City Pacific Limited

Townsville Ocean Terminal Supplementary EIS

Draft Interim Supplementary Nature Conservation Report

Monday, 21 July 2008

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Hyder Consulting

City Pacific Limited

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Habitat mapping

Seagrass sampling was undertaken once on 11 September 2007. More detailed biological distribution mapping of the future development area (FDA) and areas located immediately downstream has since been undertaken in May and June 2008.

Seagrasses were found within the project footprint in low densities, with scattered patches in the northern half of the area, and more contiguous coverage in the southern half. Seagrass areas covered 17.9ha, or 30.5% of the project site. No dugong feeding scars were noted in the course of this survey.

The percentage cover of macroalgal species within the project footprint was minimal (7.9ha, or 13.9% of the project site), and spread out in sparse patches over the southern two thirds of the area.

There was a low density of benthic macroinvertebrates, with benthic macroinvertebrates found across 21.3ha or 36.3% of the site. Marine macroinvertebrate burrow density varied across the site, with densities higher towards the centre and western edge of the site.

No seagrass or other marine plants were found in the immediate vicinity to the north-west of the FDA. A large bed of Caulerpa was found extending along the length of the Strand, and overlapped by a large seagrass bed of variable density towards Kissing Point.

No seagrasses or other organisms were found in nine grab samples taken from beneath the footprint of the proposed temporary bridge. Mangrove trees, Guinea grass, Para grass and Townsville wattle were found on creek banks.

Dolphins, dugongs and turtles

A separate comprehensive Ecological Impact Assessment of potential effects of the project on dolphins, dugongs and marine turtles is being prepared by Simon Mustoe of Applied Ecology Solutions. This Ecological Impact Assessment will incorporate the findings of an investigation of the potential noise effects of piling on marine mammals (to be carried out by Dr Christine Erbe of JASCO Research), as well as developing a formal mitigation strategy and an assessment of potential impacts of the project post-mitigation. Accordingly, this *Interim Supplementary Nature Conservation Report* does not include an investigation into the potential effects of the project on marine mammal and turtle species.

Avifauna

An avifauna report was completed by a specialist consultant, Dr Justin Watson (Natural Solutions Environmental Consultants) in May 2008, in order to address concerns raised by the Townsville Region Bird Observers

Club (TRBOC) in response to the original Townsville Ocean Terminal project EIS.

The specialist avifauna report indicates that although the site is frequented by a number of species, a majority of the species identified at the site by both Dr Watson and the TRBOC would be considered transient and '*not resident or reliant upon the site*'. Dr Watson has indicated that the site does not represent significant habitat critical to the survival of any bird species listed as threatened under Commonwealth or Queensland legislation, and that higher quality habitat is located nearby.

A number of mitigation measures have been proposed, including reservation of part of the final site as compensatory bird habitat. Impacts of the project on local bird species, following implementation of mitigation measures, are expected to be no more than temporary.

Potential impacts

The construction methodology currently proposed for the TOT project involves sealing off the duckpond area, dewatering, land reclamation and construction. The project therefore represents a direct removal of habitat in this area. Part of this habitat removal is expected to be only temporary, as marine species are likely to recolonise the area following completion of construction.

A full assessment of potential impacts of the project will be completed following finalisation of the construction methodology, mapping of marine habitat within the summer period, and completion of specialist reports relating to marine mammal and turtle species. This section of the report is therefore not complete, as the full range of impacts is currently being assessed.

Mitigation and offset measures

As agreed with DPI&F following discussions held in May 2008, a second round of marine habitat mapping will be carried out by the proponent in late October/early November 2008, in order to provide a snapshot of likely maximum coverage of seagrass (immediately prior to the height of summer). Details of appropriate mitigation and offsets will only be able to be finalised following completion of this round of mapping in summer. In the interim, the proponent has acknowledged potential maximum offsets calculated by DPI&F based on an estimated maximum coverage of seagrass within the project footprint, with the understanding that these offset calculations will be revised upon completion of mapping in late 2008.

Mitigation strategies relating to marine mammal and turtle species will be considered in the Ecological Impact Assessment to be completed by Simon Mustoe.

Mitigation measures relating to maintenance of water quality during construction and operational phases of the project are to be addressed in the full *Supplementary Water Quality Report* and revised Environmental Management Plans (EMPs) for the project.

A comprehensive assessment of mitigation measures appropriate to the project will be presented in the *Supplementary Nature Conservation Report* following finalisation of the proposed construction methodology, mapping of marine habitat within the summer period, and finalisation of relevant specialist reports. This section of the report is therefore not complete, as the full range of mitigation and offset measures are currently being assessed.

