Section 8
Matters of National Environmental Significance
8 Matters of National Environmental Significance

8.1 Introduction

Matters raised in submissions to the EIS relating to Chapter 7 – MNES were predominantly focussed on:

- Significant species occurrence assessments;
- Assessment of Migratory Shorebirds;
- Assessment of significant species against objectives of the applicable recovery plans, Threat Abatement Plans and/or Species/specific conservation advice documents;
- Potential occurrence of listed significant fauna species and the consequential assessment for significant residual impacts; and
- Offsets.

The following sections provide additional information to that already included in the EIS in response to the submissions. Responses to submissions relating to marine ecology and Matters of National Environmental Significance are discussed in Chapters 7 and 8 respectively of the Supplementary Report.

Since the release of the EIS, and the purchase of Gulf Alumina and it’s SRBP, the original MIA (including the BLF and RoRo) and the north-south haul road have been removed from the Project scope (refer to Section 4 of this Supplementary Report for further information). Consequently, the comments to the EIS in regard to these infrastructure components are no longer relevant to the Supplementary Report.

Appendix A includes the full details of all submissions received for the Project.

8.2 Significant Species Occurrence Assessments

EHP and DotEE have both noted concerns in several of their EIS submissions regarding the occurrence of particular conservation significant fauna species detailed in Table 5-9 and Table 7-15 of the EIS. The species of concern are all considered as with ‘potential’ to occur and comprise the following species:

- Red Goshawk (*Erythrotriorchis radiatus*) – Endangered NC Act, Vulnerable EPBC Act;
- Masked Owl (Northern) (*Tyto novaehollandiae kimberlii*) - Vulnerable NC Act and EPBC Act;
- Northern Quoll (*Dasyurus hallucatus*) – Vulnerable EPBC Act; and
- Bare-rumped Sheathtail Bat (*Saccolaimus nudicluniatus*) - Endangered NC Act, Critically Endangered EPBC Act.

It is noted the listing for Bare-rumped Sheathtail Bat under the EPBC Act was changed by DotEE from Critically Endangered to Vulnerable on 7 December 2016.
Species are considered to have ‘potential’ to occur where there is a ‘possibility of suitable habitat or limited records of the species occurring within or around the Project area’ as stated in Section 5.4.4.3 of the EIS. Species under this occurrence rating are not discussed further regarding the Project impact assessment, where only species considered ‘likely’ or ‘known’ to occur are discussed which is a standard practice in EIS impact assessment. It is noted that DotEE recognise this in their submissions on the Project EIS where they state ‘the Department considers species assessed against the significant impact criteria should be categorised as no less than ‘Likely’ to occur’.

All of the Project’s ecology surveys were undertaken with consideration of the relevant State and Commonwealth standards, and undertaken by suitably qualified and experienced ecologists who have determined these species are not “Likely” to occur in the Project area, and that including the proposed species in the impact assessment sections with no additional scientific justification or confirmation as to their presence in the area will simply produce a superfluous result of ‘no residual impact’ on that species. Assessing species against significant impact criteria that, following detailed surveys by qualified and experienced ecologists, have been determined not to meet the criteria of being Likely to occur in the area, is not required and has not been undertaken.

In response to the EHP and DotEE submissions, an additional desktop review has been carried out on the status of occurrence of these species in or near the Project area and has been presented below. The review utilised the findings in the ecology surveys that have been undertaken for both this Project and the neighbouring SRBP, as well as advice from the fauna ecologist experienced with the site (Mark Sanders), including the following:

- Two comprehensive general fauna surveys of sites located across the Project area carried out over six survey days in both November 2014 and January/February 2015;
- A comprehensive fauna survey of sites that had not been surveyed previously in the Project area including the proposed BLF, RoRo, haul roads and MIA area was carried out over five days in June 2016. While the MIA, BLF, RoRo and north south haul road have since been removed from the Project scope to avoid potential environmental impacts, and the BH1 haul road has been relocated to avoid sensitive HES wetlands the information collected in these surveys is still relevant for the general area. The survey also included targeted trapping for Water Mouse and Black-footed Tree-rat;
- General onsite fauna observations carried out for the SRBP over 5 days in June 2010;
- Targeted surveys for threatened fauna carried out in September/October 2014 including:
  - Surveys for Red Goshawk (*Erythrotriorchis radiatus*) and Spectacled Flying-fox (*Pteropus conspicillatus*) carried out over five days in September 2014
  - Extended targeted surveys using echolocation call for recording for Bare-rumped Sheathtail Bat (*Saccolaimus nudicluniatus*) carried out over 12 days in September 2014
  - Extended and comprehensive targeted surveys using baited camera traps at 51 sites for Northern Quoll (*Dasyurus hallucatus*) carried out over 17 September to 4 October 2014
- A comprehensive general fauna survey of sites within the SRBP carried out over 6 days in February 2015.
A review has been carried out on the status of occurrence of these species in or near the Project area and has been presented below. The review investigated the Atlas of Living Australia (ALA) database records, EHPs WildNet database records, as well as other appropriate reference material including:

- The Action Plan for Australian Birds (Garnett et al., 2011); and

### 8.2.1 Red Goshawk

The nearest ALA and WildNet records of Red Goshawk to the Project area include: one 1990 record from Bamaga (100 km to the north); a January 2016 record from Weipa (90 km to the south); a pre-1980's record 90 km southeast of the site; and a 2011 and 2013 record approximately 100 km southeast of the site. The Action Plan for Australian Birds (Garnett et al., 2011) species account shows a single record to the east of Weipa and no other records north of this point.

EHP has commented there is an active Red Goshawk nest approximately 40 km south of the Project area and this is within foraging range for the species. It has been noted this information is also included in the June 2016 EHP assessment report of the SRBP EIS. However, extensive field surveys have not identified the species on site, there is no record of the Red Goshawk nest site in any of the recognised databases, and the information provided by EHP has not been verified. Limited studies have recorded that male Red Goshawks in the non-breeding season move up to 7 km from the nest site hunting within an estimated home range of up to 200 km². During the breeding season females were recorded moving up to 5 km in all directions from the nest site with an estimated home range of 120 km² (Aumann and Baker-Gabb, 1991). The stated nest site is located quite a distance (40 km) away from the Project area and there are extensive foraging habitats in all directions surrounding the supposed nest. Consequently, it is considered unlikely the Project lies within the foraging range of the individuals resident at this nest site.

EHP also note there are confirmed records in the Steve Irwin Reserve. This and the aforementioned occurrence information is not a publicly available confirmed record, was not documented to Metro Mining at any stage and is not referenced or attributed to any source. The original information searches for the EIS were carried out using the best available information at the time. The species has not been recorded in the wider Weipa area during extensive recent surveys for several development projects in the region. As such no change is proposed to the status of occurrence (potential to occur) of Red Goshawk in the Project area.

Potential impacts under the Significant Impact Guidelines 1.1 (DotE, 2013) (hereon ‘the Guidelines’) on the Red Goshawk have not been assessed as it has determined it is not likely to be in the area. Notwithstanding, the species is not anticipated to occur, as part of mitigation measures that have already been proposed in the EIS, raptor species in general will be included as part of the Project Significant Species Management Plan (SSMP). A qualified fauna spotter will thoroughly inspect all areas requiring vegetation clearing prior to any clearing activity and this will include the identification of potential raptor nests. In the unlikely event an active nest of the species is found to occur EHP will be notified and measures within the SSMP will identify impact mitigation strategies such as appropriate ‘no-clearing’ buffer distances. Given the extensive similar habitat available in the wider region and the relatively minor impacts proposed by the Project within this area, it is considered unlikely that there will be significant impacts resulting from the Project on the Red Goshawk.
8.2.2 Masked Owl

There are no recent records of Masked Owl from Cape York. The nearest record to the site (ALA and WildNet) is from 1913 near the Claudie River on eastern Cape York (150 km southeast of the Project area). There is a 1995 record from the Flinders Island group near Cape Melville (350 km southeast of the Project area). The Action Plan for Australian Birds (Garnett et al., 2011) species account shows only a single record occurring near Arukun (170 km south of the Project area) and does not consider the Project area is encompassed under the species range based on previous occurrence. The DotEE Species Profile and Threats Database notes that on Cape York Peninsula there are historical records from the Pascoe, Archer and Chester Rivers on the east coast (between 150 and 250 km south-east of the Project area), Normanton (over 650 km south of the Project area) and the Watson River at Aurukun (Higgins 1999; Mees 1964; Storr 1984). The New Atlas of Australian Birds (Barrett et al., 2003) compiles records of standardised bird surveys across Australia carried out from 1998 to 2002 and does not record the species from the entirety of Cape York Peninsula. Expert distribution mapping on the ALA database designates the subspecies as ‘maybe’ occurring in or near the Project area. The species has not been recorded in the Weipa region (including the Project area) despite extensive recent surveys for several development projects in the region. As such the assessment of ‘potential to occur’ rather than likely is considered appropriate.

Potential impacts under the Guidelines on Masked Owl have not been assessed as the species is not known to occur in the region and so it has been determined it is not likely to be in the Project area. As part of mitigation measures that have already been proposed in the EIS a qualified fauna spotter will thoroughly inspect all areas requiring vegetation clearing prior to any clearing activity. The inspection will include large tree hollows that may serve as roosting sites for this species. Given lack of any records of this species in the wider region, the extensive similar habitat available in the wider region, and the relatively minor impacts proposed by the Project within this area, it is considered unlikely that there will be significant impacts resulting from the Project on Masked Owl, should it even occur in the region.

