

**ECOLOGICAL ASSESSMENT OF DEVELOPMENT AREA, EXISTING
DOLERITE QUARRY, LONG HILL, TASMANIA**

**ADDENDUM TO *Flora and Fauna Assessment Flora and Fauna Assessment -
Long Hill Proposed Quarry Site (Bushways 2009)***



**Environmental Consulting Options Tasmania (ECOtas) for
Hazell Bros Group**

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COVER ILLUSTRATIONS

View across development area showing selectively harvested native forest.

Please note: the blank pages in this document are deliberate to facilitate double-sided printing.

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SUMMARY

General

Hazell Bros Group (through Integrated Land Management and Planning) engaged Environmental Consulting Options Tasmania (ECOtas) to document the ecological values associated with the proposed development area of an existing dolerite quarry at Long Hill, northern Tasmania, primarily to inform decision approval processes through local, State and Commonwealth government agencies.

This report is presented as an addendum to *Flora and Fauna Assessment Flora and Fauna Assessment - Long Hill Proposed Quarry Site* (Bushways 2009).

Assessment

The study area was assessed by Mark Wapstra on 17 July 2015.

Summary of key findings

Threatened flora

- No plant species, listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, were detected within the study area. The study area does not support significant potential habitat of EPBCA-listed species such that further surveys are not warranted.
- No plant species, listed as threatened on the Tasmanian *Threatened Species Protection Act 1995*, were detected within the study area. No permit under the Act is required.

Threatened fauna

- No fauna species, listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or the Tasmanian *Threatened Species Protection Act 1995*, were detected, or are known from database records, from the study area (but see notes below on wedge-tailed eagle nests from adjacent to study area).
- The study area is within the predicted/known range of several species, as follows:
 - *Sarcophilus harrisii* (Tasmanian devil): no evidence of species noted, despite extensive areas of tracks and bare ground ideal for detection of scats;
 - *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll): as above;
 - *Aquila audax* subsp. *fleayi* (wedge-tailed eagle): several nests known from adjacent to quarry site.
- No special management is recommended in relation to the Tasmanian devil and spotted-tailed quoll.
- The potential impact of the proposed extension of quarrying into the development area has been assessed separately (Mooney 2015) and a determination made that the proposed works represents a low level of risk to the disruption of the breeding behaviour of the local pair of wedge-tailed eagles.

- An analysis of the potential of the project to trigger the Significant Impact Guidelines under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is presented, which indicated that the project will not require referral.

Vegetation types

- The study area supports three TASVEG mapping units:
 - extra-urban miscellaneous (FUM): areas of previously worked quarry;
 - *Eucalyptus amygdalina* forest and woodland on dolerite" (DAD): extensive on slopes and ridges/saddle; and
 - *Eucalyptus amygdalina-Eucalyptus obliqua* damp sclerophyll forest (DOV): parts of previously harvested areas, grading into DAD on higher terrain and into *Eucalyptus obliqua* wet forest with broad-leaf shrubs (WOB) on more sheltered slopes.
- None of these vegetation types are classified as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002* or on schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Weeds

- One species classified as a "declared weed" within the meaning of the Tasmanian *Weed Management Act 1999* was detected from the study area. *Erica lusitanica* (spanish heath) was highly localised within harvested areas. All individuals were hand-pulled on detection.

Plant disease

- No evidence of plant disease (*Phytophthora cinnamomi*, rootrot fungus; myrtle wilt; myrtle rust) was detected.

Animal disease (chytrid)

- The study area is not known to support the frog chytrid pathogen.

Recommendations

The proposed extension of quarrying into the development area will not have a deleterious impact on threatened vegetation, flora or fauna.

Continued careful management of the site in relation to weeds and hygiene is recommended.

The guidelines provided in Mooney (2015) in relation to the management of wedge-tailed eagle nests should be followed.

No formal referral to the relevant Commonwealth government agency under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is considered warranted.

A permit under the Tasmanian *Threatened Species Protection Act 1995* is not required.

PURPOSE, SCOPE, LIMITATIONS AND QUALIFICATIONS OF THE SURVEY

Purpose

Hazell Bros Group (through Integrated Land Management and Planning) engaged Environmental Consulting Options Tasmania (ECOtas) to document the ecological values associated with the proposed development area of an existing dolerite quarry at Long Hill, northern Tasmania, primarily to inform decision approval processes through local, State and Commonwealth government agencies.

The area has been previously assessed and the ecological values documented in *Flora and Fauna Assessment Flora and Fauna Assessment - Long Hill Proposed Quarry Site* (Bushways 2009). That report recommended that “the damp sclerophyll forest in the north of the site should be surveyed once regeneration has proceeded and before stage 3 is cleared, to ensure no threatened species are present”, primarily related to the potential presence of threatened flora viz. “it is possible that a slender curved riceflower population could occur in the damp sclerophyll forest which was not visible due to recent logging”. This statement is the primary impetus for the present assessment and report.

Additionally it was requested that a statement be provided on the potential of the proposal to impact on Matters of National Environmental Significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and whether a referral to the Commonwealth Department of Environment is required.

Scope

This report relates to:

- flora and fauna species of conservation significance, including a discussion of listed threatened species (on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) present and potentially present, and other species of conservation significance (e.g. species of biogeographic interest such as those at the limit of their range or not previously reported from the bioregion);
- vegetation types (forest and non-forest, native and exotic) present, including a discussion of the distribution, condition, extent, composition and conservation significance of each community under Commonwealth, State and local government legislation and policy;
- plant and animal disease management issues;
- weed management issues; and
- a discussion of some of the policy and legislative implications of the identified ecological values, including an assessment against the Significant Impact Guidelines under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) present and potentially present, and other species of conservation significance (especially as these relate to the wedge-tailed eagle).

This report follows the government-produced *Guidelines for Natural Values Surveys - Terrestrial Development Proposals* (DPIPWE 2015) in anticipation that the report (or extracts of it) may be used as part of various approval processes that may be required for the project by the Tasmanian Department of Primary Industries, Parks, Water & Environment. It also follows the *Survey*

Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil (Sarcophilus harrisii) (DPIPWE 2015).

