ATTACHMENT 4

MNES FLORA SPECIES ASSESSMENT:

Table 1. EPBC Act Vulnerable flora species that are known to occur in the Project area or predicted to occur with a reasonable likelihood of occurrence due to presence of suitable habitat.

Table 2. Endangered and Vulnerable flora species that are predicted to occur in the project area and vicinity but are highly unlikely to be present.

Table 3. Potential impacts of the project on EPBC flora species known or considered likely to occur in the project area and its immediate environs

Significant Impact Assessments:

Table 4-1: Bunya Mountains Bluegrass *Bothriochloa bunyensis*
Table 4-2: Cliff Orchid *Sarcochilus hartmanii*
Table 4-3: Austral Toadflax *Thesium australe*

References

Appendix

Table 1. EPBC Act Vulnerable terrestrial flora species that are known[1] to occur in the Project area or predicted[2] to occur with a reasonable likelihood of occurrence due to presence of suitable habitat.

Species	EPBC Act Status	Comments[2]
Bunya Mountains Bluegrass *Bothriochloa bunyensis*	Vulnerable	Bunya Mountains Bluegrass (Satin-top Grass) is a rhizomatous species growing in fire prone grassy habitats (Halford 1998) and is also considered to be tolerant of some levels of disturbance, for example grazing by cattle (Fensham and Fairfax 1996). Queensland Herbarium records indicate that the species is confined to a small number of disjunct occurrences of open to relatively open vegetation growing on higher altitude basalt in southern Queensland. The major threats identified for the species across its range include competition from native woody understorey invaders and weeds (Threatened Species Scientific Committee 2008). The species is known from the northern-most section of Main Range NP in exposed grassy Eucalyptus Open Forest/Woodland close to the sheer eastern scarp. It was confirmed as being present in the vicinity of a 200 m long section of disused roadway proposed for re-opening (Winder Management Road). The species was recorded in a low density from within a 0.1ha survey plot located in close proximity to the former road alignment (Appendix). Within the Project envelope other patches of suitable habitat are present along the scarp to the north of the known location. However, the trail will use existing tracks and footpads in this area and no ground disturbance is required.
Cliff Orchid *Sarcochilus hartmanii*	Vulnerable	Cliff Orchid, Boulder Orchid or Blotched Sarcochilus is a small perennial orchid. It is often lithophytic and herbarium label information and notes by Jones (2006) indicate it grows on rocks and rock faces within rainforest at altitudes of 500-1000 m. However, Barker and Borsboom suggested that it grows at lower altitudes (500 – 700 m). The identified threats in the range of the species include habitat loss, fire damage to habitat and collection (Threatened Species Scientific Committee 2014) In the Project area, suitable habitat may occur within a form of Warm Temperate Rainforest (WTRF) (Young and Dillewaard 1999; Harden *et al.* 2014) which grows on higher ridges and associated cool sheltered slopes. These areas were found to often have a surface lag of large moss and lichen-covered basalt boulders. However, the altitude (>1050 m) is somewhat higher than recorded occurrences in southern Queensland. While the Project area lies within the broad ecological range of the species there are no specimen-backed herbarium records from the general area. The proposed Class 5 trail traverses patches of WTRF with a bouldery ground stratum. The trail follows the route of the renowned Scenic Rim (Groom 1979) from the Mistake Range to McPherson Range, and there is long history of use by a low volume of long-distance bushwalkers.
Austral Toadflax *Thesium australe*	Vulnerable	Austral Toadflax is a small, uncommon and often inconspicuous sub-shrub which is partially parasitic on the roots of native grasses including the widely-occurring Kangaroo Grass *Themeda triandra* (Leigh *et al.* 1984; Scarlett *et al.* 2003). Notes accompanying specimens collected from southern Queensland suggest it tends to grow in very low densities. However, it is relatively short-lived and is known to regenerate freely after fire

Species	EPBC Act Status	Comments[2]
		(DSE 2003). The threats identified for the species include weeds, competition from native woody understorey invaders, habitat loss, grazing and agricultural intensification (Threatened Species Scientific Committee 2013). The Project area lies within the broad ecological range of the species although there are no specimen-backed herbarium records from the area. It has been collected from a basalt Woodland site around 15km west of the Project area which is a much drier area than the northern Main - Mistake Ranges. If present within the Project envelope it is likely to be restricted to areas of open grassy vegetation with abundant Kangaroo Grass. This type of habitat is confined to the scarp edge and crest in the extreme north of the proposal area. Here, the trail proposes to use existing tracks and footpads and no ground disturbance is required to establish the route.

