Referral of proposed action

Project title: Carmichael Coal Mine and Rail Project

1 Summary of proposed action

1.1 **Short description**

Adani Group (Adani) is proposing to develop the Carmichael Coal Mine and Rail Project (the Project). This involves the development of a new open-cut and underground coal mine over EPC 1690, and the construction of a rail link. Coal will be exported via rail to the Port of Abbot Point and the Port of Hay Point. The proposed mine will produce up to 60 million tonnes per annum (Mtpa) of product coal and have a mine life of 150 years, inclusive of construction, operation and closure.

1.2 **Latitude and longitude**

Mine Site

Point	Y_WGS_84_DMS	X_WGS84_DMS
Northwest corner	E146°12'3.6"	S21°54'54.36"
Northeast corner	E146°17'2.4"	S21°54'54.36"
Southwest corner	E146°27'3.6"	S22°8'54.24"
Southeast corner	E146°24'3.6"	S22°13'54.48"

Rail Option 1 – a corridor of 2 km based on a centre line as follows:

Point	Y_WGS_84_DMS	X_WGS84_DMS
Mine 0	E146°24'28.8"	S22°2'19.68"
1	E146°29'6"	S22°2'18.24"
2	E146°34'26.44"	S22°0'8.28"
3	E146°38'13.16"	S22°0'57.96"
4	E146°46'33.6"	S22°1'0.84"
5	E146°51'54.04"	S22°0'4.68"
6	E146°55'40.76"	S21°57'58.32"
7	E147°0'54"	S21°58'39"
8	E147°4'30"	S22°0'4.68"
9	E147°7'48"	S21°59'11.4"
10	E147°14'24.04"	S21°59'58.56"
11	E147°19'37.2"	S21°59'6"
12	E147°23'49.2"	S21°56'13.2"
13	E147°25'12"	S21°53'27.6"
14	E147°26'2.44"	S21°48'27"
15	E147°29'45.6"	S21°45'34.2"
16	E147°33'14.4"	S21°45'43.56"
17	E147°35'52.84"	S21°43'33.6"
18	E147°41'9.6"	S21°30'29.88"
19	E147°50'20.4"	S21°18'47.88"
20	E147°49'8.4"	S21°15'26.64"
21	E147°49'26.44"	S21°12'42.84"
22	E147°50'49.2"	S21°10'37.92"
23	E147°53'27.64"	S21°9'19.8"
24	E147°55'22.8"	S21°6'19.8"
25	E147°49'58.76"	S20°46'44.76"
26	E147°46'58.8"	S20°45'21.6"
27	E147°43'22.84"	S20°39'7.56"
28	E147°40'47.96"	S20°36'28.08"
29	E147°39'57.6"	S20°32'52.44"
30	E147°36'10.8"	S20°31'8.4"
31	E147°34'22.8"	S20°28'0.12"

32	E147°31'51.64"	S20°26'38.76"
33	E147°28'15.56"	S20°21'20.52"
34	E147°28'48"	S20°18'22.32"
35	E147°32'16.76"	S20°14'30.48"
36	E147°32'52.8"	S20°9'37.44"
37	E147°36'43.2"	S20°8'56.76"
38	E147°40'55.24"	S20°1'47.64"
39	E147°43'48"	S20°0'21.96"
40	E147°52'48"	S20°1'17.04"
41	E147°56'52.8"	S20°0'47.88"
42	E148°6'3.6"	S19°57'3.24"
43	E148°4'30"	S19°54'31.32"
Port 44	E148°6'7.24"	S19°56'18.96"

Rail Option 2 – a corridor of 2 km based on a centre line as follows:

Point	Y_WGS_84_DMS	X_WGS84_DMS
1	E146°23'2.79"	S22°2'59.56"
2	E146°25'10.5"	S22°1'46.35"
3	E146°32'56.92"	S21°59'6.97"
4	E146°47'37.87"	S22°0'42.17"
5	E146°55'37.51"	S22°1'26.76"
6	E146°59'9.61"	S21°59'58.79"
7	E147°3'55.23"	S21°59'55.17"
8	E147°10'43.77"	S21°58'29.61"
9	E147°20'30.66"	S21°58'52.5"
10	E147°22'9.69"	S21°58'42.56"
11	E147°24'29.28"	S21°58'22.38"
12	E147°32'50.61"	S21°55'30.04"
13	E147°45'35.87"	S21°56'59.22"
14	E147°47'44.82"	S21°59'11.79"
15	E147°52'28.02"	S21°59'43.12"
16	E147°54'34.18"	S22°1'0.55"
17	E147°56'34.17"	S22°1'16.82"
18	E147°58'34.15"	S22°2'28"
19	E148°0'6.55"	S22°1'35.29"
20	E148°2'4.74"	S21°58'10.31"
21	E148°6'19.04"	S21°56'14.93"
22	E148°12'29.59"	S21°56'32.17"
23	E148°16'24.1"	S21°55'4.37"
24	E148°18'59.76"	S21°55'54.59"
25	E148°22'35.54"	S21°54'6.23"
26	E148°27'38.34"	S21°51'34.81"
27	E148°34'13.4"	S21°51'8.71"
28	E148°37'51.56"	S21°50'24.36"
29	E148°41'22.6"	S21°48'28.01"
30	E148°47'4.34"	S21°46'8.69"
31	E148°52'6.24"	S21°46'8.83"
32	E148°56'55.36"	S21°46'18.59"
33	E148°59'28.03"	S21°42'2.41"
34	E149°1'57.68"	S21°38'25.22"
35	E149°4'10.2"	S21°37'54.52"
36	E149°6'49.9"	S21°39'3.71"
37	E149°11'2.33"	S21°38'17.23"
38	E149°14'3.23"	S21°31'53.58"

39	E149°14'8.59"	S21°26'29.29"
40	E149°16'6.96"	S21°22'43.07"
41	E149°16'43.54"	S21°18'15.23"
42	E149°17'22.7"	S21°17'14.53"
43	E149°17'27.46"	S21°17'5.14"
44	E149°17'23.06"	S21°16'50.95"
45	E149°17'16.19"	S21°17'3.16"

Rail Option 3 – a corridor of 2 km based on a centre line as follows:

Point	Y_WGS_84_DMS	X_WGS84_DMS
Mine 0	E146°23'5.96"	S22°2'53.88"
1	E146°27'54"	S21°59'28.32"
2	E146°42'43.24"	S21°45'48.96"
3	E146°43'55.16"	S21°42'21.24"
4	E146°44'6"	S21°37'44.76"
5	E146°48'0"	S21°31'39.72"
6	E146°49'22.8"	S21°25'23.52"
7	E146°51'43.2"	S21°21'50.4"
8	E146°51'43.2"	S21°20'17.88"
9	E146°56'6"	S21°15'34.2"
10	E146°58'30.04"	S21°9'2.16"
11	E146°58'33.6"	S21°5'52.8"
12	E147°2'23.96"	S21°1'25.32"
13	E147°2'34.8"	S20°50'22.56"
14	E147°7'33.64"	S20°45'28.08"
15	E147°12'54"	S20°36'12.24"
16	E147°18'25.24"	S20°33'34.56"
17	E147°21'18"	S20°33'8.64"
18	E147°23'13.16"	S20°30'57.96"
19	E147°24'46.76"	S20°25'50.52"
20	E147°29'27.6"	S20°21'21.96"
21	E147°29'9.56"	S20°18'28.8"
22	E147°31'8.4"	S20°16'16.68"
23	E147°32'23.96"	S20°9'19.44"
24	E147°40'1.24"	S20°1'7.68"
25	E147°43'12"	S19°59'16.8"
26	E147°52'40.84"	S19°59'51.72"
27	E147°55'58.8"	S19°58'10.56"
28	E148°0'43.16"	S19°58'14.16"
29	E148°3'10.76"	S19°56'3.12"
Port 30	E148°3'10.76"	S19°53'24.36"

1.3 Locality and property description

The Carmichael Coal Mine is located on EPC 1690. The lease is mostly located on the Moray Downs cattle station, which is located approximately 160 km to the North West of the Clermont township, which inturn is located approximately 100 kilometres North of the major Central Queensland regional town of Emerald. The site is accessed by the Gregory Development Road which runs from Clermont to Charters Towers, and then the property access road called the Moray Carmichael Access Road (Figure 1).

The rail line to the Port of Hay Point generally runs in an easterly direction from the mine to Moranbah where it will link with the existing Goonyella Railway system. Rail option 1 to Abbot Point following the same route to Moranbah, then turns North East, and follows the proposed alignment of the Alpha Coal Mine and Rail Project. A second option to Abbot Point is a greenfield alignment which generally runs in a North Easterly direction from the mine.

The rail options are indicative only and the exact corridors will be finalised as part of the ongoing environmental and engineering investigations.

1.4	**Size of the development footprint or work area (hectares)**	The mine site is an area of 25,740 ha Rail option 1 (to Abbot Point) covers an area of 630 ha (105 km x 60 m) Rail option 2 (to Hay Point) covers an area of 1,050 ha (175 km x 60 m) Rail option 3 (to Abbot Point) covers an area of 2,004 ha (334 km x 60m)
1.5	**Street address of the site**	Moray Carmichael Access Road, Moray Downs

1.6 **Lot description**

EPC 1690 is over the following parcels: Lot 1 on AY35, Lot 1 on SP164918, Lot 662 on PH1491 and Lot 663 on SP228220 (see attached Figure 2 for parcel tenure types traversed by the proposed rail alignments)

1.7 **Local Government Area and Council contact (if known)**

The project lies within Isaac Regional Council, Mackay Regional Council, and Whitsunday Regional Council

1.8 **Time frame**

Baseline environmental and engineering surveys are proposed to commence in November 2010. Construction, on both mine and rail components, is expected to commence in first quarter 2012 following receipt of all relevant environmental approvals.

Initial output of 2 Mtpa is expecting in the first year of operation (2014) with maximum productivity of 60 Mtpa being reached within eight years of mining commencement. The mine will have an estimated mine-life of 150 years.

