standing water impoundment or redirection of water flows into potential mosquito breeding areas; and
	  • stormwater drainage will be designed to avoid silt accumulation and be free draining. Exit points from drains into waterways or wetlands will be designed to avoid habitat changes at discharge points.

Monitoring	• Monitoring of vegetation clearance, earthwork components and requirements of this EMP on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted to achieve the specified Environmental Objectives. • Regular monitoring is necessary for long-term projects. A monthly site inspection will be conducted to ensure that protection measures are being adhered to and that retained trees are not showing signs of damage or stress. Such inspections shall be completed by a qualified arborist. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Monthly report prepared and submitted to Eaton Place to include details of monitoring results, audits, training and occurrence of any incidents. • Immediate reporting to site supervisor/construction contractor of any incident, spill or release of materials to the environment. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	▪ **Site Supervisor / Construction Contractor**
Corrective Action	• Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding fauna management. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring.

17.4.6 Aquatic Fauna and Flora

Hummock Hill Island is located within the;

- Great Barrier Reef World Heritage Area (International);
- Great Barrier Reef Marine Park (Commonwealth); and
- Great Barrier Reef Coast Marine Park (State).

- The GBR Coast Marine Park covers all waters, to the highest astronomical tide (HAT), of Seven Mile Creek, Boyne Creek and Colosseum Inlet in the Hummock Hill Island area and imposes the same restrictions for the General Use Zone that the Commonwealth Great Barrier Reef Marine Park does. In addition, the region surrounding Hummock Hill Island has areas of nationally and regionally important wetlands, designated Fish Habitat Areas, designated Dugong Protection Areas, and Areas of State Significance (Natural Resources).

The significance of the Colosseum Inlet – Rodds Bay marine environment and wetland vegetation is attributed to the presence of rare (Sr), vulnerable (Sv) and endangered (Se) flora and fauna. Directory entries include, but are not limited to, seagrass beds and mangrove communities, Eastern Curlew (*Numenius madagascariensis*) (Sr), various listed species of migratory waders, dugong (*Dugong dugong*) (Sv), and marine turtles including the green (*Chelonia mydas*) (Sv), loggerhead (*Caretta caretta*) (Se) and hawksbill (*Eretmochelys imbricata*) (Sv) turtles.

The proposed management strategies to mitigate potential impacts on aquatic fauna and flora are outlined below.

Environmental Objectives – Aquatic Flora & Fauna • Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, during construction of the project. • Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
Performance Criteria	• No discharge of materials through stormwater runoff from construction areas, with particular regard to suspended sediments, fuels, chemicals, and oils. • No waste materials (general and construction rubbish etc) entering waterways from construction areas. • A program must be implemented to monitor and treat aquatic weeds and other pest species that may enter the waterways including the estuary and coastal zones from a work site. • No uncontrolled or untreated release of water or sediment from a work site.
Mitigation Measures	**Water Quality** • Discharge of pollutants (sediments, nutrients, other chemicals, litter) to the marine environment will be managed through ESCP, WSUD, integrated turf and pest management. • No use of septic tanks and discharges of treated sewage or desalination effluents to the marine environment. • Buffers of at least 100 m will be maintained between development areas and Highest Astronomical Tide, increasing the level of protection to intertidal ecosystems. **Sediment and Erosion Control** • Implementation and maintenance of the Land Erosion EMP.

Environmental Objectives – Aquatic Flora & Fauna • Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, during construction of the project. • Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	

	• Implementation and maintenance of WSUD for storm water control, to mitigate sedimentation, suspended sediment and the pollutants they can transport through various treatment trains.
	Chemicals, Fuels, and Oils
	• Implementation and maintenance of the Land Contamination EMP.
	Waste Materials
	• Implementation and maintenance of the Waste Management EMP.
	Movement of Vehicles/Plant from Weed Infested Areas
	• Implementation and maintenance of the Weed Management EMP.
	Weed Management
	• Implement and maintain a program to monitor and control aquatic weed growth including those found in existing waterways on Hummock Hill Island. This program will include a survey to determine the distribution and abundance of declared weeds within the project area.
	Pest Management
	• Control access to turtle nesting sites by feral animals (such as foxes, dogs) and cattle to reduce the taking or trampling of eggs.
	• Implement measures to assist in the control of mosquitoes, for example preventing the accumulation of water in containers, tanks and trenches etc and frequent emptying of sediment ponds.
	• The creation of small waterbodies will be minimised by accurate contouring of works areas and draining as quickly as possible to prevent breeding habitat for biting insects.
	Artificial Lighting
	• Develop and implement an Artificial Lighting Management Plan to reduce potential light interference for nesting turtles. The plan will incorporate the following measures outlined by Witherington and Martin (1996), such as:
	  • Eliminating unnecessary light sources such as decorative lighting, flood lighting of footpaths, beach access lighting.
	  • Use of low wattage directional lighting (directed away from nesting beaches).
	  • Use long wavelength lighting sources such as low-pressure sodium vapour lighting.
	  • Use of shields on lights visible from beaches.
	  • Use of recessed directional lighting to reduce light spillage.
	  • Use of low pole mounted or waist height and louvered shield lighting on beach access and public pathways.
	  • Place lights behind natural vegetation screens such as trees.
	  • Use of motion triggered switches and timers on outdoor security lighting.
	  • Installation of opaque awnings and tinted windows on houses facing the main beach.
	  • Rehabilitation of low screening vegetation below headland housing to block lights

Environmental Objectives – Aquatic Flora & Fauna • Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, during construction of the project. • Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
	visible from beach level whilst maintaining views. • Educating house owners of the potential impacts from household lighting during nesting season, such as the use of flyers during nesting season.
Monitoring	• Implementation and maintenance of Water Quality Monitoring Program (WQMP), including nutrients, metals and pesticides. • Implementation of turbidity monitoring as part of the WQMP to assess the effectiveness of erosion and sediment control plan. • Implementation and maintenance of Marine Ecological Monitoring Program, including but not limited to, coral reefs, seagrass beds and mangrove communities. • Implement and maintain the Weed Management EMP, to determine the distribution of known declared weeds and, where practicable, control these infestations, in accordance with the Land Protection (Pest and Stock Route Management) Act 2002. • Implement and maintain a program to monitor and control pest species in waterways (both flora and fauna). • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Monthly report prepared and submitted to Eaton Place Pty Ltd to include details ofmonitoring results, audits, training and any incidents. • Incidents, complaints and any significant environmental harm to the aquatic environment reported to regulatory body/ies where required. • Assessment of performance against the identified indicators will be determined by auditing and reporting on a monthly (internally) and three monthly (externally) basis during construction.
Responsibility	▪ **Site Supervisor/Construction Contractor**
Corrective Action	• Measures undertaken to protect the aquatic environment where unacceptable impacts or risk of environmental harm becomes apparent. • Immediate reporting to site supervisor/construction contractor of any incident which contravenes the objectives of the EMP. • The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.7 Air Quality

The main potential for construction phase air quality impacts is likely to arise from dust generation (both larger particles described as 'dust' and finer particulate matter described as PM_{10}) during

earthworks and vehicle movement over unsealed surfaces and would occur following the initial stages of construction, as residential receivers begin to inhabit Hummock Hill Island.

Large-scale earthworks associated with site preparation for residential and road construction projects typically produces dust from grading, dozing, excavation, drilling/piling, concrete batching, trucks transporting equipment to and from the site and vehicles moving around the site.

Due to Hummock Hill Island's isolation from residential receivers and the short-term nature of bulk earthworks associated with the construction, nuisance dust impacts from these sources are not expected to be significant during initial stages of development. However, given that the HHI Development will be staged over a number of years, potential nuisance dust impacts may occur during the latter stages of construction, as the number of newly constructed residential receivers increase and construction works are carried out adjacent to these receivers.

The proposed management strategies for potential impacts resulting from nuisance dust emissions are outlined below.

Environmental Objective – Air Quality To minimise the potential to generate air quality impacts during construction	
Performance Criteria	At sensitive receptors, aim to achieve: • PM10 (24 hr average) - 50 µg/m3 At sensitive receptors, not to be exceeded: • PM10 (annual average) - 50 µg/m3 (five allowable exceedances/year) • Dust Deposition - 120 mg/m2/day
Mitigation Measures	**General Work Practices** • Newly established stockpiles in the construction site seeded and stabilised as soon as practical. Water sprays used on stockpiles will be activated during dry and windy conditions. • Hydro-mulch, mulch or hydro-seed will be applied to batters adjacent to haul roads to stabilise these areas and minimise wind-blown dust. • Retention of existing vegetation, where practical, between construction activities and sensitive receivers to reduce particulate concentrations and dust deposition rates at receivers. • Burning of cleared vegetation must only be undertaken if other disposal options are not feasible. • Prevailing meteorological conditions will be considered before undertaking any burn event to minimise potential air quality impacts from this activity. These events to be undertaken in consultation with the Queensland Rural Fire Service and QPWS. • Sealed access roads to the worksite sheds kept relatively dust free by regular sweeping and washing if needed. • Locate stationary dust generating activities (including concrete batching, rock crushing) as far as practical from sensitive receivers.

Environmental Objective – Air Quality To minimise the potential to generate air quality impacts during construction	

	• Detailed investigations and Air Quality Management Plans including a Dust Management Plan would be developed for each phase of the project.
	• Maximise the separation distance from construction activities to sensitive receptors for significant dust generating activities.
	• The determination and maintenance of adequate separation distances for particular activities would be dependent on the type of activity and levels of control proposed in detailed management plans, and would be further investigated as part of the development and design.
	Construction Dust
	• A Dust Management Plan will be developed and implemented. The plan will address at least the following matters:
	  • Construction of a sealed site access road will be undertaken during the initial stage of construction works and works will be staged to minimise the extent of disturbed land at any one time.
	  • Minimise vehicle speeds on unsealed road areas (<20-40km/hr) to minimise wheel generated dust.
	  • Use posts / kerbs to discourage vehicle movement on unsealed areas (short-cuts).
	  • Use dedicated site entry and exit points, and defined roadways only and install truck wheel shaker pads or washer sprays at the access / egress points to unsealed trafficked areas in order to minimise tracking dirt onto the adjacent paved road network.
	  • Progressive rehabilitation of disturbed areas will be undertaken to minimise the potential for windblown dust.
	  • Haul roads will be sealed or watered regularly using truck water carts to reduce emissions of wheel generated dust (recycled water will be used preferentially for dust suppression purposes).
	  • The size of cleared areas will be kept to a minimum to limit exposed areas available for dust emissions by wind erosion.
	  • Haul truck loads are to be covered when travelling on public roads, the load it to be lower that the sides of the truck and the truck is to free of loose mud and dirt before entering public roads.
	  • Enclosures around cement truck unloading bays (at least two sides for drive through plant and three sides for rear unload plant) or sealed transfer processes to be implemented.
	  • Storage of aggregate within protected stockpile areas (two or three sided bins, with aggregate loaded to more than 0.5m below bin wall height).
	  • Cement and fly ash handling to be undertaken within dust tight systems (including filters on discharge from delivery trucks to storage silos and weigh hoppers etc).
	  • Ensure any other necessary dust controls and enclosures are incorporated, including semi enclosing the crushing plant and batching plants and including dry collection systems (fabric filters etc).
	Excavation and Stockpiling

