21. Environmental Management Plans

21.1 Effects of Blasting on Marine Ecosystems

Blasting is not expected to be required during construction of the Port of Airlie project. In the event that blasting is required, it will only be undertaken in dewatered areas behind the cofferdams and bunds. The following will be incorporated into the construction EMP:

Impact	Management Principles	Performance Criteria	Monitoring Requirements	Corrective Action	Responsibility
Effects of blasting on fish, turtles and marine mammals	☐ Ensure that blasting does not effect dugongs and turtles ☐ Minimise impacts of blasting on fish and other aquatic species	☐ No effects on dugongs and turtles ☐ Minimal effects on fish and other aquatic species	Visual inspection before and after blasting events	Gently scare away dugongs, turtles and fish prior to blasting	Construction contractor

21.2 Baseline Monitoring

It is acknowledged in the Supplementary EIS that a range of baseline monitoring activities will be conducted prior to commencement of construction of the proposed development. These baseline monitoring activities are intended to establish monitoring sites and methodologies for use during construction and initial years of operation of the proposed marina development as well as providing a picture of the physical, chemical and biological characteristics of Boathaven Bay prior to construction so that any changes during construction and operation can be measured. Baseline monitoring will also supplement information on Boathaven Bay gathered since 1988 (Sinclair Knight Merz 1988, Burchill/WBM 1998, FRC Environmental various reports and Sinclair Knight Merz 2002) as presented in the Supplementary EIS.

Given the range and period of data already available on physical, chemical and biological characteristics of Boathaven Bay, further detailed information was not considered necessary for presentation in the Supplementary EIS. Existing data did not identify any particular characteristics of Boathaven Bay that would preclude the suitability of the bay for the proposed development. Results obtained from the various monitoring events showed sufficient consistency that further detailed monitoring during the Supplementary EIS was considered unlikely to provide any additional information that would change the outcome of the impact assessment.

21.3 Further Investigations

21.3.1 Hydrodynamic Modelling

Hydrodynamic modelling is expected to include:

- 3 dimensional modelling of currents and flows in Boathaven Bay and surrounds
- Sediment transport patterns
- Sediment deposition rates and patterns
- Plume modelling.

21.3.2 Water Quality Baseline Monitoring

Water quality baseline monitoring will be carried out prior to commencement of construction.

Objective

To establish baseline water quality conditions in the vicinity of the site and at a reference site.

Sampling Locations:

Representative sampling locations will be established within Boathaven Bay and Campbell's Creek estuary. A reference site will also be established in Pioneer Bay, in an area of similar catchment land uses as Boathaven Bay.

Samples will be taken at surface and several intervals in the water column, depending on the depth at the sample location.

Frequency and Timing

Sampling events will be determined to allow understanding of:

- Fluctuations in water quality with tidal conditions
- Influence of rainfall events on water quality.

It is anticipated that at least three sampling events will be carried out over a period of two months, with sampling on the incoming and outgoing tides.

In addition, at least two sampling events will be undertaken immediately following rainfall events.

Parameters:

It is anticipated that the following parameters will be included in the baseline sampling program:

- Salinity (field and lab)
- Temperature (field and lab)
- Dissolved oxygen (field and lab)
- pH (field and lab)
- Turbidity (field)
- total suspended solids (lab)
- Nutrients N and P (total, bioavailable)
- Metals
- Chlorophyll a.

21.3.3 Biological Baseline Survey

Additional survey of ecosystem distribution and health and biological indicators in Boathaven Bay will be undertaken prior to commencement of construction. Ecosystems and indicators will include:

- Seagrasses: Distribution, species composition and depth range
- Mangroves: Distribution and signs of stress

- Turbid corals: Evidence of stress
- Macroinvertebrates: abundance and community structure indicators.

Outcomes of the baseline ecosystem survey will include:

- Established locations for ongoing ecosystem and biological indicator monitoring.
- Agreed baseline assessment of ecological health of Boathaven Bay for comparison with future trends.
- Agreed indicators of ecosystem stress for Boathaven Bay.