1. Atlas of Living Australia record backed by a specimen in the Queensland Herbarium and a Herbarium confirmed record from trail surveys as part of this project.
2. Predicted by the Protected Matters Search Tool (PMST).

Table 2. Endangered and Vulnerable flora species that are predicted[1] to occur in the project area and vicinity but are highly unlikely to be present.

Species & EPBC Act status	Distribution and Habitat
Hairy Jointgrass *Arthraxon hispidus* Vulnerable	*Arthraxon hispidus* is an uncommon grass – in south-eastern Queensland it has been recorded mainly from boggy ground with heavy soils, often near watercourses (Halford 1998). There is an extremely low probability of occurrence in the Project area based upon habitat preference.
Miniature Moss Orchid, Hoop Pine Orchid *Bulbophyllum globuliforme*	*Bulbophyllum globuliforme* is a minute, epiphytic orchid which grows on upper/outer branches of tall trees especially Hoop Pine. There are no specimen-backed herbarium records from northern Main Range - Mistake Range which lies to the north-east of the main area of distribution along the McPherson Range.
Northern Clematis *Clematis fawcettii* Vulnerable	*Clematis fawcettii* is a distinctive, slender vine/climber recorded from a range of different types of rainforests and rainforest – Open Forest ecotones at altitudes > 500m (Halford 1998; Harden *et al.* 2014). The Project area lies within the geographical and ecological ranges of the species although there are no specimen-backed herbarium records from the area and it has not been observed along field traverses conducted to date. The closest records to Mistake Range – northern Main Range are from Semi-evergreen vine thicket growing in areas receiving < 800 mm of rainfall p a. The species is very distinctive and unlikely to be missed by experienced observers in places where it grows. This factor and the moist rainforest environments within the Project area substantially reduce the likelihood that it is present.
Wandering Pepper Cress *Lepidium peregrinum* Endangered	*Lepidium peregrinum* is an uncommon herbaceous plant recorded from riparian forest, *Eucalyptus* Open Forest and Open forest – Rainforest ecotones, often appearing after disturbance (Scarlett 1999). Herbarium label information and notes by Scarlett (1999) suggest the taxon appears to regenerate heavily following disturbance, for example earthworks, fire and flooding. The Project area lies within the geographical range of the species although there are no specimen-backed herbarium records and nearby records are from quite different habitat. The most likely habitat in which it may occur in the Project area would be close to Open Forest – Rainforest ecotones.
Macadamia Nut *Macadamia integrifolia* Vulnerable	*Macadamia integrifolia* grows in lowland rainforest within 60 – 70 km of the coast. The proposal area is outside its ecological and geographical ranges.
Slender Marsdenia *Marsdenia longiloba* Vulnerable	*Marsdenia longiloba* grows mostly in Wet sclerophyll forest on relatively infertile soils (e.g. soils derived from rhyolite and meta-sediments). Wet sclerophyll forest on lower fertility substrates is not present along any new trail route.
Mount Berryman Phebalium *Phebalium distans* Vulnerable	*Phebalium distans* grows in Semi-evergreen vine thicket in lower rainfall parts of SEQ. The typical habitat of the species is not represented in the proposal area.
Austral Cornflower *Rhaponticum austral* Vulnerable	*Rhaponticum australe* grows on alluvial plains and gently undulating topography on fertile soils in areas receiving rainfall o 650 – 850 mm pa. These habitat conditions are not represented along the trail route.
Brush Sophora *Sophora fraseri* Vulnerable	*Sophora fraseri* is a distinctive sprawling shrub which often grows in *Eucalyptus* Open Forest subject to invasion by rainforest pioneer species in the absence of fire and open areas within drier types of Rainforest (Halford 1998). The project area lies within the geographical range of the species although there are no specimen-backed herbarium records from the general area. It generally occurs at altitudes <650m (Halford 1998) and the Project area is mostly >950m. The species is very distinctive and has not been observed along the small parts of the trail route where there is a possibility it may occur due to the type of habitat present.

