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KOALA MANAGEMENT MASTER PLAN

Gainsborough Greens,
Yawalpah Road, Pimpama QLD.

June 2013

**Habitat Environment
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Pty Ltd**

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CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

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TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	1
2.0	INTRODUCTION	1
1.1	Location and Site Description	2
1.2	Development Proposal	2
3.0	KOALA LEGISLATIVE REQUIREMENTS.....	4
2.1	Nature Conservation (Koala)Conservation Plan 2006 and Management Program 2006-2016	4
2.2	State Planning Policy 2/10: Koala Conservation in South East Queensland	4
2.3	South East Queensland Koala Conservation State Planning Regulatory Provisions	5
2.4	Environment Protection and Biodiversity Conservation Act 1999.....	7
4.0	History of Koala Management	8
3.1	Precinct 1.....	13
3.2	Precinct 2.....	15
3.3	Precinct 3.....	16
3.4	Precinct 4.....	19
3.5	Precinct 5.....	20
3.6	Precinct 6.....	20
3.7	All Precincts.....	25
3.8	Community Engagement and Education	27
5.0	KOALA MANAGEMENT PLAN.....	28
5.1	Vegetation Communities	28
5.2	Koala Management Areas.....	28
5.3	KMA 1 - Development Footprint	31
5.3.1	Management Objectives	31
5.3.2	Vegetation Clearing Practices.....	31
5.3.3	Koala Management.....	31
5.3.4	Koala Operational Works Actions.....	31
5.4	Adaptive Management	32
5.5	Koala Protection Fencing	32
5.6	Koala Management Conclusions.....	32
6.0	Native Fauna Protection Strategy	33
7.0	REFERENCES.....	36

LIST OF APPENDICES

APPENDIX A: Example - Gainsborough Greens, Precinct 1, Native Fauna Protection Strategy Map	A
APPENDIX B: Approved Gainsborough Greens Master Plan	B
APPENDIX C: Koala Exclusion Fencing.....	C
APPENDIX D: Gainsborough Greens, Forest Greens Resident Induction	D
APPENDIX E: Plan of Management - Koala	E

APPENDIX F: Fauna Management Strategy F

LIST OF FIGURES

Figure 1: Site Location Gainsborough Greens 3
Figure 2: State Planning Policy 2/10 - Koala Habitat Values 4
Figure 3: State Planning Regulatory Provisions - Assessable Development Koala Habitat Values 5
Figure 4: Site Based Koala Habitat Value 6
Figure 5: Nest Boxes Compensatory Area 23

1.0 EXECUTIVE SUMMARY

This Koala Management Master Plan was prepared for the Gainsborough Greens Development at Yawalpah Road, Pimpama. It was considered necessary to prepare a document that reviews all previous fauna and flora approved reports over the site with respect to koala management in order to provide a consolidated point of reference for the range of initiatives set forward for the preservation of koalas. In total, 26 documents have been reviewed as part of this report. All reports have previously been approved by State or Local Government for different areas of the Gainsborough Greens development. The reports detail the range of efforts that have been approved over the years and support the framework for their implementation through Conditions of Approval and links to Operational Works. The efforts delivered to this date include the following:

1. detailed ecological investigation of the site to determine flora and fauna communities, habitat features, significant habitat, significant flora and significant fauna value;
2. investigations into koala movements within the Gainsborough Greens site to determine high value habitat;
3. investigation into wider koala movements through the Gainsborough Greens site to determine regional corridor requirements;
4. numerous tree surveys and fauna surveys to inform the retention of high value habitat;
5. the preservation of habitat within Gainsborough Greens and the restoration or enhancement of areas that may provide a strategic advantage to the movement of koalas across the site;
6. The retention of large corridors through the site incorporating the existing golf course and open space areas;
7. Enhancement of golf course land to improve opportunities for koala movement;
8. Weed eradication and rehabilitation of degraded areas to further provide important linkages or support threatened ecological communities;
9. Offset planting and habitat creation in compensation for habitat loss;
10. Staged clearing in accordance with the Nature Conservation (Koala) Conservation Plan 2006;
11. Koala Spotter Catcher present during operational works;
12. Koala exclusion fencing where required to direct koalas to safe habitat;
13. Koala friendly fencing where suitable to allow unimpeded movement;
14. Speed limiting devices for vehicles and signage;
15. Koala sensitive lighting;
16. Rehabilitation of retained areas of vegetation; and
17. Interpretive koala signage and education for new residents.

2.0 INTRODUCTION

Habitat Environment Management (Trading) Pty Ltd ('Habitat') was engaged by Mirvac Pacific Pty Ltd ('the client') to prepare a Koala Management Master Plan for the Gainsborough Greens residential development at Yawalpah Road, Pimpama, Queensland ('the site'). This Koala Management Master Plan is required in support of the recent referral under the *Environment Protection and Biodiversity Conservation Act 1999* for the above mentioned development. This Koala Management Master Plan reviews all previous investigations and

management plans pertaining to koalas prepared for the site over the past nineteen(19) years in order to provide a consolidated point of reference and overarching management plan that will inform future detailed koala management plans. This management plan supports alternative methods for the protection of koalas to those contained within early plans by Habitat and others to reflect agreements made between the applicant and Gold Coast City Council, the Department of Environment and Resource Management, and the Department of Sustainability, Environment, Water, Population and Communities. It has been established that the alternative measures will achieve an equivalent or more likely, improved outcome for koalas than the original protection methods.

All previous investigations and management plans are Approved Reports by the Gold Coast City Council and where relevant, the State of Queensland for the purpose of development approval.

The purpose of this Koala Management Master Plan is to:

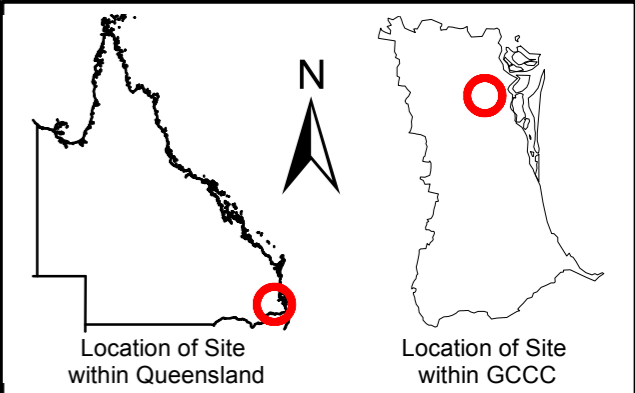
- Review all previous investigations and management plans within all precincts of the Gainsborough Greens development pertaining to koalas;
- Provide a consolidated reference for an up to date summary of approved koala management reports and agreements made for koala preservation across the entire site;
- Provide an overall direction to inform future precinct specific management plans;
- Demonstrate how Koala Habitat values are to be protected or enhanced, including how potential threats to Koala Habitat values will be eliminated or where required, managed;
- Describe actions and processes that will be undertaken to manage habitat before, during and after construction within the development site and, if required, additional actions and processes off-site.

1.1 Location and Site Description

Gainsborough Greens is located approximately 3 km east of the Pacific Highway on Yawalpah Road, Pimpama, in the northern Gold Coast region. Yawalpah Road runs along the southern boundary of the site, with the eastern and western boundaries bounded by Kerkin Road the Old Pacific Highway respectively. To the north the site is bounded by rural properties (**Figure 1**).The topography of the site can be described as undulating hills with 5-10% slope. Remnant vegetation communities are present within the site in addition to essential habitat mapping. A number of artificial and natural waterways and wetlands occur within the site.

1.2 Development Proposal

At the time of the writing of this report, the development footprint was interpreted from the Master Plan (**Appendix A**), dated 9 January 2013, prepared by Land Partners. This plan details that the proposed development will consist of a master planned community including a mixed use urban village surrounded by a range of residential housing options and supporting land uses, an internal road network and large areas of open space. The total site area is approximately 500 ha. The development footprint occupies approximately 180 ha inclusive of local parks and roads. The balance is retained for conservation and open space including the existing golf course which is to be enhanced for koala movement as part of the proposed development.



- Legend**
- Site Locality
 - Gold Coast City North Cadastre (2006)
 - Development Footprint

Figure 1:
Location of Gainsborough Greens

Client:
Mirvac Pty Ltd

Address:
Gainsborough Greens Golf Course
Yawalpah Road,
PIMPAMA QLD

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Scale: As Shown	Paper: A3	Reference: DERM 2006; Near Map 2011
Drawn: HB	Date: May 2013	
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3.0 KOALA LEGISLATIVE REQUIREMENTS

2.1 Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016

The effect of the Nature Conservation (Koala) Conservation Plan 2006 (the Koala Plan) and management program that relate to planning and development assessment have been replaced by the new koala planning instruments (*South East Queensland Koala Conservation State Planning Regulatory Provisions* and *State Planning Policy 2/10: Koala Conservation in South East Queensland*). Other elements of the plan, such as policies relating to the rehabilitation of injured or sick koalas and translocation remain in place.

2.2 State Planning Policy 2/10: Koala Conservation in South East Queensland

The State Planning Policy 2/10 informs land use planning undertaken by State and Local Government and infrastructure providers. It is used to make decisions on planning scheme amendments, structure plans, master plans, and local area plans etc. The aim is to ensure that koala habitat conservation is taken into account in planning processes within the South East Queensland Koala Protection Area (SEQKPA), contributing to a net increase in koala habitat in south-east Queensland, and assist in the long term retention of viable koala populations in South East Queensland. This is achieved by identifying and protecting significant areas of koala habitat value, retaining connectivity, maximising koala safety and movement through the design and layout of development, and controlling land use to achieve the outcomes of the policy. **Figure 2** illustrates the koala habitat values map for SPP 2/10.

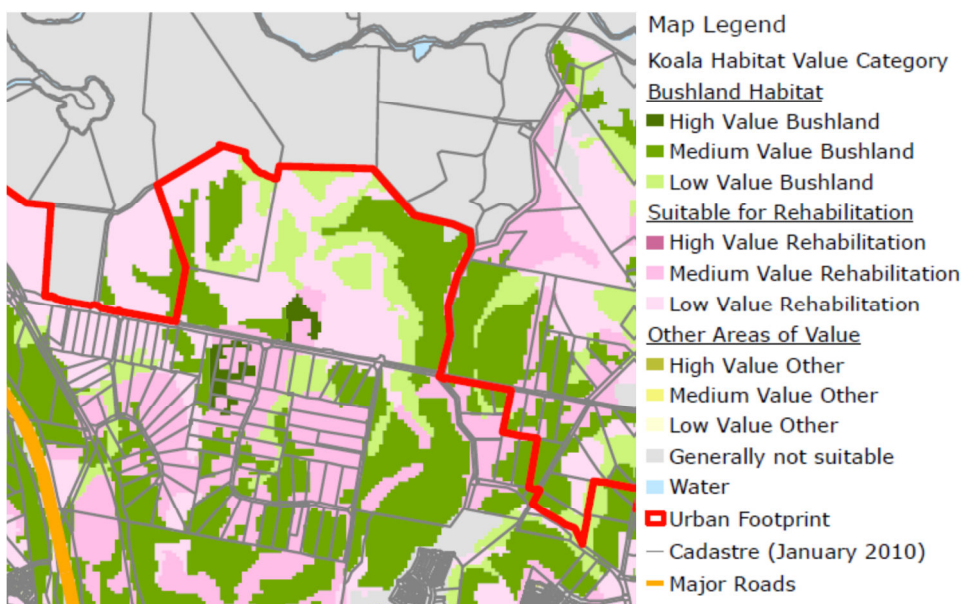


Figure 2: State Planning Policy 2/10 - Koala Habitat Values

It is noted that the State Planning Policy mapping identifies the majority of the site as Medium and Low Value Bushland Habitat or Low Value Rehabilitation. One small area of High Value Bushland is identified.

Koala habitat will be protected by maintaining connectivity through buffers and golf course revegetation, maximising koala safety and movement. Koalas will be excluded from development nodes and significant movement opportunities will be provided north-south and east-west through the site.

2.3 South East Queensland Koala Conservation State Planning Regulatory Provisions

The South East Queensland Koala Conservation State Planning Regulatory Provision is an overarching planning tool which, in the case of any inconsistencies, prevails over any other planning instrument (such as Local Government Planning Schemes). It sets out certain requirements that local governments and others must assess development applications against in order to minimise the impact of new development on koalas.

As illustrated within **Figure 3**, some areas of the site are within a Koala Assessable Development Area and therefore the regulatory provisions are triggered for all new development proposals in that area.