Monitoring programs

Following the obtaining of full seasonal data relating to seagrass coverage with the second round of mapping in late 2008, negotiations will be entered into with DPI&F and other relevant parties to confirm any requirements for ongoing monitoring and/or mapping of marine habitats and fisheries resources.

The need for any ongoing monitoring programs for dolphin, dugong, marine turtle and bird species will also be discussed with government agencies, following completion of relevant specialist reports, and conclusions presented in the final *Supplementary Nature Conservation Report*.

Management measures

Details of management and response measures relating to the nature conservation values of the site will be contained within the revised project EMPs.

2 Glossary

AES	Applied Ecology Solutions
CEMP	Construction Environmental Management Plan
DEWHA	Commonwealth Government Department of the Environment, Water, Heritage and the Arts
DPI&F	Queensland Government Department of Primary Industries and Fisheries
'duckpond'	area between the current breakwater walls, i.e. synonymous with the future development area (FDA)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Queensland Government Environmental Protection Agency
FDA	future development area
GPS	global positioning system
NQCC	North Queensland Conservation Council
OEMP	Operation Environmental Management Plan
TCC	Townsville City Council
TLMAC	Townsville Local Marine Advisory Committee
TOT	Townsville Ocean Terminal
TPA	Townsville Port Authority
TRBOC	Townsville Region Bird Observers Club

3 Introduction

Hyder Consulting was commissioned by City Pacific Limited to respond to the submissions received in relation to the nature conservation aspects of the Environmental Impact Statement for the proposed Townsville Ocean Terminal project.

A number of comments were received from individuals, organisations, community groups and government agencies regarding potential hazards to native species and sensitive local receptors. This *Interim Supplementary Nature Conservation Report* outlines the current status of responses to these submissions, and supersedes earlier TOT EIS documents in any case of apparent contradiction. A full *Supplementary Nature Conservation Report* will be produced following the collection of further biological distribution data in summer (November) 2008.

Management and response measures to protect the environmental values of the areas surrounding the FDA will be presented in the revised CEMP and OEMP.

Issues specifically relating to marine mammal and turtle species will be addressed in a separate comprehensive Ecological Impact Assessment for these species being prepared by Simon Mustoe of Applied Ecology Solutions.

Other documents relating to expected impacts of the project are in the process of being developed by the Flanagan Consulting Group (FCG), Townsville. At time of writing, these included:

- "*R-PF3946 – Review of Construction Issues*";
- "*R-KO0131 – Water Quality Management During Construction*"; and
- "*R-KO0123 – Potential Operational Dredging Impacts on Water Quality*".

4 Current status

The current status of flora and fauna species specifically raised as issues of concern in submissions to the original EIS is outlined in Sections 4.1 to 4.3 below.

4.1 Habitat

Seagrass sampling was undertaken once on 11 September 2007, and the results presented in Appendix 19 of the original Townsville Ocean Terminal project EIS. More detailed biological distribution mapping of the future development area (FDA) and areas located immediately downstream has since been undertaken by Dr Daniela Ceccarelli and Ben Cuff of C&R Consulting in May and June 2008, and has been summarised in this section of the *Interim Supplementary Nature Conservation Report*.

Figure 1 below illustrates the areas surveyed. The 'duckpond investigation area' was surveyed at a finer resolution than the larger 'Strand investigation area'; details of the mapping methodology are provided below. The complete marine habitat mapping report from C&R is attached as Appendix A to this *Interim Supplementary Nature Conservation Report*.

Figure 1: Drawing of 'Duckpond investigation area' and 'Strand investigation area' for marine habitat mapping study carried out in May/June 2008 by C&R Consulting (Source: Marine habitat mapping report, Appendix A).

For preparation of the maps within the FDA a 50m by 50m grid was superimposed on a map of the FDA and global positioning system (GPS) coordinates generated for intersecting points. A scuba diver descended at each of these points on May 1 2008 and deployed five random 25cm by 25cm quadrats in the vicinity of the point. The species and number of any biota within the quadrats were recorded, and this data converted to species composition and density estimates (open dots on the final maps represent points where no relevant biota was found). The proposed methodology and scope of this mapping was approved by the Queensland Government Department of Primary Industries and Fisheries (R. Sheppard, P. Hales, pers. comm., May 2008).