The assessment also complies with the Tasmanian Environmental Protection Authority's *Environmental Effects Report* requirements. The report format will also be applicable to other assessment protocols as required by the Commonwealth Department of the Environment's (for any referral/approval that may be required under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*).

Limitations

The ecological assessment was undertaken in mid July 2015. Many plant species have ephemeral or seasonal growth or flowering habits, or patchy distributions (at varying scales), and it is possible that some species were not recorded for this reason. However, every effort was made to sample the range of habitats present in the survey area to maximise the opportunity of recording the majority of species present (particular those of conservation significance). Late spring and into summer is usually regarded as the most suitable period to undertake the majority of botanical assessments, although it is noted that the assessment did produce a list of vascular species quite typical for the vegetation types present in this part of the State. While some species have more restricted flowering periods, a discussion of the potential for the site to support these is presented.

In my opinion, which is based on extensive surveys of forested habitat in the central north of Tasmania (especially as they relate to threatened flora species), a timed targeted survey is not warranted in the case of the Long Hill quarry site, because the site has a very low potential to support species that are present only for short periods of the year. As such, I was very comfortable with the survey being undertaken in winter rather than spring-summer.

The survey was also limited to vascular species: species of mosses, lichens and liverworts were not recorded. However, a consideration is made of threatened species (vascular and non-vascular) potentially present (based on habitat information and database records) and reasons presented for their apparent absence.

Surveys for threatened fauna were practically limited to an examination of "potential habitat" (i.e. comparison of on-site habitat features to habitat descriptions for threatened fauna), and detection of tracks, scats and other signs.

Qualifications

Except where otherwise stated, the opinions and interpretations of legislation and policy expressed in this report are made by the author and do not necessarily reflect those of the relevant agency. The interpretation of legislation and policy is current at the time of report preparation. The client should confirm management prescriptions with the relevant agency before acting on the content of this report.

Permits

Any plant material was collected under DPIPWE permit TFL 13066, in the name of Mark Wapstra. Relevant data will be entered into DPIPWE's *Natural Values Atlas* database by the authors. Some plant material will be lodged at the Tasmanian Herbarium by the author.

No vertebrate or invertebrate material was collected.

PROPOSAL

The assessment was restricted to the area referred to as the "development area" as per Figure 1 below, which will be further utilised to extract dolerite materials.

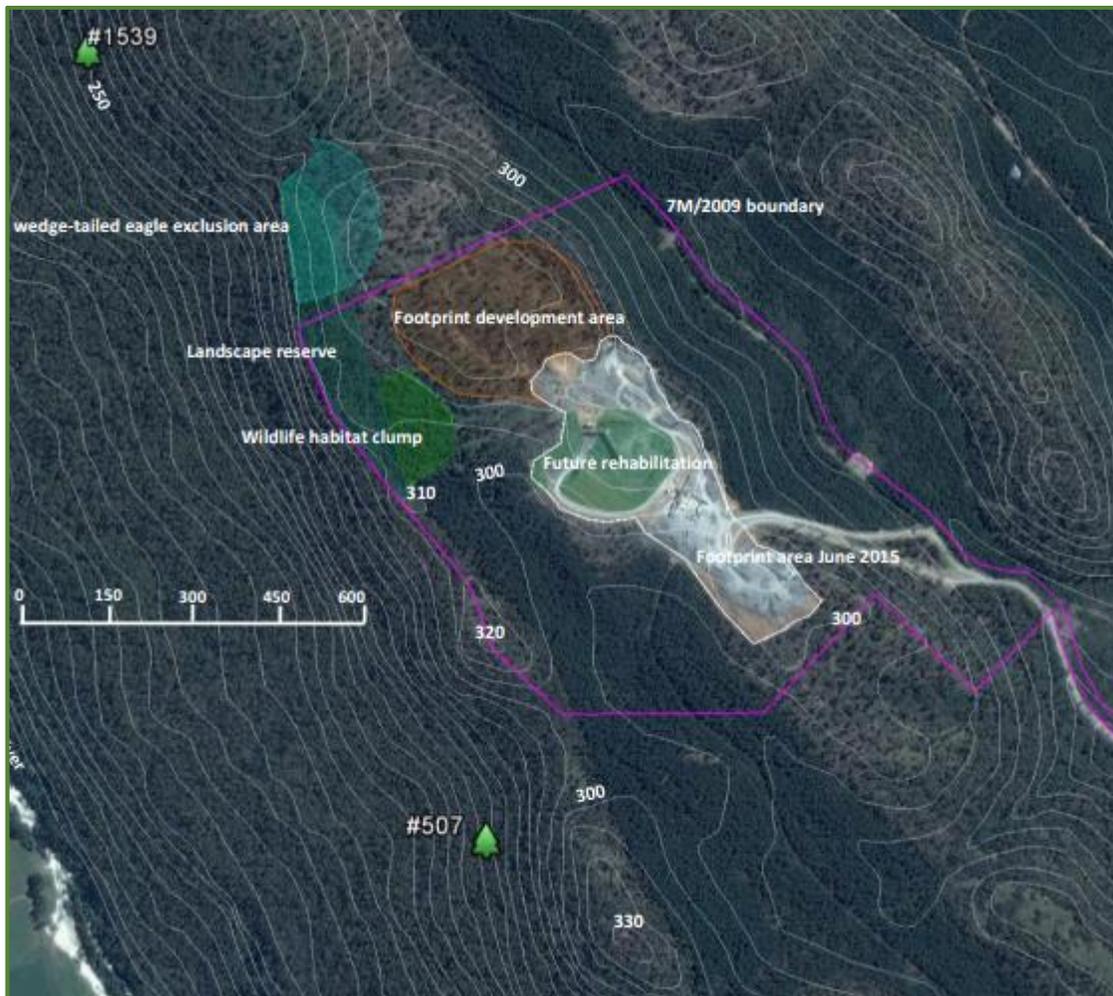


Figure 1. Existing quarry showing development area (extract from map provided by Integrated Land Management and Planning)

THE STUDY AREA

The location details and physical characteristics of the development area (and broader existing quarry facility) have been appropriately documented by Integrated Land Management and Planning and in the report by Bushways (2009) and are not further reiterated here, except in relation to the classification of vegetation types within the development area and the potential for this area to support threatened flora and fauna (see sections below).

