Listed threatened species and ecological communities

Description

A desktop study and investigation was supplemented by undertaking a rapid field verification survey (April and September 2016) along the investigation corridor where access was available. The survey sought to verify and refine the presence or absence of ecological constraints within the referral area, focusing in particular on threatened ecological communities as well as habitat capable of supporting threatened biota.

Survey methodologies employed to assess floristic composition included:

- Rapid field assessments where the structure of the vegetation (including height and cover of each vegetation layer) and dominant species are recorded. This allows verification of existing vegetation mapping and rapid determination of vegetation communities present in unmapped sections of the investigation corridor.
- Random meander surveys as described by Cropper (1993) whereby the recorder walks in a random meander throughout the investigation corridor recording dominant and key plant species (e.g. threatened species, noxious weeds), between various vegetation communities and condition of vegetation. The time spent in each vegetation community was generally proportional to the size of the community and its species richness. This method is used to map boundaries of vegetation communities and to target areas where potential threatened species could occur.

Survey methodologies employed to assess fauna onsite included opportunistic fauna survey, fauna habitat assessments, and aquatic habitat assessments.

Threatened ecological communities

The PMST identified three Threatened Ecological Communities (TECs) that are known or predicted to occur. Desktop analysis and field surveys identified two of these TECs as occurring (Table 3.1; Figure 3 in Appendix A).

Table 3.1 Threatened Ecological Communities within the Preferred Alignment

THREATENED ECOLOGICAL COMMUNITY	EPBC STATUS	PRESENT WITHIN THE REFERRAL AREA?
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grassland of South-eastern Australia (Grey Box Woodland)	E	Yes, 18.3 ha
White Box-Yellow Box-Blakely's Red Gum Grassy woodland and derived Native Grassland (Box Gum Woodland)	CE	Yes, 21.4 ha
Weeping Myall Woodlands	E	No

(E = Endangered; CE = Critically Endangered under the EPBC Act)

Threatened terrestrial flora and fauna species

The PMST identified 14 commonwealth listed threatened fauna species, and five threatened flora species, as recorded or predicted to occur (Appendix B) (Department of the Environment and Energy 2016). In addition a BioNet database search identified a further 12 EPBC listed fauna species and 15 EPBC listed flora species, as recorded within 10 km of the investigation corridor (NSW Office of Environment & Heritage 2016).

On completion of the field surveys, commonwealth listed threatened species were given a likelihood of occurrence rating based on their known habitat preferences as outline in Table 3.2 and the full list can be seen in the attached Appendix C. One threatened species (Superb Parrot, *Polytelis swainsonii)* was recorded at two locations of which one is likely to contain roosting and breeding habitat for the species based on survey of the properties and information provided by the landowners.

Table 3.2 Likelihood of occurrence of threatened species

LIKELIHOOD	DESCRIPTION
Low	Species considered to have a low likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria: • Have not been recorded previously in the study area and surrounds and for which the study area is beyond the current distribution range. • Rely on specific habitat types or resources that are not present in the study area. • Are considered locally extinct.
Moderate	Species considered to have a moderate likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria: • Have infrequently been recorded previously in the study area and surrounds. • Use habitat types or resources that are present in the study area, although generally in a poor or modified condition. • Are unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically during variable seasons or migration.
High	Species considered to have a high likelihood of occurrence include species not recorded that fit one or more of the following criteria: • Have frequently been recorded previously in the study area and surrounds. • Use habitat types or resources that are present in the study area that are abundant and/or in good condition within the study area. • Are known or likely to maintain resident populations surrounding the study area. • Are known or likely to visit the site during regular seasonal movements or migration.
Recorded	Any threat-listed species recorded during field surveys associated with the proposed action.

The likelihood of occurrence assessment identified seven threatened fauna species and four threatened flora species listed under the EPBC Act as having a moderate or higher likelihood of occurring within the study area (outlined in Table 3.3 below). The full database search and likelihood of occurrence assessment is provided in Appendix C.