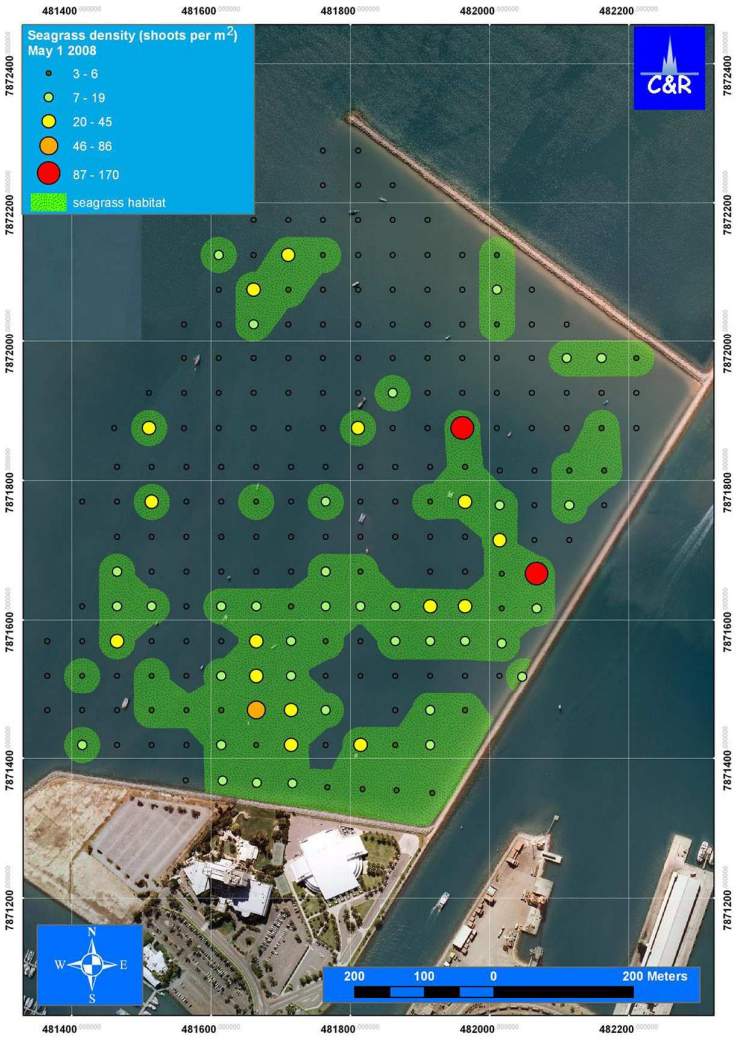

Figure 2: Map of seagrass density (shoots per square metre) in the duckpond investigation area, 1 May 2008 (Source: Marine habitat mapping report, Appendix A).

Figure 2 above shows seagrass density in shoots per square metre across the FDA. Seagrasses occur in the project footprint at low densities, with scattered patches found in the northern half of the area, and more contiguous coverage in the southern half. The species occurring throughout the area are *Halophila ovalis* and *H. spinulosa*, with isolated occurrences of *Halodule uninervis*. It should be noted that seagrasses are an ephemeral species with seasonal differences in distribution to be expected. This map is likely to represent the minimum coverage of seagrass distribution in the area (in order to obtain data on likely maximum coverage levels, further mapping has been proposed by the proponent, as described in Section 7.2 below). Overall, seagrass areas covered 17.9ha, or 30.5% of the project site. Dr Ceccarelli has noted that no dugong feeding scars were observed in the FDA in the course of this survey.

