

Magpie-lark *Grallina cyanoleuca*, Little Raven *Corvus mellori* and Willie Wagtail *Rhipidura leucophrys*. Diurnal and nocturnal raptors are likely to forage over these areas, with Wedge-tailed Eagle *Aquila audax* and Black-shouldered Kite *Elanus axillaris* observed during the current assessment, and a large mob of Eastern Grey Kangaroo *Macropus giganteus* (approximately 60 individuals) was observed foraging in grassland areas throughout the study area.



Plate 5. Artificial dam within the study area



Plate 6. Introduced Grassland within the study area

3.2.6 Notable Habitat Values

3.2.6.1 Landscape Permeability

Adjoining the western boundary of the study area is approximately 120 hectares of remnant vegetation comprising privately owned land, and the Mt Cannibal Flora and Fauna Reserve. Vegetation within the study area provides connective habitat between these forested areas, remnant forest patches in private properties to the east of the study area and branches of Cannibal Creek (Plates 7 and 8). Such connectivity is important in a landscape that has largely been cleared for agricultural purposes. Wildlife corridors and ‘stepping stones’ of vegetation have numerous benefits to native flora and fauna populations, particularly in modified landscapes where much of the surrounding vegetation is restricted to linear strips along roadsides. Some of the key benefits of habitat patches and wildlife corridors associated with the maintenance of biodiversity on a local and landscape level include:

- Protection and ongoing maintenance of ecosystem functionality through the reduction of threatening processes (erosion, weed spread, hydrological alterations);
- Protection for populations of threatened species, or disturbance sensitive species (e.g. orchids) that may have been lost from the surrounding landscape;
- Provision of habitat (refuge, shelter, breeding opportunities) for a range of fauna either residing within corridors, or moving through the landscape;
- Maintenance of species richness and diversity;
- A source of seed dispersal for flora species sensitive to moderate levels of disturbance;
- Immigration of animals to supplement declining populations, thus reducing the likelihood of local extinctions;

- Availability of habitat for reintroduction following extinction events;
- Prevent demographic changes occurring in populations that may result from prolonged isolation from other populations of the same species by aiding gene flow, thus enhancement of genetic variation and prevention of inbreeding; and,
- Facilitating fauna movement through modified landscapes to more optimal habitats.

3.2.6.2 Hollow-bearing Trees

A large number of Australia's fauna species use hollows, with a previous estimate by Ambrose (1982) of approximately 400 species. As stated by Gibbons and Lindenmayer (2002) approximately 13% of Australian amphibians, 10% of reptiles, 15% of birds and 31% of mammals may at some time use hollows. Many of these species are considered rare or threatened in Australia and ongoing loss of hollows due to firewood collection, logging, grazing pressures, and land clearing places pressure on fauna populations to a point where they may not, in many areas, be viable in the long-term.

Eucalypt hollows can occur in living and dead branches of the crown, at the base of trees (basal or butt hollows), and in the main trunk or stem of trees (Gibbons and Lindenmayer 2002). Mature trees often support vertical fissures or cracks along branches and trunks, which provide habitat for species such as insectivorous bats and small gliders. The presence of a range of different hollow types (i.e. opening size, shape, depth and height from the ground) is an important habitat feature, as individual fauna species are likely to be dependent upon a particular hollow type.

Several factors influence the presence of hollows in trees, including the type of species and tree form, its age and diameter, and the presence of a fire scar. The occurrence and overall density of hollow-bearing trees is typically greater in older stands of forest/woodland, in moist fertile gullies, and in areas that have not been extensively disturbed through logging or land clearing (Lindenmayer *et al.* 1991).

Many of the large trees within the study area are likely to be over 200 years of age, which demonstrates that there is a long period before suitable hollow formation occurs, and subsequent use by fauna. Due to the paucity of woodland and forest habitat in the local area and across the landscape, tree hollows are important in the life history of many woodland and forest-dependent birds and mammals as they are likely to be scarce.



Plate 7. Habitat corridor within the western portion of the study area



Plate 8. Habitat corridor into the study area from the west (looking south from the ridge)

3.3 National Significance Assessment

National significance for flora and fauna is defined in Appendix 1.2.

3.3.1 Flora

The VBA and FIS contain records of two nationally listed flora species (Strzelecki Gum and Green-Striped Greenhood) previously recorded within 10 kilometres of the study area (DEPI 2014b; Viridans 2013a) (Appendix 2.2; Figure 3). The PMST nominated an additional five nationally significant species which have not been recorded in the locality but have the potential to occur (DoE 2014; Appendix 2.2).

Of these species, there is suitable habitat within the study area for the Strzelecki Gum *Eucalyptus strzeleckii*, and the Green-striped Greenhood *Pterostylis chlorogramma*. As no Strzelecki Gum were observed within the study area during the previous assessment (Ecology Partners Pty Ltd 2008) or the current assessment, it is unlikely that it occurs on site. However, given the number of records recorded within 10 kilometres of the site, there is potential habitat present for this species to recruit (albeit low likelihood).

Green-striped Greenhood

Listed as Vulnerable under the EPBC Act.

The Green-striped Greenhood is a perennial orchid to 45 centimetres tall, with up to seven distinctive green striped flowers. Each flower generally comprises an emerald green (occasionally brownish) labellum, galea up to 12 millimetres long and petals with prominent flanges. It flowers through late winter into spring (July – September) (Backhouse and Jeanes 1995; Viridans 2013a). Green-striped Greenhood is endemic to Victoria, and generally occurs within heathy woodland habitat.