1. Predicted by the Protected Matters Search Tool (PMST).

Table 3 provides the results of a qualitative risk assessment process whereby documented threats to those EPBC Act threatened flora species that are known or likely to be present are assessed against the relevant aspects of the Project. This process has been undertaken to identify potential impacts and enable appropriate avoidance, mitigation and management measures to inform project design where moderate or higher impacts were predicted. This has been an iterative process involving project modification throughout the planning stages and the adoption of management measures resulting in a “low” risk assessment for all potential threat/impacts, as shown in Table 3.

Risks are assessed by identifying potential impacts, determining the likelihood of those impacts occurring, and describing the consequences of those impacts should they occur, applying the categories shown in the table below.

Qualitative Risk Matrix

	Consequence Level				
Likelihood Level	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost certain					
Likely					
Possible					
Unlikely					
Very Unlikely					

Risk Rating
Extreme
High
Moderate
Low

The consequence of each impact is categorised as ‘catastrophic’, ‘major’, ‘moderate’, ‘minor’ or ‘insignificant’ in terms of its effect on the element in question. Briefly put,

- ‘catastrophic’ impacts would result in the extinction of a species
- ‘major’ impacts may be notably detrimental to the species on a population scale
- ‘moderate’ impacts may result in a substantial change to a local population
- ‘minor’ impacts may result in small decreases to a local population that would be overcome without mitigation, and
- ‘insignificant’ impacts are those that are likely to be undetectable.

Table 3. Potential impacts of the project on EPBC Act Vulnerable flora species known to occur or with a possibility of occurrence within the Project area

Risk rating code: **Extreme** **High** **Moderate** **Low**

Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
Bunya Mountains Bluegrass *Bothriochloa bunyensis*	Destruction of a small number of individuals	Small reduction in local population or no net loss.	The re-opening of the Winder Management Road would require removal of shrubs and ground layer species that have become established in the former road corridor since it became unused. An area of 0.05 ha will be disturbed (200 m x 2.5 m). Any Bunya Mountains Bluegrass plants located within the road corridor would be identified prior to ground disturbance and either avoided or salvaged and translocated to the verges of the 200 m long section of the re-built road. Post construction weed monitoring and control measures are included within this Project.	Possible	Insignificant
	Competition from weeds especially along open verges of rebuilt road	Reduction in local population	The habitat of Bunya Mountains Bluegrass in northern Main Range National Park is presently considered to be in good condition based upon observations as part of field surveys associated with this Project, although some weeds are present locally (Appendix 1). A major weed is Crofton Weed which was noted as favouring the moist sunny conditions near the boundary with Rainforest. Broom Milkwort *Polygala virgata*, a possible recent arrival, was also noted along with ruderal species (Grime 1979) (e.g. short-lived colonisers of bare ground), which come and go with disturbance (e.g. appearing for a period after fire). The road verges would be mulched with converted woody material removed from the roadway to reduce the extent of bare mineral soil prone to weed invasion especially by ruderal species. Post construction weed monitoring and control measures are included within this Project. A strategy to limit risk of weed introductions in the operational phase of the project (e.g. cleaning of footwear) will also be implemented.	Unlikely	Minor

Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
	Altered fire management of the *Eucalyptus* Open Forest habitat	Change in understorey species composition and abundance (Tran and Wild 2000)	There are no factors associated with the Project which would be likely to influence the prevailing fire management (periodic use of planned fire by QPWS) which maintains the health and integrity of the high altitude basalt *Eucalyptus* Open Forest/Woodland ecological community in which the species occurs.	Unlikely	Insignificant
Cliff Orchid *Sarcochilus hartmannii*	Destruction of a small number of individuals	Small reduction in local population.	There is some likelihood that Cliff Orchid could occur locally along parts of the proposed Class 5 trail route on very steep, bouldery slopes >1100m altitude. It was not recorded during reconnaissance of the proposed route. Any potential impacts will be avoided by selecting the placement of the route to avoid any rocks where lithophytic orchids are present.	Unlikely	Minor
	Introduction of weeds	Loss of habitat	The Warm Temperate Rainforest ecological community which occupies the higher ridges and slopes where suitable boulder substrate occurs is currently weed-free. This includes a section that is traversed by a long-used rough walking track similar to a Class 5 trail. The dense shade and cool conditions would inhibit the establishment of many rainforest weeds occurring in southern Queensland. However, temperate adapted weed species are present along the more open conditions of internal roads in the national park which indicate that there is a potential for introductions of species adapted to the cooler climate. Risks along the trail as it is developed are to be minimised by prior wash down/ cleaning of hand-held equipment, footwear etc. A strategy to limit risk of weed introductions in the operational phase of the project will also be implemented.	Unlikely	Insignificant
	Introduction of pathogens	Change in habitat, especially overstorey cover (e.g. due to tree death)	The pathogen Myrtle Rust has not been observed within the Project envelope. However, patches of dead trees were observed in inaccessible parts of the route (e.g. a localised patch of Hoop Pine) which may indicate attack by fungal pathogens. Localised patches of dead trees present along the route will be avoided/detoured as a precautionary measure.	Unlikely	Minor

