Figure 6: Grey-headed Flying Fox and Micro-bats

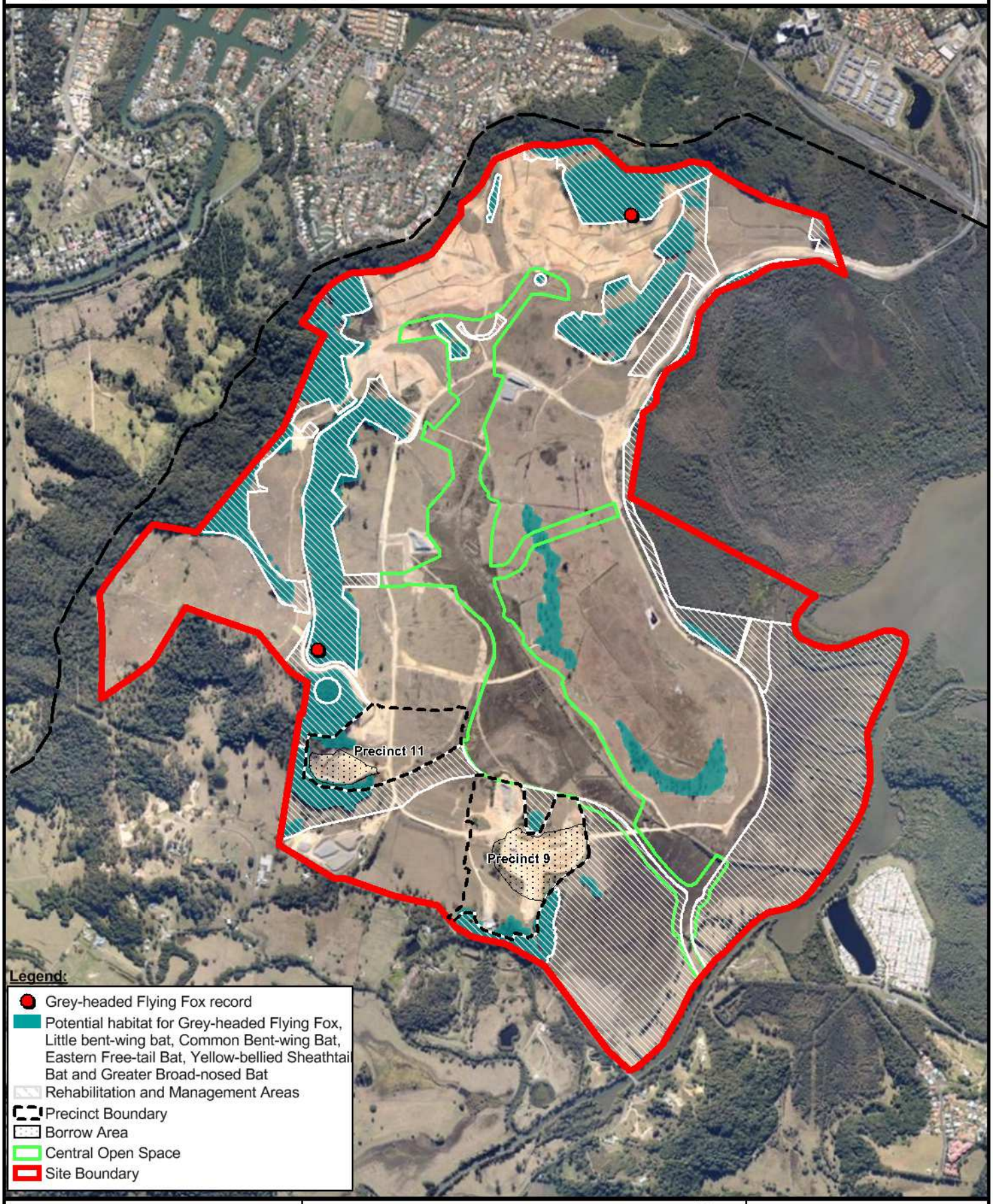

FIGURE 6: Grey-headed Flying Fox and Micro-bats
CREATED BY AM11482

REVISION 2
DATE 17/12/2013
STATUS FINAL
ISSUED FOR INFORMATION

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PROJECT NO. 30031162

PROJECT TITLE
Cobaki Estate Environmental Management Plans

COORDINATE SYSTEM
GDA 1994 MGA Zone 56

0 0.5 1km
Scale: 1:20,000 @ A4

SOURCE
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6 MITIGATION MEASURES

Aside from minimising the total area of habitat to be cleared, mitigation measures to be discussed in this section are: the management of native fauna during construction, the maintenance of native fauna within retained habitat areas, management of pest species and maintenance of connectivity between habitats.

6.1 Pre-clearing

Prior to any clearing within Precincts 9 and 11, the following procedures are to be followed:

At least two (2) weeks prior to clearing and earthworks:

- A pre-clearing survey will be undertaken by the Ecologist as part of baseline surveys, involving:
    - Extensive searches for all native fauna, particularly threatened species and arboreal mammals.
    - Visual inspection for breeding places (hollow-bearing trees, roost sites), fissures and other habitat features. The locations of all fauna identified shall be GPS recorded, and trees containing fauna and/or habitat features shall be GPS recorded and flagged.
- A pre-clearing checklist (Appendix A) will be completed by the Environmental Officer.

Within 12 hours prior to clearing:

- Additional inspection of flagged habitat trees to be cleared (as identified within the pre-clearing fauna survey) will be undertaken by the fauna spotter-catcher. The fauna spotter-catcher will be present during all stages of clearing and the initial stage of earthworks in order to inspect on-ground habitat features and ensure the safety of any fauna detected. Checking for hollows and the presence of fauna in breeding places above eye level must be undertaken with the use of camera poles or other such suitable equipment. The Hollows Inspection Checklist provided in Appendix B should be used to record all hollows and fissures identified and to determine nest-box requirements.
- All retained habitat will be clearly delineated using parawebbing prior to any earthworks to ensure that vehicles and other direct disturbances associated with earthworks do not encroach into adjacent habitat. An Earthworks Fencing Plan is provided in Appendix C. Signage is to be erected on fencing stating: “No Entry – Environmental Protection Area” or “No Entry – Compensatory Habitat Area” as appropriate.
- In the event of injury to an animal, the fauna rescue procedures outlined in Section 6.2.3 should be followed.

6.2 Management of Fauna during Construction

6.2.1 Clearing and Earthworks

The following management strategies shall be implemented during clearing and earthworks:

- A fauna spotter-catcher will be present during all stages of clearing and the initial stage of earthworks.
- To minimise impacts on fauna species of conservation significance during clearing, a two-stage clearing process is proposed:
    - The first stage of clearing will involve removal of smaller, non-habitat trees in order to allow fauna to leave inhabited trees of their own accord, thereby minimizing risk of injury or death. The second stage of clearing will involve removal of remaining flagged habitat trees (identified during pre-clearing surveys to contain suitable roosting/nesting hollows or fissures).
    - Prior to the 2nd stage of clearing, under the supervision of the spotter catcher will inspect the trees, and where fauna has not relocated of its own accord, the tree must be gently tapped with the arm of a piece of machinery. If the nesting animal cannot be readily removed by the spotter-catcher, the portion of the tree containing the hollow will be soft-felled and reattached to suitable standing trees in nearby retained vegetation.
    - Soft-felling techniques will be implemented for the removal of habitat trees in order to reduce the disturbance and risk of injury to any inhabiting fauna.
- Following clearing, a second inspection of felled trees will be undertaken to relocate fauna disturbed or remaining within the felled trees to suitable nearby habitat areas.
- Sections of felled trees containing medium to large hollows will be removed and attached to suitable standing trees found in nearby retained vegetation.
- Grubbing operations shall ensure the site is left free draining with no ponding of stormwater which may result in breeding habitat for mosquitoes and cane toads, or cause alterations to the hydrology of wetland habitats.
- Erosion and sediment control works shall be designed and managed in accordance with the Erosion and Sediment Control Plans (Yeats, 2013).
- No unrestrained dogs shall be allowed on site during construction. The Environment Officer is to monitor compliance with the *Companion Animals Act 1998*.
- Contact details for the qualified ecologist/fauna specialist, Wildlife Relocation and Management Services and the Local Veterinary Hospital will be kept on site at all times in the case that injured wildlife are identified (**Section 6.2.3**).