Environmental Objective – Air Quality To minimise the potential to generate air quality impacts during construction	
	• Surface excavation works are to incorporate consideration of prevailing meteorological conditions wind speed and direction, with works potentially ceasing if high winds are blowing in the direction towards sensitive receivers. • Stockpiles or material stores will be kept damp by water sprays and/or covered and will be located as far from sensitive receptors as possible. • Any stockpiles will be stored in sheltered locations with the slope of the upwind surface minimised. • Regular watering of spoil stockpiles prior to stabilisation. • Dust/wind fencing will be provided around stockpile areas, where suitable. **Vehicle Emissions** • Implement and maintain the Traffic EMP. • Regularly maintain diesel exhaust equipment and ensure compliance with appropriate design emission standards for in service vehicles. • Maintain diesel powered stationary plant to ensure appropriate levels of air emissions and consider fitting emission controls where required. **Complaint Handling** • Communication with the local community is an important component of the management of construction related air quality impacts. A readily accessible source of information, such as an information telephone line, would be included as part of the construction management plans. • A complaint register would be prepared and maintained throughout the duration of construction and would incorporate commitments to investigation and close out of complaints within a reasonable timeframe. • Findings from review of the complaints register, monitoring and site inspections would be discussed in regular Construction Environmental Management Reporting (e.g., monthly), including actions taken control or ameliorate further such incidents. • Incident records, and actions taken to address air quality issues, would be used to further modify work or environmental management practices on site.
Monitoring	• In order to assist with the investigation of complaints and the management of air emissions during construction it is recommended that a meteorological monitoring station be established at the site. • Ideally the meteorological monitoring station would be established prior to the commencement of construction works to assist further with characterising prevailing wind conditions in the Study area and their impact on air dispersion (and noise propagation) and therefore in tailoring management plans. • The meteorological monitoring station would continuously monitor wind speed, wind direction, temperature and rainfall as a minimum and would continue throughout the duration of construction. Visual inspections throughout workday. • A detailed air quality and meteorological monitoring plan, including construction dust management targets and monitoring trigger levels, would be prepared as part of the construction Air Quality Management plan prepared for the Project. • A dust concentration and deposition monitoring network will be established to assist

Environmental Objective – Air Quality To minimise the potential to generate air quality impacts during construction	
	with the quantification of background air pollutant levels (PM10 and dust deposition) at a number of representative receiver locations adjacent to the site. The monitoring will be continued throughout the duration of construction, as required. As with the meteorological monitoring station, at least one long term air quality monitoring station will be established for a minimum period of 21 months prior to construction. This will allow the establishment of background levels and assist in the development of appropriate construction air quality management targets. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Monthly Report prepared and submitted to Eaton Place Pty Ltd to include details of air quality monitoring results, audits, training and the occurrence of any complaints. • Immediate reporting to site supervisor / construction contractor of significant dust event that will require mitigation measures to be implemented. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	▪ **Site Supervisor / Construction Contractor**
Corrective Action	• Air quality mitigation measures must be implemented immediately or as soon as practicable where air quality objectives are not being met. • Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding air quality management and monitoring. • The site supervisor / construction contractor can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.8 Noise and Vibration Management

Potential noise and vibration generation from construction activities will be variable, depending on the stage of works, type of equipment operating at a particular time and the proximity to sensitive noise receptors.

During initial works, potential impacts are likely to be restricted to receivers adjacent to the mainland access route to Hummock Hill Island. Given that there are currently no identified noise receptors on Hummock Hill Island, construction noise and vibration impacts from proposed earthworks and civil works are not expected to be significant during the initial stages of construction.

However, as the HHI Development progresses and tourist/residential accommodation expands, a potential exists for construction activities to impact on new Island residents.

Construction traffic, associated with limited earthworks and materials to and from development areas has the potential to result in noise and vibration impacts at residential dwellings adjacent to the mainland access and egress route. Although there is likely to be an increase in the number of

heavy vehicle movements during the construction period, vibration impacts from construction traffic travelling along the access route to Hummock Hill Island are not expected to be significant.

Given that there are currently no sensitive receptors identified on Hummock Hill Island, construction vibration impacts are not expected to be significant during the initial stages of construction. If, during the later stages of development on Hummock Hill Island, construction occurs within 50-100m of residential uses, minor annoyance (or disturbance) from vibration may be experienced by building occupants.

The proposed management strategies for potential impacts resulting from nuisance noise and vibration are outlined below.

<table>
<tr><td colspan="2">Environmental Objective – Noise & Vibration
To minimise noise and vibration impacts from construction activities at residential locations near the construction areas.</td></tr>
<tr><td>Performance Criteria</td><td>Aim to achieve
Noise and vibrations from early construction activities are to be minimised so as to not create nuisance.
Noise from construction activities during the latter stages of the development phase would aim to achieve a level of 55 dB(A) L_{Aeq} 11 Hr during the day and evening and an internal noise level of L_{Amax} 52 dB(A) (equivalent to an external noise level of L_{Amax} 62 dB(A)) during the night.</td></tr>
<tr><td>Mitigation Measures</td><td>Hierarchy of Control
Develop and implement a Noise Management Plan. The plan will address the following hierarchy of noise and vibration controls:
Ameliorative measures would be implemented based on a hierarchy of control firstly by elimination then substitution and finally modification of the noise source.
Where these methods cannot produce the desired result, secondary measures would include blocking the path of the sound transmission between the receiver and the source.
When all of the above methods of reducing noise impacts are exhausted then noise control at the receiver location must be considered.
Identification of noise impacts and subsequent remedial actions are to be based on consultation with the relevant members of the community.
During later stages of construction the following additional mitigation measures will also be incorporated into the plan:
No ‘warming up’ of plant and machinery would occur near residential dwellings before specified working hours.
Ensure all noise suppression devices are maintained to manufacturers specifications.
Fit all exhausts of mobile plant operating within close proximity to sensitive receivers, with suitable mufflers.</td></tr>
</table>

Environmental Objective – Noise & Vibration To minimise noise and vibration impacts from construction activities at residential locations near the construction areas.	

	• Consider further limiting the allowable hours of operation.
	• Consideration to fitting adjustable reversing alarms (which are set at a margin above background level).
	Controls at Receivers
	• Due to the mobile nature of the proposed construction works, effective source noise controls may not be possible. Where the extent of noise mitigation which can practically be implemented at the site cannot achieve acceptable noise levels, noise mitigation at receivers will then be considered to assist with minimising the impact to acoustic amenity.
	• The implementation of noise controls at a receiver location would be based on several factors including the construction of the residence and must be considered in light of the project noise goal. Where mitigation measures at the source or in the path of the noise emission has reduced noise levels to be within 3 dB(A) of the Project specific noise goal, additional treatment would not generally be considered based on the additional cost to provide only a marginal benefit.
	Operating Times
	• As far as practicable, general construction activities will be in accordance with the EPP (Noise) and *Environmental Protection Regulation 1998.*
	General work practices and scheduling of activities
	• In general, construction works and consideration of quite work practices would be carried out in accordance with AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites.
	• Appropriate selection of construction processes / methodologies and equipment which minimise the generation of noise would be further considered during the development of the project schedule.
	• Employ respite periods for particularly noisy activities.
	• Maintain a site activity log, recording the type of activities occurring during various times of the day to assist with the retrospective investigation of community complaints relating to noise complaint.
	• Tailgates of all vehicles transporting materials to and from the site would be securely fixed prior to loading and immediately after unloading.
	• All mobile plant equipment used on site shall be maintained in an efficient condition and operated in a proper manner.
	Worker Education & Awareness
	• Regularly educate workers and contractors (such as during tool box/pre-start meetings) to maximise awareness of project noise goals and nuisance noise generating activities and encourage minimisation of these activities, including:
	  • Unnecessary or overuse of PA devices, horns
	  • Use of compression air brakes adjacent to sensitive areas.
	  • Shouting and swearing at shift start/end.
	  • Efficient material handling procedures to reduce unnecessary loud banging sounds.
	Traffic Noise Management

Environmental Objective – Noise & Vibration To minimise noise and vibration impacts from construction activities at residential locations near the construction areas.	

	• Reduce the potential for impacts from construction traffic by:
	  • Establishing designated access route/s to the site and informing drivers of these routes, parking lots and acceptable delivery times.
	  • Undertaking regular site road maintenance (and inspections) to minimise impact noises from trucks travelling over irregularities in the road surface (such as pot-holes, washouts or ruts).
	  • Limiting vehicle speeds in critical areas both on and off site.
	  • Allowing for one-way traffic flow through the site to minimise the use of reversing alarms as much as possible and minimise traffic delays.
	  • The use of 'smart', reversing alarms (as above).
	  • Limiting excessive acceleration from site exits.
	  • Ensure that vehicles required within compounds do not "queue" outside the worksite close to residential areas. This particularly applies in the commencement of shift during morning hours, where sleep disturbance issues may arise.
	  • Entry and departure of heavy vehicles to and from the site are restricted to the standard daytime construction times.
	  • Best available controls over engine noise emissions by maintaining the vehicle fleet in compliance with Australian Design Rule 28/01 for engine noise emissions, tested in accordance with the National Road Transport Commission document Stationary Exhaust Noise Test Procedures for In-Service Motor Vehicles.

Monitoring	**Environmental Noise Monitoring**
	• Due to the varying nature of the construction activities to be undertaken throughout the project the effectiveness of the construction noise mitigation measures and management procedures would be reviewed regularly.
	• Monitoring and review of the site noise management practices would be undertaken:
	  • At the commencement of construction activities.
	  • In response to a valid community complaint regarding construction noise or
	  • Where review of upcoming construction schedule indicates a high likelihood for impact at nearest sensitive receiver locations.
	  • The purpose of monitoring is as a proactive management tool to assist with:
	  • Investigating the likely sources of construction noise impact.
	  • Quantifying the extent of likely impact (through comparison with the project noise level goals).
	  • Identifying the need for further controls or modified site noise management practices.
	  • Establishing the effectiveness of noise mitigation implemented.
	• Noise monitoring would also be undertaken in response to noise complaints or where new activities are initiated, as required. Where noise monitoring is required in response to valid community complaints investigations it would be performed at a location representative of the nearest affected sensitive receiver to the site or a location

Environmental Objective – Noise & Vibration To minimise noise and vibration impacts from construction activities at residential locations near the construction areas.	
	representative of the complainant(s) dwelling. • The L_{Amax}, L_{A10}, L_{A1}, L_{A90}, L_{Aeq} noise levels would be reported and construction noise levels would be compared with the project noise level goals. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).

Reporting	• General monitoring information is for the use of the site supervisor/construction contractor, however, the results of noise level measurements and investigations undertaken in response to community complaints would be summarised and included with other environmental reporting documentation (as required) and provided to the DERM on request. Reporting would note:
	  • The time of monitoring.
	  • The type and location of activities occurring on site at the time of monitoring.
	  • The location of monitoring positions with respect to site noise sources (also marked on a plan).
	  • Noise generating activities audible at the monitoring location.
	  • Other extraneous noise sources which could influence the noise level measurements.
	  • Weather conditions prior to and during the monitoring (or complaint).
	• Where site activities are identified as the probable cause of concern or complaint, action would be taken to minimise future events by revising noise management procedures (involving modification to work practices or further controls at source or at receiver) for the activities identified as contributing to the nuisance or high noise event.
	• Management measures outlined above would be revised and the updated commitments implemented to reduce potential for future impacts as a result of similar activities

Responsibility	Site supervisor/construction contractor
Corrective Action	• If complaints are received in relation to a short-term unavoidable event/s or emergency the community engagement and awareness of the possibility of such future activities would be improved. • Where construction noise level investigations in response to community complaints show unacceptable project noise levels, revision to the noise mitigation measures and management commitments would be undertaken to further control noise impacts. • The project noise level goals would be used to assist with determining the need for further corrective actions. • Where further source noise controls or mitigation in the sound transmission path are not possible or ineffective in further controlling noise levels, controls at the receiver would be investigated. Detailed investigation of façade attenuation would be required as part of these investigations.