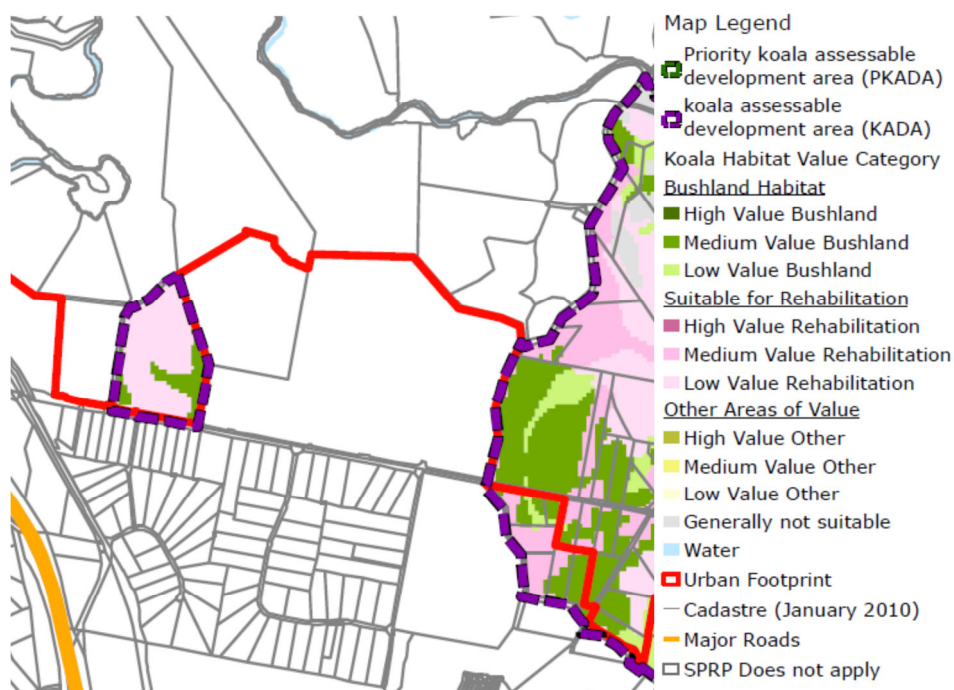
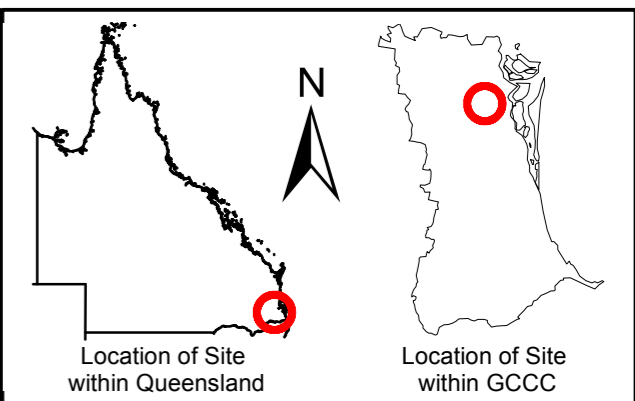
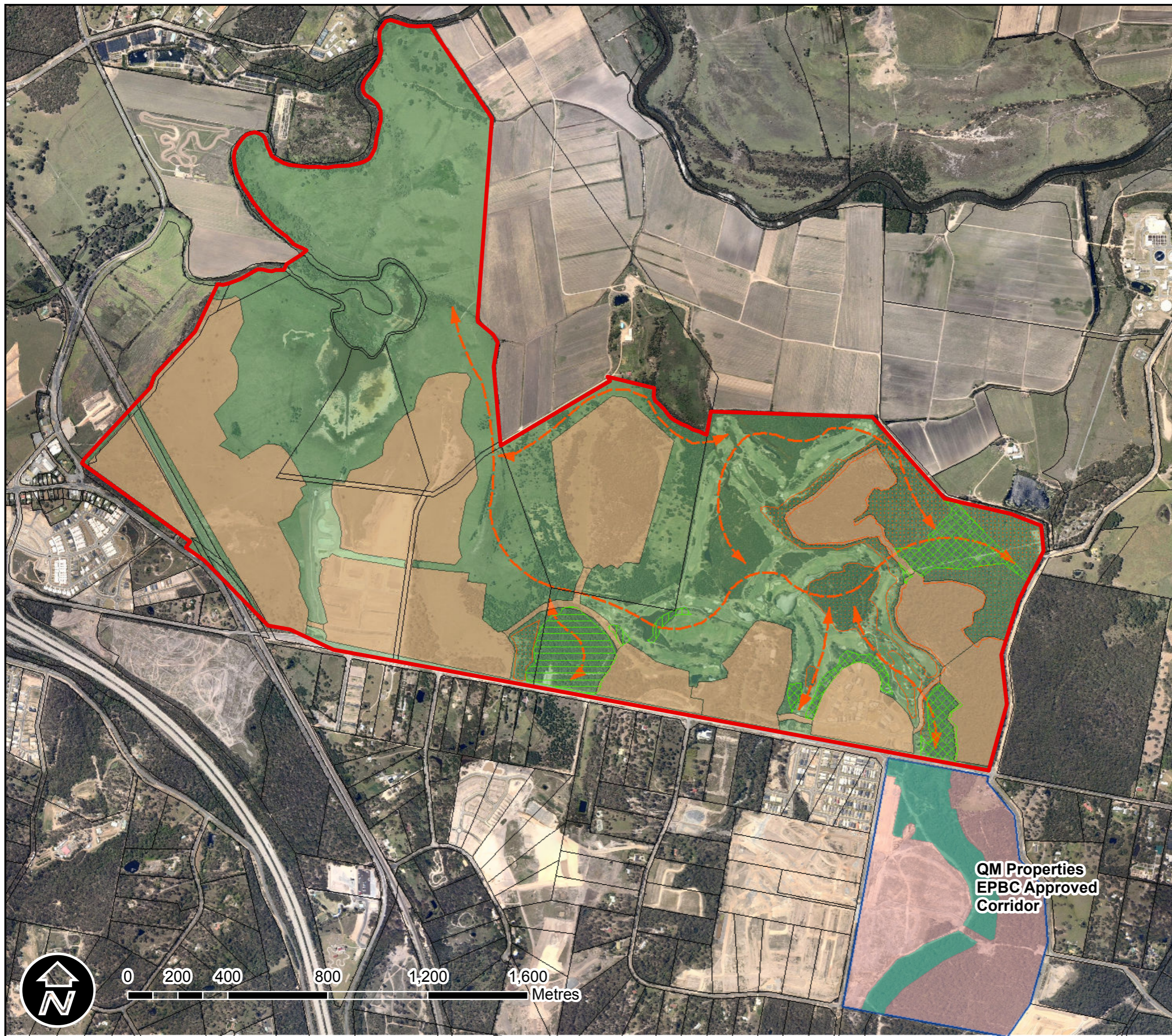


Figure 3: State Planning Regulatory Provisions - Assessable Development Koala Habitat Values

Koala designations have required development to be consistent with the urban intent of the area while maintaining habitat linkages and incorporating koala sensitive development in accordance with the relevant policies and provisions. Koala sensitive practices have been incorporated into the development design across the entire site. An assessment of the site has identified areas of high value vegetation and areas suitable for rehabilitation. **Figure 4** illustrates the overall koala habitat and linkages retained across the site.



Legend

- Site Locality
- Gold Coast City North Cadastre (2006)
- High Value Bushland Habitat *Koala Habitat*
- Medium Value Bushland Habitat
- Low Value Bushland Habitat
- Suitable for Rehabilitation
- Gainsborough Greens Development Footprint
- Gainsborough Greens Open Space
- Wildlife Corridors
- QM Properties Site
- QM Properties Development Footprint
- QM Properties EPBC Approved Corridor

Figure 4:
Koala Habitat

Client:
Mirvac Pty Ltd

Address:
Gainsborough Greens Golf Course
Yawalpah Road,
PIMPAMA QLD

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**QM Properties
EPBC Approved
Corridor**

2.4 Environment Protection and Biodiversity Conservation Act 1999

The *EPBC Act* is the Commonwealth Government's primary environmental legislative instrument. This Act necessitates approval for any action that will have an impact on a Matter of National Environmental Significance (MNES). MNES is recognised under the *EPBC Act* and act as a trigger for the Commonwealth assessment and approval process includes:

- World Heritage properties;
- National Heritage Places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory species;
- Nuclear actions, including uranium mining; and
- The Commonwealth marine environment.

The Koala (*Phascolarctos cinereus*) has recently been listed as 'Vulnerable' under the EPBC Act and is therefore considered to be a MNES. A person must not have a significant impact on a MNES therefore the Gainsborough Greens development must manage the surrounding koala population by identifying and protecting significant areas of koala habitat value, retaining connectivity, maximising koala safety and movement through the design and layout of development to ensure there is no significant impact on this species. As part of the development approval process, koalas are provided with mechanisms to protect their habitat, maintain connectivity, and relocate animals from developable areas to surrounding suitable areas.

The Gold Coast City Council will require koalas to be captured relocated and monitored in instances where they are displaced by development. The koala relocation project will be implemented where animals cannot relocate of their own accord through vegetation corridors retained during clearing activities.

4.0 History of Koala Management

Koala Management within Gainsborough Greens has involved a number of highly detailed scientific investigations, reports, management plans and negotiations with government departments over the past nineteen(19) years. Some of these investigations considered the entire site while others were precinct specific. All of these reports have previously been submitted to the Department of Sustainability, Environment, Water, Population and Communities in support of the recent referral under the EPBC Act. As each new precinct comes online further detailed investigations will be undertaken. The following reports and management plans were reviewed and consolidated as part of the background study for this Koala Management Master Plan.

- **Gainsborough Greens Residential Development – Habitat Values of the Eastern Bushland, prepared by Chenoweth and Associates, dated June 1994.**

This report evaluates the habitat value of the site and suggests areas most suitable for retention. Suggestion is made that species will persist within reduced areas of Bushland if the eastern Bushland remains well connected to the golf course open space and is protected from dogs and cats. Fencing around reserves is not considered beneficial to wildlife unless a fence is also erected between housing and the proposed reserve.

- **Wildlife of Gainsborough Greens and Surrounding Areas, prepared by WBM Oceanics, dated March 1995.**

This report identifies that koala food trees are available on site but no sign of use by koalas was identified. Reference is made to previous reporting by others that did not locate koalas or only provided anecdotal evidence. It was concluded that it is unlikely that significant numbers of koalas occur regularly in the region.

- **Fauna Survey: Gainsborough Greens and Surrounds, prepared by White, White and Power, dated Feb/March 2003.**

This report found one individual koala and some evidence of koala usage. The report suggests the introduction of speed restrictions, ensuring domestic animals are contained, limiting the number of access roads, and planting koala friendly species are factors which can be introduced to reduce the likelihood of negative impact.

- **Flora Survey and Report, prepared by Gold Coast Native Flora, dated March 2003.**

This report identifies areas of high conservation value and recommends fencing to retained Bushland and the retention of appropriate vegetated corridors throughout development areas to allow fauna movement. A weed control program and Bushland rehabilitation program are recommended including supplementary planting with particular emphasis to edge/regrowth areas to increase vegetation buffer widths especially to Hotham Creek.

- **Ecological Site Assessment – Level 3, prepared by Gold Coast Native Flora, dated April 2003.**

This investigation recorded the koala within the site and recommends fauna corridor widths of greater than 50 m to ensure they are wide enough for most species. Other recommendations include site specific vegetation management plans, experienced rehabilitation personnel, spotter catcher to be present during the removal of habitat trees, landscape plan with the intent of ensuring no invasive plant species is used, areas of high ecological value should be fenced off prior to construction activities, environmental protection awareness for construction personnel, environmental awareness signage or information sheets for users. Possible methods to mitigate against the loss of faunal biodiversity from the site include: 1. Protection of current vegetation, keeping access roads to a minimum to limit fragmentation and maintain low speed limits, retention of larger habitat trees containing hollows, removal of weeds and planting of native species, restraining of domestic animals, encouraging residents to use local native species, relocation of ground logs, creation of wetland habitat, additional planting along Hotham Creek to increase habitat and corridor value, preservation of Bushland and the use of a spotter catcher prior to and during land clearing to pin point habitat trees and if required aid in removing animals. No animals should be translocated long distances.

- **Vegetation Management Plan, prepared by Belleng, dated August 2003.**

This report recommends the following vegetation management conditions during the construction phase: Induction procedure for all personnel on the VMP, retained vegetation to be left undisturbed, temporary barrier fencing to retained vegetation, safe waste disposal practices, erosion and sediment control best practice, minimise earthworks, cleared areas left bare to be treated with rapid growing infertile grass seed, consider storm events prior to clearing, a spotter catcher to be employed to inspect trees prior to removal, transplant native species which are typically unavailable in cultivation to retained vegetation areas, utilise cleared native vegetation as mulch, supplementary planting within golf course planted landscape to enhance habitat corridors. During the operational phase all retained vegetation should be protected, residents should be encouraged to restrict domestic animals use of these areas. New residents should be inducted with environmental awareness material including describing the ecological value of the retained vegetation and ways in which they can improve the ecological integrity such as planting local native species, weed removal, responsible domestic animal ownership and bushfire protection measures. Rehabilitation areas should be maintained for a period as determined by Council.

- **Koala Impact Assessment, prepared by Biodiversity Assessment and Management, dated December 2006.**

This report deals specifically with the assessment of koala habitat on site, estimated population, potential impacts of the proposed development and recommended mitigation measures. Evidence of koalas was primarily identified within the eastern Bushland. The value of this retained Bushland can be enhanced and the linkage to adjoining habitat strengthened by the following recommendations: retain the highest value areas and allow movement opportunities between the eastern conservation areas, provide a safe means for fauna to cross the road to the east and south, maintain habitat values by retaining essential habitat trees, protection from fire, weed and pests, the control of domestic animals

on site and appropriate infrastructure and fencing locations. Roads are to be constructed with minimal disturbance, and managed to reduce edge effects. Monitoring should be undertaken to ensure the success of management measures. It was recommended that the site be a dog free area and speed limits are kept to 40km/hr with signage for motorists.

The following recommendations are made to minimise the impact to koalas during development stages: vegetation clearance to be minimised with no disturbance outside the development area, vegetation areas outside the development areas are to be clearly defined, Tree clearing in accordance with the Koala Plan. Koalas should be allowed time to move away without human intervention by conducting clearing in stages with no more than 3 ha or 3% of the stage (whichever is larger) to be cleared at any one time. The direction of clearing is to be away from threatening processes and towards retained vegetation. Koalas must not be pressured through loss of habitat to cross roads or move through developed or disturbed areas. Clearing should not occur between the hours of 6pm and 7am. A spotter catcher will be on site prior to and during tree clearing to inspect but will not physically move koalas. Any individual koalas will be allowed to move of its own accord with the tree and immediate surrounds not damaged until the koala has moved. Felled trees/branches with hollows are to be placed within surrounding retained vegetation.

On-going management will include: exclusion of weeds to allow natural regeneration of native plants, rehabilitation of koala habitat to mirror existing habitat trees and suit the surrounding density, provide a range of understorey and ground cover species in addition to canopy species, provide monitoring and maintenance until plants are able to survive without human intervention, plant trees (3m apart) in groupings rather than dense mass plantings, discourage planting of invasive exotic species, landscaping should not impede movement and landscaping should not adversely impact on the surrounding ecological values. The incorporation of koala habitat trees into the golf course redesign will provide koala movement opportunities across the site. Fencing should lead koalas to designated crossing points. Improved lighting and verge maintenance will make animals more visible in these areas, traffic calming devices and reduced speed limits should be used.

- **Integrated Ecological Management Plan, prepared by Habitat Environment Management, dated March 2007.**

*This is a whole of site plan. The fauna management provisions are summarised below under **Section 3.7**.*

- **Conserving Koalas in the Coomera-Pimpama Koala Habitat Area: A View to the Future, prepared by Biolink, dated March 2007.**

This report focuses on the wider catchment being the Coomera-Pimpama Koala Habitat Area (C-PKHA). It is suggested that the existing koala population within the C-PKHA can be sustainable provided a minimum area of 1500 ha and 170 individuals are retained within the Urban Koala Area (UKA) and the Koala Conservation Area (KCA). It is also suggested that corridors are created between

the UKA (the majority of the site) and the KCA (part of the site and to the east of the site). A translocation program is proposed for animals located within areas to be developed to be safely relocated to the KCA and elsewhere in the Local Government Area.

- **Plan of Management – Koala, prepared by Biodiversity Assessment and Management, dated March 2007.**

*This report discussed threatening processes to koala populations and recommends actions to mitigate the identified issues associated with the proposed development. Reference is made to **Appendix E**. For a copy of Table 5.1 Plan of Management – Koala.*

- **Precinct 3.1 Detailed Ecological Site Assessment, prepared by Habitat Environment Management, dated July 2007.**

This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 2 Vegetation Management Plan, prepared by Habitat Environment Management, dated September 2007.**

This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 2 Fauna Management Plan, prepared by Habitat Environment Management, dated September 2007.**

This is a precinct specific plan and is summarised below under the relevant precinct heading.

- **Precinct 3.2 Detailed Ecological Site Assessment, prepared by Habitat Environment Management, dated March 2008.**

This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Environmental Management Master Plan, prepared by Habitat Environment Management, dated February 2010.**

*This is a whole of site plan. The fauna management provisions are summarised below under **Section 3.7**.*

- **Precinct 6 Fauna Management Plan, prepared by Habitat Environment Management, dated September 2010.**

This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 6 Vegetation Management Plan, prepared by Habitat Environment Management, dated September 2010.**

This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 3.1 Vegetation Management Plan - ELPA, prepared by Habitat Environment Management, dated November 2011.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 6.2 Fauna Management Plan, prepared by Habitat Environment Management, dated February 2012.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 6.2 Vegetation Management Plan, prepared by Habitat Environment Management, dated February 2012.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 1.2 Addendum to Plan of Management - Koala, prepared by Habitat Environment Management, dated October 2012.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Vegetation Management Plan (Golf Course Buffer), prepared by Habitat Environment Management, dated December 2012.**
*This is a whole of site plan. The fauna management provisions are summarised below under **Section 3.7.***

- **Precinct 1.2 Covenant Management Plan, prepared by Habitat Environment Management, dated March 2013.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 1.2 Fauna Management Plan, prepared by Habitat Environment Management, dated April 2013.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Precinct 1.2 Vegetation Management Plan, prepared by Habitat Environment Management, dated April 2013.**
This is a precinct specific plan and is summarised below under the relevant precinct section.

