Supporting information

Listed threatened species and ecological communities

Description: koala

Brief description of the matter

- Habitat requirements: the diet for the koala is restricted mainly to foliage of *Eucalyptus spp*. but koalas may also eat leaves of *Corymbia, Angophora, Lophostemon, Leptospermum* and *Melaleuca*. Preferences for particular food tree species vary between individual koalas and also between regions and seasons (DoEE 2016).
- Female koalas can produce up to one offspring each year, with births occurring between October and May. Young stay in the pouch for six to eight months and then ride on the mother's back, remaining dependent until around 12 months old (DoEE 2016). Juvenile koala disperse from their natal home range prior to or early in the breeding season, moving up to 10 km away. Koalas live for approximately 15 years (females) or 12 years (males) in the wild and have a generation length of around six to eight years (DoEE 2016).
- Home range size is highly variable depending on the quality of habitat, with those in poorer quality habitats being larger than in higher quality habitats (DoEE 2016).

Status, extent and condition of the matter within the affected area and also more broadly in the region

- EPBC Act status: vulnerable
- Observation details: one koala was observed in August 2015 during Ecosure dry season fauna surveys (Ecosure 2016) (along the western boundary) approximately 2.5 km from the proposed clearing footprint for the borrow pit. A koala presence/absence survey (undertaken using a modified rapid spot assessment technique) was conducted by Ecosure in 2016 (refer to Attachment B for a copy of the report). No koalas were observed during the three-day survey, however koala faecal pellets were collected and confirmed from five sites across the project area. No scats or koalas were observed in the CIA. The closest sign of presence (scat) to the CIA was approximately 450 m south west within the project area. Approximately 898.4 hectares of the project area (i.e. Lot 7) was surveyed and results show that primary food species *Eucalyptus tereticornis, Eucalyptus crebra, Eucalyptus moluccana* and *Eucalyptus exserta* were present along with a secondary food species, *Corymbia citriodora. Eucalyptus crebra* was the most common species growing in this area in contrast to a relatively low incidence of *E. tereticornis*.

  The methods used to survey for koala within the project area were:
  - koala presence/absence survey was undertaken by Ecosure between 30 March 2016 – 1 April 2016 utilising a modified Rapid Spot Assessment (RSAT) Protocol to determine presence/absence
  - nocturnal surveys (32 hours survey effort).

  The koala presence/absence survey undertaken by Ecosure between 30 March 2016 – 1 April 2016 found koala faecal pellets. The pellets were collected and confirmed from five sites across the project area (being the whole of Lot 7 SP228453). These findings confirm the presence of koalas within the project area but it was not possible to assess the population size and if the project area supports resident aggregations and/or transient populations based on the measures of activity (Ecosure 2016). The field survey did not find any scats in the proposed CIA (two survey sites were undertaken in the CIA) (Figure 2). One area was found with a scat northeast of the proposed clearing area and the closest scat was to the southwest of the CIA (approximately 450 m away). Attachment B provides a copy of the koala survey.

  The koala survey (Ecosure 2016) found vegetation at survey location B5 closest to the CIA (refer to Figure 2 for rapid SAT locations) was cleared with remnant *E. moluccana, E. tereticornis* species. At site B6, remnant RE 11.3.4 was observed, with *E. tereticornis* and *Corymbia tessellaris.* The understorey comprised of lantana, *Acacia disparrima* and giant rats tail grass (*Sporobulus pyramidalis*). Despite the weedy understorey, the eucalypt species are potential koala feed trees.

  An estimated score of 6 for the koala habitat was given to the project area (utilising the Environment Protection and Biodiversity Conservation Act Referral Guidelines for the Vulnerable Koala (2014) Koala Habitat tool) (Ecosure 2016). This corresponds to a determination that the project area contains habitat critical to the survival of the koala.

  Attachment A Figure 1 shows the location where the koala was observed. Refer to Appendix B (Koala Presence/Absence Survey) for the locations of scats and the survey locations of the rapid SAT.

Aerial and state regional ecosystem mapping reviews shows that suitable habitat within the local area is prevalent. Barriers and threats to the koala would likely include roads/vehicle strikes, loss of habitat (i.e. clearing of potential feed trees and fragmentation) and wild dogs.

Key threats and threatening processes and beneficial actions and processes

The main identified threats to this species are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs (TSSC 2012).

Identify the impacts the proposed action may have on the matters protected under the EPBC Act

Intermittent blasting activities are possible as part of the operation of the borrow pit which could potentially disrupt the koala. The borrow pit may have periods of inactivity of up to one month or more at a time (RPS 2014). When blasting is required, blasting activities will occur intermittently and infrequently and therefore are not likely to have a significant impact on the koala.

Within Lot 7, a score of 6 was calculated for the project area (utilising the Environment Protection and Biodiversity Conservation Act Referral Guidelines for the Vulnerable Koala (2014) Koala Habitat tool) (Ecosure 2016). The koala habitat within the 39.87 ha CIA was calculated at approximately 31.7 ha which will be removed for the borrow pit, haul routes and stockpile areas (note, this figure was calculated from aerial analysis and by excluding larger grassed areas which did not appear to have any potential koala food trees, or contained minimal trees – it should be noted that the koala habitat estimate also includes some untreed grassed areas, therefore the estimate is considered relatively accurate). Some sections of the haul road where the batters are steeper than 1:2 could prevent the koala from moving into the potential habitat between the haul roads.

The length and width of the proposed borrow pit is approximately 580 m in length by 223 m width. The northern haul road is approximately 850 m long, and the southern haul road is approximately 1.4 km long. The entire area will require clearing for the borrow pit and stockpile area. Vegetation along the haul road will also require clearing.

The project area (and surrounds) provides suitable habitat for koalas to traverse the area. Movement within the project area was evidenced by scats found within various locations of the project area (outside of the proposed CIA).