8.2.3 Northern Quoll

There are several Atlas of Living Australia/EHP Wildnet records from the early 1980s located approximately 22 km south of the site at Red Beach near Mapoon. These are the closest records to the site albeit recorded in the 1980s. Targeted surveys for Northern Quolls at Big Swamp and Red Beach, Mapoon, in December 2006 did not record any quolls (Woinarski et al., 2008). There is a relatively recent 2010 EHP record located approximately 37 km to the south of the Project area at Blue Bottle Spring.

The original EIS text noted anecdotal information stating populations of this species have been recently found approximately 20 km north of Weipa (at an undisclosed site) during works for Rio Tinto Alcan and at RAAF Base Scherger (east of Weipa). There are no publicly available records or site information for either of these reports. Regardless, both of these areas are over 50 km from the Project area. EHP have commented there is a record of Northern Quoll in the Steve Irwin Reserve located to the south of the Project area and east of the 2010 record noted above. This occurrence information is not publicly available, was not provided to Metro Mining at any stage and is not referenced or attributed to any source. The original information searches were carried out using the best available information at the time and no subsequent information has been presented that substantiates any of the additional records that have been raised.

There is no presence data from either the Bauxite Hills or SRBP EIS survey efforts, including targeted Northern Quoll surveys undertaken for the SRBP in 2014, and there are no recent records of the Northern Quoll in the Project area. Trapping for the SRBP and Bauxite Hills EIS has included over
2,000 trap nights using small Elliott traps, 63 trap nights using baited cage traps and cameras, and 488 nights of baited camera traps and no Northern Quoll were recorded. Further dry season surveys in June 2016 included 600 trap nights using small Elliott traps and 44 nights of baited camera traps (refer Appendix C of the Supplementary Report).

The assessment of the Northern Quoll as possibly occurring is consistent with the findings in the approved SRBP EIS and previous surveys undertaken for the Pisolite Hills Project. There is no rocky habitat (preferred breeding habitat) in the area. The area is subject to regular burning to reduce fuel loads thereby impacting potential breeding structures (large hollow woody debris). In the June 2016 assessment report of the SRBP EIS, EHP commented that it is satisfied that the Project site is not likely to contain important habitat for the species and that the Project is unlikely to have unacceptable impacts on the Northern Quoll. As such no change is proposed to the status of occurrence of Northern Quoll in the Project area.

Potential impacts under the Guidelines on Northern Quoll have not been assessed as the Project ecologists have determined it is not likely to be in the area. As part of mitigation measures that have already been proposed in the EIS a qualified fauna spotter will thoroughly inspect all areas requiring vegetation clearing prior to any clearing activity. The inspection will include large fallen woody debris that may serve as denning sites for this species. Given the lack of any records of the species presence despite extensive suitable surveys being carried out in the local area, the extensive similar habitat available in the wider region, and the relatively minor impacts proposed by the Project within this area, it is considered unlikely that there will be significant impacts resulting from the Project on Northern Quoll, should it occur in the area.

### 8.2.4 Bare-rumped Sheathtail Bat

There are no records from western Cape York for the Bare-rumped Sheathtail Bat. The nearest confirmed species record available from database searches is from the McIlwraith Range 200 km southeast of the Project area. In addition to this record, there is a known population being studied in Iron Range National Park (150 km southeast of the Project area) (pers. comm. J. Broken-Brow); however, as of August 2016 no voucher specimen from this population has been collected and submitted to the Queensland Museum. Thereby there is no official database record of the Iron Range population.

The species is difficult to survey for as it tends to fly high in the canopy and above the height of general microbat trapping techniques (i.e. harp traps). Targeted canopy mist-netting surveys for the species located south of Weipa in Darwin Stringybark woodland did not trap Bare-rumped Sheathtail Bat but did record the two other species of Saccolaimus known from Australia: Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*); and Papuan Sheathtail Bat (*Saccolaimus mixtus*) (Armstrong et al., 2014).

The Bare-rumped Sheathtail Bat was detected as possibly occurring from microbat call pass files recorded from the Project area in surveys undertaken for the EIS; however, there are two other species of Saccolaimus potentially, and more likely, occurring in the area. Differentiating calls of species in the genus is known to be problematic. Subsequent dry season fauna surveys have been carried out in June 2016 for Metro Mining since the publication of the EIS (refer Appendix C of the Supplementary Report). No recordings, either confirmed or potential, for the Bare-rumped Sheathtail Bat were captured.

Further broad spectrum bat call analysis for the Gulf Alumina EIS recorded over a 12 day period in September/October 2014 identified the presence of both Yellow-bellied Sheathtail Bat and Papuan Sheathtail Bat. Bare-rumped Sheathtail Bat was not recorded and was not considered as possibly
occurring. Given the species has never been recorded on western Cape York Peninsula the rating of potentially occurring rather than likely is considered appropriate.

**8.2.5 Water Mouse**

Further ecological surveys were carried out (10th to 16th June 2016) for the Project following the publication of the EIS. The surveys included methods targeting Water Mouse as recommended under the *Referral guideline for the vulnerable water mouse Xeromys myoides* (DotE, 2015a) in mangrove habitat that was originally identified as being impacted by proposed Project infrastructure including the north-south haul road, RoRo and MIA (refer Appendix C of the Supplementary Report). The north-south haul road, BLF, RoRo and MIA have since been removed from the scope as the existing or proposed infrastructure associated with the SRBP will be utilised. Moreover, the BH1 haul road has been relocated to avoid sensitive HES wetlands associated with the Skardon River. Given there will now be no impact to mangrove or estuarine saltpan habitat the Project is not considered to have any impact on Water Mouse should a local population occur. Nevertheless, the information gained from the early dry season survey is presented in the following section.

The surveys included the following survey methods:

- Searches within mangrove communities focused on locating Water Mouse feed middens (typically found in locations such as at the base of mangrove flutes), prints in the mud, mud plugs in hollow roots/branches (indicating a nest tree), or other nesting signs (mounds etc.) with a total search effort of six hours at four search transects; and

- Eight motion sensing cameras were located within mangroves on logs or debris above the high-tide mark. Cameras were baited with liberal volumes of tuna oil, peanut butter and pilchards, and left in situ for four consecutive nights for a total of 32 survey nights.

No Water Mouse were detected using the baited camera traps or active daytime searches targeting habitat areas. The intertidal community at the area of interest was restricted, often not exceeding more than 10 m in width and dominated by mangrove fern or sedge (e.g. *Acrostichum* and *Eleocharis*). These areas are not considered suitable for Water Mouse nesting. However, Water Mouse can also nest in tree hollows, utilising sloping trunks or narrow diameter vertical trunks/branches/root systems (M. Sanders pers. obs; I. Gynther pers. comm). While searches at Bauxite Hills were successful in locating numerous hollow trees throughout the mangrove community, most had very large and vertical hollows. Of the few trees that were suitable, none had obvious mud plugs or entrances with signs of frequent use. Water Mouse food middens, which can be found in locations such as shallow hollows or at the base of mangrove buttresses, were absent.

The species has never been recorded north of Proserpine in Queensland. Russel and Hale (2009) note that many searches in selected regions with apparently suitable habitat failed to detect the species. While limited survey effort for Water Mouse has occurred on the west of Cape York, research carried out by Project survey staff (which has included communication with recognised Water Mouse expert Ian Gynther, EHP) has failed to uncover any verifiable Water Mouse records from the region. The lack of known regional records, and the in-field results of surveys for the Project suggest this species is unlikely to occur. As such, the designation of ‘unlikely to occur’ in or near the Project area remains unchanged.
8.3 Assessment of Migratory Shorebirds

8.3.1 Migratory Bird Species - EPBC Act Policy Statement 3.2.1

The EIS identified two Migratory wader species recorded during surveys in the Project area and surrounds – Whimbrel (Numenius phaeopus) and Common Sandpiper (Actitis hypoleucos).

Surveys carried out since the EIS (June 2016) on the Skardon River (refer Appendix C of the Supplementary Report) recorded further sightings of Whimbrel and a single record of Eastern Curlew (Numenius madagascariensis) which is also listed as Critically Endangered under the EPBC Act.

A summary of the species ecology and an assessment of impacts to Eastern Curlew under the Significant impact guidelines 1.1 (DotE, 2013) is provided in Section 8.3.1 of this Supplementary Report.

An assessment of the potential Project impacts against EPBC Act Policy Statement 3.2.1 is provided below.

8.3.1.1 Industry Guidelines for Avoiding, Assessing and Mitigating Impacts on EPBC Act Listed Migratory Shorebird Species

The Industry Guidelines state the identification of ‘important habitat’ for migratory shorebirds as the “key concept in determining the likelihood of significant impact from proposed actions.” ‘Important habitat’ may be defined using the criteria adopted under the Ramsar Convention on Wetlands:

- Wetland habitat should be considered internationally important if it regularly supports:
  - 1 per cent of the individuals in a population of one species or subspecies of waterbird, or
  - a total abundance of at least 20,000 waterbirds

- Wetland habitat should be considered nationally important if it regularly supports:
  - 0.1 per cent of the flyway population of a single species of migratory shorebird, or
  - 2,000 migratory shorebirds, or
  - 15 migratory shorebird species (DotE, 2015).