The Green-striped Greenhood has been recorded 28 times within 10 kilometres of the study area, including several recorded by David Piko (Australian Native Orchid Society) within the Mt Cannibal Flora and Fauna Reserve (Piko, D, 2014). Suitable habitat exists within the study area towards the west on the southern slopes (patches LF c, LF d, LF f, HrFF d and HrFF g) and east (patches HrFF a, HrFF c, HrFF d, HrFF f, LF e) of the study area.

It is recommended that targeted surveys are undertaken for the Green-striped Greenhood during the flowering season (July – September) to determine the presence and/or distribution, or otherwise, of the species within the study area.

3.3.2 Fauna

The VBA and AVW contain records of seven nationally listed fauna species previously recorded within 10 kilometres of the study area (DEPI 2014b; Viridans 2013b) (Appendix 3.2; Figure 4). The PMST nominated an additional nine nationally significant species which have not been recorded in the locality but have the potential to occur (DoE 2014).

There is suitable habitat within the study area for several of these species (Table 4).

Table 4. Fauna species of National significance that may occur within the study area

| Species | Suitable habitat within the study area | Survey conducted in 2009* | Updated survey proposed | Proposed survey method | Survey timing |
|---|--|---------------------------|-------------------------|--|-------------------|
| Southern Brown Bandicoot <i>Isodon obesulus obesulus</i> | <p>Areas of Herb-rich Foothill Forest along the eastern and western boundaries, and within Riparian Scrub (Figure 2a).</p> <p>There are numerous records of Southern Brown Bandicoot south of the Princes Highway, approximately four kilometres south of the study area. Surveys undertaken in 2009 employed only the use of hair tubes for detection of Southern Brown Bandicoot. This method is not considered sufficient to detect the species, nor is it consistent with requirements under the EPBC Act survey guidelines <i>Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999</i>. Further survey is recommended.</p> | ✓ | ✓ | Infra-red cameras, hair tubes | Year round |
| Growling Grass Frog <i>Litoria raniformis</i> | <p>Wetland habitats (Figure 2b).</p> <p>There is a record of Growling Grass Frog (taken in 1982) in Two Mile Creek approximately 400 metres of the study area (Figure 2b). Surveys undertaken in 2009 did not detect the species, however based the on high quality habitat within the study area further surveys for this species are recommended.</p> | ✓ | ✓ | Spotlight and call playback | October - January |
| Dwarf Galaxias <i>Galaxiella pusilla</i> | <p>The species was recorded at Site 14, and in Cannibal Creek (approximately one kilometre south of the study area) in January 2009 (Ecology Australia 2009). Surveys were undertaken at Sites 1, 2 and 11, along with Two Mile Creek, but the species was not detected.</p> <p>The continued presence of Dwarf Galaxias should be assumed at Site 14, Cannibal Creek, and any waterbodies with suitable habitat that are connected to existing populations, or have been connected during times of flooding previously.</p> <p>As wetlands within the study area are uphill of waterways they are unlikely to have been connected during times of flooding and the species is unlikely to be present. However, the primary survey methods used in 2009* were dip-net and electrofishing. Electrofishing is generally considered an inefficient method for detecting very small bodied fish such as the Dwarf Galaxias (Dolan and Miranda 2003), while dip-netting, which is suitable as a rapid method for detecting Dwarf Galaxias when in high abundance, is generally not suitable for establishing presence in low-abundance populations. Electrofishing and dip-netting are also ineffective when used in areas of high cover of aquatic vegetation, as preferred by Dwarf Galaxias (DSEWPAC 2011).</p> <p>In light of the above, it may be prudent to undertake further survey of aquatic habitats within the study area where surveys for Dwarf Galaxias failed to detect the species.</p> | ✓(r) | ✓ | Active netting (dip net and seine net), and setting of overnight passive nets (illuminated bait traps and fyke nets) | Year round |

| Species | Suitable habitat within the study area | Survey conducted in 2009* | Updated survey proposed | Proposed survey method | Survey timing |
|---|--|---------------------------|-------------------------|-----------------------------|-----------------|
| Australasian Bittern <i>Botaurus poiciloptilus</i> | The species was recorded at Site 14 in January 2009 (Ecology Australia 2009). Other potential habitat includes wetland habitats throughout the study area (Figure 2b). The species was not detected at other wetlands within the study area. However based the on high quality habitat present further survey is recommended. | ✓(r) | ✓ | Spotlight and call playback | October - March |

Notes: (r) = recorded on site. * Ecology Australia 2009.

3.3.3 Communities

One nationally listed ecological community (White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland) is predicted to occur within 10 kilometres of the study area (DoE 2014). Vegetation within the study area did not meet the condition thresholds that define this community, and it is considered that this community does not occur within the study area.

3.4 State Significance Assessment

State significance for flora and fauna is defined in Appendix 1.2.

3.4.1 Flora

The VBA and FIS contain records of 30 State-significant flora species within 10 kilometres of the study area (DEPI 2014b; Viridans 2013a) (Appendix 2.2; Figure 3).

