Assessment of Potential Impacts on EPBC Act Threatened and Migratory Species

Introduction

It is recognised that the proposed Flinders development has the potential to have a significant impact on species listed as Threatened under the EPBC Act and therefore the project will likely be a controlled action to allow more detailed assessment to be carried out.

An EPBC Act Protected Matters Search for the site using a 10 kilometre buffer zone identified the following as having potential to occur on, or in vicinity to, the site:

Wetlands of International Importance		
Name	**Proximity**	
Moreton Bay	40 – 50 km upstream	
Listed Threatened Ecological Communities		
Name	**Status**	**Type of presence**
Brigalow (*Acacia harpophylla* dominant and codominant)	Endangered	Known to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Likely to occur within area
Listed Threatened Species		
Scientific name	**Status**	**Type of presence**
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Known to occur
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Likely to occur
Erythrotriorchis radiates Red Goshawk [942]	Vulnerable	Likely to occur
Lathamus discolour Swift Parrot [744]	Endangered	Likely to occur
Rostratula australis Australian Painted Snipe [77037]	Endangered	Likely to occur
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Likely to occur
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat [183]	Vulnerable	Likely to occur
Petauroides Volans Greater Glider [254]	Vulnerable	Likely to occur
Petrogale penicillata Brush-tailed rock-wallaby [225]	Vulnerable	Known to occur
Phascolarctos cinereus Koala (combined populations of QLD, NSW and the ACT) [85104]	Vulnerable	Known to occur
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Known to occur
Plants		
Bosistoa transversa Three-leaved Bosistoa [16091]	Vulnerable	Likely to occur
Bulbophyllum globuliforme Hoop Pine Orchid [6649]	Vulnerable	Likely to occur
Cupaniopsis tomentella Boonah Tuckeroo [3322]	Vulnerable	Likely to occur
Dichanthium setosum bluegrass [14159]	Vulnerable	Likely to occur
Macadamia integrifolia Macadamia Nut [7326]	Vulnerable	Likely to occur
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Likely to occur
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Likely to occur
Planchonella eerwah Wild Apple [17340]	Endangered	Likely to occur
Plectranthus habrophyllus [64589]	Endangered	Likely to occur
Samadera bidwillii Quassia [29708]	Vulnerable	Likely to occur
Thesium austral Austral Toadflax, Toadflax [15202]	Vulnerable	Likely to occur

Other		
Cycas ophiolitica [55797]	Endangered	Likely to occur
Listed Migratory Species		
Scientific name	**Threatened**	**Type of presence**
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]	-	Likely to occur
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	-	Likely to occur
Monarcha melanopsis Black-faced Monarch [609]	-	Known to occur
Myiagra cyanoleuca Satin Flycatcher [612]	-	Known to occur
Rhipidura rufifrons Rufous Fantail [592]	-	Known to occur
Migratory Wetlands Species		
Pandion haliaetus Osprey [952]	-	Likely to occur
Tringa nebularia Common Greenshank [832]	-	Likely to occur

A number of flora and fauna field surveys including desktop (government databases, regional level studies, etc.) and site -specific ecological surveys have been carried out for the site. Specific investigations include:

- General searches and species identification —
  The referral area was traversed by foot to identify and record vegetation communities and flora species. Particular attention was paid to any threatened species that were listed as potentially occurring on or within the vicinity of the referral area and specific micro assemblages which may support these threatened species.
- Observational survey —
  A detailed observational survey of the vertebrate fauna present on or that may utilise the referral area, including faunal lists and significance status of species under the EPBC Act (including listed threatened species and listed migratory species); and Queensland's *Nature Conservation Act 1992* (NCA).
- Descriptions and identifications —
  Descriptions of the major fauna habitats present and identification of habitat values within the area relevant to terrestrial vertebrate fauna, including ecological corridors.

Targeted species surveys

Based on the desktop research and historical knowledge of the referral area, the survey effort for specific threatened species protected under the EPBC Act and NCA is listed below. This list was compiled as a result of a review of the likelihood of each listed species occurring and historical knowledge based on surveys in the region completed by both **Saunders Havill Group** and **James Warren & Associates Pty Ltd.**

Species	Survey methodology
Large-eared Pied Bat *Chalinolobus dwyeri*	Spotlighting, call playback and Echo-meter recording
Boonah Tuckeroo *Cupaniopsis tomentella*	Habitat suitability assessment, incidental surveys and meanders
Spotted-tailed Quoll *Dasyurus maculatus maculatus*	Infa-red motion sensor cameras with baited traps (i.e. targeted searches), spotlighting and incidental diurnal and nocturnal surveys
Collared Delma *Delma torquata*	Habitat suitability assessment, targeted surveys and meanders
Red Goshawk *Erythrotriorchis radiatus*	Diurnal bird surveys, targeted surveys and incidental surveys
Swift Parrot *Lathamus discolor*	Diurnal bird surveys, targeted surveys and incidental surveys
Weeping Paperbark *Melaleuca irbyana*	Habitat suitability assessment, incidental surveys and meanders
Cooneana Olive *Notelaea ipsviciensis*	Targeted surveys, habitat suitability assessments and incidental surveys
Brush-tailed Rock Wallaby *Petrogale penicillata*	Infa-red motion sensor cameras with baited traps, spotlighting and incidental diurnal and nocturnal surveys

Species	Survey methodology
Koala *Phascolarctos cinereus*	Habitat suitability assessment, SAT survey and meanders, spotlighting and diurnal and nocturnal incidental surveys
Flinders Plum *Planchonella eerwah*	Habitat suitability assessment, incidental surveys and meanders
Grey-headed Flying Fox *Pteropus poliocephalus*	Spotlighting, call playback and Echo-meter recording
Black-breasted Button Quail *Turnix melanogaster*	Diurnal bird surveys, targeted surveys and incidental surveys
Shiny-leaved Condoo *Planchonella eerwah*	Habitat suitability assessment, targeted surveys, incidental surveys and meanders
Plectranthus *Plectranthus habrophyllus*	Targeted surveys, habitat suitability assessments and incidental surveys

Threatened and Migratory Species Assessment Summary

A likelihood of occurrence assessment has been carried out using information from the desktop and field surveys assessing the potential for each threatened species and community to utilise the site. For detailed assessment of all species identified by the PMST search refer to the Ecological Assessment Report Attachment.