An assessment of the vulnerable species impact criteria was also undertaken:

- will the action lead to a long-term decrease in the size of an important population of a species
    - given the proportion of koala habitat to be removed in the CIA (approximately 31.67 ha from a total of 898.4 ha of the project area (of which 92% is coarsely estimated to koala habitat (Ecosure 2016)) and the length and width of the borrow pit footprint (580 m by 223 m) the action is not considered to lead to a long-term population decrease in this species. Approximately 858 ha of potential habitat will not be cleared for these works. This is further supported by the management measures that will be adopted along the haul road (i.e. signage, speed restrictions and awareness).
- will the action reduce the area of occupancy of an important population
    - the area of potential koala habitat which will be cleared is approximately 3.5% of the available potential koala habitat within the project area (i.e. Lot 7) RTAY property. Similar koala habitat is present surrounding the site (based on a review of surrounding regional ecosystems and aerial photo analysis). The action is therefore not considered to reduce the area of occupancy of an important population.
    - no cats or dogs will be introduced to the site and measures will be put in place along the haul road to restrict speed limits and increase awareness.
    - speed limits and signage will be provided along the haul routes to reduce the risk of koala strikes, and all personnel will be made aware of koala's in the area.
    - rope ladders will be installed in areas with steep batters along the haul road at 50 m intervals to allow the koala to exit the haul road.

Timing and duration of the likely impact

Clearing for the borrow pit, haul roads and stockpile areas will result in the removal of an estimated 31.7 ha of potential koala feed trees. Clearing for the proposed borrow pit, haul roads and stockpile areas will occur over approximately two months.

Operation of the borrow pit is not anticipated to have a direct on-going impact to the koala. Blasting activities are unlikely, and if required would be extremely infrequent. Construction of the haul roads (if unmanaged) could pose some mobility issues for koalas in areas where there are steep batters. Providing the 1:2 batters are

grassed, koalas will likely be able to traverse across the haul road. Batters steeper than 1:2 (i.e. 1:1 batters) may pose an issue for koalas traversing to habitat between the haul roads (with some sections potentially comprising of exposed rock). Given the low speeds and that operations will be in the day time, it is expected that risk of koala strike would be low. The aim will be to minimise the time koalas are on the haul road to further reduce koala strike and to allow koalas access to other potential habitat between the haul roads. In the circumstance that a koala enters onto the haul road, controls will be in place to reduce the likelihood of vehicle strikes such as:

- education in the induction process regarding koalas in the area
- awareness during tool box talks
- speed restrictions to 30 km/h for heavy vehicles (e.g. dump trucks) and 40 km/h for light vehicles, with speed and monitoring trackers installed on the heavy vehicles
- signage

A key measure for reducing time spent on the haul roads in areas where steep batters are located will be the installation (and maintenance) of rope bridges. These will be installed as a precaution to assist any koala exit the haul road if they cannot easily climb the batter. Alternatively, poles (or reused cleared tree trunks) could be used instead of rope bridges. The escapes are to be installed at maximum 50 m intervals in areas with steep (1:1) batters. If the koala crosses onto the haul road and cannot traverse a steep batter, the escapes will allow the koala to grip and climb up the batter – the rope ladder system is expected to work in a similar way to underpasses and fencing systems, with the steep batter acting as a 'fence' to guide the koala to a rope ladder nearby to escape off the haul road. To further ensure the koala exits the haul road as quickly as possible, the positioning of the escapes should enter/exit treed areas (with favoured koala feed trees as close as possible to the escapes, whist complying with vegetation restrictions of tree proximity to the haul road). This will assist the koala to quickly traverse the haul road as it will sense the nearby trees.

Extent of the impact

The construction and operation of the borrow pit will result in the permanent localised removal of potential koala feed trees. Given the area of similar suitable habitat in the localised area (i.e. within Lot 7) and the surrounds, the removal of the vegetation is not likely to have a significant impact to the koala population. Access to potential habitat between the haul roads will be assisted through the installation and maintenance of escapes between the haul roads.

To mitigate any potential risk to the koala during construction, suitably qualified koala fauna spotter catchers must conduct a pre-clearance survey for koalas and must be present on site during the clearing to specifically spot for koalas. If any koalas are observed, a no go area will be established around the koala and the tree and the koala will be left to disperse on its own accord. The koala will be monitored until it is out of the works zone.

All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.

Speed restrictions along the haul route will be implemented as well as signage. Koala information (e.g. presence in the area, speed restrictions, reporting any sightings, not touching the koala etc.) will form part of the induction package for the refinery and borrow pits.

If any blasting is to occur, fauna spotter catchers will assess the borrow pit area and surrounds to ensure there are no koalas (or other species) impacted by blasting. Blasting is not likely, and if required would be infrequent.

Likely consequence of the impact on the Protected Matter(s), including both adverse and beneficial impacts and any related social and economic impacts

Direct removal of vegetation (and potential koala feed trees) will occur as a result of the proposed action. Haul roads will act as a barrier to koala movement given the steepness of the batters. It is possible to construct a more gentle grade to the haul roads, however this would result in an increase of potential food tree removal, which also provides habitat for other fauna species. Given the availability of potential koala habitat available in the project area (surrounding the CIA) and the amount of habitat surrounding the project area, the proposed action is not likely to result in a significant impact on the koala.

Benefits to the koala will include the ongoing Pest Management Program, which is removing koala predators from the site. During 2015, the baiting program resulted in the death of a single wild dog adjacent to the baiting station (Ecosure 2015). At least one other wild dog (potentially two) frequented baiting stations, one of which were photographed consuming inoculated bait. It is expected that this wild dog met a similar fate elsewhere throughout the property. There have been opportunistic sightings of feral pigs in the area since 2015, however there was no evidence of pig activity or any individuals observed within the area during the 2015 Pest Management Program. Feral dog densities will continue to be monitored by RTAY staff, particularly following rainfall events to monitor changes in population densities and control as required. In addition, the greater presence of people accessing the area will increase reporting on pest animals and koala sightings. The giant rats tail grass eradication program will continue.

Economic impacts will stay positive, with the continued operation of the RMA 1 site.

Likelihood of the impact affecting the Protected Matter(s)
Given the availability of similar habitat both within Lot 7 and the surrounds, it is unlikely that the action will significantly impact the koala. The koala will still be able to move through the landscape and access feed trees around the borrow pit and the limits of the haul roads.

Measures available to prevent and avoid, or mitigate and repair the consequences of, the impact
Whilst the construction and operation of the borrow pit and haul roads is not likely to adversely affect the koala, measures will be put in place to:

- reduce koala strikes: in the unlikely circumstances that koalas access the haul roads, measures will be in place to reduce the risk of koala vehicle strikes including escapes (such as ropes or poles) in areas where steep batters are present. This will be undertaken through speed limit restrictions (30 km/hour for truck s and 40 km/hour for light vehicles), environmental awareness in inductions and toolbox talks and signage.