6.2.2 Management Practices Specific to Threatened and Significant Fauna

Koala *(Phascolarctos cinereus)*

- Visual inspection for koalas in trees to be removed shall be completed on the day of clearing, prior to any vegetation removal.
- In the event that a koala is identified in a tree marked for removal, no works will be undertaken within 25 m of the tree until the individual has moved from the area of

its own accord. If necessary, the tree shall be left overnight to enable the koala to move away. The tree can only be removed following inspection by an appropriately qualified spotter catcher to ensure that the koala has dispersed and that the removal of the tree poses no direct threat to the health or survival of the koala.

Black-necked stork (*Xenorhynchus asiaticus*)

- The boundaries of the Environmental Protection Areas will be demarcated to exclude construction traffic.
- Sediment and erosion control measures will be implemented during construction in accordance with the approved Erosion and Sediment Control Plans (Yeats, 2013).
- Exclusion fences will be retained until clearing and construction works are completed.

Powerful owl (*Ninox strenua*) and Masked owl (*Tyto novaehollandiae*)

- In the event that a powerful owl or masked owl is identified in any tree marked for removal, whether habitat or otherwise, no works will be undertaken within 25m of the tree until the individual has moved from the area of its own accord. The tree shall be left overnight to enable the owl to move away. The tree can only to be removed following inspection by an appropriately qualified spotter catcher to ensure that the owl has dispersed and that the removal of the tree poses no direct threat to the health or survival of the owl.

Microchiropteran bats

- In the event that a little bent-wing bat, common bent-wing bat, eastern free-tail bat, yellow-bellied sheathtail bat of greater broad-nosed bat is located within felled timber, the bat will be captured by a suitably qualified spotter-catcher and relocated to a suitable location. The bat will be released at dusk to prevent undue stress or predation.
- If a bat is located within a hollow limb, but cannot be readily removed by an ecologist, it is recommended that the hollow end of the limb be blocked with porous material and a chainsaw be used to remove the limb. The limb should then be relocated to a suitable place and the hollow end unblocked at an appropriate time of day to minimise predation.

Wedge-tailed Eagle

- No works will be allowed within 100m of the wedge-tailed eagle nests (refer to Appendix C).

6.2.3 Fauna Rescue

Contact details for the qualified ecologist/fauna specialist, Wildlife Relocation and Management Services (07 5590 4301) and the Local Veterinary Hospital (Billinudgel: 02 6680 3480) must be kept at all times in the site offices and with the on-site Environmental Officer. If an injured, shocked or juvenile animal and/or eggs are discovered during works, including during activities associated with the relocation/removal or hollow bearing trees, the following procedures will be followed:

- If fauna require handling, this should be done with care and by a fauna specialist, who should hold the relevant licenses and permits listed in **Table 2** (**Section 3.3**).

- Large animals shall be covered with a towel or blanket to minimise stress and gently placed in a cardboard box or natural fibre bag.
- Small animals shall be placed in a cotton bag, tied at the top.
- Keep the animal in a quiet, warm, ventilated and dark place. A designated site will be decided upon in advance of any construction works commencing.
- If the animal is seriously injured and requires immediate attention, as determined by the fauna specialist, the veterinarian should be contacted immediately.
- If the fauna specialist is not present when an injured/juvenile animal is found, Wildlife Relocation and Management Services or veterinary surgeon shall be contacted immediately, as required.
- If the animal is reluctant to move away or is injured, it should not be released and Wildlife Relocation and Management Services shall be contacted.
- Some animals require specialised handling skills (e.g. venomous reptiles, raptors) and should not be handled by site personnel.

6.2.4 Two-stage Post Clearing and Earthworks Report

Given the potential time lapse between clearing and earthworks activities, the Post-Clearing and Earthworks Report will be completed in two stages. At the completion of clearing activities, the project ecologist/environmental officer in consultation with the fauna specialist will produce a Draft Stage 1 report providing a summary of the results of pre-clearing surveys, clearing operations and hollow relocations. A follow-up Stage 2 report will then be prepared to follow up on any additional issues that may have resulted from Earthworks activities. A separate two-stage report will be prepared for activities within each stage of construction (Precincts 9 and 11).

Details within each report will include:

- Information on clearing and earthworks operations, dates, procedures, areas
- Details of habitat trees
- Information on tree species and tree sizes being used for breeding or roosting by fauna, including location, size, height and girth (i.e. for information base purpose).
- Detailed information about any incursion into no-go zones.
- Assessment against the performance criteria detailed in Section 8.
- Recommended remediation measures for any incursions into no-go zones.

Final reports will be submitted to TSC at the completion of Earthworks.

6.3 Long-term Management of Fauna

The following measures will be implemented to manage fauna during the operational phase of the project:

- Maintenance of habitat and connectivity between the estate and adjacent habitat areas
- Hollow management
- Management of pests and domestic species

These will be discussed further below.

6.3.1 Maintenance of Habitat and Connectivity for Fauna

The following fauna structures will be implemented in order to maintain habitat connectivity between the estate and adjacent habitat areas:

- Buildings, roads and fences shall be sited and constructed to allow movement of fauna through the rehabilitated central east-west fauna corridor retained on the site. These structures will be constructed in consultation with an Ecologist, where necessary, to determine the most appropriate location and design that maximises fauna movement between adjacent habitat areas (JWA, 2010a).
- Fauna friendly fences will be constructed at the interface of the development envelope and all areas of retained vegetation. Fences are not to exceed 1.2m in height, and should be installed at least 150mm away from the base of retained vegetation, so as not to impede fauna movement along these areas (JWA, 2010a). Specifications for the design of Fauna Friendly fences are provided in Appendix D.
- Fauna underpasses under Cobaki Parkway have been designed. This is discussed further in the Long-nosed Potoroo Management Plan (SMEC, 2013a).
- As mentioned below, nest boxes of varying sizes will be installed in retained vegetation to provide habitat for species such as gliders, possums, owls and parrots.

6.3.2 Hollow Management

Tree hollows provide refuge and breeding habitat for a range of arboreal fauna species such as gliders, possums, owls and bats. The following hollow management requirements shall be implemented by the Proponent under the direction of the spotter-catcher and Environmental Officer:

- As mentioned in Sections 5.1 and 5.2, a pre-clearing survey will identify and record all hollow-bearing trees to be cleared and sections of felled trees containing medium to large hollows will be removed and attached to suitable standing trees found in close proximity to the development footprint.
- Should tree hollows be destroyed during felling, nest boxes will be placed in adjacent habitat according to the following protocol:
    - Smalls hollows will be replaced with nest boxes designed for bats, incorporating an overhanging roof and internal baffles with both external and internal walls lined flyscreen to improve grip
    - Medium sized hollows will be replaced with those designed for gliders, medium sized parrots and Microchiropteran bats
    - Large sized hollows will be replaced with those designed for cockatoos, greater glider, common brush-tail possum
    - Nails used to attach nest boxes will not be galvanised or coated and will not contain zinc so as to not poison the tree
    - Galvanised wire covered in tubing will be used to attach boxes to large branches
    - Boxes will be placed between four and eight metres above the ground and orientated to minimise penetration by rainfall and sunlight
    - Boxes will be placed away from main access tracks to minimise the chances of them falling and injuring anyone.

- The number and size of nest boxes and felled hollows to be installed will be no less than the number and size of hollows within trees to be cleared, as identified during the hollows inspection undertaken by a qualified ecologist prior to clearing (Checklist provided in Appendix B).
- All nest boxes will be GPS mapped and the tree species they are installed in recorded for future monitoring.
- Nest boxes and felled hollows shall be inspected for colonisation by exotic bees (*Apis melinifera*) and maintained on an annual basis. If colonisation by bees has occurred, the nest box shall be removed and replaced. Inspections for bees shall occur in winter to avoid disturbance to breeding animals.
- Nest boxes and felled hollows within the retained vegetation areas shall be maintained by the Proponent for a minimum of 5 years. Following the 5 year maintenance period, management responsibilities will be overtaken by Tweed Shire Council.

Specifications for the design of nest boxes are included as Appendix E.

6.3.3 Management of Pest and Domestic Species

- The keeping of cats within the Cobaki Estate development shall be prohibited.
- Domestic dogs shall be contained to fenced yards and prohibited from the central drainage reserve and Environmental Protection Areas.
- Pest management will be adaptive in response to the identification of an increase in pest species during monitoring (methodology detailed in the Flora and Fauna Monitoring Program (SMEC, 2013b)). Suggested responses provided in Section 10.