17.4.9 Cultural Heritage

Seventeen specific indigenous cultural heritage sites were located during the field surveys conducted on Hummock Hill Island. These sites consisted of:

- 5 x isolated stone artefacts.
- 1 x possible ceremonial area.
- 3 x artefact scatters (under five artefacts).
- 1 x background degraded shell scatter with associated artefacts.
- 4 x shell midden deposits in various levels of erosion and/or disturbance (some with associated stone artefacts including one containing 8 artefacts [HH Site 13 SO17]).
- 2 x stone arrangements (1 consisting of four individual arrangements – S12A-D).
- 1 x mound (possible midden mound)

The proposed management strategies for potential impacts on cultural heritage aspects are outlined below.

Environmental Objective – Cultural Heritage To manage the known and unknown components of indigenous archaeological records and areas.	
Performance Criteria	• All known indigenous archaeological records, as identified within Section 13 of the EIS, are preserved and not impacted upon by the project. • All unknown indigenous archaeological records found during the course of the project are reported to the Department of Environment and Resource Management (DERM), Eaton Place Pty Ltd, site supervisor / construction contractor.
Mitigation Measures	**Induction** • Conduct cultural heritage awareness training for all on-site personnel identifying areas and items of cultural heritage significance. • Work crews will be specifically instructed of their obligations to look for cultural heritage material, including handing out educational leaflets at Workplace Health and Safety meetings. These leaflets will inform the workers what archaeological material may look like, and give them clear instructions on what to do if they find any items of (potential) cultural and heritage significance. • Develop and implement a consistent system of site monitoring by the Aboriginal community at the planning stages for works in all areas deemed sensitive for heritage values. • For works that may impact directly on dense artefact scatters or midden material, or areas suspected to contain significant sub-surface archaeological deposits, establish a program of test excavations followed, if necessary, by full-scale excavation. • Artefacts removed from a site will be analysed, and an artefact handling and a curatorial agreement negotiated between the Aboriginal community and the Queensland Museum. • Utilising existing cleared areas for activities such as stockpiling and establishment of ancillary works areas as well as repairing any environmental damage directly resulting from activities associated with the project. • Establish exclusion zones for sites of particular significance in consultation with the

Environmental Objective – Cultural Heritage To manage the known and unknown components of indigenous archaeological records and areas.	

	Traditional Owners. The way in which this consultation process is undertaken with the Traditional Owners is specifically addressed in the Cultural Heritage Management Plan (CHMP) or agreement required for the project.
	• Intangible aspects of indigenous cultural heritage may require the avoidance of an area.
	Excavation activities
	• All site operations are to be carried out in accordance with the Cultural Heritage Investigation and Management Strategy (CHIMS) as agreed between Eaton Place Pty Ltd and the Traditional Owners for the area. The Cultural Heritage Investigation and Management Plan (CHIMP) will address at least the following matters:
	  • an earthworks monitoring program involving the representatives of the participating Traditional Owners during initial vegetation removal and grubbing activities. These areas to be included in the monitoring program include:
	  • A 250 metre wide strip extending inland from the lease boundary inclusive of and located both east and west of the headland (Area 1).
	  • A 100 metre wide strip extending inland from that area of the HHI Development incorporating the high-water mark situated adjacent to tidal flats located southwest of the headland (Area 2).
	  • The entire area to be developed in the immediate vicinity of the causeway (Area 3).
	  • A 100 metre wide strip extending inland from the lease boundary and incorporating the lower reaches of the headland/ridgeline located to the west of the causeway and incorporating that area immediately south of the dammed watercourse (Area 4).
	  • A 100 metre wide section of the HHI Development area incorporating elevated land immediately north of the dammed watercourse (Area 5).
	  • A 100 metre wide strip extending inland from that area of the proposed golf course incorporating the high-water mark situated adjacent to tidal flats located northwest of the causeway.
	• Establish exclusion zones for the following sites during construction activities:
	  • All sites noted in Appendix A7.13 that are situated outside the immediate HHI Development area [HH05 - HH07 and HH10-12, HH16 and sections of HH13].
	  • Stone arrangements located at sites HH03 (S04) and HH09 (S12A-D).
	  • HH04 (S05).
	  • Traditional Owners will be consulted regarding the exact type, specifications and location of exclusion zones and have particularly emphasised the importance of this consultation process in relation to Sites HH03, HH05, HH06, HH07, HH09, HH10 and HH13.
	Discovery of Artefacts
	• An artefact handling and a curatorial agreement will be negotiated between the Traditional Owners and the Queensland Museum.
	• All artefacts located during the survey within the confines of the project area, excluding Site HH04, will be collected by nominated representatives of the Traditional

Environmental Objective – Cultural Heritage To manage the known and unknown components of indigenous archaeological records and areas.	
	Owners prior to the commencement of the project. These include HH01, HH02, HH08, HH13 (S18) and HH17.
Monitoring	• Updating of archaeological records as appropriate. • Further to this, the management of cultural heritage will be in accordance with the Cultural Heritage Management Plan (CHMP) for the project which was approved by DERM on 17 January 2007 (refer to Appendix A7.10 of the EIS). Incorporation of the above mitigation measures in accordance with the CHMP will effectively manage potential impacts to cultural heritage sites within the proposed development. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Report any findings of any indigenous archaeological items to the Site Supervisor immediately. • Report any findings of any indigenous archaeological items to Cultural Heritage Coordination Unit, DERM and Eaton Place Pty Ltd Cultural Heritage Senior Project Officer.
Responsibility	All site personnel
Corrective Action	• Non-compliances to be followed to completion.

17.4.10 Waste Management

The waste streams expected to be generated by proposed construction activities are:

- Fill and soil (not contaminated).
- Fill and soil (contaminated).
- Timber and vegetation.
- Scrap metal.
- Cable and wire.
- Concrete, bricks, tile and rubble.
- Plasterboard.
- Packaging wastes, plastic, glass and timber.
- Domestic and general waste.
- Organic and food waste.
- Wastewater.
- Diesel and other fuels.
- Paints and other chemicals.
- Asbestos.

Uncontrolled generation and management of such waste materials can result in risks to the environment. The environmental risks range from potential environmental harm, such as pollution

of waterways, to environmental nuisance, such as odour complaints. The potential impacts of the proposed HHI Development on the identified environmental values are listed below.

- Waste spills and loss of containment of waste resulting in impacts to soils, surface water, groundwater, terrestrial and marine fauna, and human health.
- Littering and contamination of waterways.
- Plastic waste causing mortality to marine fauna.
- Waste spills and related incidents from transportation of waste on and off Hummock Hill Island.
- Cross contamination of wastes, making wastes unsuitable for reuse and/or recycling, thus increasing the quantity of waste being disposed of to landfill.
- Increasing the pressure on regional landfills.
- Odour and noise generation from waste handling and storage.
- Propagation of pests, vermin and disease vectors.

The proposed management strategies for potential impacts relating to waste generation and control are outlined below.

<table>
<tr><td colspan="2">Environmental Objective – Waste Management
To prevent or minimise the generation of wastes, where practicable and to appropriately contain, control and dispose of all waste generated.</td></tr>
<tr><td>Performance Criteria</td><td>• Implementation of waste management principles (Reduce, Reuse, Recycle) and effective and sustainable disposal strategies on site.
• Reasonable and practicable steps to minimise the impacts of handling and disposal of construction waste will carried out such as:
  • Minimisation of the production of waste and amount of waste requiring disposal.
  • Minimisation of the impact to the environment from waste.
  • Maximisation of the opportunities to reuse waste on-site.
  • Correct disposal of all wastes produced.
  • Reduction of waste generated on site through reuse and recycling.
• All waste must be disposed of lawfully.
• Construction and storage areas clean and tidy.</td></tr>
<tr><td>Mitigation Measures</td><td>• Prepare and implement a Waste Management Plan to deal with all construction waste streams. The plan will address at least the following matters:
  • Wastes to be managed in accordance with the Environmental Protection (Waste Management) Regulation 2000.
  • Waste avoidance, minimisation, reuse and recycling principles to be utilised wherever possible.
  • Wastes to be segregated to assist in recovery and recycling.
  • Provision of waste facilities in all break out areas.
  • Construction and demolition wastes to be reused and recycled, wherever possible.
  • No disposal of solid or hazardous wastes on Hummock Hill Island.</td></tr>
</table>

Environmental Objective – Waste Management To prevent or minimise the generation of wastes, where practicable and to appropriately contain, control and dispose of all waste generated.	

	• Materials to be fabricated off site where possible to minimise the generation of waste.
	• In order to reduce waste volumes all wastes generated from construction activities will be reused on site or sent to recyclers. Disposal to appropriately licensed waste facilities will only be undertaken where reuse or recycling is not possible or feasible.
	• Where appropriate waste generators will be encouraged to segregate wastes at the source to minimise cross contamination of waste streams.
	• Waste will only be transported by appropriately licensed waste transporters.
	• A centralised waste collection area will be provided as part of the development. The Waste Transfer Station will be constructed on a concrete hardstand and roofed, where practicable.
	• The Waste Transfer Station location and design has taken into consideration appropriate containment and engineering, buffer distances to receiving environments and ongoing operation of the facility and environmental monitoring programs.
	• Colour-coded and/or labelled bins will be provided for each waste stream to assist in the segregation of wastes and maximise waste recovery and recycling.
	• Alternatives to plastic bags to be provided at retail outlets.
	• Records of waste quantities removed from Hummock Hill Island are to be maintained.
	Reuse
	• Identify and implement strategies for the re-use of waste products during construction. this may include measures such as:
	  • The reuse of material containers.
	  • Purchase in bulk to avoid individual packaging.
	  • Promotion of the use of container return programs such as the delivery of materials on crates that are then returned to the manufacturer for reuse.
	  • Mulching of vegetation and other organic waste to be reused as landscaping material on Hummock Hill Island.
	  • Building materials, timber and metal off cuts and plastics from construction and demolition will be reused on site where practicable.
	Recycle
	• Materials will be selected on the basis of recyclability including end-of-life recyclability. Opportunities for waste recycling may include the following measures:
	  • Materials salvaged and reused.
	  • Purchasing recyclable or recycled materials.
	  • Separation and collection of recyclable materials.
	  • All wastes will be transferred to the Benaraby Landfill where they will be sorted into reusable, recyclable and waste disposal streams.

