

Appendix 5

Draft Dredge Management Plan – River Facilities

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1. INTRODUCTION

The South of Embley (SoE) Project involves the construction and operation of a bauxite mine and associated processing and port facilities to be located near Boyd Point on the western side of Cape York Peninsula. The SoE Project would be developed and operated by RTA Weipa Pty Ltd., which is a wholly-owned subsidiary of Rio Tinto Aluminium Limited. A detailed description of the Project is provided in the SoE Project Environmental Impact Statement (EIS) (RTA 2011).

The SoE Project requires the construction and operation of a new ferry terminal at Hornibrook Point, a roll on/roll off (RORO) barge facility at Humbug Wharf, and a new barge/ferry terminal on the western bank of the Hey River. These would be used to transport workforce, materials and equipment between Weipa and the Project. Minor capital dredging would be required in each of these areas to accommodate barge and/or ferry access to the proposed terminals.

Dredged material derived from the construction of these facilities would be disposed of at the existing Albatross Bay spoil ground utilised by North Queensland Bulk Ports (NQBP) (refer **Figure 1**). The volumes of dredged material to be placed at the Albatross Bay spoil ground from capital dredging for the ferry and barge terminals are small compared to the approximately 1,000,000m³ being deposited annually by NQBP for routine maintenance dredging at the Port of Weipa.

This Dredge Management Plan (DMP) describes monitoring and management response arrangements for capital dredging and dredged material disposal associated with the development of the barge/ferry terminals to be undertaken by RTA as part of the SoE Project.

1.1 Commonwealth and State Approvals

The Project has been declared a "significant project" for which an EIS was required pursuant to section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO) Act. The Project was declared a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) on 29 October 2010. As a consequence of this decision, the Project requires approval under the EPBC Act. The Commonwealth has determined an EIS under the EPBC Act is required.

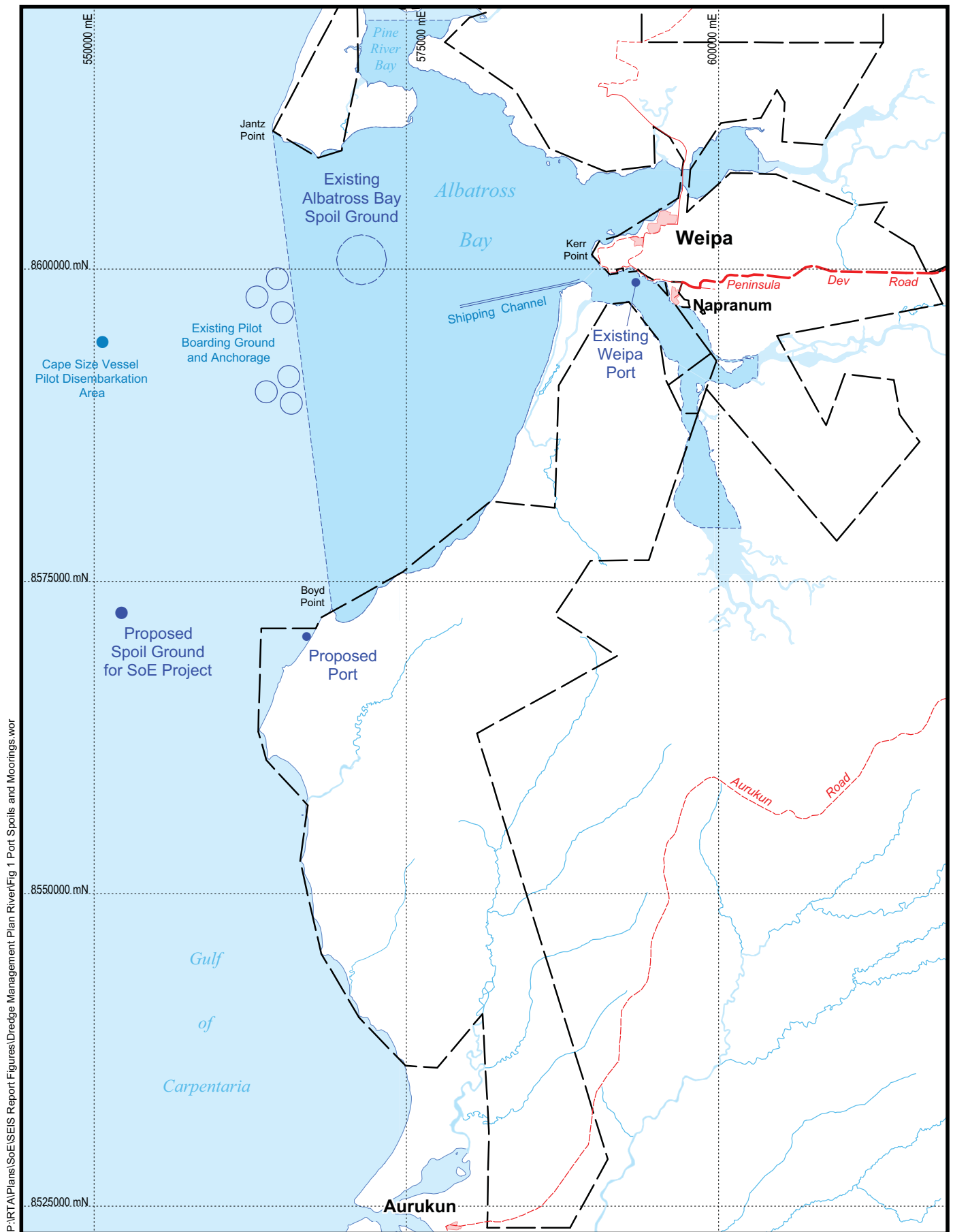
The Commonwealth *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) regulates the loading and dumping of spoil from dredging operations in Commonwealth waters. A permit will be required for loading and disposal of dredged spoil from the Humbug barge terminal, Hornibrook ferry terminal and Hey River barge/ferry terminal at the existing Albatross Bay Dredged Materials Grounds.

Section 160 of the EPBC Act requires that Commonwealth agencies seek advice from the Commonwealth Minister responsible for the EPBC Act before granting certain authorisations under other Acts. A permit under the Sea Dumping Act to dispose of dredged material at sea is such an authorisation. The EPBC Act has the effect of allowing the Minister to require assessment of the sea dumping application as though it was a controlled action under Part 8 of the Act. In order to avoid duplication of assessment processes and to ensure that all relevant information is considered at once, Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) has requested that sufficient information be provided in the EIS to support the application for a Sea Dumping Permit for capital dredging for the barge and ferry terminals. RTA submitted information for the sea dumping permit application for the barge/ferry terminals to DSEWPaC in February 2011 and the EIS was subsequently finalised and placed on exhibition in July 2011.