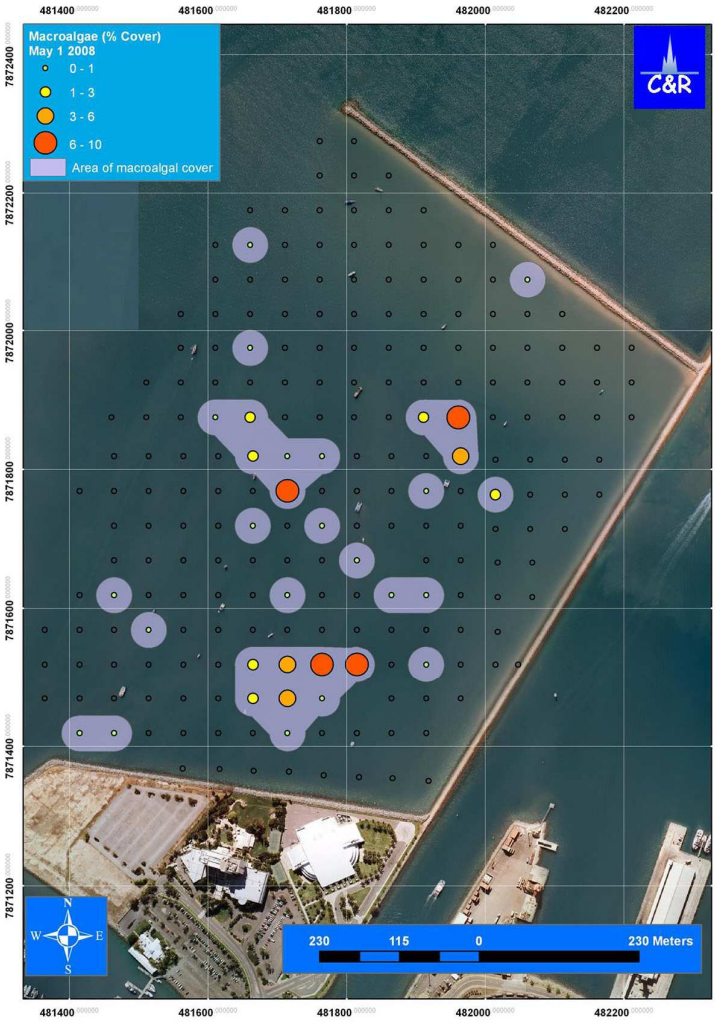

Figure 3: Map of macroalgae cover (percentage cover) in the duckpond investigation area, 1 May 2008 (Source: Marine habitat mapping report, Appendix A).

Figure 3 above shows the percentage cover of macroalgal species within the project footprint. Overall, coverage of the FDA was minimal (7.9ha, or 13.9% of the project site), and spread out in sparse patches over the southern two thirds of the area. The most abundant and widespread species was the calcified red alga *Jania* sp., with isolated patches of *Caulerpa* sp. (green algae) and filamentous red algae.

Figure 4: Map of benthic invertebrate density (number of invertebrates per square metre) in the duckpond investigation area, 1 May 2008 (Source: Marine habitat mapping report, Appendix A).

Figure 4 above shows the benthic macroinvertebrate density within the FDA in numbers per square metre. The benthic macroinvertebrate community included bivalves (scallops (*Pectinidae*) and oysters (*Ostridae*)), hydroids (*Hydroida*), crinoids (feather stars), ascidians (both colonial and individual), sponges, flatworms (*Platyhelminthes*), nudibranchs, crayfish (*Crustacea)* and polychaetes (worms), many of which have been recorded in the diets of commercially and recreationally important fish that occur in Cleveland Bay. Overall however there was a low density of invertebrates, with benthic invertebrate habitat found across 21.3ha or 36.3% of the site. Most organisms were found in the southern two thirds of the site.

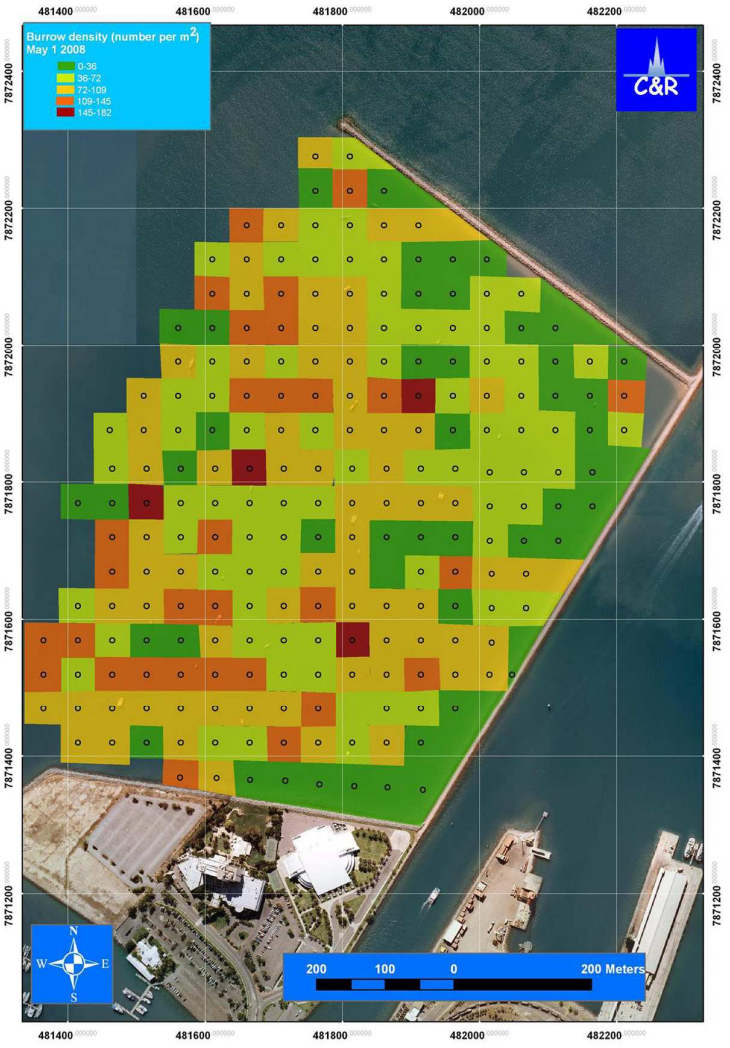

Figure 5: Map of marine macroinvertebrate burrow density (number of butters per square metre) in the duckpond investigation area, 1 May 2008 (Source: Marine habitat mapping report, Appendix A).