Nature and extent of likely impact

Similar suitable habitat is available around the proposed borrow pit and the surrounding areas. The koala will be able to move through the landscape and access feed trees around the borrow pit and across the haul roads to potential habitat between the haul roads. There is not expected to be any fragmentation of habitat, however permanent clearing of potential feed trees will result.

Description: *Geophaps scripta scripta* (squatter pigeon)

Brief description of the matter
Habitat requirements: this species occurs in open forests, sparse open woodlands and scrub. These communities are generally dominated by *Eucalyptus*, *Corymbia, Acacia* or *Callitris* species, and can be remnant, regrowth or partly modified. They are generally found within 3 km of a water body or water course (DoEE 2016). Dry, grassy eucalypt woodlands and open forests in sandy country, close to water and depressions in the ground (Ecosure 2016). This species breeds in well drained, gravel, sand or loamy soils in woodland and open forest vegetation with a tussock grass understorey. Breeding occurs on stony rises (on sand or gravel soils) and within 1 km of a suitable, permanent waterbody. The nest comprises a depression scraped into the ground underneath grass tussocks, bushes or fallen trees/logs. If conditions are favourable, this species can breed most of the year (DoEE 2016).

Status, extent and condition of the matter within the affected area and also more broadly in the region

- EPBC status: vulnerable
- Observation details: no individuals were recorded during the initial dry season survey conducted by Ecosure in August 2015. Various sightings of squatter pigeons at numerous locations within the site have occurred since this time, including the wet season survey in April 2016 and during other ecological surveys (e.g. opportunistic sightings during flora assessments), indicating that an existing resident population may be present (Ecosure 2016). Some of the area within the proposed clearing footprint are mapped as essential habitat for this species by the Queensland government (DNRM 2015). No individuals were observed within the mapped essential habitat or within the CIA during the dry season fauna surveys undertaken by Ecosure (2015). The essential habitat area was searched for evidence of nests/and or for individuals feeding in the area. Two individuals were observed north of the proposed clearing footprint. One individual was observed in the highly disturbed area near the quarry and two others were located in areas west of the proposed clearing location (Ecosure 2016).

  The vegetation to be removed in the CIA is comprised of predominately of eucalypt woodland to eucalypt open forest. An area within the CIA is mapped as RE 11.3.4 (described in the RE short descriptions as floodplain other than floodplain wetlands). This area was found to comprise predominately of *E. moluccana* (Ecosure 2015). Ephemeral waterways traverse the area. Essential habitat for the squatter pigeon has been mapped in the surrounding area on the Regional Ecosystem maps. The methods used to survey for squatter pigeon within the project area were:
  - Targeted survey within mapped essential habitat (20hrs survey effort over 5 days)
  - Incidental sightings
  - Wet and dry season searches

Key threats and threatening processes and beneficial actions and processes for the Protected Matter(s)
Key threats to the squatter pigeon as described in the conservation advice by the Threatened Species Scientific Committee (TSSC, 2015) include destruction of habitat to create cattle-grazing pasture, ongoing vegetation

clearance and fragmentation, overgrazing by domestic animals and feral animals such as rabbits, weeds, inappropriate fire regimes, growth of understorey vegetation, predation, nest trampling and illegal shooting.

Identify the impacts the proposed action may have on the matters protected under the EPBC Act
Intermittent blasting activities are possible as part of the operation of the borrow pit, which could potentially disrupt the squatter pigeon. The borrow pit may have periods of inactivity of up to one month or more at a time (RPS 2014). When blasting is required, blasting activities will occur intermittently and infrequently and therefore are not likely to have a significant impact on the squatter pigeon.

No squatter pigeons were observed within the CIA. The proposed clearing footprint and borrow pit extraction area will result in the removal of approximately 39.87 ha of potential habitat for the squatter pigeon (approximately 14.53 ha of which is mapped as essential habitat under the Vegetation Management Act). Given the wide variety of habitats this species occurs in (including disturbed areas) which remain present in the property and surrounds, the removal of vegetation is unlikely to have a significant impact on this species.

Timing and duration of the likely impact

Clearing for the borrow pit, haul roads and stockpile areas will result in the removal of an estimated 14.53 ha of essential habitat (mapped on RE mapping). Clearing will occur over approximately two months. Given the amount of suitable similar habitat within the project area (ie. Within Lot 7) and the surrounds, the removal of the vegetation is unlikely to have a significant impact on this species.

Operation of the borrow pit is not anticipated to have a direct on-going impact to the squatter pigeon - blasting activities are unlikely, and if required would be extremely infrequent.

Extent of the impact
The construction and operation of the borrow pit will result in the permanent localised removal of essential habitat (mapped by RE mapping). Given the amount of suitable similar habitat within the project area (ie. within Lot 7) and the surrounds, the removal of the vegetation is unlikely to have a significant impact on this species.

To mitigate any potential risk to the squatter pigeon during construction, the following actions will be undertaken:

- No weed or animal pest species are to be introduced to the site.
- RTAY have a weed management program which will be extended to include the new clay borrow pit and surrounds.
- All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.
- A pre-clearance survey for fauna is conducted prior to clearing and a qualified fauna spotter catcher is present on site during the clearing

Likely consequence of the impact on the Protected Matter(s), including both adverse and beneficial impacts and any related social and economic impacts
Direct removal of vegetation will occur as a result of the proposed action, however this is not expected to significantly impact the squatter pigeon given the range of habitats this species utilises (including disturbed areas).

Benefits to the squatter pigeon will include the ongoing Pest Management Program, which is removing squatter pigeon predators from the site. During 2015, the baiting program resulted in the death of a single wild dog adjacent to the baiting station (Ecosure 2015). At least one other wild dog (potentially two) frequented baiting stations, one of which were photographed consuming inoculated bait. It is expected that this wild dog, met a similar fate elsewhere throughout the property. There have been opportunistic sightings of feral pigs in the area since 2015, however there was no evidence of pig activity or any individuals observed within the area during the 2015 Pest Management Program. Feral dog densities will continue to be monitored by RTAY staff, particularly following rainfall events to monitor changes in population densities and control as required. In addition, the greater presence of people accessing the area will increase reporting on pest animals and squatter pigeon sightings. The giant rats tail grass eradication program will continue.