1.9	**Alternatives to proposed action**	X	No
			Yes, you must also complete section 2.2
1.10	**Alternative time frames etc**		No
		X	Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.12	**State assessment**		No
		X	Yes, you must also complete Section 2.4
1.12	**Component of larger action**	X	No
			Yes, you must also complete Section 2.6
1.13	**Related actions/proposals**	X	No
			Yes, provide details:
1.14	**Australian Government funding**	X	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park**	X	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

The proposed action includes:

- the development and operation of the Carmichael Coal Mine, a new open-cut and underground coal mine proposed to be located at Moray Downs, 160 km northwest of Clermont (See Figure 1) and;
- the construction and operation of a rail link to transport coal between the mine and a coal export terminals located at the Port of Abbot Point and/or Port of Hay Point. Three rail alignments are currently proposed:
  - one linking to the Alpha Rail alignment - a rail line that is proposed for construction by Hancock Prospecting Pty Ltd linking the Alpha Mine and Abbot Point (Figure 1);
  - one along the Goonyella line between Moranbah and Dudgeon Point (Port of Hay Point); and
  - a third option linking to the Port of Abbot Point via a greenfield Adani rail line.

Mine Infrastructure

The project will involve mining and processing of up to 60 Mtpa product coal for export. Upto 20% of higher ash run of mine (ROM) coals may be washed and blended with lower ash by-pass coals on site. It is proposed that the project will operate 24 hours a day, 7 days a week.

The mine will combine open cut and underground operations with. The overall workable length of the mine will be approximately 45 km. Pit dimensions are approximated below.

Table 1 Estimated pit dimensions

	Pit No.					
Pit Dimensions	**1**	**2**	**3**	**4**	**5**	**6**
Approx. Length (km)	6	6	7.5	8.5	8.5	8.5
Width to Final H/W (km)	2	1.7	3.5	2.4	2.5	3.5

It is assumed that mining operations will be by Owner/Operator using large electric shovels, and/or excavators, and trucks for both waste removal and coal mining.

The detailed Infrastructure layout has not been designed but it is expected to include the following:

- Services within the mine site including potable water, communications, power reticulation and process water;
- Fuel storage (approximately 2.5 million litres of fuel) and filling;
- Haul truck wash (two allowed for, capable of washing 140+ tonne mine trucks);
- Workshops and stores capacity suitable to 30Mtpa fleet;
- Administration and bathhouse for up to 850 site staff;
- Car parking allowance for up to 300 vehicles; and
- Tyre bay and water cart filling station;
- Water tank farm; and
- Fire hose down.

Materials Handling will include

- Internal haul roads from pit top to ROM pad;
- ROM Pad with dual 400 tonne dump stations;
- Feeder breakers at dump station discharge prior to crushing stations reducing the ROM coal down to <450 mm;
- Two stage crushing and screening stations reducing coal from <450 to <80 mm product. A bypass system utilising a roller screen has been allowed for between the secondary and tertiary sizing.
- Conveyors from crusher station discharge to stockpiling systems. Discharge to either of two stockpile stacking conveyors;
- An optional coal washery. A separate CHPP dump station may be required for processing high ash coal before feeding it back into the proposed stockpile system;
- 2.4 Mt capacity (4 weeks production) coal stockpile supplied by dual stackers;

- Reclaim from product stockpile by four bridge type reclaimers to Train Load Out Bin (TLO). Two reclaimers working at once reclaiming at a combined capacity of 6,000 tph. The proposed loadout would be a volumetric type;
- Dust suppression for the stockpiles has not been included. Water sprays have been allowed for at all transfer points;
- Auxiliary equipment including weigher, coal scan and metal detectors has been included.

Rail Infrastructure

Three rail options for the railway from the mine to port are currently proposed:

- Option 1 – From mine site to the proposed standard gauge Alpha Railway (Hancock Prospecting) and export via the Port of Abbott Point;
- Option 2 – From mine site to the existing narrow gauge Goonyella System south of Moranbah and export via Dudgeon Point (the Port of Hay Point); and
- Option 3 – From mine site to the Port of Abbot Point via a northern greenfield's route.

It is assumed that both the Alpha Railway and the Goonyella System will be operating at capacity when Adani seeks access. Therefore any additional trains Adani runs on existing systems will require corresponding upgrades to existing track capacity to avoid negatively impacting existing operations. This may require duplication of the existing lines. Other alternative rail options to Dudgeon or Abbot Point may be considered if required.

Table 2 Rail Distances

	Abbott Point via Alpha	Hay Point via Goonyella	Abbot Point via greenfields
Length of New Track	105km	175km	334km
Length of Existing Track	325km	195km	-
Total Trip Length	430km	370km	334km

2.2 Alternatives to taking the proposed action

The project has high economic value to the State of Queensland, providing jobs and stimulating the local economy. The project is based on extraction of a defined coal resource. As such, an alternative action is not proposed.

2.3 Alternative locations, time frames or activities that form part of the referred action

The project is based on extraction of a defined coal resource. As such, an alternative location for the mine site is not proposed. The Project timeframe aims to maximise the high value of coal in the marketplace. As such, alternative timing is not proposed. Three rail alignment options will be considered with various alternative locations assessed along each option. Environmental considerations will be used to inform the rail alignment selection process. To maximise flexibility and increase the capacity to avoid MNES and other environmentally sensitive areas, a broad (2 km wide) alignment is proposed here. The final alignment will be refined through consideration of environmental, social and geotechnical constraints through a desktop-based GIS (INDIGO) process. Flora and fauna surveys will be undertaken as part of the Environmental Impact Assessment. Information obtained from these surveys will be used to further reduce the impact on local flora, fauna and ecological communities through local re-alignments.

2.4 Context, planning framework and state/local government requirements

Adani are currently seeking declaration of the project as a significant project under the Queensland *State Development and Public Works Organisation Act 1974* (SDPWO Act). The project will be assessed by Environmental Impact Statement (EIS). Mining leases will be applied for under the Queensland *Mineral Resources Act 1989* along with an Environmental Authority (EA) application under the Queensland *Environmental Protection Act 1994*. The EA application will be supported by the EIS and will contain several Environmental Management Plans (EMP), for the mine and rail.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

It is proposed that an EIS be undertaken in accordance with the Bilateral Agreement between the State of Queensland and Commonwealth, to meet the requirements of the EPBC Act and the SDPWOA Act.

2.6 Public consultation (including with Indigenous stakeholders)

Public consultation activities will be undertaken as part the EIS process (as described above).

2.7 A staged development or component of a larger project

This is not part of a staged development.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

The Project area does not contain any World Heritage Properties.

Nature and extent of likely impact

N/A

3.1 (b) National Heritage Places

Description

The Project area does not contain any Natural Heritage Places.

Nature and extent of likely impact

N/A

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

- No RAMSAR wetlands occur within 40 km of the mine site or the three rail options.
- Creeks that form part of the Shoalwater Bay catchment occur along Rail Option 2 (Dudgeon Point). These lead to the Shoalwater and Corio Bay RAMSAR site that lies east of the proposed port at Dudgeon Point.
- Coongie Lakes RAMSAR site is located 98 km south-west of the Mine Site (in South Australia). However the mine site is within the same catchment. Coongie Lakes is listed as a wetland of international significance under the *Ramsar Convention 1971*.

Nature and extent of likely impact

The project footprint does not intersect and will therefore not have a direct impact on RAMSAR wetlands. Creeks within the Shoalwater Bay Catchment will be crossed by Rail Option 2. This rail option has the potential to cause indirect impact on the Shoalwater Bay RAMSAR site by impacting creeks in the upper catchment. Measures will be taken to reduce the impact on creeklines to a small, localised level. Creek crossings are likely to involve removal of a small area of vegetation within the riparian zone. Flora and fauna surveys will be undertaken to assess the ecological value of key creek crossings as part of the EIS process. Opportunities to reduce impact will be sought through local realignments. Standard mitigation measures will be used to minimise direct impact on the riparian zone and protect the creek and riparian zone from indirect impacts during the construction and operational phase. All creek-crossings will be considered areas of high ecological sensitivity and subject to management guidelines outlined in an Environmental Management Plan. Sub-artesian water will not be directly impacted. Sub-artesian water will not be used for a local water source and sub-surface water flows will be monitored as part of the EIS. The Coongie Lakes RAMSAR site is therefore unlikely to be adversely impacted by mining operations at the Mine Site.

3.1 (d) Listed threatened species and ecological communities

Description

A review of relevant State and Commonwealth databases including the Environmental Protection and Biodiversity Conservation Act Protected Matters database and the DERM Wildlife Online database was undertaken to identify any listed threatened species or ecological communities potentially occurring on the Project site. The databases identified 39 EPBC

listed species and five Threatened Ecological Communities that may occur on or within the vicinity of the Mine and/or two rail options. Some of these species are unlikely to occur.