Figure 5 above illustrates the density of burrows of sediment-dwelling invertebrates within the site in burrows per square metre. Such burrows are usually linked to the presence of worms, crustaceans and small fish, while the invertebrates themselves can also form part of the diet of local fish populations. Moderate to high densities of invertebrate burrows were found across most of the project footprint, with densities higher towards the centre and western edge of the site. Burrows ranged in size from a few millimetres to approximately 10 centimetres in diameter.

Figure 6 below represents the distribution of marine plants (seagrass and macroalgae) within the FDA and along the Strand to Kissing Point. As the primary purpose of this map was to identify the location and size of the nearest marine plant beds downstream of the project site, the area beyond the project site was not surveyed at the same 50m by 50m resolution as the duckpond investigation area. Instead, divers were deployed (between 1 May and 4 June 2008) to search for the presence of seagrasses and other plants at increasing distances from the project site until beds were located, at which point investigations continued to roughly establish the perimeter of these beds. No seagrasses or macroalgae were found in the immediate vicinity downstream of the FDA.

Figure 6: Map of seagrass and macroalgae distribution in the duckpond investigation area and Strand investigation area, May-June 2008 (Source: Marine habitat mapping report, Appendix A).

A dense bed of *Caulerpa* sp., a green alga, was found to extend from the lower intertidal zone approximately 200 metres seaward along the length of the Strand. Seagrasses were found in sparse patches (approximately 10-20% coverage) at the south-eastern end of the indicated seagrass bed, becoming more contiguous towards Kissing Point. This seagrass bed also contained a diverse soft-bottom community, and provides habitat for juvenile fish (observed during this June survey) and mobile invertebrates. These communities also increased in density towards Kissing Point.

Finally, nine grab samples were taken on 4 June 2008 from beneath the footprint of the proposed temporary bridge using a Van Veen grab with an area of 125cm^2 in order to investigate the presence or absence of seagrass in this area. No seagrasses or other organisms were found in Ross Creek at these grab sample sites. Figure 7 below indicates the grab sampling sites, as well as mangrove trees (*Avicennia marina* sp.) found on the creek banks on this date. Higher up the banks Guinea grass (*Panicum maximum*), Para grass (*Brachiaria mutica*) and Townsville wattles (*Acacia* sp.) were found. No saltwater couch (*Paspalum vaginatum*) was found growing in the area.

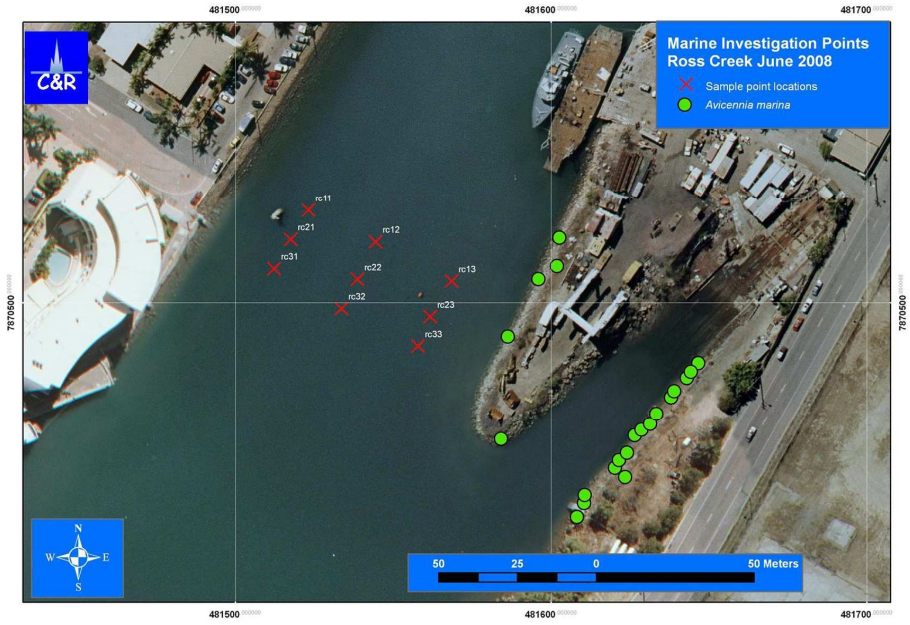

Figure 7: Map of marine vegetation in the environs of the proposed temporary bridge, 4 June 2008 (Source: Marine habitat mapping report, Appendix A).