Previous fauna surveys for the Project have included bird surveys and incidental sighting records of Migratory shorebirds in the area, as noted above, thereby providing evidence of shorebird habitat being present in the wider area.

A specific survey for wader birds was undertaken during 2009 for the previously proposed Pisolite Hills Project. The survey was undertaken throughout the Port Musgrave estuary system located to the south of the Project area focussing on:

- Mouth of Namaleta Creek and surrounding shores;

- Lower Ducie River in the vicinity of the proposed barge loading area, including Pargon Creek, Palm Creek and adjacent creeks and shores; and
Mouth of the Wenlock River.

The results of the survey are summarised in Section 4.3.4.5 of Appendix B3 of the EIS. Port Musgrave meets the requirements for nationally important habitat for migratory shorebirds because 16 species of migratory shorebird were recorded. In addition, Port Musgrave qualifies as nationally important habitat for four species of shorebird because at least 0.1% of their estimated East Asian-Australasian flyway population were recorded: Great Knot (*Calidris tenuirostris*); Greater Sand Plover (*Charadrius leschenaultii*); Whimbrel; and Terek Sandpiper (*Xenus cinereus*).

The entrance to Skardon River presents a similar habitat layout to Namaleta Creek, with adjacent creek systems and intertidal sandy shores and beaches. However, Namaleta Creek is a minor portion of the overall Port Musgrave shorebird habitat area. The relatively narrow Skardon River entrance presents a diverse system of sandbars and shoreline sand flats which are variably exposed during tidal movement. Upstream of the entrance the waterway expands in width and includes intertidal flats on the southern and northern edges of the river. The extent of these intertidal habitats reduce markedly as the river progresses upstream toward the Project area.

Records of Migratory shorebird species along the Skardon River have recorded the three species identified above. All three species (Eastern Curlew, Common Sandpiper and Whimbrel) were observed as individuals utilising habitat along the Skardon River. No significant numbers of these species have been observed, although individual sightings of Whimbrel may indicate several are present.

Within the Industry Guidelines, Table 2 outlines the ‘Thresholds of significant impacts on migratory shorebirds’ as it applies to ‘important habitat.’ No such habitat has been identified in the Project area through the standard ecology surveys. The significant impacts identified in Table 2 of the Industry Guideline are addressed in Table 8-1.

### Table 8-1 Thresholds of significant impacts on migratory shorebirds

<table>
<thead>
<tr>
<th>Significant impact</th>
<th>Project comment</th>
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<tbody>
<tr>
<td>Loss of habitat</td>
<td>The cyclone moorings proposed for the Project are located approximately 8 km upstream of the mouth of the Skardon River. The cyclone mooring area has been located in an area where foraging habitat for shorebirds (mudflats exposed at low tide) is limited in extent. There is abundant more suitable habitat downstream and upstream of the cyclone mooring area in the form of wide exposed mudflats and sandflats at the river mouth (personal observation, B. Taylor – CDM Smith). High tide roost habitat for shorebirds may include saltmarsh areas for many species and mangroves (mainly for Whimbrel).</td>
</tr>
<tr>
<td>Degradation of habitat leading to a substantial reduction in migratory shorebird numbers</td>
<td>Under the Project Environmental Management Plan potential indirect impacts such as riverine water quality will be monitored with corrective management actions in place where impacts are detected. Based on wave wake modelling for the Project shoreline erosion is not considered to be an impact from vessel traffic along the Skardon River.</td>
</tr>
<tr>
<td>Increased disturbance leading to a substantial reduction in migratory shorebird numbers</td>
<td>An increase in riverine boat traffic is not expected to impact shorebirds that are present given the width of the Skardon River downstream of the Project. Barges will be restricted to a designated transport channel in the river. The Project is not proposed to operate in the wet season when Migratory shorebirds are most likely to be present. Camping currently occurs at the mouth of the Skardon River and adjacent to suitable foraging habitat for shorebirds at the river mouth. Access to the camping area is not controlled by Metro Mining and there is no control over potential disturbance impacts to shorebirds in this area from people accessing the camping ground and river.</td>
</tr>
<tr>
<td>Direct mortality of birds leading to a substantial reduction in migratory shorebird numbers</td>
<td>There is no feasible reason the Project will result in the direct mortality of shorebirds in the area. Barge movements will be restricted to 6 knots and as such, potential for mortality to birds from barge strike is considered low.</td>
</tr>
</tbody>
</table>
An assessment for significant impacts to Whimbrel and Common Sandpiper under the *Significant impact guidelines 1.1* (DotE, 2013) is located in Table 7-29 of the EIS. An assessment for Eastern Curlew is provided in the following section.

### 8.3.1.2 Eastern Curlew

Eastern Curlew (*Numenius madagascariensis*) is listed as Critically Endangered under the EPBC Act and was considered with ‘potential to occur’ in the Project area in the EIS. Studies carried out by CDM Smith in the Project area (7th to 10th June 2016), following the publication of the EIS, opportunistically recorded the species foraging along the Skardon River (refer Appendix C of the Supplementary Report). As such, the species should be considered as ‘known to occur’ in the area. The following text is included in this Supplementary Report as per the text included for species ‘known to occur’ in the EIS.

**Eastern Curlew**

**Status:** Near Threatened – NC Act; Critically Endangered and Migratory under the EPBC Act.

**Occurrence in the study area:** A single individual (overwintering) was observed foraging at low tide with other waders on exposed mudflats on the Skardon River in June 2016. The site was approximately 4 km downstream of the existing Skardon River port area. Wheller and Seymour (2009) identified a total of 10 individuals during targeted surveys for migratory shorebirds at Port Musgrave to the south of the Project area.

**Ecology and habitat:** Eastern Curlews occur on sheltered coasts, especially estuaries, harbours and coastal lagoons, and are often recorded in saltmarsh and on mudflats within mangroves. They mainly forage on intertidal mudflats and sandflats, particularly on seagrass beds and where burrowing crustaceans are common (Geering et al., 2007). They roost on sandy spits and islets, in mangroves and saltmarsh, and along high water mark on beaches (Higgins and Davies, 1996). The species is usually located while feeding individually or in small groups. However, large numbers congregate at high tide roosts (Lane, 1987).

**Distribution and breeding:** The Eastern Curlew breeds in eastern Siberia, Mongolia and northern Manchuria during the northern hemisphere summer. The majority of the population migrates to Australia arriving mostly in August-September. Southeast Queensland is a major stronghold for the species in Australia with 25% of the non-breeding population occurring there (Geering et al., 2007).

**Threats:** Eastern Curlews are easily disturbed by people at foraging and roosting sites (Higgins and Davies 1996) and are often the first species in a high-tide roost to take to flight if disturbed, relocating to alternative roosts often some considerable distance away (Geering et al., 2007). Pollution may have also reduced food availability (Higgins and Davies, 1996).

By far the greatest threat appears to be wetland degradation and reclamation along the southeast Asian coastline where the species rests and feeds during migration. The population estimate for Australia was 28,000 (Bamford et al., 2008), however, this population estimate is out of date. An assessment by the University of Queensland of data from sites across Australia indicates the species has declined 66.8% over the last 20 years (Fuller, pers. comm. 2014; in DotE, 2015).
Impact Assessment

The Project area or surrounds does not comprise ‘important habitat’ for migratory waders as defined under the *Significant Impact Guidelines 1.1* (DotE, 2013) (refer Section 5.6.2.7 of the EIS).

A single individual was observed over 4 km downstream of Project infrastructure proposed for the Skardon River. No targeted surveys for migratory waders/shorebirds have been carried out along the Skardon River. Targeted surveys in the Port Musgrave area (20 km south of the Project area) were carried out in March 2009 and recorded a total of 10 Eastern Curlew (WorleyParsons, 2010). Table 8-2 provides an impact assessment for the species as per the *Significant Impact Guidelines 1.1*.

