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Section 12

Environmental Management and Commitments



12 Environmental Management

The commitments and management measures contained in this PER/Draft EIS will be implemented through BHP Billiton Iron Ore's Environmental Management System which is certified to the Australian and New Zealand Standard AS/NZS ISO 14001.

12.1 BHP Billiton Environmental Management Overview

BHP Billiton has developed a Company Charter and Sustainable Development Policy for its operations. The Charter and Policy are guiding resources for maintaining an emphasis on Health, Safety, Environment and Community (HSEC) and clarifying a broader commitment to aspects of sustainability including biodiversity, human rights, ethical business practices and economic contributions at all BHP Billiton Iron Ore activities. To interpret and support the Company Charter and Sustainable Development Policy (refer **Figure 12.1**), BHP Billiton Iron Ore has developed a series of Group Level Documents (e.g. Management Standards), which form the basis for the development and application of environmental management systems at all levels of BHP Billiton Iron Ore's operations. These are discussed in more detail below.

12.1.1 Health, Safety and Environmental Management System

BHP Billiton Iron Ore has developed and implemented a Health, Safety and Environmental Management System (HSEMS) (refer **Figure 12.2**) for its operations that is certified to Australian and New Zealand Standard AS/NZS ISO 14001. The HSEMS describes the organisational structure, responsibilities, practices, processes and resources for implementing and maintaining environmental objectives at all BHP Billiton Iron Ore sites (including the proposed Outer Harbour Development) and achieving continual improvement in environmental performance. The principal components of the HSEMS include:

- ▶ Company Charter and Sustainable Development Policy;
- ▶ planning;
- ▶ implementation and operation;
- ▶ monitoring and corrective action; and
- ▶ management review.

12.1.2 Risk Assessment and Management System

Risk management is recognised as an integral part of management practices and is core to managing environmental impacts at BHP Billiton's Iron Ore operations. BHP Billiton Iron Ore has developed

a risk assessment and management system to be implemented at all operations. The process is iterative and consists of steps, which when undertaken in a sequence, enable continuous improvement in decision making. The main elements of the risk assessment and management process are as follows:

- ▶ establish the context;
- ▶ identify risks;
- ▶ analyse risks;
- ▶ evaluate risks;
- ▶ control risks;
- ▶ monitor and review; and
- ▶ communicate and consult.

12.2 Project Environmental Management Program

For the proposed Outer Harbour Development, a number of measures will be implemented to manage the potential environmental impacts resulting from construction and operational activities. These management measures have been identified from the PER/Draft EIS impact assessment, regulatory requirements, BHP Billiton Iron Ore's operational experience, BHP Billiton Iron Ore's current operational environmental management programs and stakeholder consultation. The proposed measures include standard practices which are routinely applied at BHP Billiton Iron Ore's Port Hedland facilities through the AS/NZ ISO 14001 certified Environmental Management System and project-specific measures which relate to reducing key environmental impacts associated with the proposed Outer Harbour Development.

The environmental management program is an overarching strategy that will be used to translate the commitments and management measures contained in the PER/Draft EIS into the planning documents, engineering designs, contract documents and the day-to-day construction and operation of the proposed Outer Harbour Development. The existing HSEMS and its regulatory regime will continue to be used as the mechanism through which environmental management, monitoring and reporting is implemented for the project.

12.2.1 Outcome Based Conditions

The project has been developed to align with the Environmental Objectives developed by the Environmental Protection Authority (EPA). The EPA objectives have been used as a guide for the project's environmental management program and are described in **Table 12.1**. **Table 12.1** also summarises the relevant environmental management plans which are proposed for EPA review and how they are linked



Figure 12.1 – BHP Billiton’s Sustainable Development Policy

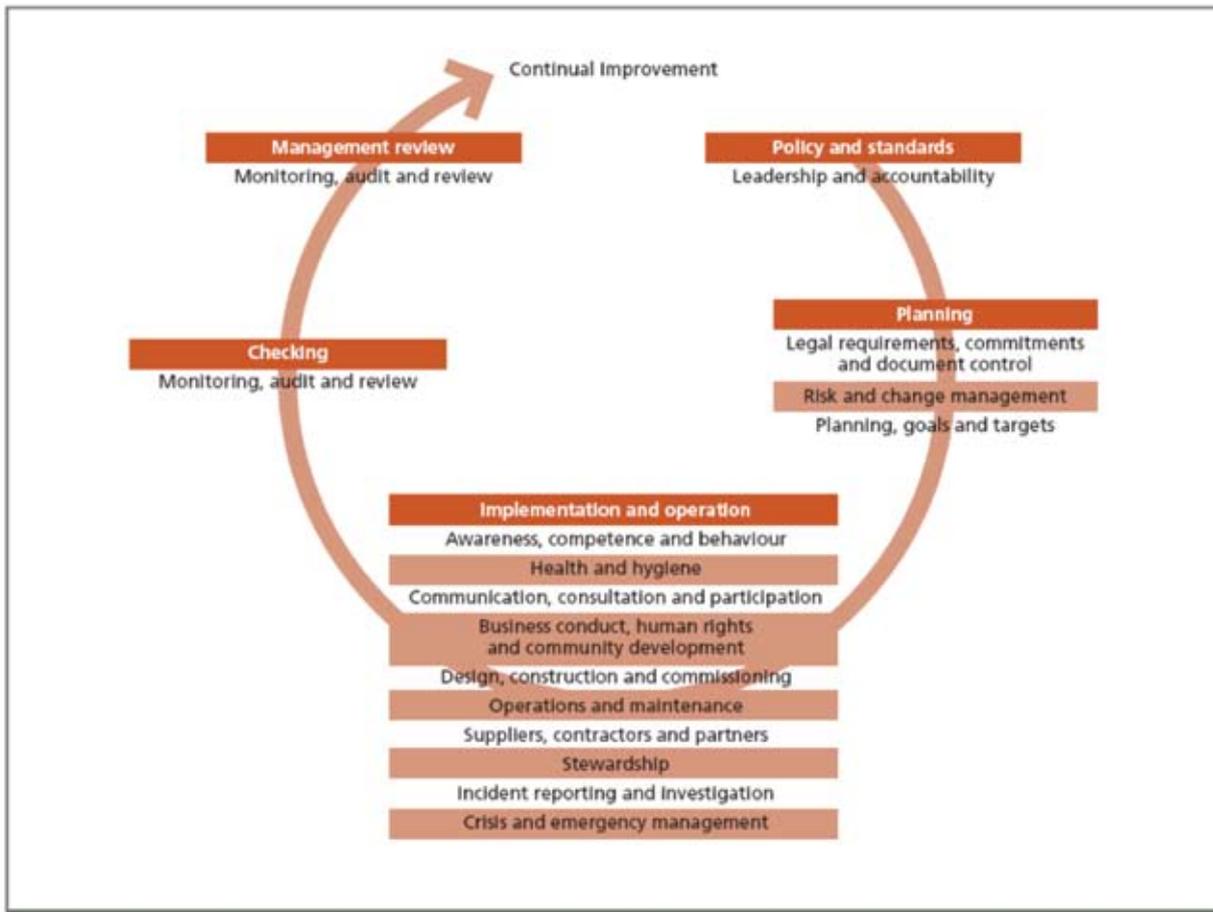


Figure 12.2 – BHP Billiton Iron Ore Health, Safety, Environment and Community Management Standards

to both the key factors and the eventual proposed outcome based conditions. Further summary information on the individual statutory plans is provided in **Section 12.2.2**.