- **Conceptual Rehabilitation Management Plan, prepared by Habitat Environment Management, dated May 2013.**
*This is a whole of site plan. The fauna management provisions are summarised below under **Section 3.7.***

3.1 Precinct 1

Precinct 1 has been subject to detailed fauna investigations and subsequent management plans to reduce the potential impact that the proposed development may have on the ecological values of the site. The most recent Fauna Management Plan, prepared by Habitat Environment Management, dated April 2013, divided Precinct 1.2 into two distinct areas, one to manage the existing fauna within areas of disturbance and one to maintain an area of existing habitat to provide movement opportunities through the site. Precinct 1.1 and 1.3 have not yet come online and will be subject to future detailed Fauna Management Plans that will be informed by this Koala Management Master Plan and all aforementioned reports prepared for the site.

The area for proposed clearing in Precinct 1.2 was assessed by a suitably qualified Spotter-Catcher from Habitat in February 2013. The survey methodology focused on identifying habitat features which have the potential to contain native fauna during Operational Works (Clearing). A number of trees containing large hollows were identified directly within the site. A number of trees were also identified containing smaller 'spouts' and the end of limbs, 'flakey bark' etc. No evidence was recorded that could positively identify usage of any particular hollow and allow for specific management regimes to be provided.

The location of Precinct 1.2 is within a patch of native remnant woodland and as such many of the common native species identified from the DERM Wildlife Online (Database) including koalas could be found to utilise the site for foraging and occasional breeding.

The koala (*Phascolarctos cinereus*) was considered to possibly occur within Precinct 1.2 but no koala scats were recorded within the locality in 2013 nor were any animals observed. Suitable food trees for this species were present. A study undertaken by BAAM in 2006 found evidence of koalas on the subject site.

A number of studies over the subject site have been undertaken previously including a report by White, White and Power (ddw fauna), in 2003, that identified two arboreal mammals on the subject site including the Sugar Glider (*Petaurus breviceps*) and Squirrel Glider (*Petaurus norfolcensis*). It is reasonable to assume these species may be encountered during removal of vegetation within hollows and under 'flakey bark'. Signs of koalas (*Phascolarctos cinereus*) have also been previously recorded on the site.

A Covenant Management Plan was prepared for Precinct 1.2 by Habitat Environment Management, dated March 2013, to govern the ongoing maintenance of the retained vegetation corridor adjacent to the waterway. The rehabilitation of this area consisted primarily of Koala Habitat Trees in the canopy layer. A Native Fauna Protection Strategy was also prepared for Precinct 1 which essentially provides safe access for koalas around the development footprint and prevents access to high risk areas of the development. This was the outcome of extensive negotiations with Gold Coast City Council and the Department of Environment and Resource Management (DERM).

As part of the extensive negotiations, and based on the recommendations of the Koala Impact Assessment prepared by BAAM, it was agreed that a restriction would be placed over Precinct 1 land excluding ownership

of domestic animals from this area. This was reflected in the Gainsborough Greens Masterplan and various other approved documents including the Plan of Management - Koala. Subsequent negotiations with both the Department of Environment and Resource Management (DERM) and Gold Coast City Council (GCCC) led to the agreement that alternative protection measures could achieve the objectives of the original koala impact assessment without restricting the use and enjoyment of private property.

Condition 2 of the Preliminary Approval (PN161275/12/DA2) required development to be generally in accordance with, among other plans, The Gainsborough Greens Masterplan and Place Code, the Plan of Management - Koala, and the Koala Impact Assessment.

The Gainsborough Greens Masterplan and Place Code includes a number of references to the restriction of domestic animals within Precinct 1 based on the agreement at that point in time. The Plan of Management - Koala includes the designation of a 'no dog' zone within Precinct 1 to deal with the threatening process of dog attacks based on the recommendations of the Koala Impact Assessment. The Koala Impact Assessment prepared by BAAM identified a number of factors that affect the ability of koalas to inhabit the subject site. These include:

1. *Whether the species is present within, dependant on, or restricted to, the vegetation to be removed;*
2. *The extent and type of vegetation retained and future habitat values post operation, including the ongoing management and protection of retained areas from excessive fire regimes, weed and feral animal invasion;*
3. *The control of domestic animals on the site; and*
4. *Infrastructure design and locations, particularly the type and location of fencing.*

While the Koala Impact Assessment by BAAM suggests that the control of domestic animals on the site would help reduce dog attacks, it does not specifically require a covenant preventing the ownership of dogs and cats within private property. The Gainsborough Greens Master Plan & Place Code envisaged a 'no cat and dog' covenant to achieve the recommendations of the Koala Impact Assessment. However experience has shown that covenants are reliant on the owner's responsibility, can be difficult to maintain through the sale of the property and are difficult to ensure compliance. It is now envisaged that the control of domestic animals can be achieved by the use of koala exclusion fencing at the interface between urban development and the koala movement corridor. Condition 2 of the Preliminary Approval has been amended, by *Permissible Change* under the *Sustainable Planning Act 2009*, to include reference to an addendum report being *Addendum to Plan of Management -Koala*, prepared by Habitat Environment Management (Trading) Pty Ltd. The *Gainsborough Greens Master Plan and Place Code* has been amended to reflect the agreement on koala protection and remove any reference to domestic animal covenants. The *Plan of Management - Koala* was not amended as it is modified by the addendum and all other relevant sections are still applicable to the development.

3.2 Precinct 2

Precinct 2 was subject to detailed fauna investigations and subsequent management plans to reduce the potential impact that the development would have on the ecological values of the site. The most recent Fauna Management Plan, prepared by Habitat Environment Management, dated September 2007, divided Precinct 2 into two distinct areas, one to manage the existing fauna within areas of disturbance and one to maintain an area of existing habitat and provide movement opportunities through the site.

The site provides fauna habitat value with existing nesting and roosting opportunities for birds and arboreal mammals. There is scrub and native undergrowth which may support reptiles or small terrestrial mammals with loose debris and fallen logs also present. This shrub and ground layer vegetation is likely to support numerous habitats for insects and invertebrates. This in turn provides a feed resource for insectivorous birds such as flycatchers, bee eaters and other omnivorous species. Drainage lines and waterways bound the site on the east and the west. The riparian vegetation along the drainage lines consisted of denser understorey consisting of a variety of native shrubs. This provides ample habitat for smaller birds such as wrens, honeyeaters, pardalotes and finches. There was no evidence of wet sclerophyll or rainforest areas along the waterways. These waterways represent habitat for frogs and rodents as well as predators of these species such as snakes and raptors.

Several observations were made of frog species in the target area (Table 3). The vegetation community across the majority of the site is a Regional Ecosystem (RE 12.11.5) that supports species which are known Koala feed trees and would contribute to habitat that is present within the area for this species. Several trees with small, medium and large hollows were observed including arboreal termite nests with hollows. It is likely that kingfishers, owls and arboreal mammals would be regularly utilising these hollows. This was confirmed through evidence such as direct observations and scratchings being observed.

Wetlands are located around the majority of the perimeter of the target area. This area of vegetation provides habitat for frogs and small mammals and predators of these species. Wetland communities often provide habitat for rare or threatened species including acid frogs and raptor species such as goshawks. The koala (*Phascolarctos cinereus*) was considered to possibly occur within Precinct 2 but no evidence of the koala was recorded within the locality in 2007.

The existing development layout retains and protects areas of koala habitat along the eastern boundary of Precinct 2, and a small area to the west of Precinct 2. **Figure 4** displays the wildlife corridors and linkages throughout the site. Several areas of Precinct 2 were designated for habitat rehabilitation and restoration. The wildlife corridors throughout the subject site all link to an area of high habitat value, which in turn links to the planned eastern wildlife corridor which will reduce the effects of habitat fragmentation. Due to wildlife mortality occurring along Yawalpah Road, fauna protection is essential. Fauna road underpasses have been suggested, in order to give fauna safe passage across Yawalpah Road. Alternative methods of fauna management include one way fauna fencing along Yawalpah Road which will exclude koalas from the roadway

but allow stranded animals to escape into Gainsborough Greens should they become trapped within the roadway.

The clearing of the site occurred in a controlled and staged manner to reduce the impacts on fauna populations. Clearing occurred in a north easterly direction from developed areas towards vegetation to be retained. Fauna were provided sufficient time and space to move of their own accord without the need for physical removal of the animals by a Spotter Catcher. The Spotter Catcher was employed to inspect trees prior to removal and follow the machine during removal. Koalas are not to be physically removed but if found are to be allowed to move of their own accord through a corridor of canopy trees to be retained until the koala has relocated.

The development of Precinct 2 provided areas of vegetation to be retained. This is the primary protection for fauna during the ongoing operation of the development. Fencing to be used throughout new residences shall be fauna friendly so as not to trap fauna from moving across the site with the exception of designated areas in which are seeking to keep fauna out. The perimeter of the subject site has been fenced with fauna exclusion fencing. Fauna exclusion fencing will assist in preventing attacks by domestic animals, while also guiding fauna towards the wildlife corridors (**Figure 4**).

Fauna exclusion fencing has been constructed around the perimeter of the subject site. Details of the fence are as follows:

Due to changes in ground level associated with the development, a 1.5m stone retaining wall was constructed around the perimeter of the precinct. Pool fencing has been installed on top of the retaining wall. The pool fencing has a minimum height of 1.2m and the base is level to the retaining wall (no higher than 75mm from the ground). It was manufactured as such that a koala (full standing height of 1m) cannot reach the top rung of the fence whilst standing on the bottom rung. The pool fencing was manufactured to have a maximum of 70mm spacing between fencing pickets as opposed to the standard 100mm. This deters most domestic species from gaining access to areas of high faunal activity and is conducive to excluding native fauna from the precinct, whilst also aiding in funnelling native fauna towards the wildlife corridor.

3.3 Precinct 3

Precinct 3 has been subject to detailed fauna investigations and subsequent management plans to reduce the potential impact that the proposed development may have on the ecological values of the site. A summary of the fauna management provisions of the Detailed Ecological Site Assessments, prepared by Habitat Environment Management for Precinct 3.1, dated July 2007 and Precinct 3.2, dated March 2008 follows.

Precinct 3.1

It was found that the target area supported two vegetation communities: Tall Open Forest Mosaic analogous to RE 12.11.5; and Open Forest dominated by *Melaleuca quinquenervia* analogous to RE12.3.5. In total sixty-eight (68) species were recorded in the target area of the subject site. Birds were the dominant faunal group

on site with forty-four (44) species in total, four (4) amphibian species observed and three (3) reptiles were identified. Nine (9) mammal species were observed. Precinct 3.1 is considered to be of Moderate Conservation value. These areas are those where no significant species are directly observed however local populations are known and viable habitat for said species can be considered to be present.

The site provides fauna habitat value with existing nesting and roosting opportunities for birds or arboreal mammals. There is scrub and native undergrowth which may support reptiles or small terrestrial mammals with loose debris and fallen logs also present. This shrub and ground layer vegetation is likely to support numerous habitats for insects and invertebrates. This in turn provides a feed resource for insectivorous birds such as flycatchers.

Drainage lines and waterways bound the site on the east and the west. The riparian vegetation along the drainage lines consisted of more dense understorey consisting of a variety of native shrubs. This provided ample habitat for smaller birds such as wrens, honeyeaters, pardalotes and finches. There was no evidence of wet sclerophyll or rainforest areas along the waterways. These waterways represent habitat for frogs and rodents as well as predators of these species such as snakes and raptors. Several observations were made of frog species utilising these gullies for habitat.

The vegetation community across the majority of the site is a Regional Ecosystem (RE) that supports species which are known Koala feed trees and would contribute to habitat that is present within the area for this species. Several trees with small, medium and large hollows were observed including arboreal termite nests with hollows. It is likely that kingfishers, owls and arboreal mammals would be regularly utilising these hollows. This was confirmed through evidence such as direct observations and scratchings being observed.

A small patch of wetland was located on the east boundary. This area of vegetation provides habitat for frogs and small mammals and predators of these species. Wetland communities often provide habitat for rare or threatened species including acid frogs and raptor species such as goshawks. Due to the small size of the patch in the target area for assessment of the subject site it is considered unlikely that these species occur regularly within the site.

The koala (*Phascolarctos cinereus*) was considered to possibly occur within Precinct 3 but no evidence of the koala was recorded within the locality in 2007. It is noted that no koala has been observed since the reported sighting in 2003. Despite no current sightings, the Koala (*Phascolarctos cinereus*) has occurred in the past and is likely to occur within the site. This species is found in Eucalypt forests throughout South-east Queensland and feeds exclusively on Eucalyptus, Corymbia, Lophostemon and Melaleuca species. It would be anticipated that any proposed development would provide appropriate management for this species.

Vegetation clearing practices outlined within the Vegetation Management Plan - ELPA prepared by Habitat include:

1. Clear delineation with fencing and stakes of the area of disturbance;
2. Identification and flagging of vegetation within the VMA to be retained; and

3. Clearing of vegetation to be monitored by a suitably qualified ecologist or environmental scientist.

Precinct 3.2

It was found that the target area supported three (3) vegetation communities: Tall Open Forest Mosaic analogous to RE 12.11.5; Open Forest dominated by *Melaleuca quinquenervia* analogous to RE 12.3.5; and maintained turf areas with scattered Eucalypts. In total sixty-seven (67) species were recorded in the target area of the subject site. Birds were the dominant faunal group on site with forty-nine (49) species in total, six (6) amphibian species observed and three (3) reptiles were identified. A total of nine (9) mammal species were observed during surveying. Precinct 3.2 is considered to be of Moderate Conservation value. Areas of Moderate Conservation Value are those where no significant species are directly observed, however local populations are known and viable habitat for said species can be considered to be present.

The site provides fauna habitat value with existing nesting and roosting opportunities for birds or arboreal mammals. There is scrub and native undergrowth which may support reptiles or small terrestrial mammals with loose debris and fallen logs also present. This shrub and ground layer vegetation is likely to support numerous habitats for insects and invertebrates. This in turn provides a feed resource for insectivorous birds such as flycatchers.

Two (2) man made water bodies are located to the north and associated drainage lines have been cut throughout the subject site approximately 20 years ago. The vegetation along the drainage lines consisted of more dense understorey consisting of a variety of native shrubs. This provided ample habitat for smaller birds such as wrens, honeyeaters, pardalotes and finches. There was no evidence of wet sclerophyll or rainforest areas along the waterways. These waterways represent habitat for frogs and rodents as well as predators of these species such as snakes and raptors. Several observations were made of frog species utilising these gullies for habitat.

The target area consisted of small freshwater wetland. This area of vegetation provides habitat for frogs and small mammals and predators of these species. Wetland communities often provide habitat for rare or threatened species including acid frogs and raptor species such as goshawks. Due to the small size of the patch in the target area for assessment of the subject site it is considered unlikely that these species occur regularly within the site.

The koala (*Phascolarctos cinereus*) was considered to possibly occur within Precinct 3 but no evidence of the koala was recorded within the locality in 2007. The Koala (*Phascolarctos cinereus*) is likely to occur within the site. This species is found in Eucalypt forests throughout South-east Queensland and feeds exclusively on Eucalyptus, Corymbia, Lophostemon and Melaleuca species. It would be anticipated that any proposed development would provide appropriate management for this species.

The target area contributes to a corridor that runs on an east-west axis. This corridor links areas of remnant vegetation located within the region. The target area does not provide an integral role in this corridor and

this function can be maintained should development occur through buffers to waterways. As part of the development it is recommended that a conservation park / buffer be incorporated along the western boundary. This will improve the existing proposed linkage along the boundary by providing a patch of vegetation supporting several different vegetation communities and a diverse variety of habitats.