Economic impacts will stay positive, with the continued operation of the RMA 1 site.

Likelihood of the impact affecting the Protected Matter(s)
Given the availability of similar habitat both within Lot 7 and the surrounds, it is unlikely that the proposed action will significantly impact the squatter pigeon.

Measures available to prevent and avoid, or mitigate and repair the consequences of, the impact
Whilst the construction and operation of the borrow pit and haul roads is not likely to adversely affect the squatter pigeon, measures will be put in place to mitigate any potential risk to the squatter pigeon and the wild dog and weed eradication programs will be expanded.

Nature and extent of likely impact
Similar suitable habitat is present on and off-site, and the species is mobile and able to disperse to adjacent areas. The proposed clearing and operation is not likely to significantly impact this species.

Description: semi-evergreen vine thicket

Brief description of the matter

An area of semi-evergreen vine thicket (SEVT) (RE 11.11.18) is present on the project area (however not within the proposed CIA). The TEC SEVT locations were re-mapped as a result of a PMAV (#2015_005915, dated 18th December 2015). SEVT TEC is defined by the Commonwealth listing advice on SEVT of the Brigalow Belt (North and South) and Nandewar Bioregions. To meet the TEC (for Queensland) the community is required to contain the REs 11.2.3, 11.3.11, 11.4.1, 11.5.15, 11.8.3, 11.8.6, 11.8.13, 11.9.4, 11.9.8 or 11.11.18 (Threatened Species Scientific Committee 2001). Figure 1 shows the location of the SEVT and the CIA.

Status, extent and condition of the matter within the affected area and also more broadly in the region

The "*semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions*" (SEVT TEC) community is listed as endangered under the EPBC Act. The SEVT is located approximately 600 m south of the haul road and greater than 1 km from the borrow pit. Dense remnant vegetation and undulating land is located between the borrow pits and haul roads.

Key threats and threatening processes and beneficial actions and processes for the Protected Matter(s) excluding those from the proposed action, for example, under relevant approved conservation advices, recovery plans or threat abatement plans, management plans or other strategic plans, management principles or obligations under International Conventions (DoEE 2016).

There is no approved conservation advice for the SEVT community (DoEE). Current threats are fragmentation, lack of connectivity, clearing, inappropriate fire regimes, pasture grass invasion and increased grazing (by domestic and native animals) (DoEE 2016).

Identify the impacts the proposed action may have on the matters protected under the EPBC Act
The SEVT is located a minimum of 600 m south of the haul road and greater than 1 km away from the proposed borrow pit. The landscape is undulating in between and contains mapped remnant vegetation. No clearing of the SEVT is proposed, and given the distances and the presence of vegetation, a sufficient buffer between the proposed clearing areas and the SEVT is present.

The proposed clearing of the borrow pit and haul roads will not reduce the extent of the mapped ecological community nor fragment any populations (note – the RE mapping shows another fragment of SEVT just south of the southern haul road, however ground truthing revealed that only the one community is present and is further south – refer to Attachment A, Figure 1 and Attachement C for PMAV report).

The SEVT is located at a higher elevation than the proposed works and is also upstream, therefore the proposed borrow pit and operation is not likely to modify or destroy abiotic factors necessary for the survival of the mapped SEVT.

Any impacts associated with dust would be sufficiently buffered by the distance between the community, the undulating land, and the dense vegetation. No weed or animal pest species are to be introduced to the site. No fertilisers, herbicides or other chemicals or pollutants will be used which could kill or inhibit the ecological community. RTAY have a weed management program which will be extended to include the new clay borrow pit and surrounds. All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.

Nature and extent of likely impact
The clearing for the proposed borrow pit and operation is unlikely to have any significant impact on the SEVT community as the community is over 600 m away from the proposed clearing footprint with sufficient vegetated buffers between the haul route and the community. The community is located upstream of the works and works will be managed to prevent the introduction of weeds to the site.

Listed migratory species

Description *Gallinago hardwickii* (Latham's snipe)

Brief description of the matter
Habitat requirements: This species occurs in permanent and ephemeral wetlands, generally in open, freshwater wetlands with low and dense vegetation. This species is not selective of vegetation composition around the wetlands and therefore are found in a variety of vegetation types including grasslands (with rushes, reeds and sedges), coastal and alpine heathlands, lignum or tea-tree areas and open forest (DoEE 2016).

The Latham's snipe does not breed in Australia, only migrating to Australia during the northern winter (DoEE 2016). They pass through Queensland from February to April, stopping for feeding, however the species is dispersive during this period, migrating in response to food availability and rainfall (DoEE 2016).

Status, extent and condition of the matter within the affected area and also more broadly in the region

- EPBC status: migratory (shorebird)
- Observation details: A single individual was observed flying off from the dam site on the north-west edge of the project site in August 2015 during the dry season fauna surveys (Ecosure 2016). The methods used to survey for Latham's snipe within the project area were:
  - bird surveys of dams and wetlands (32hrs of survey effort over 10 days)
  - wet and dry survey

One Latham's snipe was sighted approximately 2 km south west of the CIA during the August 2015 survey (dry season). The vegetation to be removed in the CIA is predominately eucalypt woodland to eucalypt open forest. A small area within the CIA is mapped as 11.3.4 (described in the RE short descriptions as floodplain other than floodplain wetlands) but this area was found to comprise predominately of *E. moluccana* (Ecosure 2015) and is therefore not considered to provide important wetland habitat for the Latham's snipe. Ephemeral waterways traverse the area but these are not considered to be habitat for Latham's snipe.
The area within the CIA is not considered important habitat for the species due to lack of wetland habitat, however this species is also known to utilise woodland habitats so the site could provide limited potential habitat value.

Key threats and threatening processes and beneficial actions and processes
The main identified threats to this species are ongoing habitat loss, draining wetlands, diversion of water to wetlands, development, mowing of habitat and vegetation replacement (SPRAT).