4.2 Dolphins, dugongs, marine turtles

Comments were received in response to the original Townsville Ocean Terminal Project EIS regarding the Australian snubfin dolphin (*Orcaella heinsohni*), Indo-pacific humpback dolphin (*Sousa chinensis*), Dugong (*Dugong dugon*) and marine turtles.

The proponent has accordingly commissioned a separate comprehensive Ecological Impact Assessment of potential impacts of the project on these species to address the relevant project Terms of Reference, to be prepared by Simon Mustoe of Applied Ecology Solutions (AES). This assessment report will incorporate the findings of an investigation into the potential noise effects of piling on marine mammals, including creation of a three-dimensional noise propagation model of the area currently being undertaken by Dr Christine Erbe of JASCO Research. In addition the report by AES will consider mitigation strategies to minimise potential impacts, and an assessment of likely impacts post-mitigation.

Final versions of these reports are not available at the time of writing of this *Interim Supplementary Nature Conservation Report*. AES have indicated that the following potential hazards linked to construction and operation of the TOT project will be considered as part of the ecological impact assessment process:

- Potential loss of habitat from within the footprint of the site;
- Potential displacement of dolphins and dugongs from the site;
- Potential for mobilisation of dredged sediment;
- Potential for mobilisation of contaminants and other material in water from the dewatering process;
- Potential for offsite noise associated with piling, other construction activities and increased vessel traffic;
- Potential for the spread of waterborne diseases from cat faeces;
- Potential for vessel strike (particularly from small recreational boats); and
- Potential for contamination from stormwater runoff.

4.3 Birds

In order to address concerns raised by the Townsville Region Bird Observers Club (TRBOC) in response to the original Townsville Ocean Terminal Project EIS, an avifauna report was commissioned from a specialist ecological consultant, Dr Justin Watson (Natural Solutions Environmental Consultants) in May 2008. The complete avifauna report is attached as Appendix C to this report.

The avifauna report was informed by:

- A desktop review of background information;
- Seven site inspections between 11 May and 14 May 2008 to identify potential habitat and local bird populations;
- A desktop review and site inspections (between 12 May and 14 May 2008) of similar habitat in the locality;
- Liaison/meetings with relevant project consultants and engineers; and
- Liaison/meetings with the TRBOC.

Dr Watson was able to confirm statements by the TRBOC that existing infrastructure at the FDA provides habitat for a number of bird species. The report states that habitat for feeding, foraging and roosting (and potentially nesting – unconfirmed during May 2008 site inspections) is provided by the current breakwaters and area between them. The site is estimated to provide less than 6% of the total rocky shore habitat within Cleveland Bay.

Table 1 below provides a list of the avifauna species observed by Dr Watson during the site inspections held between 11 May and 14 May 2008. Data from TRBOC sightings between 1996 and 2008 is also provided in the avifauna report, including a number of species not sighted during the May 2008 site inspections.

Table 1: Species recorded at Townsville Port breakwaters (Watson, 11-14 May 2008) (Source: Avifauna report, Appendix C).

SPECIES NAME	COMMON NAME
Puffinus tenuirostris	Short-tailed Shearwater
Anhinga melanogaster	Darter
Phalacrocorax varius	Pied Cormorant
Egretta sacra	Eastern Reef Egret
Butorides striatus	Striated Heron
Elanus axillaris	Black Kite
Haliastur Indus	Brahminy Kite
Pandion haliaetus	Osprey
Sula leucogaster	Brown Booby
Larus novaehollandiae	Silver Gull
Sterna caspia	Caspian Tern
Sterna nilotica	Gull-billed Tern
Sterna bergii	Crested Tern
Vanellus miles novaehollandiae	Masked Lapwing
Hirundo neoxena	Welcome Swallow
Grallina cyanoleuca	Magpie Lark
Acridotheres trsitis	Common Mynah
Passer domesticus	House sparrow
Corvus orru	Torresian Crow
Artamus leucorynchus	White-breasted Woodswallow
Entomyzon cyanotis	Blue-faced Honey-eater

The specialist avifauna report indicates that although the site could provide preferred habitat of some species (including Eastern Reef Egret and Striated Heron), a majority of the species identified at the site by both Watson and the TRBOC would be considered transient and '*not resident or reliant on the site*'. Dr Watson believes that the site does not represent significant habitat critical to the survival of any bird species listed as threatened under Commonwealth or Queensland legislation, and that higher quality habitat is located nearby.