Vegetation clearing within this precinct will follow the initiatives of previous precincts including:

- Full ecological investigation including habitat identification and significant flora and fauna searches;
- Retaining high value and strategic koala habitat to allow ongoing koala movement through the site;
- Full weed eradication and restoration of retained vegetation;
- Staged clearing in accordance with the Nature Conservation (Koala) Conservation Plan 2006;
- Koala Spotter Catcher present during operational works;
- Koala exclusion fencing where required to direct koalas to safe habitat;
- Koala friendly fencing where suitable to allow unimpeded movement;
- Speed limiting devices for vehicles and signage;
- Koala sensitive lighting;
- Rehabilitation of retained areas of vegetation;
- Interpretive koala signage and education for new residents.

3.4 Precinct 4

Precinct 4 has not yet come online but will be subject to the same detailed fauna investigations and subsequent management plans to reduce the potential impact that the proposed development may have on the ecological values of the site. All future ecological reporting will be informed by this Koala Management Master Plan and all aforementioned reports prepared for the site.

Just as each precinct to date has developed koala management provisions specific to the site, this precinct will also be subject to extensive investigation and recommendations that result in site specific koala preservation initiatives. As each precinct before, this precinct will also conform to the following standard initiatives:

- Extensive ecological investigation including habitat identification and significant flora and fauna searches;
- Retaining high value and strategic koala habitat to allow ongoing koala movement through the site;
- Complete weed eradication and restoration of retained vegetation;
- Staged clearing in accordance with the Nature Conservation (Koala) Conservation Plan 2006;
- Koala Spotter Catcher present during operational works;
- Koala exclusion fencing where required to direct koalas to safe habitat;
- Koala friendly fencing where suitable to allow unimpeded movement;
- Speed limiting devices for vehicles and signage;
- Koala sensitive lighting;
- Rehabilitation of retained areas of vegetation;

- Interpretive koala signage and education for new residents.

3.5 Precinct 5

Precinct 5 is currently under detailed investigation and will soon undergo the planning process for Reconfiguration of a Lot. This precinct will be subject to the same detailed fauna investigations and subsequent management plans to reduce the potential impact that the proposed development may have on the ecological values of the site. All future ecological reporting will be informed by this Koala Management Master Plan and all aforementioned reports prepared for the site.

Just as each precinct to date has developed koala management provisions specific to the site, this precinct will also be subject to extensive investigation and recommendations that result in site specific koala preservation initiatives. As each precinct before, this precinct will also conform to the following standard initiatives:

- Extensive ecological investigation including habitat identification and significant flora and fauna searches;
- Retaining high value and strategic koala habitat to allow ongoing koala movement through the site;
- Complete weed eradication and restoration of retained vegetation;
- Staged clearing in accordance with the Nature Conservation (Koala) Conservation Plan 2006;
- Koala Spotter Catcher present during operational works;
- Koala exclusion fencing where required to direct koalas to safe habitat;
- Koala friendly fencing where suitable to allow unimpeded movement;
- Speed limiting devices for vehicles and signage;
- Koala sensitive lighting;
- Rehabilitation of retained areas of vegetation;
- Interpretive koala signage and education for new residents.

3.6 Precinct 6

Precinct 6 has been subject to detailed fauna investigations and subsequent management plans to reduce the potential impact that the proposed development may have on the ecological values of the site. A Fauna Management Plan was prepared by Habitat Environment Management, dated September 2012. A summary of the fauna management provisions follows.

The fauna habitat within and adjacent to the proposed bulk earthworks can only be described as highly marginal rural land with a long history of disturbance associated with grazing of stock and fire events (the author witnessed one such fire occurring in the paddocks in 2008).

The Paddock Vegetation Community is nearly completely devoid of any canopy or understory vegetation with pasture grass heavily grazed and/or slashed. The habitat in this vegetation community is the most marginal with no fauna species recorded in this area during the site assessment in September 2010 with the exception of fly-overs by common native species such as the Torresion Crow (*Corvusorru*). Previous site visits by the

author did record one raptor searching for prey in the paddock after the last fire event. The only other species known to regularly utilise the paddock and surrounding areas is the Eastern Grey Kangaroo (*Macropus giganteus*) which is found extensively throughout the vicinity including areas subject to regular on-going anthropogenic disturbance such as the existing Gainsborough Green Golf Course area where large numbers of Kangaroos are to be found.

The remaining canopy vegetation within the Operational Works area can also be described as marginal and only supporting common native species typical of disturbed and cosmopolitan habitats in south-east Queensland. With the exception of a small number of trunks with ambiguous scratches, no evidence was recorded to indicate usage of the canopy by arboreal mammals such as Koalas and Possums, though smaller mammals such as Gliders can never be completely discounted due to the difficulty in detection. Furthermore, no large hollows were recorded, instead a number on trees displayed small knots and spouts, which may be able to provide habitat for smaller native fauna such as Microchiropteran Bats and smaller Glider species such as the Feathertail Glider (*Acrobates pygmaeus*) which has been recorded five times previously within a 2 km radius of the site (WildNet Database, 2010).

The Fauna Management Plan considers that even unlikely species listed in the Wildnet database query such as the koala should be assumed to be present during clearing activities. The koala habitat present was described as marginal and the koala was considered unlikely to occur. The patches of vegetation in the Operational Works area are separated by large areas of pasture and fences and roads provide further disruption to Koala movement. Furthermore, no direct evidence (scats or direct sightings) were recorded during the site inspection. On this basis it is considered unlikely this species will be found during tree clearing. It must be noted that clearing of Koala food trees in south-east Queensland is still controlled by the Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006 - 2016 and a Koala spotter must be present during clearing.

The Fauna Management Plan was prepared to govern the management objectives for fauna protection during and post construction. The primary function of the FMP is to provide specifications for the protection and enhancement of habitat functions within and adjacent to the site, whilst facilitating the development of residential properties that are consistent with the planning intent of Gold Coast City Council. The FMP also provides actions to reduce the potential impact that the proposed development may have on the ecological values of the site. Precinct 6 was divided into two distinct areas, one to manage the existing fauna within areas of disturbance and one to maintain an area of existing habitat and provide movement opportunities through the site.

During Operational Works the following actions were to be taken:

1. A qualified Spotter-Catcher must be present during all clearing activities.
2. Drivers of vehicles and machinery that utilise Swan Road are to be made aware of the potential for Kangaroo road-strike and not to exceed 40 km/h.

3. Prior to the commencement of works for clearing each day, the Spotter-Catcher is to examine the canopy and area to be cleared for *Phascolarctos cinereus*, other arboreal mammals, nests, and terrestrial habitat features, and remove and relocate fauna, nests or habitat features as required. Such actions may include the use of a cherry-picker for the removal of nests, or leaving a tree to be cleared for a time period to allow for the movement of fauna.
4. It is the responsibility of the wildlife Spotter-Catcher to identify significant wildlife safety risks both for wildlife retained on-site, as well as wildlife in adjacent areas or widely ranging wildlife that may use, or move through, the site during operational works.
5. As no large hollows were found within the area to be cleared on site, nesting boxes will provide a range of habitat that is representative of the hollow dwelling fauna that would be expected to inhabit the area. The nesting boxes will compensate for any loss of habitat in FMA 1 and will be installed within the protected areas of the Gainsborough Greens development site along Hotham Creek (as Illustrated within Figure 5: Nest Boxes Compensatory Area) prior to clearing. Small native fauna, such as Microchiropteran Bats and smaller Glider species, such as the Feathertail Glider (*Acrobates pygmaeus*), which may utilise small knots and spouts, will find refuge in similar features within FMA 2. In addition to the existing nesting opportunities, the following nesting boxes will be constructed:
 - 6 nest boxes designed for smaller gliders (i.e. feathertail glider and squirrel glider);
 - 6 nest boxes designed for possums (i.e. common brushtail possum and short-eared possum);
 - 6 nest boxes designed for microchiropteran bats.
 - 2 nest boxes designed for medium sized parrots (scaly-breasted lorikeet, rainbow lorikeet, and pale headed rosella);
 - 2 nest boxes designed for cockatoos and parrots (i.e. glossy black-cockatoo and Australian king-parrot);
 - 2 nest boxes designed for small owls (i.e. eastern barn owl).

If any hollow bearing limbs are found during tree removal, these limbs will be used to construct nesting boxes or relocated to the protected areas for use by ground dwelling species such as Yellow-footed Antechinus under the direction of the Spotter-Catcher. Alternative construction of nesting boxes would be in accordance with the Australian Nest Box Company specifications (ozbox.net.au).

Monthly maintenance of the nest boxes will be undertaken to ensure the removal of pest species throughout the establishment and maintenance periods.

6. A number of piles of debris will be required to be removed during Operational Works. This debris shall only be removed in the presence, and under the direction of the Spotter-Catcher.
7. Where any incidents occur involving Kangaroos, such as road-strike or entanglement in fencing, due to tree clearing activities, work is to immediately halt. The Spotter-Catcher is to review and modify the tree clearing process to minimise a similar incident occurring.
8. If any *Phascolarctos cinereus* individuals are located prior to clearing or during clearing activities, the tree containing the individual, and any other trees having canopy overlap with the primary tree, shall be clearly marked. Where the layout of existing vegetation will allow, a corridor of trees is to

remain undisturbed so as to enable the individual to escape to a protected area of suitable habitat. The corridor is to remain undisturbed until the individual has moved out of the area to be cleared. All machinery operators are to be informed of the presence and location of the individual, and all relevant trees that have been marked to prevent disturbance.

9. These trees must not be disturbed in any form until the individual has moved of its own accord, and this has been confirmed by the Spotter-Catcher, as in accordance with the guidelines presented in the Nature Conservation (Koala) Conservation 2006 and Management Program 2006-2016 which are still applicable with the exception of specific planning instruments which have now been superseded.
10. For the remainder of fauna species captured during Operational Works, euthanasia should not be undertaken unless the animal is severely injured, or a listed pest species under local, State or Commonwealth legislation and shall be at the discretion of the Spotter-catcher engaged to undertake the clearing. In order of preference, outcomes for removed wildlife are as follows:
 - a. Translocation to suitable areas of retained vegetation on-site e.g. the Environmental Open Space;
 - b. Translocation to suitable areas of habitat off-site;
 - c. Placement in an institution for rehabilitation and release, or where this is not possible for educational, conservation or research purposes; or
 - d. Euthanasia as per the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Post-construction, fauna management within FMA 1, the development footprint, will be managed on site through a number of effective fauna friendly development design concepts. These shall include the following:

Koala Interpretive signage

Interpretive signage can play a vital role in educating local residents about the ecological values of the area and their respective responsibilities with regard to protecting and maintaining these values. Signage will be installed at key locations within the site with particular reference to koalas. This signage will act as an ongoing 'messenger' relating to local flora and fauna.

Koala Sensitive Street Lighting

Street lights will be strategically located to reduce artificial light incursion into any Environmental Open Space thereby reducing impacts on nocturnal fauna. This is a particularly important (and often overlooked) element of sustainable urban design.

Koala Friendly Fencing

Temporary Fauna friendly fencing is to be implemented in the balance areas subject to future development to facilitate the movement of fauna throughout sections of the site where practicable. This fencing will have a space of at least 50 cm beneath the fence and will have gaps left at corners to allow fauna to pass through. This fencing is not required within the developed area of Precinct 6.1 and 6.2.

Koala Exclusion Fencing

Exclusion fencing will be implemented in those areas where the development fronts open space, creating the possibility of interactions between wildlife and domestic animals. To avoid occurrence of such interactions, exclusion fencing prevents access of domestic animals to environmental reserves. Design Covenants will be applied to housing designs to ensure all new dwellings have domestic animal exclusion fencing installed.

A monitoring program is set in place to ensure the effectiveness of the fauna management provisions in achieving the objectives of the Fauna Management Plan. The monitoring program assesses the integrity of fencing and structures, the integrity of retained habitat and ensures that adequate reporting has occurred.

3.7 All Precincts

Various reports have been prepared by Habitat that concern the entire Gainsborough Greens site. These reports include the Integrated Ecological Management Plan (2007), the Environment Management Master Plan (2010), the Conceptual Rehabilitation Management Plan (2012) and the Vegetation Management Plan - Golf Course Buffer (2012). The fauna management actions detailed within these reports are summarised below.

- **Environment Management Master Plan (2010)**

This report describes the overall retention of high value areas and rehabilitation strategy for the site incorporating suitable buffers and corridors for sustainable habitat and movement of fauna post construction. Ecologically significant areas are identified for retention, rehabilitation and habitat creation to achieve the rehabilitation objectives of the plan including:

- Rehabilitation and habitat improvement within existing vegetation in proposed open space areas;
- Re-establishing vegetated buffers to Ecologically Significant Features;
- Re-establishing vegetated buffers along natural waterways and wetlands;
- Habitat improvement along Hotham Creek and within the associated oxbow wetlands; and
- Establishment of habitat linkages on site to enhance wildlife movement on a local and regional scale.

- **Conceptual Rehabilitation Management Plan (2012)**

This plan provides an overall intent for rehabilitation of the golf course precinct within the site and links areas of the golf course with the development of individual precincts. This plan informs future detailed rehabilitation management plans for each precinct.

- **Vegetation Management Plan - Golf Course Buffer (2012)**

This plan provides the strategic framework for maintenance of buffer vegetation between the golf course and future residential areas. The primary function of this VMP is to provide specifications for the protection and enhancement of the biodiversity and habitat functions of vegetation within the buffer whilst facilitating the development of residential properties to allow filtered views of the golf course and bushfire safety.

- Integrated Ecological Management Plan (2007)

This investigation includes a review of previous ecological studies prior to 2007, a review of impacts and mitigation techniques and recommended actions to reduce and offset the impacts of development.

The following table is an extract from the IEMP which provides mitigation for the identified impacts with respect to fauna values.

Table 1: Review of potential impacts to site values

Fauna values	Displacement	<ul style="list-style-type: none"> ▪ Sequential clearing to encourage migration to areas of retained vegetation. ▪ Habitat creation programme to ensure quality habitat is available for displaced fauna. (Eg Nest boxes of varying sizes to suit birds and gliders)
	Habitat loss and modification	<ul style="list-style-type: none"> ▪ The creation of environmental Reserves and rehabilitation areas for the protection and enhancement of habitat values on the site.
	Loss of connectivity & corridors	<ul style="list-style-type: none"> ▪ The provision of wildlife corridors and fauna friendly crossings to allow fauna to traverse the site unhindered to other habitat patches.
	Edge effects	<ul style="list-style-type: none"> ▪ Provision of ecologically relevant buffers to ecologically significant areas. ▪ ESAs to be clearly located and fenced off prior to development.
	Direct impact - vehicle strike & damage during clearing	<ul style="list-style-type: none"> ▪ The preparation of a fauna management plan, endorsed by Queensland Parks and Wildlife Services, to be implemented during clearing works. ▪ Site induction programme to educate site staff. ▪ Fauna exclusion fencing to areas traffic and works. ▪ Setting an appropriate site speed limit during construction works.

Reference is made to **Appendix F** for a copy of the fauna management strategy.

3.8 Community Engagement and Education

Since October 2012 Mirvac Pacific have engaged the services of Not For Profit organisation - Connections Community Development CCD. The relationship with CCD is ongoing. CCD's primary function at Gainsborough Greens is to facilitate a sense of community among new residents moving into Gainsborough Greens. This sense of community is developed by direct engagement with new residents. This engagement includes a full familiarisation of all social and environmental values of Gainsborough Greens. As each new precinct of Gainsborough Greens is progressively released customised community education programs will be developed and implemented in response to the differing characteristics of each precinct. Being a large master planned community, Gainsborough Greens invariably has differing levels of ecological values from one precinct to the next. Thus far, a broad overview of environmental values has been provided to new residents in the existing 'Stage 2' precinct. Stage 2 is the first developed precinct in Gainsborough Greens. Due to it being surrounded by Golf Course, an overview of environmental values and responsibilities is appropriate. However, other future precincts of Gainsborough are located adjacent to or within areas of higher ecological sensitivity. Thus, it's planned to customise each engagement program to respond to these higher ecological values. These programs will not only reference the potential presence of koalas but will take an entirely holistic approach to ecological values and resident responsibilities to ensure that all these values are maintained.