Of these species, all 30 have previously been recorded within 10 kilometres of the study area. There is suitable habitat within the study area for Green Scentbark *Eucalyptus fulgens*, Long Pink-bells *Tetratheca stenocarpa*, Marsh Sun-orchid *Thelymitra longiloba*, and Swamp Bush-pea *Pultenaea weindorferi* (Appendix 2.2).

3.4.2 Fauna

The VBA and AVW contain records of 26 State-significant fauna species within 10 kilometres of the study area (DEPI 2014b; Viridans 2013b) (Appendix 2.2; Figure 4).

There is suitable habitat within the study area for several of these species, summarised in Table 5.

Table 5. Fauna species of State significance that may occur within the study area

| Species | Suitable habitat within the study area | Survey conducted in 2009* | Updated survey proposed | Proposed survey method | Survey timing |
|--|---|---------------------------|-------------------------|-----------------------------|-----------------|
| Black Bittern <i>Ixobrychus flavicollis australis</i> | Wetland habitats (Figure 2a). These species were not detected during surveys undertaken in 2009*. However based the on high quality habitat present further survey is recommended. | ✗ | ✓ | Spotlight and call playback | October - March |
| Lewin's Rail <i>Rallus pectoralis</i> | | ✓ | ✓ | Spotlight and call playback | October - March |
| Baillon's Crake | | ✓ | ✓ | Spotlight and | October - |

| Species | Suitable habitat within the study area | Survey conducted in 2009* | Updated survey proposed | Proposed survey method | Survey timing |
|---|--|---------------------------|-------------------------|------------------------------------|---|
| <i>Porzana pusilla</i> | | | | call playback | March |
| Masked Owl <i>Tyto novaehollandiae</i> | Forested areas supporting large, hollow-bearing trees (Figure 2b). | ✓ | ✓ | Spotlight and call playback | Year round |
| Powerful Owl <i>Ninox strenua</i> | Barking Owl and Powerful Owl were recorded immediately west of the study area in 1988 and 1991 (Figure 2b). These species were not detected during surveys undertaken in 2009*. However only 2 surveys were completed whereas DEPI survey guidelines** recommend a minimum of 5 surveys. As such, further survey is recommended. | ✓ | ✓ | Spotlight and call playback | March - December |
| Barking Owl <i>Ninox connivens</i> | | ✓ | ✓ | Spotlight and call playback | November - June |
| Sooty Owl <i>Tyto tenebricosa</i> | | ✗ | ✓ | Spotlight and call playback | Year round |
| White-footed Dunnart <i>Sminthopsis leucopus</i> | Areas of Herb-rich Foothill Forest along the eastern and western boundaries, and within Riparian Scrub (Figure 2a). This species was not detected during surveys undertaken in 2009*. However surveys undertaken for Southern Brown Bandicoot (above) and Swamp Skink (below) will also serve to identify White-footed Dunnart. | ✓ | ✓ | Infra-red cameras, hair tubes | Year round (preferably between Spring – early autumn) |
| Greater Glider <i>Petauroides volans</i> | Forested areas supporting large, hollow-bearing trees (Figure 2b). Greater Glider has been recorded on numerous occasions in the local area, with most records located in Bunyip State Park. However based on the high quality habitat present targeted survey is recommended for this species. | ✗ | ✓ | Spotlight | Year round |
| Southern Toadlet <i>Pseudophryne semimarmorata</i> | Periodically inundated areas and seeps throughout the study area. Southern Toadlet was recorded immediately east of the study area in 1960. | ✓ | ✓ | Spotlight and call playback | April - July |
| Swamp Skink <i>Egernia coventryi</i> | Within Herb-rich Foothill Forest and Riparian Scrub along the western boundary (Figure 2a). Surveys undertaken for Swamp Skink will also serve to identify small mammals residing in the study area, including White-footed Dunnart. Although unlikely to be present, this may also include the State significant Broad-toothed Rat <i>Mastacomys fuscus mordicus</i> . | ✗ | ✓ | Elliott traps, tin and ply refugia | October - March |

Notes: (r) = recorded on site. * Ecology Australia 2009. **The Department of Sustainability and Environment Approved Survey Standards: Masked Owl, Powerful Owl and Sooty Owl Date: 2 May 2011. Version 1.0.

3.4.3 Communities

Vegetation within the study area did not meet the condition thresholds that define any State-significant communities, and none are modelled to occur within the property (DEPI 2014a).

3.5 Regional Significance Assessment

Regional significance for fauna is defined in Appendix 1.2.

The VBA and AVW contain records of nine regionally significant fauna species within 10 kilometres of the study area (DEPI 2014b; Viridans 2013b) (Appendix 2.2; Figure 4).

There is suitable habitat within the study area for several of these species, summarised in Table 6.

Table 6. Fauna species of Regional significance that may occur within the study area

| Species | Suitable habitat within the study area | Survey conducted in 2009* | Updated survey proposed | Proposed survey method | Survey timing |
|---|---|---------------------------|-------------------------|------------------------------------|-----------------|
| Latham's Snipe <i>Gallinago hardwickii</i> | Wetland habitats (Figure 2b). | ✓ (r) | ✓ | Spotlight and call playback | October - March |
| Small mammals | Surveys undertaken for Swamp Skink (above) will also serve to identify small mammals residing in the study area. | ✗ | ✓ | Elliott traps, tin and ply refugia | October - March |
| Microbats | Forested areas and scattered trees supporting hollows, spouts and fissures or loose or shedding bark (Figure 2b). | ✓ (r) | ✓ | Anabat | October - March |

Notes: (r) = recorded on site. * Ecology Australia 2009.