6.3.4 Operational Management Practices Specific to Threatened Fauna:

Koala *(Phascolarctos cinereus)*

- Koala habitat will be retained and protected within Environmental Protection areas throughout the site.
- Additional areas will be enhanced to facilitate koala movement through the site in accordance with the Site Regeneration & Rehabilitation Plan (JWA, 2012b).

Black-necked stork (*Xenorhynchus asiaticus*)

- Habitat for the black-necked stork is proposed to be retained within Environmental Protection and Open Space Areas throughout the site.
- A Compensatory Habitat Area comprised of freshwater wetland will provide approximately 2.25 ha of additional habitat for the black-necked stork, east of the Cobaki Parkway.
- An area of Swamp Sclerophyll Forest on Floodplain within the northern part of the Central Open Space will be established through revegetation works in accordance with the Site Regeneration and Revegetation Management Plan (JWA, 2012b). Buffer vegetation will be incorporated as the outer 5 m of planting.
- 93.3 ha of suitable forage habitat for the black-necked stork within the south-eastern portion of the site will be retained and rehabilitated in accordance with the Revised Saltmarsh Rehabilitation Plan (JWA, 2012c).

Powerful owl (*Ninox strenua*)

- Habitat for the powerful owl (i.e. old growth trees) will be retained and protected within the Environmental Protection Areas throughout the site. Additional areas will be enhanced to facilitate fauna movement through the site, and to provide forage resources, in accordance with the Site Regeneration and Revegetation Plan (JWA, 2012b).
- At least 1-3 nest-boxes of a suitable size for powerful owl will be installed within retained vegetation in order to improve the habitat values of the site, the quantity and location of which will be confirmed following baseline surveys. Additional nest boxes will be installed to compensate for the loss of any hollows which could not be salvaged during clearing. The number and location will be determined based on the outcomes of the pre- clearing survey (using the Hollows Inspection Checklist provided in Appendix B).

Masked owl – (*Tyto novaehollandiae*)

- Habitat for the masked owl (i.e. old growth trees) will be retained and protected within Environmental Protection and Open Space areas throughout the site. Additional areas will be enhanced to facilitate fauna movement through the site, and to provide forage resources, in accordance with the Site Regeneration and Revegetation Plan (JWA, 2012b).
- At least 1-3 large nest-boxes for the masked owl will be installed within retained vegetation in order to improve the habitat values of the site, the quantity and location of which will be confirmed following baseline surveys. Additional nest boxes will be installed to compensate for the loss of any hollows which could not be salvaged during clearing. The number and location will be determined based on the outcomes of the pre-clearing survey (using the Hollows Inspection Checklist provided in Appendix B).

Osprey (*Pandion haliaetus*)

- The developer has installed two (2) artificial nesting platforms on the site. These platforms have been highly successful to date (NSW Scientific Committee, 2009). They have been located within the Salt Marsh Rehabilitation Area on the southeast side of the site, adjacent to the Cobaki Broadwater (**Figure 8**).

Grey-headed flying-fox (*Pteropus poliocephelus*)

- The proponent has committed to submitting a Biodiversity Offset Strategy to SEWPaC for approval. No clearing of grey-headed flying fox habitat is permitted until the strategy is approved by the Minister. The strategy will include key milestones, performance indicators, corrective actions and completion timeframes for:
    - The acquisition and conservation of land containing a minimum of 3 ha of foraging habitat for the grey-headed flying fox for every 1 ha of habitat cleared or degraded for this species, that is of equal or greater quality to that removed. If the land acquired is of lower value, then the ration will need to be greater to account for the difference; and

    - The land acquired must be protected by a legal instrument under relevant nature conservation legislation that ensures the land is conserved in perpetuity.
- Forage habitat for the grey-headed flying-fox will be retained and protected within Environmental Protection areas throughout the site. (Note: No roosting flying-fox camps have been identified on or adjacent to the site.)
- Areas of additional Swamp sclerophyll forest on Floodplain will be generated and enhanced in accordance with the Site Regeneration and Revegetation Management Plan (JWA, 2012b) to provide forage resources and facilitate fauna movement throughout the site. Landscaping within this area will utilise Swamp Sclerophyll forest species.
- Flowering and fruiting trees and shrubs (e.g. Eucalypts, Figs etc.) shall be planted as part of the landscaping practices throughout the development site.

Microchiropteran bats

- Approximately 64 ha of on-site revegetation/regeneration will be completed in accordance with the Site Regeneration and Revegetation Plan (JWA, 2012b) to offset any loss of remnant bushland and to provide vegetated links across the site.
- Landscaping within this area will utilise Swamp Sclerophyll forest species.
- Additional areas will be enhanced to facilitate fauna movement throughout the site, and to provide forage resources.
- At least 2-5 nest-boxes of a suitable size for microchiropteran bats will be installed within retained vegetation in order to improve the habitat values of the site, the quantity and location of which will be confirmed following baseline surveys. Additional nest boxes will be installed to compensate for the loss of any hollows which could not be salvaged during clearing. The number and location will be determined based on the outcomes of the pre-clearing survey (using the Hollows Inspection Checklist provided in Appendix B).

7 IMPLEMENTATION OF CONTROL MEASURES

Table 5 provides a summary of the management actions, timing, and responsibility recommended to minimise the impact of construction activities on fauna and fauna habitat. This table will act as a schedule to ensure items are completed according to requirements, and to clarify necessary staging of construction works as a result of environmental requirements.

Table 5: Summary of Actions to mitigate impacts to fauna.

Action	Responsibility	Prior to Construction	During construction	Post Construction
Parawebbing around vegetation protection areas	Environmental Officer	X		
Installation of permanent fauna-friendly fencing (posts and rails) on the boundary of the Saltmarsh Rehabilitation Area and Freshwater Wetland Management Area and erection of signage on fencing stating 'No entry – Environmental Protection Area'.	Construction Manager/Site Superintendent Sign off: Environmental officer	X		
Installation of sediment and erosion controls to protect drainage lines, Compensatory Habitat Area and saltmarsh wetland habitat to be retained	Construction Manager/Site Superintendent Sign off: Environmental officer	X		
Flagging of any identified habitat features (hollows, nests, etc)	Fauna Spotter Catcher (under direction of the Environmental Officer)	X		
Undertaking of a site-specific threatened species induction for all site staff. Induction would cover issues relating to threatened species, designated and restricted areas of access and waste disposal	Environmental Officer	X		
Vegetation Clearing				
Visual inspection for koalas in trees to be removed on the day of clearing, prior to any vegetation removal	Fauna Spotter Catcher (under direction of the Environmental Officer)	X		

Two stage clearing ensuring that non-hollow bearing trees are cleared first	Fauna Spotter Catcher (under direction of the Environmental Officer)		X	
Relocation of hollows	Environmental Officer/Fauna Spotter Catcher		X	
Fencing inspections	Environmental Officer/ Site Superintendent		X	
Post-clearing report to Tweed Shire Council	Environmental Officer		X	
Retention and stockpiling of large woody debris for use in the habitat augmentation program	Environmental Officer		X	
Protection of fauna				
Construction of fauna friendly fences around retained vegetation	Environmental Officer		X	
Ongoing education of site staff through 'toolbox talks', ensuring important information relating to the protection of fauna are reiterated regularly. To be signed off by all attendees.	Environmental Officer		X	
Weekly inspection of construction site/works (Weekly Construction Checklist – Appendix F)	Environmental Officer		X	
Inspection to ensure that grubbing operations are leaving the site free draining with no ponding of stormwater which may result in breeding habitat for mosquitos and cane toads or cause alterations to the hydrology of wetland habitats.	Environmental Officer		X	
Maintenance of protection fencing and monitoring to ensure that non permitted activities do not occur within protected areas	Environmental Officer		X	
Monitoring compliance with the *Companion Animals Act 1998* (That no unrestrained dogs are allowed on site during construction)	Environmental Officer		X	
Construction/design and Installation of nest boxes. Recording location of installed nest boxes for future monitoring.	Environmental Officer	X	X	
Maintenance and monitoring of nest boxes within the retained vegetation areas for	Ecologist (under direction of the			X

a minimum of 5 years.	Environmental Officer)			
Contact details for the qualified ecologist/fauna specialist, Wildlife Relocation and Management Services (07 5590 4301) and the Local Veterinary Hospital (Billinudgel: 02 6680 3480) must be kept at all times in the site offices and with the on-site Environmental Officer.	Environmental Officer	X	X	
Notification of any additional threatened species identified to DECCW (NPWS)	Environmental Officer	X	X	
No works within 100m of the raptor nests (subject to confirmation of usage)	Project Manager/ Environmental Officer		X	
Erecting at least 2 artificial nesting platforms within the Saltmarsh Rehabilitation Area	Project Manager/ Environmental Officer		X	X
Adaptive pest management	Ecologist (under direction of the Environmental Officer)		X	X
Annual Fauna Monitoring	Ecologist (under direction of the Environmental Officer)		X	X
Removal of protection fencing	Site Superintendent Sign off: Environmental Officer			X

8 FAUNA MONITORING PROGRAM

Mitigation measures and management programs will be inspected, reviewed and updated regularly by the Environmental Officer.