The more detailed extent of the development area is shown in Figure 2. This map was used to direct the on-ground survey, noting that the survey extended a minimum of 50-100 m beyond the indicated footprint to ensure compliance with the *Survey Guidelines and Management Advice for*

Development Proposals that may impact on the Tasmanian Devil (*Sarcophilus harrisii*) (DPIPWE 2015), which recommend a minimum 50 m buffer for any surveys.

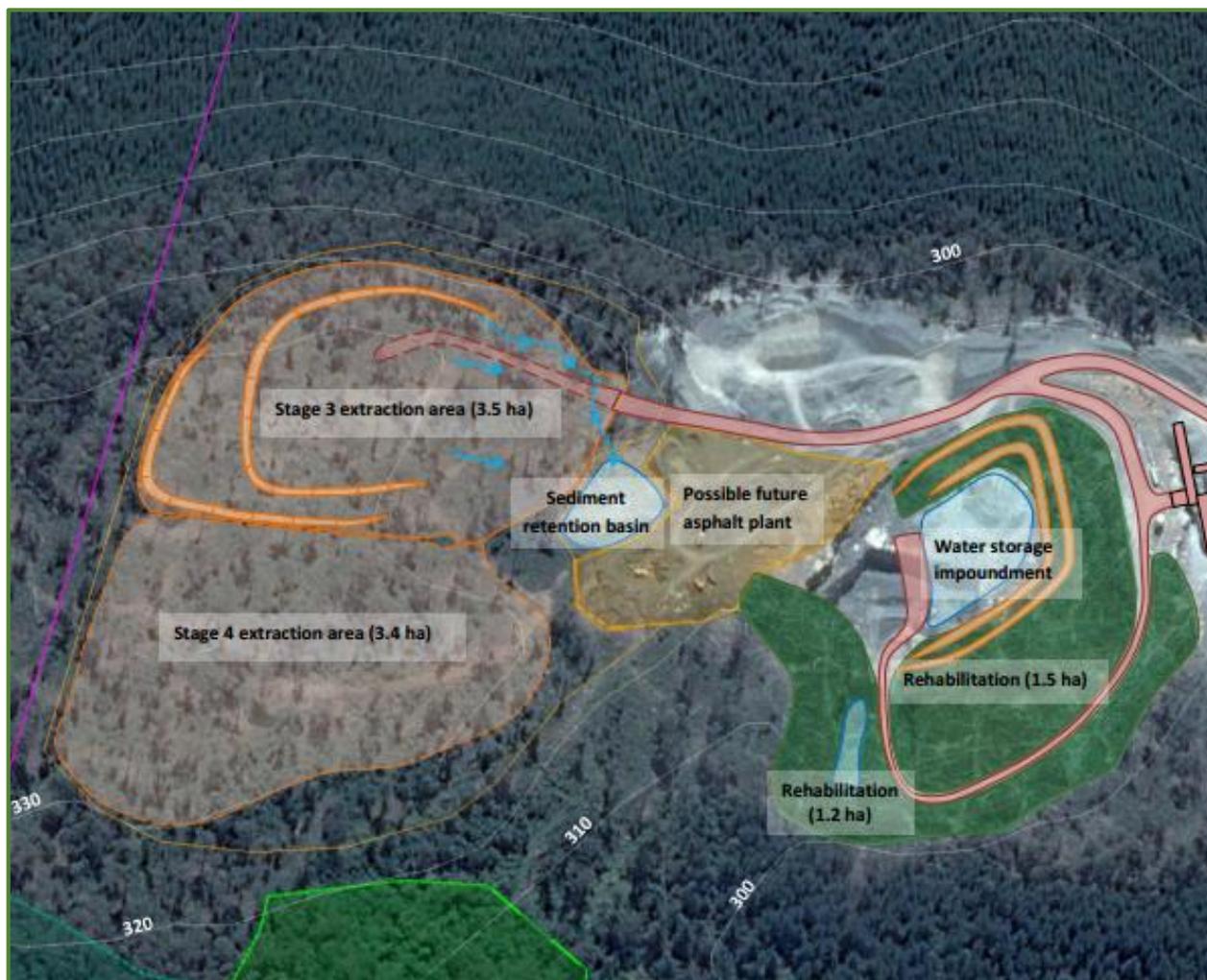


Figure 2. More detailed map of development area (extract from map provided by Integrated Land Management and Planning)

METHODS

Nomenclature

All grid references in this report are in GDA94, except where otherwise stated.

Vascular species nomenclature follows de Salas & Baker (2015) for scientific names and Wapstra et al. (2005+) for common names. Fauna species scientific and common names follow the listings in the cited *Natural Values Atlas* reports (DPIPWE 2015), and as otherwise stated.

Vegetation classification follows TASVEG, as described in *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013).

Preliminary investigation

Available sources of threatened flora and fauna records, vegetation mapping and other potential environmental values were interrogated. These sources include:

- Tasmanian Department of Primary Industries, Parks, Water & Environment's *Natural Values Atlas Report No. 64017 ECOtas_HazellBros_LongHillQuarry* for the development area (approximate centroid of site at 458879mE 541969mN), buffered by 5 km, dated 13 July 2015 (DPIPWE 2015) – Appendix B;
- Forest Practices Authority's *Biodiversity Values Database* report, specifically the species' information for grid reference centroid 458879mE 541969mN (nominally the centroid of the *Natural Values Atlas* search area), buffered by 5 km, hyperlinked species' profiles and predicted range boundary maps, dated 13 July 2015 (FPA 2015) – Appendix C;
- Commonwealth Department of the Environment's *Protected Matters Search Tool* for the approximate centre of the development area, buffered by 5 km, dated 13 July 2015 (CofA 2015) – Appendix D;
- the TASVEG 3.0 vegetation coverage (as available through a GIS coverage);
- *Flora and Fauna Assessment Flora and Fauna Assessment - Long Hill Proposed Quarry Site* (Bushways 2009);
- *Final Report on Impact of Explosive Blasts at the Long Hill Quarry on Local Nesting of Wedge-tailed Eagles (Aquila audax fleayi)* (Mooney 2011); and
- other sources listed in tables and text as indicated.