Table 3 EPBC listed threatened species and threatened ecological communities

Endangered (EPBC Act)	Vulnerable (EPBC Act)	Threatened Ecological Communities
salt piperwort (Eriocaulon carsonii)	White's mountain wattle (Acacia ramiflora)	Brigalow (Acacia harpophylla dominant and co-dominant communities)
blue devil (Eryngium fontanum)	Croton magneticus	The Community of Native Species Dependent on Natural Discharge of Groundwater from the Great Artesian Basin
Marlborough blue cycad (Cycas ophiolitica)	black ironbox (Eucalyptus raveretiana)	Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin
finger panic grass (Digitaria porrecta)	northern beard heath (Leucopogon cuspidatus)	Semi-evergreen vine thickets of the Brigalow Belt (North and South) and the Nandewar Bioregions
black-throated finch southern (Poephila cincta cincta)	Ozothamnus eriocephalus	Littoral Rainforests and Coastal Vine Thickets of Eastern Australia
star finch (Neochima ruficauda ruficauda)	minute orchid (Taeniophyllum muelleri)	
northern hairy-nosed wombat (Lasiorrhinus krefftii)	king bluegrass (Dicanthium queenslandicum)	
northern quoll (Dasyurus hallucatus)	red goshawk (Erythriotriorchis radiatus)	
greater large-eared horshoe bat (Rhinolophus philippinensis)	squatter pigeon (Geophaps scripta scripta)	
Eungella day frog (Taudactylus eungellensis)	Australian painted snipe (Rostratula australis)	
loggerhead turtle (Caretta caretta)	ornamental snake (Denisonia maculata)	
leatherback turtle (Dermochelys coriacea)	Dunmall's snake (Furina dunmalli)	
olive ridley turtle (Lepidochelys olivacea)	spectacled flying fox (Pteropus conspicillatus)	
southern giant petrel (Macronectes giganteus)	greater long-eared bat (Nyctophilus timoriensis)	
kermadec petrel (Pterodroma neglecta neglecta)	water mouse (Xeromys myoides)	
	yakka skink (Egernia rugosa)	
	brigalow scalyfoot (Paradelma orientalis)	
	Fitzroy River turtle (Rheodytes leukops)	
	humpback whale (Megaptera novaeangliae)	
	green turtle (Chelonia mydas)	
	hawksbill turtle (Eretmochelys	

	imbricata)	
	flatback turtle (Natador depressus)	
	green sawfish (Pristis zijsran)	
	whale shark (Rhincodon typus)	

The species listed above were evaluated to determine their likelihood of occurrence in or adjacent to the Project area, distinguishing between species that are known, likely, possible or unlikely to occur. The likelihood of occurrence was determined based on the known habitat requirements of each species, information on their known distribution, recent historical records and information on habitats thought to be present on the Project site.
At the time of submission, surveys have not been undertaken at the site to verify the type and quality of habitats present. More detailed information on the likelihood of occurrence and potential impacts will be determined through detailed flora and fauna surveys undertaken as part of the EIS process.

squatter pigeon (*Geophaps scripta scripta*) – Likely to occur
The squatter pigeon is regionally abundant within the Brigalow and Desert Uplands Bioregions. The species occurs in a wide range of habitats wherever there is a grassy understorey. It is commonly encountered in grassy woodlands and open forests dominated by Eucalypts (Frith, 1982; Leach, 1988). This species is abundant in the region and is likely to occur in the mine site and along all rail options.

ornamental snake (*Denisonia maculata*) – Potential to occur
This species is typically found in areas of brigalow, riverside woodland and open forest on natural levees (McDonald *et al*. 1991; Cogger *et al*. 1993). Suitable habitat occurs within the mining lease and along the rail options. It has been predicted to occur in other mining and rail developments within the region. This species has the potential to occur within the mining lease and along any of the rail options.

brigalow scalyfoot (*Paradelma orientalis*) – Potential to occur
The brigalow scaly foot is found in a wide variety of open forest habitats on several soil types (Schultz and Eyre, 1997). The species often shelters below sandstone slabs, surface debris or amongst grass hummocks (Wilson and Knowles, 1988). The Brigalow scaly-foot is found in open forests and woodlands of Brigalow (*Acacia harpophylla*), Narrow-leaved Ironbark, Bimble Box (*Eucalyptus populnea*), Cypress Pine (*Callitris columellaris*), Belah (*Casuarina pauper*), Buloke (*Allocasuarina luehmannii*), Spotted Gum (*Corymbia maculata*), Gidgee (*Acacia cambagei*), Lancewood (*Acacia* spp.) and Hickory Wattle (*Acacia falciformis*). They have also been found in vine thickets. Topography varies from sandstone ridges to flats and gently undulating plains with clay, loam or sand (Schultz & Eyre 1997; Tremul 2000). The species occurs in the Brigalow Belt bioregion in south-central Queensland (Cogger, 2000), the southern Desert Uplands and Mulga Lands bioregions (TSN, 2008). Suitable habitat occurs within the mine site and along all rail options. This species has the potential to occur.

black ironbox (*Eucalyptus raveretiana*) – Potential to occur
Black ironbox occurs along the banks of rivers, creeks and other watercourses on clay and loam soils (Queensland Herbarium, 2008). The species is known from 23 recorded sites in two main areas: Nebo to Ayr and Apis Creek to Rockhampton (Halford, 1997; Queensland Herbarium, 2008). Its' distribution coincides with three EPBC listed Threatened Ecological Communities: Brigalow (*Acacia harpophylla* dominant and co-dominant), Bluegrass (Dicanthium spp.) dominated grasslands of the Brigalow Belt Bioregion (northern and southern) and Semi-evergreen Vine Thicket of the Brigalow Belt (northern and southern) and Nandewar Bioregion. Brigalow and Semi-evergreen Vine Thicket occur along all rail alignments and Brigalow also occurs on the mine site. The species has the potential to occur in these areas.

black-throated finch (*Poephila cincta cincta*) – Potential to occur
The southern subspecies of the black-throated finch typically occurs in grassy open woodlands and forests dominated by Eucalyptus, Corymbia and Melaleuca, often along or near watercourses and occasionally in tussock grasslands or freshwater wetlands (Baldwin, 1976; Britton and Britton, 2000). This species' range previously extended from the Atherton Tablelands in north Queensland to the northern Tableland and north-west slope regions of northern New South Wales. The species is currently known from two strongholds in the Townsville region and from scattered locations throughout central Queensland. The species has been historically recorded (since 1998), within 40 km of the Project site at Doongmabulla Station. Potential habitat occurs along the Carmichael River and along creeks within the Project site. This black-throated finch has the potential to occur within the mine site or any of the rail options.

White's mountain wattle (*Acacia ramiflora*) – Potential to occur
Acacia ramiflora grows in woodland on sandstone hills (Pedley, 1978, 1987; Orchard, 2001). A collection from Hughenden is from pebbly red earth in low open woodland of *Eucalyptus whitei* and *Triodia* sp. (Pedley 1981). Gentle ridges of soft sandstone and mudstone occur on the western side of the mining lease. These areas may contain suitable habitat for *Acacia ramiflora*. The species has not been historically recorded within 40 km of the mine site. However, suitable habitat is present and the species has the potential to occur.

red goshawk (*Erythriotriorchis radiatus*) – Potential to occur

The red goshawk typically occurs in woodland and forests in subtropical and warm temperate regions of Australia (Marchant and Higgins, 1993). It prefers landscapes that contain a mix of habitats including coastal and sub-coastal tall open forest, woodland and rainforest edges (Marchant & Higgins 1993). The species occurs at low densities. The red goshawk typically nests in tall trees within 1 km of (and generally beside) permanent water (Aumann and Baker-Gabb, 1991) and forages at ecotones or in low-moderate density woodland (Marchant and Higgins, 1993). Potential foraging habitat occurs within the mine site and along the rail options. This species has the potential to occur.

Australian painted snipe (*Rostratula australis*) – Potential to occur
This is a terrestrial, shallow freshwater species found in wetlands, lakes, swamps, inundated or waterlogged grasslands, dams and other freshwater to brackish habitats. Its distribution is poorly known. There are no historical records for the mining lease.

Dunmall's snake (*Furina dunmalli*) – Potential to occur
This species is typically found in areas of brigalow forest and open woodland with fallen timber on floodplains with deep-cracking black clay and clay loam soils. This species is generally uncommon throughout its range. Its' habitats have been largely impacted by land clearing for cattle grazing. Remnants of brigalow that represent potential habitat for Dunmall's snake occurs within the mining lease and along the rail options. This species has the potential to occur.

finger panic grass (*Digitaria porrecta*) – Potential to occur
Finger panic grass typically occurs in grasslands on extensive basaltic plains, and in undulating woodlands and open forests with an underlying basaltic geology. It generally occurs on dark and fine textured soils with some degree of seasonal cracking (Leigh *et al.,* 1984; Halford, 1995). It also persists in disturbed habitats, such as fallow paddocks, but its capability to maintain a viable population is unknown (Halford, 1995). Finger panic grass occurs in communities dominated by *Eucalyptus orgadophila* on hills and slopes and *E. tereticornis* and *E. populnea* in drainage lines. Suitable habitat occurs along all rail options and in the mine site. This species has the potential to occur.

Marlborough blue cycad *(Cycas ophiolitica)* – Potential to occur
Cycas ophiolitica occurs in eucalypt open forest and woodland communities with a grassy understory. Typically it occurs on hill tops and steep slopes between 80 – 620 m above sea level. It grows on shallow, stony, red clay loams and sandy soils (Halford, 1995). This species occurs between Marlborough and Rockhampton in central Queensland (Hill, 1998). Suitable habitat occurs along all rail options. The species has the potential to occur.

greater long-eared bat (*Nyctophilus timoriensis*) – Potential to occur
The species occurs in a range of inland woodland vegetation types including box, ironbark and cypress pine woodlands. It also occurs in Buloke woodland, Brigalow woodland, Belah woodland, Smooth-barked Apple, *Angophora leiocarpa,* woodland; River Red Gum, *Eucalyptus camaldulensis,* forests lining watercourses and lakes, Black Box, *Eucalyptus largiflorens,* woodland, dry sclerophyll forest. Throughout inland Queensland, the species habitat is dominated by various eucalypt and bloodwood species, and various types of tree mallee with it being most abundant in vegetation with a distinct canopy and a dense cluttered shrub layer (Lumsden 1994; McFarland et al. 1999; Ellis et al. 1999; Dominelli 2000; Koehler 2006). In Queensland, the South-eastern Long-eared Bat is mainly recorded in the Brigalow Belt South Bioregion, extending eastwards to the Bunya Mountains National Park. It has been recorded as far north as the Expedition Range and Dawson River areas. Its westerly range extends into the Mulgalands Bioregion and west of Bollon. Suitable habitat occurs within the mine site and along both rail options. This species has the potential to occur.

northern quoll (*Dasyurus hallucatus*) – Potential to occur
Dasyurus hallucatus is commonly found in open Eucalypt woodland and dens in specific habitats among rocky outcrops (Woinarski, 2006). Dens are constructed in hollow logs, in crevices and small caves among rocks and in tree hollows (Woinarski, 2006). Most successful breeding occurs near creeklines (Braithwaite and Begg, 1998). Northern quolls forage primarily on the ground but are also capable of climbing trees (Woinarski, 2006). The home range is typically around 35 ha. However breeding males typically increase their home range to about 100 ha during the breeding season in late May/early June (Oakwood, 2002). In recent times the species has experienced a marked contraction in range (Braithwaite and Griffiths 1994). This has been attributed to numerous potential causal factors including changes in fire regime, vegetation structure, disease, competition with feral cats and poisoning by ingesting cane toads (Burnett 1997; Woinarski *et al*. 2001). (van Dam *et al*. 2002; Freeland 2004; Woinarski *et al.* 2008). Potential habitat occurs on the western side of the mine site and along both rail options. The species has the potential to occur.