Environmental Objective – Waste Management To prevent or minimise the generation of wastes, where practicable and to appropriately contain, control and dispose of all waste generated.	
	• Implement training for employees in the Waste Management Plan and recycling opportunities. **Regulated Waste** • The regulated wastes generated during the construction of the HHI Development include waste oils, fuels, lubricants, tyres, batteries, oily air filters, paints, resins, solvents, sewage sludges and residues, spill cleanup materials and water, soiled rags, drums and soils containing regulated wastes. • The management of regulated wastes (collection, transport, tracking, treatment and disposal) will be in accordance with the DERM Guidelines, including appropriate licensing of the contractor, transport vehicles and facilities. • Implementation and maintenance of the Land Contamination EMP particularly related to Asbestos. **Disposal** • Waste for disposal will be transported off Hummock Hill Island, using appropriately licensed waste contractors. • Domestic and general waste will be disposed of at the Benaraby Landfill within the Calliope Shire. **Waste Transport** • Restriction of site works and surface truck movements for transport of waste material to designated hours. • Ensure the movement of hazardous materials and regulated wastes occurs at non-peak times to minimise the possibility of traffic conflicts and associated risks.
Monitoring	• Regular inspection of on-site facilities to ensure waste is being generated, stored, handled, disposed and transported in accordance with this EMP. • Registers and manifests maintained to track waste material. This documentation subject to internal or external audit, especially for any regulated waste material. • Any discharges from site that could impact on the environment monitored in accordance with DERM's requirements. • Records kept of any regulated waste removed from the site, including name and licence number of waste transporters, volume and description of waste transported, destination of waste and licence number of the waste treatment operator. • Waste contractors to provide certification (licence) records verifying their registrations and points of discharge of waste. • Assessment of actual waste results and comparison with predicted impacts and mitigation measures. Provide baseline data to enable continuous improvement of waste avoidance, reduction and management measures throughout the project. • Monitoring for potential environmental impacts. • Auditing of the EMP conducted quarterly (internally) and annually (externally).
Reporting	• Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. • Any environmental incidents involving spills recorded including time of incident,

Environmental Objective – Waste Management To prevent or minimise the generation of wastes, where practicable and to appropriately contain, control and dispose of all waste generated.	
	persons involved, details of incident, mitigation measures and actions taken to minimise the probability of recurrence. Immediate reporting to site supervisor / construction contractor of any large spills or potential risk of spills. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	**Site Supervisor / Construction Contractor**
Corrective Action	• Ensure that the appropriate personnel undertake adequate environmental awareness training covering the requirements of the EMP regarding waste management. • The site supervisor / construction contractor can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.11 Hazard and Risk

Existing sensitive receptors within the area are limited to existing inhabitants of Bangalee on the southern tip of Wild Cattle Island and Mundoolin Rocks on the mainland side of Boyne Creek. Health and safety issues will require action during the various phases of development. Tourists and residents can be exposed to health and safety hazards from construction sites if not managed correctly.

Based on community consultation responses current environmental values that may be associated with health and safety include:

- Concern that water taken for desalination supply may not be of suitable quality.
- Location and methods for storage and removal of waste.
- Possible air quality impacts depending on prevailing breezes.
- Increased boat traffic on waterways presents additional risks.
- Need for a lifeguard/surf lifesaving presence on surf beach.

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	
Performance Criteria	• Compliance with relevant Standards, guidelines and legislation identified in the mitigation measures section below. • Storage, use and disposal of any chemicals, fuels, solvents or other hazardous materials or substances which may cause pollution, done so in such a way as to not cause environmental harm. • Containment of all spills involving materials that may cause environmental and effective cleaned up and measures taken to prevent the incident from recurring.

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	
	• Recording and reporting of incidents accurately and describing the extent of spill that occurred. • Correctly sized bunds intact and free from materials. • Water quality in the estuary and marine environment is not impacted as a result of spills at the construction site or on access routes within the catchment.

Mitigation Measures	• AS4801 and AS4804 will be complied with in developing and operating the safety management system
	Hazardous Materials or Dangerous Goods
	• Undertake storage and transport of materials according to relevant Australian standards, guidelines and legislation, including:
	  • AS4452 The Storage and Handling of Toxic Substances.
	  • AS1940 The Storage and Handling of Flammable and Combustible Liquids.
	  • AS3780 The Storage and Handling of Corrosive Substances.
	  • Dangerous Goods Safety Management Act 2001.
	  • Material Safety Data Sheets (MSDS).
	  • Local council requirements.
	• Implement a program of regular equipment inspection and testing to ensure reliable performance.
	• Operators will be trained in the safe operation of the system and emergency procedures in the event of fuel oil leakage.
	• Spill containment equipment will be available at the unloading pad for use in the event of spillage.
	• A sump will be provided to collect any spillage and allow recovery.
	• Ignition sources will be strictly controlled and limited to avoid a fire.
	• An approved fire protection system will be installed around new hydrocarbon storage areas.
	• The following measures will be taken to minimise the potential for the leakage of fuel oil from storage tanks:
	  • Adequate bunding will be constructed to contain spills, in accordance with AS 1940:2004.
	  • Tank level indicators will be installed on fuel oil tanks for monitoring of fuel oil levels.
	  • Maintenance of fuel oil tanks will be undertaken, to ensure safe and effective operation of all components.
	  • Tanks will be designed in accordance with AS 1692: 2006 steel tanks for flammable and combustible liquids to minimise the potential for failure of the diesel storage vessel.
	• Undertake refuelling and maintenance activities in designated bunded areas to minimise the potential for soil and water contamination to result from these activities. Prepare

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	
	and implement spill response measures including: • A program of regular equipment inspection and testing to ensure reliable performance. • Operators will be trained in the safe operation of the system and emergency procedures in the event of fuel oil leakage. • Spill containment equipment will be available at the unloading pad for use in the event of spillage. • A sump will be provided to collect any spillage and allow recovery. • Ignition sources will be strictly controlled and limited to avoid a fire. • An approved fire protection system will be installed around new hydrocarbon storage areas. • Spill kits for contaminated material and protective clothing will be provided at each transfer and storage location for use in the event of any spillages or leaks. • Copy of up to date MSDS for each chemical / product used on site, will be available on site and readily available to all site personnel. • Appropriate signage provided using HAZCHEM coders which are to be visible at all times. Signage also listing contact details for the Project Environmental Advisor and Safety Officer in case of an emergency. • Fire fighting equipment must be checked and maintained at all times. • Records will be kept on the existing inventory, storage location, personnel training and disposal of waste for all chemicals, fuel and dangerous goods used on site. • All relevant staff must be trained in appropriate handling, storage and containment practices for chemicals, fuel and dangerous goods. • Liquid chemicals and fuels storage in above ground tanks and chemicals and fuels stored in drums will be bunded in accordance with relevant Australian Standards. • In the event that Asbestos is located on site, develop an Asbestos Management Plan. • Implement particulate and gas / vapour exposure standards and procedures that will apply to dust, fibres, mist and fume (i.e. particulates), and gas and vapour exposures in the workplace (with emphasis on inhalation as the primary route of exposure). The standards and procedures will cover: • Evaluation of particulate and gas / vapour hazards. • Development of a control program to ensure that employees, contractors and the community will not suffer adverse health effects from particulates or gas / vapours, either used or generated by the Project. **Emergency Response** • Develop an Emergency Management and Response Plan which will include the following: • Designated first aid and emergency rescue facilities and equipment will be available during the construction and operation phases of the proposed development. • Appropriately trained personnel will be on-site throughout the construction life of

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	
	the proposed development, to provide a first response capability (e.g. occupational first aid and basic fire fighting). • A permanent emergency services presence will occur after the third year of construction with inclusion of a combined Police, Ambulance and Fire Brigade building located in are adjacent the town centre. • For specialist emergency response services, the Project will rely on the service provided by the local QPOL, QFRS and QAS officers stationed in Gladstone, Boyne Island, Calliope and Miriam Vale (i.e. via the 000 service) and once established the emergency services present on Hummock Hill Island. • The emergency controller, who will be the on-duty operations team leader, will control and coordinate emergency response actions on site until such time as the incident is either effectively managed or handed over to external emergency services. • Stores, restaurants, commercial premises and offices will be fitted with approved and certified fire detection (smoke detectors) and sprinkler systems. • First aid fire fighting equipment (hand held extinguishers and fire hoses) will be installed at strategic points at the development. • All fire fighting facilities and equipment will be serviced, maintained and inspected by a certified body. • Site induction training will include emergency response actions including first aid. • Fire drills will be undertaken on a regular basis where necessary by construction personnel. • Permanent facilities, such as fuel storage areas, will have a dedicated fire alarm, suppression and fire fighting systems. • Site fire fighting capabilities also will be addressed in the Emergency Management and Response Plan. • The Principal Contractor will liaise with local State Emergency Services and local ambulance and hospital services with respect to planning for emergency response. • Contingency plans to account for natural disasters such as storms, floods and fires will be developed for the construction, operation and maintenance phases. • Develop a Bushfire Management Plan for construction and operation phases. • Fire fighting equipment and exit locations will be suitably signed and all work areas will be within the required distance to reach emergency exits. • Emergency exits will be planned to allow for the safe evacuation of the workforce and in accordance with Building Code of Australia. • Appropriately trained personnel will be available throughout the life of the Project to provide first aid and emergency response to on site emergencies. • The site will have a fire truck or suitably equipped water truck or trailer that can support fire response requirements. Site fire fighting capabilities also will be addressed in the Emergency Management and Response Plan.

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	

	• Fire drills will be undertaken on a biannual basis.
	• Permanent facilities, such as fuel storage areas will have a dedicated fire alarm, suppression and fire fighting systems.
	• The site supervisor / construction contractor will liaise with local State Emergency Services and local ambulance and hospital services with respect to emergency response planning, and the development of those plans.
	Aerodrome
	• Develop and implement a Bird and Animal Hazard Management Plan (Civil Aviation Safety Authority (CASA) Manual of Standards Pt 139 – Aerodromes 10.14). The management plan must address:
	  • Hazard assessment, including monitoring action and analysis.
	  • Pilot notification.
	  • Liaison and working relationships with land use planning authorities.
	  • On-airport bird and animal attractors which provide food, water or shelter.
	  • Suitable harassment methods.
	  • An ongoing strategy for bird and animal hazard reduction, including provision of appropriate fencing.
	• The development of the airfield will be in accordance with Civil Aviation Safety Authority "Guidelines for Aeroplane Landing Areas" No:92-1(1).
	Transportation, Vehicle Collision and Driving Conditions
	• Construction workers operating vehicles on-site will be trained and licensed, so that these vehicles are driven in a safe and appropriate manner.
	• Speed control (signage), driving to conditions, and prescribed driving etiquette on the site will be used to control the risk.
	• All vehicles will be fitted with radios for two-way communication.
	• Watering of roads and access areas will be undertaken regularly to reduce emissions of wheel generated dust and improve visibility.
	• Adequate night lighting through the provision of lighting towers and vehicle headlights will be provided to ensure night operating and driving conditions are safe.
	• Liaise with emergency services to develop an Emergency Action Plan (EAP) to deal with tanker incidents off-site.
	• Vehicles carry HAZCHEM identification and response guidelines for use by emergency personnel attending the scene of the accident.
	• Tankers incorporate internal valves on all outlets to prevent spills, in the event of vehicle damage.
	• Tankers to conform to the Australian code for the transport of dangerous goods by road and rail, and AS 2809.4.
	Equipment
	• Construction vehicles and equipment will be operated within the manufacturer's specifications. All vehicles and equipment will be maintained and serviced on a regular

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	

	basis. Records of maintenance and servicing will be retained on-site for the duration of the construction phase.
	• Machinery and equipment operators will be trained and carry their current licences, where necessary.
	• There will be specific and detailed standard operating procedures implemented that deal with high voltage.
	Personal Safety
	• Access to the construction site will be denied to any site staff / visitor not wearing the following mandatory Personal Protective Equipment (PPE):
	  • Safety helmet.
	  • Steel cap boots.
	  • Safety glasses.
	  • High visibility vest.
	• Mandatory PPE on a construction site that protects against objects falling from height includes steel capped boots and safety hats (both are worn at all times).
	• Fall of persons will be controlled through appropriate elevated work platforms and the proper use of harnesses.
	Public Risk
	• Enhancing physical protection to the public by the use of natural ground features.
	• A safety risk assessment will be undertaken of the Project to identify areas of high risk to public safety. Exclusion zones will be developed to prevent public access to high risk areas, with fences and signs erected to delineate such areas.
	Security
	• Fencing will protect selected areas with high risk of a security breach or unauthorised public access.
	• Prior to being given access to the Project site, visitors will complete mandatory registration and an environmental, health and safety induction. The scope of induction will reflect those areas of the Project site that the visitor will be permitted access.