The Outcomes of these assessments note that there is potential for impacts on:

- Koala (*Phascolarctos cinereus*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)

Table 1: EPBC Act Threatened Species Likelihood of Occurrence Assessment

8020 HABITAT ASSESSMENT FOR LISTED EPBC SPECIES 10km Search						
Matters of National Environmental Significance						
Name		**Status**	**Proximity**	**Description of Community**	**Likelihood of Occurrence**	**Risk**
Wetlands of International Importance	Moreton Bay	RAMSAR Listed	30 - 40 kilometres upstream	The site is located approximately 50 kilometres directly west of Moreton Bay.	There will be no measurable effect on Moreton Bay.	Low Risk
Listed Threatened Ecological Communities						
Name		**Status**	**Type of Presence**	**Description of Community**	**Likelihood of Occurrence**	**Risk**
Lowland rainforest of Subtropical Australia		Critically Endangered	This Threatened Ecological Community is listed as a community that may occur within the area.	Typically there is a relatively low abundance of species from the genera *Eucalyptus, Melaleuca* and *Casuarina*. Buttresses are common as is an abundance and diversity of vines. This community is usually associated Regional Ecosystems 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.16.	No species representing these characteristics or vegetation communities were observed within the assessment area. All regional ecosystem communities mapped on site are associated with land zone 9-10, which is not suitable to this threatened ecological community.	No Risk
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		Critically Endangered	This Threatened Ecological Community is listed as a community likely to occur within the area.	This threatened community is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs and the dominance of White Box, Yellow Box, or Blakely's Red gum trees. This community is usually associated with Regional Ecosystem 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, and 13.12.9. It can also be a small component of Regional Ecosystem 11.3.23, 12.8.16, 13.3.4, 13.11.3 and 13.11.4.	No species representing these characteristics or vegetation communities were observed within the assessment area. All regional ecosystem communities mapped on site are associated with land zone 9-10, which is not suitable to this threatened ecological community.	No Risk
Birds						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**

Anthochaera phrygia	Regent Honeyeater	Endangered	82338	Regent Honeyeaters mostly occur in dry Box-Ironbark Eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites. These areas are generally associated with creek flats and river valleys and foothills. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. They are a generalist forager, which mainly feed on nectar from a wide range of eucalypts and mistletoes.	The site is covered in both remnant and regrowth vegetation communities dominated by eucalypt and Corymbia species, particularly Corymbia citriodora (Spotted Gum) however all riparian areas are highly disturbed from cattle grazing, tree removal and weed invasion. This species relies on vegetation with a diversity of species for food resources throughout the year.	No Risk
Botaurus poiciloptilus	Australasian Bittern	Endangered	1001	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate southeast and southwest. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and / or reeds or cutting grass growing over muddy or peaty substrate. The Australasian Bittern occurs in the far South-East of Queensland; it has been reported North to Baralaba and West to Wyandra, although in most years it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.	No suitable habitat was observed throughout the referral area.	No Risk
Cyclopsitta diophthalmacoxeni	Coxen's Fig Parrot	Endangered	59714	The Coxen's fig Parrot occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. Food is mainly taken from figs however other species fruit have been recorded in their diet including Elaeocarpus grandis, Syzygium corynanthum, Litsea reticulata and Grevillea robusta.	No suitable habitat, including suitable feed trees was observed throughout the assessment area.	No Risk

Dasyornis brachypterus	Eastern Bristlebird	Endangered	533	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedge land, heathland, swampland, shrub land, sclerophyll forest and woodland, and rainforest. It occurs near the coast, on tablelands and in ranges. The Eastern Bristlebird is found in habitats with a variety of species compositions, but is defined by a similar structure of low, dense, ground or understorey vegetation.	The majority of the investigation area contains severe Lantana camara infestations and historical logging and grazing practices. No suitable habitat was observed throughout the assessment area.	No Risk
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	942	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins. Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey.	Due to a lack of records within the local area, it is unlikely that this species will occur. However, possible foraging habitat throughout the mapped remnant areas. There is no evidence of permanent residence on site and very few areas containing permanent water.	No Risk
Geophaps scripta scripta	Squatter Pigeon (southern)	Vulnerable	64440	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	No confirmed local records. The species is now very rarely observed in southern Queensland. Not expected onsite and no direct impact from proposed actions.	No Risk
Grantiella picta	Painted Honeyeater	Vulnerable	470	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips	Due to a lack of records within the local area and south east Queensland, it is highly unlikely that this species will occur. However, vegetation communities typical of this species preferred habitat is observed along Woollaman Creek, which boarders the sites south western boundary.	No Risk