Threatened aquatic flora and fauna species

The PMST identified two threatened aquatic fauna species as occurring within the locality (Attachment B). These species were:

- Murray Cod (Maccullochella peelii) (V).
- Macquarie Perch (Macquaria australasica) (E).

Neither of these threatened aquatic species are considered likely to occur within the investigation area. This is based on the lack of suitable habitat available observed during the rapid field verification surveys (i.e. no permanent rivers or streams present within the investigation area). Further details of species requirements and assessment of likelihood are provided in Appendix C.

Table 3.3 EPBC listed threatened species considered to have a moderate or higher likelihood of occurring within the study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]
Mammals		
Pteropus poliocephalus	Grey-headed Flying-fox	V
Phascolarctos cinereus	Koala	V
Nyctophilus corbeni	South-eastern Long-eared Bat	V
Birds		
Polytelis swainsonii	Superb Parrot	V - recorded
Lathamus discolor	Swift Parrot	E
Anthochaera phrygia	Regent Honeyeater	CE
Grantiella picta	Painted Honeyeater	V
Plants		
Swainsona murrayana	Slender Darling Pea	V
Caladenia concolor	Crimson Spider Orchid	V
Caladenia arenaria	Sand-hill Spider Orchid	E
Austrostipa wakoolica	No common name, a spear-grass	E

1) V = Vulnerable, E = Endangered, CE = Critically Endangered under the EPBC Act.

The remaining threatened flora and fauna species are considered to have a low likelihood of occurrence (refer to Table 3.2) based on the lack of preferred habitat available, and/or outside the known range of the species, and/or habitat is of marginal quality.

Nature and extent of likely impact

Address any impacts on the members of any listened threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat.

Since the preferred alignment within the investigation area has not yet been determined, the extent of likely impacts presented is the worst case clearing extent for each vegetation community.

The proposed action will impact habitat values within a corridor, as the area would be cleared for construction resulting in loss of habitat, new edge effects, fragmentation and loss of connectivity.

The major impact relating to threatened species and communities will be the direct loss of habitat. The preferred alignment will result in the removal of approximately 46.3 hectares of native vegetation, including 39.7 ha of Threatened Ecological Communities (TECs) (refer to Table 3.4 below) which forms habitat for threatened species.

Indirect impacts may persist long after the development of the route and may include facilitation of weed infestation (where soils are disturbed and seed sources are present) and pollution of waterways through mobilised sediments.

Many of these impacts can be avoided or reduced through appropriate design, implementation of erosion and sediment controls and clear demarcation of the works areas, to confine the impacts of the activities. Some however, such as the loss of foraging or nesting habitat, will adversely affect native species. A summary of the vegetation communities impacted by the proposed action, and their status under the EPBC Act and the *Threatened Species Conservation Act* 1995 (TSC Act), are summarised in Table 3.4.

Table 3.4 Vegetation clearing

PLANT COMMUNITY TYPE	AREA (HA)	TSC ACT	EPBC ACT
Black Cypress Pine - Red Stringybark - red gum - box low open forest on siliceous rocky outcrops in the NSW South-western Slopes Bioregion (PCT 309 MR520/LA228)	0.6	Not Listed	Not Listed
River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes bioregion and western South East Highlands Bioregion (PCT 5 MR610/LA264)	2.5	Not Listed	Not Listed Not Listed
Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes and Riverina Bioregions (PCT 80 MR565/LA153)	6.7	Up to 18.3 ha corresponds to Inland Grey Box Woodland **(Endangered)**	Up to 18.3 ha corresponds to Grey Box Woodland **(Endangered)**
Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (PCT 76 MR566/LA154)	11.6		
White Box - Blakely's Red Gum shrub/grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South-western Slopes Bioregion (PCT 346 MR687)	0.5	Up to 21.4 ha of White Box Yellow Box Blakely's Red Gum Woodland **(Endangered)**	Up to 21.4 ha corresponds to Box Gum Woodland **(Critically Endangered)**
Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South-western Slopes Bioregion (PCT 277 MR528/LA120)	13.9		
White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South-western Slopes Bioregion (PCT 267 MR643/LA218)	1.8		
White Box grassy woodland in the upper slopes sub-region of the NSW South-western Slopes Bioregion (PCT266 MR561/LA219)	4.1		
Yellow Box grassy tall woodland on alluvium or parna loams and clays on flats in NSW South-western Slopes Bioregion (PCT 276 MR562/LA226)	1.1		
Native grassland complex (undetermined PCT)	3.4	Not Listed	Not Listed
Planted woody vegetation (n/a)	0.1	Not Listed	Not Listed
Exotic grassland including cropping lands (n/a)	161	Not Listed	Not Listed