Monitoring	• Monitoring will be undertaken to assess whether Project health and safety measures are being implemented and effective. Monitoring will involve the compilation and assessment of data relating to health and safety issues, such as reported near misses, accident reports and any health surveillance data (sickness data). Outcomes from this monitoring may trigger the need for additional safety and health risk control actions.
	• Accident and near hit data will be monitored to identify where:
	  • Common themes occur.
	  • PPE is being incorrectly used.
	  • Corrective actions have not been strictly implemented.
	  • Corrective actions are ineffective.
	  • Procedures/practices need to be reviewed.
	  • Retraining may be required.

Environmental Objective – Hazard and Risk (Hazardous Substances) Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project.	
	• Health surveillance data will be monitored to identify common themes. • Auditing of the EMP conducted quarterly (internally) and annually (externally).
Reporting	• Any environmental incidents involving spills recorded including time of incident, persons involved, details of incident, mitigation measures and actions taken to minimise the probability of recurrence. Immediate reporting to the site supervisor / construction contractor of any large spills or potential risk of spills. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Site Supervisor / Construction Contractor
Corrective Action	• In the event of a spill of hazardous substances, necessary work procedures and operation controls will be reviewed to ensure they are fit for purpose and revised where necessary. • Ensure that the appropriate personnel undertake adequate environmental awareness training covering the requirements of the EMP regarding the management of hazardous substances. • The site supervisor / construction contractor can request the cessation of works at any time will a breach of performance criteria of the EMP be occurring or is at risk of occurring. • Schedule construction to avoid periods with highest risk from heavy rain events.

17.4.12 Transport and Traffic

Initial development is predicted to see an increase in heavy vehicle traffic as plant and bulk materials are delivered to the bridge and internal infrastructure sites. Based on the proposed development program outlined in Section 3 bulk works are likely to be completed within the first 18 months. Following this period heavy plant volumes will reduce as major infrastructure is completed and work on tourist buildings commences. Subsequently heavy vehicle traffic will consist of trucks delivering bulk construction materials. Heavy vehicle traffic will continue to decrease as initial intensive construction activities associated with town centre and tourist facilities decreases.

Environmental Objective – Transport and Roads Manage construction traffic and transport issues to minimise potential impact on the community and the operation of the road network.	
Performance Criteria	• Avoidance, mitigation and management of the potential construction traffic impacts on nearby communities. • Minimisation, as much as possible, of potential traffic disruptions to the operation of the road network due to construction works. • Maintenance of safe access near all project work areas for road users, including pedestrians, cyclists and tourists to recreational areas. In particular, development of local access strategies in consultation with stakeholders groups (Department of Main

Environmental Objective – Transport and Roads Manage construction traffic and transport issues to minimise potential impact on the community and the operation of the road network.	
	Roads, Gladstone Regional Council) to maintain safe, convenient and efficient access throughout the area. • Implementation of traffic management measures near each worksite to avoid conflicts between construction traffic and local traffic, including pedestrians and cyclists around the areas. • Local and broader communities kept informed about the time and scale of changes in the traffic conditions on roads in the vicinity. • Traffic flows near construction works monitored, as required. • Corrective measures implemented in response to traffic impacts subsequent to construction works.

Mitigation Measures	• Transport of hazardous and dangerous materials during the construction phase will be undertaken in accordance with the DERM tracking system as defined in Environment Protection (Waste Management) Regulation 2000.
	• In consultation with relevant road authorities prepare and implement local area Road-use Management Plan in order to maintain the role and function of the road network during construction and operation of the project. The plan would address the safety and convenience for all road users and consider the following:
	  • Safe movement of pedestrians and cyclists accessing community facilities.
	  • Installation of proper signage to make drivers aware about road works and guide them through the work area.
	  • Measures to help ensure safety and manage the changes in traffic conditions (e.g. traffic controllers/and/or variable message signage.
	  • Wet weather specific operational requirements including any management measures necessary to address any potential environmental impacts of wet weather operations.
	  • Truck routes and construction site access.
	• Control working hours and avoiding haulage tasks during peak traffic periods and during school drop-off and pick-up times. Where haulage in peak hours is unavoidable, such activities will be managed in accordance with specific Road-use Management Plans (p17-62 - 63) provided to the relevant agencies in advance.
	• Use of the established truck routes and arterial roads for the haulage of construction materials and spoil in order to minimise truck traffic on local roads.
	• Minimise congestion effects by effectively staging of the construction work.
	• Analyse the capacity of intersections and road links along the haulage routes in order to identify and mitigate against any operational impacts.
	• Model the exit sign and construction traffic (on the major roads and intersections in the vicinity of the site) in order to predict the effect of temporary traffic arrangements.
	• Provide signage and delineation past the work site, including any diversion routes.
	• Implement measures to help ensure safety and manage the changes in traffic conditions (e.g. traffic controllers and/or variable message signage).

Environmental Objective – Transport and Roads Manage construction traffic and transport issues to minimise potential impact on the community and the operation of the road network.	

	• Provide traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the community facilities.
	• Consideration will be given during construction of any specific safety or amenity issues on particular routes should this be identified during the detailed design stage of the Project.
	• Intersection configurations will be confirmed for all new intersections and any revised existing intersections in the preliminary Design Phase of the project to ensure they are adequate to safely cater for the future traffic volumes and that the intersection performance criteria are met.
	• Identify management and process controls as a means of mitigating or eliminating the hazards and risks associated with construction traffic and transport during construction.
	• Consider drainage as well as the volume of traffic during and post construction to ensure that road designs are suitable to account for scour and load capacity.
	• For construction and realignment of local roads, the appropriate industry and local government standards and codes of practice will be adopted in undertaking the works.
	• Manage traffic flows in order to achieve safe and efficient movement thought-out the project area and the affected transport network.
	Heavy Vehicle Movement
	• Each haulage contractor will be required to prepare a Road-use Management Plan (RUMP) which addresses the following key items associated with the haulage of materials:
	  • Haulage routes.
	  • Safety management.
	  • Traffic management.
	  • Operations.
	  • Environmental controls.
	  • Emergency plans.
	• Avoidance of haulage tasks during peak traffic periods and during the school drop-off and pick-up times. Where haulage in peak hours in unavoidable, such activities managed in accordance with specific RUMP provided to the relevant agencies and appropriate Councils in advance.
	• Prepare dilapidation surveys prior to haulage operations to identify any pre-start improvement. A maintenance plan will be prepared to manage any impacts during construction and a post construction survey undertaken to confirm the need or otherwise for restoration following completion.
	• Use of the established truck routes and arterial roads for the haulage of construction materials and spoil in order to minimise truck traffic on local roads.
	Local Traffic
	• Notification to the local communities and local authorities where practicable about proposed changes to local traffic access and possible delays due to construction activities and provision of clear signage of changed traffic conditions and alternative

Environmental Objective – Transport and Roads Manage construction traffic and transport issues to minimise potential impact on the community and the operation of the road network.	
	routes. **Workforce Transportation and Parking** • Provision of sufficient parking to accommodate employees' vehicles and instructions given to commuting employees to use the providing parking facilities in order to avoid traffic disruption due to road side parking. • Provision of buses and encouraging car pooling for transportation of construction workforce. **Emergency vehicles** • Ensure at least one lane will be kept open on all roads during the construction period.
Monitoring	• Monitor the local area traffic impacts during construction peaks, to ensure the safe and efficient operation of the effected road network. • Monitor the construction conditions and review the TMP as appropriate in order to address any negative impacts. • Auditing of the EMP conducted quarterly (internally) and annually (externally).
Reporting	• Monthly report on local traffic conditions, including any accidents involving construction traffic to Project Supervisor. • Monthly Report prepared and submitted to Eaton Place Pty Ltd to include details of local traffic conditions, including any accidents involving construction traffic, any monitoring results, audits, training and incidents. • Immediate reporting to site supervisor / construction contractor of any incident which contravenes the objectives of the EMP. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Site Supervisor / Construction Contractor
Corrective Action	• Plan and implement traffic control measures in advance of forecasted increased traffic. For mitigation works in the State-controlled road reserve, apply for relevant approvals under the Transport Infrastructure Act 1994 (Sections 33 and 50). • Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding traffic management. • The site supervisor / construction contractor can request the cessation of works at any time should they feel that the performance criteria of the EMP have been breached.

17.4.13 Social and Economic

The project will not have a direct impact on existing community services and facilities on Hummock Hill Island. However, potential impacts on community services and facilities could occur as a result of an increase in population during the construction phase, with workers relocating to the area.

Environmental Objective Avoid or mitigate and manage construction impacts on local residents and visitors to Hummock Hill Island.

Performance Criteria	• Local residents and visitors to Hummock Hill Island are notified in advance of construction activities, changes arising from construction activities (i.e. to local access), and possible management measures. • Local residents and visitors have access to a communication and complaints process to address and respond to social impacts.

Mitigation Measures	**Consultation**
	• Provide a communication program targeted to local residents and visitors to Hummock Hill Island, and including:
	  • regular construction updates.
	  • advice on construction schedules.
	  • the results of monitoring required by the EMP.
	• Develop, promote and implement an effective complaints response system for receiving, handling and responding to complaints received during construction of the Project, including:
	  • Provision and promotion of a phone contact with construction management staff during hours of construction.
	  • A follow up procedure which notifies complainants within 24 hours of the intended response to the issue raised.
	• Early consultation and communication residents in adjacent townships should be undertaken to raise community awareness of construction activities, potential changes arising from construction activities (i.e. to road access and access to recreational uses) and proposed environmental management measures;
	• Consultation with local Indigenous groups should be undertaken to identify and facilitate training and employment opportunities associated with the Project; and
	• Ongoing consultation with local Indigenous groups, to ensure access to places and sites of importance is maintained.
	Fisheries
	• Consultation with local commercial fishing operators to identify particularly issues associated with the construction and operation of the Project, and to identify specific strategies to minimise potential impacts.
	• Liaison with the Queensland Rural Adjustment Authority to identify possible options to mitigate potential impacts for local commercial fishing operators, for communication to affected fishing operators.
	Employment
	• Develop and implement an Employment and Training Strategy, including:
	  • A skills audit of existing local community to identify gaps in skills and workforce capacity required for construction.
	  • Identification of the skills required for construction and trainings needs to enable local employees to gain the necessary skills.
	  • Identification of opportunities to work through State and Federal government apprenticeship and training programmes to address skills shortages and benefit community.
	  • Identification of opportunities to facilitate skills development for local residents through local training facilities such as Central Queensland Institute of TAFE and other local training providers, to enable local residents' employment in construction aspects of the project.
	  • Undertake early consultation and communication with local businesses in the Gladstone Regional Council area to maximise the benefit of local supply arrangements to the Project.