Species	Potential Impact	Potential consequences	Comments	Likelihood of the impact occurring	Expected severity of the impact
			Risks along the trail as it is developed are to be minimised by prior wash down/ cleaning of hand-held equipment, footwear etc. A strategy to limit risk of pathogen introductions in the operational phase of the project will also be implemented.	Unlikely	Minor
Austral Toadflax *Thesium australe*	Inadvertent destruction of a very small number of individuals	Small reduction in local population	There is a small chance that Austral Toadflax could be growing in the same 200 m section of disused roadway as Bunya Mountains Bluegrass. It is not an easy species to detect amongst the grasses where it grows. However, it was not recorded from a 0.1 ha vegetation plot located near the 200 m section of roadway where the Bunya Mountains Bluegrass is likely to occur (Appendix 1). No other suitable habitat of the species is proposed to be disturbed as part of this Project.	Unlikely	Minor
	Competition from weeds	Reduction in local population	The habitat where Austral Toadflax may grow within the Project envelope in Main Range National Park is presently considered to be in good condition based upon observations as part of field surveys associated with this Project, although some weeds are present locally. The most serious weed locally is Crofton Weed which was noted as favouring the moist sunny conditions near the boundary with Rainforest. Broom Milkwort *Polygala virgata*, a possible recent arrival, was also noted along with ruderal (short-lived colonisers of bare ground) species which come and go with disturbance (e.g. appear for period after fire). The road verges would be mulched with woody material removed from the roadway to reduce the extent of bare mineral soils prone to weed invasion. Post construction weed monitoring and control measures are included within this Project. A strategy to limit risk of weed introductions in the operational phase of the project will also be implemented.	Unlikely	Minor
	Altered fire management of the *Eucalyptus* Open Forest habitat	Change in understorey species composition	There is no reason to alter the prevailing fire management (periodic use of planned fire by QPWS) which maintains the health and integrity of the high altitude basalt *Eucalyptus* Open Forest/Woodland ecological community in which the species could occur.	Unlikely	Insignificant