A summary of the impacts to threatened species is provided in more detail below.

An assessment of the impacts of the proposed action on EPBC listed threatened communities and species either recorded or likely to occur was completed (Appendix D). Due to the lack of data and detailed surveys for the project, a precautionary approach has been taken for the assessments of significance which concluded that the project may have a significant impact on:

- Threatened fauna:
  - Superb Parrot (Polytelis swainsonii).
  - Regent Honeyeater (Anthochaera phrygia).
  - Swift Parrot (Lathamus discolor).
- Threatened flora:
  - Swainsona murrayana (Slender Darling Pea).
  - Caldenia arenaria (a Spider Orchid with no commonly used common name).
  - Caldenia concolor (Crimson Spider Orchid).
  - Austrostipa wakoolica (a Spear Grass).

The Superb Parrot *(Polytelis swainsonii)* which occurs within the investigation corridor are part of the South-west Slope Region population which is one of two key breeding populations (Department of the Environment and Energy 2016e) and the source of less established populations in northern Victoria and the NSW Central-west Slope and North-west Plain Regions (Department of the Environment and Energy 2016e). The population within

the investigation corridor is therefore considered to be part of a key source population for breeding and dispersal and an important population. This species was recorded at two locations within the investigation corridor, one of which is likely to contain roosting and breeding habitat for the species (based on surveys of the properties and information provided by the landholders). As no targeted surveys have been undertaken, a precautionary approach has been taken and the project is considered likely to have a significant impact on the Superb Parrot *(Polytelis swainsonii)* due to:

- The importance of the population as a key-breeding population.
- Presence of critical habitat for this species in the form of box-gum woodlands of the tableland slopes that provide breeding habitat.
- Clearing of approximately 43.8 ha of foraging, roosting and nesting habitat which may disrupt the breeding cycle of the important population.
- Potential to interfere with the recovery of the species due to impacts to nest sites and foraging habitat within the vicinity of a colony.

The investigation corridor also contains potential habitat for Regent Honeyeater *(Anthochaera phrygia)* (listed as Critically Endangered) and Swift Parrot *(Lathamus discolor)* (listed as Endangered). As no targeted surveys have been undertaken, a precautionary approach has been taken and as such it is considered that the proposed action may have a significant impact on the species as the investigation corridor is potentially critical to the survival of the species due to presence of potential breeding or foraging areas.

No targeted surveys have been undertaken during peak flowering periods for threatened flora. As such the significance assessments have taken the precautionary approach and concluded that the proposed action may have a significant impact on four species of threatened plant:

- Swainsona murrayana (Slender Darling Pea) – up to 43.1 ha of potential habitat.
- Austrostipa wakoolica (A Spear Grass) – up to 46.3 ha of potential habitat.
- Caldenia arenaria (Sand-hill Spider Orchid) – up to 46.3 ha of potential habitat.
- Caldenia concolor (Crimson Spider Orchid) – up to 0.6 ha of potential habitat.

Threatened ecological communities

The proposed action will impact up to 39.7 ha of EPBC listed TECs within the investigation corridor, as a result of vegetation clearing. This includes two TECs; 18.3 ha of EPBC endangered Grey Box Woodland and 21.4 ha of the critically endangered EPBC Box Gum Woodland. A summary of the direct impacts on TECs are provided in Table 3.5 (Figure 3.1 see Appendix A).