Lathamus discolour	Swift Parrot	Endangered	744	Swift Parrots breed in Tasmania during spring to early summer. During autumn and winter the species migrates to the mainland where it follows a nomadic existence linked to the availability and timing of flowering of trees in various locations. While the species is very uncommon in south-east Queensland, its occurrence cannot be completely discounted. There are suitable winter flowing species present on the site which may attract birds during flowing (e.g. E. tereticornis).	Due to a lack of records within the local area and south east Queensland, it is highly unlikely that this species will occur.	No Risk
Peophila cincta cincta	Black-throated Finch (southern)	Endangered	64447	The Black-throated Finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by Eucalyptus, Corymbia and Melaleuca, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. It occurs at two general locations: in the Townsville region, where it is considered to be locally common at a few sites around Townsville and Charters Towers; and at scattered sites in central-eastern Queensland (between Aramac and Great Basalt Wall National Park). It has been absent from Brisbane and its surrounds since the 1930s.	Due to a lack of records within the local area, it is highly unlikely that this species will occur.	No Risk
Rostratula australis	Australian Painted Snipe	Endangered	77037	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania.	No suitable habitat was observed throughout the referral area.	No Risk
Turnix melanogaster	Black-breasted Button-quail	Vulnerable	923	Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However the species has also been recorded in a variety of low coastal heathlands around Frazer Island and nearby mainland. Deep leaf litter in which the species can forage appears to be particularly favoured.	Habitats on the site are highly disturbed due to prior logging regimes, weed invasion and current pastoral/grazing activities. Although this species is known to favour areas with a dense shrub layer, including thick Lantana camara patches, no evidence (i.e.: platelets) has been observed on site.	No Risk
Fish						

Species	Common Name	Status	EPBC Code	Description of Community / Habitat	Likelihood of Occurrence	Risk
Maccullochella mariensis	Mary River Cod	Endangered	83806	The Mary River Cod occurs mainly in pools within relatively undisturbed tributaries. They prefer relatively large and deep shaded pools with abundant, slowly flowing water.	No suitable habitat to support this species was observed throughout the assessment area. The lack of abundant slowly flowing water was apparent from the traverse of the waterways associated with the site.	No Risk
Frogs						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Mixophyes iteratus	Giant Barred Frog	Endangered	1944	The Giant Barred Frog occurs in rainforests and wet sclerophyll forests in upper to lower catchment areas. This species has been observed to prefer a closed forest canopy with a relatively light cover of vegetation at ground level.	No suitable habitat is observed on or immediately adjacent to the assessment area. All creek lines are highly modified through vegetation clearing and cattle access. No vegetation is described as wet sclerophyll or rainforest occurs on site.	No Risk
Insects						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Phyllodes imperialis smithersi	Pink Underwing Moth	Endangered	86084	The Pink Underwing Moth is found below the altitude of 600m in undisturbed, subtropical rainforest. It occurs in association with the vine Carronia multisepalea.	No suitable habitat to support this species was observed throughout the assessment area.	No Risk
Mammals						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	183	The Large-eared Pied Bat roosts on sandstone cliffs and fertile woodland valley habitat within close proximity of each other. However in South-east Queensland habitat includes rainforest and moist eucalypt forest habitats at high elevations.	No confirmed local records of this uncommon species.	No Risk

Dasyurus maculatus maculatus	Spot-tailed Quoll	Endangered	75184	The Spot-tailed Quoll has a preference for mature wet forest habitat. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. This predominantly nocturnal species rests during the day in dens. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food such as birds and small mammals, and large areas of relatively intact vegetation through which to forage.	No suitable habitat for den sites were observed on site, however, it may be possible that the site could be used for broader foraging purposes. No evidence of Quoll activity was found throughout the field assessment and they are not expected to occur.	No Risk
Petauriodes volans	Greater Glider	Vulnerable	254	The Greater Glider prefers tall eucalypt forests and woodlands. It is found in highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows.	Possible habitat occurs within the northern portion of the assessment area throughout the steep slopes containing a variety of Eucalypt and Corymbia species.	No Risk
Petrogale penicillata	Brush-tailed Rock-wallaby	Vulnerable	225	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks. Most populations have been found on north facing slopes but have occurred on south facing slopes. This species browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Although some of the peaks and ridges on the site contained exposed rocks, these areas did not include overly suitable habitat for the rock wallaby such as dens. However habitat to support this species is considered to occur throughout the broader area as well as towards the northern boundary of the site.	No Risk
Phascolarctos cinereus	Koala	Vulnerable	85104	They are found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland. The species is known from the surrounding area and evidence has been recorded on-site.	Extensive searches of this species, including SAT surveys and spotlighting did not find any individual specimens. However some old scats were observed throughout the site in various locations. The site is highly disturbed through past vegetation clearing and grazing purposes and severe infestations of Lantana camara have also reduced the quality of habitat for this species.	Medium Risk

Pteropus poliocephalus	Grey-headed Flying Fox	Vulnerable	186	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feed son commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.	No camps were observed throughout the assessment area however food resources cover the site. This species is highly likely to occur when the Eucalypts are in flower and was observed throughout the assessment period.	Low Risk
Plants						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Arthraxon hispidus	Hairy-joint Grass	Vulnerable	9338	Hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland.	No suitable habitat was observed throughout the referral area.	No Risk
Bosistoa transversa	Three-leaved Bosistoa	Vulnerable	16091	The Three-leaved Bosistoa is conserved within Mt Warning National Park, Numbinbah Nature Reserve, Limpinwood Nature Reserve and Whian Whian State Forest. While population information is unavailable, it is thought to be common in its range. It generally grows in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 3oo meters in altitude. It is commonly associated with Argyrodendron trifoliolatum, Syzygium hodgkinsoniae, Endiandra pubens, Dendrocnide photinophylla, Acmena ingens, Diploglottis australis and Diospyros mabacea.	No suitable habitat was observed throughout the referral area.	No Risk
Bulbophyllum globuliforme	Miniature Moss-orchid, Hoop Pine Orchid	Vulnerable	6649	The species is a host specific species only growing on Araucaria cunninghamii (Hoop Pine), colonising the upper branches of mature trees in upland rainforest.	No Araucaria cunninghamii (Hoop Pine) specimens were recorded throughout the assessment area or regional ecosystem communities to support this species.	No Risk
Cupaniopsis tomentella	Boonah Tuckeroo	Vulnerable	3322	Boonah Tuckeroo is known only from an area between Boonah and Ipswich in south-eastern Queensland. It grows in vine thickets on fertile clay soils.	No regional ecosystems representative of vine thickets or suitable habitat was observed throughout the assessment area.	No Risk