The environmental management plans have been prepared as a means of demonstrating how key factors will be managed during the construction and operation phases of the project. Whilst the content will vary depending on the topic of each plan, the individual plans typically outline the following:

- ▶ the management plan context including objectives, relevant legislation, existing environment and relevant guidance;
- ▶ an overview of the potential risks or impacts as a result of the development;
- ▶ an outline of the management strategies and measures to be undertaken; and
- ▶ relevant monitoring, reporting and contingency measures.

The objectives and scopes of each of the plans are outlined in **Table 12.10**.

Following review and assessment of the key factors and the proposed environmental management plans, potential outcome based conditions were developed and are presented in **Table 12.2** to **Table 12.7**.

12.2.2 Environmental Management – Construction

It is the primary objective that all potential environmental impacts during construction are avoided or minimised as far as reasonably practicable, and are consistent with the principles of environmental protection. During the impact assessment process, opportunities to modify design parameters, and identify management practices and controls to mitigate potential impacts were explored. The construction practices and management measures identified by this process are reflected in the various environmental management plans which will be implemented during landside and offshore construction activities. A documented process for reviewing risks, which involves the systematic identification and evaluation of environmental aspects that apply to construction activities, will be implemented. The relevant risks for the project will be considered throughout the Contractor

Table 12.1 – Proposed Outcome Based Conditions

Key Factor	Environmental Objectives	Title of Proposed Outcome-based Condition	Proposed Environmental Management Plan
Terrestrial Environment			
Geology, Soils (inc Acid Sulphate Soils) and Landforms	To maintain the integrity, ecological functions and environmental values of the soils and landform. Potentially acid sulphate soil disturbing activities are avoided or managed to avoid harm to the surrounding environment.	Acid Sulphate Soils	Acid Sulphate Soil Management Plan
Terrestrial Flora and Vegetation	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. To meet statutory requirements and acceptable standards.	Flora and Vegetation	Significant Species Management Plan
Terrestrial Fauna	To maintain the abundance, diversity, geographic distribution and productivity of fauna species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. To provide for the protection of the environment, especially those aspects of the environment that are matters of national significance. To meet statutory requirements and acceptable standards.	Fauna	Significant Species Management Plan
Marine Environment			
Marine Habitat	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem level through the avoidance or management of adverse impacts and improvement in knowledge. To maintain the integrity, ecological function, and environmental values of the seabed and coast.	Marine Dredging and Dredge Spoil Disposal	Dredging and Spoil Disposal Monitoring and Management Plan Mangrove Management Plan
Water and Sediment Quality	To ensure that the environmental values or the health, welfare and amenity of people and land uses are not adversely affected. To meet statutory requirements and acceptable standards.	Marine Dredging and Dredge Spoil Disposal	Dredging and Spoil Disposal Monitoring and Management Plan Marine Facilities Environmental Management Plan
Marine Fauna	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through avoidance or management of adverse impacts and improvement in knowledge. To provide for the protection of the environment, especially matters of NES and to conserve Australian biodiversity. To be consistent with all relevant legislation and guidance.	Marine Fauna	Dredging and Spoil Disposal Monitoring and Management Plan Marine Mammals Management Plan Marine Turtle Management Plan
Social Surrounds			
Public Amenity	To ensure that emissions resulting from activities associated with the proposal do not adversely affect the amenity of nearby residents by ensuring that emission levels meet the statutory requirements and acceptable standards.	Air Quality Noise	Dust Management Plan Noise Management Plan

Table 12.2 – Acid Sulphate Soils

1.	Proposed Outcome Based Condition 1: Acid Sulphate Soils
1.1	Objective and Outcome
	The proposed investigations into the extent of ASS will be undertaken prior to commencing construction activities in accordance with the DEC guideline series. Based on the outcomes of these investigations, BHP Billiton Iron Ore will implement the management measures described in the Acid Sulphate Soil Management Plan
1.2	Management Measures
	<ul style="list-style-type: none"> ▶ Further detailed ASS investigations will be undertaken to confirm the presence of ASS within the area proposed for the construction of the transfer pad, infrastructure corridor and car dumpers and conveyor tunnels. ▶ Disturbance to potential areas of ASS is to be managed in accordance with the Acid Sulphate Soils Management Plan (Appendix A7). The Acid Sulphate Soils Management Plan will be updated with the findings from the further detailed ASS investigation. ▶ Project design is to incorporate corrosion resistant design materials based upon field identification of ASS, if required. ▶ Following further detailed ASS investigations, for areas confirmed with ASS present, excavated soil will be treated during construction to prevent acidic fluids leaching into surface water or groundwater.
1.3	Monitoring and Reporting
	<p>The proponent will undertake the following monitoring to ensure the above management measure is effective:</p> <ul style="list-style-type: none"> ▶ Erosion and sediment control structures will be routinely inspected, especially after high rainfall events, to ensure they stay effective. ▶ Captured dewatered effluent during car dumper construction will be monitored for water quality to identify the need for treatment of acidic conditions. ▶ Validation samples will be collected from excavated ASS to determine adequate treatment rates. Post treatment samples will be collected to confirm adequate treatment prior to reuse or disposal. ▶ Groundwater monitoring will be undertaken during construction activities according to regulatory guidelines.
1.4	Contingencies
	Following the further detailed ASS investigation, for areas confirmed with ASS present, excavated soil is to be treated during construction to prevent acidic fluids leaching into surface water or groundwater.

Table 12.3 – Terrestrial Flora, Vegetation and Fauna

2.	Proposed Outcome Based Condition 2: Terrestrial Flora, Vegetation and Fauna
2.1	Objective and Outcome
	<p>Vegetation removal will be confined to the approved disturbance envelope.</p> <p>The predicted environmental outcomes for flora and vegetation as a result of the Outer Harbour Development are:</p> <ul style="list-style-type: none"> ▶ Direct disturbance of up to 940 ha. ▶ Direct loss of four Priority Flora species <i>Heliotropium muticum</i> (Priority 1), <i>Tephrosia rosea</i> var. <i>venulosa</i> (Priority 1), <i>Pterocaulon</i> sp. A Kimberley Flora (Priority 2), and <i>Goodenia nuda</i> (Priority 4) within the disturbance footprint. ▶ Impacts to groundwater dependent vegetation are unlikely due to their distance from de-watering activities, and groundwater abstraction will be a short-term activity and if aquifer drawdown does occur it is likely to recover following completion of construction activities.
2.2	Management Measures
	<p>The following key specific management measures will be adopted by the proponent in order to achieve the above outcomes:</p> <ul style="list-style-type: none"> ▶ No clearing or disturbance outside of the approved disturbance envelope. ▶ Construction laydown areas will be located in previously disturbed areas where sufficient space is available and will be rehabilitated or used for other purposes following completion of construction activities, if not required for other purposes, to minimise loss of vegetation. ▶ Dust control measures will be implemented such as regular watering of unsealed roads, exposed surfaces and active construction areas, and progressive rehabilitation of disturbed areas, which are no longer required. ▶ Fill will be acquired from weed-free sources. ▶ BHP Billiton will develop and implement a Weed Management Program in consultation with DEC. ▶ Vehicle and equipment access will be restricted to designated access roads where possible.
2.3	Monitoring and Reporting
	<p>The proponent will undertake the following monitoring to ensure the management measures are effective:</p> <ul style="list-style-type: none"> ▶ Regular inspections will be undertaken to ensure that vegetation is being cleared and stockpiled in the appropriate locations, Priority Flora have not been impacted unnecessarily and that the relevant databases are updated. ▶ Regular inspections of disturbance areas within the Outer Harbour Development will be undertaken to monitor for the presence of new weed infestation areas or new weed species.
2.4	Contingencies
	<ul style="list-style-type: none"> ▶ Topsoil will be stockpiled from cleared areas, including those known to contain Priority Flora, and reused where possible.