5 Potential impacts of the project

The current understanding of the potential impacts of the project is outlined in Sections 5.1, 5.2 and 5.3. A full examination of potential impacts will be presented in the final *Supplementary Nature Conservation Report*, following finalisation of the construction methodology, summer-period biological distribution mapping, and relevant specialist reports.

5.1 Habitat

The current proposed construction methodology for the TOT project involves effectively sealing off the duckpond area with impermeable walls, dewatering, land reclamation and construction. The project therefore represents a direct removal of habitat in this area. Part of this habitat removal may be only temporary, as marine species are likely to recolonise the area following completion of construction.

As noted in Section 4.1 above, approximately 17.9ha of the FDA was covered by seagrass on 1 May 2008 (with patches varying in density). Further mapping of seagrasses to determine the early summer (i.e. likely maximum) extent of coverage will be carried out in late 2008, as described in Section 7.2 below. Maps of both maximum and minimum coverage of seagrass need to be developed before a full understanding of the potential loss of seagrass can be obtained.

5.2 Dolphins, dugongs, marine turtles

As described in Section 4.2 above, the potential impacts of the TOT project on dolphins, dugongs and marine turtles will be described and assessed in an Ecological Impact Assessment to be completed by Simon Mustoe.

5.3 Birds

Potential impacts of the project on bird species are outlined in Section 8.0 of the Avifauna report (attached as Appendix C to this report). These potential impacts, many of which are potentially temporary, are summarised in Table 2 below. Dr Watson emphasises that the implications of these potential impacts need to be reviewed in consideration of the amount of similar habitat in Cleveland Bay, the numbers of common and threatened species that are known or are likely to use the site, and the relative value of the habitat this site provides to the species' survival.

Table 2: Potential impacts of the TOT project on local avifauna (Source: Avifauna report, Appendix C).

CHANGE TO CURRENT SITE	POTENTIAL IMPACT
Loss of internal portion of the northern breakwater	Loss of roosting & foraging
Loss of the internal & external Port western breakwater	Loss of roosting & foraging
Pedestrian access to northern breakwater	Disturbance – loss of foraging opportunities, energy expenditure
Reclamation of shallow open water	Loss of shallow feeding resources

6 Mitigation and offset measures

The status of current arrangements relating to mitigation and offset measures for the project is outlined in Sections 6.1, 6.2 and 6.3. A full list of mitigation and offset measures will be presented in the full *Supplementary Nature Conservation Report*, following finalisation of the construction methodology, summer-period biological distribution mapping, and relevant specialist reports.

6.1 Habitat

Discussions with DPI&F have commenced in order to negotiate appropriate mitigation and offset measures for the disturbance or loss of seagrasses and other fisheries resources. These discussions are ongoing and will also be informed by the results of the further marine habitat mapping to be carried out in late 2008, as described in Section 7.2 below.

In addition a range of mitigation measures will be considered during the detailed design phase of the project for incorporation into the final project design, including:

- design of aquatic infrastructure to encourage use as fish habitat, in line with principles presented in *Fish Habitats Guideline FG006: Fisheries Guidelines for Fish-Friendly Structures* (DPI&F 2006); and
- incorporation into the design of fishing platforms, signage, cutting platforms etc in appropriate positions, for the use of local fishers.

6.2 Dolphins, dugongs, marine turtles

A range of appropriate mitigation, and where possible, offset measures will be developed and examined in works by Dr Christine Erbe and Simon Mustoe, as described in Section 4.2 above.

6.3 Birds

A range of management measures to mitigate and offset potential impacts to avifauna species has been proposed in Section 9.0 of the avifauna report (Appendix C to this document). Among these suggested measures are:

- the creation of appropriately designed “compensatory bird habitat”, to preserve or replace current bird habitat values of the Townsville Port breakwaters;
- utilisation of rip-rap for breakwaters;
- staged construction, to minimise unnecessary disturbance of bird habitat;
- protection of actual or potential bird habitat areas from human and domestic/feral animal access; and

- ongoing monitoring of birds within the project area, including within any compensatory habitat areas.

7 Monitoring programs

The status of current arrangements relating to monitoring programs for the project is outlined in Sections 7.1, 7.2, 7.3 and 7.4. Full details of appropriate monitoring programs, if required, will be presented in the final *Supplementary Nature Conservation Report*, following completion of the construction methodology, summer-period biological distribution mapping, and relevant specialist reports.