Identify the impacts the proposed action may have on the matters protected under the EPBC Act
Intermittent blasting activities are possible as part of the operation of the borrow pit, which could potentially disrupt the Latham's snipe. The borrow pit may have periods of inactivity of up to one month or more at a time (RPS 2014). When blasting is required, blasting activities will occur intermittently and infrequently and therefore are not likely to have a significant impact on the Latham's snipe.

The proposed clearing footprint and immediate surrounds is unlikely to provide important habitat for the Latham's snipe given the lack of wetland habitat and is unlikely to have a significant impact on this species. Furthermore, similar habitat to that being removed is available on and around the property.

Timing and duration of the likely impact
The proposed clearing footprint and immediate surrounds is unlikely to provide important habitat for the Latham's snipe given the lack of wetland habitat and is unlikely to have a significant impact on this species. Furthermore, similar habitat to that being removed is available on and around the property.

Extent of the impact
The proposed clearing footprint and immediate surrounds is unlikely to provide important habitat for the Latham's snipe given the lack of wetland habitat and therefore the removal of the vegetation is unlikely to have a significant impact on this species. Furthermore, similar habitat to that being removed is available on and around the property.

To mitigate any potential risk to the Latham's snipe during construction, the following actions will be undertaken:

- No weed or animal pest species are to be introduced to the site.
- RTAY have a weed management program which will be extended to include the new clay borrow pit and surrounds.
- All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.

- A pre-clearance survey for fauna is conducted prior to clearing and a qualified fauna spotter catcher is present on site during the clearing.

Likely consequence of the impact on the Protected Matter(s), including both adverse and beneficial impacts and any related social and economic impacts
Direct removal of vegetation will occur as a result of the proposed action, however this is not expected to significantly impact the Latham's snipe as it does not provide important habitat for this species.

Benefits to the Latham's snipe will include the ongoing Pest Management Program. During 2015, the baiting program resulted in the death of a single wild dog adjacent to the baiting station (Ecosure 2015). At least one other wild dog (potentially two) frequented baiting stations, one of which were photographed consuming inoculated bait. It is expected that this wild dog, met a similar fate elsewhere throughout the property. There have been opportunistic sightings of feral pigs in the area since 2015, however there was no evidence of pig activity or any individuals observed within the area during the 2015 Pest Management Program. Feral dog densities will continue to be monitored by RTAY staff, particularly following rainfall events to monitor changes in population densities and control as required. In addition, the greater presence of people accessing the area will increase reporting on pest animals and Latham's snipe sightings.
The giant rats tail grass eradication program will continue.

Economic impacts will stay positive, with the continued operation of the RMA 1 site due to increases to the capacity of the dam and compliance with environmental authority conditions.

Likelihood of the impact affecting the Protected Matter(s)
The proposed clearing footprint and immediate surrounds is unlikely to provide important habitat for the Latham's snipe given the lack of wetland habitat and is unlikely to have a significant impact on this species. With the availability of similar habitat both within Lot 7 and the surrounds, it is unlikely that the action will significantly impact the Latham's snipe.

Measures available to prevent and avoid, or mitigate and repair the consequences of, the impact
Whilst the construction and operation of the borrow pit and haul roads is not likely to adversely affect the Latham's snipe, measures will be put in place to mitigate any potential risk to the Latham's snipe and the wild dog and weed eradication programs will be expanded.

Nature and extent of likely impact
No important habitat for the Latham's snipe will be removed, therefore it is unlikely that the action will result in a significant impact on this species.

Description: *Myiagra cyanoleuca* (satin flycatcher)

Brief description of the matter
Habitat requirements: this species occurs in vegetated gullies in eucalypt forests and woodland and are recorded in wet sclerophyll forests. During migration they occur in coastal forest, woodland, mangroves and drier woodlands/open forests. They generally occur in more moist forests (DOE2016). Breeding season for this species in Queensland occurs from November to January, nesting in clusters or clustering nests (DOE2016). Suitable habitat for nesting is available in the project area and in areas surrounding the project area.

Status, extent and condition of the matter within the affected area and also more broadly in the region
- EPBC status: migratory
- Observation details: satin flycatchers were recorded in several locations on site, along riparian zones and the SEVT community (Ecosure 2016). The methods used to survey for satin flycatcher within the project area were:
  - bird survey
  - incidental sightings throughout site
  - wet and dry survey

The satin flycatcher was observed directly adjacent (just north) to the proposed clearing area. The majority of vegetation to be removed in the CIA is comprised of eucalypt woodland to eucalypt open forest. Ephemeral waterways traverse the area.

Vegetation within the proposed clearing footprint is considered to provide some habitat value for the satin flycatcher. Four individuals were also observed in the surrounding area in woodlands, which is common for the species as their habitat preferences expand during migration, with the species recorded in most wooded habitats except for rainforests (DOE2016). Given that this species can occupy a large range of habitats, the vegetation within the proposed clearing footprint is not considered to provide important habitat for this species.

Key threats and threatening processes and beneficial actions and processes
The main identified threats to this species are clearing and logging of forests, particularly the loss of mature forests. This species is largely absent from regrowth forests (SPRAT).

Identify the impacts the proposed action may have on the matters protected under the EPBC Act
Intermittent blasting activities are possible as part of the operation of the borrow pit, which could potentially disrupt the satin flycatcher. The borrow pit may have periods of inactivity of up to one month or more at a time (RPS 2014). When blasting is required, blasting activities will occur intermittently and infrequently and therefore are not likely to have a significant impact on the satin flycatcher.

The satin flycatcher was observed directly adjacent (just north) of the proposed clearing area. Given that this species can occupy a large range of habitats, the vegetation within the proposed clearing footprint is not considered to provide important habitat for this species.

Timing and duration of the likely impact
The proposed clearing and operation of the borrow pit is not likely to substantially modify, destroy or isolate an area of important habitat for this species as:

- there is an abundance of suitable habitat both on-site and offsite for this species
- the CIA is small relative to the abundance of suitable habitat available
- this is a highly mobile species with suitable habitat and rest trees surrounding the proposed clearing footprint.

Extent of the impact
Given the abundance of similar suitable habitat, and the wide range of habitats this species occupies, the clearing and operation of the proposed action is unlikely to have a significant impact on the satin flycatcher.