**Table 8-2 Assessment against significant impact criteria: Eastern Curlew**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Assessment Against Significance Criteria (Critically Endangered)</th>
</tr>
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<tr>
<td>Lead to a long-term decrease in the size of a population</td>
<td>It is unlikely the species occurs in large numbers in the Skardon River as the majority of birds move further south in Australia during migration. The Project infrastructure on the Skardon River does not impact the most suitable habitat for the species i.e. wide mudflat areas. Project infrastructure (cyclone mooring areas) is located in areas with only a narrow area of exposed bank at low tide. There is abundant suitable habitat surrounding the Project which will remain undisturbed. The Project EMP will include monitoring and management of riverine water quality and ESCs. Barge traffic is considered unlikely to be more than a minor disturbance to this species (if at all) given the species still occurs in areas where there is high water traffic such as Moreton Bay, southeast Queensland. The Project is unlikely to lead to a long term decrease in the size of the population of Eastern Curlew.</td>
</tr>
<tr>
<td>Reduce the area of occupancy of the species</td>
<td>The Project infrastructure on the Skardon River does not impact the most suitable habitat for the species (wide mudflat areas). The species occurs across much of the Australian coastline. If the species does occur there, the estimated area of occupancy for the species will increase. The Project is very unlikely to reduce the area of occupancy.</td>
</tr>
<tr>
<td>Fragment an existing population into two or more populations</td>
<td>The proposed activity does not feasibly create a barrier to the movement or migration of Eastern curlew.</td>
</tr>
<tr>
<td>Adversely affect habitat critical to the survival of the species</td>
<td>There is no critical habitat identified for the species in the Skardon River although targeted studies have not been carried out. Regardless, the Project infrastructure does not impact high quality habitat for the species and the Project EMP will manage potential impacts to the surrounding habitat from Project activities. The Project will not affect habitat critical to the survival of the species.</td>
</tr>
<tr>
<td>Disrupt the breeding cycle of a population</td>
<td>The species breeds in the northern hemisphere. The Project could not feasibly disrupt the breeding cycle.</td>
</tr>
<tr>
<td>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</td>
<td>The Project infrastructure does not impact high quality habitat for the species and the Project EMP will manage potential impacts to the surrounding habitat from Project activities. The Project will not decrease the availability or quality of habitat to the extent that the species is likely to decline.</td>
</tr>
<tr>
<td>Criterion</td>
<td>Assessment Against Significance Criteria (Critically Endangered)</td>
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<tr>
<td>Result in invasive species that are harmful to a critically endangered species becoming established in the critically endangered species habitat</td>
<td>Port developments at Weipa have not been implicated in the introduction of invasive species, and these developments are at a larger scale than that proposed for the SRBP. In addition, the Project proposes transhipment of ore, meaning OGV’s do not come into shore and remain approximately 12 km offshore, significantly limiting the opportunity for invasive species to be introduced. The area is currently relatively free of introduced weeds, although favoured habitat for Eastern Curlew (estuarine mudflats) remain resistant to weed invasion. Pest animals such as Dingo (Canis lupus lupus) and Pig (Sus scrofa) already occur in the area. The Project will implement a Land Use Management Plan (LUMP) to control the introduction and spread of weed species across the Project area. The LUMP will be in place for the life of the Project, and will minimise the potential for weed invasion and may in the long-term improve habitat condition within vegetation communities located adjacent to Project infrastructure. The Project is considered unlikely to result in invasive species becoming established in this species’ habitat.</td>
</tr>
<tr>
<td>Introduce disease that may cause the species to decline</td>
<td>The Project EMP will incorporate the management of invasive species which will assist in the prevention of pest plant introduction and associated diseases resulting from Project activities. Project equipment sourced from overseas will be quarantined as required under State and Commonwealth legislation. The Project is considered unlikely to introduce disease that may cause the species to decline. Monitoring of any confirmed threatened orchids will also occur during operation of the Project to identify if any impacts are arising from disease.</td>
</tr>
<tr>
<td>Interfere with the recovery of the species</td>
<td>The nature and scale of the Project will not plausibly interfere with the recovery of the species. The Project does not interfere with any of the management actions outlined in The Action Plan for Australian Birds 2010 (Garnett et al., 2011). The Project can contribute positively to recovery by providing localised information on shorebird numbers and activity in the area.</td>
</tr>
</tbody>
</table>

### 8.4 Assessment of Significant Species

A comment has been made that the operations of the two bauxite mining projects, i.e. increased vessel traffic in the Skardon River, will result in a number of potential impacts to Sawfish spp. and Speartooth Shark. More information was requested regarding the potential impacts on these species.

Project impacts on these cryptic species are difficult to assess because there is very little information about their biology and there is a lack of certainty about the potential impacts of human activities on their behaviour and population status.

Commercial and recreational (and illegal) fishing are known threatening processes, but the impact of the proposed increase in vessel traffic in the Skardon River, and the disturbance that may have on populations of threatened marine and estuarine species, is unknown. Moreover, there is no available literature in relation to noise and vibration impacts on Speartooth Shark and Sawfish spp. which precludes the ability to undertake a more thorough assessment of potential impacts. The approach taken in the Project EIS is consistent with the SRBP EIS, which has subsequently been approved by EHP, therefore the standard of assessment required by EHP is understood to have been achieved.

#### 8.4.1 Speartooth Shark – Significant Impact Assessment

Speartooth Shark has been recorded from the lower reaches (salinity between 0.8 and 28 ppt) of the Wenlock and Dunic Rivers and Port Musgrave, as well as the Bizant River, and a number of river systems in the Northern Territory (Peverell et al., 2006). From a limited amount of tagging work, Speartooth Sharks are considered to move up and down an estuary system with the tide and...
repeatedly use the same available habitat (Pillans et al., 2010). Younger sharks are generally found further upstream than older juveniles and sub-adults. Adult sharks are assumed to occur in offshore (marine) waters (Pillans et al., 2010). While it is possible that the species also occurs in other rivers of Western Cape York, dedicated surveying and observer data from commercial fishing operations to date has not documented their occurrence elsewhere. Given the habitat preference and occurrence in the Port Musgrave area, Metro Mining have taken the conservative approach and assessed the species as likely to occur in the Skardon River.

However, the catchment of the Skardon River is small and is supplied with only minor freshwater flows during the dry season. The life history of Speartooth Shark pups indicate they move into the upper estuary adjacent to freshwater flows with lower salinity regimes. If flows in the Skardon River are not sufficient (given their small size), and particularly noting the ephemeral nature of the upstream tributaries of the Skardon river that actually cross the Project area, then the river would not appear to be suitable to sustain the required conditions for the estimated three to six years before migration to more saline waters occurs.

The significant overall threat to Speartooth Shark is very clearly associated with incidental capture by commercial fishing operations. A lesser impact is from recreational fishing activities. The impacting processes from the proposed project are highly unlikely to result in impacts to Speartooth Shark. The species is not expected to be negatively impacted by artificial lighting, underwater noise or shipping movements, although knowledge of the species biology is limited. Proposed construction and operational activities largely occur outside of what is believed to be the pupping period for Speartooth Shark, with the Skardon River already considered unlikely to be suitable for pupping due to the limited upstream water flows and limited extent of estuarine and freshwater interaction.

Any potential indirect impacts from barge transit and transhipping operations are not expected to alter any key habitat for the species. Relocation of the BH1 haul road, and the use of the SRBP BLF, RoRo and main haul road has reduced the potential for direct impacts (habitat loss) and indirect impacts (such as underwater noise from pile-driving associated now only to the construction of the cyclone moorings) to potential habitat for the species. Hydrological modelling indicates the Project will not directly or indirectly alter the hydrology of the Skardon River (refer Section 10.5.1 of the EIS) to the degree that it will affect the extent or condition of freshwater and brackish water habitats that are considered to be important for the life history of Speartooth Shark.

The assessment against significant impact criteria for the critically endangered Speartooth Shark is presented in Table 8-3.

Table 8-3 Assessment against significant impact criteria: Speartooth Shark and Sawfish spp. – Significant Impact Assessment

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Assessment Against Significance Criteria (Critically Endangered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead to a long-term decrease in the size of a population</td>
<td>The Project is unlikely to lead to a long term decrease in the size of any populations of Speartooth Shark, should the species occur in the Skardon River. The Project will not plausibly result in the death of any individual animals, and the impacting processes are not of a type or scale where a long-term decrease in the size of the population is plausible. Fisheries impacts are widely considered the key impacting factors influencing populations.</td>
</tr>
<tr>
<td>Reduce the area of occupancy of the species</td>
<td>The Skardon River is not currently included as part of the published estimate of the area of occupancy of the Speartooth Shark (Stevens et al., 2005). If the species does occur there, the estimated area of occupancy for the species will increase. The impacting processes that will occur as a result of the Project will not feasibly reduce the area of occupancy.</td>
</tr>
<tr>
<td>Criterion</td>
<td>Assessment Against Significance Criteria (Critically Endangered)</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Fragment an existing population into two or more populations</td>
<td>The proposed activity does not feasibly create a barrier to the movement or migration of the Speartooth Shark - either directly or indirectly.</td>
</tr>
<tr>
<td>Adversely affect habitat critical to the survival of the species</td>
<td>The critical habitat for the survival of the Speartooth Shark on western Cape York is the Port Musgrave/Ducie River/Wenlock system which is remote from the Project and not impacted by it. Freshwater habitat is considered important nursery habitat for Speartooth Sharks. The east-west BH1 haul road crosses two ephemeral creeklines upstream of the estuary. Culverts at both of these crossings will be designed to allow fish passage should this species occur.</td>
</tr>
<tr>
<td>Disrupt the breeding cycle of a population</td>
<td>The Project is considered unlikely to disrupt the breeding cycle for the Speartooth Shark although the species life cycle is poorly known. Hydrological connectivity will be maintained in the upper estuary through the use of culverts allowing freshwater flows through haul road crossings where they intersect watercourses. The creeks at the site of the proposed crossings are freshwater and ephemeral, and appear of minor value for juvenile Speartooth Shark. To the best available knowledge pupping for the Speartooth Shark occurs from October - December. Construction is not proposed during this period. As operations are not proposed during the wet season, they will not plausibly interfere with the passage of Speartooth Shark for pupping in the lower estuary, or the migration of recruits to the upper estuarine/lower freshwater reaches if they do occur.</td>
</tr>
<tr>
<td>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</td>
<td>The Project will have a limited direct impact on benthic habitat through the installation of the cyclone moorings. However, this area is relatively minor in the context of the amount of available habitat within the Skardon River and the relocation of the BH1 haul road, and the use of the SRBP BLF, RoRo and main haul road has reduced the original area of impact. The installation of culverts and low-flow haul road crossings between the freshwater and estuarine reaches will maintain hydrological flows of the area. Connectivity between the freshwater and marine system will remain. The Project will not plausibly result in the decline of the Speartooth Shark.</td>
</tr>
<tr>
<td>Result in invasive species that are harmful to a critically endangered species becoming established in the critically endangered species habitat</td>
<td>Port developments at Weipa have not been implicated in the introduction of invasive species, and these developments are at a larger scale than that proposed for the Project. In addition, the Project proposes transshipment of ore, meaning OGV’s do not come into shore and remain approximately 12 km offshore, significantly limiting the opportunity for invasive species to be introduced. Ballast water of vessels in bulk carriers will adhere to relevant national and international standards aimed at preventing the spread of invasive species. Barges proposed for use are designed to operate with minimum ballast and where ballast is required the same national and international requirements as for bulk carriers will be adhered to.</td>
</tr>
<tr>
<td>Introduce disease that may cause the species to decline</td>
<td>Port developments at Weipa have not been implicated in the introduction of disease, and these developments are at a larger scale than that proposed for the SRBP. In addition, the Project proposes transshipment of ore, meaning OGV’s do not come into shore and remain approximately 12 km offshore, significantly limiting the opportunity for invasive species to be introduced. Ballast water of vessels in bulk carriers will adhere to relevant national and international standards aimed at preventing the spread of invasive species. Barges proposed for use are designed to operate with minimum ballast and where ballast is required the same national and international requirements as for bulk carriers will be adhered to.</td>
</tr>
<tr>
<td>Interfere with the recovery of the species</td>
<td>The nature and scale of the Project will not plausibly interfere with the recovery of the species. The Project can contribute positively to recovery through active education of staff and contractors of the conservation status and threats to the Speartooth Shark. Metro Mining will investigate funding research within the study area as party of the Offsets Strategy which will contribute to the overall management objectives of the draft recovery plan.</td>
</tr>
</tbody>
</table>
8.4.2 Sawfish spp. – Significant Impact Assessment