Table 12.4 – Dredging and Dredge Spoil Disposal

3.	Proposed Outcome Based Condition 3: Dredging and Dredge Spoil Disposal
3.1	Objective and Outcome
	The proponent will manage its dredging activities related to the project to reduce: <ul style="list-style-type: none"> ▶ Impacts on water and sediment quality. ▶ Losses of marine benthic primary producer habitat and communities, so as not to exceed the predicted levels of acceptable loss.
3.2	Management Measures
	The following specific management measures will be adopted by the proponent in order to achieve the above outcomes: <ul style="list-style-type: none"> ▶ Dredging to be minimised through effective works planning and design. ▶ Strategic positioning of spoil grounds to avoid sensitive habitats and ongoing spoil ground management. ▶ TSHDs will be fitted with a turbidity reducing valve within the overflow pipe in order to minimise disturbance.
3.3	Monitoring and Reporting
	The proponent will undertake the following monitoring in conjunction with the above management measures: <ul style="list-style-type: none"> ▶ Bathymetric surveys demonstrating dredging and spoil disposal has been undertaken within the approved project footprint. ▶ A tiered trigger level approach will be applied to the zones of impact and influence, whereby the exceedance of each subsequent level would result in a greater degree of monitoring and/or management. ▶ Logging of all dredged materials and surveyed dredged quantities (net measured in situ prior to dumping) to be recorded for management purposes. ▶ The scope and frequency of reporting will be by agreement with the EPA but will, as a minimum, comprise an annual report capturing the key criteria.
3.4	Contingencies
	Implement an adaptive approach which includes identification of alternative spoil ground and dredge areas if impacts at a particular location exceed impact thresholds. A tiered trigger level approach will be applied to the zones of impact and influence, whereby the exceedance of each subsequent level would result in a greater degree of monitoring and/or management. Reporting of incidents or other relevant occurrences to the relevant statutory authority.

Table 12.5 – Marine Fauna

4.	Proposed Outcome Based Condition 4: Marine Fauna
4.1	Objective and Outcome
	The proponent will manage its project marine activities during the construction and operational phases to reduce the impacts on marine fauna. The proponent will ensure the placement of spoil disposal grounds occur in areas with low representation of significant benthic primary producer habitat thus creating an outcome where sensitive habitats are avoided and potential habitat impacts are minimised.
4.2	Management Measures
	The following specific management measures will be adopted by the proponent in order to achieve the above outcomes: <ul style="list-style-type: none"> ▶ Prior to commencement of construction, designated crew (one per vessel) will be trained as Marine Fauna Observers, and trained to observe for marine turtles and marine mammals, record sightings and the actions to be taken in event of sightings, injury or mortality. ▶ Site inductions for all vessel crew and awareness programs covering procedures to be undertaken to minimise disturbance to marine fauna. ▶ Operators of specified vessels will be required to maintain a watch for marine turtles and marine mammals, and if they are spotted, vessels will avoid impacting the fauna (within safe operational constraints of the vessel). ▶ If marine mammals or marine turtles are sighted in the area, relevant project vessels operating in the area will be notified. ▶ The maximum allowed speed for construction vessels will be in accordance with Port Hedland Port Authority regulations. ▶ A log detailing marine turtle and marine mammal (except dolphin) sightings will be maintained on all vessels. ▶ Any incidents that relate to mammal injury/mortality will be documented and reported to BHP Billiton Iron Ore. BHP Billiton Iron Ore report all incidents of injury or mortality to the DEC and DSEWPaC within 48 hours.
4.3	Monitoring and Reporting
	The proponent will undertake the following monitoring in conjunction with the above management measures: <ul style="list-style-type: none"> ▶ The marine fauna observers will complete daily records of all sightings and report incidents to BHP Billiton Iron Ore who will determine appropriate actions.
4.4	Contingencies
	Any observed breaches of controls will be investigated fully and additional corrective measures devised with the aim of preventing any recurrences. Reporting of incidents or other relevant occurrences to the relevant statutory authority.

Table 12.6 – Public Amenity (Air Quality)

5.	Proposed Outcome Based Condition 6: Air Quality
5.1	Objective and Outcome
	<p>Cumulative dust modelling conducted for the proposed BHP Billiton Iron Ore expansions, including the Outer Harbour Development, predicts:</p> <ul style="list-style-type: none"> ▶ a cumulative annual average concentration of 58.1 µg/m³ at the Hospital receptor; and ▶ a cumulative annual average concentration of 39.1 µg/m³ and 48.9 µg/m³ at South Hedland and Wedgefield, respectively. <p>As the predicted cumulative annual average concentrations of TSP are less than the long-term public amenity target of 65 µg/m³, the dust emission levels from the proposed Outer Harbour Development will meet the relevant statutory requirements and will not adversely affect the amenity of the local community.</p>
5.2	Management Measures
	<p>The Dust Management Program will be applied during the operation of the proposed Outer Harbour Development. The Dust Management Plan requires that BHP Billiton Iron Ore includes best practicable dust control during the design phase of any proposed expansion. Equipment and processes have been considered to enhance mine to port controls including ensuring ore at the mines is conditioned to optimum moisture content and that moisture content is maintained throughout the various materials handling processes at the port by the efficient use of water.</p>
5.3	Monitoring and Reporting
	<p>The proponent will undertake the following monitoring in conjunction with the above management measures:</p> <ul style="list-style-type: none"> ▶ Use of the Proactive Management System (PaMS) to predict adverse meteorological conditions to ensure that appropriate dust reductions are undertaken. ▶ The scope and frequency of reporting will be by agreement with the EPA but will, as a minimum, comprise an annual report capturing the key criteria.
5.4	Contingencies
	Where community concerns arise then these shall be addressed through BHP Billiton Iron Ore’s community response mechanisms.

Table 12.7 – Public Amenity (Noise)

6.	Proposed Outcome Based Condition 7: Noise
6.1	Objective and Outcome
	<p>Noise modelling conducted for the operation of fixed plant at the proposed Outer Harbour Development indicates that under worst case meteorological conditions and without the implementation of noise mitigation measures, noise criteria at/in and around Port Hedland is predicted to be exceeded for all but Wedgefield. Cumulative noise modelling conducted for the operation of fixed plant at the proposed BHP Billiton Iron Ore expansions and the Outer Harbour Development indicates that under worst case meteorological conditions and without the implementation of noise mitigation measures, noise criteria at/in and around Port Hedland is predicted to be exceeded for all but Wedgefield.</p>
6.2	Management Measures
	<p>BHP Billiton Iron Ore has integrated noise management into the existing certified Environmental Management System through the implementation of an Environmental Noise Reduction Management Program to improve the control and management of noise emissions from its Port Hedland operations. The program is supported by noise action plans which address each phase of the life cycle of the Port infrastructure, design and engineering, procurement, operation and maintenance.</p> <p>Potential engineering measures to be assessed include the installation of:</p> <ul style="list-style-type: none"> ▶ noise barriers; ▶ enclosures for conveyor drives and transfer stations; and ▶ low noise conveyor idlers.
6.3	Monitoring and Reporting
	<p>The proponent will undertake the following monitoring in conjunction with the above management measures:</p> <ul style="list-style-type: none"> ▶ Regular monitoring and maintenance of equipment so that equipment remains in good working condition and noise emissions are kept to a minimum.
6.4	Contingencies
	Where community concerns arise then these shall be addressed through BHP Billiton Iron Ore’s community response mechanisms.