To mitigate any potential risk to the satin flycatcher during construction, the following actions will be undertaken:

- No weed or animal pest species are to be introduced to the site.
- RTAY have a weed management program which will be extended to include the new clay borrow pit and surrounds.
- All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.
- A pre-clearance survey for fauna is conducted prior to clearing and a qualified fauna spotter catcher is present on site during the clearing.

Likely consequence of the impact on the Protected Matter(s), including both adverse and beneficial impacts and any related social and economic impacts
Direct removal of vegetation will occur as a result of the proposed action, however this is not expected to significantly impact the satin flycatcher given the abundance of similar suitable habitat present within the area and the wide range of habitats this species occupies.

Economic impacts will stay positive, with the continued operation of the RMA 1 site due to increases to the capacity of the dam and compliance with environmental authority conditions.

Likelihood of the impact affecting the Protected Matter(s)
Given the availability of similar habitat both within Lot 7 and the surrounds, it is unlikely that the proposed action will significantly impact the satin flycatcher.

Measures available to prevent and avoid, or mitigate and repair the consequences of, the impact
Whilst the construction and operation of the borrow pit and haul roads is not likely to adversely affect the satin flycatcher, measures will be put in place to mitigate any potential risk to the satin flycatcher and the wild dog and weed eradication programs will be expanded.

Nature and extent of likely impact
Similar suitable habitat is present on and off-site, and the species is mobile and able to disperse to adjacent areas. The proposed clearing and operation is not likely to significantly impact this species.

Description: *Rhipidura rufifrons* (rufous fantail)

Brief description of the matter

Habitat requirements: occurs in wet sclerophyll forest frequently in gullies dominated by eucalyptus species. Understorey is generally dense and ferns are often present. Sometimes found in secondary regrowth in forests or rainforests (DOE2016). Breeding season in occurs from September to February, with nests in trees, shrub or vine (DOE2016). Suitable habitat for nesting is available on-site and in areas surrounding the site.

Status, extent and condition of the matter within the affected area and also more broadly in the region

- EPBC status: migratory
- Observation details: the species was recorded during surveys undertaken by Ecosure in the riparian vegetation and SEVT community. The methods used to survey for rufous fantail within the project area were:
  - bird survey
  - incidental sightings throughout site
  - wet and dry survey

One rufous fantail was observed during the surveys but not within the CIA. The vegetation to be removed in the CIA is predominately eucalypt woodland to eucalypt open forest. Ephemeral waterways traverse the area.

Given the widespread habitat this species occupies, and that it generally prefers more moist environs, vegetation within the proposed clearing footprint is considered to provide limited habitat value for the rufous fantail.

Key threats and threatening processes and beneficial actions and processes

The main identified threats to this species fragmentation, loss of moist forest breeding habitat from clearing and urbanisation (SPRAT).

Identify the impacts the proposed action may have on the matters protected under the EPBC Act

Intermittent blasting activities are possible as part of the operation of the borrow pit, which could potentially disrupt the rufous fantail. The borrow pit may have periods of inactivity of up to one month or more at a time (RPS 2014). When blasting is required, blasting activities will occur intermittently and infrequently and therefore are not likely to have a significant impact on the rufous fantail.

One rufous fantail was observed during the survey and was outside of the CIA. Given the widespread habitat this species occupies, and that it generally prefers more moist environs, vegetation with the proposed clearing footprint is considered to provide limited habitat value for the rufous fantail.

Timing and duration of the likely impact

The proposed clearing and operation of the borrow pit is not likely to substantially modify, destroy or isolate an area of important habitat for this species as:

- habitat to be cleared is only considered as marginal habitat
- there is an abundance of similar habitat both on-site and offsite for this species
- the clearing impact area is small relative to the abundance of suitable habitat available
- this is a highly mobile species with suitable habitat and rest trees surrounding the proposed clearing footprint.

Extent of the impact

Given vegetation only provides limited value to this species, and that there is an abundance of similar suitable habitat on and off the property, the clearing and operation of the proposed action is unlikely to have a significant impact on the rufous fantail.

To mitigate any potential risk to the rufous fantail during construction, the following actions will be undertaken:

- No weed or animal pest species are to be introduced to the site.
- RTAY have a weed management program which will be extended to include the new clay borrow pit and surrounds.
- All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.
- A pre-clearance survey for fauna is conducted prior to clearing and a qualified fauna spotter catcher is present on site during the clearing.

Likely consequence of the impact on the Protected Matter(s), including both adverse and beneficial impacts and any related social and economic impacts

Direct removal of vegetation will occur as a result of the proposed action, however this is not expected to significantly impact the rufous fantail as the vegetation provides limited value to this species and given the abundance of similar suitable habitat present within the area.

Economic impacts will stay positive, with the continued operation of the RMA 1 site due to increases to the capacity of the dam and compliance with environmental authority conditions.

Likelihood of the impact affecting the Protected Matter(s)
Given the availability of similar habitat both within Lot 7 and the surrounds, it is unlikely that the proposed action will significantly impact the rufous fantail.

Measures available to prevent and avoid, or mitigate and repair the consequences of, the impact
Whilst the construction and operation of the borrow pit and haul roads is not likely to adversely affect the rufous fantail, measures will be put in place to mitigate any potential risk to the rufous fantail and the wild dog and weed eradication programs will be expanded.

Nature and extent of likely impact
Similar suitable habitat is present on and off-site, and the species is mobile and able to disperse to adjacent areas. The proposed clearing and operation is not likely to significantly impact this species.

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Reliability and date of information

The source of information provided in Section 3 was gained from flora and fauna surveys conducted by Ecosure (and therefore reliability was not tested). References and dates of information (where references were required) are provided in the references sections. A renounced koala expert was consulted to dicuss options to allow koala passage along steep sections of the haul road.

Information for the map required by section 1 was gained from the mapping done as part of the flora and fauna surveys undertaken by Ecosure. The design was provided by Rio Tinto. It is possible that the design may change slightly with any refinements (such as the direct location of the haul road) or as required as a result of the change to the MCU, however this is not anticipated.