It is considered likely that two species of sawfish – the Largetooth Sawfish and the Dwarf Sawfish may occur within the Skardon River. A further species, the Green Sawfish may occur at the proposed transhipping location. Based on existing survey evidence a key location for several of the Sawfish spp. is the nearby Port Musgrave/Ducie River/Wenlock River area, directly to the south of the Skardon River.

The significant overall threat to sawfishes is associated with incidental capture by commercial fishing operations. A lesser impact is from recreational fishing activities. The impacting processes from the proposed Project are highly unlikely to result in impacts to sawfishes. It is considered unlikely that the species will be negatively impacted by artificial lighting, underwater noise or shipping movements. In addition, proposed construction and operational activities are outside the wet season which is identified as the key pupping period for sawfishes.

The barge transit routes or the transhipping operations will not alter key species specific or nursery habitat. The Project will not directly or indirectly alter the hydrology of the Skardon River and as such will not affect the extent or condition of freshwater and brackish water habitats that are considered to be important for the life history of the Largetooth Sawfish. Importantly, the use of the SRBP MIA, BLF, RoRo and main haul road and the relocation of the BH1 haul road significantly reduces potential for impacts to the upstream reaches of the Skardon River where impacts to Sawfish are more likely to occur.

The assessment in Table 8-4 demonstrates the Project will not comprise impacts to the extent that recovery of sawfishes will be negatively affected should they occur in the Skardon River.

Table 8-4 Assessment against significant impact criteria: sawfish species

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Assessment Against Significance Criteria (Vulnerable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead to a long-term decrease in the size of a population</td>
<td>The Project is unlikely to lead to a long term decrease in the size of any populations of sawfish. The Project is not likely to result in the death of any individual animals, and the impacting processes are not of a type or scale where a long-term decrease in the size of the population is plausible. Fishing impact are widely considered the key impacting factors influencing populations.</td>
</tr>
<tr>
<td>Reduce the area of occupancy of the species</td>
<td>The area of occupancy for the Largetooth and Green Sawfishes is northern Australian waters (north of 20°S). The Dwarf Sawfish has an area of occupancy from the Gulf of Carpentaria and then across northern Australia and down into the Pilbara region of Western Australia. The Project will not feasibly reduce the area of occupancy of sawfishes.</td>
</tr>
<tr>
<td>Fragment an existing population into two or more populations</td>
<td>The proposed activity does not feasibly create a barrier to the movement or migration of sawfish - either directly or indirectly.</td>
</tr>
<tr>
<td>Criterion</td>
<td>Assessment Against Significance Criteria (Vulnerable)</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Adversely affect habitat critical to the survival of the species</td>
<td>Critical habitat for the Largetooth Sawfish are the freshwater areas (including isolated pools) which the species likely uses as a nursery area. The east-west BH1 haul road crosses two ephemeral creeklines upstream of the estuary. Culverts at both of these crossing will be designed to allow sawfish passage and will be constructed when creeks are likely to be dry and out of the breeding season for this species. Available information suggests Dwarf Sawfish use mangrove habitat and shallow waters adjacent to mangroves. Now that the BLF and RoRo have been relocated to the SRBP MIA and BLF, the existing SRBP main haul road will be used in place of the originally proposed north – south haul road, and the BH1 haul road has been moved away from sensitive mangrove habitat, no mangrove habitat will be directly impacted by the Project. Available information suggests that the Green Sawfish prefers the sand and mud flats outside of river mouths, although it does extend into deeper coastal waters. The transshipping operations will not alter habitat such as the shallow sand and mud banks that the Green Sawfish prefers.</td>
</tr>
<tr>
<td>Disrupt the breeding cycle of an important population</td>
<td>The Project is highly unlikely to disrupt the breeding cycle for sawfish. For sawfish, pupping occurs during the wet season when construction and operational activities will not occur.</td>
</tr>
<tr>
<td>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</td>
<td>The Project will have a limited direct impact on benthic habitat through the installation of the cyclone moorings. This area may provide foraging habitat largely for Largetooth and Dwarf Sawfish. However, this area is relatively minor in the context of the amount of available habitat within the Skardon River and the relocation of the BH1 haul road, and the use of the SRBP BLF, RoRo and main haul road has reduced the original area of impact and will not plausibly result in the decline of these species. The installation of culverts on the haul roads will maintain hydrological flows between the freshwater and estuarine reaches. Connectivity between the freshwater and marine system will remain.</td>
</tr>
<tr>
<td>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat</td>
<td>Port developments at Weipa have not been implicated in the introduction of invasive species, and these developments are at a larger scale than that proposed for the SRBP. Ballast water of vessels in bulk carriers will adhere to relevant national and international standards aimed at preventing the spread of invasive species. Barges proposed for use are designed to operate with minimum ballast and where ballast is required fresh water will be used thus eliminating the risk of introduction or translocation of invasive species. In an exceptional circumstance where marine water was required for barge ballast, it would be retained onboard for the minimum time to ensure risk was negated.</td>
</tr>
<tr>
<td>Introduce disease that may cause the species to decline</td>
<td>Port developments at Weipa have not been implicated in the introduction of disease, and these developments are at a larger scale than that proposed for the SRBP. Ballast water of vessels in bulk carriers will adhere to relevant national and international standards aimed at preventing the spread of invasive species. Barges proposed for use are designed to operate with minimum ballast and where ballast is required fresh water will be used thus eliminating the risk of introduction or translocation of invasive species. In an exceptional circumstance where marine water was required for barge ballast, it would be retained onboard for the minimum time to ensure risk was negated.</td>
</tr>
<tr>
<td>Interfere substantially with the recovery of the species</td>
<td>The nature and scale of the Project will not plausibly interfere with the recovery of the species. The Project can contribute positively to recovery through active education of staff and contractors of the conservation status and threats to sawfishes. Bans on fishing and providing consideration to funding research within the study area will contribute to the overall management objectives of the draft recovery plan.</td>
</tr>
</tbody>
</table>

### 8.4.3 Significant Species – National Recovery Plans

Section 7.10.2 of the EIS details the predicted potential impacts and proposed mitigation measures as they apply to marine fauna. These actions are discussed in association with specific recovery plans in the following sections.
8.4.3.1 National Recovery Plan for Marine Turtles

The marine turtle species listed as significant under the EPBC Act and identified as ‘likely’ or ‘known’ to occur in the area include:

- Green Turtle (*Chelonia mydas*) – Vulnerable and Migratory;
- Hawksbill Turtle (*Eretomochelys imbricata*) – Vulnerable and Migratory;
- Olive Ridley Turtle (*Lepidochelys olivacea*) – Endangered and Migratory; and
- Flatback Turtle (*Natator depressus*) - Vulnerable and Migratory.

The National Recovery Plan for Marine Turtles (Environment Australia, 2003) adopts a threat-based approach due to an absence of detailed information on populations of marine turtles in Australia. Part 2 of the plan identifies the six overall objectives of the recovery plan and identifies more specific target actions to achieve each objective. Table 8-5 identifies the objectives of the plan and how they apply to the Project. The Project is considered to be consistent with the recovery plan for these species.