Table 12.8 – Environmental Management Programs and Supporting Environmental Management Plans – Construction

Management Mechanism	Purpose	Draft
Program		
Construction Environmental Management Program (CEMP)	Over-arching program to manage all relevant environmental factors associated with the terrestrial construction (clearing and earthworks, vehicle and equipment access, noise and dust emissions) phase.	Existing CEMP to be revised prior to construction activities
Supporting Environmental Management Plans		
Acid Sulphate Soil Management Plan (ASSMP)	Provide an operational methodology to reduce the potential risks to the environment due to the disturbance of PASS and/or Actual Acid Sulphate Soils material during construction works.	Appendix A7
Significant Terrestrial Species Management Plan (STSMP)	Reduce the potential impacts to significant flora and fauna associated with the construction of landside infrastructure.	Appendix A6
Mangrove Management Plan (MMP)	Limit the direct loss of mangroves associated with construction of the infrastructure corridor to the approved footprint and disturbance envelope, and to avoid indirect impacts to the mangrove ecosystem of the Port Hedland Harbour associated with the Project.	Appendix A2
Cultural Heritage Management Plan (CHMP)	Reduce the risk of impacts to sites of cultural significance as a result of landside construction activities.	To be provided
Noise Management Plan (NMP)	The purpose is to reduce noise emissions during construction of terrestrial infrastructure	To be developed in conjunction with the terrestrial facilities contractor (when appointed)
Program		
Marine Facilities Construction Environmental Management Program (MFCEMP)	Over-arching program to manage all relevant environmental factors associated with the marine construction (pile driving, vessel operations) phase of the proposed Outer Harbour Development.	To be developed in conjunction with the marine facilities contractor (when appointed)
Supporting Environmental Management Plans		
Marine Mammal Management Plan (MMMP)	Reduce potential impacts to marine mammals as a result of marine based project activities such as vessel movements and pile-driving.	Appendix A4
Marine Turtle Management Plan (MTMP)	Reduce potential impacts to marine turtles as a result of construction and dredging activities associated with the Outer Harbour Development.	Appendix A1
Mangrove Management Plan (MMP)	Limit the direct loss of mangroves associated with construction of the infrastructure corridor to the approved footprint and disturbance envelope, and to avoid indirect impacts to the mangrove ecosystem of the Port Hedland Harbour associated with the Project.	Appendix A2
Invasive Marine Species Management Plan (IMSMP)	Provide a framework for managing the risk of introducing invasive marine species throughout the term of the Outer Harbour Development.	Appendix A5
Noise Management Plan (NMP)	Reduce noise emissions during construction of marine infrastructure	To be developed in conjunction with the marine facilities contractor (when appointed)
Program		
Dredging and Spoil Disposal Management and Monitoring Plan (DSDMP)	Reduce the potential impacts generated in the nearshore coastal waters resulting from dredging and dredge spoil disposal activities associated with the Outer Harbour Development.	Appendix A3

Management Process. Risk assessment workshops will be held for each contract, and a copy of the resultant risk database maintained on site by the Contractor.

For construction, BHP Billiton Iron Ore proposes to combine both the factor-specific and industry standard mitigation measures in a number of environmental management plans. These plans have been consolidated into three environmental management programs and are listed in **Table 12.8**.

An outline of the management commitments proposed to minimise any potential impacts on the environment associated with the construction of the proposed Outer Harbour Development is included in **Table 12.10**.

Construction Environmental Management Program

The Construction Environmental Management Program (CEMP) will provide a framework for the environmental management of the terrestrial construction activities associated with the proposed Outer Harbour Development. To be relevant and effective, the construction environmental management program will be finalised in conjunction with the design and construction contractor. Key components of the program are:

- ▶ an Acid Sulphate Management Plan;
- ▶ a Significant Terrestrial Species Management Plan;
- ▶ a Cultural Heritage Management Plan;
- ▶ a Mangrove Management Plan;
- ▶ a Noise Management Plan; and
- ▶ a set of detailed strategies to avoid, mitigate or minimise impacts resulting from construction tasks or actions.

Context for the plans and strategies will be provided by introductory sections regarding potential impacts resulting from various construction activities. Each plan and strategy will include objectives, performance criteria, monitoring, reporting and corrective action processes as well as reference to BHP Billiton related documents.

All contractors will be expected to conform to the requirements of the management program and associated components as a minimum. In addition, Contractor Management Plans will be reviewed and signed off by BHP Billiton Iron Ore prior to works commencing, with the plans being audited throughout the construction phase of the project.

The management plans and associated management strategies will be iterative documents designed to be revised as required by changing risk profiles, near miss or incidents, management review and audit findings or approval requirements.

Acid Sulphate Soil Management Plan

The objectives of the Acid Sulphate Soil Management Plan are to minimise the risk to the environment resulting from Acid Sulphate Soils by:

- ▶ defining areas of Potential Acid Sulphate Soils (PASS);
- ▶ providing an operational methodology to reduce the potential risks to the environment due to the disturbance of PASS and/or Actual Acid Sulphate Soils (AASS) material during construction works; and
- ▶ documenting monitoring and contingency methods for implementation during construction works.

The Plan provides a methodology and ongoing system of monitoring to deal with and appropriately handle both planned and potentially unplanned occurrence of acid sulphate soil. It also deals with the potential risks from associated dewatering and provides suitable methodology for handling and monitoring dewatering discharges.

The central theme of the management process is to closely monitor soil and dewatering discharge with greater emphasis on high risk areas and to have clear measures to adopt when acid sulphate soils and related dewatering discharges are encountered.

Significant Terrestrial Flora and Fauna Management Plan

The Plan outlines general management measures for flora and fauna, and more prescriptive specific management measures aimed at the conservation species of interest i.e. level 1, level 2 and level 3 species, alongside monitoring and reporting procedures.

Three significant terrestrial fauna species and five significant flora species have been identified in the project area and an additional 15 significant species may potentially occur. The impacts to significant flora are likely to be restricted to the construction phase during vegetation clearing whereas impacts to fauna are likely to continue into the operations phase. The approach taken in the Plan will ensure that during construction of the project, impacts will be focussed within a disturbance envelope.

Cultural Heritage Management Plan

The Plan sets out the practices by which sites within the vicinity of BHP Billiton Iron Ore's operations at the port will be managed. The aims of this Plan are:

- ▶ to minimise disturbance to Aboriginal heritage sites;
- ▶ to establish appropriate management and protective measures for Aboriginal heritage sites including fencing, signage, salvage and scientific studies in accordance with the *Aboriginal Heritage Act 1972*;
- ▶ to involve the Kariyarra in the implementation of the Plan;
- ▶ to avoid Aboriginal heritage sites where practical and revising the disturbance footprint if an Aboriginal site is identified;
- ▶ to ensure all personnel and contractors are aware it is a requirement to report any potential, previously unknown Aboriginal heritage sites in the vicinity of operations;
- ▶ to ensure that any proposals to disturb an Aboriginal heritage site for the purposes of the Project take into account the provisions of the *Aboriginal Heritage Act 1972*, other relevant legislation and following consultation with the Kariyarra;
- ▶ to ensure that all personnel and contractors are made aware of their requirements under the *Aboriginal Heritage Act 1972* and of the location of Aboriginal heritage sites subject to management measures; and
- ▶ to implement procedures complying with Department of Indigenous Affairs (DIA) Guidelines in the event that human skeletal remains are uncovered.