water mouse (*Xeromys myoides*) – Potential to occur
The water mouse is restricted to specific habitats in the inter-tidal zone, occurring in tidal grassland, mangroves, margins of freshwater swamps and lakes in coastal areas of the Northern Territory and southern and central Queensland (Woinarski *et al.* 2001). It is not truly aquatic but follows the receding water into the mangrove zone and forages in littoral substrate when exposed at low tide (Menkhorst and Knight 2004). The water mouse shelters and nests in distinctive earthen mounds constructed above the high tide level. No suitable habitat occurs within the mine site. However potential habitat may occur at the coastal end of the two rail options. This species has the potential to occur.

yakka skink (*Egernia rugosa*) – Potential to occur
The yakka skink is typically found in open dry sclerophyll forest or woodland (Wilson & Knowles 1988; Cogger 2000). Most populations are concentrated within the Mulga Lands and Brigalow Belt South Bioregions (TSN, 2008), but it has also been

recorded throughout the Brigalow Belt North and Einasleigh Uplands Bioregions and north to the southern sections of Cape York Peninsula (TSN, 2008). This skink refuges in dense ground vegetation, in hollow logs, cavities in soil-bound root systems and beneath rocks (Wilson and Knowles, 1988; Cogger, 2000). Potential habitat for this species occurs within the two rail options. This species has the potential to occur.

***Croton magneticus* – Potential to occur**
Croton magneticus grows in deciduous vine thickets on soils derived from sandstone, granite, or acid agglomerate substrates (Forster, 2003). There is no accurate information on the area of occupancy or the number or size of populations. However, the species' distribution overlaps with the EPBC Threatened Ecological Communities, Semi-evergreen Vine Thickets of the Brigalow Belt (northern and southern) and Nandewar Bioregion and Brigalow (*Acacia harpophylla* dominant and co-dominant). Potential habitat occurs at the mine site and along both rail options. This species has the potential to occur.

northern beard heath (*Leucopogon cuspidatus*) – Potential to occur
Leucopogon cuspidatus has been recorded from open forest, woodland and heath on rocky slopes with granitic or serpentinitic substrates. It has been recorded from Mackay, Bowen, Townsville, Gloucester, Magnetic Island and serpentine outcrops in the Marlborough to Yaamba area. Its' distribution coincides with the EPBC Threatened Ecological Communities Brigalow (*Acacia harpophylla* dominant and co-dominant), Bluegrass (Dicanthium spp.) dominated grasslands of the Brigalow Belt Bioregion (northern and southern) and Semi-evergreen Vine Thicket of the Brigalow Belt (northern and southern) and Nandewar Bioregion. Suitable habitat occurs within the mine site and along both rail options. This species has the potential to occur.

***Ozothamnus eriocephalus* – Potential to occur**
Ozothamnus eriocephalus is a weakly woody shrub known from a range of habitat types, including the margins of disturbed notophyll vine forest, margins of gallery forest, microphyll vine forest, tall open *Eucalyptus andrewsii* - *E. resinifera* forest with an understorey of *Allocasuarina littoralis*, in open eucalypt forest and on rocky ridges with *Eucalyptus* spp. - *Acacia* spp. scrub. It is also known from the edge of creek banks and in crevices on steep granite slopes, often in sunny situations. It is known from moderate to high elevations ranging from 380 to 950 m. It occurs on skeletal sandy or gravelly soils or occasionally deeper red-brown clay loams derived from granites and sandstones (BRI collection records; Bean 1992, 1994; Pollock 1997). This species is restricted to the central coast of Qld, from the Bowen and Mackay districts, with a distributional range of about 180 km. It is known from Mt Abbott. Potential habitat occurs adjacent to rail option 1. This species has the potential to occur.
minute orchid (*Taeniophyllum muelleri*) – Potential to occur

This small epiphytic orchid is found on the mainland from Cape York Peninsula to Wauchope, New South Wales, at 50 to 1, 200 m elevation, where it is a widespread and common species found on shrubs and trees in rainforest and open forest, gullies and in riparian vegetation.

king bluegrass (*Dicanthium queenslandicum*) – Potential to occur
Dicanthium queesnlandicum occurs only in native grasslands on heavy black cracking clay soils. Suitable habitat occurs along both rail options. This species has the potential to occur.

salt piperwort (*Eriocaulon carsonii*) – Unlikely to occur
Eriocaulon carsonii is restricted to permanent wetlands fed by natural mound springs in the Great Artesian Basin (Fatchen, 2000; Fensham et al., 2004a). This species has been recorded 7 km south-west of the mine site within the vegetation community associated with Doongmabulla Springs (HERBRECS). There are no known mound springs on the mine site. The Great Artesian Basin and the Tasman Basin lie immediately west and east of the Mine site boundaries. *Eriocaulon carsonii* is not expected to occur within the mine site. However this species has the potential to occur close to the boundaries of the mining lease.

blue devil (*Eryngium fontanum*) – Unlikely to occur
Eryngium fontanum is found in spring-fed wetlands associated with the Great Artesian Basin. Essential habitat for this species occurs in Doongmabulla Springs, approximately 7 km south-west of the Project site. This species has not been historically recorded at that location and is only known from two locations in the Barcaldine spring super-group. This system has been extensively surveyed (Fensham and Fairfax 2003) and there is a high level of certainty that no further populations of *E. fontanum* await discovery (Fensham et al., 2010). Accordingly, *Eryngium fontanum* is considered unlikely to occur on or adjacent to the mine site or either of the rail options.

star finch (*Neochima ruficauda ruficauda*) – Unlikely to occur
The eastern subspecies of the star finch mainly occurs in low dense, damp grasslands and sedgelands bordering watercourses, swamps and wetlands and in grassy woodlands that are located close to freshwater sources (Garnet, 1993; Holmes, 1996; Higgins et al., 2006). The star finch (eastern) can occur in modified environments along roadsides and in suburbs and towns (Baldwin, 1975; Holmes, 1996). The species' distribution is very poorly known with records extending north to Bowen, west to Winton and in the vicinity of Wowan. The star finch (eastern) is very rarely sighted. While the star finch (eastern) is thought to have experienced a dramatic reduction in area of occupancy in the 19th and 20th Centuries (Holmes, 1996; Higgins et al., 2006), it may never have been a common species (Garnet and Crowley, 2000). The star finch (eastern) has not been historically recorded within 40 km of the mine site or rail alignments. As such it is considered unlikely to occur.

northern hairy nosed wombat (*Lasiorhinus krefftii*) – Unlikely to occur
The northern hairy-nosed wombat occurs in semi-arid cattle-grazing country (Horsup, 1999). The last remaining population is associated with Brigalow (*Acacia harpophylla*) and Gidgee (*Acacia cambagei*) scrub. Only 90 individuals are known to persist in

the wild (Treby *et al.*, 2007). These are restricted to a 300 ha area in Epping Forest National Park, approximately 40 km east the Project site. It is highly unlikely that additional populations occur. Although similar *Acacia harpophylla* and *Acacia cambagei* dominated communities are found within the mine site and rail options, the species is unlikely to occur.

greater large-eared horseshoe bat (*Rhinolophus philippinensis*) – Unlikely to occur
This species is found in lowland rainforest, dry gallery forest lined creeks within open Eucalypt forest, Melaleuca forest with rainforest understorey, open savannah woodland and tall riparian woodland of Melaleuca, forest redgum (*Eucalyptus tereticornis*) and Moreton Bay ash (*E. tesselaris*) (Pavey and Kutt, 2008; Churchill, 2009). The species commonly roosts in caves and underground mines in rainforest and open Eucalypt forest and woodland (Pavey, 2002) but also in road culverts (AMBS, 2004) and at the basal hollows of large trees, amongst dense vegetation, rockpiles and beneath creekbanks (Thomas et al., 2001; AMBS, 2004). In Australia, this species is only known from north Queensland, occurring between Iron Range and Townsville and west to Chillagoe and Mitchell-Palmer. The southern extent of its' range is uncertain. The species may occur south of Townsville at Mt Elliott and Cape Cleveland (Pavey and Kutt, 2008). However, the most southern record is from Paluma, 80 km north of Townville (Duncan et al., 1999). Although suitable habitat for this species occurs along both rail options, the species has never been recorded in the region and is unlikely to occur.

Eungella day frog (*Taudactylus eungellensis*) – Unlikely to occur
This species occurs in small creeks in rainforest and wet sclerophyll forest (Liem and Hosmer, 1973). Immediate streamside habitat is dense rainforest with ferns, vines, palms and epiphytes in the understorey (Retallick et al. 1997). The species inhabits exposed steep, rocky sections of stream within splash zones of waterfalls and cascades (McNellie & Hero 1994; Retallick et al. 1997) and may be found under rocks and crevices or on emergent rocks in the stream (Liem & Hosmer 1973; Retallick et al. 1997). It has a restricted distribution restricted distribution, only found in the ranges west of Mackay, mid-eastern Queensland, from Clarke Range in the north to Finch Hatton Gorge and Credition in the south at altitudes between 200 and 1000 m (Covacevich & McDonald 1993; Ingram 1980). No suitable habitat occurs within or adjacent to the mine site or rail options. It is unlikely to occur.

spectacled flying fox (*Pteropus conspicillatus*) – Unlikely to occur
The spectacled flying fox is primarily associated with rainforest and to a lesser extent, mangroves with black flying foxes (*Pteropus alecto*) (Richards, 1990; Hall and Richards, 2000). Roosts are always within 6 km of rainforest (Richards, 1990). The species occurs in north Queensland between Ingham and Cooktown and also between the McIlwrait and Iron Ranges on Cape York Peninsula (DEWHA 2010). Historical records are also known from Brisbane and Chillagoe (Richards, 1990; Hall and Richards, 2000). There are no recent records of this species within the region and it is unlikely to occur.