4 PERMITTED CLEARING ASSESSMENT

Aside from the native vegetation situated within the 100 metre landscape buffer that extends around the internal property boundary, all vegetation within the study area is proposed to be removed based on the extraction limit proposed for the Work Authority for the quarry site (Figure 2).

4.1 Risk-based Pathway

Based on DEPI’s NVIM Tool (DEPI 2014b) and BIOR report (Appendix 4), the study area is situated in Location A with 46.378 hectares (comprising 44.337 hectares of remnant patch vegetation, and 29 scattered trees) of native vegetation proposed to be impacted as part of the proposed quarry development (Appendix 4). As such, the permit application falls under the **Moderate Risk-based pathway**. Site information and proposed vegetation losses are summarised in Table 7, and detailed in Appendix 4.

As the current proposal falls under the Moderate Risk-based pathway, the Guidelines (DEPI 2013a) require the relevant authorities to consider whether reasonable steps have been taken to ensure that impacts of the proposed removal of native vegetation on biodiversity have been minimised.

Table 7. Permitted Clearing Assessment (the Guidelines)

| Location | | A |
|--|-------------------------------|-----------------|
| Strategic Biodiversity Score (of vegetation to be removed) | | 0.359 |
| Vegetation to be removed | Remnant Patch (ha) | 44.337 |
| | Scattered Trees (no) | 29 (2.041 ha)* |
| | Total Hectares | 46.378 |
| | Total Habitat Hectares | 23.068 |
| Risk | Vegetation Risk | Moderate |
| | Scattered Trees Risk | Moderate |
| | Risk Pathway | Moderate |

Note. * = Scattered trees are converted to hectares by multiplying the number of trees by a default extent (DEPI 2014d).

4.2 Offset Targets

The offset requirements for native vegetation removal, as prescribed by the Guidelines (DEPI 2013a) have been calculated by DEPI, based on the habitat hectares scores as assessed during the flora and fauna assessment. The resulting Biodiversity Impact and Offset Requirements report (BIOR) produced by DEPI is presented in Appendix 4. A summary of proposed vegetation losses is presented in Table 7, while the results of the habitat hectare assessment are provided in Appendix 2.3.

The specific-general offset test found that the proposed removal of vegetation does have a proportional impact on three (Spotted Gum *Corymbia maculata*, Cobra Greenhood *Pterostylis grandiflora* and Green Scentbark *Eucalyptus fulgens*) rare or threatened species habitats above the specific offset threshold, and therefore, specific offsets are required for these species (Appendix 4).

The offset requirement for native vegetation removal is 0.009 General Biodiversity Equivalence Units (BEU) and 33.712 specific BEUs for Spotted Gum, 37.491 specific BEUs for Cobra Greenhood, and 37.347 specific BEUs for Green Scentbark.

If a permit is granted to remove the vegetation identified in the study area (as summarised in Table 7), a requirement to obtain native vegetation offsets will be included in the permit conditions. The offsets must meet the requirements of Table 8 (detailed in Appendix 4).

Table 8. Offset requirements for the permitted clearance of vegetation

| | | |
|---------------------|---------------------------------------|--|
| Offset requirements | General Offsets Required (BEU) | 0.009 |
| | Specific Offsets Required (BEU) | 33.712 specific units of habitat for Spotted Gum 37.491 specific units of habitat for Cobra Greenhood 37.347 specific units of habitat for Green Scentbark |
| | Vicinity (catchment / LGA) | Port Phillip and Westernport CMA / Cardinia Shire Council (For General BEUs) No Restrictions (for Specific BEUs) |
| | Minimum Strategic Biodiversity Score* | 0.125 |

Note: BEU = Biodiversity Equivalence Units; * Minimum strategic biodiversity score is 80% of the weighted average score across habitat zones where a general offset is required.

5 POTENTIAL IMPACTS

The proposed development is likely to directly impact on several indigenous flora and fauna species, and communities present within the study area. Information on likely and potential impacts to ecological values within and/or adjacent to the study area is provided:

- The study area forms part of the catchment area for wetlands and waterways (e.g. Cannibal Creek, Two Mile Creek) supporting populations of the nationally significant Dwarf Galaxias and Australasian Bittern, and the regionally significant Latham's Snipe. Loss of this catchment area may cause permanent changes to hydrological conditions of waterways downstream of the impact area, including changes to overall availability of water. Such loss may be considered a 'significant impact' under the EPBC Act for all three species (see Section 6.1.4 for more information on implications under the EPBC Act);
- Loss of potential habitat for national (Green-striped Greenhood and Strzelecki Gum), and several State and regionally significant flora species (see Appendix 2.1);
- Loss of potential habitat for national (Southern Brown Bandicoot and Growling Grass Frog), and a range of State and regionally significant fauna species;
- The removal and fragmentation of areas of high quality EVCs (Riparian Scrub, Lowland Forest and Herb-rich Foothill Forest);
- Loss of habitat and potential mortality for locally common fauna species dependent on tree hollows (e.g. Common Brush-tailed Possum *Trichosurus vulpecula*, Eastern Rosella *Platycercus eximius*, Rainbow Lorikeet *Trichoglossus haematodus*, Gould's Wattled Bat *Chalinolobus gouldii*), loose or shedding bark (e.g. Lesser Long-eared Bat *Nictophilus geoffroyi*) and leaf litter and other ground debris (e.g. lizards, snakes, frogs and invertebrates) for foraging, shelter, roosting or nesting;
- Decreased habitat quality downstream of the study area due to inadequate sedimentation controls and subsequent deterioration of water quality;
- Loss of habitat and potential mortality for locally common fauna species dependent on wetlands or inundated areas for foraging, shelter or nesting (e.g. aquatic or wading birds, frogs, microbats);
- Loss of habitat for local populations of Eastern Grey Kangaroo;
- Potential for further habitat fragmentation in a fragmented landscape and the associated creation of barriers to the movement and migration of indigenous fauna;
- Potential for an increase to levels of indigenous fauna roadkill along new or upgraded road alignments due to increased traffic;
- Potential for the spread of weeds and soil pathogens due to on-site activities;
- Disturbance to wildlife from increased human activity and noise during construction; and,
- Indirect impacts on adjacent areas if construction activities and drainage are not appropriately managed.