Site assessment

Site assessment was undertaken on 15 July 2015 by Mark Wapstra. The assessment area has been previously selectively harvested and is dissected by numerous old snig tracks and interspersed with open areas, making access and survey coverage straightforward. Because the most likely sites for threatened flora (especially *Pimelea curviflora* var. *gracilis*) were on disturbed sites, tracks and landings were the target of the survey. In addition, the rockier ridge and saddle extending to the northwest was examined for other threatened flora (e.g. *Spyridium parvifolium*, *Pomaderris intermedia*) that favour such sites. The surrounding slopes, which support shrubbier forest, were also examined for species such as *Desmodium gunnii*. Any areas with significant piles of coarse woody debris were also examined for potential Tasmanian devil/spotted-tailed quoll dens.

Note that the nearby wedge-tailed eagle nests have been separately considered by consultant zoologist Nick Mooney and are considered in his separate report.

FINDINGS

Vegetation types

Bushways (2009) provided an appropriate description of the vegetation types of the assessment area, indicating the presence of "*Eucalyptus amygdalina* forest and woodland on dolerite" (TASVEG code: DAD) and "*Eucalyptus obliqua*-*Eucalyptus amygdalina* damp sclerophyll forest" (TASVEG code: DSC). I wholly concur with their findings and do not believe a revision to this vegetation mapping is warranted.

Bushways (2009) indicated that classifying some parts of the then recently harvested forest was problematic because "debris covers the ground so that the extent and nature of this community was harder to assess". Since that time, the forest has regenerated and it is now easier to separate the vegetation types, which are largely controlled by topography, drainage and depth of soil. Areas in the slight depression are best classified as DSC (denser shrubbier understorey, still dominated by bracken post-harvest) with a mixed canopy of *Eucalyptus amygdalina* and *E. obliqua*, perhaps slightly favouring the latter although this is obscured by harvesting). Surrounding areas on the ridge and north-facing slopes are best classified as DAD (although they also grade into DSC). The south-facing slopes are wetter and outside the development area grade into "*Eucalyptus obliqua* wet forest with broad-leaf shrubs" (TASVEG code: WOB).

None of the vegetation types present are classified as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002* or schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Clearing of these vegetation types does not compromise vegetation management policy and legislation.

Threatened flora

Bushways (2009) did not detect any threatened flora, as listed on schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or the Tasmanian *Threatened Species Protection Act 1995* from the area. They suggested that the recent harvesting within the development area could have masked the presence of species such as *Pimelea curviflora* var. *gracilis* and that a follow-up post-harvest (after some regeneration has occurred) survey was warranted. This species, and others with the potential to be present, are discussed below.

The follow-up survey did not detect any plant species listed as threatened or with a priority for conservation management.

Brunonia australis (blue pincushion): TSPA – rare; EPBCA – not listed

This species is indicated as occurring within 5,000 m but potential habitat (grassy woodland and forest) is absent. The species was not detected.

Desmodium gunnii (slender ticktrefoil): TSPA – vulnerable; EPBCA – not listed

Database information does not indicate any records within 5,000 m but much of the development area is "classic" habitat of this species, which appears to prefer sheltered slopes on fertile substrates ("damp sclerophyll forest" is prime habitat). This trailing perennial herb was not detected.

Deyeuxia densa (heath bentgrass): TSPA – rare; EPBCA – not listed

This species can occur in a wide range of habitats included harvested rocky dry sclerophyll forest. The species was not detected (the widespread and non-threatened *D. monticola* and *D. quadriseta* were both detected).

Epilobium pallidiflorum (showy willowherb): TSPA – vulnerable; EPBCA – not listed

This species is indicated as occurring within 5,000 m but potential habitat (poorly-drained sites) is absent. The species was not detected.

Glycine microphylla (small-leaf glycine): TSPA – vulnerable; EPBCA – not listed

Database information does not indicate any records within 5,000 m but much of the development area is "classic" habitat of this species, which appears to prefer sheltered slopes on fertile substrates ("damp sclerophyll forest" is prime habitat). This trailing to ascending perennial herb was not detected.

Lythrum salicaria (purple loosestrife): TSPA – vulnerable; EPBCA – not listed

This species is indicated as occurring within 5,000 m but potential habitat (poorly-drained sites) is absent. The species was not detected.

Persicaria decipiens (slender waterpepper): TSPA – vulnerable; EPBCA – not listed

This species is indicated as occurring within 5,000 m but potential habitat (poorly-drained sites) is absent. The species was not detected.

Pimelea curviflora var. *gracilis* (slender curved riceflower): TSPA – rare; EPBCA – not listed

This species can occur in a variety of vegetation types from dry sclerophyll forests (often grassy to shrubby) to wet sclerophyll forest (especially in canopy gaps) and also occurs in hardwood plantations (within plantations and on firebreaks and track verges). The species often proliferates after disturbance and has been observed as a locally dominant low shrub species on plantation firebreaks and landings/snig tracks amongst selectively harvesting forest.

The study area was criss-crossed using targeted meandering transects focussed on snig tracks, landings and harvested areas, extending through less disturbed habitats within the harvested area and on to the adjacent ridge, saddle and slopes. This species was not detected.

Pomaderris intermedia (lemon dogwood): TSPA – rare; EPBCA – not listed

Database information does not indicate any records within 5,000 m but the ridge/saddle area with the greater area of exposed rock is prime habitat, based on records from the central north of the State. This low to medium shrub was not detected.

Spyridium parvifolium (coast dustymiller): TSPA – rare; EPBCA – not listed

Database information does not indicate any records within 5,000 m but the ridge/saddle area with the greater area of exposed rock is prime habitat, based on records from the central north of the State. This low to medium shrub was not detected.