Table 4-1: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Bunya Mountains Bluegrass *Bothriochloa bunyensis*	
An action is likely to have a significant impact on vulnerable species if there is a real chance or possibility that it will:	The 0.05 ha of former road corridor where scattered individuals may be growing constitutes a small proportion of the habitat where the local meta-population occurs which is considered to comprise a total area of at least 30 ha along the eastern scarp of the Main Range north of Mount Mistake. The stoloniferous habit and tolerance to disturbance (Fensham and Fairfax 1996; Halford 1998) suggest that it will be feasible to translocate any individuals found to occur in the path of the road. Consequently, any individuals located within the former road corridor will be salvaged and re-planted post construction along the verges of the re-constructed road. This strategy aims to prevent any net loss to the number of individuals present.
Lead to a long-term decrease in the size of an important population	The disjunct occurrence of Bunya Mountains Bluegrass at Mount Mistake would represent an important outlying population 200 km from the Bunya Mountains, the major centre for the taxon. **The small size and localised nature of the proposed disturbance within the habitat of the species should not impact upon the important population either directly or indirectly.** For example, it is unlikely to present a barrier to pollination and dispersal of the species which is also capable of spreading by vegetative means.
Reduce the area of occupancy of an important population	Re-opening the former road will reduce the area of potential habitat of an important population by a maximum of 0.16%. It is likely that a small number of individuals will be present within this area which has been recolonised by native grasses and shrubs since abandonment. **The small size of the impact area in relation to the available habitat for the species in this location is not considered to represent a significant impact.**
Fragment an important population into two or more populations	Most of the habitat for the local population, which is thought to extend for several kilometres along the scarp, would remain unaffected by the project. **The nature and extent of the narrow road is not expected to fragment the important population.**
Adversely affect habitat critical to the survival of a species	**The former road which was subject to considerable earthworks and removal of rocks in the past is not considered to represent critical habitat for the species.**
Disrupt the breeding cycle of an important population	**The nature and extent of any removal of vegetation and limited use of the road when operational is not expected to disrupt the reproductive cycle of the important population.** Prevailing management, for example use of fire to maintain understorey diversity and health will continue.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**The nature and extent of any clearing of the shrub and ground layer within the former road corridor is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**. Prevailing management, for example use of fire to maintain understorey habitat quality will continue.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	A pest and weed management plan will be implemented, as is required under State legislation to control and prevent the establishment of invasive species as a result of the project. **Part of the habitat is known to contain longer-lived weeds and implementation of a pest and weed management plan will lead to improved condition of habitat**. Management measures and continuous monitoring for the life of the project will ensure that no new invasive species will be introduced and no existing invasive species will be allowed to spread. Measures to minimise risk of introduction of weeds will also be implemented when the trail becomes operational.
Introduce disease that may cause the species to decline	The re-construction and operation of the road will be subject to measures aimed to reduce the risk of introduction of, or spread of exotic species and pathogens. A pest and weed management plan will be implemented, as is required under State legislation, to control and prevent the establishment of invasive species (and associated diseases) as a result of the project, and **no significant impact from introduced disease for Bunya Mountains Bluegrass or its habitat is predicted.** Measures to minimise risk of introduction of disease (e.g. foot bath) will also be implemented when the trail becomes operational.

Table 4-1: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Bunya Mountains Bluegrass *Bothriochloa bunyensis*	
Interfere with the recovery of the species.	Much of the known extent of the taxon is confined to protected area and has been consequently subject to fewer external pressures than many comparable taxa. Population scale processes should not be affected by the small disturbance footprint and **significant disruptions to reproduction and interference to species recovery are not expected**.

Table 4-2: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Cliff Orchid *Sarcochilus hartmannii*	
An action is likely to have a significant impact on vulnerable species if there is a real chance or possibility that it will:	Queensland Herbarium records and accompanying habitat information indicate that there is a small likelihood that Cliff Orchid or Blotched Sarcochilus may be present growing on boulder piles on higher altitude, steep slopes. The Class 5 trail route is planned to traverse some of the steep rocky slopes along the Main Range scarp. Consequently stabilisation of loose rock and possibly some localised construction work is planned along with measures to confine hikers to a narrow path winding through and over boulders. This is designed to prevent rock slides and a wider spreading of potential disturbance from hikers across a larger area of slope. A similar rough trail which traverses the same type of habitat north of Sylvester's Look-out is within the Project area and can be used as a guide. A precautionary approach will be adopted which will avoid any rocks supporting lithophytic orchids when the trail route is being located and stabilised. The avoid approach will minimise the risk of any loss of individuals that may be present during location and operation of the trail.
Lead to a long-term decrease in the size of an important population	If present, a local population would be important because of the limited known extent of the taxon and the high altitude of potential habitat of the species in the project area relative to other places it has been collected from. A small decrease in any local populations that may be present could occur as the species will be unlikely to colonise and persist on parts of the boulders subject to foot traffic. **No long-term decrease in the size of an important population is expected** as these impacts are highly localised and would disappear if the trail became unused.
Reduce the area of occupancy of an important population	**The area of occupancy of an important population, if present, would not be reduced to any discernible extent as no habitat is being removed or destroyed.**
Fragment an important population into two or more populations	**The rough trail through the boulders is unlikely to lead to fragmentation of any local population(s).**
Adversely affect habitat critical to the survival of a species	**The trail through and among the boulders is unlikely to lead to any impacts upon habitat critical to the survival of the species** due to the highly localised and intermittent nature of disturbance from hikers. The trail also aims to prevent more widespread damage by focusing the small number of hikers who will use the route to a defined thoroughfare.
Disrupt the breeding cycle of an important population	**The nature and extent of the confined impacts from hikers are unlikely to disrupt in reproduction of the species if it is present.**
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	A very small decrease in habitat quality may occur locally due to the impacts of foot traffic on parts of boulder surfaces. An existing rough track through similar habitat along part of the trail provides a guide for potential impacts. The boulders traversed by the track remain covered in mosses, lichens and lithophytic ferns apart from contact points with hikers' footwear. Participation of an experienced botanist in fine route planning will ensure that any boulders supporting the species are avoided by the trail. **As such, no decline in the species as a result of the project is expected.**
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The route through the Warm Temperate Rainforest is presently weed-free and the cool, shaded conditions are likely to make it difficult for many regional rainforest weeds to establish. Trail establishment will be subject to a protocol for cleaning of hand held equipment and footwear prior to accessing the route. Measures to minimise risk of introduction of weeds will also be implemented when the trail becomes operational to ensure that no invasive species are introduced or allowed to spread in the Cliff Orchid habitat as a result of the Project. **No significant impact is considered likely.**
Introduce disease that may cause the species to decline	Trail establishment will be subject to a protocol for cleaning of hand held equipment and footwear prior to accessing the route. When operational it is proposed that hikers use foot baths and wear clean clothing when commencing the hike.