Baseline surveys (as outlined in Table 6) will be undertaken in accordance with the Flora and Fauna Monitoring Program (SMEC, 2013b) at least two weeks prior to the commencement of construction. This will provide current baseline data that can be used to establish performance criteria and to compare annual monitoring results.

Table 6. Inspections and Monitoring relevant to Fauna

Monitoring Focus	Monitoring Site	Frequency	Implementation	Person Responsible	Prior to Construction	During Construction	Post-Construction
Baseline Fauna Survey	Overall site	Already completed	A baseline fauna survey will be completed over the entire site to determine species presence. The fauna surveys will be in accordance with methodology provided in the Flora and Fauna Monitoring Program (SMEC, 2013b). All fauna surveys will include visual inspection for evidence of pest species including dogs, cats, foxes and cane toads,	Ecologist (under direction of the Environmental Officer	X		
Pre-clearing Fauna Survey	Precincts 9 and 11	Within 12hrs prior to clearing	Pre-clearing fauna survey will include: • Extensive searches for all native fauna within the development footprint, particularly threatened species and arboreal mammals; • Additional inspection of flagged habitat trees to be cleared (as identified within the baseline fauna survey) will be undertaken by the fauna spotter-catcher. Checking for hollows and the presence of fauna in breeding places above eye level must be undertaken with the use of camera poles or other such suitable equipment. The Hollows Inspection Checklist provided in Appendix B should be used to record all hollows and fissures identified and to determine nest-box requirements.	Fauna Specialist/ Fauna Spotter Catcher	X		
Fauna	Work areas	Daily	Inspection of integrity of fencing around retained vegetation during clearing	Environmental Officer/ Site Superintendent		X	

Monitoring Focus	Monitoring Site	Frequency	Implementation	Person Responsible	Prior to Construction	During Construction	Post-Construction
		Daily	Inspection of erosion and sediment controls to ensure they are clean and working correctly	Environmental Officer/ Site Superintendent		X	
		Weekly	A general inspection of fencing.	Environmental Officer		X	
		Weekly	A general inspection of works (a biweekly inspection shall take place during substantial clearing activities)	Environmental Officer		X	
	Retained vegetation	Monthly	Monitoring of re-instated nest boxes. Further detail is provided in the Fauna and Flora Monitoring Plan (SMEC, 2013b).	Ecologist (under direction of the Environmental Officer		X	
		Annually	Monitoring of nest boxes. Further detail is provided in the Flora and Fauna Monitoring Program (SMEC, 2013b).	Ecologist (under direction of the Environmental Officer			X
		Annually	A Fauna survey (inclusive of pest species) will be completed within the Rehabilitation and Management Areas, Compensatory Habitat Area and Saltmarsh Rehabilitation Area for a minimum of 5 years. The annual surveys are to replicate the baseline survey in methodology, timing and location to allow data comparison over time. Baseline survey methodology is provided in Section 3 of the Flora and Fauna Monitoring Plan (SMEC, 2013b). A report will be prepared after each annual fauna survey and will include the following: • An assessment of habitat; • Information on clearing operations, dates, procedures, areas; • Details of type/area/location of vegetation that has been cleared;	Ecologist (under direction of the Environmental Officer		X	X

Monitoring Focus	Monitoring Site	Frequency	Implementation	Person Responsible	Prior to Construction	During Construction	Post-Construction
			• Details on identification and/or clearance of hollow bearing trees; • Live animal sightings, captures, any releases or injured/shocked wildlife; • Any dead animals located; • Photographs of rescued fauna; • Recommendations on how many and what type of hollows/nest boxes will be installed to compensate for hollows lost; and • Information on tree species and tree sizes being used for breeding or roosting by fauna, including location, size, height and girth (i.e. for information base purpose). The completed report will be submitted to Tweed Shire Council annually.				
Raptors	Nest sites	Annually	Visual monitoring of the two (2) artificial nesting platforms located within the Salt Marsh Rehabilitation Area on the southeast side of the site adjacent to the Cobaki Broadwater during breeding season (May to September). Visual monitoring of existing nest site during breeding season (May to September). Results of monitoring of nest sites will be included in the annual fauna survey to be submitted to Tweed Shire Council.	Ecologist (under direction of the Environmental Officer		X	X

9 PERFORMANCE CRITERIA

Performance criteria for management and monitoring of fauna during construction are as follows:

- All hollows and other habitat features are inspected and flagged by the Fauna Spotter Catcher prior to clearing.
- All identified hollows are relocated or, where required, nest-boxes are installed in nearby retained vegetation in accordance with recommendations provided in the Hollows Inspection Checklist (Appendix B).
- Erection and maintenance of protective fencing and signage prior to and during construction in accordance with the Earthworks Fencing drawings (Appendix C).
- Erection and maintenance of erosion and sediment controls in accordance with ESC Plans (CEMP).
- All workers inducted in site-specific fauna management measures.
- No injury or death of fauna during clearing, earthworks and construction.
- No damage to or clearing of Environmental Protection Areas or areas of retained vegetation during clearing, earthworks and construction.
- The suite of fauna (including threatened species) known to currently occupy the site continue to persist within identified habitat and Environmental Protection Areas on the site.
- Annual monitoring of nest boxes demonstrates that at least 75% of nest boxes are being used by the target native species.
- No evidence of nest boxes being colonised by pest species or competitors, such as Indian mynas and European bees.
- Osprey nesting platforms have been successfully constructed and installed by the commencement of construction on Stage 1 of Central Open Space (adjacent to precinct 9).
- Evidence of utilisation of at least one of the artificial nesting platforms within three years of their construction.
- Decreased abundance of pest species during annual fauna surveys as compared to baseline monitoring (as detailed in the F&FMP).

Performance criteria specific to each threatened species identified on site are included in the Flora and Fauna Monitoring Program (SMEC, 2013b)

10 DATA ANALYSIS AND REPORTING

10.1 Adaptive Management

Regular analysis and annual documentation of data will allow for improvements and refinements in the survey design to be incorporated into future monitoring events. Monitoring results will be reviewed and assessed against performance criteria to examine whether the mitigation measures and monitoring methods implemented for fauna species are effective. Should monitoring results fail to meet performance criteria, corrective action will be required to remediate the issues. The appropriate action will be determined in conjunction with Tweed Shire Council.

Suggested corrective action/responses to a range of potential incidents or management failures specific to fauna are detailed below.

Species to which the incident applies	Incident/Failure	Corrective Action/Response
All threatened fauna	Protective exclusion fences or erosion control measures become damaged or degraded during construction	Any damaged exclusion fencing and/or sediment fencing is to be reported and re-instated immediately.
Raptors	Inspections fail to detect utilisation of artificial nests.	The suitability of the artificial nests will be investigated, and recommendations to rectify/improve their effectiveness will be provided, depending on the nature of the problem identified.
Masked Owl, Powerful Owl, Microchiropteran bats,	Nest boxes fail to attract target species.	The monitoring program and/or suitability of the nest boxes will be reviewed and recommendations provided in the annual monitoring report (Section 10.2).
	Colonisation of nest boxes by exotic bees (*Apis melinifera*) or other invasive species.	If colonisation by bees has occurred, the nest box shall be removed and replaced.
	Tree branches supporting the nest boxes break or nest boxes become weathered making them unsuitable for habituation.	Regular maintenance will be undertaken by the proponent, according to recommendations provided in the annual report prepared by the Ecologist. Any damage to nest boxes will be reported and repaired/replaced immediately.
Grey-headed flying fox	Surveys fail to detect evidence of utilization of retained foraging areas by Grey-headed fox.	The suitability of the Environmental Protection areas as foraging habitat for the species should be investigated and effective adaptive management undertaken.
	Unsuccessful regeneration of flowering and fruit trees.	If less than 95% of flowering and fruiting tree stems have survived, causes should be investigated and suitable remediation measures recommended.