Detailed sediment characterisation reports have been provided separately to DSEWPaC. An amendment to the Sea Dumping Permit application was submitted to DSEWPaC on 31 October 2011 for minor changes to dredge volumes at the Humbug barge terminal and the Hey River barge/ferry terminal. A separate Sea Dumping Permit application would be sought in the future, if required, for an extension to the numbers of tug berths at Lorim Point. Future maintenance dredging and disposal associated with the ferry, barge and tug terminals would be subject to obtaining subsequent sea dumping permits.

Development Approval is required for dredging under the Queensland Coastal Protection and Management Act 1995 and Sustainable Planning Act 2009 (Qld) at the Humbug barge terminal and Hornibrook ferry terminal which are outside the mining lease. Development Approval application will also seek approval for removal of marine plants (seagrass) at the Humbug barge terminal.

This DMP supports applications for the Sea Dumping Permit and Development Approvals.



P:\RTA\Plans\SoE\SEIS Report Figures\Dredge Management Plan River\Fig 1 Port Spoils and Moorings.wor

Rio Tinto Alcan

- RTA Mining Lease boundary
- Township
- Drainage
- Road/track
- Weipa Port Limits

South of Embley Project

Fig. 1: Port, Spoil Ground and Anchorage Locations



0 5 10 15km

Datum/Projection: GDA94/MGA Zone 54

Date: 15/12/2011

2. DREDGING AND DISPOSAL DESCRIPTION

Dredging and spoil disposal for the barge and ferry terminals is described in Section 6.5.2 of the EIS. Respective dredge volumes and dredge footprint areas for the barge/ferry terminals are:

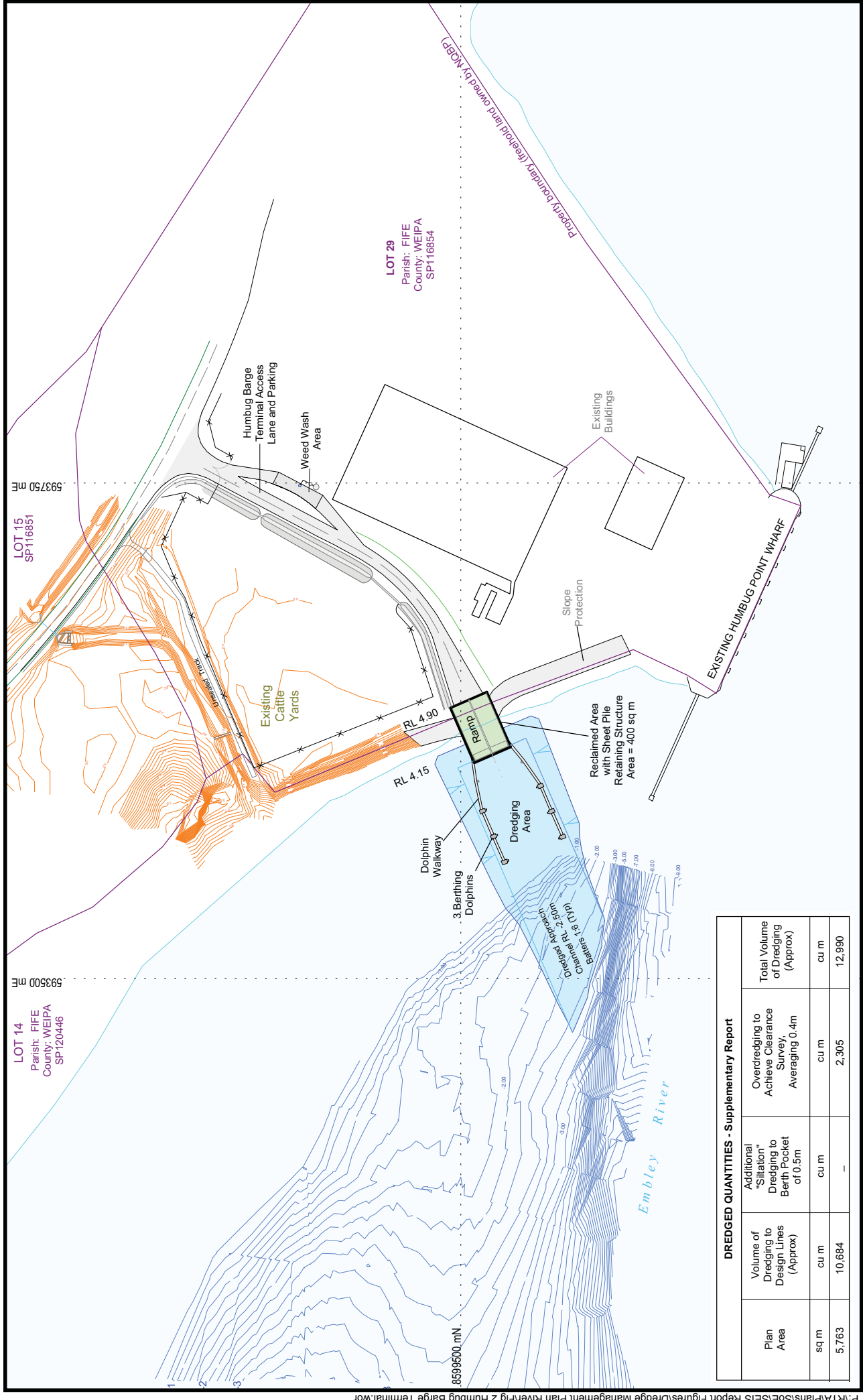
- approximately 12,990m³ to be removed from the Humbug barge terminal over an area of 5,770m² (refer **Figure 2**);
- approximately 18,700m³ to be removed from the Hornibrook ferry terminal over an area of 10,450m² (refer **Figure 3**); and
- approximately 37,380m³ to be removed from the Hey River barge/ferry terminal over an area of 24,390m² (refer **Figure 4**).

Dredging is anticipated to be undertaken using a barge-mounted backhoe/dipper dredge, with a bucket up to approximately 13m³. The method will be confirmed following engagement of the dredging contractor and included in the final DMP.

Alternative options for disposal of dredged material from the Embley and Hey River barge/ferry terminals are presented in Section 1.6.11 of the EIS and were not considered to be viable.