6 LEGISLATIVE AND POLICY IMPLICATIONS

This section identifies biodiversity policy and legislation relevant to the proposed development, principally:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth);
- *Flora and Fauna Guarantee Act 1988* (FFG Act) (Victoria);
- *Mining Resources (Sustainable Development) Act 1990*;
- *Environment Effects Act 1978* (Victoria);
- *Planning and Environment Act 1987* (Victoria);
 - Local Planning Schemes;
 - Victoria's Native Vegetation Permitted Clearing Regulations.
- *Wildlife Act 1975* and *Wildlife Regulations 2002* (Victoria);
- *Catchment and Land Protection Act 1994* (CALP Act) (Victoria); and,
- *Water Act 1989* (Victoria).

6.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any of the following matters of NES:

- World Heritage properties;
- National heritage places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory and marine species;
- Commonwealth marine area;
- Nuclear actions (including uranium mining);
- Great Barrier Reef Marine Park; or,
- Water resources impacted by coal seam gas or mining development.

6.1.1 Ramsar wetlands of international significance

The study area occurs approximately 25 kilometres upstream of the Western port Ramsar wetland (DoE 2014).

The Western Port Ramsar wetlands are unlikely to be impacted as it is situated a considerable distance from the proposed action. Provided management practices and construction techniques are consistent with Construction Techniques for Sediment Pollution Control (EPA 1991) and Environmental Guidelines for Major Construction Sites (EPA 1996), and pollution run-off and sedimentation via Cannibal Creek / Two Mile Creek and Bunyip River which flows into Western Port Bay is minimised, the project is unlikely to affect the ecological character of any Ramsar wetland.

6.1.2 Threatened species and ecological communities

Flora: There is suitable habitat within the study area for two flora species listed under the EPBC Act (Green-striped Greenhood and Strzelecki Gum) (Section 3.3.1).

Fauna: Two fauna species listed under the EPBC Act (Dwarf Galaxias and Australasian Bittern) have been recorded at Site 14, adjacent to the study area, and there is suitable habitat for two additional species (Southern Brown Bandicoot and Growling Grass Frog) (Section 3.3.2).

The population of Dwarf Galaxias is considered an 'important population', as per the Significant Impact Guidelines (DEWHA 2009), as they are near the limit of the species range. Additionally, they may also be a key source population for breeding or dispersal, and/or necessary for maintaining genetic diversity, however the species dispersal requirements and population structure in the area are unknown. Generally, where scientific uncertainties regarding a determination of significant impacts of matters of NES exist, the precautionary principle applies (DEWHA 2009).

Potential impacts on Dwarf Galaxias have 'a real chance or possibility of' triggering the following EPBC Act Significant Impact Guidelines thresholds for Vulnerable listed species (DEWHA 2009):

- Adversely affect habitat critical to the survival of the species; and,
- Modify, destroy, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Consequently, a referral to the Commonwealth environment Minister is recommended, and a Threatened Species Conservation Management Plan is likely to be required for any development likely to impact Dwarf Galaxias, as detailed in Section 7.

Communities: No ecological communities listed under the EPBC Act are present within the study area (Section 3.3.3).

6.1.3 Migratory and marine species

Thirty-four Migratory and/or Marine species have been recorded within 10 kilometres of the study area (DEPI 2014b; Appendix 3.1). The wetland on the southern boundary of the study area (Site 14) may be considered to be 'important habitat' for Latham's Snipe as defined under the EPBC Act Policy Statement 3.21 *Significant impact guidelines for 36 migratory shorebird species Migratory species*, which states that important habitat for Latham's snipe occurs at sites that:

- Support at least 18 individuals of the species; and,

- Are naturally occurring open freshwater wetland with vegetation cover nearby (for example, tussock grasslands, sedges, lignum or reeds within 100 m of the wetland).

6.1.4 Implications

There is suitable habitat within the study area for two flora species (Green-striped Greenhood, Strzelecki Gum) and five fauna species (Southern Brown Bandicoot, Australasian Bittern, Latham's Snipe, Growling Grass Frog and Dwarf Galaxias,) listed under the EPBC Act. Based on likely impacts to Dwarf Galaxias, potential impacts to Australasian Bittern, Latham's Snipe (and Green-striped Greenhood, Southern Brown Bandicoot and Growling Grass Frog pending the results of targeted surveys), a referral to the Commonwealth Environment Minister will be required.