Mangrove Management Plan

The Mangrove Management Plan has been developed specifically to mitigate the impacts to mangroves from the proposed construction activities which in this case will mainly involve clearance works.

The Plan outlines that it will not be possible to avoid all direct impacts on mangroves. However impacts will be minimised by taking the following key actions:

- ▶ conducting early field studies as part of the pre-feasibility phase of the project so that during design, the infrastructure corridor and stockyards were positioned in order to reduce the area of mangroves to be cleared; and
- ▶ optimising the design of the infrastructure corridor, including the provision of adequate culverts, to maintain natural drainage channels and tidal flushing as much as practicable.

In light of this, the key objectives of the Plan are:

- ▶ to limit the direct loss of mangroves associated with construction of the infrastructure corridor to the approved footprint and disturbance envelope;
- ▶ to avoid indirect impacts to the mangrove ecosystem of the Port Hedland Harbour associated with the Project; and
- ▶ to maintain the abundance, diversity, geographic distribution and productivity of mangrove communities at species and ecosystem levels.

In order to achieve these objectives specific management measures have been devised in the areas of altered tidal flushing, slippage of fill, dust deposition and mangrove fauna. The management measures are backed up with detailed monitoring proposals with suitable contingency to deal with any deviations.

Noise Management Plan

The objective of the Noise Management Plan is to reduce noise emissions during construction as therefore to mitigate the impacts to local residents and fauna from the proposed construction activities. The Plan will address both terrestrial and marine construction activities.

Marine Facilities Construction Environmental Management Program

The Marine Facilities Construction Environmental Management Program will provide a framework for the environmental management of the marine construction activities (other than dredging and dredge spoil disposal activities) associated with the Project.

To be relevant and effective, the marine facilities construction environmental management program will be finalised in conjunction with the design and construction contractor. Key components of the program are:

- ▶ Marine Turtle Management Plan;
- ▶ Marine Mammal Management Plan;
- ▶ Mangrove Management Plan;
- ▶ Invasive Marine Species Management Plan;
- ▶ Noise Management Plan; and
- ▶ a set of detailed strategies to avoid, mitigate or minimise impacts resulting from construction tasks or actions.

Marine Turtle Management Plan

The Marine Turtle Management Plan focuses on managing potential impacts to marine turtles associated with the Port Hedland Outer Harbour

Development. Specifically, the Plan describes the management actions and strategies associated with construction and dredging activities and outlines monitoring programs that will be adopted to mitigate potential impacts associated with the construction phase.

The Marine Turtle Management Plan:

- ▶ provides an overview of marine turtle habitat usage within and adjacent to the Project;
- ▶ provides an overview of the potential impacts that may occur to marine turtles during construction and dredging activities;
- ▶ details the management measures that will be implemented to mitigate the potential impacts to marine turtles; and
- ▶ outlines the monitoring programmes that will be implemented during the construction activities.

The main turtle species of interest within the area are the flatback, green, loggerhead and hawksbill turtles which occur within the Port Hedland region.

The Plan covers detailed mitigation and management measures associated with dredging and dredge disposal whilst also outlining specific measures dealing with potential impacts from noise, light spill, boat strikes, water quality / turbidity, hydrocarbon leaks and spills, liquid and solid waste disposal.

In tandem with the proposed management measures, detailed monitoring and reporting measures will be outlined within the Plan.

Marine Mammal Management Plan

The Marine Mammal Management Plan focuses on managing potential impacts to marine mammals associated with the project. Specifically, the Management Plan focuses on management actions and strategies associated with construction and dredging activities; and outlines management strategies and monitoring programs that will be adopted to mitigate potential impacts associated with the construction phase.

The main marine mammals of interest and occurring in the general area are:

- ▶ Humpback Whale (*Megaptera novaeangliae*);
- ▶ Blue Whale (*Balaenoptera musculus*);
- ▶ Antarctic Minke Whale (*Balaenoptera bonaerensis*);
- ▶ Bryde's Whale (*Balaenoptera edeni*);
- ▶ Fin Whale (*Balaenoptera physalus*);

- ▶ Sperm Whale (*Physeter macrocephalus*);
- ▶ Indo-Pacific Humpback Dolphin (*Sousa chinensis*);
- ▶ Spotted or Indo-Pacific Bottlenose Dolphin; Arafura/Timor Sea populations (*Tursiops aduncus*);
- ▶ Killer Whale (*Orcinus orca*);
- ▶ Australian Snubfin Dolphin (*Orcaella heinsohni*); and
- ▶ Dugong (*Dugong dugon*).

The Plan considers the marine mammal biology and habitats including known habitat usage. The resultant marine mammal management strategies will include the following objectives:

- ▶ to reduce death and injury due to boat strike;
- ▶ prevent disturbance to marine mammals from Project-related noise e.g. pile driving;
- ▶ to prevent death or injury to marine mammals from dredging and spoil disposal; and
- ▶ accurately document mammal strandings and determine cause(s) of strandings.

The Plan will develop the reporting and incident control framework around these objectives to ensure their implementation and effectiveness.

Mangrove Management Plan

Mangrove Management Plan is described above as a supporting environmental management plan under the Construction Environmental Management Program.

Invasive Marine Species Management Plan

The Invasive Marine Species Management Plan will provide a framework for managing the risk of introducing invasive marine species from vessels and immersible equipment associated with the Project. The Plan will apply to all construction vessels and immersible equipment engaged at the direction of BHP Billiton Iron Ore, as part of the construction works.

The Plan details response options and the associated responsibilities necessary to address the identified level of risk. It considers key activities requiring management attention, key invasive species of concern and existing invasive species within the area. The risk assessment approach to the identification and control of invasive species is described in detail including the associated risk management measures which are targeted towards vessels and immersible equipment.

Noise Management Plan

The objective of the Noise Management Plan is to reduce noise emissions during construction as therefore to mitigate the impacts to local residents and fauna from the proposed construction activities. The Plan will address both terrestrial and marine construction activities. Noise emissions into the marine environment due to dredging and dredge spoil disposal and subsequent impact on marine mammals and turtles are addressed in the Dredging and Spoil Disposal Management and Monitoring Program.

Dredging and Spoil Management and Monitoring Plan

The Dredging and Spoil Disposal Management and Monitoring Plan (DSDMP) provides a framework for the environmental management of the construction dredging and disposal activities of the project. The DSDMP has a performance-based management approach, structured to allow for the management of the potential environmental impacts associated with the construction dredging activities as proposed.

The intent of the DSDMP is that as a minimum, the environmental impacts arising from the proposed construction dredging and disposal activities will be managed at levels deemed acceptable by the requirements of the Ministerial Statements, the conditions therein, and permits.