Table 4-2: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Cliff Orchid *Sarcochilus hartmannii*	
	These measures will ensure that no diseases are introduced or allowed to spread in the Cliff Orchid habitat as a result of the Project. **No significant impact is considered likely.**
Interfere with the recovery of the species.	Much of the known extent of the taxon is confined to protected area and has been consequently subject to fewer external pressures than many comparable taxa. A Class 5 walking trail has a very small footprint and with the proposed avoidance and management measures, **population scale processes will not be affected and significant disruptions to reproduction and interference to species recovery are not expected.**

Table 4-3: Assessment of Matters of National Environmental Significance impact criteria for the Vulnerable Austral Toadflax *Thesium australe*	
An action is likely to have a significant impact on vulnerable species if there is a real chance or possibility that it will:	It is unlikely that the species is present within the 0.05 ha former road surface that will be disturbed to re-open the road. The general vicinity of the 200 m of road alignment has been intensively ground surveyed as part of the search for Bunya Mountain Bluegrass and the species was not evident. Further, the site had been burnt 2-3 years prior to survey – fire is known to maintain the species which regenerates post-fire and tends to disappear during long inter-fire intervals (DSE 2003).
Lead to a long-term decrease in the size of an important population	If present, an occurrence of Austral Toadflax would represent an important local population due to the highly scattered geographic distribution of the species and its tendency to grow in low abundances based upon herbarium label information. The species is known to decline in abundance with time-since-fire, and low densities could be an artefact of this process. **The small size of the disturbance is unlikely to impact upon an important population, if one is present.**
Reduce the area of occupancy of the an important population	**The area of occupancy of is unlikely to be reduced to any extent because of the low likelihood of occurrence, and the modified nature of the former road surface.**
Fragment an important population into two or more populations	**It is unlikely that the narrow road would represent a barrier to a taxon which grows in low densities, to the extent that individuals or groups of individuals become isolated.**
Adversely affect habitat critical to the survival of a species	**The former road which was subject to considerable earthworks and removal of rocks and trees is not considered to represent critical or optimal habitat for the species.**
Disrupt the breeding cycle of an important population	**The nature and extent of any removal of vegetation and limited use of the road when operational is not expected to disrupt the reproductive cycle of an important population, if present.** Prevailing management, for example use of fire which promotes regeneration of the species, will be unaffected.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**The nature and extent of any clearing associated with the project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.** Prevailing management, for example use of fire to maintain habitat condition, will be unaffected by the project.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	A pest and weed management plan will be implemented in the area where the species could occur due to the presence of Bunya Mountains Bluegrass, to control and prevent the establishment of invasive species as a result of the project. **Part of the habitat is known to contain long-lived weeds and a pest and weed management plan will potentially lead to improved condition of habitat.** Management measures and continuous monitoring for the life of the project will ensure that no new invasive species will be introduced and no existing invasive species will be allowed to spread.
Introduce disease that may cause the species to decline	Trail establishment will be subject to a protocol for cleaning of hand held equipment and footwear prior to accessing the route. When operational it is proposed that hikers use foot baths and wear clean clothing when commencing the hike. These measures will ensure that no diseases are introduced or allowed to spread in the Cliff Orchid habitat as a result of the Project. **No significant impact is considered likely.**
Interfere with the recovery of the species.	If present, population scale ecological processes should not be affected and **significant disruptions to reproduction and interference to species recovery are highly unlikely to occur as a consequence of the Project.**