Fitzroy River turtle (*Rheodytes leukops*) – Unlikely to occur
The Fitzroy River Turtle is found in rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity, and are often associated with Ribbonweed (*Vallisneria* sp.) beds (Cogger et al. 1993). Common riparian vegetation associated with the Fitzroy River Turtle includes Blue Gums (*Eucalyptus tereticornis*), River Oaks (*Casuarina cunninghamiana*), Weeping Bottlebrushes (*Callistemon viminalis*) and Paperbarks (*Melaleuca linariifolia*) (Tucker et al. 2001). The species is only found in the drainage system of the Fitzroy River, Queensland. The project area does not coincide with the known distribution of this species and it is unlikely to occur.

Brigalow (*Acacia harpophylla* dominant and co-dominant) – Potential to occur
The listed ecological community is characterised by the presence of Brigalow (*Acacia harpophylla*) as one of the three most abundant tree species (Butler 2007). Brigalow is usually either dominant in the tree layer or co-dominant with other species such as *Casuarina cristata* (Belah), other species of *Acacia*, or species of *Eucalyptus*. Occasionally Belah, or species or *Acacia* or *Eucalyptus* may be more common than Brigalow within the broad matrix of Brigalow vegetation. The structure of the vegetation ranges from open forest to open woodland. The height of the tree layer varies from about 9 m in low rainfall areas (averaging around 500 mm per annum) to around 25 m in higher rainfall areas (averaging around 750 mm per annum) (Butler 2007). A prominent shrub layer is usually present. In Queensland, 16 Regional Ecosystem types correspond with the Brigalow TEC. A number of these REs are mapped within the mine site and the two rail options. Regional Ecosystems containing dominant or co-dominant *Acacia harpophylla* are mapped within the mine site and along both rail options. As part of the EIS process, these remnants will be assessed to determine if they are correctly mapped within the RE system (i.e. whether they meet the remnant/high value regrowth status under the Vegetation Management Act) and whether they meet the requirements of the Brigalow TEC.

The Community of Native Species Dependent on Natural Discharge of Groundwater from the Great Artesian Basin – Unlikely to occur within the Project Area
This Threatened Ecological Community is comprised of a suite of plant and animal species that are dependent on natural springs derived from the Great Artesian Basin. The species are typically endemic to one or more springs and are associated predominantly with the Great Artesian Basin. Doongmabulla Springs is a natural mound springs that occurs approximately 7 km south-west of the mine site. This TEC is not expected to occur within the mine site as the boundaries of the Great Artesian Basin occur outside the mining lease.

Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin – Potential to occur
The Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin occurs where the Fitzroy River Basin and Brigalow Belt North coincide. It extends from Collinsville in the north to Carnarvon National Park in the south. It usually occurs on flat plains or gently undulating rises with black cracking clay or self-mulching soils (Fensham, 1999). The

ground layer is dominated by forbs and native grasses. Perennial native grasses are the primary indicator species. Key diagnostic characteristics include:

- Distribution (within the Brigalow Belt North and South sub bioregions);
- Tree canopy naturally absent or sparse (less than 10% projective crown cover);
- The ground layer is typically dominated by perennial native grasses and contains at least 3 of the indicator native species listed below:

Aristida latifolia Feather-top Wiregrass
Aristida leptopoda White Speargrass
Astrebla elymoides Hoop Mitchell Grass
Astrebla lappacea Curly Mitchell Grass
Astrebla squarrosa Bull Mitchell Grass
Bothriochloa erianthoides Satin-top Grass
Dichanthium queenslandicum King Bluegrass
Dichanthium sericeum Queensland Bluegrass
Eriochloa crebra Cup Grass
Panicum decompositum Native Millet
Panicum queenslandicum Yabila Grass
Paspalidium globoideum Shot Grass
Thellungia advena Coolibah Grass

This TEC has the potential to occur. Regional Ecosystems that are consistent with this TEC are mapped within the two rail options. As part of the EIS process, these areas will be assessed to determine if they are correctly mapped under the VM Act and if they are of sufficient quality to meet the requirements of the Natural Grasslands TEC.

Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and the Nandewar Bioregions – Potential to occur

Semi-evergreen vine thicket (SEVT) is considered an extreme form of dry seasonal subtropical rainforest (McDonald 1996). It is generally characterised by the prominence of trees with microphyll sized leaves (i.e. leaves usually 2.5–7.6 cm long), the presence of Bottle Trees (*Brachychiton* spp.) as emergents from the vegetation, and the thickets occurring in areas with a subtropical, seasonally dry climate on soils of high to medium fertility (e.g. Webb 1959, 1968; Webb & Tracey 1981, 1994). In Queensland, ten Regional Ecosystem communities mapped under the VM Act correspond with this TEC. All occur within the Brigalow Belt Bioregion. This species has the potential to occur within the project area. Regional Ecosystems that are consistent with this TEC occur along both rail options. As part of the EIS process, surveys will be undertaken to verify the status of these mapped REs and to determine if they meet the criteria required to be considered part of the Semi-evergreen Vine Thicket TEC.

Littoral Rainforests and Coastal Vine Thickets of Eastern Australia – Potential to occur

This Threatened Ecological Community is a complex of rainforest and coastal vine thickets on the east coast of Australia influenced by proximity to the sea. The ecological community occurs within 2 km of the eastern coastline of Australia, including offshore islands, from Princess Charlotte Bay, Cape York Peninsula to the Gippsland Lakes in Victoria. It is known to occur in Queensland, New South Wales and Victoria. Regional Ecosystems that correspond with this TEC occur along rail option 2 (to Dudgeon Point). This TEC has the potential to occur. As part of the EIS process, flora surveys will be undertaken to verify the existing RE mapping and the TEC status.

Listed Marine species

Both rail options terminate at coal handling facilities at coastal ports (Abbot Point and/or Dudgeon Point). The desktop searches included a buffer area up to 1 km either side of the rail alignments. As a result, the desktop searches have identified a large number of listed marine species that will not occur within or immediately adjacent to the rail alignment. These species have no potential to occur within or adjacent to the project area:

- loggerhead turtle (*Caretta caretta*);
- leatherback turtle (*Dermochelys coriacea*);
- olive ridley turtle (*Lepidochelys olivacea*);
- green turtle (*Chelonia mydas*);
- hawksbill turtle (*Eretomochelys imbricata*);
- flatback turtle (*Natador depressus*);
- humpback whale (*Megaptera novaeangliae*);
- green sawfish (*Pristis zijsran*); and
- whale shark (*Rhincodon typus*).

Nature and extent of likely impact

Overview

Areas of vegetation within the mine site and along the supporting rail infrastructure will be cleared to accommodate mining and rail activities. This has the potential to cause localised impacts to flora and fauna including loss of habitat and resources, direct mortality of wildlife, disturbance of wildlife through increased noise, light, vibration, sedimentation, run-off, secondary impacts associated with habitat degradation such as increased edge effects, weed infestation and restricted fauna movement. A three-staged process will be used to reduce impact on flora, fauna and ecological communities.
1) Environmental values will be used in a Multi-Criteria Analysis to identify the rail alignment that provides an optimal environmental, social and economic outcome. Mapping layers used in this process will include DERM's Regional Ecosystem mapping, Essential habitat mapping, Directory of Important Wetlands, Reserves, Protected Areas of Queensland, Queensland Wetland Data, High Value Regrowth, Nature Refuges and Wildlife Corridors;
2) Seasonal (wet and dry) flora and fauna surveys will be undertaken as part of the EIS. These will verify Regional Ecosystem mapping, identify habitat for listed flora and fauna and evaluate the value of the existing environments and breeding, nesting, foraging and sheltering resources for terrestrial and aquatic flora and fauna. Information from these surveys will be used to reduce impacts on the environment, by identifying sensitive areas that should be protected from direct impact where possible – through local realignments to rail and exclusion zones within the mine site;
3) The EIS will outline measures to mitigate impact on flora and fauna. Further specific mitigation measures will be outlined in detail in an Environmental Management Plan. Measures to reduce impact on flora and fauna will be detailed in the EIS following field investigations.
Environmental impact mitigation and rehabilitation measures will be further developed in the EIS and EMP.

Impact on species and threatened ecological communities
A detailed assessment of the potential impact on individual listed species will be provided as part of the EIS once habitats and resources have been identified in field surveys. It is anticipated that the project will cause localised impacts on some listed species. Listed species that occur in key habitats such as grassland (i.e. squatter pigeon) and brigalow (i.e. brigalow scaly-foot, ornamental snake) may experience localised loss of habitat and resources. However the extent of impact cannot be assessed until more detailed information is obtained through field surveys. Regional Ecosystems consistent with EPBC threatened ecological communities may occur within the Project Area. Impacts on any TEC's will be assessed in the EIS. This information will be provided in the EIS, once key resources and habitats for flora and fauna have been identified in field surveys.

3.1 (e) Listed migratory species

Description
According to DSEWPC's Protected Matters database 100 EPBC listed Migratory or Marine/Migratory species have the potential to occur within the vicinity of the mine and rail options. A list of migratory species predicted to occur within 1 km of the project area by the Protected Matters database is outlined in the Table below. Sixty-nine species occur only in the marine environment (but were within the 1 km buffer adjacent to the port end of both rail options). These species are not immediately adjacent to either rail alignment and will not occur in the project area. Any potential impact on those marine species will be assessed as part of the independent EIS for the port facilities.