**Table 8-5 Assessment of the Project against recovery plan objectives for marine turtles**

<table>
<thead>
<tr>
<th>Objectives and applicability to the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce the mortality of marine turtles and, where appropriate, increase natural survivorship, including through developing management strategies with Aboriginal and Torres Strait Islander communities for the sustainable use of marine turtles - potentially applicable to the Project.</td>
</tr>
<tr>
<td>Barge traffic associated with the Project has been assessed as providing a low risk of collision with marine turtles due to the necessary low speeds at which these vessels operate.</td>
</tr>
<tr>
<td>As part of the Project Offsets Strategy investigations into supporting Mapoon Land and Sea Rangers will be carried out. This includes supporting activities such as removing/cleaning up marine debris known to endanger marine turtles (e.g. discarded fishnets) and monitoring turtle nesting in the region. Metro Mining will also investigate providing a financial contribution to the Western Cape Turtle Threat Abatement Alliance Nest to Ocean Turtle Protection Program which includes programs to help reduce the threat of feral predation on marine turtle nests in the region.</td>
</tr>
<tr>
<td>To develop programs and protocols to monitor marine turtle populations in Australia, assess the size and status of those populations, the causes of their mortality and address information gaps - potentially applicable to the Project (refer to Objective 1)</td>
</tr>
<tr>
<td>Manage factors that impact on successful marine turtle nesting - potentially applicable to the Project (refer to Objective 1).</td>
</tr>
<tr>
<td>Identify and protect habitats that are critical to the survival of marine turtles – potentially applicable to the Project (refer to Objective 1).</td>
</tr>
<tr>
<td>Communicate the results of recovery actions and educate stakeholders – Site inductions for mine personnel will communicate the importance of marine turtles in the local area as well as activities Metro Mining becomes involved in as part of the Offsets Strategy. As part of the Project Offsets Strategy investigations, Metro Mining will investigate the potential to support communication of the Mapoon Land and Sea Rangers activities across the local community as well as further afield.</td>
</tr>
<tr>
<td>To support and maintain existing agreements and develop new collaborative programs with neighbouring countries for the conservation of shared turtle populations – not applicable to the Project.</td>
</tr>
</tbody>
</table>

8.4.3.2 Sawfish and River Sharks Multispecies Recovery Plan

The Sawfish and River Sharks Multispecies Recovery Plan (DotE, 2015) considers the conservation requirements of these species across their range and identifies actions to be taken to ensure their long-term viability in nature. Section 8 of the plan identifies the specific objectives of the recovery plan and Section 9 identifies action to achieve these objectives. Table 8-6 identifies the objectives of
the plan and how they apply to the Project. The Project is considered to be consistent with the recovery plan for these species.

**Table 8-6 Assessment of the Project against recovery plan objectives for sawfish and river sharks**

<table>
<thead>
<tr>
<th>Objectives and applicability to the Project</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce and, where possible, eliminate adverse impacts of commercial fishing on sawfish and river shark species - not applicable to the Project.</td>
<td></td>
</tr>
<tr>
<td>Reduce and, where possible, eliminate adverse impacts of recreational fishing on sawfish and river shark species - applicable.</td>
<td>To minimise the potential for increased impacts on these species, Metro Mining has proposed to prohibit recreational fishing by employees within the Project area.</td>
</tr>
<tr>
<td>Reduce and, where possible, eliminate adverse impacts of Indigenous fishing on sawfish and river shark species – applicable.</td>
<td>Site inductions for mine personnel, some of which are expected to be local Indigenous workers, will communicate the ecology of the species and known threats.</td>
</tr>
<tr>
<td>Reduce and, where possible, eliminate the impact of illegal, unregulated and unreported fishing (IUU) on sawfish and river shark species – applicable.</td>
<td>While not a specific commitment of the Project, it is recognised that having personnel working on the Skardon River will limit the opportunity for any illegal, unregulated or unreported fishing of sawfish and river shark species. Employees will be inducted on the ecology of these species and known threats, including fishing.</td>
</tr>
<tr>
<td>Reduce and, where possible, eliminate adverse impacts of habitat degradation and modification on sawfish and river shark species – applicable.</td>
<td>Direct impacts to riverine habitat as a result of construction of Project infrastructure have been largely reduced through the relocation of the BH1 haul road, and the use of the SRBP MIA, BLF and main haul road. There is abundant similar habitat in the Skardon River surrounding the Project that will remain undisturbed. Project construction will take place outside of the known ‘pupping’ season for sawfish species and Speartooth Shark. The Project Water Management Plan will incorporate monitoring of estuarine water quality and long-term marine ecology health. The plan will also incorporate an adaptive management approach to applying mitigation measures where concerns arise.</td>
</tr>
<tr>
<td>Reduce and, where possible, eliminate any adverse impacts of marine debris on sawfish and river shark species noting the linkages with the Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life – potentially applicable.</td>
<td>As part of the Project Offsets Strategy investigations into supporting Mapoon Land and Sea Rangers will be carried out. This includes supporting activities such as removing/cleaning up marine debris known to endanger marine species (e.g. discarded fishnets). The Project activity itself will not add to marine debris in the region through an integrated waste management program to ensure onshore operations and vessel waste is retained and does not enter the marine environment.</td>
</tr>
<tr>
<td>Reduce and, where possible, eliminate any adverse impacts of collection for public aquaria on sawfish and river shark species - not applicable to the Project.</td>
<td></td>
</tr>
<tr>
<td>Improve the information base to allow the development of a quantitative framework to assess the recovery of, and inform management options for, sawfish and river shark species – it is unlikely that Sawfish spp. and Speartooth Shark will be observed during the Project. Largetooth Sawfish are most often associated with the deeper section of a river adjacent to a sand or silt shallow, such as a sandbar or shallow backwater. Dwarf Sawfish are typically caught over fine substrates (mainly silt) in sections of the river channels almost completely devoid of instream structure (Thorburn 2004a) in areas of high turbidity. Green Sawfish utilise very shallow water (over sand/mudflats) outside of river mouths and is unlikely to be encountered by Project movements. Speartooth Shark is adapted to dark, turbid waters and is assumed to largely be a benthic feeder. Notwithstanding that it is unlikely that Sawfish spp. and Speartooth Shark will be encountered during the Projects construction and operations any incidental observations will be provided to DotEE/EHP for inclusion in further assessments of these species.</td>
<td></td>
</tr>
<tr>
<td>Develop research programs to assist conservation of sawfish and river shark species – applicable.</td>
<td></td>
</tr>
<tr>
<td>Metro Mining are exploring the potential to contribute to a broader project in the region that will support Sawfish spp. and Speartooth Shark.</td>
<td></td>
</tr>
</tbody>
</table>
Objectives and applicability to the Project

Improve community understanding and awareness in relation to sawfish and river shark conservation and management – applicable.

Project staff will be made aware of all threatened species in the area during the site induction process.

8.4.4 Significant Species – Conservation Advice/Recovery Plans

8.4.4.1 Chocolate Tea Tree Orchid (Dendrobium johannis) - Vulnerable

The Chocolate Tea Tree Orchid has not been found within the Project area. Metro Mining has, however, applied a precautionary approach to this species and considers the species likely to occur. This precautionary approach is a result of Project surveys identifying individual orchids of similar habit to this species in fringing paperbark woodlands and mangrove margins. At the time of the survey the species could not be identified and are considered more likely to be a very similar species – Three Lamellas Orchid. All orchid species observed were located outside of proposed Project disturbance areas.

The conservation advice for Chocolate Tea Tree Orchid identifies several actions generally associated with known populations and recovery actions. There are no known populations in the local area proposed to be cleared for Project activities and no Chocolate Tea Tree Orchids have been confirmed as being present within the areas proposed to be cleared for Project activities. The Project will remain consistent with the actions described in the conservation advice for this species.

8.4.4.2 Eastern Curlew – Critically Endangered

The Eastern Curlew is ‘known’ to occur in the broader Project area, although there is very little information on this species from the Skardon River. A single individual was observed downstream of Project infrastructure in June 2016 (refer Section 8.3.1). Habitat within or directly adjacent to the proposed Project infrastructure is of marginal value for this species and no ‘important habitat’ for migratory shorebirds has been identified on the Skardon River, as defined previously in Section 8.3.

The conservation advice for Eastern Curlew identifies conservation and management actions, monitoring priorities, and information and research priorities for the species. The identified management actions are generally associated with international actions and ‘important’ or ‘key’ sites. The Project EMP will incorporate monitoring of water quality and other potential impacts to habitat for this species. The EMP will take an adaptive management approach to applying mitigation measures on Project activities where issues of concern are detected.

The Project will remain consistent with the actions described in the conservation advice for this species.

8.4.4.3 Black-footed Tree-rat (Mesembriomyis gouldii rattroides) - Vulnerable

A single Black-footed Tree-rat was recorded during intensive camera trap surveys for the SRBP EIS. The location and habitat of the record was not provided. The species has not been recorded on the Project site, despite abundant trapping, including over 2,000 trap nights using small Elliott traps, 63 trap nights using baited cage traps and cameras, and 488 nights of baited camera traps and several nights of spotlighting, during late dry season (2014) and early wet season (2015) surveys. A further early dry season survey, including specific targeted searches for the species in June 2016 included 600 trap nights using small Elliott traps, 44 nights of baited camera traps and six hours of spotlighting (refer Appendix C of the Supplementary Report). This survey also failed to find any individuals of this species or indications of its utilising the site. Given the survey efforts undertaken
in the Project area, and the lack of any supporting evidence for the single sighting that was recorded on the neighbouring tenement, it is considered the species potentially occurs in very low densities in the area.