Description: koala

Brief description of the matter

- Habitat requirements: the diet for the koala is restricted mainly to foliage of *Eucalyptus spp*. but koalas may also eat leaves of *Corymbia, Angophora, Lophostemon, Leptospermum* and *Melaleuca*. Preferences for particular food tree species vary between individual koalas and also between regions and seasons (DoEE 2016).
- Female koalas can produce up to one offspring each year, with births occurring between October and May. Young stay in the pouch for six to eight months and then ride on the mother's back, remaining dependent until around 12 months old (DoEE 2016). Juvenile koala disperse from their natal home range prior to or early in the breeding season, moving up to 10 km away. Koalas live for approximately 15 years (females) or 12 years (males) in the wild and have a generation length of around six to eight years (DoEE 2016).
- Home range size is highly variable depending on the quality of habitat, with those in poorer quality habitats being larger than in higher quality habitats (DoEE 2016).

Status, extent and condition of the matter within the affected area and also more broadly in the region

- EPBC Act status: vulnerable
- Observation details: one koala was observed in August 2015 during Ecosure dry season fauna surveys (Ecosure 2016) (along the western boundary) approximately 2.5 km from the proposed clearing footprint for the borrow pit. A koala presence/absence survey (undertaken using a modified rapid spot assessment technique) was conducted by Ecosure in 2016 (refer to Attachment B for a copy of the report). No koalas were observed during the three-day survey, however koala faecal pellets were collected and confirmed from five sites across the project area. No scats or koalas were observed in the CIA. The closest sign of presence (scat) to the CIA was approximately 450 m south west within the project area. Approximately 898.4 hectares of the project area (i.e. Lot 7) was surveyed and results show that primary food species *Eucalyptus tereticornis, Eucalyptus crebra, Eucalyptus moluccana* and *Eucalyptus exserta* were present along with a secondary food species, *Corymbia citriodora. Eucalyptus crebra* was the most common species growing in this area in contrast to a relatively low incidence of *E. tereticornis*.

  The methods used to survey for koala within the project area were:
  - koala presence/absence survey was undertaken by Ecosure between 30 March 2016 – 1 April 2016 utilising a modified Rapid Spot Assessment (RSAT) Protocol to determine presence/absence
  - nocturnal surveys (32 hours survey effort).

  The koala presence/absence survey undertaken by Ecosure between 30 March 2016 – 1 April 2016 found koala faecal pellets. The pellets were collected and confirmed from five sites across the project area (being the whole of Lot 7 SP228453). These findings confirm the presence of koalas within the project area but it was not possible to assess the population size and if the project area supports resident aggregations and/or transient populations based on the measures of activity (Ecosure 2016). The field survey did not find any scats in the proposed CIA (two survey sites were undertaken in the CIA) (Figure 2). One area was found with a scat northeast of the proposed clearing area and the closest scat was to the southwest of the CIA (approximately 450 m away). Attachment B provides a copy of the koala survey.

  The koala survey (Ecosure 2016) found vegetation at survey location B5 closest to the CIA (refer to Figure 2 for rapid SAT locations) was cleared with remnant *E. moluccana, E. tereticornis* species. At site B6, remnant RE 11.3.4 was observed, with *E. tereticornis* and *Corymbia tessellaris.* The understorey comprised of lantana, *Acacia disparrima* and giant rats tail grass (*Sporobulus pyramidalis*). Despite the weedy understorey, the eucalypt species are potential koala feed trees.

  An estimated score of 6 for the koala habitat was given to the project area (utilising the Environment Protection and Biodiversity Conservation Act Referral Guidelines for the Vulnerable Koala (2014) Koala Habitat tool) (Ecosure 2016). This corresponds to a determination that the project area contains habitat critical to the survival of the koala.

  Attachment A Figure 1 shows the location where the koala was observed. Refer to Appendix B (Koala Presence/Absence Survey) for the locations of scats and the survey locations of the rapid SAT.

  Aerial and state regional ecosystem mapping reviews shows that suitable habitat within the local area is prevalent. Barriers and threats to the koala would likely include roads/vehicle strikes, loss of habitat (i.e. clearing of potential feed trees and fragmentation) and wild dogs.

Key threats and threatening processes and beneficial actions and processes

The main identified threats to this species are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs (TSSC 2012).

Identify the impacts the proposed action may have on the matters protected under the EPBC Act

Intermittent blasting activities are possible as part of the operation of the borrow pit which could potentially disrupt the koala. The borrow pit may have periods of inactivity of up to one month or more at a time (RPS 2014). When blasting is required, blasting activities will occur intermittently and infrequently and therefore are not likely to have a significant impact on the koala.

Within Lot 7, a score of 6 was calculated for the project area (utilising the Environment Protection and Biodiversity

Conservation Act Referral Guidelines for the Vulnerable Koala (2014) Koala Habitat tool) (Ecosure 2016). The koala habitat within the 39.87 ha CIA was calculated at approximately 31.7 ha which will be removed for the borrow pit, haul routes and stockpile areas (note, this figure was calculated from aerial analysis and by excluding larger grassed areas which did not appear to have any potential koala food trees, or contained minimal trees – it should be noted that the koala habitat estimate also includes some untreed grassed areas, therefore the estimate is considered relatively accurate). Some sections of the haul road where the batters are steeper than 1:2 could prevent the koala from moving into the potential habitat between the haul roads.

The length and width of the proposed borrow pit is approximately 580 m in length by 223 m width. The northern haul road is approximately 850 m long, and the southern haul road is approximately 1.4 km long. The entire area will require clearing for the borrow pit and stockpile area. Vegetation along the haul road will also require clearing.

The project area (and surrounds) provides suitable habitat for koalas to traverse the area. Movement within the project area was evidenced by scats found within various locations of the project area (outside of the proposed CIA).

An assessment of the vulnerable species impact criteria was also undertaken:

- will the action lead to a long-term decrease in the size of an important population of a species
    - given the proportion of koala habitat to be removed in the CIA (approximately 31.67 ha from a total of 898.4 ha of the project area (of which 92% is coarsely estimated to koala habitat (Ecosure 2016)) and the length and width of the borrow pit footprint (580 m by 223 m) the action is not considered to lead to a long-term population decrease in this species. Approximately 858 ha of potential habitat will not be cleared for these works. This is further supported by the management measures that will be adopted along the haul road (i.e. signage, speed restrictions and awareness).
- will the action reduce the area of occupancy of an important population
    - the area of potential koala habitat which will be cleared is approximately 3.5% of the available potential koala habitat within the project area (i.e. Lot 7) RTAY property. Similar koala habitat is present surrounding the site (based on a review of surrounding regional ecosystems and aerial photo analysis). The action is therefore not considered to reduce the area of occupancy of an important population.
    - no cats or dogs will be introduced to the site and measures will be put in place along the haul road to restrict speed limits and increase awareness.
    - speed limits and signage will be provided along the haul routes to reduce the risk of koala strikes, and all personnel will be made aware of koala's in the area.
    - rope ladders will be installed in areas with steep batters along the haul road at 50 m intervals to allow the koala to exit the haul road.