Threatened fauna

Excluding discussion on the wedge-tailed eagle, Bushways (2009) did not detect any threatened fauna, as listed on schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or the Tasmanian *Threatened Species Protection Act 1995* from the area. I concur with their findings but provide further discussion on some species below.

Sarcophilus harrisi (Tasmanian devil): TSPA – endangered; EPBCA - Endangered

The follow-up surveys met the intent of the *Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil (Sarcophilus harrisi)* (DIPWE 2015), which recommend a minimum 50 m buffer from the edge of any disturbance footprint (the surveys extended on to both adjacent slopes and to the end of the ridgeline to the northwest) and at least a 30% visual coverage (which was achieved by the extent of harvesting snig tracks, landings and firebreaks and additional random traverses of less disturbed sites).

No habitat elements identified as potential den sites were observed. The substrate is rocky with either exposed rock present or shallow soil over dolerite bedrock with loose scree on adjacent slopes. Such substrate is not ideal for denning and the absence of wombat burrows confirms this. Logging debris can provide ideal denning/"lay-up" areas, especially when within densely shrubby habitats. In this way, much of the development area is potential habitat although no potential den sites were observed. No scats were detected on any of the open areas, suggesting an absence to very low abundance of devils in this area.

Quarry works will extend progressively across the development area such that any individuals utilising the area can move into surrounding less disturbed forest. Eventually the site will be rehabilitated and in the long-term will provide potential habitat.

The potential for the extension of the quarry into the development area to impact on the species is considered further in **APPENDIX A. Statement against Significant Impact Criteria under the EPBCA.**

Dasyurus maculatus (spotted-tailed quoll): TSPA – rare; EPBCA - Vulnerable

As above for Tasmanian devil.

Aquila audax subsp. fleayi (wedge-tailed eagle): TSPA – endangered; EPBCA - Endangered

There are several nest sites for this species located on the slopes surrounding the existing quarry.

The management of this species was considered in detail in a previous management plan titled *Final Report on Impact of Explosive Blasts at the Long Hill Quarry on Local Nesting of Wedge-tailed Eagles (Aquila audax fleayi)* (Mooney 2011), which formed part of the original approval conditions when the ex-Forestry Tasmania quarry was re-developed by Hazell Bros. As part of the extension into the development area, Hazel Bros. re-engaged consultant zoologist Nick Mooney to re-assess the nest sites and revise the management plan. I also understand that the nest sites have been monitored in intervening years such that there is a good understanding of how the pair of eagles are using this cluster of nests within their territory.

I have reviewed the updated management plan (*Wedge-tailed Eagle Management Plan for the Second Proposed Extension (2015) at the Hazell Bros Long Hill Quarry*) (Mooney 2015) and concur fully with its findings that the proposed works will not deleteriously impact on the wedge-tailed eagle.

The potential for the extension of the quarry into the development area to impact on the species is considered further in **APPENDIX A. Statement against Significant Impact Criteria under the EPBCA.**

Other ecological values

Weed species

Bushways (2009) did not report any weed species from the study area, although noted that “the forest has almost no weeds apart from pine seedlings spreading from the nearby plantations” and that “spanish heath exists along Dan Road within metres of the site and can be expected to invade the site in time”. The follow-up surveys detected several highly localised occurrences of spanish heath (*Erica lusitanica*) from the harvested area. Every individual was physically uprooted during the survey and left to wither on site. I do not consider that a complex weed management plan is warranted for this site and note the apparent excellent commitment to weed control by the quarry operators, suggesting that any additionally detected occurrences of declared weeds will be rapidly treated.

The key weed management issues are to minimise the risk of introducing new weeds to the site and to ensure appropriate weed management during extraction and post-extraction (rehabilitation).

Rootrot pathogen, *Phytophthora cinnamomi*

Phytophthora cinnamomi (PC) is widespread in lowland areas of Tasmania, across all land tenures. However, disease will not develop when soils are too cold or too dry. For these reasons, PC is not a threat to susceptible plant species that grow at altitudes higher than about 700 metres or where annual rainfall is less than about 600 mm (e.g. Midlands and Derwent Valley). Furthermore, disease is unlikely to develop beneath a dense canopy of vegetation because shading cools the soils to below the optimum temperature for the pathogen. A continuous canopy of vegetation taller than about 2 metres is sufficient to suppress disease. Hence PC is not considered a threat to susceptible plant species growing in wet sclerophyll forests, rainforests (except disturbed rainforests on infertile soils) and scrub e.g. teatree scrub (Rudman 2005).

The study area supports areas of vegetation recognised as susceptible to the pathogen (i.e. dry sclerophyll open woodland and forest) and in particular many plant species known to be susceptible to the pathogen (e.g. species in the Fabaceae, Ericaceae, Proteaceae and Myrtaceae families). The field assessment did not detect any obvious evidence of the pathogen (e.g. "wavefront" of poor health understorey, dead or dying individual plants) and it appears the site is presently free of the pathogen. It is usual to undertake soil sampling for later laboratory analysis for the pathogen only when there is field evidence of the disease, especially in cases such as the present extensive area of native forest where such sampling in apparently disease-free sites would be not much more than "stabs in the dark". It would be more prudent to undertake such sampling, analysis and reporting if required by a particular client sourcing certain product (e.g. gravel for roads), where a certificate of a weed and disease free status is warranted. At that time, targeted sampling could be undertaken at sites where specific materials will be extracted, maximising the chance of a reliable result.

The operator has an existing certificate indicating a disease-free status as at 31 January 2013 (FT 2013).

Maintaining the apparent disease-free status of the site, however, is considered an important management priority. As with the management of weeds, the key to achieving this will be strict machinery and vehicle hygiene protocols. It is suggested that as part of ongoing extraction activities that such sites be contoured to divert water away such that surfaces remain well-drained and relatively dry (for most of the year). FT (2013) provides more detailed information on the management of weeds and disease at this quarry site.