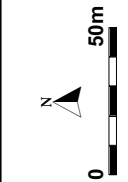
The Albatross Bay Dredged Materials Grounds is defined by a 2,000m radius, centred on the following coordinates:

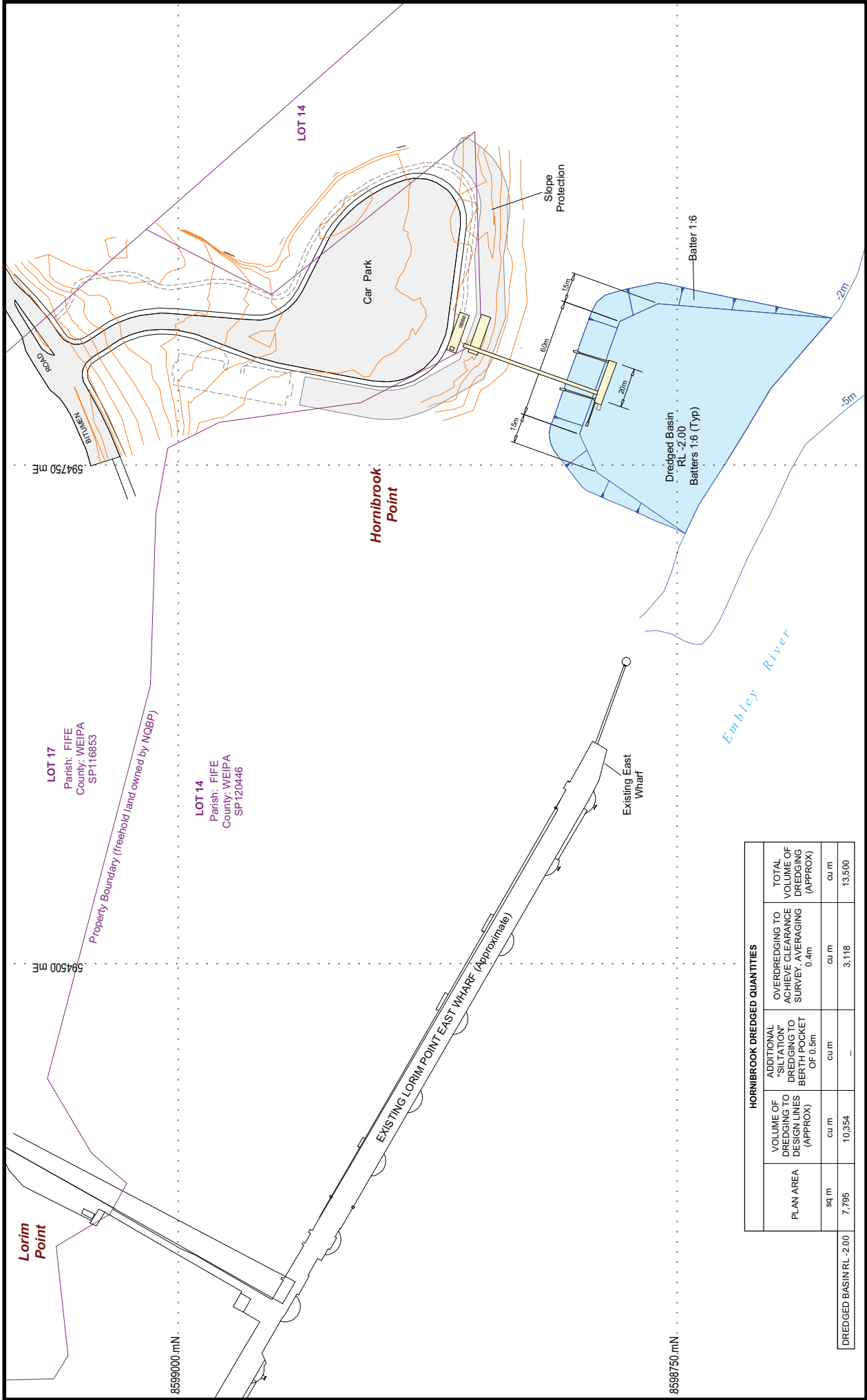
- S12° 39' 34.7" E141° 39' 24.1" (WGS84)



DREDGED QUANTITIES - Supplementary Report				
Plan Area	Volume of Dredging to Design Lines (Approx)	Additional "Sitiation" Dredging to Berth Pocket of 0.5m	Overdredging to Achieve Clearance Survey, Averaging 0.4m	Total Volume of Dredging (Approx)
sq m	cu m	cu m	cu m	cu m
5,763	10,684	—	2,305	12,990

- NOTES**
- VERTICAL DATUM:**
Depths are in metres and are reduced to Chart Datum (CD).
Which is approximately the level of lowest Astronomical Tide (LAT).
CD (LAT) is 1.752m below AHD.
 - HORIZONTAL DATUM:**
Coordinates are to MGA/GDA94 Zone 54