5.0 KOALA MANAGEMENT PLAN

It is to be noted that this document has been prepared in support of a referral of an Action under the *Environment Protection and Biodiversity Conservation Act 1999*. Figure 4 illustrates the current development footprint, open space, koala habitat and wildlife corridors throughout the site. Specific requirements of the development, rehabilitation and vegetation clearing practices are yet to be approved for some precincts. This Koala Management Master Plan is to be utilised for the purpose of minimising the risk to koalas with regard to the proposed development.

5.1 Vegetation Communities

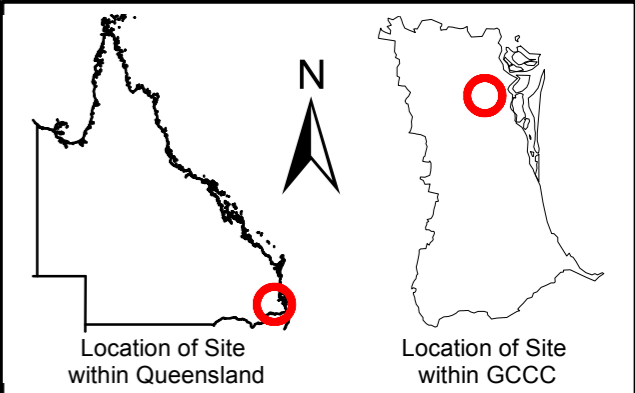
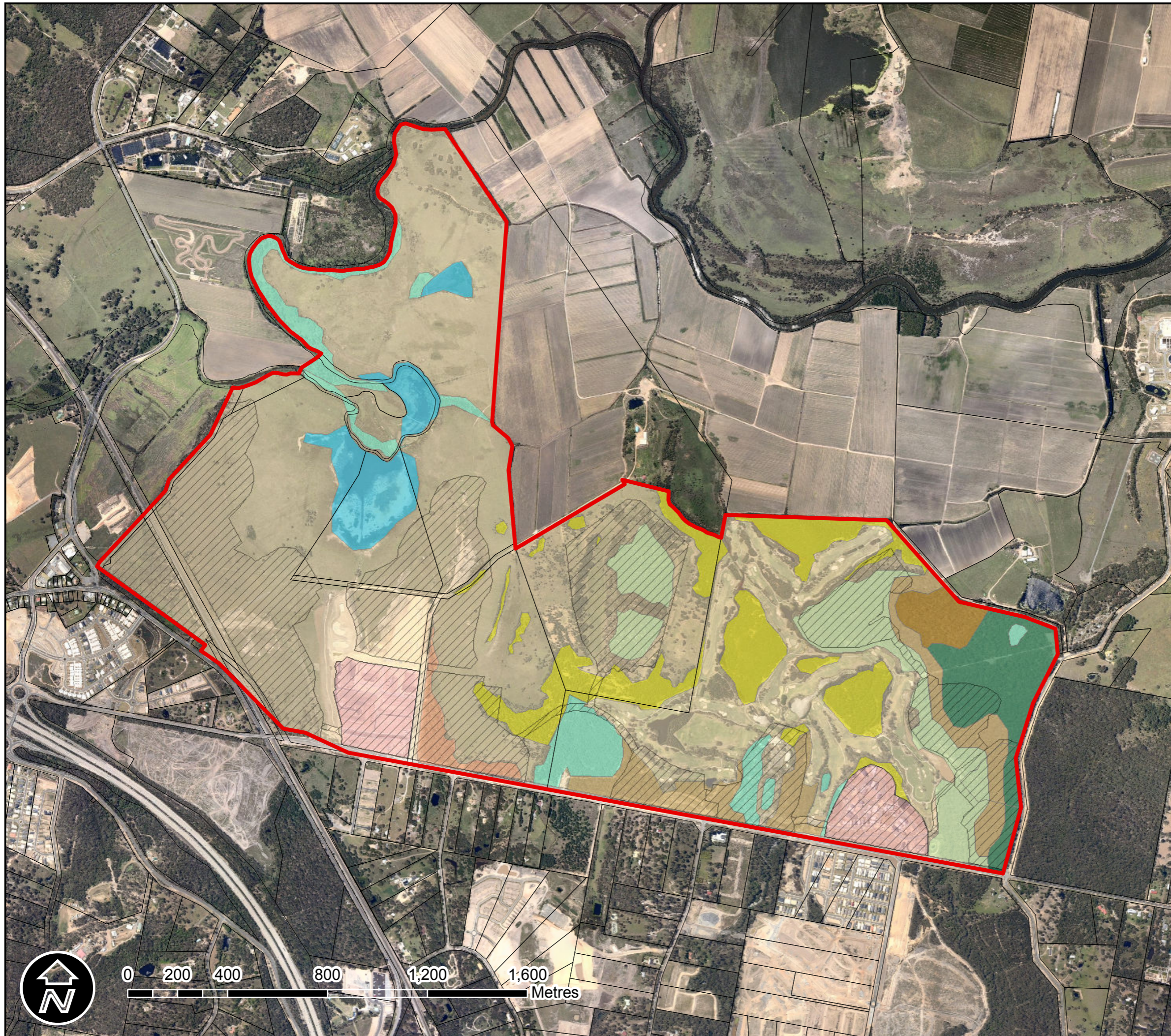
With reference to **Figure 6**, nine(9) vegetation communities have been identified within the site plus existing developed residential areas. These vegetation communities consist of the following:

1. Open Forest of *Eucalyptus racemosa* in association with mosaic of canopy species analogous to RE12.11.5;
2. Open Forest with mixed canopy *Eucalyptus tinadliae*, *Eucalyptus carnea* *E. siderophloia*, *E. seeana*, *Corymbia intermedia*, *Lophostemon Confertus* and *E. microcorys*;
3. Open Forest of *Melaleuca quinquenervia*, *Casuarina glauca* with *Eucalyptus tereticornis* and *Lophostemon suaveolens*;
4. Dry Sclerophyll forest and woodland dominated by *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Eucalyptus siderophloia* and some *Melaleuca quinquenervia* (quite degraded);
5. Open Forest and scattered patches of *Casuarina glauca* with slashed/mowed understorey throughout the golf course and scrubby weed understorey in dense patches;
6. Regrowth area, lower contours contain mainly *Melaleuca quinquenervia*, *Lophostemon suaveolens*, *Casuarina glauca*. Higher contours with *Allocasuarina littoralis*, *Acacia spp*, *Eucalyptus spp.*;
7. Dry Sclerophyll woodland with mixed canopy of *Eucalyptus siderophloia*, *Lophostemon confertus*, *Corymbia citriodora*, *Corymbia intermedia*, and *Lophostemon suaveolens*;
8. Mainly grasslands with scattered acacia, eucalypt and casuarina species with golf course fairways, exotic gardens and existing infrastructure throughout; and
9. Wetland community with Cypress, *Schoenoplectus* and *Eleocharis* species.

5.2 Koala Management Areas

For the purpose of Koala Protection within this development, Two (2) Koala Management Areas (KMAs) have been proposed as illustrated in **Figure 7**.

1. KMA 1, which encompasses the development footprint. This is considered to be an area which may pose significant safety risk and stress to koalas due to vehicles, urban activities, lighting and domestic pets. A Native Fauna Protection Strategy has been implemented within this area for Precinct 1 which will be continued for future precincts, relevant to individual site conditions (see **Appendix A**).
2. KMA 2, which includes the existing high value habitat and the proposed environmental corridor through the site providing safe movement opportunities for koalas and other fauna. The environmental corridor will be rehabilitated and retained as suitable for koala movement.



- Legend**
- Site Locality
 - Gold Coast City North Cadastre (2006)
 - Development Footprint
 - VC1
 - VC2
 - VC3
 - VC4
 - VC5
 - VC6
 - VC7
 - VC8
 - VC9
 - Existing Developed Residential Areas

Figure 5:
Vegetation Communities

Client:
Mirvac Pty Ltd

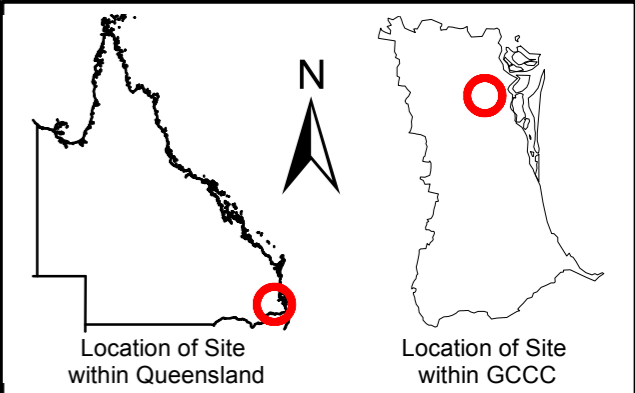
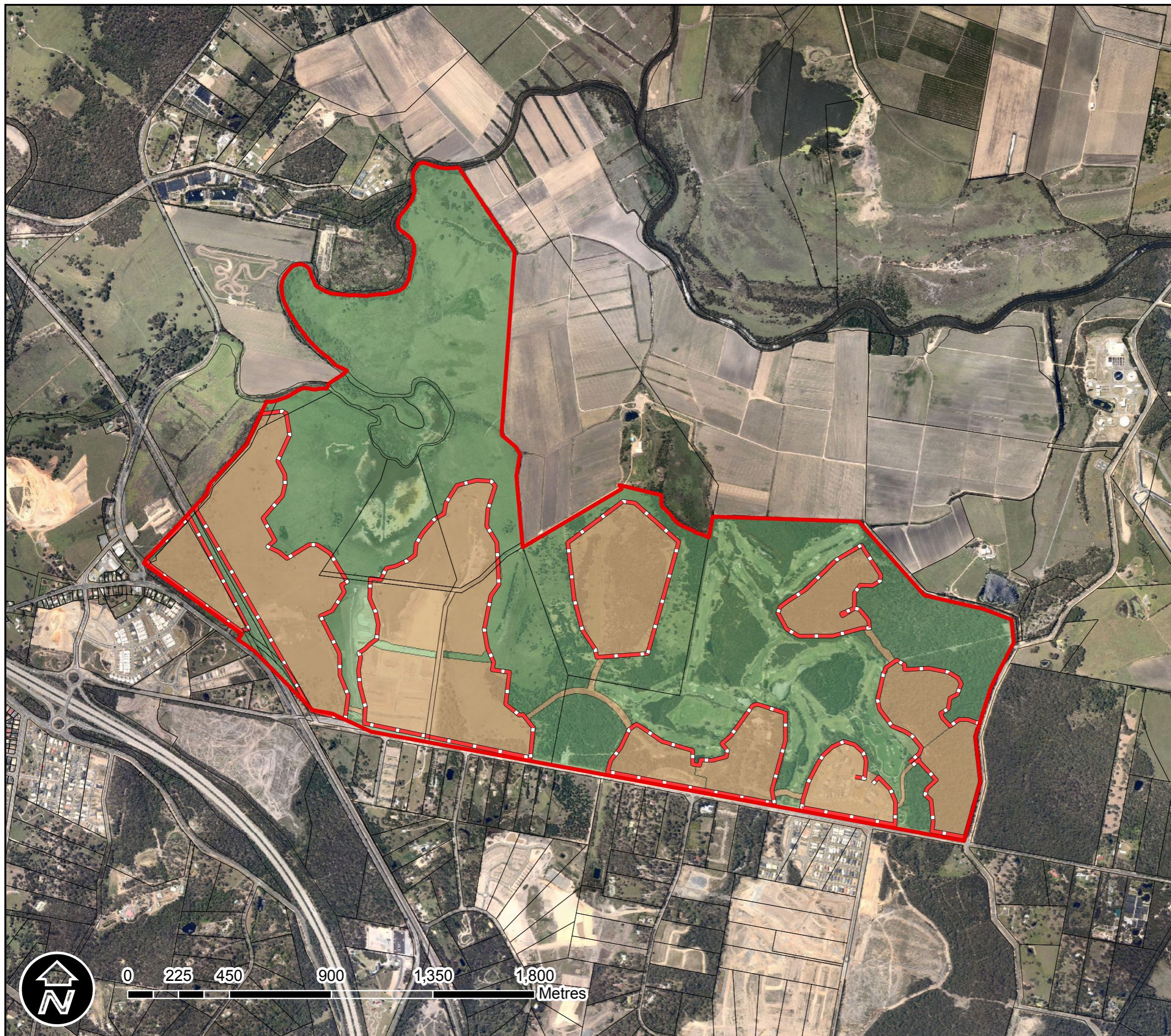
Address:
Gainsborough Greens Golf Course
Yawalpah Road,
PIMPAMA QLD

Data used in Habitat Environment Trading Pty Lt Maps is based on or contains data provided by the State of Queensland (Department of Natural Resources and Water 2006). In consideration of the State permitting use of the data, you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of privacy laws.

Scale: As Shown	Paper: A3	Reference: DERM 2006; Near Map 2011
Drawn: HB	Date: May 2013	
Checked: BP	Job Number: 6300SB	

PO Box 47
BURLEIGH HEADS
QLD 4220
Ph:(07) 5535 00999
Fax:(07) 5535 0888
info@habitat.net.au





- Legend**
- Gold Coast City North Cadastre (2006)
 - ▭ Site Locality
 - KMA 1
 - KMA 2
 - ▬ Fauna Exclusion Fencing

Figure 6:
Koala Management Areas

Client:
Mirvac Pty Ltd

Address:
Gainsborough Greens Golf Course
Yawalpah Road,
PIMPAMA QLD

Data used in Habitat Environment Trading Pty Lt Maps is based on or contains data provided by the State of Queensland (Department of Natural Resources and Water 2006). In consideration of the State permitting use of the data, you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of privacy laws.

Scale: As Shown	Paper: A3	Reference: DERM 2006; Near Map 2011
Drawn: HB	Date: May 2013	
Checked: BP	Job Number: 6300SB	PO Box 47 BURLEIGH HEADS QLD 4220 Ph:(07) 5535 00999 Fax:(07) 5535 0888 info@habitat.net.au

Habitat

5.3 KMA 1 - Development Footprint

5.3.1 Management Objectives

The objective of management for KMA 1 is to undertake best management practices to minimise harm to native fauna before, during and after development construction. Essentially this will involve excluding koalas from high risk areas of the development through koala fencing and providing suitable koala habitat corridors through the site to link with adjoining habitat areas and corridors such as the Approved QM Properties corridor to the south of the subject site as illustrated in **Figure 4**.

5.3.2 Vegetation Clearing Practices

Vegetation clearing is to be conducted in a sequential manner and to commence adjacent to roads or cleared areas and clear towards the areas of retained vegetation within the site to allow fauna to move into remaining habitat areas. Prior to vegetation clearance occurring, a number of work practices must be implemented and adhered to:

1. Installation of fencing to minimise the potential for road-strike prior to any earthworks;
2. Clear delineation with fencing and stakes of the area of disturbance to be cleared;
3. Typically it may prove beneficial to undertake spotlighting and/or trapping of individuals;
4. Identification and flagging of vegetation to be retained; and
5. Identification of suitable habitat for the relocation of any captured fauna by the Spotter-catcher engaged to be present during Operational Works (Tree Clearing).