Species to which the incident applies	Incident/Failure	Corrective Action/Response
Black-necked Stork	Surveys fail to detect the presence of target species within retained habitat areas.	The monitoring program and/or suitability of the area will be reviewed and recommendations provided in the annual monitoring report.
Pest species	Surveys detect an increase in pest species from baseline results.	Recommendations will be made for appropriate control of identified pest species. The use of methods such as traps, baiting or further exclusion fencing will be investigated

10.2 Reporting

Results of monitoring by the Ecologist will be documented in an annual report, which will discuss:

- Monitoring undertaken (including any changes to methodologies);
- Analysis of results and assessment against baseline data/performance criteria;
- Discussion of results and any survey limitations;
- Success or failures of measures implemented to rectify previously identified problems (if any);
- Recommendations

The annual report will be submitted to the Director General (NSW DoP), OEH, Tweed Shire Council and other agencies as required.

11 REFERENCES

Department of Environment, Climate Change and Water. 2012. Threatened Species, Populations and Ecological Communities Profiles.
http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx

Douglas, J. (2003) Note 91 – Nest boxes for native wildlife, Land for Wildlife

Franks A. and Franks S. 2007. Nest boxes for Wildlife: a practical guide.

Gould Group (2008) The Nestbox Book. Wilkinson Publishing, Australia.

James Warren and Associates. 2013a. Revised Assessment of Significance (7-Part Test).

James Warren and Associates. 2013b. Revised Ecological Assessment. Cobaki Lakes., Tweed Heads.
James Warren and Associates. 2012a. Revised Site Regeneration & Revegetation Plan. Cobaki Lakes Preferred Project Report.

James Warren and Associates. 2012b. Revised Saltmarsh Rehabilitation Plan. Cobaki Lakes

James Warren and Associates. 2010a. Revised Fauna Management plan. Cobaki Lakes Preferred Project Report.

JBA Urban Planning. 2009. Environmental Assessment Report Part 3A Project Application. Cobaki Lakes Estate, Tweed Heads, Mixed Use Residential Development.

JBA Urban Pty Ltd. 2008. Environmental Assessment Report Part 3A Concept Plan. Cobaki Lakes Estate, Tweed Heads, Mixed Use Residential Development.

Lewis Ecological Services. 2009. Integrated Plan of Management for The Endangered Long-Nosed Potoroo (*Potorous tridactylus tridactylus*) Population at Cobaki.

McGinn, D. 2008. Cobaki Lakes Biting Midge and Mosquito Management Control Plan.

Mosquito Consulting Services Pty Ltd. 2008. Cobaki Lakes Biting Midge and Mosquito Control Plan.

SMEC (2013a) Long-nosed Potoroo Management Plan. Unpublished report prepared for Tweed Shire Council

SMEC (2013b) Flora and Fauna Monitoring Program. Unpublished report prepared for Tweed Shire Council

SMEC (2013c) Construction Environmental Management Plan – Precincts 9 and 11.

SMEC (2012a) Wallum Froglet Compensatory Habitat Management Plan. Unpublished report prepared for Tweed Shire Council

SMEC (2012b) Freshwater Wetland Compensatory Habitat Management Plan. Unpublished report prepared for Tweed Shire Council

Warren J. 1992. Fauna Impact Assessment on Crown lands between Cobaki Lakes and the Queensland/New South Wales border. Report prepared for Cobaki Lakes by James Warren, Ballina.

Warren J. 1994. Flora and Fauna Assessment Phase 1 Residential Development at Cobaki Lakes. Report prepared for Ray Corporation Pty. Ltd. By James Warren, Alstonville.

Woodward – Clyde. 1997. Species Impact Statement Cobaki Lakes

Yeats. 2010. Construction Environmental Management Plan – Statement of Intent

Yeats. 2010. Stormwater Quality Concept Plan. Cobaki Lakes Development. Project Application Central Open Space.

Yeats. 2012. Cobaki, Tweed Heads West Precinct 6 Bulk Earthworks Construction Certificate – Civil Engineering Drawings. Prepared for Leda Manorstead Pty Ltd.

APPENDIX A – PRE-CLEARING CHECKLIST

Project:	COBAKI ESTATE
Inspection Date:	Area/Precinct:

PRE-CLEARING CHECKLIST

#	Control Measure	Yes	No	N/A	Comments/Corrective Action
1	Have pre-clearing fauna surveys been undertaken?				
2	Is a qualified spotter/catcher present?				
3	Has the boundary of the clearing zone been fenced/delineated?				
4	Have targeted surveys for Koala been undertaken?				
5	Have populations and or individuals of identified threatened flora species been marked?				
6	Has protective fencing been installed around Environmental Protection Zones to be retained?				
7	Have habitat trees within clearing areas been identified?				
8	Has weed mapping and eradication been completed?				
9	Have areas of weed-infected topsoil been removed?				
10	Have all residents adjoining the corridor been advised at least 5 days prior to clearing vegetation?				
11	Has the clearing sub-contractor undergone specific training regarding their obligation not to over-clear?				
12	Have all heritage and other items been identified and managed?				
13	If near a Creek or waterway, is the riparian zone being maintained?				
14	Have all sediment control measures been installed?				
15	Are all relevant permits been obtained?				
16	Is water quality monitoring being undertaken?				
17	Has vegetation and topsoil to be salvaged for re-use been identified?				
18	Have the clearing sub-contractors been informed to leave fallen trees for fauna?				
19	Any other issues to be added to the checklist?				
Completed by:		**Signature:**			

APPENDIX B – HOLLOW INSPECTION CHECKLIST

Hollows and/or bark fissures identified during pre-clearing surveys will be documented using the following Hollow Inspection Checklist. One checklist will be completed per hollow, and used to calculate the appropriate nest box or felled hollow relocation requirements as per Section 5.3.2.

Hollow Inspection Checklist	
Part 1 (To be completed prior to clearing)	
Inspection Date:	Location:
Project Ecologist:	
Tree Number:	Tree Location:
Tree species:	
Size of entrance: (Small: ≤5cm; Medium: 5-15cm; Large: 15-30cm; Extra Large: >30cm)	
Height of hollow from ground:	
Are there any additional hollows on same tree:	
Fauna species inhabiting hollow (if present) or species most likely to utilize the hollow:	
Can the hollow be soft-felled and relocated? If so, provide recommended GPS location for relocation:	
Part 2 (To be completed during clearing of the identified hollow)	
If an animal was present in the hollow, is it injured?	
Does it require immediate attention?	
Can it be released and, if so, where will it be released?	
If not, what time was the fauna rescue agency called?	
What was the outcome of the fauna rescue?	
Will a compensatory nest box be required? If so, specify the type/size and recommended GPS location:	
Additional Notes/Comments:	
Completed By:	Signed:

APPENDIX C - EARTHWORKS FENCING PLAN

PRECINCT 11

PRECINCT 9

PIGGABEEN ROAD

LEGEND

- ENVIRONMENTAL PROTECTION AREA (NO-GO ZONE)
- PERMANENT FENCE
- TEMPORARY FENCE
- PROPERTY BOUNDARY
- CENTRAL OPEN SPACE
- VEHICLE GATE

A	Issued for Approval	08.06.16	AM/CH	
REVISION		DATE	DES/DFT	APP'D

LEDA

Principal
Leda Developments
Suite 14, Level 1, 46 Cavill Avenue
Surfers Paradise

Project Leader
S.Sandford
Designed
A. Marsden
Drawn
C. Haywood
Checked

Authorised

Date
June 2016

N

Scale @ A1

smec urban consulting group

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COBAKI ESTATE
OVERALL
Tweed Shire Council

Fencing Plan Precinct 9,11
Drawing No. 3310071E-044 (2) **Rev A**

Sheet No. 1 of 1

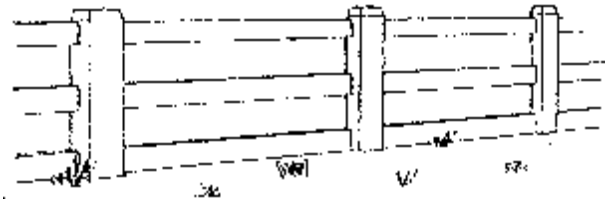
Subject to Approval
Not to be used for construction

APPENDIX D – FAUNA FRIENDLY FENCE DESIGN

A Fauna Friendly Fence should have either:

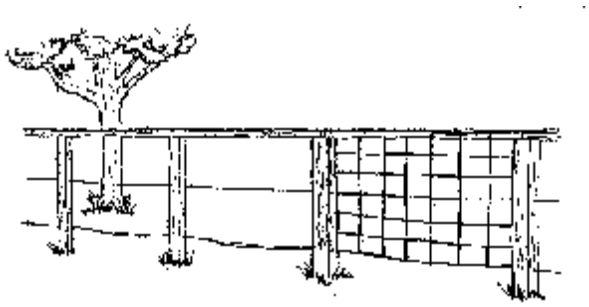
1. A 50cm gap between ground level and the first rail or strand. Spacing above this level is at the owner's discretion.