Table 4 EPBC listed migratory and marine species predicted to occur

Species	Status	Type of Presence
rainbow bee-eater (Merops ornatus)	Migratory, Marine	Species or habitat may occur in area
rufous fantail (Rhipidura rufifrons)	Migratory	Breeding may occur within area
satin flycatcher (Myiagra cyanoleuca)	Migratory, Marine	Species or habitat likely to occur in area
white-bellied sea-eagle (Haliaeetus leucogaster)	Migratory, Marine	Species or habitat may occur in area
white-throated needletail (Hirundapus caudacutus)	Migratory, Marine	Species or habitat may occur in area
fork-tailed swift (Apus pacificus)	Migratory, Marine	Species or habitat may occur in area
great egret (Ardea alba)	Migratory, Marine	Species or habitat may occur in area
bar-tailed godwit (Limosa lapponica)	Migratory	Roosting known to occur in area
black-tailed godwit (Limosa limosa)	Migratory	Roosting known to occur in area
cattle egret (Ardea ibis)	Migratory, Marine	Species or habitat may occur in area
common sandpiper (Actitis hypoleucos)	Migratory	Roosting known to occur in area

Species	Status	Type of Presence
curlew sandpiper (Calidris ferruginea)	Migratory	Roosting known to occur in area
double-banded plover (Charadrius bicinctus)	Migratory	Roosting known to occur in area
eastern curlew (Numenius madagascarienisis)	Migratory	Roosting known to occur in area
great knot (Calidris tenuirostris)	Migratory	Roosting known to occur in area
greater sand plover (Charadrius leschenaultii)	Migratory	Roosting known to occur in area
grey plover (Pluvialis squatarola)	Migratory	Roosting known to occur in area
Latham's snipe (Gallinago hardwickii)	Migratory, Marine	Species or habitat may occur in area
lesser sand plover (Charadrius mongolus)	Migratory	Roosting known to occur in area
little curlew (Numenius minutus)	Migratory	Roosting known to occur in area
oriental plover (Charadrius veredus)	Migratory	Roosting known to occur in area
Pacific golden plover (Pluvialis fulva)	Migratory	Roosting known to occur in area
painted snipe (Rostratula benghalensis s. lat)	Migratory, Marine	Species or habitat may occur in area
red knot (Calidris canutus)	Migratory	Roosting known to occur in area
red-necked stint (Calidris rufocollis)	Migratory	Roosting known to occur in area
ruddy turnstone (Arenaria interpres)	Migratory	Roosting known to occur in area
sanderling (Calidris alba)	Migratory	Roosting known to occur in area
sharp-tailed sandpiper (Calidris acuminata)	Migratory	Roosting known to occur in area
terek sandpiper (Xenus cinereus)	Migratory	Will not occur
whimbrel (Numenius phaeopus)	Migratory	Roosting known to occur in area
wood sandpiper (Tringa glareola)	Migratory	Roosting known to occur in area
Bryde's whale (Balaentoptera edeni)	Migratory	Will not occur
dugong (Dugong dugon)	Migratory	Will not occur
humpback whale (Megoptera novaeangliae)	Migratory	Will not occur
Indopacific humpback dolphin (Sousa chinensis)	Migratory	Will not occur
Irrawaddy dolphin (Oraella brevirostris)	Migratory	Will not occur
orca (Orcinus orca)	Migratory	Will not occur
green sawfish (Pristis zijsran)	Migratory	Will not occur
flatback turtle (Natador depressus)	Migratory	Will not occur
green turtle (Chelonia mydas)	Migratory	Will not occur
hawksbill turtle (Eretmochelys imbricata)	Migratory	Will not occur
leatherback turtle (Dermochelys coriacea)	Migratory	Will not occur
loggerhead turtle (Caretta caretta)	Migratory	Will not occur
olive ridley turtle (Lepidochelys olivacea)	Migratory	Will not occur
whale shark (Rhincodon typus)	Migratory	Will not occur
horned seasnake (Acalyptophis peronii)	Listed	Will not occur

Species	Status	Type of Presence
Dubois' seasnake (Aipysurus duboisii)	Listed	Will not occur
spine-tailed seasnake (Aipysurus eydouxii)	Listed	Will not occur
olive seasnake (Aipysurus laevis)	Listed	Will not occur
Stoke's seasnake (Astrotia stokesii)	Listed	Will not occur
saltwater crocodile (Crocodylus porosus)	Listed	Will not occur
spectacled seasnake (Disteira kingii)	Listed	Will not occur
olive-headed seasnake (Disteira major)	Listed	Will not occur
turtle headed seasnake (Emydocephalus annulatus)	Listed	Will not occur
elegant seasnake (Hydrophis elegans)	Listed	Will not occur
Hydrophis mcdowelli	Listed	Will not occur
Hydrophis ornatus	Listed	Will not occur
spine-bellied seasnake (Lapemis hardwickii)	Listed	Will not occur
sea krait (Laticauda columbrina)	Listed	Will not occur
sea krait (Laticauda laticauda)	Listed	Will not occur
yellow bellied seasnake (Pelamis platurus)	Listed	Will not occur
minke whale (Balaenoptera acutorostrata)	Cetacean	Will not occur
common dolphin (Delphinus delphis)	Cetacean	Will not occur
Risso's dolphin (Grampus griseus)	Cetacean	Will not occur
spotted dolphin (Stenella attenuata)	Cetacean	Will not occur
Indian Ocean bottlenose dolphin (Tursiops aduncus)	Cetacean	Will not occur
Anderson's pipefish (Micrognathus andersonii)	Listed	Will not occur
Australian messmate pipefish (Corythoichthys intestinalis)	Listed	Will not occur
beady pipefish (Hippichthys penicillus)	Listed	Will not occur
bentstick pipefish (Trachyrhamphus bicoarctatus)	Listed	Will not occur
blue-speckled pipefish (Hippichthys cyanospilos)	Listed	Will not occur
bluestripe pipefish (Doryrhamphus excisus)	Listed	Will not occur
double-end pipehorse (Syngnathoides biaculeatus)	Listed	Will not occur
Fijian banded pipefish (Corythoichthys amplexus)	Listed	Will not occur
flat-face seahorse (Hippocampus planifrons)	Listed	Will not occur
girdled pipefish (Festucalex cinctus)	Listed	Will not occur
glittering pipefish (Halicampus nitidus)	Listed	Will not occur
javelin pipefish (Lissocampus runa)	Listed	Will not occur
Madura pipefish (Hippichthys heptagonus)	Listed	Will not occur
mud pipefish (Halicampus grayi)	Listed	Will not occur

Species	Status	Type of Presence
orange-spotted pipefish (Corythoichthys ocellatus)	Listed	Will not occur
ornate ghostpipefish(Solenostomus paradoxus)	Listed	Will not occur
Pacific short-bodied pipefish (Choeroichthys brachysoma)	Listed	Will not occur
painted pipefish (Nannocampus pictus)	Listed	Will not occur
pallid pipehorse (Solegnathus hardwickii)	Listed	Will not occur
Paxton's pipefish (Corythoichthys paxtoni)	Listed	Will not occur
pygmy seahorse (Hippocampus bargibanti)	Listed	Will not occur
red-hair pipefish (Halicampus dunckeri)	Listed	Will not occur
reef-top pipefish (Corythoichthys haematopterus)	Listed	Will not occur
reticulate pipefish (Corythoichthys flavofasciatus)	Listed	Will not occur
robust ghostpipefish (Solenostomus cyanopterus)	Listed	Will not occur
rough-snout ghost pipefish (Solenostomus paegnius)	Listed	Will not occur
Schultz's pipefish (Corythoichthys schultzi)	Listed	Will not occur
shortpouch pygmy pipehorse (Acentronura tentaculata)	Listed	Will not occur
spiny-snout pipefish (Halicampus spinirostris)	Listed	Will not occur
spotted seahorse (Hippocampus kuda)	Listed	Will not occur
thorntail pipefish (Micrognathus brevirostris)	Listed	Will not occur
tiger pipefish (Filicampus tigris)	Listed	Will not occur
Tryon's pipefish (Campichthys tryoni)	Listed	Will not occur
zebra seahorse (Hippocampus zebra)	Listed	Will not occur

Nature and extent of likely impact

From the desktop analysis, the mine site and rail alignments do not intersect any wetlands or waterbodies that represent a significant breeding, nesting, roosting or foraging resource for migratory species. As such, there is not expected to be a significant impact on migratory or migratory marine species. Some foraging individuals may periodically utilise the project area, however no significant resources are on or adjacent to the project. So impacts are expected to be minimal. Many of the migratory species detected in the Protected Matters search (particularly the marine-dwelling species – i.e. pipefish, marine turtles, sharks and whales) will not occur on or adjacent to the project, as these are restricted to marine environments that are outside the project extent. While it is unlikely that any migratory species will be adversely affected, detailed surveys are required to confirm this and will be undertaken as part of the EIS process.

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

The project does not contain and is not expected to impact any Commonwealth marine areas.

Nature and extent of likely impact

N/A

3.1 (g) Commonwealth land
(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description
The project does not include any Commonwealth land.

Nature and extent of likely impact

N/A

3.1 (h) The Great Barrier Reef Marine Park

Description
The Project does not occur within or adjacent to the Great Barrier Reef Marine Park (GBRMP). However, the rail options intersect creeks that drain into marine environments that are connected to the GBRMP.

Nature and extent of likely impact

The project footprint does not coincide with the GBRMP and as such, there will be no direct impact. However, some localised impacts to creeks (eg. localised removal of riparian vegetation) may have the potential for indirect impact on the GBRMP through increased sedimentation and coal dust pollution to waterways. Measures will be implemented to minimise vegetation clearing around creeks, to control sedimentation and erosion during the construction phase and to protect creek crossings from coal dust deposition. Following these mitigation measures the impacts to the GBRMP are considered to be low.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))		

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))		

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Other important features of the environment

3.3 (a) Flora and fauna

The Carmichael Coal Project is located in the western Brigalow Belt and Desert Uplands Bioregions. Both bioregions have been heavily impacted by historical land-clearing. Consequently remnants of native vegetation that occur in the region can have high conservation values that are protected by state and federal legislation.

Results from DERM's Wildlife Online database indicate that a total of 346 species (three amphibians, 66 birds, three mammals, one fern, and 273 plants) have been historically recorded within 40 km of the mining lease. Of these, six species are listed under the NC Act and/or EPBC Act (Table 5 below).