5.3.3 Koala Management

While the *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016* has now been superseded by the *South-east Queensland Koala Conservation State Planning Regulatory Provisions (SPRP)* and *State Planning Policy SPP 2/10 - South-east Queensland Koala Conservation*, the intent of the document is still considered to apply. Koalas cannot be disturbed during construction, establishment or future use of the site. To ensure that the potential of injury or harm to any resident *Phascolarctos cinereus* limited to the greatest extent, the provisions of *Policy 6: Vegetation Clearing Practices* (Queensland Environmental Protection Agency, 2006) will be implemented on-site for the duration of vegetation clearing.

5.3.4 Koala Operational Works Actions

1. A qualified Spotter-Catcher must be present during all clearing activities of canopy vegetation.
2. Prior to the commencement of works for clearing each day, the Spotter-Catcher is to examine the canopy and area to be cleared for *Phascolarctos cinereus*.
3. If any *Phascolarctos cinereus* individuals are located prior to clearing or during clearing activities, the tree containing the individual, and any other trees having canopy overlap with the primary tree, shall be clearly marked. Where the layout of existing vegetation will allow, a corridor of trees is to remain undisturbed so as to enable the individual to escape to a protected area of suitable habitat. The corridor is to remain undisturbed until the individual has moved out of the area to be cleared. All machinery operators are to be informed of the presence and location of the individual, and all relevant trees that have been marked to prevent disturbance.

4. These trees must not be disturbed in any form until the individual has moved of its own accord, and this has been confirmed by the Spotter-Catcher, as in accordance with the guidelines presented in the *Nature Conservation (Koala) Conservation 2006 and Management Program 2006-2016*.
5. Euthanasia should not be undertaken unless the animal is severely injured, or a listed pest species under local, State or Commonwealth legislation. In order of preference, the outcomes for removed wildlife is: a. Relocation to suitable areas of vegetation on-site e.g. the Environmental Open Space; b. Translocation to suitable areas outside of the site; c. Placement in an institution for rehabilitation and release, or where this is not possible for educational, conservation or research purposes; or c. Euthanasia.
6. Koala sightings should be recorded, with a report provided to GCCC at the completion of works.
7. Any Koala injuries or deaths must be reported to GCCC and DERM immediately. It also recommended that all works cease on the site, and a review of this Koala Management Plan be undertaken.

5.4 Adaptive Management

An adaptive management approach is to be employed for the works forming all fauna management plans including an integrated process of monitoring and review of the works program to identify any alterations to ensure the objectives of this management plan are achieved. Any changes to this document in the field will require approval from GCCC Officers.

5.5 Koala Protection Fencing

The entire development footprint nodes will incorporate koala exclusion fencing of a particular form in accordance with the Native Fauna Protection Strategy and the agreed specifications for each precinct. This will ensure that urban activities including vehicles and domestic pets are adequately separated from koala movement corridors. Reference is made to **Appendix C**. The interface envisages three fencing design types including the DTMR standard 1800 mm high Native Fauna Exclusion Fencing and Gates or 1800 mm high Pool Fencing with 60 mm spacing to the majority of boundaries adjoining Conservation Areas, 1500 mm high pool fencing if required to boundaries where retaining walls occur or where appropriate, design covenants will be incorporated into housing designs to ensure domestic animals are enclosed. If required, a 2.4 m wide grassed buffer outside the fencing is to be kept clear of overhanging branches and fallen debris to prevent koalas using canopy to cross the fence. This cleared area falls within the Gainsborough Greens Development Footprint.

5.6 Koala Management Conclusions

It is envisioned that koalas may be displaced by tree clearing and may require relocation within other suitable habitat in the region. Any individuals found will move of their own accord provided the above methods of clearing are employed. A spotter catcher will be utilised to ensure safe and humane relocation if required. Ongoing management of koalas will be governed by the Native Fauna Protection Strategy.

6.0 Native Fauna Protection Strategy

For the purpose of the management of koalas within the site a Native Fauna Protection Strategy will be prepared for each precinct including:

- Perimeter fencing of sub precincts;
- Maintenance vehicular access and pedestrian gates;
- Vehicle speed reduction;
- Environmental Rehabilitation and preservation of habitat;
- Koala Sensitive Lighting;
- Interpretive signage;
- Environmental education;
- Resident Induction; and
- Range of fencing styles relevant to site requirements.

The locations of proposed fencing and gates within the Gainsborough Greens development footprint are to be illustrated within the Native Fauna Protection Strategy for each precinct.

Perimeter fencing

Perimeter fencing will consist of a range of native fauna exclusion fencing in accordance with the agreed specifications between the applicant and Gold Coast City Council as part of the DARP OWLS agreement. The native fauna exclusion fencing consists of three design types including the DTMR standard 1800 mm high Native Fauna Exclusion Fencing and Gates or 1800 mm high Pool Fencing with 60 mm spacing to the majority of boundaries adjoining Conservation Areas, 1500 mm high pool fencing if required to boundaries where retaining walls occur or where appropriate, design covenants will be incorporated into housing designs to ensure domestic animals are enclosed.

Vehicular and pedestrian gates

Where appropriate to the adjoining fence vehicular and pedestrian gates are proposed to be 1800 mm high with vertical rails at 60 mm spacing. Pedestrian gates will be self-closing. In other locations vehicular gates will be installed to restrict unauthorised movements in to open space areas.

Vehicular speed reduction

Speed will be limited to 40 km/hr within 100m of signed koala crossings and vehicle speed reduction devices will be installed to reduce the risk of vehicle strike.

Environmental rehabilitation and preservation of habitat

Detailed investigations including tree surveys, fauna surveys and habitat surveys have identified essential habitat and corridors for the preservation of koalas within Gainsborough Greens. Large corridors and open space areas have been provided to support the movement of koalas through the site and rehabilitation of these areas will be undertaken to improve the habitat value. Weed eradication will form an essential

component of the rehabilitation followed by Natural Regeneration, Assisted Natural Regeneration, Reconstruction, or Fabrication as required.

Koala sensitive lighting

Artificial lighting can affect the suitability of habitat for nocturnal species by interfering with natural behaviours or cycles. Some species are also exposed to greater risk of predation while others are hindered in their ability to locate prey or mates. During construction activities, lighting will be minimised and directed away from retained areas of vegetation. Where lighting is installed along streets, fauna sensitive lighting will be utilised incorporating design elements that reduce light spillage through shielding, embedded light bulbs, eliminating bare bulbs, reducing upward light and ensuring light reaches only the areas in need of illumination.

Interpretive Signage

Signage will be designed for the development area identifying the fauna protection needs of the development and outlining the protection methods that residents can employ to prevent harm to native fauna.

Environmental Education

Additional literature will be made available as part of an induction for residents to be informed of the Native Fauna Protection Strategy and reasons for their ongoing assistance in environmental protection. This will include outlining their responsibility in notifying the body corporate of any damage to fences or gates and procedures to follow should a koala gain entry.

Body Corporate Responsibilities (where applicable)

The Body Corporate will be responsible for monitoring all fences and gates within the development to ensure that koalas cannot access the development high risk areas. It will be the responsibility of the body corporate to manage vegetation outside the fence to prevent access via overlapping canopies or overhanging branches. Street trees inside the fence will consist of species that will not facilitate koala access. The Body Corporate will also be responsible for providing an induction to new residents.

Resident Induction

An Induction will be provided for all new residents to improve awareness of environmental issues within Gainsborough Greens. Environmental issues to be covered will include specific instructions relating to the care of koalas, general responsibilities, and additional environmental education material. The induction will be provided at the time residents collect their key to the recreation centre and will be incorporated into an owner's manual provided to all new residents. **Appendix D** provides an example of the type of information that will be presented at each induction.

Range of Fencing Styles

Fencing Styles will comprise of a variety of native fauna exclusion fencing in accordance with the agreed specifications between the applicant and Gold Coast City Council as part of the DARP OWLS agreement. Types include:

- 1800 mm high Native Fauna Exclusion Fence as detailed within Koala Proof Fence and Gate (Drawing 1603 Department of Main Roads) (**Appendix C**) or 1800 mm High Pool Fencing with vertical rails at 60 mm spacing;
- 1500 mm high Pool Fence in locations above retaining walls as illustrated within Fauna Fence Concept Design by Form Landscape Architects within **Appendix C**; and
- design covenants will be incorporated into housing designs to ensure domestic animals are enclosed

Within the Body Corporate portion of the project all fencing will be monitored by the body corporate to ensure the ongoing exclusion of fauna. In other areas the fences will be monitored by the Local Government.

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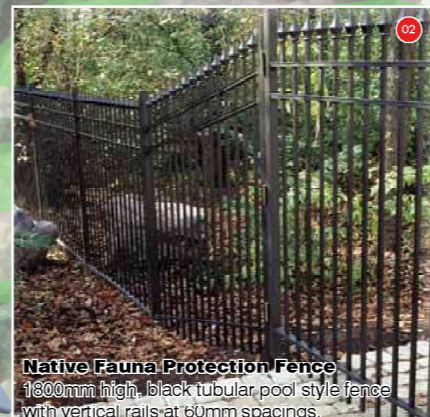
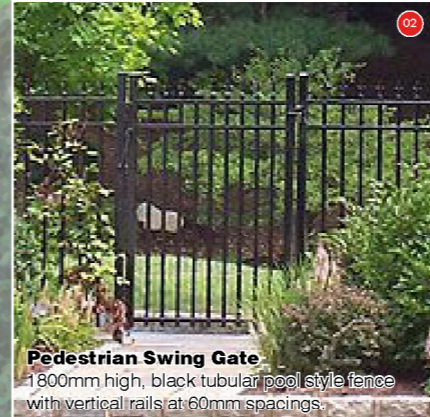
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APPENDIX A: Example - Gainsborough Greens, Precinct 1, Native Fauna Protection Strategy Map

Native Fauna Protection Fence
1800mm high, black tubular pool style fence with vertical rails at 60mm spacings.

Vehicular Sliding Gate
1800mm high, vertical rails at 60mm spacings.

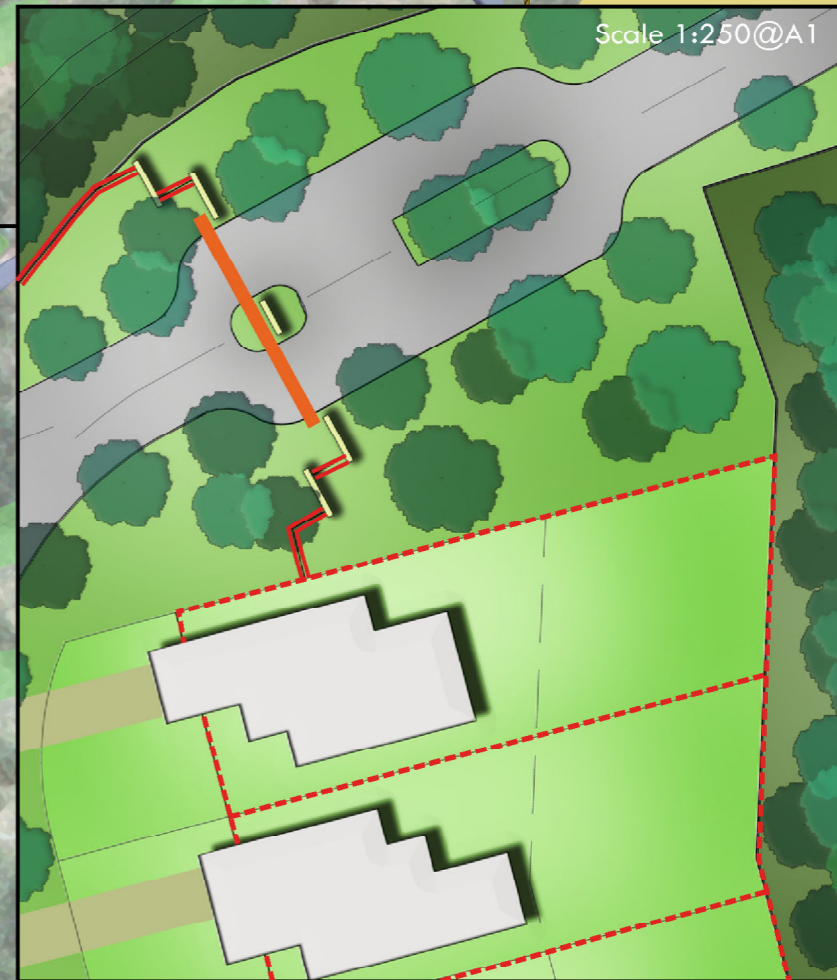
Pedestrian Swing Gate
1800mm high, black tubular pool style fence with vertical rails at 60mm spacings.

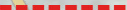





Scale 1:250@A1



Scale 1:250@A1



-  **Neighbourhood Fence**
1800mm high, Neighbourhood Fence to Private Lots.
-  **Native Fauna Protection Fence**
1800mm high, black tubular pool style fence with vertical rails at 60mm spacings.
-  **Vehicular Sliding Gate**
1800mm high, vertical rails at 60mm spacings.
-  **Pedestrian Swing Gate**
1800mm high, black tubular pool style fence with vertical rails at 60mm spacings.



APPENDIX B: Approved Gainsborough Greens Master Plan

CCCC
Gainsborough City Council

Application No. PN161275/12/0A2

APPROVED

Date: 21/3/13 Signature:

ADVISORY NOTE

Development shall comply with the conditions of approval as detailed in the Decision Notice and Council's Planning Scheme, Local Laws and Planning Policies unless stated otherwise.

LEGEND

Land Uses

- Residential
- Public Open Space - Conservation
- Public Open Space - Recreation Parkland
- Private Open Space
- Retained Agriculture

Movement & Access

- Primary Vehicular Network
- Other Key Vehicular Routes
- Primary Pedestrian Network
- Proposed Inter-Regional Transport Corridor

Key Ecological Features

- Existing Waterways
- Proposed Wildlife Corridors

DWELLING YIELD & BUILDING HEIGHT			
Precinct	Development Yield		Building Height Maximum
	Lower	Upper	
1	238	288	3
2	119	119	2
3B	70	90	3
4	340	500	3
5	405	440	3
Total	1172	1437	



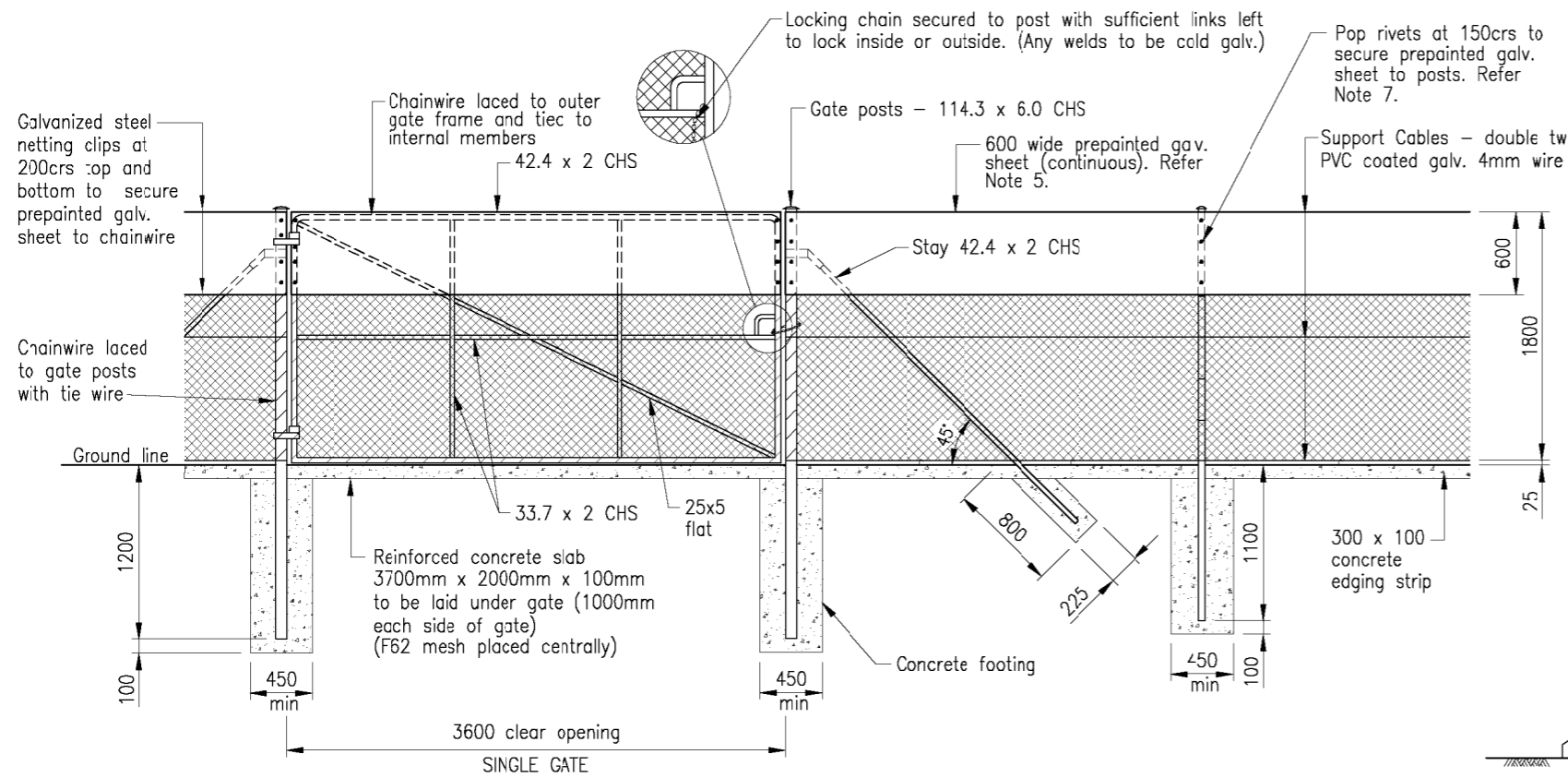
Note:

This plan was prepared as part of the Section 3.1.6 Preliminary Approval Overriding the Planning Scheme Application and should not be used for any other purpose. The dimensions and areas shown hereon are approximate only and no reliance should be placed on the information on this plan.