The conservation advice for Black-footed Tree-rat identifies active mitigation of threats including:

- Develop or maintain regimes that reduce frequency and intensity of fire – The Project in conjunction with the Mapoon Land and Sea Rangers will develop and apply a Land Use Management Plan (LUMP) for the habitat surrounding the site, particularly focussing on low intensity fires;

- Implement cost-effective control measures to reduce the abundance or impacts of feral cats – Feral cats have been recorded in the area on several occasions during surveys in the area. The Project will include a Waste Management Plan and a LUMP to ensure there is no increase of feral cats in the area, and where possible, actions will be taken to reduce numbers in the area; and

- Maintain patch integrity and increase connectivity – Progressive clearing of approximately 1,410 ha of Darwin Stringybark woodland for the Project will result in some loss of connectivity in the local area. However, these impacts are proposed to be minimised as much as possible through minimising the amount of clearing that is done at any one time to that specifically required for site operations for the short-term mine plan and progressive rehabilitation of cleared areas back to native ecosystems as they become available. In addition, there is abundant similar habitat in the region including over 44,000 ha within a radius of 20 km of the Project area. Connectivity with the surrounding region will remain to the south of proposed Project works.

The Project may also be able to inform further knowledge of the species in the area. A Significant Species Management Plan will incorporate actions to monitor for occurrences of this species and manage any impacts should they occur (such as during vegetation clearing). The Project will remain consistent with the actions described in the conservation advice for this species.

8.4.4.4  Marine Turtles

The marine turtle species listed previously in Section 8.4.3.1 are also subject to the Threat abatement plan for predation by the European red fox (DEWHA, 2008). No foxes were found in any of the Project ecology surveys, and the Department of Sustainability, Environment, Water, Population and Communities (2010) noted that foxes are absent from the Cape York Peninsula.

The Threat abatement plan for the impacts of marine debris on vertebrate marine life (DEWHA, 2009) is also considered as applicable to marine turtles. As part of the Project offsets strategy investigations into supporting Mapoon Land and Sea Rangers are being carried out. This includes supporting activities such as removing/cleaning up marine debris known to endanger marine species (e.g. discarded fishnets). The Project activity itself will not add to marine debris in the region.

8.4.4.5  Migratory Bird Species (non-shorebird species)

There is no conservation advice, recovery plan or threat abatement plan for several of the migratory bird species considered as ‘likely’ or ‘known’ to occur in the area: Great Egret (*Ardea alba*), Eastern Cattle Egret (*Bubulcus ibis*), Eastern Osprey (*Pandion cristatus*) and Rufous Fantail (*Rhipidura rufifrons*). Great Egret and Eastern Cattle Egret are no longer listed as Migratory under the EPBC Act.
The Threat abatement plan for predation by the European red fox (DEWHA, 2008) is considered as applicable to Gull-billed Tern (*Gelochelidon nilotica*), Little Tern (*Sternula albifrons*), and Rainbow Bee-eater (*Merops ornatus*) (also no longer listed as Migratory under the EPBC Act). Foxes are not currently known to occur on Cape York Peninsula.

The Threat abatement plan for predation by feral cats (DotE, 2015) is considered applicable to Little Tern. Feral cats have been recorded in the area on several occasions during surveys in the area. The Project will include a Waste Management Plan and a LUMP to ensure there is no increase of feral cats in the area, and where possible, actions will be taken to reduce numbers in the area.

The Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (CoA, 2011) is considered as applicable to Rainbow Bee-eater (*Merops ornatus*) in the region. Cane Toads are already prevalent in the area and suitable wetland habitat is naturally abundant in the region. There is no feasible reason the Project will cause an increase in Cane Toad numbers in the area.

### 8.4.4.6 Migratory Shorebirds

Migratory shorebird species recorded in the area include Common Sandpiper, Whimbrel and Eastern Curlew. The Wildlife conservation plan for migratory shorebirds (DotE, 2015) is applicable to these species. All the species have been observed as individuals and in low numbers. Habitat within or directly adjacent to the proposed Project infrastructure is of marginal value for these species. No ‘important habitat’ for migratory shorebirds has been identified on the Skardon River, as defined previously in Section 8.3.

The plan lists four overall objectives for the conservation and management of migratory shorebird species which are listed Table 8-7.
Table 8-7 Assessment of the Project against conservation plan objectives

<table>
<thead>
<tr>
<th>Objectives and applicability to the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection of important habitats for migratory shorebirds has occurred throughout the East Asian-Australasian Flyway – applicable to the Project.</td>
</tr>
<tr>
<td>Metro Mining are investigating supporting Mapoon Shire Council in working to have a migratory shorebird area nominated in the East Asian – Australasian Flyway Site Network. The area extends from Skardon River in the north, south to Pennefather River and takes in Port Musgrave.</td>
</tr>
<tr>
<td>Wetland habitats in Australia, on which migratory shorebirds depend, are protected and conserved – applicable to the Project.</td>
</tr>
<tr>
<td>The Project’s potential impacts to migratory shorebird habitat in the area will be mitigated through the Project Environmental Management Plan including management measures for ESC, hazardous materials management, pest and weed management and waste management. There will be ongoing monitoring of water quality in the Skardon River to ensure foraging habitat (exposed mudflats) along the Skardon River and at the river mouth itself remain in good condition for shorebirds.</td>
</tr>
<tr>
<td>Anthropogenic threats to migratory shorebirds in Australia are minimised or, where possible, eliminated – applicable to the Project.</td>
</tr>
<tr>
<td>The location of Project infrastructure (such as the cyclone mooring areas) has been located in areas where foraging habitat for shorebirds (mudflats exposed at low tide) is relatively narrow and limited in extent. There is abundant more suitable habitat downstream of the Project in the form of wide exposed mudflats along the river and sandflats at the river mouth.</td>
</tr>
<tr>
<td>The Project EMP will incorporate monitoring of water quality and other potential impacts to habitat for this species. The EMP will take an adaptive management approach to applying mitigation measures on Project activities where issues of concern are detected.</td>
</tr>
<tr>
<td>Knowledge gaps in migratory shorebird ecology in Australia are identified and addressed to inform decision makers, land managers and the public – results of monitoring and opportunistic sightings will be provided to EHP.</td>
</tr>
</tbody>
</table>

The Project will remain consistent with the actions described in the conservation plan for this species group.

8.4.4.7 Migratory Marine Fauna

There is no conservation advice, recovery plan or threat abatement plan for several of the migratory marine fauna species considered as 'likely' or 'known' to occur in the area: Indo-pacific Humpback Dolphin (*Sousa sahulensis*), Estuarine Crocodile (*Crocodylus porosus*), Coastal Manta Ray (*Manta alfredi*) and Narrow Sawfish (*Anoxypristis cuspidata*).

Dugong is considered 'known' (although rarely recorded) in the Project area. The *Threat abatement plan for the impacts of marine debris on vertebrate marine life* (DEWHA, 2009) is considered as applicable to this species. As part of the Project offsets strategy investigations into supporting Mapoon Land and Sea Rangers will be carried out. This includes supporting activities such as removing/cleaning up marine debris known to endanger marine species (e.g. discarded fishnets). The Project activity itself will not add to marine debris in the region.

Metro Mining does not propose to release or abandon persistent solid material (either manufactured or processed) directly or intentionally into the marine environment. The Project will manage and limit the risk of indirect, or unintentionally released debris into the marine environment through the establishment of appropriate onshore waste management and seaborne waste transfer procedures and processes that are to be implemented prior to the commencement of construction and throughout the life of the Project.
8.4.5 Table of Commitments

An updated Table of Commitments is presented in Appendix J of the Supplementary Report.

8.5 Offsets

The Project offsets are discussed in Section 6.12 of the Supplementary Report.

8.6 Cumulative Impacts

8.6.1 Terrestrial Ecology

Cumulative impacts on terrestrial ecological values were assessed within the EIS by considering impacts on vegetation communities and significant species from past, current and (reasonably foreseeable) proposed developments within the broader bioregion. During the EIS, cumulative impacts were assessed against the adjacent SRBP as at that stage, both Projects were utilising separate infrastructure. However, as detailed throughout this Supplementary Report, the originally proposed north-south haul road, MIA, BLF and RoRo have all been removed from the scope as the existing or proposed MIA and barge loading infrastructure associated with the SRBP will be utilised. The acquisition of Gulf Alumina and the SRBP also enables the sharing of the airstrip and accommodation camp to minimise potential noise and dust impacts.

The relocation of Project infrastructure since the publication of the EIS has resulted in a decrease in cumulative impacts as outlined in the following sections. The relocation of infrastructure now means that no loss of mangroves, saltmarsh, wetlands and other habitats for MNES will occur.