Myrtle wilt

Myrtle wilt, caused by a wind-borne fungus (*Chalara australis*), occurs naturally in rainforest where myrtle beech (*Nothofagus cunninghamii*) is present. The fungus enters wounds in the tree, usually caused by damage from wood-boring insects, wind damage and forest clearing. The incidence of myrtle wilt often increases forest clearing events such as windthrow and wildfire.

Nothofagus cunninghamii is absent from the study area.

Myrtle rust

No evidence of myrtle rust was noted.

Chytrid fungus and other freshwater pathogens

Native freshwater species and habitat are under threat from freshwater pests and pathogens including *Phytophthora cinnamomi* (root rot), *Batrachochytrium dendrobatidis* (Chytrid frog

disease), *Mucor amphibiorum* (platypus Mucor disease) and the freshwater algal pest *Didymosphenia geminata* (Didymo) (Allan & Gartenstein 2010). Freshwater pests and pathogens are spread to new areas when contaminated water, mud, gravel, soil and plant material or infected animals are moved between sites. Contaminated materials and animals are commonly transported on boots, equipment, vehicles tyres and during road construction and maintenance activities. Once a pest pathogen is present in a water system it is usually impossible to eradicate. The manual *Keeping it Clean - A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens* (Allan & Gartenstein 2010) provides information on how to prevent the spread of freshwater pests and pathogens in Tasmanian waterways wetlands, swamps and boggy areas.

The development area does not contain any free-standing or flowing (ephemeral or permanent) waterbodies, and it is understood that all surface waters will be directed to settling ponds within the existing quarry site, such that contamination of nearby riparian habitats will not occur. Special management to minimise the risk of introducing or spreading the frog chytrid pathogen is not considered warranted.

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APPENDIX A. Statement against Significant Impact Criteria under the EPBCA

Preamble

The purpose of this document is to clearly demonstrate the assessment and decision-making process involved in reaching a determination by the proponent operating the Long Hill dolerite quarry not to refer the action concerning possible impacts on matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA).

Summary of requirements under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

Matters of national environmental significance considered under the EPBCA include:

- listed threatened species and communities
- listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- world heritage properties;
- national heritage places;
- the Great Barrier Reef Marine Park;
- nuclear actions; and
- a water resource, in relation to coal seam gas development and large coal mining development.

The Commonwealth Department of the Environment provides a policy statement titled *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (CofA 2013, herein the *Guidelines*), which provides overarching guidance on determining whether an action is likely to have a significant impact on a matter protected under the EPBCA.

The *Guidelines* define a significant impact as:

"...an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts"

and note that:

*"...all of these factors [need to be considered] when determining whether an action is **likely** to have a significant impact on matters of national environmental significance".*

The *Guidelines* provide advice on when a significant impact may be **likely**:

"To be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility.

If there is scientific uncertainty about the impacts of your action and potential impacts are serious or irreversible, the precautionary principle is applicable. Accordingly, a lack of scientific certainty about the potential impacts of an action will not itself justify a decision that the action is not likely to have a significant impact on the environment".

The following steps and matters are recommended under the *Guidelines* to determine whether a referral under the EPBCA is required.

- 1. Are there any matters of national environmental significance located in the area of the proposed action (noting that 'the area of the proposed action' is broader than the immediate location where the action is undertaken; consider also whether there are any matters of national environmental significance adjacent to or downstream from the immediate location that may potentially be impacted)?*
- 2. Considering the proposed action at its broadest scope (that is, considering all stages and components of the action, and all related activities and infrastructure), is there potential for impacts, including indirect impacts, on matters of national environmental significance?*
- 3. Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance (and if so, is the effectiveness of these measures certain enough to reduce the level of impact below the 'significant impact' threshold)?*

The *Guidelines* also state:

However you should not conclude that a significant impact is not likely to occur because of management or mitigation measures unless the effectiveness of those measures is well-established (for example through demonstrated application, studies or surveys) and there is a high degree of certainty about the avoidance of impacts or the extent to which impacts will be reduced.

- 4. Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts (important, notable, or of consequence, having regard to their context or intensity)?*

The *Guidelines* provide a set of Significant Impact Criteria, which are "intended to assist...in determining whether the impacts of [the] proposed action on any matter of national environmental significance are likely to be significant impacts". It is noted that the criteria are "intended to provide general guidance on the types of actions that will require approval and the types of actions that will not require approval...[and]...not intended to be exhaustive or definitive".

In relation to species listed as Vulnerable, the definition of an important population is:

"An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal;*
- populations that are necessary for maintaining genetic diversity; and/or*
- populations that are near the limit of the species range".*

Summary of matters of national environmental significance that may be impacted by the extension of extraction into the development area of the Long Hill dolerite quarry

Assessments of the project have been undertaken and reviewed. These include:

- Bushways (2009). *Flora and Fauna Assessment Flora and Fauna Assessment - Long Hill Proposed Quarry Site*. Report by Bushways for Hazell Bros Group;
- ECOtas (2015). *Ecological Assessment of Development Area, Existing Dolerite Quarry, Long Hill, Tasmania. Addendum to Flora and Fauna Assessment Flora and Fauna Assessment - Long Hill Proposed Quarry Site* (Bushways 2009). Report by Environmental Consulting Options Tasmania (ECOtas) for Hazell Bros Group, 5 August 2015.
- Mooney, N. (2011). *Final Report on Impact of Explosive Blasts at the Long Hill Quarry on Local Nesting of Wedge-tailed Eagles (Aquila audax fleayi)*. Report by Nick Mooney for Hazell Bros Group; and
- Mooney, N. (2015). *Wedge-tailed Eagle Management Plan for the Second Proposed Extension (2015) at the Hazell Bros Long Hill Quarry*. Report by Nick Mooney for Hazell Bros Group.

The extension of extraction into the development area has been determined to only have a potential impact on the listed threatened species and communities component of matters of national environmental significance, as follows:

Threatened ecological communities

None present.

Threatened flora species

No known populations of flora species listed under the Act have been detected. Potential habitat for flora species listed under the Act has not been identified.