Table 3.5 Summary of impacts to Threatened ecological Communities within the Preferred Alignment

THREATENED ECOLOGICAL COMMUNITY	EPBC ACT STATUS	IMPACT (ha)	PRELIMINARY SIGNIFICANCE ASSESSMENT
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grassland of South-eastern Australia (Grey Box Woodland)	Endangered	18.3	No significant impact (Appendix D)
White Box-Yellow Box-Blakely's Red Gum Grassy woodland and derived Native Grassland (Box Gum Woodland)	Critically Endangered	21.4	No significant impact (Appendix D)

Threatened terrestrial fauna species

A summary of the direct impacts on each threatened fauna species is provided in Table 3.6.

Table 3.6 A summary of impacts to EPBC listed threatened Fauna within the Preferred Alignment

SCIENTIFIC NAME	SPECIES NAME	EPBC ACT STATUS[1]	POTENTIAL HABITAT IMPACTED (ha)	PRELIMINARY SIGNIFICANCE ASSESSMENT
Mammals				
Pteropus poliocephalus	Grey-headed Flying-fox	V	43.8	Not significant
Phascolarctos cinereus	Koala	V	43.8	Not significant
Nyctophilus corbeni	South-eastern Long-eared Bat	V	46.3	Not significant
Birds				
Polytelis swainsonii	Superb Parrot	V	43.8	Significant
Lathamus discolor	Swift Parrot	E	43.8	Significant
Anthochaera phrygia	Regent Honeyeater	CE	43.8	Significant
Grantiella picta	Painted Honeyeater	V	43.8	Not significant

The proposed action will impact up to 46.3 ha of native vegetation (including two TECs) which provide potential habitat for the above seven species, reducing potential foraging, breeding, roosting habitat, area of occupancy, and increasing fragmentation on these species within in the locality.

Fauna injury or death has the greatest potential to occur during vegetation clearing. Some mobile species, such as birds, may be able to move away from the path of clearing unless they are a nesting or roosting hollow dependant bird such as the Superb Parrot *(Polytelis swainsonii)*. However, other species that are less mobile (ground dwelling reptiles and mammals), or those that are nesting or roosting in tree hollows during the day (nesting birds, arboreal mammals and microchiropteran bat species), may find it difficult to escape roosts and move rapidly over relatively large distances when disturbed.

Indirect impacts to fauna may include fragmentation of habitat, increased edge effects in areas of remaining habitat and increased noise during construction and operation. The extent of fragmentation and edge effects will depend on the final location and design of the proposed action, however, given the current fragmentation and disturbance to habitats these are unlikely to increase significantly. Many of these impacts can be avoided or reduced through appropriate design, implementation of erosion and sediment controls and clear demarcation of the works areas, to confine the impacts of the activities.

Threatened terrestrial flora species

A summary of the direct impacts on each threatened flora species is provided in Table 3.7.

Table 3.7 A summary of impacts to EPBC listed threatened flora within the Preferred Alignment

SCIENTIFIC NAME	SPECIES NAME	EPBC ACT STATUS[1]	POTENTIAL HABITAT IMPACTED (HA)	PRELIMINARY SIGNIFICANCE ASSESSMENT
Caladenia concolor	Crimson Spider Orchid	V	0.6	Significant
Caladenia arenaria	Sand-hill Spider Orchid	E	43.1	Significant
Austrostipa wakoolica	a spear-grass	E	46.3	Significant
Swainsona murrayana	Slender Darling Pea	V	43.1	Significant

The proposed action will impact up to 46.3 ha of native vegetation (including two TEC's) that is considered likely to provide potential habitat for the above flora species. In accordance with survey guidelines, appropriate targeted surveys and methods will need to be applied to verify the potential likelihood of occurrence.

Additional indirect impacts would include disturbance resulting from construction, earthmoving and stockpiling of materials. Indirect impacts may persist long after construction and may include facilitation of weed infestation (where soils are disturbed and seed sources are present) and pollution of waterways through mobilised sediments.