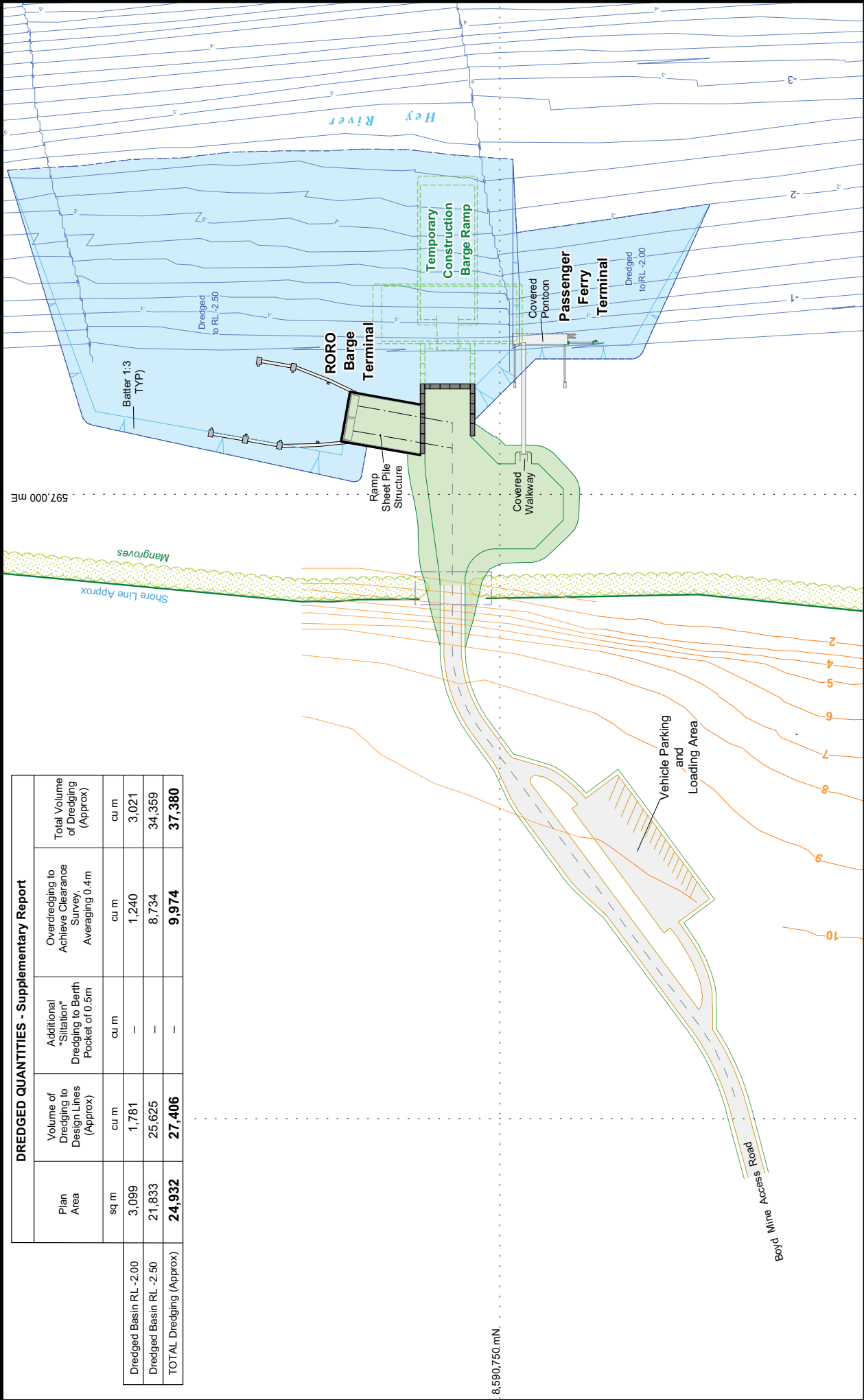




HORNIBROOK DREDGED QUANTITIES				
PLAN AREA	VOLUME OF DREDGING TO DESIGN LINES (APPROX)	ADDITIONAL "SITUATION" DREDGING TO BERTH POCKET OF 0.5m	OVERDREDGING TO ACHIEVE CLEARANCE SURVEY, AVERAGING 0.4m	TOTAL VOLUME OF DREDGING (APPROX)
Sq m	cu m	cu m	cu m	cu m
7,795	10,354	—	3,118	13,500
DREDGED BASIN RL -2.00				

- NOTES
- VERTICAL DATUM:
Depths are in metres and are reduced to Chart Datum (CD) which is approximately the level of Lowest Astronomical Tide (LAT). CD (LAT) is 1.752m below AHD.
 - HORIZONTAL DATUM:
Coordinates are to MGA/GDA94 Zone 54
- Dredged area

DREDGED QUANTITIES - Supplementary Report					
	Plan Area	Volume of Dredging to Design Lines (Approx)	Additional "Siltation" Dredging to Berth Pocket of 0.5m	Overdredging to Achieve Clearance Survey, Averaging 0.4m	Total Volume of Dredging (Approx)
	sq m	cu m	cu m	cu m	cu m
Dredged Basin RL -2.00	3,099	1,781	—	1,240	3,021
Dredged Basin RL -2.50	21,833	25,625	—	8,734	34,359
TOTAL Dredging (Approx)	24,932	27,406	—	9,974	37,380



NOTES:
 Vertical Datum:
 Depths are in metres and are reduced to chart datum (CD) which is approximately the level of lowest astronomical tide (LAT).
 CD (LAT) is 1.508m below AHD.

Reclaimed area
 Dredged area

South of Embley Project

Fig. 4: Hey River Barge/Ferry Terminal

Data Source: SKM Drawing S0-1630-00001.dxf

Datum/Projection: GDA94/MGA Zone 54 Date: 15/12/2011

3. SEDIMENT CHARACTERISATION

The sediment sampling and analyses completed at the Hornibrook, Humbug and Hey River terminal locations is described in Section 6.5.6 and summarised in Section 22 (EPBC Assessment Report) of the EIS and summarised below. The assessment of dredged material is consistent with the assessment guidance described in the *National Assessment Guidelines for Dredging* (NAGD) (Commonwealth of Australia 2009), Annex 2 of the London Protocol, and the *Waste Specific Guidelines for Assessment of Dredged Material* (IMO 2000).

Chemical analyses of sediments to be dredged from the Hornibrook terminal area demonstrate that potential contaminants, if present, are all below respective NAGD screening level criteria for individual samples, the mean and 95% UCL of the mean. Based on this assessment it is considered that dredge material from the Hornibrook terminal area is suitable for unconfined ocean disposal at the Albatross Bay Dredged Materials Grounds.

At the Humbug terminal area, no contaminants in sediments exceeded NAGD screening levels for any samples; however one sample contained mercury

at the screening level. Despite this, the mean and 95% UCL of the mean for all contaminants was below respective NAGD screening levels. Based on this assessment it is considered that dredge material from the Humbug terminal area is suitable for unconfined ocean disposal at the Albatross Bay Dredged Materials Grounds.

Analyses of sediment samples collected from the Hey River terminal area demonstrate that concentrations for all but one contaminant were below respective NAGD screening levels. Arsenic is the exception, with three of the seven sites exceeding the NAGD screening level of 20mg/kg. The mean and the 95% UCL of the mean were also above the NAGD screening levels. Further testing of sediments identified the arsenic had low bio availability, with Dilute Acid Extract (DAE) concentrations well below the NAGD screening level and elutriate concentrations requiring only minimal dilution to achieve ANZECC/ARMCANZ (2000) low reliability water quality guidelines. Accordingly, the sediments to be dredged from the Hey River terminal area are considered suitable for unconfined ocean disposal at the Albatross Bay Dredged Materials Grounds.

4. EXISTING ENVIRONMENT

4.1 Embley and Hey Rivers Past and Current Uses

The Port of Weipa and its approach channel were developed through capital dredging from 1961 through to 1975 (PCQ 1995). The most recent capital dredging program occurred in 2006 to widen the existing channel and maintenance dredging generally occurs on an annual basis, typically during the dry season (PCQ 2009). Currently within the Port of Weipa there are four wharves located at Lorim Point East, Lorim Point West, Humbug Wharf and Evans Landing. These wharves require maintenance dredging on a regular basis.