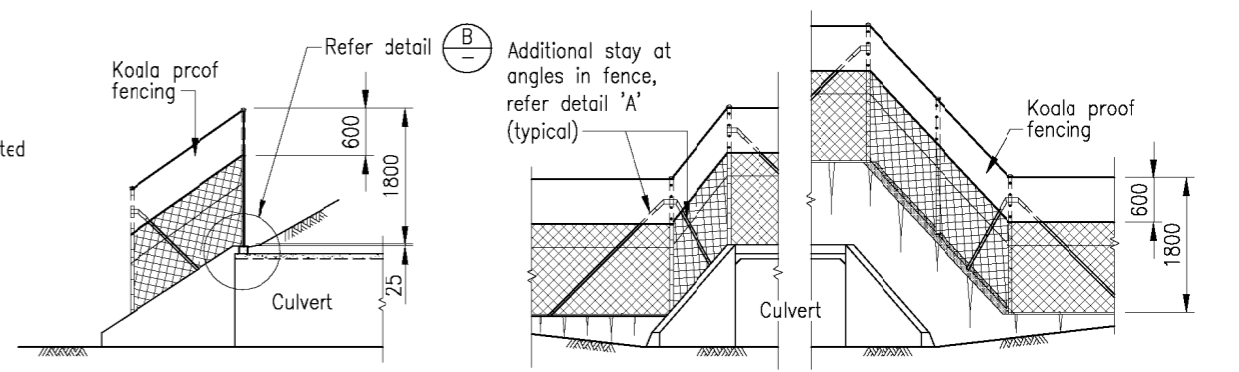
GAINSBOROUGH GREENS MASTER PLAN



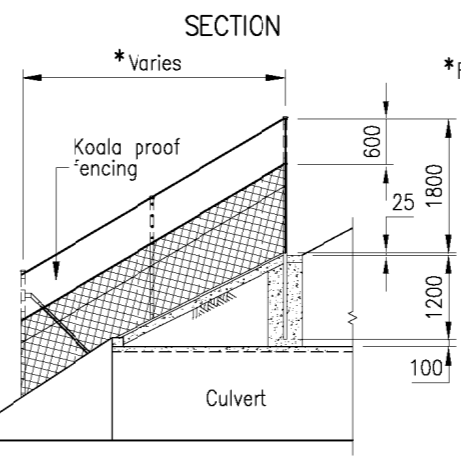
APPENDIX C: Koala Exclusion Fencing



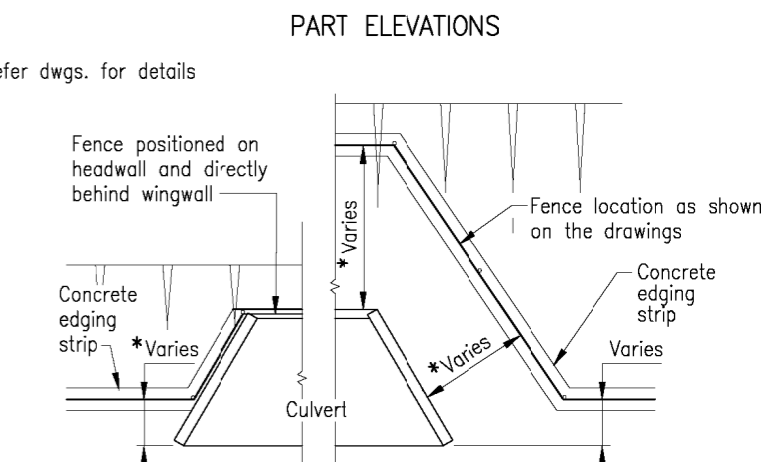
KOALA PROOF FENCE AND GATE (VIEWED FROM OUTSIDE ROAD RESERVE)



PART ELEVATIONS

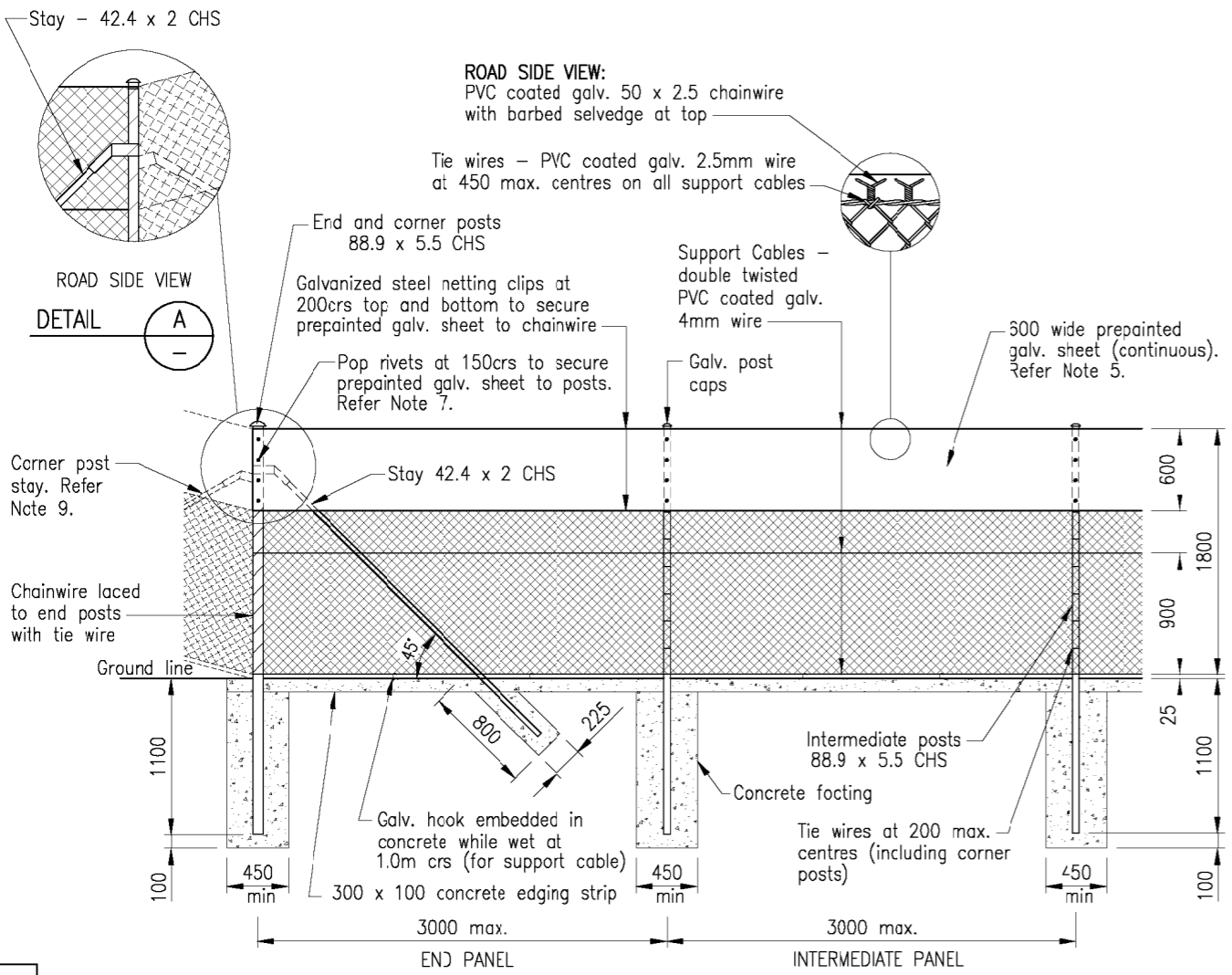


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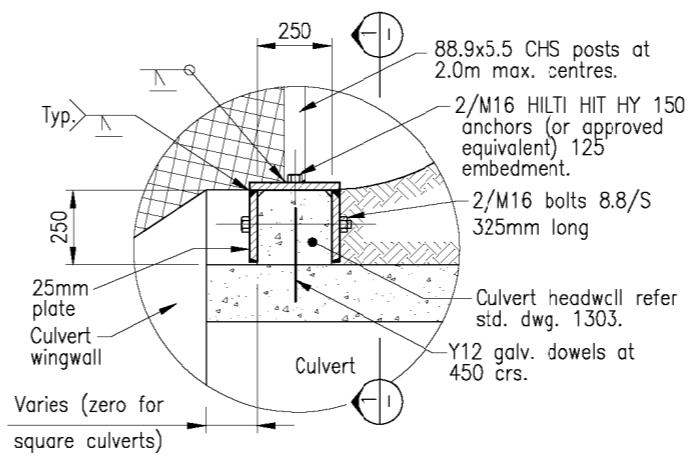


PART PLANS

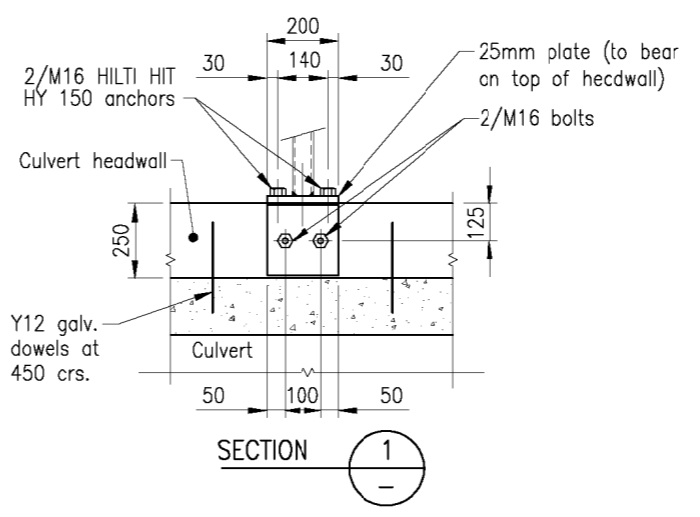
KOALA PROOF FENCE AT CULVERTS - TYPICAL ARRANGEMENTS



KOALA PROOF FENCE (VIEWED FROM OUTSIDE ROAD RESERVE)



DETAIL B



SECTION 1

NOTES :

- CIRCULAR HOLLOW SECTIONS (CHS) to be grade C350 to AS 1163.
- CONCRETE GRADE shall be N32/20.
- GALVANIZED CHAINWIRE shall conform to AS 2423, with a mesh size of 50mm and 2.5mm diameter wire, and coated with green PVC.
- SELVEDGES : Barbed selvedges shall be used at top except on gates where knuckled selvedges are used top and bottom.
- PREFINISHED/ PREPAINTED GALV. STEEL SHEET shall be 0.42mm BMT to AS 2728 coloured on both sides. The colour shall be "Mist Green" or "River Gum" subject to final approval of the Superintendent.
- CHAIN WIRE AND PREPAINTED GALV. SHEET shall be located on the opposite side of the posts to the roadway to prevent koalas climbing the CHS posts and stays.
- POP RIVETS WITH ALUMINIUM SHELL, STEEL STEM (LARGE FLANGED) maximum grip 9.5mm, drill bit No. 11 (4.9mm), shall be used.
- TIE/LACING WIRE shall be 1.57mm green PVC coated galvanized wire unless specified otherwise.
- CORNER POSTS to be adopted where the change in angle in horizontal alignment exceeds 20 degrees.
- BOLTS, NUTS AND WASHERS to be hot-dip galvanized to AS 1214.
- WELDING shall be to AS/NZS 1554.1.
- ALL STEELWORK AND FITTINGS shall be hot-dip galvanized to AS/NZS 4680.
- GALVANIZED FENCING WIRE to AS 2423.
- DESIGN BASED ON ULTIMATE WIND LOAD of 51m/s to AS 1170.2.
- KOALA PROOF FENCE:
 - Connection to culvert headwalls: all dimensions to be verified on site prior to fabrication of steel components. Formed/cored holes in headwall and drilled holes in plates for M16 bolts and anchors shall be 18mm dia.
 - Connection to bridges shall be as detailed in the bridge drawings.
- DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DOCUMENTS:
 Department of Main Roads Manual of Standard Drawings Roads
 Department of Main Roads Manual of Standard Specifications Roads

REFERENCED DOCUMENTS:
 Standard Drawings:
 1303 RC Box Culverts and Slab Link Box Culverts - Construction of Reinforced Concrete Wingwalls and Headwalls
 Standard Specifications:
 Road Furniture

FENCING		Queensland Government Department of Main Roads	
KOALA PROOF FENCE AND GATE		Size A3	Drawing No
		as shown	1603
			Date 6/02

1603

APPENDIX D: Gainsborough Greens, Forest Greens Resident Induction

GAINSBOROUGH GREENS, FOREST GREENS RESIDENT INDUCTION

The Residents of Gainsborough Greens, Precinct 1, Forest Greens have an opportunity to live within a high quality urban environment in harmony with surrounding high value natural habitat and essential fauna corridors. With this opportunity comes the responsibility to care for and respect your surroundings.

HERE'S HOW YOU CAN HELP...



Close the gates behind you.

Forest Greens has installed a number of pedestrian and vehicular gates throughout the estate. Fences are also in place to separate native fauna from the urban environment and allow safe passage around the estate so it is important that the gates are kept closed to prevent injury to native fauna.

While pedestrian gates are self-closing and vehicular gates are automatic, you should check that the gates are closed properly behind you. The attached Gainsborough Greens, Forest Greens Native Fauna Protection Strategy Map illustrates the location of all gates and fences.



Keep your pets under control.

Domestic pets tend to impact negatively on native fauna due to territorial behaviour or instinctual attacks. This can be minimised by keeping your pets contained within your property and when walking them keep them on a leash.