Threatened fauna species

Potential and known habitat of three species listed under the Act has been reported from the project area or from areas that could be affected by the project's activities. Those requiring consideration under the *Guidelines* are:

- *Sarcophilus harrisii* (Tasmanian devil): Endangered (EN);
- *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll): Vulnerable (VU);
- *Aquila audax* subsp. *fleayi* (wedge-tailed eagle): Endangered (EN).

Note that species including *Perameles gunnii* (eastern barred bandicoot) and *Tyto novaehollandiae* (masked owl) are not considered further because only highly marginal potential habitat has been identified. The project area is also within the potential range of other species such as *Engaeus granulatus* (central north burrowing crayfish), *Astacopsis gouldi* (giant freshwater crayfish), *Litoria raniformis* (green and golden frog) and *Lathamus discolor* (swift parrot) but no potential habitat of these species has been identified so they are not considered further.

The potential impact on *Sarcophilus harrisii* (Tasmanian devil), *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll), and *Aquila audax* subsp. *fleayi* (wedge-tailed eagle) has been

considered against the Significant Impact Criteria for Endangered and Vulnerable species: Table 1 – devil, Table 2 – quoll, Table 3 – eagle.

The analysis against the criteria indicates that the proposed works will not trigger the need for any form of referral under the EPBCA.

Table 1. Assessment against Significant Impact Criteria for Endangered (Tasmanian devil) species under the *Significant Impact Guidelines 1.1*

Criterion	Species
	<i>Sarcophilus harrisii</i> (Tasmanian devil)
lead to a long-term decrease in the size of a population	<p>There is a very low likelihood of the action resulting in a long-term decrease on the size of a population of the Tasmanian devil because evidence from surveys suggests that the species is absent (or at least in very low numbers). Only a miniscule proportion of potential habitat will be affected (and eventually rehabilitated) and the action is therefore highly unlikely to affect the local, regional or Statewide population at a measurable level.</p> <p>CRITERION NOT MET</p>
reduce the area of occupancy of the species	<p>The area of occupancy of the species will be materially unaffected at a local or whole-of-population scale. At a local scale there is no evidence that the species will be affected at all (no evidence of dens). Even if present, the extent of works is so slight as to constitute a miniscule proportion of the total area occupied by the species.</p> <p>For the record, in my opinion this criterion is missing the logical critical phrase “to the extent that the species is likely to decline”, which is included in the criterion on availability or quality of habitat.</p> <p>CRITERION NOT MET</p>
fragment an existing population into two or more populations	<p>The works will not further fragment the population at any scale – if present, the species would be distributed either side of the works area (and in the broader project area), indicating that the existing roads and associated structures (e.g. culverts, etc.) have not fragmented the local population to any significant extent, and further works would not exacerbate this situation.</p> <p>CRITERION NOT MET</p>
adversely affect habitat critical to the survival of a species	<p>Technically, critical habitat for <i>Sarcophilus harrisii</i> is not defined on the Register of Critical Habitat under the EPBCA.</p> <p>More conservatively, recovery plans and other statements identify potential habitat, which includes the forests types as identified within the project area. However, no documents identify the project area as “critical” to the species, and site assessments support this notion.</p> <p>CRITERION NOT MET</p>
disrupt the breeding cycle of a population	<p>The project area does not support potential or known breeding sites (dens) such that the works would not result in the breeding cycle of the species/population being disrupted.</p> <p>CRITERION NOT MET</p>
modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>At a local scale, potential habitat may be disturbed but it does not follow that the availability or quality of habitat will be decreased to such an extent that the species is likely to decline because the project area is already modified (and only one Statewide population is recognised).</p> <p>CRITERION NOT MET</p>
result in invasive species that are harmful to a critically endangered or endangered	<p>There is no indication that the works would result in the establishment of invasive species harmful to the Tasmanian devil.</p> <p>CRITERION NOT MET</p>

Criterion	Species
	<i>Sarcophilus harrisi</i> (Tasmanian devil)
species becoming established in the endangered or critically endangered species' habitat	
introduce disease that may cause the species to decline	There is no indication that the works would result in the introduction of any diseases of concern to the Tasmanian devil (this part of the population is already within part of the State affected by the Devil Facial Tumour Disease). CRITERION NOT MET
interfere with the recovery of the species	This specific part of the species' range and/or population has not been identified as critical to the recovery of the species in an endorsed Recovery Plan. CRITERION NOT MET

Table 2. Assessment against Significant Impact Criteria for Vulnerable (spotted-tailed quoll) species under the *Significant Impact Guidelines 1.1*

Criterion	Species
	<i>Dasyurus maculatus</i> subsp. <i>maculatus</i> (spotted-tailed quoll)
lead to a long-term decrease in the size of an important population of a species	There is no documentation that the population that may be present in the Long Hill area would comprise an "important population" because it is not identified as necessary for the species' long-term survival and recovery and it is not identified as (a) a key source population for breeding or dispersal; (b) necessary for maintaining genetic diversity; or (c) near the limit of the species' range. There is a very low likelihood of the action resulting in a long-term decrease on the size of a local (but not "important") population of the spotted-tailed quoll because evidence from surveys suggests that the species is absent (or at least in very low numbers). CRITERION NOT MET
reduce the area of occupancy of an important population	The area of occupancy of the species will be unaffected at a local or whole-of-population scale. At a local scale there is no evidence that the species will be affected at all (no evidence of dens). Even if present, the extent of works is so slight as to constitute a miniscule proportion of the total area occupied by the species. For the record, in my opinion this criterion is missing the logical critical phrase "to the extent that the species is likely to decline", which is included in the criterion on availability or quality of habitat. See discussion above regarding definition of an "important population". CRITERION NOT MET
fragment an existing important population into two or more populations	The works will not further fragment the population at any scale – if present, the species would be distributed either side of the works area (and in the broader project area), indicating that the existing roads and associated structures (e.g. culverts, etc.) have not fragmented the local population to any significant extent, and further works would not exacerbate this situation. See discussion above regarding definition of an "important population". CRITERION NOT MET
adversely affect habitat critical to the survival of a species	Technically, critical habitat for <i>Dasyurus maculatus</i> is not defined on the Register of Critical Habitat under the EPBCA. More conservatively, recovery plans and other statements identify potential habitat, which includes the forests types as identified within