Monitoring	• Evaluate effectiveness of construction, liaison and mitigation strategies. **Housing and Accommodation** • Develop and implement an accommodation management strategy in consultation with the Department of Housing for the construction, including consideration of the construction of a worker village. • Encourage local employment through up-skilling of existing unskilled workers. • Where possible, tourist accommodation should be used for the accommodation of short-term construction workers, with consideration of existing tourist accommodation demands.
Reporting	• Report to the complainant within 24 hours of what action, if any, would be undertaken in response to the issue raised. • Provide monthly reports (publicly accessible on request) regarding communication activities, residents' complaints and resolution of complaints.
Responsibility	**Site Supervisor / Construction Contractor**
Corrective Action	• Appropriate actions implemented where community or residents report complaints or comments during construction as per communications procedures. Ensure all complaints are followed up and logged. • Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding community liaison, incidents and complaints. • The site supervisor / construction contractor can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

17.4.14 Landscape Character and Visual Amenity

Construction of the HHI Development will occur in stages so the potential impacts of the construction phase will vary accordingly.

Likely construction phase activities include:

- Construction of a bridge across Boyne Creek between the mainland and Hummock Hill Island;
- Increase in the frequency of heavy vehicles in the area;
- The storage of construction materials and construction equipment;
- Construction works, including vegetation clearing, earthworks, and installation of services such as reticulated water, sewerage systems, stormwater, electricity and telecommunication infrastructure will be undertaken;
- Temporary parking and potential on-site accommodation and working areas; and
- Although it is not anticipated that construction activities would occur in the evening, some lighting may be necessary in and around the construction sites for safety purposes if light is poor. The lighting may be visible from sensitive receptors.

Environmental Objective – Landscape Character and Visual Amenity Ensure that site rehabilitation works are undertaken and landscaping completed to assist in the restoration of the visual environment of Hummock Hill Island	
Performance Criteria	• Disturbed areas are rehabilitated with native endemic vegetation. • Landscaping is progressively undertaken throughout the construction period.

Mitigation Measures	• Prepare Landscape Masterplan(s) for the HHI Development prior to construction, dealing particularly with the management of existing vegetation and the design and management of the public areas such as urban or tourist areas as well as infrastructure such as roads. Particular attention will be given to the early establishment of suitable vegetation and the creation of special areas suitable for water based recreation and enjoyment. The Landscape Masterplan(s) will detail plant densities, species, schedules and timing will be specified on approved landscape plans. Details on fertilizer and chemical usage will be detailed on specifications attached to the approved landscaping plan.
	• Protection and management of native vegetation within the HHI Development footprint.
	• Develop and implement a lighting plan to reduce potential light pollution. The plan may incorporate the following measures:
	  • Eliminating unnecessary light sources such as decorative lighting, flood lighting of footpaths beach access lighting.
	  • Use of low wattage directional lighting.
	  • Use long wavelength lighting sources such as low-pressure sodium vapour lighting.
	  • Use of shields on lights visible from beaches.
	  • Use of recessed directional lighting to reduce light spillage.
	  • Use of low pole mounted or waist height and shielded lighting on beach access and public pathways.
	  • Place lights behind natural screens such as trees.
	  • Use of motion triggered switches and timers on outdoor security lighting.
	  • Installation of tinted windows on houses facing the main beach.
	  • Rehabilitation of low screening vegetation below headland housing to block lights visible from beach level whilst maintaining views.
	• Bridge will be designed to achieve visual permeability. This means that the receptor will maintain some view of the landscape beyond the bridge.
	• Buildings and infrastructure including road cuttings will be sited below any prominent ridge line or hilltop so that there are no visible changes in the skyline.
	• The location and design of access roads and driveways will conform to the landform and cause minimum visual impact or erosion hazard. Screen plantings on the sides of roads can mitigate any disturbance cause by initial loss of vegetation.
	• The roof tops of buildings will not protrude above the canopy height of the surrounding vegetation.
	• Where the cladding of any part of a house (including the roof and rain water tanks) is proposed to be in metal sheet, this cladding be required to be colorbond or painted in muted tones to reduce reflection.
	• Where the wall cladding of a house is proposed to be in excess of 25% timber siding or

Environmental Objective – Landscape Character and Visual Amenity Ensure that site rehabilitation works are undertaken and landscaping completed to assist in the restoration of the visual environment of Hummock Hill Island	
	fibre cement siding or metal sheet, the cladding can be required to be painted or stained in muted tones prior to occupation of the house or within a specified time thereafter. • Reflective factory finished metal sheets i.e. untreated galvanised sheet, aluminium, zincalume, or white, off white or silver paint finishes will not be permitted for roofs unless the slope of the roof is 10% or less. • Existing vegetation will be retained on site and selected clearing undertaken for building envelopes and public spaces. • Landscaped areas in public and private spaces planted using species that are native and occur locally on Hummock Hill island. • Additional plantings can be undertaken including mature trees of a height above 10 metres increasing density and screening qualities of vegetation. A dense under storey can also be planted. • Restrict development on the elevated sections of Hummock Hill Island and cluster development on the lower plains. • Limit development on the hills and slopes to single storey residences reducing vertical bulk and scale. • Limit development to two storey dwellings or 8.5 metres above natural ground level allowing a greater diversity of housing types and design options.
Monitoring	• Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	• Report monitoring results as per the Terrestrial Flora EMP and the Aquatic Flora and Fauna EMP.
Responsibility	Site Supervisor / Construction Contractor
Corrective Action	• Non-compliances to be followed to completion.

17.5 Draft Operational Environmental Management Plan

The Draft Operational Environmental Management Plan describes proposed objectives, performance criteria and identified mitigation measures for the operational phase of Hummock Hill Island Development. Some of the environmental elements suggest specific monitoring requirements and / or statutory requirements.

The environmental element topics for this Draft Operational Environmental Management Plan (OEMP) are:

- coastal areas;
- water resources;
- land;
- terrestrial flora and fauna;

- aquatic flora and fauna;
- transport and roads;
- waste management; and
- social and economics.

17.5.1 Coastal Management

Operation impacts are likely to be indirect as a result of upstream activities within ephemeral watercourse catchments that discharge to the estuarine environment and pedestrian access to coastal areas.

Environmental Objective – Coastal Management Minimise environmental impact by managing operation aspects within the coastal zone	
Performance Criteria	• Maintenance soil and water control devices for long-term surface stability and protection against erosion. • Manage and mitigate the risks of soil erosion impacts from all coastal access areas. • All waste must be disposed of lawfully and storage areas kept clean and tidy.
Mitigation Measures	**Erosion and Sediment Control** • Implementation and maintenance of the Operational Land EMP. **Beach Access** • Maintain beach access points including boardwalks, sand ladders and fencing. **Coastal Habitats** • Implementation and maintenance of the Operational Terrestrial Fauna EMP and Operational Terrestrial Flora EMP. • Implementation of the Operational Waste EMP.
Monitoring	• Regular inspection of beach access points. Following storm events more frequent inspection may be necessary. • Compliance checking of EMP conducted quarterly (internally) and auditing conducted annually (externally).
Reporting	• Immediate reporting to operator of any incident, spill or release of materials to the environment. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Operator
Corrective Action	• Timely rehabilitation. • Appropriate control measures implemented where unacceptable sediment or erosion is identified or may occur. • Necessary corrective action implemented following incident or complaint. • The Operator will ensure that all appropriate personnel undertake adequate environmental awareness and training covering the requirements of the OEMP regarding soil management and erosion control.

17.5.2 Water Resources and Quality

Potential impacts on surface water resources and water quality resulting from the operation of the HHI Development may include:

- Impacts from contaminants (nutrients, heavy metals, pesticides, litter) on watercourse and riparian vegetation; and
- Installation of storm water management devices and systems may change existing hydrodynamics.

Environmental Objective – Water Resources and Quality To maintain environmental values associated with the ephemeral water courses, estuarine and coastal waters (high conservation value, human consumption of aquatic foods, primary and secondary contact recreation, visual appreciation and cultural and spiritual values).	
Performance Criteria	• Water quality is maintained according to local water quality objectives (WQOs) established for the project. • Environmental Values as per the Environmental Protection (Water) Policy 1997, for waters not listed in schedule 1 of the EPP are met.

Mitigation Measures	**Stormwater Management**
	• Regular maintenance of drainage structures will maintain efficiency of litter and trash removal devices.
	Nutrient Loading
	• Ensure buffer zones are well vegetated and maintained, to retard surface runoff and to act as a sink for nutrients.
	• Minimise use of emergency outflow from Waste Water Treatment Plant (WWTP).
	• Incorporation of off-leash areas for dogs with waste facilities.
	• Management of upstream nutrient sources, such as those that come from human sewerage.
	• Chemical storages above trigger volumes will require construction to AS1940-2004 and will include appropriate sealed bunding or an approved containment system.
	Golf Course Management
	• Develop and implement a Golf Course Management Plan in accordance with AGCSA (2001) Guidelines, current and future best management practices, including:
	  • Integrated Turf Management Plans (ITMPs) as recommended by the Improving the Eco-efficiency of Golf Courses in Queensland (AGCSA & Qld EPA, 2001).
	  • Use of recycled water for irrigation of turf using in ground sensors to control application.
	  • Integrated Pest Management Plan in accordance with AGCSA requirements for the wild golf course will required prior to commission.

Monitoring	**Routine water quality monitoring program** • Monitoring should be undertaken in accordance with the WQMP developed prior to construction in accordance with QWQG (2006). • Monitoring of riparian vegetation (where present) will also be required to assess any potential impact to vegetation communities within ephemeral watercourses in the relict beach ridge system. This monitoring will be conducted in accordance with Qld

Environmental Objective – Water Resources and Quality To maintain environmental values associated with the ephemeral water courses, estuarine and coastal waters (high conservation value, human consumption of aquatic foods, primary and secondary contact recreation, visual appreciation and cultural and spiritual values).	
	Herbarium guidelines for assessing BioCondition. This would involve the establishment of a number of control/reference sites to determine benchmark data, and the receiving sites monitored to determine trends against the established BioCondition benchmark data over the medium term. **Event base monitoring** • Event-based monitoring may also be carried out in order to understand the inflow of contaminants where an event discharge has occurred and to re-assess the success of water quality management practices. • During and after rainfall, a visual inspection of rehabilitated areas undertaken to ensure no major erosion is occurring.
Reporting	• Monitoring results will be compared to the WQOs that support the EVs; • Additional monitoring and reporting may be required to determine the extent of stormwater runoff after pulse events. • Quarterly water quality reports prepared by operational personnel which report on water quality conditions within the development. • Reports issued to include any action to be implemented in the case of non-compliance and the person/ organisation responsible for action to be highlighted.
Responsibility	• Operator
Corrective Actions	• Where WQOs and EVs are not met management action must be taken to ensure objectives are met. • Any elevated physico-chemical parameters, or nutrient or metal concentrations, observed at upstream sources (eg storage dams, WWTP discharge point) will be identified and the appropriate action taken. • Any detrimental impacts to downstream water quality shall be reported to the DERM.

17.5.3 Land Management

17.5.3.1 Land Erosion

Risks of erosion during operation of the HHI Development will be primarily derived surface runoff during storm events and inadequate storm water control measures. Mitigation of post construction erosion will be based on WSUD.