Place litter in bins.

Litter has the potential to be harmful to native fauna and their habitat by being consumed, becoming tangled, changing habitat or otherwise injuring animals. While only large pieces of rubbish are easily seen, even small pieces of litter like tissues, cigarette butts, wrappers, receipts, and bottle tops are a choking hazard to animals of all sizes. While some objects such as aluminium cans and bottles may seem harmless, over time these objects may break apart and become a hazard.

Often, organic items such as apple cores, orange skins and seeds are not considered to be litter since they are biodegradable however even these items can impact on the natural

environment by adding nutrients to the soil and helping the spread of weeds and non-native vegetation. Any change to the natural habitat can impact negatively on the native fauna which rely on it. It is always better to place all litter in the bin.



Don't throw Garden Clippings.

Garden clippings often end up over the back fence because it is out of sight and out of mind. At Forest Greens the back of your fence is part of a natural wildlife corridor. The green waste may contain weeds, rubbish or non-native vegetation seeds therefore it is important that this be reused within your property or disposed of properly.



Drive Safely.

Should native animals gain entry to the urban areas of Forest Greens, they will be at high risk of vehicle strike. In order to minimise the risk, it is important to reduce your speed and be observant.



Educate your kids.

Children should be encouraged to follow the general guidelines as set out within this document. You will be surprised at their ability and eagerness to make a difference with just a little encouragement.



Keep an Eye Out.

You can also help by keeping an eye out for any domestic animals that shouldn't be in the Forest Greens reserve. All domestic animals are to remain out of the reserve - no exceptions. This is to ensure that the delicate forest ecosystem remains undisturbed and that native animals are free to roam the reserve without being attacked by domestic animals. If you see a domestic animal in the reserve, please report the sighting to your Body Corporate managers. If you have a camera phone, a photograph of the animal would help with identifying the owner. All reports will be treated in strict confidence



Don't Light Fires.

The Forest Greens reserve is a dry sclerophyll forest. Typically, dry sclerophyll forests contain a wide range of eucalypt species which can quickly become engulfed in the event of a bushfire. Please, under no circumstances can any fire be lit within the forest. Equally, cigarette butts must also be disposed of in ash trays. Please do not throw cigarette butts from the car window. Not only are they a fire threat and litter but they also have the ability to wash into our streams and harm native animals.



Respect your environment.

Forest Greens is considered to be set within a high value natural environment which supports native fauna habitat and ecological corridors to surrounding habitat. The continued high value of this estate can only be maintained with a level of respect for the environment and the intent of the Native Fauna Protection Strategy which has been implemented as part of the ongoing protection of Forest Greens. The future of Forest Greens is up to you.



Protect the animals.

From time to time the native fauna protection strategy may break down or become ineffective. This might include issues such as damaged gates, damaged fences, vegetation overhanging fences, litter or weeds within natural areas, or native fauna within the urban areas of the estate.

If you become aware of an issue or an animal within the urban areas of the estate (i.e. within the fenced areas) it is essential that you contact the Body Corporate immediately. The Body Corporate will arrange for the repair of infrastructure or the safe relocation of any animals by a registered spotter catcher.

Do not attempt to relocate the animal yourself as it could become stressed and place itself in danger or harm others. A registered spotter catcher is trained to relocate animals with reduced risk and the least impact on the animal.

APPENDIX E: Plan of Management - Koala

TABLE 5.1. PLAN OF MANAGEMENT – KOALA, GAINSBOROUGH GREENS

PLANNING PHASE	Issue	Objective	Action	Responsibility/Monitoring
	Development within a designated Koala Conservation Area under the <i>Nature Conservation (Koala) Conservation Plan 2006-2016</i> and <i>Management Program 2006-2016</i> (Figure 1).	Under the <i>Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016</i> uncommitted development for urban purposes is not allowable within Koala Conservation Areas. Consultation with the EPA is required to resolve this conflict. Should the result of the consultation be that the development may occur providing there is no net loss of Koala habitat within the Conservation Area, the provision of habitat offsets as detailed under Policy 2 of the Plan - "Offsets for net benefit to Koalas and Koala habitat" will be required (Appendix 1).	A Habitat Rehabilitation/Restoration Plan should be prepared and implemented. Policy 11 of the <i>Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016</i> provides a guide for the rehabilitation of land to provide Koala habitat (Appendix 2).	In accordance with an approved Rehabilitation Plan. Monitoring and performance criteria will need to be developed for any approved works and restoration actions.
	Development within a designated Urban Koala Area under the <i>Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016</i> (Figure 1)	Compensate for the loss of approximately 66 ha of Koala habitat within the Urban Koala Area as far as practicable through habitat enhancement.	Figure 2 shows areas identified for habitat enhancement.	In accordance with an approved Rehabilitation Plan.
	Koalas are most vulnerable to predation and vehicle strike when moving through open country, residential allotments or roadways between habitat areas.	Provide habitat connection through the preservation or planting of vegetated corridors.	A Habitat Rehabilitation/Restoration Plan should be prepared and implemented. Policy 11 of the <i>Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016</i> provides a guide for the rehabilitation of land to provide Koala habitat.	Monitoring and performance criteria will need to be developed for any approved works and restoration actions.
	Domestic dogs are known to attack and kill Koalas, and their presence in Koala habitat areas is a recognized threatening process.	Minimize the potential for Koala deaths and injuries from dog attack within the subject land.	Within the subject site, habitat areas are to be linked by linear corridors of Koala food trees, preferably with overlapping upper branches so that the animals do not need to come to ground. The width of the corridors will vary, but should be as wide as possible. Areas designated as wildlife corridors are shown on Figure 4.	In accordance with an approved Rehabilitation Plan. Monitoring and performance criteria will need to be developed for any approved works and restoration actions.
	The construction of roads within the proposed development area will result in a risk of vehicle strike where none currently exists.	Ensure that safe Koala crossing areas are provided on roads at key locations within the development area (Figure 4).	The eastern half of the development area should be designated as a "no dog" zone. No dog off-leash areas on the subject land. Ensure that remaining precincts are designed to prevent Koalas from entering into areas where dogs may be present.	In accordance with an approved Rehabilitation Plan. Monitoring and performance criteria will need to be developed for any approved works and restoration actions.
	Koala road mortalities are not significant on roads surrounding the subject land at present (pers. comm. D. de'Villiers, QPWS, 2007). With the proposed increase in traffic on these roads as a result of increased urban development, the risk of vehicle strike will be greater and without adequate safe crossing opportunities, mortalities will increase.	Ensure that safe Koala crossing areas are provided on roads at key locations surrounding the subject land (Figure 4).	The suggested measures in the <i>Nature Conservation (Koala) Conservation Plan 2006</i> include: <ul style="list-style-type: none"> • The use of barriers and channel fencing that lead koalas to designated crossing points such as underpasses and overpasses; • Improved lighting and verge maintenance to make animals more visible when crossing roads; • Traffic calming to slow traffic down; and • Reduced speed limits. Recommended treatments are provided in Appendix 3.	In accordance with an approved Rehabilitation Plan. Monitoring and performance criteria will need to be developed for any approved works and restoration actions.
	Fencing around and within developments presents obstacles to Koala movement.	Ensure that designated Koala habitat areas are not separated by fencing that cannot be scaled by Koalas. Ensure that Koala-proof fencing is provided to exclude the animals from dangerous areas.	Specific effort is required to choreograph Koalas to designated safe crossing points and away from dangerous roadways (Figure 4).	In accordance with an approved Rehabilitation Plan. Monitoring and performance criteria will need to be developed for any approved works and restoration actions.
			Wherever fencing is required, unless the area is dangerous to Koalas, Koala-friendly fencing should be installed. The <i>Nature Conservation (Koala) Conservation Plan 2006</i> suggests the following approaches to fence design: <i>Allow Koalas to climb easily through or over the fence by:</i> <ol style="list-style-type: none"> 1. Choosing materials, such as a timber post-and-rail or chain wire, that a Koala can easily grip and climb; 2. Using rails or slats that are not more than 15cm wide; 3. Leave at least a 30cm gap between the ground level and the first rail or strand. 	

			<p>4. Provide a means for Koalas to get over a fence that cannot be easily climbed by;</p> <p>5. Installing a timber post leaning against the fence at a 45 degree angle on either side;</p> <p>6. Planting vegetation within very close proximity (branches touching) on either side of the fence to provide a natural ladder;</p> <p>7. Installing panels or planks horizontally along the top of the fence to provide a walkway.</p> <p>Locations for fauna friendly and exclusion fencing are provided in Figure 4.</p> <p>Where person-proof fencing is a requirement, this can be made more Koala-friendly by including 15 cm diameter treated timber poles, protruding above the top of the fence, positioned on both sides of the fence at every second fence post. This would allow the use of strands of barbed wire along the top of the fence to discourage human passage if safety regulations require this, although the use of barbed wire should be avoided if possible as the strands can entangle other native fauna species such as flying foxes and gliders.</p>	
CONSTRUCTION PHASE	<p>Clearing activities can cause the injury or death of resident Koalas within and adjacent to areas being cleared.</p> <p>Protection of Koala habitat trees outside of development areas. Isolated patches of remnant vegetation adjacent to construction activities are likely to be subject to increased weed infestation and other detrimental impacts.</p>	<p>Ensure that no Koalas are injured or killed during clearing activities.</p> <p>Avoid removal or damage to Koala habitat trees where possible. On the subject land these are primarily:</p> <ul style="list-style-type: none"> • <i>Eucalyptus tereticornis</i> (Forest Red Gum) • <i>Eucalyptus propinqua</i> (Small-fruited Grey Gum) • <i>Eucalyptus racemosa</i> (Scribbly Gum) • <i>Eucalyptus tindaliae</i> (White Stringybark) • <i>Eucalyptus siderophloia</i> (Grey Ironbark) • <i>Corymbia citriodora</i> (Spotted Gum) • <i>Corymbia intermedia</i> (Pink Bloodwood) <p>Appendix 5 provides descriptions of these species for ease of identification on the subject site.</p>	<p>All vegetation clearing on the subject site should follow the procedures set out in Policy 6 of the <i>Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016</i> -“Vegetation Clearing Practices” (Appendix 4).</p> <p>Prepare and implement a weed management plan.</p> <p>Prepare and implement a pest fauna management plan.</p> <p>Habitat to be retained should be cordoned off with high visibility, temporary fencing, and the Construction Management Plan should include instructions that there should be:</p> <ul style="list-style-type: none"> • No vehicles or machinery allowed within cordoned off areas; • No storing or stockpiling of material within the cordoned off areas; • No dumping of rubbish in bushland areas; and • No domestic pets present on site during the construction period. 	
OPERATIONAL PHASE	<p>Isolated patches of remnant vegetation adjacent to residential development are likely to be subject to weed infestation and too-frequent fire, reducing the value of the habitat for Koalas.</p> <p>Wild fire and/or incorrect fire regimes can have significant localised impact on Koalas or their habitat in both short and long term periods.</p> <p>Habitat replacement/recruitment</p>	<p>Maintain and/or enhance the Koala habitat values of retained vegetation.</p> <p>Ensure that fire does not unduly threaten Koalas or their habitats on the subject site.</p> <p>To ensure the long-term protection of Koala habitat and its ongoing value to Koalas</p> <p>To monitor the local population to ensure the identification of threatening processes and impacts to improve long term viability.</p>	<p>Prepare and implement a weed management plan.</p> <p>Prepare and implement a pest fauna management plan.</p> <p>Community awareness is important in controlling pests and fire. Information should be provided to the community regarding the ecological impacts of dumping garden waste, allowing pets to roam free, and the lighting of fires.</p> <p>Prepare and implement a fire management plan.</p> <p>Retained habitats should be managed to ensure suitable fire regimes and potential for uncontrolled wildfires are reduced.</p> <p>Immediately after all fire events affected areas and nearby habitats should be searched for Koalas to assess their health and if required to provide for suitable treatment. Any deaths should be recorded in the site Koala register.</p> <p>Prepare and implement a Habitat Management Plan to ensure sufficient recruitment of koala food trees and habitat within designated areas. The plan should detail minimum monitoring regimes and performance criteria for Koala habitat values.</p> <p>Ensure Koala habitats are managed to provide ongoing recruitment of Koala trees and habitat values.</p>	<p>In accordance with the individual management plans.</p> <p>In accordance with the Fire Management Plans.</p>

APPENDIX F: Fauna Management Strategy

Table 6.3: Fauna Management	
Author:	Habitat Environment Management
Applies to:	All Precincts
Person Responsible:	Developer, Contractor & Environmental Consultant.
Issue:	Fauna Management
Operational Policy:	<i>To ensure no immediate or long term impacts upon local populations of fauna during construction phase of development.</i>
Performance Criteria	<ul style="list-style-type: none"> • No loss of life for fauna during vegetation clearing or other construction phases. • No net loss of habitat resources (eg feed trees, hollows) for fauna during clearing of vegetation.
Implementation Strategy:	<p><i>Pre-Construction</i></p> <ul style="list-style-type: none"> • The developer shall ensure vegetation is inspected for fauna by an appropriately qualified and experienced Spotter Catcher prior to clearing <p><i>During Construction</i></p> <ul style="list-style-type: none"> • Fauna shall be removed or relocated as appropriate or required by the spotter catcher. • Any hollow ground/arboreal logs should be relocated from areas to be cleared into proposed Creek Corridor, to supply additional cover for any displaced fauna; • After a spotter catcher has confirmed the area is clear of fauna, fauna exclusion fencing will be used to prevent animals returning to the development footprint • Clearing to be done in a sequential fashion working from developed areas towards conservation areas to allow disturbed fauna a path to other habitat to be retained • All construction workers shall have fauna management practices explained during the environmental induction programme process • No domestic pets (including dogs, cats) allowed on the site during construction. <p><i>On Maintenance</i></p> <ul style="list-style-type: none"> • Monitoring programme as outlined within this EMP of nest boxes, supplementary habitat, and revegetation. <p><i>Operational Phase</i></p> <ul style="list-style-type: none"> • Fauna-friendly fencing will be installed throughout the development, as proposed in. Details of the fencing type will meet requirements set out in the South East Queensland Regional Plan. • Encourage responsible pet ownership and native planting on private house blocks • Restrict pet ownership within Precinct 1 adjacent to conservation area.

Table 6.3: Fauna Management	
Monitoring:	<ul style="list-style-type: none"> • Monitoring of compliance to the EMP • Inspections of fencing and flagging of areas to be retained • Inspection of habitat trees retained within the development footprint • Inspection of nest boxes provided within conservation areas for presence of Indian Mynah or Native Bees • Daily monitoring of clearing techniques
Auditing:	<ul style="list-style-type: none"> • Monthly audits during all phases of development of site activities, plan amendments, complaints, corrective action and reporting by the Environmental Consultant to ensure compliance with the EMP
Reporting:	<ul style="list-style-type: none"> • Environmental diary to be updated with any impacts or issues of non compliance; • Spotter Catcher to complete a diary of any animals relocated on site • Any injured fauna to be reported to EPA (QPWS); • The spotter catcher shall instruct the developer when no further action is required in relation to fauna relocation; and • A Fauna Report is to be compiled and forwarded to Gold Coast City Council and EPA upon completion of clearing works.
Identification of incident or failure	<ul style="list-style-type: none"> • Fauna injury or fatality • Complaints regarding impacts on fauna • Removal of Barricading or nest box
Corrective Action	<ul style="list-style-type: none"> • Reinstate barricading or supplementary habitat, where required; • Retraining of Contractors; and • Modify clearing techniques, where possible.
Commitment	<ul style="list-style-type: none"> • The proponent will ensure that the development meets the requirements of the EMP.