6.2 Flora and Fauna Guarantee Act 1988 (Victoria)

The FFG Act is the primary Victorian legislation providing for the conservation of threatened species and ecological communities, and for the management of processes that are threatening to Victoria's native flora and fauna. The FFG Act contains protection procedures such as the listing of threatened species and/or communities, and the preparation of action statements to protect the long-term viability of these values.

Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected² flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

Flora: No 'listed' flora species and 16 'protected' flora species (See Appendix 2.1) were recorded within the study area during the field assessment. There is suitable habitat within the study area for several flora species listed under the FFG Act (Section 3.3.1 and 3.4.1).

Fauna: There is suitable habitat within the study area for 13 fauna species listed under the FFG Act (Section 3.3.2 and 3.4.2).

Communities: No ecological communities listed under the FFG Act were recorded, or are modelled to occur within the study area.

Threatening processes: The following threatening processes listed under the FFG Act should be considered in relation to the proposed development:

- Alteration to the natural flow regimes of rivers and streams;
- Alteration to the natural temperature regimes of rivers and streams;
- Degradation of native riparian vegetation along Victorian rivers and streams;
- Habitat fragmentation as a threatening process for fauna in Victoria;
- Increase in sediment input into Victorian rivers and streams due to human activities;

² In addition to 'listed' flora species, the FFG Act identifies 'protected' flora species. This includes any of the Asteraceae (Daisies), all orchids, ferns (excluding *Pteridium esculentum*) and Acacia species (excluding *Acacia dealbata*, *Acacia decurrens*, *Acacia implexa*, *Acacia melanoxylon* and *Acacia paradoxa*), as well as any taxa that may be a component of a listed ecological community. A species may be both listed and protected.

- Invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg.;
- Invasion of native vegetation by ‘environmental weeds’.
- Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis;
- Loss of hollow-bearing trees from Victorian native forests;
- The spread of *Phytophthora cinnamomi* from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority;
- Use of Phytophthora-infected gravel in construction of roads, bridges and reservoirs; and,
- Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.
- Input of toxic substances into Victorian rivers and streams; and,
- Soil and vegetation disturbance resulting from marble mining.

6.2.1 Implications

The local planning authority may consider flora, fauna and communities listed under the FFG Act when making decisions regarding the use and development of land.

There is suitable habitat within the study area for several species listed or protected under the FFG Act. However, the study area is privately owned, as such a permit under the FFG Act is not required.

6.3 Mineral Resources (Sustainable Development) Act 1990

Mineral exploration, extractive industry and mining in Victoria is regulated under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) (DPI 2008). The purpose of this Act is to encourage an economically viable mining industry that operates in a way that is compatible with the environmental, social and economic objectives of the state.

One of the key objectives of this legislation is to establish a legal framework to ensure that mineral resources are developed in ways that minimise the impacts on the environment (DPI 2008). The MRSD Act requires that a licensee proposing to work under a mining licence must submit a work plan. A work plan is not required if the proposed development is:

- On land that has an area of less than five hectares;
- Has a depth less than five metres;
- Does not require blasting; and,
- Does not require clearing of native vegetation (DPI 2010).

If no exemptions apply, then Section 79 of the MRSD Act requires that the work plan include a ‘rehabilitation plan’ for the progressive rehabilitation of land disturbed by the project. A rehabilitation plan must set out the following:

- The concepts for the possible end use of the site;

- The proposal for the progressive rehabilitation to a safe and stable landform of extraction areas including slope batters, road cuttings and dumps;
- The proposals for landscaping to minimise the visual impact of the site;
- Any proposals to protect and conserve native vegetation during the production phase of the operation; and,
- Any proposals for the final rehabilitation and vegetation of the site including final security of the site, securing water dams and slimes dams and removal of plant and equipment.

If native vegetation is present within the study area, the rehabilitation plan must also describe how native vegetation will be protected during the production phase of the project (DPI 2010) as well as:

- Complying with the Commonwealth EPBC Act and the State FFG Act;
- Following Victoria's Permitted Clearing of Native Vegetation: Biodiversity Assessment Guidelines (DEPI 2013a); and,
- Preparing an Offset Management Plan (OMP) if vegetation is removed.

The obligations of the Guidelines are applied through the specific mechanism of the relevant legislation (in this case, the MRSD Act) and where applicable vegetation avoidance and/or minimisation must be demonstrated, then offset any clearing must be applied and documented (DPI 2009).

6.3.1 Implications

A work plan will need to be prepared as the proposed development does not meet any of the exemptions listed above. This work plan will need to comply with the requirements of the MRSD Act, and must include a detailed rehabilitation plan which includes:

- Assessment of pre- and post-mining flora and fauna;
- Provision of habitat corridors;
- Weed management; and,
- Monitoring of flora and fauna (including weeds).

In order for a Work Plan to be approved by DEPI, the department must be satisfied of "all necessary planning consents and approvals" including where Victoria's native vegetation policy requires action has been addressed (DPI 2009). If vegetation is to be cleared then Hansen must prepare an OMP, which is agreed between Hansen and DEPI prior to clearing commencing. Hansen will need to include the relevant requirements of the OMP in their work plan and the DEPI includes relevant conditions in the work plan and/or mining or exploration licence (DPI 2009).