The dredging and spoil management program for the project is the key management measure due to the extent of dredging works and the potential impacts. The program is structured as follows:

- ▶ an overview of the activities to which this program applies;
- ▶ an overview of the existing marine environment and the key studies that have been completed in gaining an understanding of the region;
- ▶ the results of the sediment plume modelling and representation of the marine environmental impact predictions as recommended by draft EAG No. 7 (EPA 2010);
- ▶ the environmental Project management structure that will be implemented;
- ▶ management strategies that are proposed to manage the works; and
- ▶ the reporting requirements for the project.

The key strategies detailed in the program include:

- ▶ Benthic Habitat Management;
- ▶ Marine Mammals and Turtle Management;
- ▶ Invasive Marine Species Control;

- ▶ Spoil Ground Management;
- ▶ Waste Management;
- ▶ Hydrocarbon Management; and
- ▶ Vessel Operations Management.

The extensive, specific management measures specified under each of the strategies addresses the potential impacts and provides effective mechanisms for avoiding or mitigating these impacts.

Additional Environmental Surveys to be undertaken prior to the Commencement of Construction

To compliment the level of information available regarding the use of the project area by marine fauna including the relevant whale, dolphin and turtle species identified in the relevant assessments, BHP Billiton Iron Ore will undertake additional specialist surveys prior to the commencement of construction works. It is expected that these surveys will comprise aerial surveys over the defined study area which will focus on a range of parameters including species distribution, timing of occurrence, life history information and residency patterns.

The overall aim of the work will be to determine the seasonal distribution and relative abundance and densities of marine mammals during an approximate 12 month seasonal cycle through aerial surveys. In tandem with this, the relative importance of the modelled subtidal habitats with the project area for the conservation significant marine mammals will be assessed.

The study area for the surveys will be defined as the State and Commonwealth waters within and adjacent to the project area, extending approximately 35 km west of Finucane Island, 35 km east/north-east of Finucane Island and seaward approximately 50 km.

A systematic and comprehensive aerial transect sampling method will be utilised to estimate the abundance and distribution of marine mammals in the study area. Transects will be designed to be consistent and comparable with other marine mega-fauna surveys undertaken in the region. Transects will include the main humpback whale migratory pathway.

Night time tagging surveys will be conducted during the peak of flatback nesting season. Surveys will monitor hatch success, beach and temperature monitoring, hatchling orientation, light assessment and the satellite tracking of post-nesting female flatbacks.

A key output of the survey will be marine mega fauna (include humpback whales, dugongs and marine turtles) density maps.

The surveys and analysis will be completed prior to the commencement of marine construction activities that may affect marine mega fauna. The relevant management plans will be updated based on the results of the surveys prior to the commencement of marine construction activities that may affect marine fauna.

12.2.3 Environmental Management – Operation

Environmental issues at BHP Billiton Iron Ore’s Port Hedland facilities are managed in accordance with the BHP Billiton Iron Ore’s AS/NZ ISO 14001 certified Environmental Management System. As the operation of the proposed Outer Harbour Development will mirror the activities currently being undertaken at the Port, it is intended that this management system will function as the robust tool for environmental management across all BHP Billiton Iron Ore’s Port Hedland operations. Key components of the current EMS are:

- ▶ Dust Management Program; and
- ▶ Environmental Noise Reduction Management Program.

These programs encompass the following management plans:

- ▶ Dust Management Plan;
- ▶ Water-Use Efficiency Plan; and
- ▶ Noise Reduction Management Plan.

A summary of the operational management programs and environmental management plans is provided in **Table 12.9**. Both the Dust Management Program and the Environmental Noise Reduction Management Program will be updated where appropriate to incorporate management measures for the proposed Outer Harbour Development.

Dust Management Program

The Dust Management Program, which was developed as part of Ministerial Statement 740, is a key element of the current Environmental Management System, and will be applied to the Project. The program sets the framework for a multi-faceted approach to dust management and improved water-use efficiency. Dust Management and Water-Use Efficiency Plans are critical elements of the Dust Management Program. These plans include designated responsibilities, resources and time frames to achieve dust management and water-use efficiency objectives and targets, with systems to monitor and regularly report on progress. The plans were developed using modelling outcomes, community commentary (from the ongoing social impact assessment and more detailed engagement with neighbouring residents and businesses around dust management and mitigation) and current on-site initiatives.

The Dust Management Plan requires that BHP Billiton Iron Ore includes best practice dust control during the design phase of any proposed expansion. Equipment and processes have been considered to enhance mine to port controls including ensuring

Table 12.9 – Environmental Management Programs and Supporting Environmental Management Plans – Operation

Management Mechanism	Purpose
Program	
Dust Management Program	Set the framework for a multi-faceted approach to dust management and improved water-use efficiency for all of BHP Billiton Iron Ore’s Port Hedland operations, including the Outer Harbour Development.
Supporting Environmental Management Plans	
Dust Management Plan	Provides dust management action plans which address each phase of the life cycle of the BHP Billiton Iron Ore’s Port infrastructure, design and engineering, procurement, operation and maintenance.
Water-Use Efficiency Plan	Requires the incorporation of the responsible use of water into design and work practices for dust management.
Program	
Environmental Noise Reduction Management Program	The purpose of the program is to set the framework for a multi-faceted approach to noise reduction for all of BHP Billiton Iron Ore’s Port Hedland operations, including the Outer Harbour Development.
Supporting Environmental Management Plans	
Noise Reduction Management Plan	Provides noise reduction action plans which address each phase of the life cycle of the BHP Billiton Iron Ore’s Port infrastructure, design and engineering, procurement, operation and maintenance.

ore at the mines is conditioned to optimum moisture content and that moisture content is maintained throughout the various materials handling processes at the port by the efficient use of water. These controls extend to the implementation of proactive real time dust management and reporting systems aimed at reducing high dust events within the town of Port Hedland. Furthermore, the plans require that maintenance procedures are updated to deliver a measurable decrease in the downtime of dust control equipment thus ensuring that dust control systems remain effective. The plans also require the continued implementation of current dust management initiatives, including revegetation of open areas, road sealing, and the replacement and upgrade where required, of dust control equipment.

Water Use Efficiency Plan

The Water-use Efficiency Plan requires the responsible use of water into work practices, by realising increased efficiency of fresh water recovery. This is achieved through increased recycling and use of process water and ensuring that water management objectives are understood across the operations.

Environmental Noise Reduction Management Plan

BHP Billiton Iron Ore has integrated noise management into the existing Environmental Management System through the implementation of an Environmental Noise Reduction Management Program to improve the control and management of noise emissions from its Port Hedland operations. The program is supported by noise action plans which address each phase of the life cycle of the Port infrastructure, design and engineering, procurement, operation and maintenance.

12.2.4 Environmental Management – Decommissioning

BHP Billiton Iron Ore will prepare a Decommissioning Environmental Management Plan to be approved by the EPA prior to commencement of decommissioning of the facilities. The purpose of the Plan will be to manage all activities associated with shutdown, decommissioning and rehabilitation of the project at the end of the project lifespan.

An interim Rehabilitation Plan, which provides a framework for managing the rehabilitation of disturbed and cleared areas post completion of construction activities, will also be developed.

12.2.5 Project Environmental Monitoring

Proposed environmental monitoring programs are documented in the respective Environmental Management Plans. A summary of environmental monitoring data is presented annually in the Annual Environmental Report (AER) and would continue during the life of the project.