2. A series of 30cm gaps between the rails or strands (the first gap should be no higher than 15cm above ground level).



3. A 30cm gap between ground level and the first rail or strand followed by a series of 30cm gaps.

4. Box wire mesh (squares of no less than 15cm) may be used provided that there is a 15cm gap between the ground level and the mesh, and provided the fence is not more than 1.2m in height. A capping rail along the top allows for easy movement.



Note: Rails should not be in excess of 15cm wide. Wire strands should not be too tightly strung.

Fencing Materials

When choosing your fencing materials, consider the environment in which it will be situated. The character of an area, whether it is of a rural, bush or park nature, attracts residents to live within its boundaries and as such should be taken into account when designing fences.

Wood, brick, metals and wire can be combined in a variety of designs to create an effective and unique fence while maintain the character of the area. Slight variations in the materials and design of these fences can create an individual look for your property.

Barbed wire and electric fences of any description are definitely NOT fauna friendly!

Source: Fauna Friendly Fence Design Guidelines, Redland Shire Council Fact Sheet: Fauna Friendly Fencing (2002).

APPENDIX E – NEST BOXES FOR NATIVE WILDLIFE

Nest Boxes for Native Wildlife

Artificial nest boxes can substitute for tree hollows, providing arboreal species with nesting and roosting sites.

Different species have different hollow requirements (hollow size, depth, shape degree of insulation and entrance size).

Small species such as feather tail and sugar gliders choose hollows that are only slightly larger than their bodies to prevent larger animals attacking them or taking site. Larger species such as brush tail possums, greater gliders and ringtail possums need hollows with entrances greater than 5cm. Common brush tail possums generally choose hollows with 12cm to 15cm entrances. The width of the hollow determines how much space a species has for nesting and sleeping.

The micro-climate inside the hollow is also important, particularly for micro-bats, and this can be affected by depth. Studies have shown that deeper, wider hollows have a greater likelihood of occupancy. Deeper hollows can deter would-be predators (Douglas, 2003).

Nest box materials

Nest boxes can be made from timber or exterior-grade plywood (2mm to 19mm is ideal). To waterproof the box, screw the ends together and paint the exterior. Do not paint inside the box. Sawn timber boxes such as these should be well ventilated and have good drainage (a small gap under the roof or a few small holes in the floor). 20-30mm of hardwood sawdust should be placed in the base of the box. Avoid using treated timber, toxic paints, chipboard or smelly glues and make sure there are no sharp edges or protruding nails. Some designs also use hollow logs. Nesting material is not required as this will be brought in by the fauna using the nest box (Franks, 2007).

The inside diameter, entrance above the floor, height above the ground and placement should be considered when construction and hanging a nest box. Entrance holes should be just large enough for the animal to enter.

To establish a feeling of security, the box must be firmly mounted. Boxes can be attached to the trunks of trees with wire or two coach screws with metal spaces to allow for tree growth without putting stress on the nest box. Alternatively, nest boxes can be fixed in trees by resting the box in the fork of a tree and securely wiring in position (Douglas, 2003). This method of attachment also applies to the relocation of salvaged tree hollows.

Species-Specific nest box design

Microchiropteran Bats

Nest boxes for Microchiropteran bats should accord with the general design of the Bat – Insectivorous Habitat/Nest Box below. Bats tend to select roosts with entrances only marginally bigger than the thickness of their skull and chest.

To ensure effectiveness of bat nest boxes they should be installed:

- Within 400m of a water body;
- In sunny positions on growing, mature or dead trees, and free from overhanging branches. There should be no overhanging branches within 3m in a horizontal distance from the box base entrance; and
- At a height of 4m or greater.

Owls and other bird species

Nest boxes for owl species such as the Powerful owl and Masked owl should be of the vertical habitat/nest box design, with a circular entrance a minimum of 100mm in diameter. They should be installed in large mature trees at a height of great than 5m. Similar nest box design with smaller entrances could be used to accommodate smaller bird species.

Arboreal Mammals

Nest boxes for arboreal mammals such as possums and gliders should be designed to accommodate whole familes of the target species and in accordance with the general horizontal habitat/nest box design.

Keeping pest species out of nest boxes

The following strategies will assist in preventing disturbance or habituation of non-native species from nest boxes:

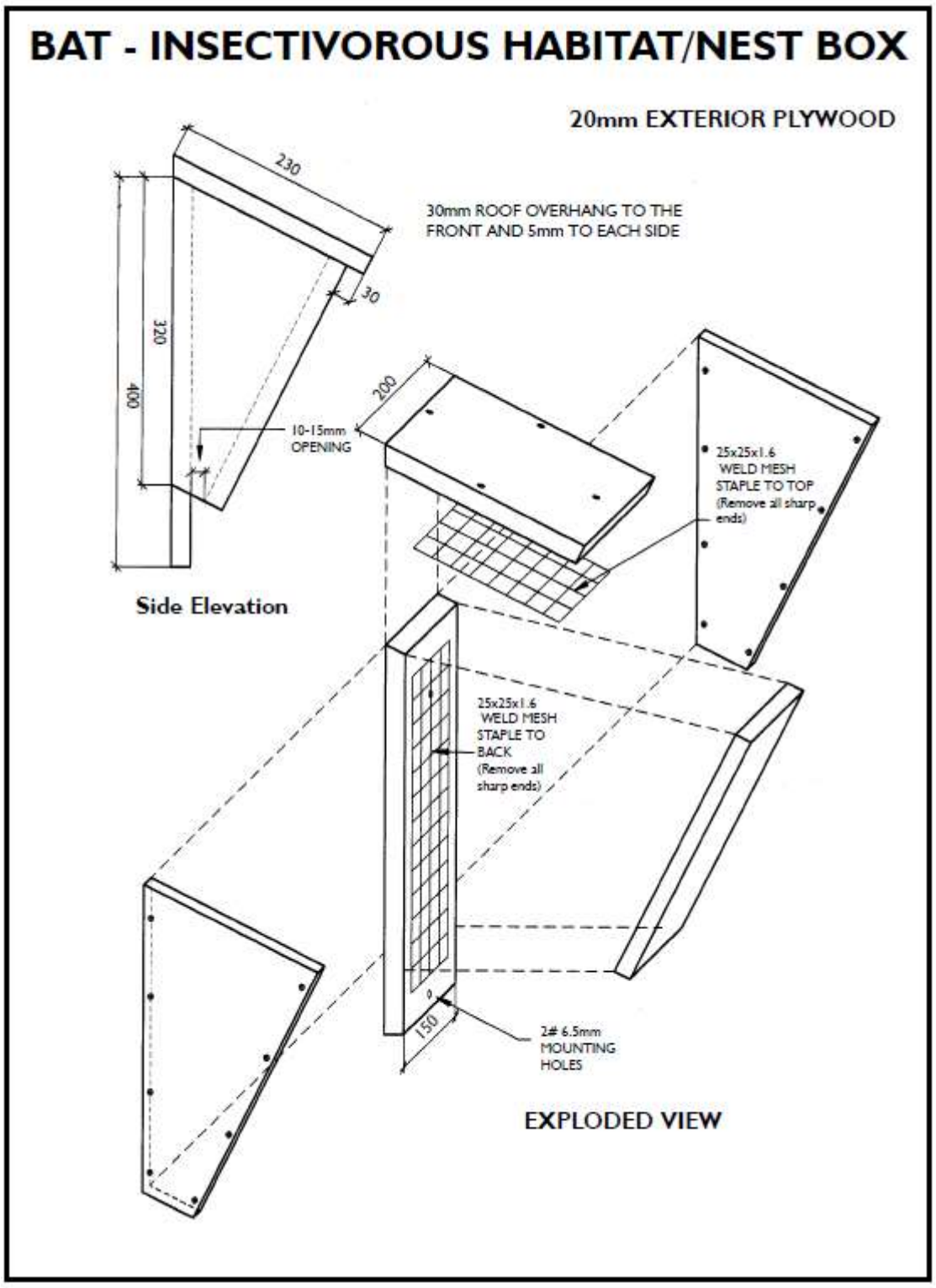
- Ensure nest boxes are at a suitable height so that they cannot be disturbed by dogs, cats and children
- Monitor nest boxes for colonisation by introduced species. Contact a pest controller for eradication of introduced species such as bees