6.4 Environment Effects Act 1978 (Victoria)

The *Environment Effects Act 1978* provides for assessment of proposed actions that are capable of having a significant effect on the environment via the preparation of an Environment Effects Statement (EES). A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred. An action may be referred for an EES decision where:

- One of the following occurs:

- Potential clearing of 10 hectares or more of native vegetation from an area that:
 - is of an EVC identified as endangered by DEPI;
 - is, of Very High conservation significance; or,
 - is not authorised under an approved Forest Management Plan or Fire Protection Plan.
- Potential long-term loss of a significant proportion (1-5% depending on conservation status of species) of known remaining habitat or population of a threatened species within Victoria.
- Potential greenhouse gas emissions exceeding 200,000 tonnes of CO₂ equivalent per annum, directly attributable to the operation of the facility;
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term;
- Or where two or more of the following occur:
 - Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Act or Fire Protection Plan;
 - Matters listed under the FFG Act:
 - Potential loss of a significant area of a listed ecological community;
 - Potential loss of a genetically important population of an endangered or threatened species;
 - Potential loss of critical habitat; or,
 - Potential significant effects on habitat values of a wetland supporting migratory birds.
 - Potential exposure of a human community to severe or chronic health hazards or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport;
 - Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term;
 - Potential significant effects on the amenity of a substantial number of residents, due to extensive, or major long term changes in visual, noise and traffic conditions.

6.4.1 Implications

Based on the current development plan, vegetation proposed to be removed and other associated impacts, the development may trigger the requirement for an Environment Effects Statement (EES). A referral under the *Environment Effects Act 1978* should be considered to ensure that all environmental impacts are considered and mitigated in an appropriate manner prior to development.

6.5 Planning and Environment Act 1987 (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies (Appendix 1.5.3) or a subdivision is proposed with lots less than 0.4 hectares³. Local planning schemes may contain other provisions in relation to the removal of native vegetation (Section 6.5.1).

Where the clearing of native vegetation is permitted, the quantity and type of vegetation to be offset is determined using methodology specified in the Guidelines (DEPI 2013a).

6.5.1 Local Planning Schemes

The study area is located within the Cardinia Shire Council municipality. The following zoning and overlays apply (DTPLI 2014):

- Green Wedge Zone – Schedule 1; and,
- Ecological Significance Overlay – Schedule 1 (ESO1).

6.5.1.1 Implications

The clearing of native vegetation for mining and extractive industries is exempt from the requirement for a planning permit subject to an assessment as part of the work plan approval process (MRSD Act). The removal of native vegetation for the Earth Resources Industry (ERI) is regulated through the Mining and Extractive Industry Work Approvals Process (DPI 2009). A Memorandum of Understanding (MoU) between the former DSE and DPI recognises that native vegetation should be offset in accordance with the relevant legislation (DPI 2007).

It should be noted that the MoU has yet to be updated to reflect the recent (late 2013) changes to Victoria's native vegetation policy. However, the current MOU is to remain in place until a review is completed by DEPI, with the assessment and offset of works to be carried out in accordance with the Guidelines (*pers.comm* Mark Chisholm, Native Vegetation Review Team – DEPI).

6.5.2 The Guidelines

In December 2013 the Victorian Government integrated the 'Permitted clearing of native vegetation - Biodiversity assessment guidelines' (the Guidelines) (DEPI 2013a) into the Victorian Planning Provisions, replacing the *Victoria's Native Vegetation Management – A Framework for Action* (The Framework) (NRE 2002). The primary objective of the regulations is "no net loss in the contribution made by native vegetation to Victoria's biodiversity". The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) of Particular Provisions and Clause 12.01 require Planning and Responsible Authorities to have regard for the Biodiversity Assessment Guidelines.

³ In accordance with the Victorian Civil and Administrative Tribunal's (VCAT) decision *Villawood v Greater Bendigo CC* (2005) VCAT 2703 (20 December 2005) all native vegetation is considered lost where proposed lots are less than 0.4 hectares in area and must be offset at the time of subdivision.

In addition, a permit must be referred to DEPI if vegetation removal meets one or more of the below thresholds (Table 9).

Table 9. Permit to remove native vegetation – application referral triggers (Clause 66, Referral and Notice Provisions)

| | |
|---------------------|---|
| Native Vegetation | <ul style="list-style-type: none"> Remove, destroy or lop native vegetation where the area to be cleared is 0.5 hectares or more |
| | <ul style="list-style-type: none"> Remove, destroy or lop native vegetation which is to be considered under the High Risk-based pathway |
| Other Circumstances | <ul style="list-style-type: none"> Remove, destroy or lop native vegetation if a property vegetation plan applies to the site |
| | <ul style="list-style-type: none"> Remove, destroy or lop native vegetation on Crown land which is occupied or managed by the responsible authority (DEPI) |

6.5.2.1 Implications

Areas of remnant native vegetation, scattered trees and habitat for significant species must be offset if they are proposed to be disturbed as part of the project. The results of the permitted clearing assessment under the Guidelines are presented in Section 4.

6.5.3 Additional information

Given the presence of potentially suitable habitat for Nationally significant species (i.e. EPBC Act-listed species), targeted surveys are required to determine the presence or absence of these species within the study area. If one or more of these species are present an assessment of the species' likely use of the study area (extent or distribution across, and/or adjacent to the study area), the abundance and importance of the habitats within the study area for the species, and the likely or potential impacts to the species associated with the proposed development is required.