Hornibrook Point is an area of land adjacent to Lorim Point and was reclaimed in the 1960s using dredge spoil from the Embley River, including dredge spoil from the original capital dredging of the Lorim Point Wharf. Hornibrook Point has remained as vacant parkland. Humbug Wharf is located approximately 1.25km downstream from Hornibrook Point and is a general cargo wharf currently managed by RTA.

The proposed Hey River terminal site south of Hey Point in the Hey River is an undeveloped area approximately 8km south of Hornibrook Point. No dredging has previously occurred within this area.

4.2 Embley and Hey Rivers Habitats

Benthic habitat surveys of estuarine areas within the SoE Project have been undertaken to identify and map benthic habitats. The results of the surveys are described in Section 6.3 of the EIS and summarised below.

The development footprints for the Hornibrook ferry terminal, Humbug barge terminal and Hey River barge/ferry terminal consist primarily of soft sediment habitats that contain sparse epifauna typical of soft sediments, such as seapens and tube dwelling anemones, softcorals or sponges (refer to Section 6.3.5 of the EIS).

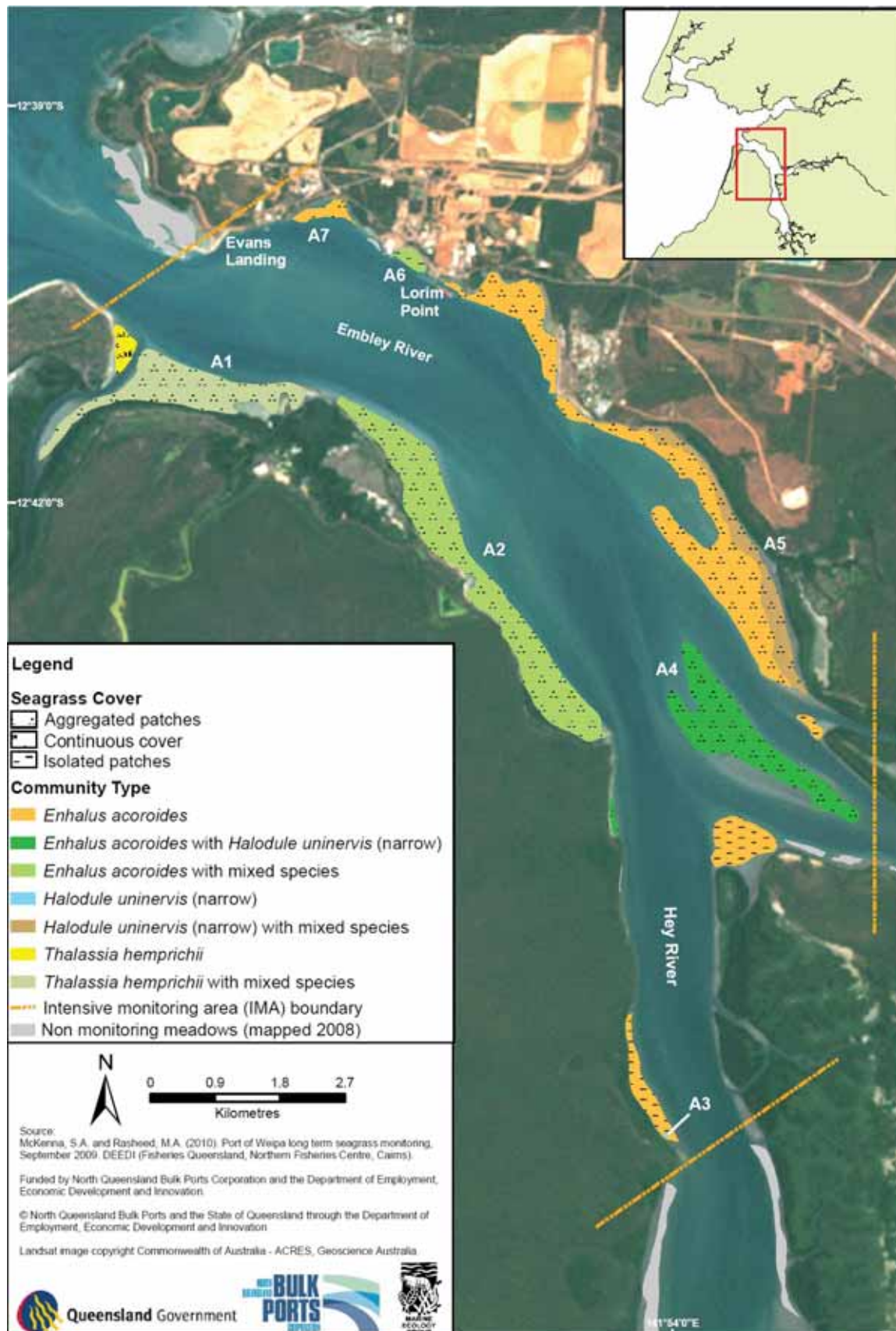
Seagrass beds are typically present in the more sheltered areas of Albatross Bay, including the lower reaches of the Embley and Mission Rivers and Pine River Bay (refer to Section 6.3.4 of the EIS). The Department of Employment, Economic Development and Innovation (DEEDI) (formerly the Department of Primary Industries and Fisheries) has been undertaking annual seagrass monitoring within the Port of Weipa since 2000. In September 2009, it was estimated there were approximately 980 hectares of seagrass in 13 meadows within the bounds of the Intensive Monitoring Area (IMA) within the Embley and Hey Rivers (McKenna and Rasheed 2010). Seagrass meadows in the IMA continued to be dominated by *Enhalus acoroides*. The distribution and condition of seagrass in the Hey and Embley Rivers is described further in Section 6.3.4.2 of the EIS.

Figure 5 shows the seagrass meadow type and cover (aggregated patches, continuous cover or isolated patches) within the IMA during the September 2009 survey. The figure also identifies the position of the proposed barge and ferry terminal infrastructure.

Visual inspection of the Humbug terminal area during early May 2010 revealed isolated patches of *E. acoroides* in good condition within and adjacent to the proposed dredge footprint at low tide. This observation is consistent with recent survey data reported by McKenna and Rasheed (2010) (refer **Figure 5**).