8.6.1.1 Vegetation Communities and Threatened Flora Species

The relocation of the port infrastructure (MIA, BLF and RoRo) and haul roads has resulted in a decrease to the extent of impacts on vegetation as follows:

- When considered at its maximum possible extent the Project may require clearing of approximately 1,430 ha of remnant vegetation and the SRBP will result in a total of approximately 1,364 ha (refer Table 15-10 of the SRBP EIS). The total combined area of clearing is 2,794 ha. Over 97% of the total clearing will impact RE 3.5.2 (*E. tetrodonta* and *C. nesophila* tall woodland on deeply weathered plateaus). This is the most widespread vegetation community in Cape York (refer Table 6-10). There are no impacts to any TECs as a result of the two bauxite mine Projects; and

- Flora ecology surveys for both projects have not confirmed the presence of any threatened flora species under the EPBC Act. Surveys for the Project potentially recorded *D. johannis* within wetland habitats proximate to proposed mining areas. The vast majority of known and potential habitat for threatened flora species identified as likely to occur in the broader Project area do not fall with the areas proposed for mining. These habitats are generally associated with buffers protecting riparian or wetland areas and the impact of the Project on these species was not considered significant under the *Significant Impact Guidelines 1.1* (DotE, 2013). Orchid species were detected in *Melaleuca* swamps and mangrove edges adjacent to proposed mining operations and are unlikely to be impacted by the proposed mining operations. The relocation of Project infrastructure has reduced the potential for any impact further by eliminating the clearing of mangrove communities altogether from the Project footprint.
8.6.1.2 Wetlands

The BH1 haul road and minor haul roads are located in areas outside the catchments of these wetlands. Hence, the relocation of the Project infrastructure will have no additional cumulative impact on Big Footprint Swamp or Lunette Swamp to those already detailed in the EIS.

8.6.1.3 Threatened and Migratory Fauna Species

Direct impacts to threatened fauna known or potentially occurring in the area would result from vegetation clearing required to accommodate the mine and infrastructure footprints for the Project and SRBP. This will in turn result in a loss of foraging and breeding habitats for some species. The largest impact will be to the E. tetrodonta woodlands and those species that utilise these habitats for foraging, nesting and breeding. This may include threatened species such as the Palm Cockatoo and Black-footed Tree-rat. Both Projects will result in a loss of E. tetrodonta woodland in the order of 2,746 ha, that will be cleared in stages over approximately 15 years. The clearing represents approximately 6.2% of the extent of this RE within a 20 km radius of the Project and 0.52% of the total extent of this RE in the bioregion. There will be large areas of E. tetrodonta woodland that will be retained adjacent to those areas cleared within the MLs, and in the local region and bioregion. Therefore, the loss of foraging habitat is unlikely to be significant, including the consideration that a number of species are highly mobile and will forage over large areas. Therefore, the most significant cumulative impact is likely to be the loss of breeding places such as hollow-bearing trees and fallen logs.

Migratory birds recorded or likely to occur in the Project areas predominantly utilise estuarine habitats such as mangroves, tidal flats and bays associated with the Skardon River and mouth of the Skardon River. The relocation of the Project infrastructure has eliminated any direct clearing impact to mangrove and saltmarsh habitat.

The SRBP is estimated to require removal of 0.03 ha of mangrove habitat. As noted in the previous section, there will be no additional impacts to Lunette Swamp or Big Footprint Swamp (areas potentially used by migratory species) resulting from relocation of the Project infrastructure. It is not expected the Projects will have a cumulative impact on Migratory birds or their habitats.

8.6.2 Marine

8.6.2.1 Mangroves and Seagrass

The EIS detailed predicted impacts to mangrove/saltmarsh communities relating to the Project infrastructure (prior to ground-truthing surveys in June 2016) requiring clearing of approximately 21 ha of mangrove habitat (RE 3.1.1a/3.1.3) and 0.25 ha of saltmarsh (RE 3.1.6). The relocation of the MIA, BLF RoRo and haul roads has eliminated the requirement to clear any patches of these communities. The SRBP is predicted to impact 0.03 ha of mangrove habitat (RE 3.1.1a/3.1.3) located in the footprint of the proposed port infrastructure. This represents a negligible impact on the extent of mangrove vegetation which is extensive in the local region and considered to have a negligible impact on the occurrence of threatened species associated with this habitat such as Estuarine Crocodile and sawfish species.

Seagrass habitat may provide foraging resources for EPBC-listed species such as Dugong and Green Turtle. There are several other small patches of seagrass in the Skardon River estuary; however, it is unlikely the extent of seagrass is of a sufficient extent to support marine fauna. Sightings of Dugong in the Skardon River are restricted to a single confirmed sighting in 2003 (Roelofs et al., 2003). There are no confirmed sightings of Green Turtle in the estuary. Impacts to seagrass within
the Project EIS predicted negligible impacts to seagrass communities from the Project. Recent Project activities including a Wave Wake Modelling study (Royal HaskoningDHV 2016) and seagrass surveys have provided additional information applicable to cumulative impacts on seagrass in the Skardon River.

Existing Pre-construction seagrass surveys in June 2016 associated with the original Project footprint confirmed negligible seagrass was present (refer Section 7-4). The relocation of Project infrastructure has further reduced the potential for construction and operational impacts in the area of the original BLF and RoRo. The cyclone moorings (which are additional to the moorings required for the SRBP) are not expected to impact any seagrass habitat. The SRBP is not predicted to directly impact any seagrass communities.

While the previously mapped seagrass communities (DPI 2006 and PaCE 2014 meadows) were not identified in the June 2016 survey, vessel movements along the navigation channel are not expected to affect these bed areas as they are more than 20 m from the centreline of the channel, and therefore beyond the area predicted to be subject to erosional forces by recent wave wake modelling (refer Section 19 of the Supplementary Report).

The concurrent operation of the SRBP and Bauxite Hills projects would increase the incidence of propeller wash and consequently the predicted TSS. However, the extent of the potential impacts to the navigational channel will remain unchanged as the number of operational vessels utilising the channel will remain unchanged. In addition, the future amalgamation of the two projects is very likely to decrease the combined annual shipping tonnage (from 10 million tonnes) thereby decreasing the extent of vessel traffic and potential shipping impacts. Therefore, the small patch of seagrass recorded near the north cyclone mooring area in the June 2016 survey and the previously mapped seagrass communities (DPI 2006 and PaCE 2014 meadows) which were not identified in the 2016 survey, are unlikely to be affected by cumulative impacts due to the relocation of infrastructure. Any increases in sediment concentration were to be experienced in these areas, it is expected to be for a relatively short duration (within an hour). This validates the statement in the EIS that cumulative impacts associated with propeller wash from the Project in coincidence with the SRBP are not expected to result in significant impacts.

8.6.2.2 Propeller Wash

The results of a Wave Wake Modelling Assessment for the Project (Royal HaskoningDHV 2016) carried out after the publication of the EIS are detailed in Section 19.3 of the Supplementary Report. Since the modelling study was undertaken, the relocation of the BLF and RoRo have significantly reduced the area of potential impacts. Based on the maximum vessel speed limit of 6 knots adopted by Metro Mining within the Skardon River, the wake waves from the Project vessels are predicted to be small when they reach the shoreline and are therefore not anticipated to significantly impact the banks at any point of the Skardon River.

The Wave Wake Modelling Assessment also considered benthic bed erosion resulting suspension of bed material (as TSS) caused by propeller wash. The results indicated the majority of predicted impacts to the bed of the Skardon River would occur upstream of the MIA area (refer to Section 19 of the Supplementary Report). Although the modelling showed that there will be an increase in suspended sediment associated with propeller wash erosion, the relocation of the BLF and RoRo will eliminate barge maneuvers in this area and thus, further reduce cumulative impacts related to wash erosion.

Two vessels may also transit the river simultaneously, such as during the concurrent operation of the SRBP and Bauxite Hills Project. In these instances, TSS concentrations could be higher than shown in the modelling which assumed a single vessel. The assumed worst case for combined
impacts is a doubling of the TSS from a second vessel with a short duration peak TSS concentrations of up to 50 mg/L. However, these would be rapidly (within one hour) dispersed to concentrations of less than 10 mg/L and on the following tide the concentrations would be expected to have reduced to less than 2 mg/L.

The SRBP BLF, which will now accommodate loading of barges for both operations, will not experience any increase in propeller wash impacts beyond that already identified in the SRBP EIS. The SRBP EIS identified that softer surface material may be displaced, leaving a harder base material. The additional barge movements will not increase this impact.

The results of the modelling the cumulative impact assessment of the combined barge movements of the two projects as described in the EIS is still relevant as the number of barge movements remains unchanged. Metro Mining proposes to incorporate any subsequent modelling work relating to finalising a single navigation channel to be used by Metro Mining and Gulf Alumina into the pre-construction work program, as part of an approved EA for the Project.

### 8.6.2.3 Noise - Construction and Vessel Movements

Noise from piling activities and vessel activity associated with both projects has potential to cause disturbance to cetaceans and Dugong that may occur within the construction area or adjacent waters. The use of the SRBP port area has eliminated pile driving required for the original BLF and pile driving will be restricted to the construction of the barge cyclone mooring areas only. As such, it is anticipated that impacts to Dugong will be highly unlikely and in the even that impacts occur, will be minor in nature, infrequent and of short duration.

The use of the SRBP port infrastructure will also have a significant reduction in the extent of noise generated by vessel activity upstream of the MIA as vessels traffic would typically be limited to vessels movements associated with the cyclone mooring. However, in general, the cumulative impacts of vessel traffic as described in the EIS will remain similar.

### 8.6.2.4 Lighting

Lighting from the two projects will result in a cumulative increase in lighting footprints depending upon their stages of development. The use of the SRBP infrastructure at the port will reduce the lighting impact resulting from two separate facilities to a single facility. Given extensive buffers between nesting beaches from vegetation and topography, the resulting light impacts from proposed mining, the single barge facility and worker accommodation areas is not anticipated to result in a cumulative increase in lighting impact along turtle nesting beaches.