Although surveys for State and regionally significant species are not a legislative requirement, there is a requirement for DEPI to consider all state matters listed under the FFG Act as part of the planning and assessment approval process. There is also a possibility that the project will trigger the *Environment Effects Act* and be assessed under an EES, in which case such surveys are likely to be required. As such, targeted surveys for significant flora and fauna species that have the potential to use habitat resources within the study area, either as residents or visitors on a regular, occasional or rare basis is recommended. Targeted surveys should be undertaken as part of the planning and assessment of the proposed development for the following species:

- Nationally significant flora species (Green-striped Greenhood and Strzelecki Gum) and fauna (Southern Brown Bandicoot, Australasian Bittern, Growling Grass Frog and Dwarf Galaxias).
- State-significant flora (Green Scentbark, Long Pink-bells, Marsh Sun-orchid and Swamp Bush-pea) and fauna species (i.e. White-footed Dunnart, Greater Glider, Black Bittern, Lewin's Rail, Baillon's Crake, Masked Owl, Powerful Owl, Barking Owl, Sooty Owl, Southern Toadlet and Swamp Skink); and,
- Regionally significant fauna species (Latham's Snipe) and microbats.

6.6 Wildlife Act 1975 and Wildlife Regulations 2002 (Victoria)

The *Wildlife Act 1975* (and associated *Wildlife Regulations 2002*) is the primary legislation in Victoria providing for protection and management of wildlife. The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The *Wildlife Act 1975* has the following objectives:

- To establish procedures for the promotion of protection and conservation of wildlife, the prevention of species extinctions, and the sustainable use and access to wildlife; and,
- To prohibit and regulate the conduct of those involved in wildlife related activities.

6.6.1 Implications

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

6.7 Water Act 1989 (Victoria)

The purposes of the *Water Act 1989* are manifold but (in part) relate to the orderly, equitable, efficient and sustainable use of water resources within Victoria. This includes the provision of a formal means of protecting and enhancing environmental qualities of waterways and their in-stream uses as well as catchment conditions that may affect water quality and the ecological environments within them.

The study area forms part of the catchment area for wetlands and waterways (e.g. Cannibal Creek, Two Mile Creek). Loss of this catchment area may cause permanent changes to hydrological conditions of waterways downstream of the impact area, including changes to overall availability of water.

6.7.1 Implications

A 'works on waterways' permit from the Port Phillip and Westernport CMA is likely to be required where any action impacts on waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DEPI with the Port Phillip and Westernport CMA included for comment.

6.8 Catchment and Land Protection Act 1994 (Victoria)

The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- Protect water resources;

- Conserve soil;
- Eradicate regionally prohibited weeds;
- Prevent the growth and spread of regionally controlled weeds; and,
- Prevent the spread of, and as far as possible eradicate, established pest animals.

6.8.1 Implications

A number of weeds listed as noxious under the CaLP Act were recorded during the assessment (see Appendix 2.1). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (Spear Thistle, Soursob, Flax-leaf Broom, Gorse, Blackberry). Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements listed noxious weeds should be appropriately controlled throughout the study area to minimise their spread and impact on ecological values, and a Weed Management Plan and pest fauna eradication plan may be required as part of the Work Plan.

7 MITIGATION MEASURES

Any loss of ecological values should be viewed in the overall context of on-going loss, fragmentation, and deterioration in the quality of remnant vegetation throughout the greater Highlands – Southern Fall bioregion.

The current proposal falls under the Moderate Risk-based pathway. As such, the Guidelines require the relevant authorities to consider whether reasonable steps have been taken to ensure that impacts of the proposed removal of native vegetation on biodiversity have been avoided and minimised.

7.1 Minimise Impacts

For the removal of vegetation that falls under the Moderate Risk-based pathway, the Guidelines require the relevant authorities to consider whether reasonable steps have been taken to ensure that impacts of the proposed removal of native vegetation on biodiversity have been minimised. These steps should have regard to the contribution to biodiversity made by the native vegetation to be removed and the native vegetation to be retained.

In this instance, demonstrating minimisation of impacts to native vegetation and habitat values outside of the 100 metre landscape buffer area is difficult given the nature of the proposed development. However, where possible, further mitigation of impacts to remnant vegetation in the south-western portion of the study area, and associated impacts to creeks and tributaries of Cannibal Creek and Two Mile Creek should be seen as a priority.

Potential minimisation and mitigation measures within the study area could include:

- Protection zones (i.e. through fencing) during any future construction phase around areas of native vegetation and trees to be retained (with an area of at least 15 metres around remnant trees);
- Ensuring any proposed works remain within the intended extraction footprint, i.e. not disturbing or removing areas of native vegetation outside the proposed works area. This also applies to machinery storage, materials stockpiles, personnel rest areas and access roads;
- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation within wetlands should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Habitat Zones (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Tree Retention Zones (TRZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2010). See Appendix 1.6;
- Where possible, removal of any habitat trees or shrubs (particularly hollow-bearing trees) should be undertaken between February and September to avoid the breeding season for the majority of fauna species. If any habitat trees or shrubs are proposed to be removed, this should be undertaken under the supervision of an appropriately qualified zoologist to salvage and translocate any