Drop camera video surveys undertaken of the sub-tidal banks at Hornibrook Point in 2009 indicate that the Hornibrook Terminal dredge footprint does not contain seagrass, however, aggregated patches of *E. acoroides* seagrass may be located adjacent to it. This is consistent with most recent mapping prepared by DEEDI (McKenna and Rasheed 2010) (refer **Figure 5**).

Figure 5 Seagrass Meadow Type and Cover – Embley and Hey River Estuaries, 2009



Seagrass monitoring between 2000 and 2009 (Chartrand and Rasheed 2009; McKenna and Rasheed 2010) in the vicinity of the Hey River Terminal location occasionally reports a very thin patch of isolated seagrass. Drop camera surveys undertaken over the Hey River Terminal dredge footprint in October 2007, November 2008 and June 2009 did not record any seagrass. However it is possible that seasonally variable seagrasses were absent (e.g. *Halophila ovalis*). Overall though, it is considered that if any seagrasses do occur at the proposed terminal site from time to time, they are likely to contribute minimally to primary productivity in the area.

4.3 Embley and Hey Rivers Fauna

Threatened and migratory marine species that occur or potentially occur in the SoE Project area are described in Section 6.6.1 of the EIS.

Threatened marine turtle species assessed as likely to occur in the Hey and Embley Rivers include:

- Loggerhead Turtle (*Caretta caretta*) (EPBC Act Endangered and Migratory and NC Act Endangered);
- Olive Ridley Turtle (*Lepidochelys olivacea*) (EPBC Act Endangered and Migratory and NC Act Endangered);
- Flatback Turtle (*Natator depressus*) (EPBC Act Vulnerable and Migratory and NC Act Vulnerable); and
- Green Turtle (*Chelonia mydas*) (EPBC Act Vulnerable and Migratory and NC Act Vulnerable).

No marine turtles were observed in the Embley and Hey Rivers during field studies. However foraging areas for these six turtle species can include seagrass meadows and unvegetated sand or mud areas, and they are considered likely to occur in the Hey and Embley Rivers.

Migratory marine fauna species that are assessed as likely or known to occur in the Embley and Hey Rivers include:

- Indo-Pacific Humpback Dolphin (*Sousa chinensis*) (EPBC Migratory and NC Act Near Threatened);
- Australian Snubfin Dolphin (*Orcaella heinsohni*) (EPBC Migratory and NC Act Near Threatened); and
- Dugong (*Dugong dugon*) (EPBC Migratory and NC Act Vulnerable).

Dolphins were not observed in the seagrass beds in the Embley and Hey Rivers during field studies, however, they are considered likely to occur in this area because they are often associated with tidal riverine and estuarine systems.

Dugongs are known to occur in low densities in Albatross Bay and are closely associated with the seagrass beds in the Embley estuary. However, no Dugong were incidentally observed associating with these seagrass beds during marine field surveys for the SoE Project. Dugongs prefer seagrasses that are early or 'pioneer' species, particularly species of the genera *Halophila* and *Halodule* (DEWHA 2010). The long, strap-like seagrass *Enhalus acoroides*, which dominates the seagrass beds of the Embley and Hey Rivers, is not a preferred species in dugong's diet.

4.4 Albatross Bay Dredged Materials Grounds

The approved Albatross Bay Dredged Materials Grounds was commissioned in 1998 and since that time has received capital and maintenance dredging material from operations within the Port of Weipa. Before any material is placed at the Albatross Bay Dredged Materials Grounds, the spoil must be proven to be suitable for placement at sea using the NAGD assessment framework.

The footprint for the Albatross Bay Dredged Materials Grounds has been confirmed as consisting primarily of soft sediment habitats that contain sparse epifauna typical of soft sediments, such as seapens and tube dwelling anemones, softcorals or sponges (refer to Section 6.3.5 of the EIS). The Albatross Bay Dredged Materials Grounds does not contain, and is not close to any, reef communities, and also contains no seagrass beds, and is not shallow in nature.

The Indo-Pacific Humpback Dolphin and Australian Snubfin Dolphin are possibly transient in the footprint of the Albatross Bay Dredged Materials Grounds, however, the proposed spoil ground does not represent preferred habitat. The spoil ground does not contain preferred habitat for Bryde's Whale (*Balaenoptera edeni*) (EPBC Act Migratory), however, the recording of the species from tropical inshore waters suggests it is possible the species may occur sporadically in the vicinity of the spoil ground footprint. Dugong may migrate through the Albatross Bay Dredged Materials Grounds area between feeding grounds, however it is more likely that the species would migrate through shallower waters.

It is unlikely that the Green Turtle, Hawksbill Turtle (*Eretmochelys imbricata*) (EPBC Act Migratory and Vulnerable and NC Act Vulnerable), Flatback Turtle and Olive Ridley Turtle would occur in the Albatross Bay Dredged Materials Grounds area, due to lack of preferred habitat. However, they may transit the site.

The Leatherback Turtle (*Dermochelys coriacea*) is listed as Endangered and Migratory under the EPBC Act and Endangered under the NC Act. The species is likely to occur sporadically in the vicinity of the Albatross Bay Dredged Materials Grounds, using it for foraging. However, Leatherback turtles are rarely found in Queensland and no Leatherback Turtle nesting has been recorded in eastern Australia since 1996, so any presence would be sporadic. The Loggerhead Turtle species is also likely to be transient in the vicinity of the Albatross Bay Dredged Materials Grounds and use it for foraging or resting.

5. POTENTIAL IMPACTS

5.1 Macrobenthic Infauna Impacts

Impacts on Macrobenthic infaunal assemblages are described in Section 6.9.4.4 of the EIS and summarised below.

Macrobenthic infaunal assemblages are likely to be affected at the site of the Hey and Embley River dredging sites and the Albatross Bay Dredged Materials Grounds as a result of physical disturbance of sedimentary habitats and fauna from dredging, and creation of a turbidity plume, and subsequent deposition and re-suspension of fine sediments. However, macrobenthic infaunal assemblages can recover over time from the impacts of dredging and spoil disposal. Recovery of the macrobenthic assemblage from spoil deposition at the Albatross Bay Dredged Materials Grounds is considered to be rapid (GHD 2005).

Despite the potentially significant local impact on the infaunal assemblage, impacts pose a low risk on a regional scale. Therefore, no macrobenthic infauna monitoring is proposed.

5.2 Seagrass Habitat Impacts

The potential impacts of dredging on seagrass habitat at the barge and ferry terminals is described in Section 6.9.3.3 of the EIS and summarised below.