<u>Timing and duration of the likely impact</u>

Clearing for the borrow pit, haul roads and stockpile areas will result in the removal of an estimated 31.7 ha of potential koala feed trees. Clearing for the proposed borrow pit, haul roads and stockpile areas will occur over approximately two months.

Operation of the borrow pit is not anticipated to have a direct on-going impact to the koala. Blasting activities are unlikely, and if required would be extremely infrequent. Construction of the haul roads (if unmanaged) could pose some mobility issues for koalas in areas where there are steep batters. Providing the 1:2 batters are grassed, koalas will likely be able to traverse across the haul road. Batters steeper than 1:2 (i.e. 1:1 batters) may pose an issue for koalas traversing to habitat between the haul roads (with some sections potentially comprising of exposed rock). Given the low speeds and that operations will be in the day time, it is expected that risk of koala strike would be low. The aim will be to minimise the time koalas are on the haul road to further reduce koala strike and to allow koalas access to other potential habitat between the haul roads. In the circumstance that a koala enters onto the haul road, controls will be in place to reduce the likelihood of vehicle strikes such as:

- education in the induction process regarding koalas in the area
- awareness during tool box talks
- speed restrictions to 30 km/h for heavy vehicles (e.g. dump trucks) and 40 km/h for light vehicles, with speed and monitoring trackers installed on the heavy vehicles
- signage

A key measure for reducing time spent on the haul roads in areas where steep batters are located will be the installation (and maintenance) of rope bridges. These will be installed as a precaution to assist any koala exit the haul road if they cannot easily climb the batter. Alternatively, poles (or reused cleared tree trunks) could be used instead of rope bridges. The escapes are to be installed at maximum 50 m intervals in areas with steep (1:1) batters. If the koala crosses onto the haul road and cannot traverse a steep batter, the escapes will allow the koala to grip and climb up the batter – the rope ladder system is expected to work in a similar way to underpasses and fencing systems, with the steep batter acting as a 'fence' to guide the koala to a rope ladder nearby to escape off the haul road. To further ensure the koala exits the haul road as quickly as possible, the positioning of the escapes should enter/exit treed areas (with favoured koala feed trees as close as possible to the escapes, whist complying with vegetation restrictions of tree proximity to the haul road). This will assist the koala to quickly traverse the haul road as it will sense the nearby trees.

<u>Extent of the impact</u>

The construction and operation of the borrow pit will result in the permanent localised removal of potential koala feed trees.

Given the area of similar suitable habitat in the localised area (i.e. within Lot 7) and the surrounds, the removal of the vegetation is not likely to have a significant impact to the koala population. Access to potential habitat between the haul roads will be assisted through the installation and maintenance of escapes between the haul roads.

To mitigate any potential risk to the koala during construction, suitably qualified koala fauna spotter catchers must conduct a pre-clearance survey for koalas and must be present on site during the clearing to specifically spot for koalas. If any koalas are observed, a no go area will be established around the koala and the tree and the koala will be left to disperse on its own accord. The koala will be monitored until it is out of the works zone.

All machinery shall be declared weed free prior to mobilising to site to reduce the introduction or spread of weeds.
Speed restrictions along the haul route will be implemented as well as signage. Koala information (e.g. presence in the area, speed restrictions, reporting any sightings, not touching the koala etc.) will form part of the induction package for the refinery and borrow pits.

If any blasting is to occur, fauna spotter catchers will assess the borrow pit area and surrounds to ensure there are no koalas (or other species) impacted by blasting. Blasting is not likely, and if required would be infrequent.

Likely consequence of the impact on the Protected Matter(s), including both adverse and beneficial impacts and any related social and economic impacts
Direct removal of vegetation (and potential koala feed trees) will occur as a result of the proposed action. Haul roads will act as a barrier to koala movement given the steepness of the batters. It is possible to construct a more gentle grade to the haul roads, however this would result in an increase of potential food tree removal, which also provides habitat for other fauna species. Given the availability of potential koala habitat available in the project area (surrounding the CIA) and the amount of habitat surrounding the project area, the proposed action is not likely to result in a significant impact on the koala.

Benefits to the koala will include the ongoing Pest Management Program, which is removing koala predators from the site. During 2015, the baiting program resulted in the death of a single wild dog adjacent to the baiting station (Ecosure 2015). At least one other wild dog (potentially two) frequented baiting stations, one of which were photographed consuming inoculated bait. It is expected that this wild dog met a similar fate elsewhere throughout the property. There have been opportunistic sightings of feral pigs in the area since 2015, however there was no evidence of pig activity or any individuals observed within the area during the 2015 Pest Management Program. Feral dog densities will continue to be monitored by RTAY staff, particularly following rainfall events to monitor changes in population densities and control as required. In addition, the greater presence of people accessing the area will increase reporting on pest animals and koala sightings. The giant rats tail grass eradication program will continue.

Economic impacts will stay positive, with the continued operation of the RMA 1 site.

Likelihood of the impact affecting the Protected Matter(s)
Given the availability of similar habitat both within Lot 7 and the surrounds, it is unlikely that the action will significantly impact the koala. The koala will still be able to move through the landscape and access feed trees around the borrow pit and the limits of the haul roads.

Measures available to prevent and avoid, or mitigate and repair the consequences of, the impact
Whilst the construction and operation of the borrow pit and haul roads is not likely to adversely affect the koala, measures will be put in place to:

- reduce koala strikes: in the unlikely circumstances that koalas access the haul roads, measures will be in place to reduce the risk of koala vehicle strikes including escapes (such as ropes or poles) in areas where steep batters are present. This will be undertaken through speed limit restrictions (30 km/hour for truck s and 40 km/hour for light vehicles), environmental awareness in inductions and toolbox talks and signage.