Environmental Objective – Land Erosion The development is managed to avoid any impacts associated with soil erosion (i.e. decrease in land condition or increase in water turbidity or increase in sedimentation).	
Performance Criteria	• Maintenance soil and water control devices for long-term surface stability and protection against erosion.
Mitigation Measures	• Maintenance of permanent soil and water control devices for long-term surface stability and protection against erosion by wind or water. • A Topsoil Management Plan implemented for the public open space areas and to assist

Environmental Objective – Land Erosion The development is managed to avoid any impacts associated with soil erosion (i.e. decrease in land condition or increase in water turbidity or increase in sedimentation).	
	with re-establishment of the area and ongoing stability. • Vegetation within the HHI Development footprint will be maintained to ensure the stabilisation of soil and to reduce raindrop impact erosion and runoff velocities which would likely result in the detachment and transport of soil particles. Furthermore particular attention will be paid to sediment and erosion control measures required for any activities that will potentially expose or disturb soils and geological materials.
Monitoring	• Regular monitoring of permanent soil and water control devices installed during operational phase for evidence of soil erosion and sedimentation. • Regular inspections by qualified person of structures to ensure compliance with the design specifications. • Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	• Reports issued to include any action to be implemented in the case of non-compliance and the person/ organisation responsible for action to be highlighted.
Responsibility	• Operator

Corrective Action	• Appropriate action will be taken if impacts are found to be unacceptable in terms of adjoining stability, sedimentation or erosion. Depending on the circumstances, appropriate action could include:
	  • structural maintenance;
	  • removal of accumulated sediment;
	  • measures to entrap sediment at a site more accessible for sediment removal; or
	  • catchment management measures to minimise erosion from sediment sources.

17.5.4 Terrestrial Flora and Fauna

17.5.4.1 Terrestrial Flora

Potential impacts on terrestrial flora resulting from the operation of the HHI Development may include:

- Spread of weeds;
- Loss of vegetation due to edge effects from the HHI Development;
- Trampling of vegetation from unauthorised access to the balance areas of Hummock Hill Island; and
- Increased risk of bushfire.

Environmental Objective – Terrestrial Flora Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
Performance Criteria	• Vegetation management offsets are established and managed. • A program in place to manage weeds species both within the HHI Development footprint

Environmental Objective – Terrestrial Flora Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
	and in adjoining areas.

Mitigation Measures	**Weed Management**
	• Develop and implement a Weed Management Plan for the operation of the HHI Development. Management measures may include:
	  • Establishment of permanent weed monitoring transects within conserved vegetation adjacent to the HHI Development area.
	  • Weed monitoring at permanent transects on an annual basis to ensure that new weed species are not introduced into the immediate HHI Development area or surrounding sites.
	  • Regular inspection of conservation areas/native vegetation and parklands by the site environmental officer to determine the presence of weed species and implement control measures.
	  • Implementation of adequate control measures where new weed infestations are detected.
	Access
	• Ensure that fencing about the HHI Development is inspected on a regular basis and repaired as required.
	• Maintain designated access points to ensure that informal access paths are not established over time.
	Bushfire Management
	  • Develop and implement a Bushfire Management Plan for the operation of the HHI Development. The Bushfire Management Plan will include the following elements:
	  • Identification of the location and configuration of firebreaks, including specifications for Asset Protection Zones;
	  • Location of fire hydrants and water supply for firefighting purposes;
	  • Discussion of appropriate plant species for landscaping works in fire prone areas;
	  • An assessment of hazard and risk as it applies to a range of land uses within the development.
	  • The Bushfire Management Plan will incorporate ecological burning principles so that retained vegetation is burnt in accordance with current best practice.
	Sediment and Erosion Control
	• Implementation and maintenance of the Land Erosion EMP.
	Rehabilitated Areas and Vegetation Offset
	• Management of vegetation offset and re-vegetation areas.
	Landscape Planning
	• Management of landscaped areas within the HHI Development to ensure no new weeds area introduced.

Monitoring	• Monitor re-vegetation areas to identify new weed infestations and eradicate any declared

Environmental Objective – Terrestrial Flora Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
	weeds found. • Weed monitoring within the HHI Development footprint to ensure no new weeds are introduced. • Auditing of the EMP conducted annually (internally).
Reporting	• A report describing performance against the management measures and including results of monitoring will be submitted on an annual basis to the operator. • Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	• Operator
Corrective Action	• Initiate weed control programs as required. • Repair any breaks in fencing. • Restrict access to areas where unauthorised access is being gained to an area. • Repair or install sediment and erosion control devices as required. • Carry out additional vegetation management works as required to ensure consistency with Fire Management Plan.

17.5.4.2 Terrestrial Fauna

Potential impacts on terrestrial fauna resulting from the operation of the HHI Development may include:

- Invasion on pests;
- Air strike hazards associated with the airport;
- Road kill;
- Damage to nesting and roosting sites particularly on the beaches and dune; and
- Lighting from the development.

Environmental Objective – Terrestrial Fauna Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, developed and implemented strategies to mitigate these impacts to an acceptable level.	
Performance Criteria	• The risk (of injury and death) to fauna is managed and minimised during operations. • Retained habitat is not compromised by adjacent land uses. • Fauna species continue to utilise the retained habitat area during operation.
Mitigation Measures	**Bird and Animal Hazard** • Develop and implement a Bird and Animal Hazard Management Plan in

Environmental Objective – Terrestrial Fauna Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, developed and implemented strategies to mitigate these impacts to an acceptable level.	
	accordance with Civil Aviation Safety Authority (CASA) Manual of Standards Pt 139 – Aerodromes 10.14. The management plan must be prepared by a suitably qualified person such as an ornithologist or a biologist, etc and must address: • Monitor and record, on a regular basis, the presence of birds or animals on or in the vicinity of an airstrip. Monitoring personnel must be suitably trained for this purpose. • Hazard assessment, including monitoring action and analysis. • Pilot notification. • Liaison and working relationships with land use planning authorities. • On-airport bird and animal attractors which provide food, water or shelter. • Suitable harassment methods. • An ongoing strategy for bird and animal hazard reduction, including provision of appropriate fencing. **Roadside Wildlife Management Plan** • Develop and implement a Roadside Wildlife Management Plan for roads within the HHI Development and in Clarkes Road leading to Hummock Hill Island. The plan may include the following management measures: • Construction of elevated bridges over designated crossing points. These are commonly referred to as underpasses. • Construction of culverts beneath the final road surface. • Establishment of traffic "go slow" zones. • Construction of overpasses. • Installation of exclusion fencing to prevent fauna entering the roadway and guide fauna towards the crossing points and associated infrastructure. • All injured animals immediately removed and taken to an appropriately qualified veterinary surgeon. Any orphaned or injured native fauna discovered at a later stage during operational works immediately reported to the QPWS. **Beach and Foreshore Management Plan** • Develop and implement a Beach and Foreshore Management Plan for the management of sensitive areas particularly for turtles and shorebirds. The management plan may 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

Environmental Objective – Terrestrial Fauna Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, developed and implemented strategies to mitigate these impacts to an acceptable level.	
	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. • Monitoring of shorebird and turtle activity on the beaches and foreshore to determine the presence of protected species. **Night Lighting** • Lighting during operation of the project will be targeted to the amenity areas with minimal spill particularly to areas of potential habitat for nocturnal and light sensitive species. • Light will be directed to the ground wherever possible. • All lights will be shielded to eliminate skyward illumination. • Lighting systems will be programmed to be extinguished for as long a period as possible during the night. Alternatively all external lights could be triggered by sensors. • Red warning lights (on towers etc) will be replaced by to white strobe lights where possible. **Pest Control** • Develop and implement a Pest Management Plan for the control of wild dogs, foxes, cane toad, horse and cattle on the lease area held by Eaton Place Pty Ltd. • A Vector Management Plan will be developed and implemented which addresses at least the following matters: • Maintaining breaks in any continuous vegetation lines leading to residential areas. • Ensure that there is standing water within landscaped areas suitable for mosquito breeding. • Maintenance of permanent soil and water control devices to ensure that silt is not accumulating an water is able to freely drain.
Monitoring	• The Bird and Animal Hazard Management Plan must be reviewed for effectiveness, on a regular basis, at least as part of each technical inspection. • Monitoring of shorebird populations and turtle breeding activity should be carried out in response to seasonal migration and breeding events. • The effectiveness of night lighting management should be reviewed annually, particularly with reference to turtle breeding activity and hatchling behaviour, determined from shorebird and turtle monitoring. • An annual Pest monitoring program will be implemented to determine abundance of pest vertebrates.
Reporting	• Annual monitoring reports should be submitted to Gladstone Regional Council which consider shorebird and turtle monitoring, review the effectiveness of mitigation strategies and document pest species populations.
Responsibility	• Operator • Airport Operator

Environmental Objective – Terrestrial Fauna Minimise and mitigate as far as is practicable the adverse impacts on terrestrial fauna and flora, during operation of the project. Where unavoidable impacts occur, developed and implemented strategies to mitigate these impacts to an acceptable level.	
Corrective Action	• Where the presence of birds or animals is assessed as constituting an ongoing hazard to aircraft, the airstrip operator must notify the Aeronautical Information Service (AIS) in writing, to include an appropriate warning notice in the Enroute Supplement Australia (ERSA). Where a bird or animal hazard is assessed as acute, of short term or seasonal nature, additional warning must be given to pilots by Notice to Airmen (NOTAM). • Amend management strategies contained within the Beach and Foreshore Management Plan in response to specific concerns. • Review the design specifications for artificial lighting and the need for additional habitat modification or screening of light sources. • Increase the frequency of pest control activities.

17.5.5 Aquatic Fauna and Flora

Potential impacts on aquatic flora and fauna from operations associated with the development may include:

- Contamination (nutrients, heavy metals, pesticides, litter) of watercourses and riparian vegetation;
- Changes to the existing hydrodynamics as a result of installation of storm water management devices and systems;
- Lighting impacts on nesting turtles;
- Physical disturbance of turtle nesting grounds;
- Threat to marine fauna from increased boating traffic; and
- Spread of pests and weeds.

Environmental Objective – Aquatic Flora & Fauna • Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, during construction of the project. • Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
Performance Criteria	• No discharge of materials through stormwater runoff from construction and operational areas, with particular regard to suspended sediments, fuels, chemicals, and oils. • No waste materials (general and construction rubbish etc) entering waterways from operational areas. • A program must be implemented to monitor and treat aquatic weeds and other pest species that may enter the waterways including the estuary and coastal zones from the HHI Development. • No uncontrolled or untreated release of water or sediment from the HHI Development.

Environmental Objective – Aquatic Flora & Fauna • Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, during construction of the project. • Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	

Mitigation Measures	**Water Quality**
	• Implement and maintain a Water Quality Monitoring Program.
	• Implement and maintain turbidity monitoring as part of the WQMP to assess the effectiveness of Water Sensitive Urban Design and Erosion and Sediment Control Plans.
	• Implement and maintain a Marine Ecological Monitoring Program.
	• Implementation and Maintenance of the Water Management EMP.
	Sediment and Erosion Control
	• Implementation and maintenance of the Land Erosion EMP.
	Chemicals, Fuels, and Oils
	• Implementation and maintenance of the Land Contamination EMP.
	Waste Materials
	• Implementation and maintenance of the Waste Management EMP.
	Weed Management
	• Implement and maintain a program to monitor and control aquatic weed growth including those found existing waterways on Hummock Hill Island. This program will include a survey to determine the distribution and abundance of declared weeds within the project area.
	Pest Management
	• Control access to turtle nesting sites by feral and domestic animals (such as foxes, dogs) and cattle to reduce the taking or trampling of eggs.
	• A Vector Management Plan will be developed and implemented which addresses at least the following matters:
	  • Breaks in any continuous vegetation lines leading to residential areas.
	  • Roadway embankment construction will be designed to eliminate (if possible) any standing water impoundment or redirection of water flows into potential mosquito breeding areas.
	  • Stormwater drainage will be designed to avoid silt accumulation and be free draining. Exit points from drains into waterways or wetlands will be designed to avoid habitat changes at discharge points.
	Night Lighting
	• Develop and implement a Artificial Lighting Management Plan to reduce potential light interference for nesting turtles. The plan will incorporate the following measures outlined by Witherington and Martin (1996), such as:
	  • Eliminating unnecessary light sources such as decorative lighting, flood lighting of footpaths beach access lighting.
	  • Use of low wattage directional lighting (directed away from nesting beaches).
	  • Use long wavelength lighting sources such as low-pressure sodium vapour lighting.
	  • Use of shields on lights visible from beaches.