At the Humbug Terminal the 1250m² area of seagrass within the dredge footprint represents about 0.003% of the seagrass meadows within the Weipa region and approximately 0.13% of the meadows monitored within the Intensive Monitoring Area, based on most recent (2008/2009) data (Chartrand and Rasheed 2009; McKenna and Rasheed 2010).

At each of the dredging sites in the Embley and Hey Rivers, dredging is likely to take only one to two weeks and involve only minor dredge volumes. Given the minor scale and short duration of dredging, it is unlikely that sediment loads would be generated over the aggregated *E. acoroides* patches adjacent to the proposed infrastructure at a thickness that would approach critical levels. Further, any reduction in light levels would be short-term and the large-structured *E. acoroides* would likely have sufficient stored reserves to provide resilience to the predicted low impact. No additional seagrass monitoring is proposed.

5.3 Marine Fauna Impacts

Marine fauna impacts are described in Section 6.9.4 of the EIS.

The area of seagrass to be disturbed at the Humbug terminal is not significant in terms of a Dugong or marine turtle foraging resource. Given the minor scale and short duration of dredging at each of the Embley and Hey River dredge sites, it is unlikely that Dugong and marine turtle foraging areas would be significantly affected by turbidity plumes from barge/ferry terminal dredging. Therefore no additional seagrass or water quality monitoring is proposed.

Bucket type dredges, such as those to be used for Embley and Hey River dredging activities, do not pose an entrainment hazard to marine mammals or turtles. Slow moving displacement vessels like barges are not considered a boat strike risk to marine mammals or turtles during dredging and spoil disposal activities. The potential for boat strike on dolphins would be less than for Dugongs and whales overall due to their greater mobility and ability to quicker respond to disturbances.

5.4 Water Quality Impacts

Dredging

The potential impacts of barge and ferry terminal dredging and disposal activities on water quality are described in Section 6.9.2 of the EIS. Analysis of the sediments to be dredged from the proposed barge/ferry terminals have not identified any constituents present at levels of environmental concern that would persist in the water column during dredging or sea disposal at the Albatross Bay Dredged Materials Grounds. Proposed works within the Embley River and Hey River are likely to generate turbidity concentrations that fall within the natural turbidity range. Due to these factors and the very short duration of dredging at each location, no water quality monitoring during dredging is proposed.

Spoil Disposal

The potential impacts of disposal of dredged material from the barge and ferry terminal dredging at the Albatross Bay Dredged Materials Grounds are described in Section 6.9.2.11 of the EIS and summarised below.

GHD (2005) has previously carried out an impact assessment study in relation to capital dredging of the shipping channel and placement of the material at the Albatross Bay Dredged Materials Grounds. GHD (2005) concluded that the impacts to sensitive areas, such as seagrass meadows to the north-east,

from migration of material would be low because the material is predicted to migrate south towards the South Channel. The material to be dredged from the barge/ferry terminals has physical characteristics similar to Weipa shipping channel (South Channel) sediments. The combined volume of material to be dredged from the Embley and Hey River dredge areas is very small (<10%) compared to routine maintenance dredging at the Port of Weipa. It is concluded that the potential for impact on sensitive habitats from disposal of dredged material from the barge and ferry terminal at the Albatross Bay Dredged Materials Grounds is very low. No water quality monitoring during spoil disposal is proposed.

6. MANAGEMENT AND MONITORING

The NQBP Technical Advisory and Consultative Committee (TACC) has been in place for the Port of Weipa for more than 10 years. The TACC would be advised on the capital dredging and spoil disposal activities associated with the Hey and Embley River barge and ferry terminals.

6.1 Water Quality

Management and control strategies to reduce potential water quality impacts of dredging in the Hey and Embley Rivers and spoil disposal at the Albatross Bay Dredged Materials Grounds are described in Section 6.9.2 of the EIS and summarised below.

- The method of dredging in the Embley and Hey Rivers is likely to be by bucket or grab dredgers, which generate relatively low levels of turbidity. This is because there is no significant return of waters via overflow such as would occur through suction dredging methods.
- The short duration of dredging in each barge/ferry terminal area (1-2 weeks) would limit potential for impacts.

To further minimise potential turbidity impacts at the dredge spoil disposal sites, the following measures to reduce loss of bulk material into the marine environment during dredging operations would be considered:

- Specifying that hopper barges used in Embley River and Hey River dredging must have hopper door seals that are in good condition.
- Taking loaded hopper barges or hopper dredge to spoil disposal areas and discharging material as soon as possible to minimise clays settling and adhering to the hopper lining. (Removing the settled clays within a hopper barge's lining generally requires sailing the barge at full speed across the spoil grounds when disposing, causing unwarranted turbidity.)
- Where possible, placing a sandy silt lining (from dredge material) on the bottom of the barge before loading clays to facilitate clay discharge.
- Developing a spoil dumping plan to aid the even distribution of material over the spoil grounds.

The dredge operator would ensure that dredged material is only placed in the Albatross Bay Dredged

Materials Grounds. Each spoil placement would be logged using both satellite navigation and standard bridge equipment, and would be electronically fixed using a differentially corrected global positioning system (GPS). Electronic track plots will mark the start of each placement process (hopper open), and the end of the process (hopper closed). Placement tracks usually show an arc, which the dredge follows to ensure that dredged material is placed within the designated spoil ground boundary. Position would be determined with an accuracy of at least 10m.

Within one month of completion of dredging and dumping, the volume of material disposed at the Albatross Bay Dredged Material Grounds will be reported to DSEWPac.

6.2 Marine Fauna

Bucket type dredges, such as those potentially used for Embley and Hey River dredging activities, do not pose an entrainment hazard to marine mammals or turtles, and slow moving displacement vessels like barges are not considered a boat strike risk to marine mammals and turtles during spoil disposal activities. However, in accordance with typical permit conditions for dredging and sea disposal, RTA will ensure that before beginning dredging and dumping activities during daylight hours, a check will be undertaken, using binoculars from land or the dredge, for marine mammals and turtles within a monitoring zone (approximately 300 metres of any point on the dredging/dumping run about to be commenced). If any marine mammal or turtle is sighted in the monitoring zone, dredging/dumping activities will not commence until after the animal is observed to leave the monitoring zone or has not been sighted for 20 minutes. The marine mammal and turtle management procedures for dredging and disposal are detailed in **Figure 6** and **Figure 7**.

Any injury or death of a marine mammal or turtle from spoil disposal would be documented and reported in writing within 24 hours of the incident to DERM and DSEWPac, and further monitoring and/or management requirements discussed. The time and nature of each incident and species involved, if known, would be recorded.