Recommended Nest Box Dimensions for common species (Gould Group, 2008)

Species	Dimensions (L*B*H) (cm)	Entrance diameter (mm)	Depth below entrance (mm)	Height above ground (m)	Placement
Brushtail Possum	30*30*40	100	300-500	3-5	Vertical
Ringtail Possum	20*20*45	60-80	250-350	3-5	Vertical
Feathertail Glider	15*15*45	30	100-200	2	Vertical
Sugar glider	20*20*50	50	250-450	4-8	Vertical
Eastern Freetail Bat, Common bentwing bat and Little Bentwing bat	10*20*45	10	Entrance at bottom	4	Clear flight path
Greater Broad nosed bat	15*20	15	Entrance at bottom	4	Clear flight path
Crimson Rosella	20*20*50	80-100	400	5	Vertical
Galah	20*20*75	120	600	6	Vertical
Rainbow lorikeets	13*13*80	50-70	400	5	45degrees
Kookaburra	22*40*22	180 (arch)	level	5-10	Horizontal
Barn owl	40*90*20	Platform	Platform	5-10	Horizontal
Owlet nightjar	15*15*15	70	300	5	Vertical
Powerful Owl/Masked Owl	100*180*240	100	300	>5	Vertical

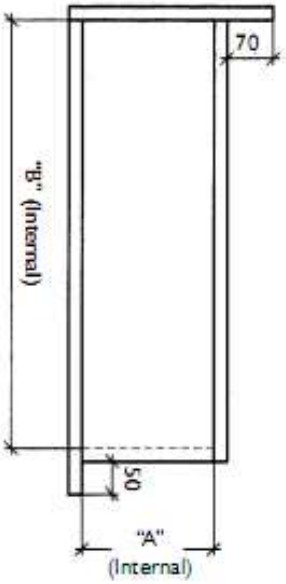
Eastern Freetail bat, Common bentwing and Little Bentwing bat, the base entrance of the nest box should be 12 to 15mm. For the Greater Broad nosed bat, a base entrance of 15 to 20mm would be more suitable. It is therefore recommended that emphasis is placed on construction of bat roost boxes with a base entrance ranging from 12 to 20mm.

BAT - INSECTIVOROUS HABITAT/NEST BOX

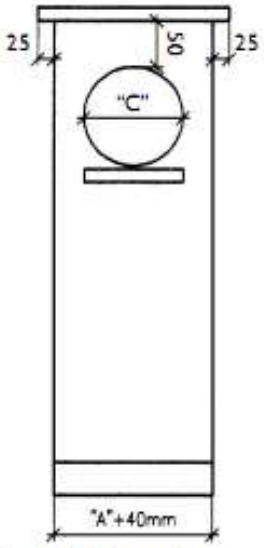


VERTICAL HABITAT/NEST BOX

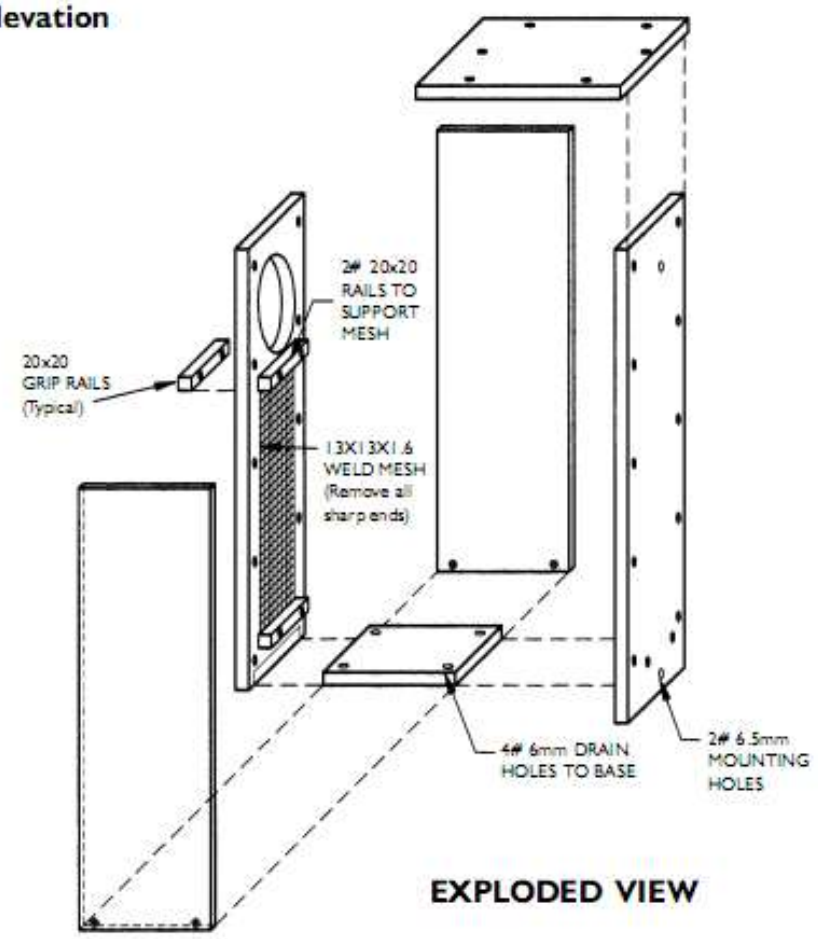
20mm EXTERIOR PLYWOOD



Side Elevation

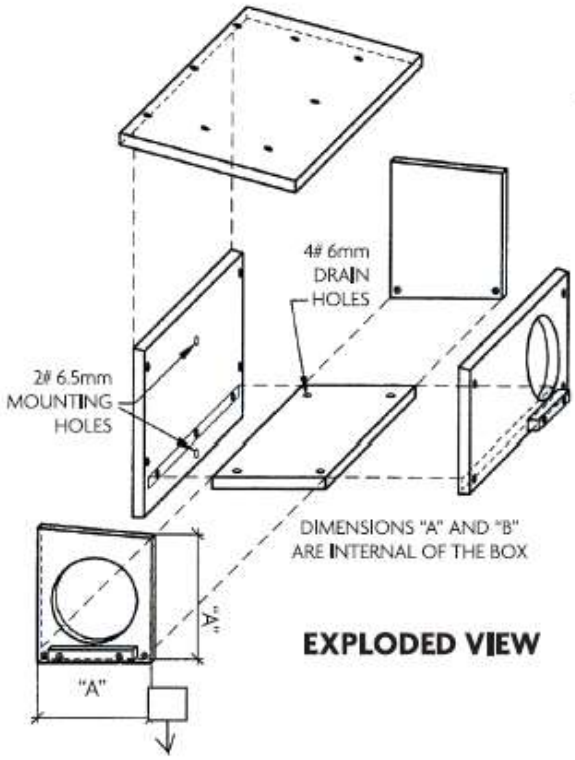


Front Elevation



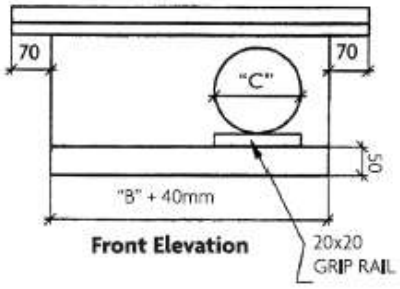
EXPLODED VIEW

HABITAT/NEST BOX



EXPLODED VIEW

20mm EXTERIOR PLYWOOD



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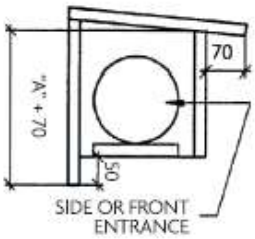
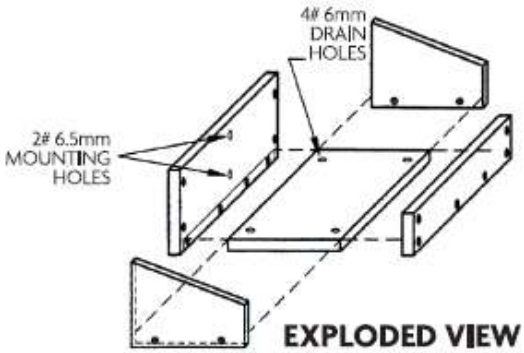