Annual Environmental Report

An Annual Environmental Report (AER) is prepared annually by BHP Billiton Iron Ore for all of its Western Australian Iron Ore construction projects and operations. The objectives of the AER are to:

- ▶ address all legislative requirements and commitments applicable to the project (such as conditions of the Ministerial Statement of Approval and the operating licence conditions);
- ▶ document the major activities for the reporting period and the proposed activities for the upcoming year;
- ▶ record environmental management and rehabilitation activities for the reporting year and proposed activities and developments for the upcoming year;
- ▶ provide a mechanism for BHP Billiton Iron Ore to monitor the environmental performance of the proposed development during construction and operations; and
- ▶ provide information to stakeholders about the environmental performance of the proposed development during construction and operations.

The AER is prepared in accordance with the relevant Environmental Protection Authority (EPA), Department of Environment and Conservation (DEC) and Department of Mines and Petroleum (DMP) guidelines. Where appropriate, environmental monitoring data is summarised and/or submitted in full as an appendix to the AER. The AER is available to non-government stakeholders through the DEC.

BHP Billiton Corporate Sustainable Development Reporting

As part of BHP Billiton Iron Ore's Corporate reporting program, all BHP Billiton Iron Ore operations (including the project) complete Sustainable Development questionnaires every six months. These questionnaires require each site to report on matters such as environmental management measures, initiatives and events. Annually, BHP Billiton Iron Ore releases a whole-of-business Sustainable Development Report based on the six monthly data provided by each site.

Internal Environmental Event Reporting and Management

BHP Billiton Iron Ore's system for reporting environmental events include:

- ▶ all employees and contractors are required to report environmental occurrences and hazards via their supervisor for notification and follow-up investigation and assessment;
- ▶ non-compliance or emergency events are reported to regulatory authorities as per the requirements of relevant licences and approvals; and
- ▶ significant events are reported to BHP Billiton Iron Ore at a corporate level where appropriate. BHP Billiton Iron Ore uses the First Priority enterprise reporting system, which is designed to manage the reporting, investigation, response and sign-off of environmental incidents by appropriate management personnel.

Employees and contractors are trained in event reporting procedures through the induction program, and are encouraged to report all environmental events to the relevant manager(s). The AER presents a summary of all environmental events recorded in the event reporting system.

Notification of Emergencies and Events

As soon as practicable after becoming aware of an emergency or event resulting in a release of contaminants or other potentially harmful effect on the environment BHP Billiton Iron Ore would notify the DEC of the event.

12.2.6 Project Environmental and Heritage Review Process

The Project Environmental and Heritage Review (PEAHR) process which is an element of the approved EMS will be used to ensure that appropriate land ownership and approvals are in place and that no works are carried out within heritage or environmentally sensitive areas. It is automated into a consistent and streamlined on-line workflow and extensive review process, with all relevant reviewers notified by email of each new request.

12.2.7 Project Workforce Education

Education of all BHP Billiton Iron Ore's employees and contractors is conducted to minimise potential impacts regarding sensitivities of the environment or inadequate application of site management procedures.

BHP Billiton's HSEC Standards sets a requirement for BHP Billiton Iron Ore to put in place induction programs for employees, contractors and visitors that address relevant HSEC objectives, hazards, risks, controls, behaviours and consequences of inappropriate behaviour. Ongoing education and awareness will be provided through inductions, educational posters and toolbox meetings.

Workforce training and induction practices will continue throughout the life of the project.

12.3 Key Environmental Management Commitments

BHP Billiton Iron Ore is committed to implementing the design modifications, mitigation measures and standard controls identified within this PER/Draft EIS document so that all environmental risks that may result from the proposed Outer Harbour Development are minimised and a sustaining overall net benefit to the community is achieved.

A list of the key commitments as identified in the environmental impact risk assessment process is provided in **Table 12.10** (refer to **Section 8**).

Table 12.10 – Environmental Management Commitments

Action No.	Topic	Commitment	Objectives	PER/Draft EIS Reference	Timing	Advice from
1	Training and Awareness	Provide environmental training and inductions to all personnel accessing the project areas.	<ul style="list-style-type: none"> ▶ Ensure workforce compliance with environmental requirements, commitments, guidelines and plans. 	Section 12.2.4	Prior to accessing project areas	
2	Auditing and Inspection	Undertake environmental audits during construction and operations.	<ul style="list-style-type: none"> ▶ Ensure compliance with environmental requirements, commitments, guidelines and plans. ▶ Provide mechanisms for continuous improvement in environmental performance. 	Section 12.1	During construction and operations	
3	Incident Reporting	Implement environmental incident reporting procedure.	<ul style="list-style-type: none"> ▶ Ensure that commitments in this PER/Draft EIS, the Ministerial Statement and management plans are complied with. 	Section 12.2.3	During construction and operations	
4	Emergency Response and Preparedness	Develop and implement emergency preparedness and response procedures that include: <ul style="list-style-type: none"> ▶ cyclone response; ▶ emergency response and management structure; and ▶ oil and chemical spill response. 	<ul style="list-style-type: none"> ▶ Demonstrate ability to deal with emergency and non-routine situations. 	Section 12.2.3	Pre construction	
5	Construction Environmental Management	BHP Billiton Iron Ore and its contractors will implement a Construction Environmental Management Program inclusive of procedures and monitoring program to encompass the Project and ensure that the management measures identified for each of the factors and aspects are implemented. The following factors and aspects will be addressed: <p>Land disturbance</p> <p>Significant species</p> <p>Acid sulphate soils</p> <p>Mangroves</p> <p>Air quality</p>	<ul style="list-style-type: none"> ▶ Manage all relevant environmental factors associated with the terrestrial construction phase of the project. ▶ To prevent unauthorised clearing of land. ▶ To minimise adverse impacts from clearing. ▶ To comply with BHP Billiton Iron Ore Project Environmental and Aboriginal Heritage Review process (PEAHR). ▶ To minimise impacts to significant terrestrial species. ▶ To minimise the acidification of soil, surface water and groundwater. ▶ To prevent the unauthorised clearing of mangroves. ▶ To minimise adverse impacts to mangroves from clearing and other construction activities. ▶ To ensure that the effects of dust generation on the environment and communities are minimised. 	Section 12.2.1	Pre terrestrial construction	DEC
				Section 9.1.5 Section 9.2.5	During terrestrial construction	
				Section 9.1.5	During terrestrial construction	
				Section 9.3.5	During terrestrial construction	
				Section 10.1.5	During terrestrial construction	
				Section 11.3.5 Section 11.4.5	During terrestrial construction	