Sighting of any marine mammals or turtles during dredging and disposal activities would be recorded and reported to DERM and DSEWPac.

Figure 6
Turtle and Marine Mammal Management Procedure – Dredging

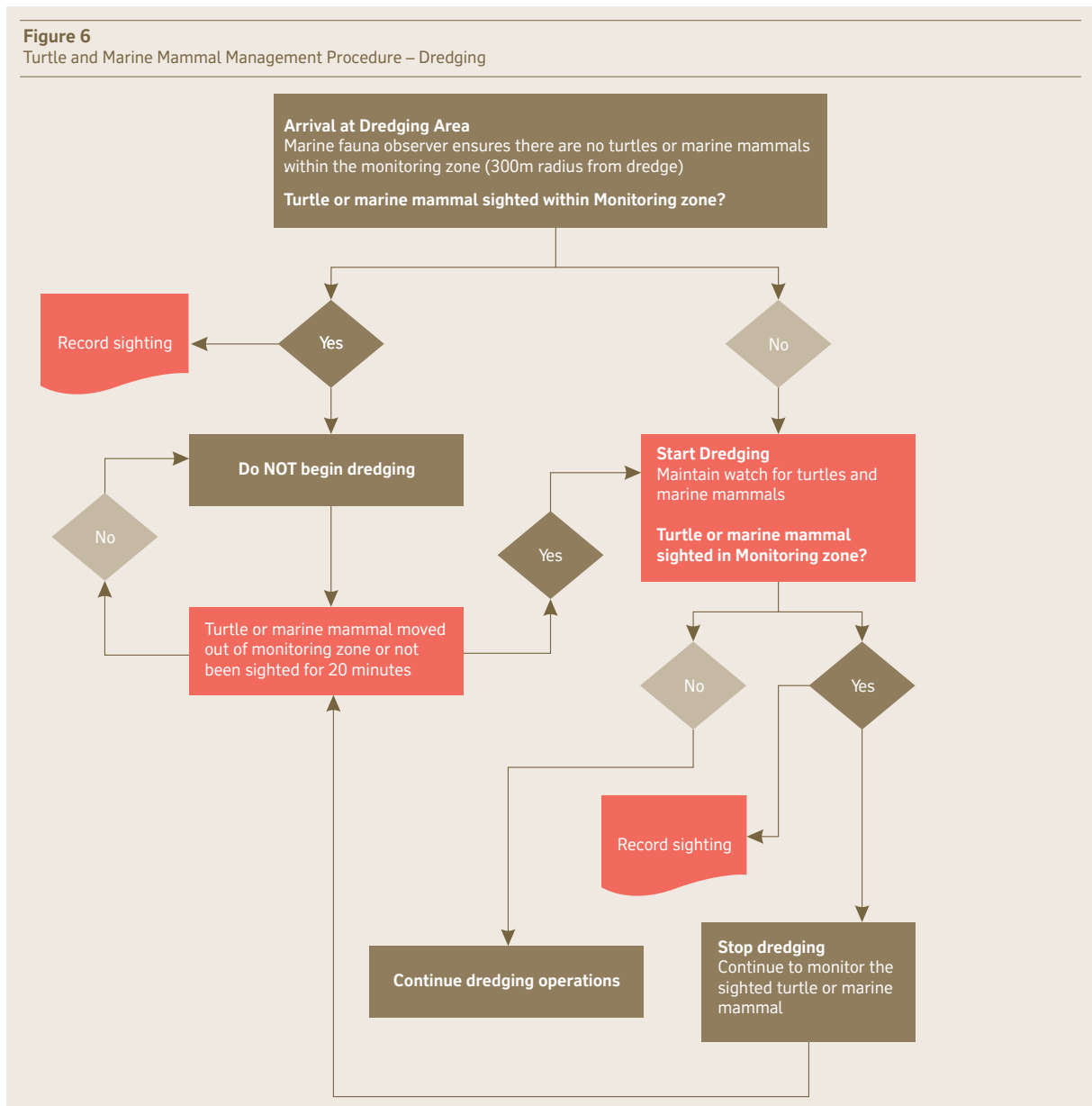
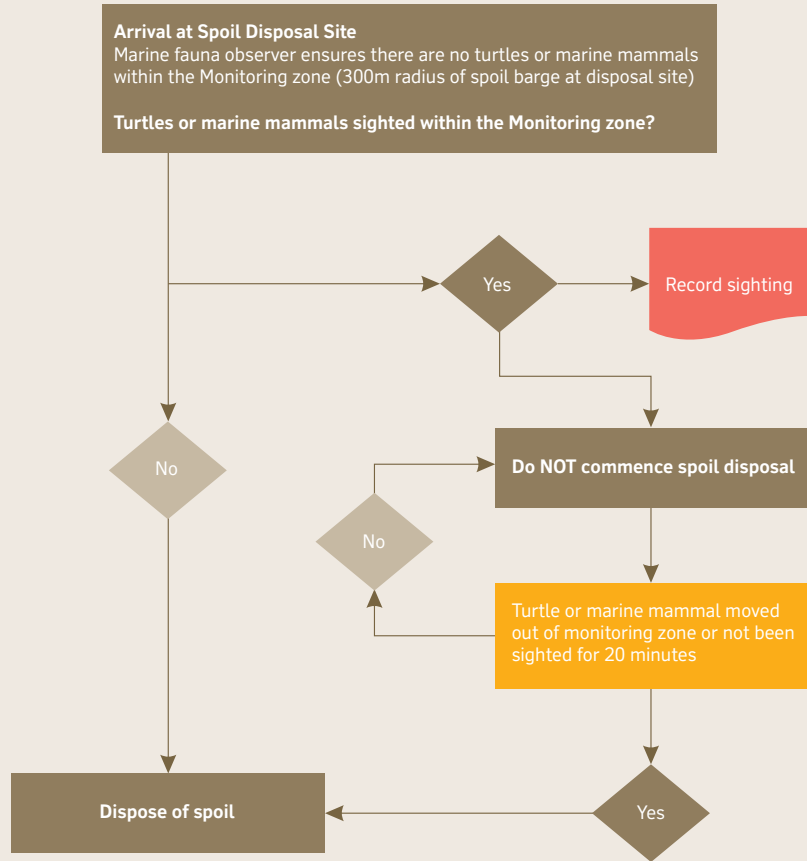


Figure 7

Turtle and Marine Mammal Management Procedure – Spoil Disposal



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