Criterion	Species
	<i>Dasyurus maculatus</i> subsp. <i>maculatus</i> (spotted-tailed quoll)
	the project area. However, no documents identify the project area as "critical" to the species, and site assessments support this notion. CRITERION NOT MET
disrupt the breeding cycle of an important population	The project area does not support potential or known breeding sites (dens) such that the works would not result in the breeding cycle of the species/population being disrupted. See discussion above regarding definition of an "important population". CRITERION NOT MET
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	At a local scale, potential habitat may be disturbed but it does not follow that the availability or quality of habitat will be decreased to such an extent that the species is likely to decline because the project area is already modified (and only one Statewide population is recognised). CRITERION NOT MET
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	There is no indication that the works would result in the establishment of invasive species harmful to the spotted-tailed quoll. CRITERION NOT MET
introduce disease that may cause the species to decline	There is no indication that the works would result in the introduction of any diseases of concern to the spotted-tailed quoll (none of concern are identified). CRITERION NOT MET
interfere substantially with the recovery of the species	This specific part of the species' range and/or population has not been identified as critical to the recovery of the species in an endorsed Recovery Plan. CRITERION NOT MET

Table 3. Assessment against Significant Impact Criteria for Endangered (wedge-tailed eagle) species under the *Significant Impact Guidelines 1.1*

Criterion	Species
	<i>Aquila audax</i> subsp. <i>fleayi</i> (wedge-tailed eagle)
lead to a long-term decrease in the size of a population	The project will not result in the direct loss of any individuals in any timeframe such that a long-term decrease in the population (only one Statewide population is recognised) is not anticipated. If it could be demonstrated that the project would result in the local pair of eagles no longer breeding successfully, it could be argued that eventually there could be a very minor decrease in the Statewide population. However, for this to be realised, there would need to be no generational replacement of this pair of birds within the generation length of the species, which is highly unlikely. That said, a specialist assessment has indicated that the project is highly unlikely to deleteriously impact on the breeding behaviour of this pair of birds, such that a long-term decrease in the population is not anticipated. CRITERION NOT MET
reduce the area of occupancy of the species	The area of occupancy of the species will be materially unaffected at a local or whole-of-population scale. The "area of occupancy" for a species such as the wedge-tailed eagle has little meaning at the scale of this project. If it is accepted that the species "occupies" the whole State, temporarily clearing less than 10 ha of previously disturbed forest not being specifically used as a breeding site (although clearly

Criterion	Species
	<i>Aquila audax</i> subsp. <i>fleayi</i> (wedge-tailed eagle)
	<p>part of a breeding territory and would be used for foraging) clearly affects a miniscule proportion of habitat for the species.</p> <p>For the record, in my opinion this criterion is missing the logical critical phrase "to the extent that the species is likely to decline", which is included in the criterion on availability or quality of habitat.</p> <p>CRITERION NOT MET</p>
fragment an existing population into two or more populations	<p>The works will not further fragment the population at any scale. The wedge-tailed eagle is a highly mobile species but occupies stable breeding territories. The clearance (and eventual rehabilitation) of the development area will only affect a miniscule proportion of the breeding territory of one pair of birds and as such the population cannot be fragmented further.</p> <p>CRITERION NOT MET</p>
adversely affect habitat critical to the survival of a species	<p>Technically, critical habitat for <i>Aquila audax</i> subsp. <i>fleayi</i> is not defined on the Register of Critical Habitat under the EPBCA.</p> <p>More conservatively, recovery plans and other statements identify potential habitat, which includes the forests types as identified within the project area. Known nest sites can reasonably be interpreted as "critical" habitat components to the wedge-tailed eagle. It has been demonstrated through specialist consideration that the project will not adversely affect the habitat "critical" to the survival of the species because the areas around all the known nest site will be retained undisturbed.</p> <p>CRITERION NOT MET</p>
disrupt the breeding cycle of a population	<p>The project is close to several known nests of the wedge-tailed eagle, all representing the one breeding territory. Works (of various types) within close proximity to nest sites have the potential to affect the breeding success of this species. The degree of potential impact of the quarry has been assessed on two occasions including 2013 and 2015, the latter specifically to address any additional concerns that may arise from the extension of quarrying into the development area.</p> <p>The updated report (Mooney 2015) confirmed the previous findings (Mooney 2013) that the quarrying activities are not having a deleterious (i.e. significant) impact on the breeding behaviour of this pair of wedge-tailed eagles, and that the proposed extension into the development area is of sufficient distance from the nest sites that a deleterious impact is not anticipated.</p> <p>CRITERION NOT MET</p>
modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>At a local scale, a very small part of the habitat that is utilised opportunistically for foraging and comprises a part of a breeding territory of one pair of wedge-tailed eagles will be cleared (and eventually rehabilitated). Disturbance at this scale is not anticipated to decrease the availability or quality of habitat to the extent that the species is likely to decline.</p> <p>CRITERION NOT MET</p>
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>There is no indication that the works would result in the establishment of invasive species harmful to the wedge-tailed eagle.</p> <p>CRITERION NOT MET</p>

Criterion	Species
introduce disease that may cause the species to decline	<p><i>Aquila audax</i> subsp. <i>fleayi</i> (wedge-tailed eagle)</p> <p>There is no indication that the works would result in the introduction of any diseases of concern to the wedge-tailed eagle.</p> <p>CRITERION NOT MET</p>
interfere with the recovery of the species	<p>This specific part of the species' range and/or population has not been identified as critical to the recovery of the species in an endorsed Recovery Plan, except in general terms that all nest sites are regarded as a "critical" element of the species' life cycle.</p> <p>CRITERION NOT MET</p>

APPENDIX B. DPIPWE's *Natural Values Atlas* report for study area

Appended as pdf file.

APPENDIX C. Forest Practices Authority's *Fauna Values Database* report for study area

Appended as pdf file.

APPENDIX D. CofA's *Protected Matters* report for study area

Appended as pdf file.