Action No.	Topic	Commitment	Objectives	PER/Draft EIS Reference	Timing	Advice from
		Noise and vibration	<ul style="list-style-type: none"> ▶ To minimise the impacts of noise on the amenity of the surrounding areas during construction. 	Section 11.3.5 Section 11.4.5	During terrestrial construction	
		Indigenous heritage	<ul style="list-style-type: none"> ▶ To minimise adverse effects on sites of Aboriginal significance and comply with relevant heritage legislation. 	Section 11.2.5	During terrestrial construction	
		Abstraction of groundwater	<ul style="list-style-type: none"> ▶ To minimise impacts to groundwater and groundwater-dependent ecosystems. 	Section 9.7.5	During terrestrial construction	
		Surface water and drainage	<ul style="list-style-type: none"> ▶ To minimise erosion and sedimentation as far as practical. ▶ To minimise soil disturbance, degradation and erosion. ▶ To minimise turbidity impacts on surface waters. 	Section 9.6.5	During terrestrial construction	
		Rehabilitation and demobilisation	<ul style="list-style-type: none"> ▶ To maximise rehabilitation success by minimising the effects of vegetation clearance. ▶ To ensure that the area is appropriately rehabilitated with regard to the control of erosion and sedimentation. 	Section 9.1.5 Section 9.2.5	During and post terrestrial construction	
		Light spill	<ul style="list-style-type: none"> ▶ To minimise light spill impacts on marine and terrestrial fauna and on visual and public amenity. 	Section 9.2.5 Section 11.5.5	During terrestrial construction	
		Fire	<ul style="list-style-type: none"> ▶ To minimise environmental impacts arising from accidental fires. 	Section 9.1.5	During terrestrial construction	
		Mosquito habitat	<ul style="list-style-type: none"> ▶ To minimise the generation of habitat for the breeding of nuisance insects, such as mosquitoes. 	Section 11.4.5	During terrestrial construction and operation	
		Storage and handling of hazardous materials	<ul style="list-style-type: none"> ▶ To minimise the impacts from handling and storage of fuel, oil and chemicals. 	Section 9.1.5	During terrestrial construction	
		Solid and liquid wastes	<ul style="list-style-type: none"> ▶ To minimise environmental impacts associated with waste generation. ▶ Maximise waste reduction, recycling, reuse and recovery. ▶ To minimise impacts on existing waste facilities. 	Section 9.1.5	During terrestrial construction	
		Greenhouse gases	<ul style="list-style-type: none"> ▶ To minimise the generation of greenhouse gases. 	Section 11.9.5	During terrestrial construction	
		BHP Billiton Iron Ore will implement and review the Construction Environmental Management Program throughout the construction phase.		Section 12.	During and post terrestrial construction	

Action No.	Topic	Commitment	Objectives	PER/Draft EIS Reference	Timing	Advice from
6	Marine Facilities Construction Environmental Management	BHP Billiton Iron Ore and its contractors will implement a Construction Environmental Management program inclusive of procedures and monitoring programs to encompass the marine components of the proposed Outer Harbour Development and ensure that the management measures identified for each of the factors and aspects are implemented. The following factors and aspects will be addressed:	<ul style="list-style-type: none"> ▶ Manage all relevant environmental factors associated with the marine construction phase of the proposed Outer Harbour Development. 		Pre Marine Construction	DEC, DSEWPac
		Marine mammals	<ul style="list-style-type: none"> ▶ To minimise impacts on marine mammals from marine construction activities. 	Section 10.2.5	During marine construction	
		Turtles	<ul style="list-style-type: none"> ▶ To minimise impacts on marine turtles from marine construction activities. 	Section 10.2.5	During marine construction	
		Noise and vibration	<ul style="list-style-type: none"> ▶ To minimise the impacts of noise on marine fauna and the amenity of the surrounding areas from marine construction activities. 	Section 10.2.5	During marine construction	
		Light spill	<ul style="list-style-type: none"> ▶ To minimise light spill impacts on marine fauna and on visual and public amenity. 	Section 10.2.5 Section 11.5.5	During marine construction	
		Spill response	<ul style="list-style-type: none"> ▶ To minimise impacts to the marine environment arising from spills of hazardous materials during marine construction activities. 	Section 10.2.5	During marine construction	
		Storage and handling of hazardous materials	<ul style="list-style-type: none"> ▶ To minimise the impacts from handling and storage of fuel, oil and chemicals. 	Section 10.2.5	During marine construction	
		Solid and liquid wastes	<ul style="list-style-type: none"> ▶ To minimise environmental impacts associated with waste generation. ▶ Maximise waste reduction, recycling, reuse and recovery. ▶ To minimise impacts on existing waste facilities. 	Section 10.2.5	During marine construction	
		Invasive marine species	<ul style="list-style-type: none"> ▶ To prevent the introduction and establishment of invasive marine species 	Section 11.5.5	During marine construction	
		BHP Billiton Iron Ore will implement and review the marine Facilities Construction Environmental Management Program throughout construction phase.				During Construction

Action No.	Topic	Commitment	Objectives	PER/Draft EIS Reference	Timing	Advice from
7	Dredging and Spoil Disposal Management	BHP Billiton Iron Ore and its contractors will implement a Dredging and Spoil Disposal Management Plan inclusive of procedures and monitoring program to encompass the dredging and spoil disposal components of the proposed Outer Harbour Development to ensure that management measures identified for each of the factors are implemented. The following factors and aspects will be addressed:	<ul style="list-style-type: none"> ▶ To ensure compliance with environmental commitments made in this PER/Draft EIS. ▶ To minimise the indirect impacts to subtidal benthic primary producers (scleractinian coral and macroalgae) and habitats from dredging and disposal activities (sedimentation, light deprivation and shading). ▶ To minimise impacts on water quality (turbidity, oxygen depletion, light attenuation). 	Section 10.1.5	Pre dredging and spoil disposal activities	DEC, DSEWPac
		Coral health monitoring program	<ul style="list-style-type: none"> ▶ To minimise indirect impacts to corals. 	Section 10.1.5	During dredging and spoil disposal activities	
		Marine Mammals and Turtles	<ul style="list-style-type: none"> ▶ To minimise impacts to marine mammals and turtles. 	Section 10.2.5	During dredging and spoil disposal activities	
		Invasive marine species	<ul style="list-style-type: none"> ▶ To prevent the introduction and establishment of invasive marine species. 	Section 10.2.5	During dredging and spoil disposal activities	
		Light spill	<ul style="list-style-type: none"> ▶ To minimise light spill impacts on marine fauna and on visual and public amenity. 	Section 10.2.5	During dredging and spoil disposal activities	
		Spill response	<ul style="list-style-type: none"> ▶ To minimise impacts to the marine environment arising from spills of hazardous materials during dredging and spoil disposal activities. 	Section 10.2.5	During dredging and spoil disposal activities	
		Storage and handling of hazardous materials	<ul style="list-style-type: none"> ▶ To minimise the impacts from handling and storage of fuel, oil and chemicals. 	Section 10.2.5	During dredging and spoil disposal activities	
		Solid and liquid wastes	<ul style="list-style-type: none"> ▶ To minimise environmental impacts associated with waste generation. ▶ To maximise waste reduction, recycling, reuse and recovery. ▶ To minimise impacts on marine fauna from accidental ingestion. 	Section 10.2.5	During dredging and spoil disposal activities	
		Noise and vibration	<ul style="list-style-type: none"> ▶ To minimise the impacts of noise on marine fauna from dredging and spoil disposal activities. 	Section 10.2.5	During dredging and spoil disposal activities	

Action No.	Topic	Commitment	Objectives	PER/Draft EIS Reference	Timing	Advice from
8	Performance	<p>BHP Billiton Iron Ore will implement and revise the Dredging and Spoil Disposal Management Plan throughout dredging and capital activities.</p> <p>Maintain a high standard of performance through:</p> <ul style="list-style-type: none"> ▶ enforcing compliance with site Construction Environmental Management Plans; ▶ implementing training and awareness; ▶ undertaking audits and providing feedback; and ▶ empowering site personnel to ensure adherence with environmental procedures. 	<p>Ensure compliance with environmental commitments in this PER/Draft EIS, in the Ministerial Statement, and with BHP Billiton Iron Ore's Corporate Sustainability Framework.</p>		<p>During dredging and spoil disposal activities</p> <p>During construction</p>	