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Appendix 1

Site pro forma (Open Forest with *Bothriochloa bunyensis*)

CORVEG - VEGETATION SITE SURVEY RECORDING FORM

Project: Scenic Rim
Bioregion: SEQ
Map sheet:
Site No.: P19

Sample Level: (circle)	2°(A) 3°(D) 4°(Q)	Sample floristics: (circle)	A B C D E F	Complete list (min. required. for 2° with BA and stem counts); Woody species; Woody species & perennial herbs (min. required. for 3°); Dominant characteristic species; Other; Unrepresentative of ground strata	Date:	15	2	2016

Position derivation:	A GPS; B Topographic map; C Other	Precision:	±8 m	Recorders:	P. YOUNG, I. CHARTERS

Locality: near northern boundary of Main Range National Park on Mistake Range

Site context (description): Eucalyptus eugenioides - E. quadrangulata Open Forest with dense ground stratum of grasses, vines, sedges, twiners, ferns and forbs.

General notes:

Community width: A: <35m wide B: 35-75m C: 75-150m D: 150-300m E: >300 m F: not linear

Community area: A: site only (point) B: <1 ha C: 1-5 ha D: 5-<20 E: 20-50 ha F: >50 ha

Photo:	Image number(s):	Map Unit No:	Regional ecosystem:	12.8.14

Mapped: Yes No Reference Site: Yes No

ZONE	EASTING	NORTHING	LATITUDE (dd mm ss)	LONGITUDE (dd mm ss)
56	433266	6915629		

Landform				Slope			Altitude
Situation*	Element*	Eros Pattern*	Pattern*	Type*	Slope (o)	Aspect (o)	
CREST OF MOUNTAIN	HILLCREST	VERY STEEP MOUNTAINS	MOUNTAINS	RIDGE	o 8°	o 234	980m

Site sketch/notes:

Soils

Source	Reliability	Code*	Add info.	Isbell code /MU	Top soil Colour*	Top soil Texture*
I. Map; E. Cutting; B. Core; S. Surface observation	High; Med; Low[d]	Y KRASNOZEM	+		RED-BROWN	CLAY LOAM
Notes:						

Geology

Source	Reliability	Code*	Geology unit
I. Map; E. Cutting; B. Core; O. Outcrop	High; Med; Low[d]	MAIN RA VOLCANICS	TERTIARY BASALT
Notes:			

Structure form (Specht):	OF	Litter %:	15	Rock %:	15	Bare ground %:	10	Cryptogam %:	0

Rainforest structure: Structural complexity: S X C Leaf Size: Leaf fall : Floristic Structure: M S X Indicator growth form: (1 – 6)

104

Site No.:

Disturbance	Proportion *	Age*	Height*	Disturbance	Count / No.	Disturbance	
Storm damage	0 1 2 3	1 2		Logging	#	Grazing	No Present Severe
Roadworks	0 1 2 3	1 2		Ringbarking/ thinning	# 1.61.	Feral digging	No Yes
Fire	0 1 2 (3)	(1) 2	1 (2) 3 4	Extensive clearing	No / Yes	Flood	
Salinity	0 1 2 3			Weeds ✓	Cover %: 1.6.	Non-remnant	Yes
*Proportion: 0 = 0; 1 ≤ 1%; 2 1-5%; 3 ≥ 5% *Age: 1: ≤ 3 years (short term impact still evident); 2: > 3 years *Fire height: 1 ≤ 1m; 2 1 - 6m; 3 6-12m; 4 ≥ 12m.				Erosion type:		Type: 0 none; 1 Sheet; 2 Rill; 3 Gully; 4 Tunnel; 5 Stream bank; 6 Mass movement.	
				Erosion Severity:		Severity: 1 minor; 2 moderate; 3 severe	

Crown Cover calculations:										
0 m	5 m	10 m	15 m	20 m	25 m	30 m	35 m	40 m	45 m	50 m

Structural Summary: Record 'Individual Covers' for Tertiary sites only

Stratum	Med. Canopy Height	Range in strata height	Total Crown Cover	Key Species	Individual Covers
Emergent					
Tree 1	28	26-32	60%	E. eugenioides E. quadrangulata E. biturbinata	28 15 12