Lepidiuim peregrinum	Wandering Pepper-cress	Endangered	14035	The Wandering Pepper-cress occurs in open riparian forests on creek banks, and also in the tussock grassland fringe of the riparian area.	All riparian areas contain severe infestations of *Lantana camara*. No suitable habitat was observed throughout the assessment area.	No Risk
Notelaea ipsviciensis	Cooneana Olive	Critically Endangered	81858	The Cooneana Olive survives as an understorey plant in degraded, eucalypt dominated dry sclerophyll vegetation communities. Soils are of low fertility and sandstone based.	This is regarded as one of the rarest plants in Australia with the only known population occurring within an area of less than 2km2.	No Risk
Notelaea lloydii	Lloyd's Olive	Vulnerable	15002	This species occurs on undulating to hilly terrain either in moist gullies or on gentle to steep dry slopes, but is rarely found on rocky outcrops. It is generally found in the ecotone between eucalypt forests and vine thickets.	No suitable habitat was observed throughout the referral area.	No Risk
Phaius australis	Lesser Swamp Orchid	Endangered	5872	The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedge land wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest (Broad-leaved Paperbark/Swamp Mahogany/Swamp Box (Lophostemon suaveolens), swampy rainforest (often with sclerophyll emergent), or fringing open forest. It is often associated with rainforest elements such as Bangalow Palm (Archontophoenix cunninghamiana) or Cabbage Tree Palm (Livistona australis).	No suitable habitat was observed throughout the referral area.	No Risk

Phebalium distans	Mt Berryman Phebalium	Critically Endangered	81869	Mt Berryman Phebalium is found in semi-evergreen vine thicket on red volcanic soils, or in communities adjacent to this vegetation type. Geology of the area in which this species occurs is deeply weathered basalt with undulating to hilly terrain. Soils range from red-brown earths to brown clays (derived from siltstone and mudstones), and lithosols to shallow, gravelly krasnozems (very dark brown loam), derived from the Main Range Volcanics of the Tertiary period. Vegetation associations in which Mt Berryman Phebalium occur include microphyll to notophyll vine forest with or without Araucaria cunninghamii and low microphyll vine forest and semi-evergreen vine thicket with or without Araucaria cunninghamii which can be divided further into regional ecosystems depending on substrate, geography and associated vegetation species.	No suitable habitat was observed throughout the referral area.	No Risk
Planchonella eerwah	Shiny-leaved Condoo	Endangered	17340	Populations within the Ipswich-Beaudesert areas occur in small remnants of notophyll vine forests with emergent on rocky slopes and drainage lines. These forest types are generally dominated by Flindersia species with occasional emergent Hoop Pine and Harpullia pendula (Tulipwood).	No species representing these characteristics or vegetation communities were observed within the assessment area.	No Risk

Plectranthus habrophyllus	Plectranthus	Endangered	64589	Plectranthus is restricted to SEQ near Ipswich and Ormeau and is known from six locations including Oxley Creek, Greenbank; Opposum Creek, Springfield, Woogaroo Creek, Goodna; three populations within White Rock Conservation Park incorporating Six Mile Creek Conservation Park; and near Ormeau, south of Beenleigh. Specific habitat characteristics have the plant growing on chert or sandstone outcrops in open woodlands often in shaded situations near vine forest.	Limited habitat was observed throughout the referral area, with the most suitable areas located along Undullah Creek. The referral area is highly disturbed, further limiting suitable habitat for this species. Although not recorded at the time of the assessment, this species has the potential to occur.	Low Risk
Thesium australe	Austral Toadflax	Vulnerable	15202	Austral toadflax is semi-parasitic on roots of a range of grass species, most notably, *Themeda triandra* (Kangaroo Grass). Previously recorded within open woodland with Eucalyptus tereticornis (Forest Red Gum) and Eucalyptus tindaliae (Tindale's Stringybark).	The site is highly disturbed however some potential habitat is recorded on site towards the northern boundary. Not recorded at the time of the assessment and this species has minimal potential to occur. No risk of occurrence due to disturbance from cattle.	No Risk
Other						
Cycas ophiolitica		Endangered	55797	Cycas ophiolitica inhabits open forest and woodland communities with a grassy understorey. It will grow on hills and slopes in sparse, grassy open forest at altitudes ranging from 80-620m above sea level.	Although not observed at the time of the assessment, the site contained some habitat to support this species, particularly towards the sites northern boundary towards the ridge lines.	No Risk
Reptiles						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**

Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	Vulnerable	59628	Found mostly in closed forest and possibly open layered Eucalyptus forest. Generally recorded in moist layered forest on loamy basaltic soils, but also found in closed forest overlying silica sand dunes at Cooloola. Within forests, this species is found in well-mulched, loose, friable rainforest soil in leaf litter, often immediately adjacent to fallen tree trunks. Much of the lowland closed forest within its range has been cleared for agriculture and grazing, pasture improvement, crop production, tropical fruit production, and native forest logging. Suitable habitat has generally been reduced to patches, especially in lowland areas.	No suitable habitat was observed throughout the referral area.	No Risk
Delma torquata	Collared Delma	Vulnerable	1656	In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket.	The site is covered in both remnant and regrowth vegetation communities dominated by Eucalypt and Corymbia species. A large portion of the site is currently utilised for grazing purposes and is also periodically slashed, which is unsuitable for this species. However the peaks and ridgelines towards the north of the survey area provide some suitable habitat for this species.	Low Risk
Furina dunmalli	Dunmall's Snake	Vulnerable	59254	Dunmall's Snake has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils. Dunmall's Snake occurs primarily in the Brigalow Belt region in the South-eastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level. The snake is very rare or secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between	No suitable habitat was observed throughout the referral area.	No Risk

				Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park.		
Listed Migratory Species						
Migratory Marine Birds						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Apus pacificus	Fork-tailed Swift	Migratory	678	This species is almost exclusively aerial and mostly occur over inland plains but sometimes above foothills or in coastal areas.	Possible as a fly over species however no impact to this species is likely to occur.	No Risk
Migratory Terrestrial Species						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Cuculus optatus	Oriental Cuckoo	Migratory	86651	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types	Due to the disturbed nature of the site it is highly unlikely this migratory species would utilise the site	No Risk
Hirundapus caudacutus	White-throated Needle tail	Migratory	682	The White-throated needle tail is almost exclusively aerial. This species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests.	Low potential to occur on site within roosting periods.	No Risk

Monarcha melanopsis	Black-faced Monarch	Migratory	609	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine forests, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest.	No suitable habitat was observed throughout the referral area.	No Risk
Monarcha trivirgatus	Spectacled Monarch	Migratory	610	The Spectacled Monarchs natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests. Its preference is for thick understorey areas.	No suitable habitat was observed throughout the referral area.	No Risk
Myiagra cyanoleuca	Satin Flycatcher	Migratory	612	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt dominated forests and taller woodlands, and on migration occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	No suitable habitat was observed throughout the referral area.	No Risk
Motacilla flava	Yellow Wagtail	Migratory	644	This insectivorous bird inhabits mostly well-watered open grasslands and the fringes of wetlands Roosts in mangroves and other dense vegetation. Listed as an extremely uncommon migrant to Australia under the draft referral guideline for 14 birds listed as a migratory species under the EPBC Act.	Observations of this species have been primarily from NSW. This migratory species may be present but highly unlikely due to lack of historical observations or suitable roosting habitat.	No Risk
Rhipidura rufifrons	Rufous Fantail	Migratory	592	The Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts such as Eucalyptus microcorys, Eucalyptus pilularis, Eucalyptus resiniferia and a number of other Eucalyptus species.	Limited habitat was observed throughout the assessment area however potential to occur especially towards the site southern boundary.	No Risk
Migratory Wetland Species						
Species	**Common Name**	**Status**	**EPBC Code**	**Description of Community / Habitat**	**Likelihood of Occurrence**	**Risk**
Pandion haliaetus	Osprey	Migratory	952	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers.	No suitable habitat was observed throughout the referral area.	No Risk

Gallinago hardwickii	Latham's Snipe	Migratory	863	Latham's Snipe occurs in permanent and ephemeral wetlands. They usually inhabit open, freshwater wetlands with low, dense vegetation.	No suitable habitat was observed throughout the referral area.	No Risk
Tringa nebularia	Common Greenshank	Migratory	832	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. The species is known to forage at the edges of wetlands in soft mud or mudflats.	No suitable habitat was observed throughout the referral area.	No Risk

Threatened Species Impact Assessment

To assist proponents to determine if their proposed action is likely to have a significant impact on Matters of National Environmental Significance (MNES), the Commonwealth Government produced a series of guidelines on significant impacts. Relevant to this project are the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* and the *EPBC Referral Guidelines for the Vulnerable Koala*.

The Koala referral guidelines apply a Habitat Assessment Tool to determine the potential presence of habitat critical to the survival of the Koala. Under the Habitat Assessment Tool, the referral site scores and 8 (refer below), suggesting that the site contains critical habitat and so the action requires referral.

Attribute	Score	Comment
Koala occurrence	**+2 (High)**	Desktop A Protected Matters Search using a 10 km radius identified the Koala as having the potential to occur on site. A Wildlife Online search report using a 5 kilometre radius found records of the Koala. Koalas are known to occur in the wider Greater Flagstone area.
		On-ground No Koalas were sighted within the referral area during the survey period. Additionally, no Koalas were recorded on motion sensor cameras deployed continuously prior to, during, and post the field survey period. Evidence of Koala activity (e.g. scats) were observed in several locations across the site. **As there is evidence of one or more Koalas within the last two years, the 'Koala Occurrence' attribute has been given a score of +2 (High).**
Vegetation composition	**+2 (High)**	Desktop The Queensland Government Regulated Vegetation Supporting Map (Regional Ecosystem V8.0) identifies the study area as predominately conditioning Category X (non-remnant) vegetation with the northern portion of site mapped as containing Category B remnant vegetation (refer to EAR).
		On-ground The site contains a mix of recognised Koala trees in varying densities and remnant status. **Two or more Koala food trees were identified in the canopy, resulting in an attribute score of +2 (High).**
Habitat connectivity	**+2 (High)**	Connectivity toward the east and south of the site is limited by extensive clearing for pastoral pursuits. The area to the east has proposed development associated with the Greater Flagstone PDA, which will continue to increasingly expanded within the surrounding area, further fragmenting the surrounding landscape. A controlled action determination has been made over properties to the east within the PDA. The site adjoins the relatively extensive Flinders-Karawatha Bioregional Corridor to the north and Woollaman Creek to the south. The proposal intends to retain connectivity to the north and west along waterways within Open Space. Review of aerial imagery shows the site, and adjoining allotments, were subject to broad scale clearing. Large portions of the site have been regularly maintained and are