7.1 Water and sediment quality

Marine water, groundwater and sediment quality will be monitored prior to construction (in order to form a baseline data set), during construction, and after construction, with a separate monitoring program during maintenance dredging. Details of each of these proposed monitoring programs are contained within the *Water Quality Monitoring Program* (Hyder Consulting, July 2008), and will be confirmed in a full *Supplementary Water Quality Report* (anticipated completion date February 2009) following collection of adequate baseline data.

7.2 Habitat

As agreed with DPI&F following discussions held in May 2008, a second round of marine habitat mapping will be carried out by the proponent in late October/early November 2008 in order to provide a snapshot of likely maximum coverage of seagrass (which generally occurs immediately prior to the height of summer). This mapping is necessary in order to complement the mapping of presumed minimum coverage obtained during May/June 2008 to provide a full picture of the natural variation in seagrass coverage of the FDA and adjacent downstream areas.

The second round of mapping (late 2008) is proposed to be carried out with a methodology similar to that used for the May-June 2008 round and described in Section 4.1 above, namely:

- Investigation of seagrass density, macroalgae cover, benthic invertebrate density and marine macroinvertebrate burrow density within the 'duckpond investigation area' (as shown in Figure 1 above) at points located on a grid of 50m by 50m; and
- Mapping of marine plants within the downstream 'Strand investigation area' (as shown in Figure 1 above) at a broader resolution.

Following the obtaining of this full seasonal data relating to seagrass coverage, negotiations will be entered into with DPI&F and other relevant parties to confirm any requirements for ongoing monitoring/mapping of marine habitats and fisheries resources.

7.3 Dolphins, dugongs, marine turtles

Any requirements for ongoing monitoring of dolphins, dugongs and marine turtles will be discussed and negotiated with relevant government agencies (e.g. DPI&F, EPA, DEWHA) following completion of the final ecological impact assessment report on these species by Simon Mustoe (as described in Section 4.2 above).

7.4 Birds

At present, it is not anticipated that monitoring of avifauna species will be required during the pre-construction and construction phases of the TOT project. This will be confirmed with relevant government agencies, together with the need for any ongoing monitoring in the operational phase of the project.

8 Management measures

Details of practical response measures, as well as ongoing and preventative management measures to maintain the nature conservation values of the FDA and surrounding environment will be provided in the revised CEMP and OEMP for the project. In particular, new EMPs will be, or have been produced in order to address:

- Fish and marine mammal rescue; and
- Response measures to potential algal blooms.

9 Conclusion

The *Interim Supplementary Nature Conservation Report* has been produced to outline the current status of responses to submissions received in relation to nature conservation aspects of the original Environmental Impact Statement for the Townsville Ocean Terminal project.

The conclusions drawn by this report are, in summary:

- Detailed marine habitat mapping was commissioned and carried out in May/June (winter) 2008, with the results provided in Appendix A to this document;
- More detailed studies of the issues surrounding marine mammal and turtle species have been commissioned, including an investigation of noise effects, and a comprehensive Ecological Impact Assessment addressing the Terms of Reference relating to these species;
- A detailed avifauna report was commissioned and completed, with the results provided in Appendix B to this document;
- Potential impacts of the project as well as appropriate mitigation and offset measures are to be assessed following finalisation of the proposed construction methodology, mapping of marine habitat within the summer period, and completion of specialist reports. Results will be presented in a final *Supplementary Nature Conservation Report*;
- Marine water, groundwater and sediment quality monitoring programs have been developed in conjunction with the EPA, and are presented in the *Water Quality Monitoring Program* (Hyder Consulting, July 2008);
- A further round of marine habitat mapping is proposed to be carried out in late 2008 in order to obtain data for the summer period (i.e. likely maximum extent of seagrass coverage). Following the obtaining of this data, negotiations will be entered into with relevant government agencies to confirm any requirements for ongoing monitoring and/or mapping of marine habitats and fisheries resources. Agreed arrangements will be presented in the final *Supplementary Nature Conservation Report*;
- The need for any ongoing monitoring programs for dolphin, dugong, marine turtle and bird species is to be discussed with government agencies, following completion of relevant specialist reports; and
- Details of management and response measures relating to the nature conservation values of the site are contained within the revised project EMPs.

Appendix A

Marine habitat mapping report (Dr Daniela Ceccarelli, C&R Consulting)

Appendix B

Avifauna report
(Dr Justin Watson, Natural Solutions)