Environmental Objective – Aquatic Flora & Fauna • Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, during construction of the project. • Where unavoidable impacts occur, develop and implement strategies to mitigate these impacts to an acceptable level.	
	• Use of recessed directional lighting to reduce light spillage. • Use of low pole mounted or waist height and shielded lighting on beach access and public pathways. • Place lights behind natural screens such as trees. • Use of motion triggered switches and timers on outdoor security lighting. • Installation of tinted windows on houses facing the main beach. • Rehabilitation of low screening vegetation below headland housing to block lights visible from beach level whilst maintaining views. • Educating house owners of the potential impacts from household lighting during nesting season, such as the use of flyers during nesting season.
Monitoring	• Monitor according to the approved Marine Ecological Monitoring Plan. • Monitor according to the approved Water Quality Monitoring Program. • Maintain the Weed Management EMP, to determine the distribution of known declared weeds and, where practicable, control these infestations, in accordance with the Land Protection (Pest and Stock Route Management) Act 2002. • Maintain a program to monitoring and control pest species in waterways (both flora and fauna).
Reporting	• Annual report prepared by operator to include details of monitoring results, audits, training and the occurrence of any incidents. • Incidents, complaints and any significant environmental harm to aquatic environment reported to regulatory body/ies where required. • Assessment of performance against the identified indicators will be determined by auditing and reporting annual basis during operation.
Responsibility	• Operator
Corrective Action	• Measures undertaken to protect the aquatic environment where unacceptable impacts or risk of environmental harm becomes apparent. • Immediate reporting to operator of any incident which contravenes the objectives of the EMP.

17.5.6 Cultural Heritage

Seventeen specific indigenous cultural heritage sites were located during the field surveys conducted on Hummock Hill Island. It was determined that there is a low potential for further items or sites of high or exceptional cultural/archaeological significance to exist within the study area, however there is likelihood for further historic items of low to moderate significant to exist, particularly around the Former Homestead Complex (Site 1). Construction management measures suggest that significant elements to remain in-situ within the proposed HHI Development and incorporated and interpreted into the new development.

The proposed management strategies for potential impacts on cultural heritage aspects are outlined below.

Environmental Objective – Cultural Heritage To manage the known and unknown components of indigenous archaeological records and areas.	
Performance Criteria	• All known indigenous archaeological records, as identified within Section 13 of the EIS, are preserved and not impacted upon by the operation of the HHI Development. • All unknown indigenous archaeological records found are reported to the Department of Environment and Resource Management (DERM) and operator.
Mitigation Measures	• Maintain exclusion zones established during construction. **Buffer Zones** • The final buffer zone will be established by the Project Liaison Officer for the developers or their nominee and the Aboriginal Party and/or the Aboriginal Party's nominees. **Discovery of Artefacts** • An artefact handling and a curatorial agreement will be negotiated between the Traditional Owners and the Queensland Museum. • Any findings of any indigenous archaeological items to the operator immediately and handled according to the curatorial agreement.
Monitoring	• Updating of archaeological records as appropriate. • Further to this, the management of cultural heritage will be in accordance with the Cultural Heritage Management Plan (CHMP) for the project which was approved by DERM on 17 January 2007 (refer to Appendix A7.10 of the EIS). Incorporation of the above mitigation measures in accordance with the CHMP will effectively manage potential impacts to cultural heritage sites within the proposed development.
Reporting	• Report any findings of any indigenous archaeological items to the operator immediately. • Report any findings of any indigenous archaeological items to Cultural Heritage Coordination Unit, DERM and operator.
Responsibility	• All staff • Operator
Corrective Action	• Non-compliances to be followed to completion.

17.5.7 Waste Management

Domestic and general waste will be the largest waste stream generated during operation of the development. The remaining wastes streams generated include recyclable wastes such as paper, cardboard, plastics, glass, metals and organic waste.

Environmental Objective – Waste Management
• Minimise the production of waste and amount of waste requiring disposal. • Minimise the impact to the environment from waste disposal. • Maximise the opportunities to reuse wastes on-site. • Correct disposal of all wastes produced.

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Performance Criteria	• Implementation of waste management principles (reduce, re-use, recycle) and effective and sustainable disposal strategies. • Minimisation of the impacts of handling and disposal of operational waste. • Reduction of waste generated on site through re-use and recycling, where practical. • All waste disposed of lawfully. • Storage areas clean and tidy.
Mitigation Measures	**Waste Minimisation** • Prepare and implement Operations Waste Management Plan prior to completion of development addressing issues such as location and methods of storage, transport and disposal; • Implementation of training for employees in the Waste Management Plan and recycling opportunities. • On-site waste management practices highlighted during employee inductions. **Disposal** • Waste minimisation encouraged and staff training and awareness provided in correct identification and disposal of wastes; • Bins provided that are suitable for the type of waste that will be produced, of the correct size and strategically placed to receive the waste that will be disposed; • Disposal bin not overfilled and waste compacted as much as possible before disposal; • Waste bins on-site monitored and arrangement for their replacement to occur on a regular basis and/or when full; • Prevent animals from accessing the bins using specially designed lids and strategic placement where necessary; • Housekeeping procedures, (including spillage control, litter pick up and tidying up of site areas) implemented to minimise the generation of waste; • All domestic and general waste generated at the construction site removed from the site and disposed of at the nearest licensed disposal facility, as required; • Recycling bins for glass, plastic and metal transported to a local council facility. • Dispose of waste that is unable to be reused or recycled in a certified land fill site; • Ensure the transport of regulated wastes and contaminated soils or other material is conducted by licensed contractors for disposal at licensed facilities, in accordance with legislative requirements. **Waste Transport** • Waste only removed from the premises and disposed of in a lawful manner in accordance with the requirements of the DERM and the appropriate council. **Incidents** • Preparation of waste management procedures (as part of the Operations Waste

Environmental Objective – Waste Management • Minimise the production of waste and amount of waste requiring disposal. • Minimise the impact to the environment from waste disposal. • Maximise the opportunities to reuse wastes on-site. • Correct disposal of all wastes produced.	
	Management Plan) to deal with any potential incident during operation in which waste material with the potential to cause environmental harm is released to the environment; • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimise environmental harm.
Monitoring	• Regular inspection of on-site facilities to ensure waste is being generated, stored, handled, disposed and transported in accordance with this EMP. • Registers and manifests maintained of hazardous substances and regulated waste. This documentation is subject to internal or external audit, especially for any regulated waste material. • Records kept of any regulated waste removed from the site, including name and licence number of waste transporters, volume and description of waste transported, destination of waste and licence number of the waste treatment operator. • Waste contractors to provide certification (licence) records verifying their registrations and points of discharge of waste. • Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	• Operator to report operations as required.
Responsibility	• Operator
Corrective Action	• Ensure that all staff are reminded of the requirements regarding waste transport, storage and management, and shall endeavour to ensure that the situation is improved by the allocation of staff and other resources to rectify any non-conformance.

17.5.8 Transport and Traffic

The peak traffic generated by the proposed HHI Development will generally coincide with the peak hours of the external road network which is mainly centred on travel to and from work and school. The development is also expected to generate predominantly light vehicle traffic as the bulk of the development is residential in nature.

Environmental Objective – Transport and Roads • Maintain, or exceed the current level of road safety and transport efficiency in the road network and intersections surrounding the Project area.	
Performance Criteria	• Manage traffic flows in order to achieve safe and efficient movement through-out the project area and the affected transport network.
Mitigation Measures	**Traffic** • In consultation with relevant road authorities prepare and implement local area Road-use Management Plan in order to maintain the role and function of the road network during operation of the project. The plan would address the safety and convenience for all road users and consider the following:

Environmental Objective – Transport and Roads • Maintain, or exceed the current level of road safety and transport efficiency in the road network and intersections surrounding the Project area.	
	• Safe movement of pedestrians and cyclists accessing community facilities. • Installation of proper signage to make drivers aware about road works and guide them through the work area. • Measures to help ensure safety and manage the changes in traffic conditions (e.g. traffic controllers/and/or variable message signage. • Wet weather specific operational requirements including any management measures necessary to address any potential environmental impacts of wet weather operations. • Truck routes. • Consult with Queensland Transport regarding demand for and supply of public transport services for island residents. **Airstrip** • Airstrip operations will be in accordance with CASA requirements. • A Bird and Animal Hazard Management Plan will be developed (included as part of the Airstrip Manual) and implemented. The Plan will be prepared by a suitably qualified person such as an ornithologist or a biologist, etc and will address: • hazard assessment, including monitoring action and analysis; • pilot notification; • liaison and working relationships with land use planning authorities; • on-airport bird and animal attractors which provide food, water or shelter; • suitable harassment methods; and • an ongoing strategy for bird and animal hazard reduction, including provision of appropriate fencing.
Monitoring	• Monitor local area traffic impacts during the peak periods (weekends and during major competitions/events in the region). • Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	• Operator to report on operations as required.
Responsibility	• Operator
Corrective Action	• Plan and implement traffic control measures in advance of forecasted increased traffic. For mitigation works in the State-controlled road reserve, apply for relevant approvals under the Transport Infrastructure Act 1994 (Sections 33 and 50).

17.5.9 Social and Economic

When operational, Hummock Hill Island is expected to deliver a range of community facilities including recreation facilities and shops. The HHI Development will also provide potential employment opportunities for local residents during the operation in the resort or local shops. It is important that the HHI Development integrates with existing communities in the region, this is a focus of the OEMP for Social and Economic.

Environmental Objective – Social and Economic • Maximise business activity and amenity values once the HHI Development has been established (revenues and recreational amenity may take a while to establish).	
Performance Criteria	• Maximise use of local employment and contractors • Supporting establishment of sporting clubs and community organisations • Establishment and maintenance of community facilities

Mitigation Measures	**Consultation**
	• Provide a communication program targeted to local residents and visitors to Hummock Hill Island, and including:
	  • environmental updates;
	  • construction updates; and
	  • community events and activities updates.
	• Develop and implement community development strategies to build an 'island' sense of community and integrate residents with the surrounding communities.
	• Ensure public access to services and facilities is promoted to local and regional residents.
	• Consultation with local Indigenous organisations should be undertaken to identify and facilitate training and employment opportunities associated with the Project; and
	• Ongoing consultation with local Indigenous groups, to ensure access to places and sites of importance is maintained.
	Employment
	• Facilitate employment opportunities suitable for older people or retirees, such as part-time or casual employment.
	• Develop and implement an Employment and Training Strategy, including:
	  • Identification of the skills required for operation and trainings needs to enable local employees to gain the necessary skills.
	  • Identification of opportunities to work through State and Federal government apprenticeship and training programmes to address skills shortages and benefit community.
	  • Identification of opportunities to facilitate skills development for local residents through local training facilities such as CQ TAFE and other local training providers, to enable local residents' employment in operational aspects of the project.
	  • Undertake early consultation and communication with local businesses in the Gladstone Regional Council area to maximise the benefit of local supply arrangements to the Project.

Monitoring	• Evaluate effectiveness of consultation, liaison and mitigation outcomes; • Report consultation activities, liaison and environmental compliance.
Reporting	• Operator to report operations as required.
Responsibility	Operator
Corrective Action	• Appropriate actions implemented where the EMP is not being met.