Stratum	Med. Canopy Height	Range in strata height	Total Crown Cover	Key Species	Individual Covers	Key species	Individual Covers
Tree 2	10	8-12	15	regen. trees Allocasuarina torulosa	10 5		
Tree 3							
Shrub 1	3.5	3-5	6	Xanthorrhoea glauca A. torulosa	2.5 2		
Shrub 2	1.2	.8-1.6	16	Hibbertia diffusa A. torulosa	6 5		
Ground	.5	.1-.7	60	Grass Vine	30 15	Fern Subshrub Herb	5 10

105

Site Number:

Factor (circle): 1 = (1cm) [circled] | 0.5 = (.71cm) | 0.25 = (.5cm)

BASAL AREA (number) 26

Cover method: P = Photographic; V = Visual estimate [circled]; I = Line intercept

Cover measure: C = Crown cover [circled]; P = Projective foliage cover (Ground)

Misc. = Off-site; Ident. = C, V, F

COVER (%) — Assessment area: 1000 m²

STEM COUNT (number) — _m² _m² _m² _m² _m² _m²

Basal E	Basal T1	Basal T2	Basal T3	Basal S1	SPECIES	Cr. Den%	Misc	Ident	Cover E	Cover T1	Cover T2	Cover T3	Cover S1	Cover S2	Cover G
					Dead tree (present if cover % or stem count given)			Herb. verified							
	10	2			Eucalyptus eugenioides					28	5				
	4				E. biturbinata					12					
	5	1			E. quadrangulata					15	3				
		1			Lophostemon confertus						2		1		
	1				E. melliodora					5					
		2			Allocasuarina torulosa						5		2.5	5	
					Xanthorrhoea glauca								2	3	
					Acacia melanoxylon								.4		
					Acacia irrorata								.1		
					Hibbertia diffusa	Herbarium voucher		✓						6	
					* Polygala virgata (WEED)									.5	
					Polyscias sambucifolius									.5	
					Gahnia ~~[illegible]~~ melanocarpa			✓						1	
					Pimelea curviflora			✓						.1	

106

Site Number: (Ground layer only)

GROUND SPECIES	Cr Den %	Misc	Ident ✓	G %	G1	G2	G3	G4	G5	GROUND SPECIES	Cr Den%	Misc	Ident	G%	G1	G2	G3	G4	G5
Poa labillardieri	8																		
Themeda Triandra	1																		
* Bothriochloa bunyensis	.5		✓ Herbarium voucher																
Lomandra longifolia	2																		
Dianella caerulea	.5		var. assera																
Xerochrysum bracteatum	.5																		
Cyanthillium cinereum	.2																		
Plectranthus graveolens	.2																		
Rubus moluccanus	6		var. Trilobus																
Derris involuta	6																		
Rubus rosifolius	3																		
Cissus antarctica	3																		
Hibbertia scandens	6																		
Gahnia melanocarpa	2		✓ Herbarium voucher																
Lepidosperma laterale	1																		
Carex declinata	1																		
Glycine clandestina	.2									Litter									
Gymnostachys anceps	.5									Rock									
Doodia aspera	2									Bare Ground									
Adiantum aethiopicum	2									Cryptogam									
Pteridium esculentum	5									TOTAL GROUND COVER									

Site Number: (Ground layer only)

GROUND SPECIES	Cr Den %	Misc	Ident	G%	G1	G2	G3	G4	G5
Hardenbergia Violacea	.2								
Cordyline rubra	.1	(Seedlings)							
Anthosachne scabra			✓						
Ageratina adenophora	1	(Weed)							
Geranium Solanderi	.2								
Ophismenus aemulus	.5		✓						
Echinopogon nutans	.1	✓							
Viola hederacea	.1								
Imperata cylindrica	4								
Plectranthus graveolens	1								
Commelina diffusa	.1								
Lobelia purpurascens	.1								
Rytidosperma longifolium	.1	✓							
Clematis glycinoides	1								
Sigesbeckia orientalis	.5								
Conyza sumatrensis	.1	(Weed)							

GROUND SPECIES	Cr Den%	Misc	Ident	G%	G1	G2	G3	G4	G5
Litter									
Rock									
Bare Ground									
Cryptogam									
TOTAL GROUND COVER									

107