Table 5 Listed species historically recorded within 40 km of the mining lease

Scientific Name	Common Name	Conservation Status	
Plants		**NC Act**	**EPBC Act**
Eryngium fontanum	blue devil	E	E
Myriophyllum artesium	watermilfoil	E	
Eriocaulon carsonii	salt piperwort, button grass	E	
Sporobolus pamelae	spring dropseed	E	
Sporobolus partimpatens	smooth dropseed	NT	
Animals			
Poephila cincta cincta	black-throated finch (southern subspecies)	E	E

Legend E = endangered **NT** = near threatened

3.3 (b) Hydrology, including water flows

Mine Site

The mining lease is located close to the boundary between the Great Artesian Basin (to the west) and the Tasman Basin (to the east). The region is often referred to as the Burdekin Dry Tropics region. This region is a recharge source of groundwater for the Great Artesian Basin, which underlies 22% of Australia. It is one of Australia's most important water resources, with over 1.7 million square kilometres in a combined area with an estimated water storage of 8700 million ML (Source: www.DERM.qld.gov.au).

There are several waterways in the vicinity of EPC 1690 (refer to Figure 3). The most relevant one is the Carmichael River, which flows across the mine lease area. This river has a number of waterways feeding into it upstream of the mine lease boundary. It concerns Carmichael Creek, Dingo Creek, Clarke Creek, Cattle Creek, Bimbah Creek and Surprise Creek.

The Carmichael River subcatchment is the largest of the 51 Burdekin subcatchments, with an area of 7,508 sq. km. The mean average flow is relatively low (238,807 ML), indicating a low rainfall associated with this sub-catchment[1]. Upstream of EPC 1690 is approximately 2,750 sq. km, equating approximately 30%.

Rail Options

The rail options intersect a number of major rivers and creeks (See Figure 1). Rail option 1 to Abbot Point crosses Middle Creek, Fox Creek, Mistake Creek, Logan Creek, Diamond Creek, Eaglefield Creek, Suttor Creek, Kangaroo Creek, Bowen River, Pelican Creek and the Bogie River. Rail option 2 to Dudgeon Point crosses Middle Creek, Fox Creek, Mistake Creek, Isaac River, Hall Creek and Cooper Creek. Rail option 3 to Abbot Point crosses Middle Creek, Fox Creek, Suttor River,

Sellheim River, Bowen River and the Bogie River. Most creeks are ephemeral and flow in an easterly direction. Detailed ecological assessments will be undertaken at each creek crossing during the EIS.

3.3 (c) Outstanding natural features

The mine site is wedged between the Great Artesian Basin and Tasman basin. Subartesian water sources represent a principal outstanding natural feature adjacent to the mine site. No other outstanding environmental features have been identified in the desktop assessment.

3.3 (d) Remnant native vegetation

Ten Of Concern and Endangered REs occur within the mining lease. Two are Endangered (46 ha in total) and eight as Of Concern (469 ha in total) under the VM Act. Table 20 shows the area of Endangered and Of Concern REs within the mining lease. A summary of all REs mapped within the Carmichael mining lease and their conservation status is shown in Figure 4. It is important to note that RE mapping is a desktop procedure undertaken via spectral analysis of satellite imagery. RE mapping can be incorrect, particularly in areas that have not been ground-truthed in recent surveys. The mapping here is indicative only.

Table 3 Endangered and Of Concern REs that occur within the mining lease

RE Number	Brief Description	VMA Status	Area (ha)
11.3.10/11.3.5/ 11.3.3/11.3.1	*Eucalyptus brownii* woodland on alluvial plains/*Acacia cambagei* woodland on alluvial plains/*Eucalyptus coolabah* woodland on alluvial plains/*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains (Brigalow TEC)	E	28.6 ha
11.3.5/11.3.10/ 11.3.1/11.3.3	*Acacia cambagei* woodland on alluvial plains/ *Eucalyptus brownii* woodland on alluvial plains/*Acacia cambagei* woodland on alluvial plains/ *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ *Eucalyptus coolabah* woodland on alluvial plains (Brigalow TEC)	E	10.2 ha
11.4.5/11.4.6/11.3.3 /11.3.10/ 11.4.8	*Acacia argyrodendron* woodland on Cainozoic clay plains/ *Acacia cambagei* woodland on Cainozoic clay plains/ *Eucalyptus coolabah* woodland on alluvial plains/ *Eucalyptus brownii* woodland on alluvial plains/ *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains (Brigalow TEC)	E	3.9 ha
11.4.6/11.3.10/ 11.4.8	*Acacia cambagei* woodland on Cainozoic clay plains/ *Eucalyptus brownii* woodland on alluvial plains/ *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains (Brigalow TEC)	E	2.9 ha
10.5.5/10.7.2/ 10.7.3/10.7.4	*Eucalyptus melanophloia* open woodland on sand plains/ *Eucalyptus persistens* or *Corymbia dallachiana* low open woodland or *Triodia pungens* hummock grassland on ferricrete above scarps/ *Acacia shirleyi* woodland or *A. catenulata* low woodland at margins of plateaus/ *Eucalyptus persistens* low open woodland on pediments below scarps	OC	171.1 ha
11.4.6/11.3.10	*Acacia cambagei* woodland on Cainozoic clay plains/ *Eucalyptus brownii* woodland on alluvial plains	OC	108.9 ha
10.7.2/10.3.6/ 10.7.4	*Eucalyptus persistens* or *Corymbia dallachiana* low open woodland or *Triodia pungens* hummock grassland on ferricrete above scarps/ *Eucalyptus brownii* open woodland on alluvial plains/ *Eucalyptus persistens* low open woodland on pediments below scarps	OC	86.1 ha

11.3.10/11.3.5/ 11.3.3	*Eucalyptus brownii* woodland on alluvial plains/*Acacia cambagei* woodland on alluvial plains/*Eucalyptus coolabah* woodland on alluvial plains	OC	70.7 ha
11.4.6	*Acacia cambagei* woodland on Cainozoic clay plains	OC	29.5 ha
10.7.3/10.7.2/ 10.7.4	*Acacia shirleyi* woodland or *A. catenulata* low woodland at margins of plateaus/ *Eucalyptus persistens* or *Corymbia dallachiana* low open woodland or *Triodia pungens* hummock grassland on ferricrete above scarps/ *Eucalyptus persistens* low open woodland on pediments below scarps	OC	3 ha
	Total Endangered RE		**46 ha**
	Total Of Concern RE		**469 ha**

Rail Options
The new section of the Alpha option (between the Carmichael mining lease and the likely point of intersection with the proposed Hancock alignment) intersects 12 km of Endangered and 3 km of Of Concern REs. Endangered and Of Concern REs intersected for more than 100 m are summarised below. RE mapping for rail option 1 and 2 is shown in Figure 5. These two options are considered most likely. If option 3 is selected, RE mapping will be mapped and ground-truthed as part of the EIS process.

Table 4 Endangered and Of Concern REs intersected by the Alpha rail option

RE type	Short Description	VM A	Length
11.4.8	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	E	3.6 km
11.4.11/11.4.9/ 11.4.5	*Dichanthium sericeum, Astrebla spp.* and patchy *Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains/ *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains/ *Acacia argyrodendron* woodland on Cainozoic clay plains	E	2.7 km
11.3.1/11.3.3/ 11.3.10	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ *Eucalyptus coolabah* woodland on alluvial plains/ *Eucalyptus brownii* woodland on alluvial plains	E	1.8 km
11.5.3/11.4.8	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* on Cainozoic sand plains/remnant surfaces/ *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	E	1.3 km
11.4.9/11.4.6	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains/ *Acacia cambagei* woodland on Cainozoic clay plains	E	0.7 km
11.3.25/11.3.37/ 11.3.1	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines/ Eucalyptus coolabah fringing woodland on alluvial plains/ *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	E	0.7 km
11.3.5/11.3.1/11.3.3/11 .3.10	*Acacia cambagei* woodland on alluvial plains/ *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ *Eucalyptus coolabah* woodland on alluvial plains/ *Eucalyptus brownii*	E	0.5 km

RE type	Short Description	VM A	Length
	woodland on alluvial plains		
11.4.6/11.4.8	*Acacia cambagei* woodland on Cainozoic clay plains/ *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	E	0.2 km
11.4.11	*Dichanthium sericeum, Astrebla spp*. and patchy *Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains	OC	2.8 km
11.3.3/11.3.5	*Eucalyptus coolabah* woodland on alluvial plains/ *Acacia cambagei* woodland on alluvial plains	OC	0.1 km

The new section of the Goonyella option (which extends from the Carmichael mine to the Moranbah junction) intersects 19 km mapped as Endangered RE and 11 km of Of Concern RE. Endangered and Of Concern REs intersected for more than 100 m are summarised below.

Table 5 Summary of Endangered and Of Concern RE types intersected by rail Option 2

RE type	Short Description	VM A	Length
11.5.3/11.5.9/11.4.9/11.3.25	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* on Cainozoic sand plains/remnant surfaces/ *Eucalyptus crebra* and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains/remnant surfaces/ *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains/ *Eucalyptus tereticornis or E. camaldulensis* woodland fringing drainage lines	E	6.5 km
11.4.8	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	E	4.1 km
11.4.11/11.4.9/ 11.4.5	*Dichanthium sericeum, Astrebla spp*. and patchy *Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains/ *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains/ *Acacia argyrodendron* woodland on Cainozoic clay plains	E	2.8 km
11.3.1/11.3.3/ 11.3.10	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ Eucalyptus coolabah woodland on alluvial plains/ *Eucalyptus brownii* woodland on alluvial plains	E	1.9 km
11.5.3/11.4.8	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* on Cainozoic sand plains/remnant surfaces/ *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	E	1.3 km
11.3.25/11.3.37/ 11.3.1	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines/ *Eucalyptus coolabah* fringing woodland on alluvial plains/ *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	E	0.7 km
11.4.9/11.4.6	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains/ *Acacia cambagei* woodland on Cainozoic clay plains	E	0.7 km

RE type	Short Description	VM A	Length
11.3.5/11.3.1/11.3.3/11.3.10/	*Acacia cambagei* woodland on alluvial plains/ *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ *Eucalyptus coolabah* woodland on alluvial plains/ *Eucalyptus brownii* woodland on alluvial plains	E	0.5 km
11.4.6/11.4.8	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains/ *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	E	0.2 km
11.3.3/11.4.11	*Eucalyptus coolabah* woodland on alluvial plains/ *Dichanthium sericeum, Astrebla spp*. and patchy *Acacia harpophylla*, *Eucalyptus coolabah* on Cainozoic clay plains	OC	5.2 km
11.4.11	*Dichanthium sericeum, Astrebla spp*. and patchy *Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains	OC	2.8 km
11.4.11/11.3.34	*Dichanthium sericeum, Astrebla spp*. and patchy *Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains/ *Acacia tephrina* woodland on alluvial plains	OC	1.6 km
11.3.34	*Acacia tephrina* woodland on alluvial plains	OC	0.6 km
11.3.3/11.3.5	*Eucalyptus coolabah* woodland on alluvial plains/ *Acacia cambagei* woodland on alluvial plains	OC	0.2 km

3.3 (e) Current state of the environment

The mine site is currently managed as an active cattle grazing property. The majority of vegetation on the eastern side of the mine area has been cleared for grazing. The grazing intensity and the level of associated land degradation is uncertain and will be determined from detailed ecological surveys undertaken during the EIS. However it is evident that large areas on the east of the site have been cleared of vegetation and impacted to some extent by cattle grazing. Low ridges occur along the western boundary of the mining lease. These areas are expected to maintain greater levels on native vegetation and preserve habitats for flora and fauna.