Attribute	Score	Comment
		predominately cleared of vegetation. As such, connectivity to the south is largely non-existent. **The potential connectivity of remaining vegetation within the northern extent to adjoining bushland associated with the Finders-Karawatha Bioregional Corridor results in a 'habitat connectivity' score for this Zone of + 2 (High).**
Key Existing Threats	**+1 (Medium)**	A number of existing threats pose risk to survival of local Koala populations. These include: **Vehicle Strike:** A review of the **Australian Koala Foundation** Koala map shows a number of verified sightings for Koala within close proximity to the site were made along major roads including Greenbank Road (80kph), Teviot Road (80kph) and Mount Lindesay Highway (100kph). The location of these sightings, indicates the risk of vehicular strike is considerably high. Additionally, it is noted that anticipated growth and planned upgrades to Teviot Road and Mount Lindesay Highway will result in increased traffic flows. **Dog Attack:** The **Ipswich Koala Protection Society** holds substantial records for both frequent and regular koala mortality from vehicle strike and dog attack within the immediate proximity of the project site. **Logan City Council** states on their website that on average, approximately 110 Koalas are attacked and killed by dogs each year. Further, between 1997 and 2008, **EHP's** Moggill Koala Hospital and the Australian Wildlife Hospital at Beerwah admitted around 1400 Koalas that had been attacked by dogs Dog ownership in rural residential areas is considerably high, with properties > 600m^2 allowed to keep 2 dogs without or up to 4 dogs with Council approval. **As threats from vehicle strikes and dog attacks are present in the area, the 'Key Existing Threats' attribute has been given a score of +1 (Medium).**
Recovery value	**+1 (Medium)**	It is uncertain whether the vegetation on the referral site is important in achieving the Interim Recovery Objectives for the coastal context given its foundation on the ability to protect and conserve large connected areas of Koala habitat. Koala Context Attributes listed under Interim Recovery Objectives in Table 1 of the Guidelines for coastal areas are to: 1) Protect and conserve large, connected areas of Koala habitat, particularly large connected areas that support koalas that are: • of sufficient size to be genetically robust or operate as a viable sub-population, or; • are free of disease or have a low incidence of disease, or; • are breeding. 2) Maintain corridors and connective habitat that allow movement of koalas between large areas of habitat. The site is zoned Emerging Community, maintains a Preliminary Approval and is located adjacent to a Priority Development Area as identified under state planning instruments. It is part of a broader area designated for urban development to cater for future population growth. The fact that it has been strategically designated as an urban development area under state and regional planning supports the position that the subject site does not have an important conservation or recovery value.

Attribute	Score	Comment
		The site is relatively disturbed from cattle grazing and as a result suffers from heavy infestations of invasive weeds. Retention of vegetation along waterways will provide connectivity to the Flinders-Karawatha Bioregional Corridor. No evidence of breeding was recorded on-site and the local Koala population is not considered genetically distinct from other Koala populations in South East Queensland. While the health of local Koalas is unknown, diseases such as Chlamydia and Koala Retrovirus are extremely prevalent amongst South East Queensland Koalas. It is generally understood that corridor areas provide most effective habitat value and connectivity when edge effects are minimised (Hill & Curran 2003). The subject site is bordered by the PDA to the east and cleared rural properties to the south. As such, within the broader landscape the survey area is considered of compromised value for Koala dispersal, recovery and persistence. In summary, the recovery value of the site is compromised by its urban designation, the expansion of existing and approved development within the local area and existing disturbances from historical logging and agricultural land uses. **The 'Recovery Value' attribute has been given a score of +1 (Medium).**
Total	**8**	**As the habitat score is more than 5, this referral area is considered to provide Critical Habitat for the Koala.**

The *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* state that:

An action is likely to have a significant impact on a threatened species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population (or any population for endangered and critically endangered species);
- reduce the area of occupancy of an important population (or the species in general for endangered and
- critically endangered species);
- fragment an existing important population into two or more populations (or any population or endangered and critically endangered species);
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population (or any population for endangered and critically endangered species);
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

The site is not considered to accommodate important populations of Koala or the Grey-headed Flying-fox given the low levels of indirect or foraging activity recorded. Likewise, no evidence of breeding was recorded and the action is not considered likely to cause a decline in the population, interfere with the recovery of the species, nor exacerbate existing levels of disease or invasive species (refer Habitat Assessment Tool).

Of these items, potential impacts on habitat critical to the survival of the Koala are likely under the proposal, therefore it is considered likely that the action will have a significant impact. As Grey-headed Flying–fox forage on the same habitat and were recorded doing so on-site, by default impacts on this species are considered a possibility.

Management Measures

A number of design construction and management measures will be implemented to reduce the overall environmental impact of the project. Many of these are mandatory and based on Local and State legislation or embedded in the Material Change of Use approval over the site (refer Attachment). Development measures to be employed are outlined in this section of the referral.

Site Selection for Development

The application site has been earmarked by the State and Local Governments as a suitable site for future urban development. There are very few sites in Queensland with easy connection to existing transport facilities and major infrastructure that can result in such a large development outcome (population base) with relatively limited environmental, economic and social impacts.