21.3.4 Baseline Noise Studies

Additional information on existing noise conditions in the vicinity of the site will be collected using standard EPA noise survey techniques. This will provide a basis for establishment of:

- Night time background noise levels for use during construction (no audible noise is allowed at night during the construction period)
- Day, evening and night background noise levels for calculation of acceptable noise levels from the boat maintenance area.

This information will be incorporated into construction environmental management requirements and will also be used during detailed design of boat maintenance facilities to ensure that acceptable noise levels can be met.

21.3.5 Geotechnical Investigations

Geotechnical investigations will be carried out for all soils/muds to be excavated from the development site. Before construction commences, the soils will be will be tested for mechanical and chemical properties and the information used in technical design of the works. Testing is expected to include:

- Chemical characteristics, including nutrients and heavy metals
- Acid generating potential
- Settlement rates
- Mechanical strength and ability to support buildings and infrastructure
- Dewatering/drying characteristics.

Testing for acid sulphate soils will be carried out in accordance with QASSIT Guidelines.

21.4 Effects on Accommodation

The section of the EMP relating to accommodation for construction workers is revised as follows:

Impact	Management Principles	Performance Criteria	Monitoring Requirements	Corrective Action	Responsibility
Impacts on cost and availability of accommodation due to housing of workforce	❑ Proponents and contractors to supply temporary worker accommodation during construction	☐ Construction contractor to develop accommodation plan, taking into consideration availability and cost of	☐ Plan implemented ☐ Housing availability data	☐ Provide additional temporary housing if availability is low such that local residents are not	☐ Construction contractor

Impact	Management Principles	Performance Criteria	Monitoring Requirements	Corrective Action	Responsibility
	workforce peaks ❑ Accommodation in private rental market to be such that different levels of rental housing remain available in the area.	housing in Airlie Beach and Proserpine as part of contract requirements ☐ Details of plan to be provided in bid documents ☐ No significant impacts on rent levels or rental housing supply that can be attributed to the construction works.		disadvantaged ☐ Provide additional transport options from Proserpine and other locations as necessary to relieve demand in Airlie Beach/Cannonvale	

21.5 Dredge Management Plan

A comprehensive Dredge Management Plan will be prepared for capital dredging and earthworks associated with marina excavation and land reclamation. Further Dredge Management Plans will be developed for maintenance dredging in later years.

The Dredge Management Plan will incorporate results of detailed hydrodynamic modelling, water quality investigations and biological surveys in Boathaven Bay and surrounds. The outputs of these studies will be used to:

- ❑ Identify locations where water flows may carry plumes of sediment or other contaminants to sensitive marine and intertidal ecosystems
- ❑ Assess appropriate water quality standards for Boathaven Bay and surrounding waters, based on the requirements of the EPP(Water) (Section 9) which requires consideration to be given to:
  - Site specific data
  - The Australian Water Quality Guidelines (ANZECC 2000)
  - Other reputable studies which may indicate appropriate water quality indicators (for example the dredge monitoring results from the recent Nelly Bay dredging program).
- ❑ Identify trigger levels for water quality indicators that identify the need for ameliorative action to avoid impacts on ecological resources through degradation of water quality
- ❑ Identify appropriate responses when trigger levels are reached, for example use of silt curtains, changes in dredging method or location
- ❑ Identify other protection measures such as coordination of dredging activities with tidal flows, monitoring for marine megafauna
- ❑ Specify an appropriate monitoring program for the dredging activity.

Dredging will be undertaken under an Environmental Authority issued by EPA and any other requirements set out in that Environmental Authority will be incorporated into the Dredge Management Plan. In addition, dredging policies and procedures

established by DPI and GBRMPA will be reviewed and adhered to wherever applicable to the project (see also **Section 4.1.1** of this Addendum).

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