3.3 (f) Commonwealth Heritage Places or other places recognised as having heritage values

There are no Commonwealth Heritage Places within the mine site or either rail alignment.

3.3 (g) Indigenous heritage values

No indigenous heritage values have been identified at the mine site. More detailed assessment of indigenous cultural heritage values will be undertaken as part of the EIS. This will involve engagement with local indigenous groups.

3.3 (h) Other important or unique values of the environment

Key environmental constraints for the mine site are shown in Figure 6. Key environmental constraints for the rail options are mapped in Figure 7. Bygana West Nature Refuge is a key environmental feature within the mining lease. Doongmabulla Springs is another key environmental feature located 7 km southwest of the mining lease. Remnant REs and rivers represent the key environmental values along the rail options.

Bygana West Nature Refuge

Bygana West Nature Refuge occurs in the southern portion of the Carmichael mining lease. This contains a number of ecological values:

- Of Concern RE 11.4.6 *Acacia cambagei* woodland on Cainozoic clay plains;
- Endangered RE 11.4.8 *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains;
- A high diversity of species and regional ecosystems (since the boundary between the Desert Uplands and Brigalow bioregions runs through the refuge); and
- Suitable habitat for a variety of fauna species including the koala *Phascolarctos cinereus*.

Doongmabulla Springs
A Wetland of National Significance Doongmabulla Springs occurs 7 km southwest of the mine site. It is listed on the 'Directory of Important Wetlands'. Doongmabulla Springs, with a total area of 399 ha is classified as an 'Inland Wetland' and is considered significant because of its status as: a permanent river and stream including waterfalls; and contains a permanent inland delta (Environment Australia, 2001) The WetlandInfo database indicates that Doongmabulla Springs occurs within the Burdekin NRM region and has conservation significance. According to the Directory of Important Wetlands (2010), Doongmabulla Springs is a '*Permanent artesian springs that supports an unusual habitat type which is distinct from the surrounding arid region. Plant communities include mixed grassland (Sporobolus pamelae), sedgeland (Cyperus laevigatus) and forbland (Utricularia sp., Eriocaulon sp.)*'. Doongmabulla Springs provides Essential Habitat for six plant species listed under the NC Act.

3.3 (i) Tenure of the action area (eg freehold, leasehold)
EPC 1690 is over the following parcels: Lot 1 on AY35, Lot 1 on SP164918, Lot 662 on PH1491 and Lot 663 on SP228220 (see attached Figure 2 for parcel tenure types transversed by the proposed rail alignments)

3.3 (j) Existing land/marine uses of area
The mine site is currently managed as a cattle grazing property Moray Downs. Much of the land area along both rail options are also devoted to cattle grazing at varying intensities.

3.3 (k) Any proposed land/marine uses of area
There are no other proposed land uses for the mine site.

4 Measures to avoid or reduce impacts

Multi-Criteria Analysis of Rail Options
Environmental values will be used in a Multi-Criteria Analysis to identify the rail alignment that provides an optimal environmental, social and economic outcome. Mapping layers used in this process will include DERM's Regional Ecosystem mapping, Essential habitat mapping, Directory of Important Wetlands, Reserves, Protected Areas of Queensland, Queensland Wetland Data, High Value Regrowth, Nature Refuges and Wildlife Corridors;

Environmental Management Plans
Environmental Management Plans EMPs will be prepared for the Project, one for the management of the mine site and mining operations and another for the supporting rail infrastructure. Each EMP will include:

- Description of the environmental values and potential impacts to the values from the Project; Assessment of adverse or beneficial impacts will consider:
  - The magnitude of any impact in relation to the environmental value being affected;
  - The severity of any adverse effects or scale of any positive benefits;
  - The likely duration of impact (i.e. whether it is likely to last through the construction phase, until the end of the mine life or a permanent impact);
  - An indication of the level of uncertainty and any assumptions used to address the uncertainty in any of the proposed commitments to protect environmental values.
- Environmental objectives, targets and indicators will be developed to reflect acceptable standards of management for development of the coal mine and rail infrastructure;
- Environmental controls and management measures proposed for the project based on recommendations made in the EIS and accepted standards of environmental management for mining and rail projects in Queensland and Australia and proposed conditions for the Environmental Authority. Environmental controls and proposed conditions will address:
  - Air emissions including control of dust levels;
  - Noise and vibration including ameliorating noise impact on sensitive receptors;
  - Surface water, including mechanisms to control run-off and contain discharges on the site;
  - Groundwater including protection of sub-surface flows and protection from contamination;
  - Waste management and minimisation;
  - Land management and rehabilitation;
  - Flora, fauna and communities, protecting threatened species and limiting impact on species diversity;
  - Community and social amenity.

5 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. whether you think that significant impacts on the matters protected under Part 3 of the EPBC Act are likely) and the reasons why.

5.1 Do you THINK your proposed action is a controlled action?

	No, complete section 5.2
X	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

N/A

5.3 Proposed action IS a controlled action

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
X	Listed threatened species and communities (sections 18 and 18A)
X	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

At this stage it is currently uncertain whether there will be a significant impact on listed threatened species and communities and listed migratory species. However, given the magnitude of the mine and associated rail infrastructure there is potential for impact on listed species. For this reason the proposed action is considered a Controlled Action and will seek development approval through the EIS process. More information on the threats to specific resources for listed fauna and flora will be identified in field surveys and documented in the EIS.

6 Environmental record of the responsible party

NOTE: If a decision is made that a proposal needs approval under the EPBC Act, the Environment Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach.

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** The Carmichael Coal Mine and Rail Project is the Adani Group's first operation within Australia. The Adani Group has a history of responsible environmental and community management applied to similar projects in other countries.	X	
6.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		X
6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework** A project specific environmental policy will be developed for the project in accordance with the Adani Group framework for environmental and community management.	X	
6.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)**		X

7 Information sources and attachments

(For the information provided above)

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7.2 Reliability and date of information

All reference material is listed above. These sources are considered to be reliable and accurate.

7.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Figure 1 Regional Site Location Figure 2 Land Tenure
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Figure 3 Waterways Figure 4 RE maps for mine Figure 5 RE maps for rail Figure 6 Key Environmental constraints for mine Figure 7 Key Environmental constraints for rail Figure 8 BPA mapping for mine Figure 9 BPA mapping for rail
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.3)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.4)		
	copies of any flora and fauna investigations and surveys (section 3)	✓	Protected Matters and Wildlife Online searches
	technical reports relevant to the assessment of impacts on protected matters and that support the arguments and conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

8 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action (which can include a person acting on their behalf); or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[2].

Project title: Carmichael Coal Mine and Rail Project

8.1 Person proposing to take action

This is the individual, government agency or company that will be principally responsible for, or who will carry out, the proposed action.

If the proposed action will be taken under a contract or other arrangement, this is:

- the person for whose benefit the action will be taken; or
- the person who procured the contract or other arrangement and who will have principal control and responsibility for the taking of the proposed action.

If the proposed action requires a permit under the Great Barrier Reef Marine Park Act[3], this is the person requiring the grant of a GBRMP permission.

The Minister may also request relevant additional information from this person.

If further assessment and approval for the action is required, any approval which may be granted will be issued to the person proposing to take the action. This person will be responsible for complying with any conditions attached to the approval.

If the Minister decides that further assessment and approval is required, the Minister must designate a person as a proponent of the action. The proponent is responsible for meeting the requirements of the EPBC Act during the assessment process. The proponent will generally be the person proposing to take the action[4].

Name	Harsh Mishra
Title	Director
Organisation	Adani Mining Pty Ltd
ACN / ABN (if applicable)	27 145 455 205
Postal address	GPO Box 2569 Brisbane, QLD 4001
Telephone	0420 416 650
Email	Harsh@adanigroup.com
Declaration	I declare that the information contained in this form is, to my knowledge, true and not misleading. I agree to be the proponent for this action.
Signature	
Date	3rd Nov 2010

[2] *If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Business Entry Point (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

[3] *If your referred action, or a component of it, is to be taken in the Great Barrier Reef Marine Park the Minister is required to provide a copy of your referral to the Great Barrier Reef Marine Park Authority (GBRMPA) (see section 73A,* EPBC Act*). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.*

[4] *If a person other than the person proposing to take action is to be nominated as the proponent, please contact the Referrals Business Entry Point (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

8.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	Julie Keane - GHD Pty Ltd
Title	Principal Impact Assessment Manager
ACN / ABN (if applicable)	39 008 464 373
Postal address	GPO Box 668 Brisbane Qld 4001
Telephone	07 3316 3940
Email	Julie.Keane@ghd.com
Declaration	I declare that the information contained in this form is, to my knowledge, true and not misleading.

15/11/10

Signature  Date