It is acknowledged in this referral and Ecological Assessment Report EPBC Act Referral (refer Attachment) notes that the site retains remnant vegetation and other habitat features, importantly, to implement the development the following core impacts do not occur:

1. No Threatened Ecological Communities are located on the site.
2. No Remnant Endangered Regional Ecosystems are located on the site.
3. Minor clearing of Of Concern and Least Concern Remnant Regional Ecosystems.
4. No development is proposed in Costal Management or Hazard areas.
5. No development is proposed in Wetlands.
6. The site is not located within a Koala assessable area of the Planning Regulation

Site Design

The approved Land Use Plan (refer Attachment) will guide the development layout and reduce potential impacts by concentrating development in degraded land and lower value habitat areas with a focus on retaining higher value ecological features and site habitat opportunities within the drainage line corridors. vast majority of clearing will occur in non-remnant areas and a small area of low order remnant communities with a state classification of Least Concern and Of Concern due to their abundance remaining within the immediate bioregion.

Key features of the site design considered to minimise impacts include:

- Retention of drainage line corridors which connect to the Flinders-Karawatha Bioregional Corridor
- Retention and rehabilitation of Linear Open Space along waterways which provides connectivity to Woollaman and Undullah Creeks
- Retention of a Primary Koala habitat tree species within the Linear Open Space.

- Buffers to waterway corridors and adjoining lands
- Retention of major drainage lines and important connective areas

Further Assessment, Studies and Pre-clearance Surveys

The assessment and approval process requires the submission and review of multiple stages of applications prior to the commencement of works. The existing approval over the referral site is an overarching Material Change of Use (refer Attachment). Prior to commencement of any actual works on the ground, the following sequential submissions must be lodged and approved:

1. Lodge and receive approval for Plans of Development (similar to Plans of Subdivision or reconfiguration)
2. Operational Works or Compliance Assessment Approval (Actual Works approvals, roads, tree clearing, landscaping, etc)

Each of these submissions and approvals require differing environmental surveys, studies, constraint planning and reporting based on the smaller area in which the application applies. At the Operational Works / Compliance Assessment phase, detailed reporting and mapping is converted into management and rehabilitation plans protecting environmental values during construction and establishing operational measures to ensure enhancement.

Pre-Clearance Surveys

Once approvals for actual on-ground works have been issued (Operational Works / Compliance Assessment) pre-clearance surveys for flora and fauna are required in advance of any clearing. These surveys form part of the extensive management plans provided in support of final approvals.

Detailed Design Considerations (Roads)

At the Plan of Development Scale (Subdivision Design), tweaking of road locations, setbacks and earthworks will occur to ensure the corridor areas are protected and enhanced. This is particularly the case where roads traverse and adjoin corridors. All new roads will be designed in accordance with the Queensland Department of Transport and Main Roads Fauna Sensitive Road Design Manual (Volumes 1 and 2). Some of the aspects and practices outlined in this manual and to be incorporated into the proposal include:

Safe Passage Road Fauna Movement Solutions

Where internal roads within the project are required to cross waterways, bridges and or specific fauna movement culverts will be incorporated into the design. These structures will be designed and sized to cater for the movement of native fauna anticipated to utilise the waterway corridors. Fauna underpasses will be exclusively designed for fauna and separate to hydrology devices. The safe crossing movement solutions will be augmented by directional fauna exclusion fencing to ensure animals are funnelled away from vehicle conflicts and into safe passage areas. Where required, additional large tree plantings will be installed either side of a constructed road crossing to reinstate as quickly as possible a closed canopy over the new road infrastructure. Where considered necessary, rope tunnels and other canopy linking structures will be provided to cater for the time lag between clearing and the re-establishment of suitable vegetation.

At a smaller scale, the design of roads near to waterway corridors area will adopt traffic calming and reduced speed signage to control vehicles adjoining sensitive areas.

Detailed Design Considerations (Storm Water and Landscaping)

Importantly, the application process requires the consideration of Storm Water treatment and Landscape outcomes.

Management Measures

In addition to mitigation outcomes incorporated in the design process, a number of management measures are proposed to ensure impacts are avoided and or minimised through the construction and operational phases. These include:

a. Confirmation and Pre-Clearance Surveys

As a result of the likely time delay from preparation of assessment reports to approvals and again through the sequencing of development precincts and clearing works, it is a requirement that a system of pre-clearance surveys are conducted prior to each stage of actual site clearing. These surveys can be used to safeguard the site against changing Commonwealth, State and Local government species listings and inform management plans relative to the natural features in each Context Plan and Plan of Development.

b. Vegetation Clearing and Management Plan

A Vegetation Clearing and Management Plan (VC&MP) will form part of a broader management document submitted which each stage of the operational works package. The VC&MP will be critical to limit vegetation clearing to only what is required within each stage of works to help control erosion and sediment control risks and provide for the long term sequencing of clearing over the application area. The likely contents of each VC&MP include:

- Clearly show all trees to be removed and retained
- Include details of all civil works likely to impact on existing vegetation
- Temporary and permanent exclusion and protection fencing tor riparian corridors and parklands
- Roles and responsibilities for site contractors, developer and the consultant group
- Stockpiling and site access locations
- A clearing sequencing plan showing the commencement of clearing and direction of removal (this should be in conjunction with the Fauna Management Plan to allow for the appropriate flushing of fauna towards surrounding safe haven areas.
- Links to weed management and revegetation proposals
- The stock piling and reuse of cleared vegetation
- Specific details on the removal of previously identified potential fauna habitat trees
- Where trees are shown to be retained within disturbance zones they should be accompanied by necessary arborist specifications incorporated into the VC&MP.

c. Fauna Management Plan

A Fauna Management Plan (FMP) should be prepared for the impacts of the construction phase covering for the loss of vegetated areas, isolated trees and barriers and impediments to dispersal. The FMP should link closely with the VC&MP and include details on:

- Summary of species surveyed as using the site and which of those are likely to be impacted by works occurring within each stage of works
- List relevant State and Federal legislation constraints and controls for the above listed fauna
- A plan showing existing habitat opportunities and locations
- Detail the threats for existing fauna species
- Include clearing sequencing plan from VC&MP
- Specify management and mitigation measures – could include temporary use of fauna exclusion fencing

- Details of fauna spotter role and contacts and certification
- Specific fauna management procedures for potential or known habitat trees
- Commitment to the early installation of nest boxes to surrounding bushland areas to be retained
- Commitment to the early rehabilitation of proposed strategic corridors to minimise lag time between clearing and the functioning of future corridors

d. Fauna Spotter Roles and Reporting

The Fauna Management Plan will be implemented by an EHP registered wildlife spotter / catcher. This role is mandated for any clearing of native vegetation in Queensland. The role of the Fauna Spotter is to complete an assessment of the works area no more than two weeks prior to the works actually occurring and present a report on the findings and how the proposed clearing is to be managed. The Fauna Spotter / Catcher is required at the pre-start meeting and to be on-site during all times of construction. Under the Nature Conservation Act 1992, registered Fauna Spotter / Catchers must complete a return of operations report to the Queensland State Government stating all fauna encountered and the specific management measures used to ensure the safety of native animals.

e. Rehabilitation and On-Going Management Plan

Detailed Rehabilitation Plans will be prepared in accordance with the South East Queensland Restoration Framework are subject to assessment by LCC.

f. Stormwater Quality Management Plan / Erosion and Sediment Control Plans

A detailed Stormwater Quality Management Plan and Erosion Sediment Control Plan will be prepared covering both the construction and operational phases for each stage of works. The plan will contain details on the exact location of stormwater treatment systems, including structural and surface treatment devices. The plan will include details on:

- Objectives, monitoring, reporting, actions for non-compliance
- Identification of possible sources of water pollution including nutrients and contaminates
- Details on management and quality devices proposed.
- Erosion and Sediment Control Plan

Operational Measures

The proposal is a large scale residential project and at completion will include many variable precincts and land uses over the tenure of the project. Development densities increase with proximity to local centres with built environments containing medium density development. Areas away from centres are expected to be less dense and in areas integrated within surrounding environmental values. Within some of these stages, a number of potential operational awareness tools and, in some areas, specific regulations are likely to be applied.

a. Lifestyle Guidelines – New Residents Awareness

As part of the release of new Plan of Development Areas which adjoin or are in close proximity to sensitive receiving environments, the proponent will prepare a lifestyle guideline document to help promote a range of ecological sustainable living principles. Development areas directly adjoining waterway corridors will be targeted for a tailored lifestyle guidelines document. The guidelines should be used to directly educate and raise awareness of a large audience towards the management of surrounding creeks, bushland, and other conservation areas including the nearby Flinders-Karawatha Bioregional Corridor. Topics within the education documents will include:

- Appropriate plant selection on allotments

- Inappropriate planting species (known local or declared weed species)
- Management of household scale run off
- Protection of native animals and the types residents could expect to see
- Understanding storm water devices
- Appropriate management of domestic animals
- Location of dog on-lead and off-leash areas
- Key local and state phone numbers to contact if distressed or orphaned fauna is located.

Through raising awareness, the lifestyle guidelines will help new residents take direct ownership of the local streetscapes, immediate creek corridors and open space infrastructure.

b. Detailed Landscape Submissions

A non-invasive, locally endemic species palette will be adopted throughout all project areas providing the following ecological benefits:

- Additional native trees, shrubs and ground covers for native fauna known to adapt to fringing urban environments
- Reduce the potential for non-native and exotic landscape species invading retained bushland and waterway areas
- Reduce maintenance and fertiliser requirements
- Provide an in-ground example to future residents of a practical suite of working native plants for incorporation into private gardens.
- Help establish a more sustainable and robust connected link along Sandy Creek and other site tributaries.

c. Cat and Dog Restrictions

The variability of the proposed development areas within the proposal do not feasibly support wholesale cat and/or dog restrictions on private allotments. For the bulk of the project area, a broad non-mandated animal control scheme will be proposed which is likely to include the following features:

- Broad resident education on responsible domestic animal ownership within the area
- Dog on-lead areas within and adjoining designated conservation areas – supported by notification and education signage
- Specific dog off-leash areas in support of controls in other locations
- Logan City Council Animal Control Local Law which requires registration, vaccinations, etc. will apply throughout the project.

In a limited number of locations, more stringent private allotment animal controls will be applied. These areas will likely be along areas which adjoin the Flinders–Karawatha Bioregional Corridor. In these locations, controls will vary from complete prohibition to limiting the number and size of animals allowable on individual allotments. These controls are regulated through the application of a covenant on the created allotment prescribing the prohibition or restriction on the allotment title making purchasers aware up-front and allowing the controls to apply in perpetuity.

d. Building Envelopes / Vegetation Protection / Covenants

In the precincts surrounding the local centres allotments and densities will be more intense. Based on the type of development, there are very few opportunities where existing native trees can be safely retained and protected in

private property. The exception is in the western and northern extents of the project where steep grades substantially limit the ability to create smaller allotments. These locations present an opportunity to establish larger allotments where vegetation is retained and protected through building location envelopes. Again, where these controls are considered appropriate, covenants will be used to enforce the controls on allotment titles.

e. Offsets

It is presumed that an offset for impacts on critical habitat for the Koala and Grey-headed Flying-fox will be required for the project to proceed.

Summary

Under the proposed action, the clearing of habitat critical to the survival of the Koala is considered likely to have a significant impact on the Koala and potentially the Grey-headed Flying-fox. A raft of management measures outlined above are intended to mitigate these impacts.