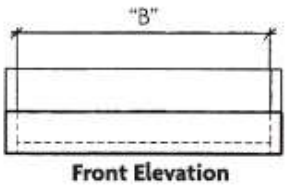
Side Elevation

HABITAT/NEST PLATFORM

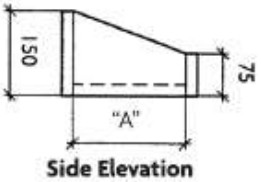


EXPLODED VIEW

20mm EXTERIOR PLYWOOD



Front Elevation



Side Elevation

APPENDIX F – WEEKLY INSPECTION CHECKLIST

Project:	COBAKI ESTATE
Inspection Date:	Area/Precinct:

WEEKLY CONSTRUCTION CHECKLIST

#	Control Measure	Ye	No	N/A	Comments/Corrective Action
1	Are all protected areas adequately fenced and signed? Is the integrity of the delineation fencing satisfactory?				
2	Are suitable sedimentation and erosion control devices in place where necessary?				
3	Are sediment fences clean/free of silt and working effectively?				
4	Are areas surrounding waterways satisfactorily stable?				
5	Has the site induction been undertaken by all personell on site (is the induction register up to date?)				
6	Is drainage from the project site being directed through necessary controls prior to entering any watercourse?				
7	Have any areas of standing or ponded water been appropriately filled?				
8	Has weekly water quality monitoring been undertaken within stormwater retention basins?				
9	Are surface waters free of Mosquito larvae?				
10	Has the Compensatory habitat area been inspected for the presence of unrestrained dogs?				
11	Are fauna structures (nest boxes) in place?				
12	Have hollows been inspected by the ecologist?				
13	Have any new weed infestations been identified on site?				
14	Is there evidence to suggest changes should be made to the site induction relating to flora and fauna aspects? (i.e. reoccurring issues, prevention measures, etc)				
15	Have any injuries or death to wildlife been identified or reported?				
16	Have all complaints been recorded and addressed?				
17	Any other issues to add to the checklist?				
Completed by:		**Signature:**			

K2 - Vegetation Management Plan

Cobaki Estate
Vegetation Management Plan
Precincts 9 & 11 Bulk Earthworks

Revision 1
December 2013

For LEDA Manorstead Pty Ltd

Project Name:	Cobaki Estate Development – Precincts 9 & 11
Project Number:	30031162
Report for:	LEDA Manorstead PTY LTD

PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
1	09/12/13	J de Boer A Marsden	J Alexander	J Alexander

ISSUE REGISTER

Distribution List	Date Issued	Number of Copies
LEDA Manorstead PTY LTD:	12/12/13	1 x electronic
SMEC staff:		
Associates:	12/12/13	
Tweed Shire Council		1 x hard copy 1 x e copy
Gold Coast Office Library (SMEC office location):		
SMEC Project File:		

SMEC COMPANY DETAILS

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TABLE OF CONTENTS

1 INTRODUCTION

This Vegetation Management Plan (VMP) has been prepared by SMEC Pty Ltd for LEDA Manorstead Pty Ltd for the proposed borrow areas located within Precincts 9 and 11 of the Cobaki Estate development.

1.1 Project Location

The Cobaki Development is located west of the Tugun Bypass and Gold Coast Airport, Tweed Heads. The proposed development is bound by the Queensland and New South Wales border to the north and west and Piggabean Road to the south. The site adjoins Cobaki Creek and Cobaki Broadwater to the east. It is located approximately 6 km west of Tweed Heads/Coolangatta Town Centre and 1.5 km west of the Gold Coast Airport and the Gold Coast Highway, and 500 m west of the Pacific Motorway (Tugun Bypass). Access is currently off Piggabean Road. Future access will be off Boyd Street from the north and linking to Piggabean Road via the proposed Cobaki Parkway.

The site exists in its current state as a large portion of cleared land, which was previously cleared for agricultural purposes (cattle grazing), and scatterings of native vegetation communities.

This report specifically pertains to the borrow areas located in Development Precincts 9 and 11. Precincts 9 and 11 occur in the south-western portion of the Cobaki site and consist of land described as Lot 2 DP 566529, Lot 1 DP 562222, Lot 1 DP 570077, Lot 1 DP 823679, Lots 46, 228 & 305 DP 755740. Precinct 9 covers a total area of approximately 22.6 ha and Precinct 11 covers an area of approximately 15.6 ha.

The location of Development Precincts 9 and 11 with respect to the Cobaki site is shown in Figure 1.

1.2 Scope

LEDA Manorstead are seeking an amendment to the current modification application for the Cobaki Estate Central Open Space Project Approval (08_0200 Mod 1) for the winning of fill from Precincts 9 and 11 for construction of the Central Open Space (as approved under 08_0200), including:

- Precinct 9 - Quarrying of approximately 500,000m^3 of fill material sufficient to complete bulk earthworks in Stage 1 of the Central Open Space.
- Precinct 11 – Quarrying of approximately 100,000m^3 of fill material to complete bulk earthworks in the Central Open Space (Stage 2 and 3).

This Report details potential impacts to native vegetation, threatened flora and Endanagered Ecological Communities (EECs) as a result of the proposed borrow earthworks and a description of environmental management, mitigation and monitoring measures to minimise these potential impacts. Refer to Drawing YC0229-1E1-D03 of Appendix A for Scope of Works.

Figure 1: Site Locality

COORDINATE SYSTEM GDA 1994 MGA Zone 56	0 1 2 km Scale: 1: 40,000 @ A4	**FIGURE** 1 - Site Locality	**REVISION** 1	**STATUS** FINAL
		CREATED BY AM11482	**DATE** 12/12/2013	**ISSUED FOR INFORMATION**

N

SMEC

PROJECT NO. 30031162	**PROJECT TITLE** Cobaki Estate Management Plans	**SOURCE** The State of Queensland (Department of Environment and Resource Management), Copyright 2010 Aerial Imagery from Nearmap Hypertiles, copyright 2011	**CLIENT** LEDA MANORSTEAD PTY LTD

CONSULTANT SMEC Australia

PATH:I:\Projects\30031162\007_Spatial\Workspaces\Fauna Management Maps.wor

1.3 Previous Studies

A number of previous studies have been undertaken as part of the various stages of development approval for this proposed development.

Such studies reviewed as part of this report include, but are not limited to:

- Flora and Fauna Monitoring Program (SMEC, 2013a)
- Revised Assessment of Significance (JWA, 2013a)
- Revised Ecological Assessment (JWA, 2013b)
- Revised Regeneration and Revegetation Plan (JWA, 2012a)
- Revised Saltmarsh Rehabilitation Plan (JWA, 2012b)
-
- Revised Fauna Management Plan (JWA, 2010a)
- Vegetation Management Plan – Preferred Project Report (JWA, 2009)
- Construction Environmental Management Plan – Statement of Intent (Yeats, 2010).
- Stormwater Quality Concept Plan (Yeats, 2010)
- Environmental Assessment Report Part 3A Concept Plan (JBA Urban Planning, 2008)

2 PURPOSE AND OBJECTIVES

2.1 VMP Context and Purpose

The purpose of the VMP is to protect native vegetation and endangered ecological communities (EEC's) throughout construction associated with the Precinct 9 & 11 borrow areas, and to provide a practical guide to minimising adverse impacts to flora associated with the proposed works.

2.2 VMP Objectives

The main objective of the VMP is to ensure that the proposed works will have minimal impacts to native vegetation by:

- protecting all retained vegetation and threatened flora species from damage;
- preventing unapproved clearing or disturbance of native vegetation;
- preventing degradation of aquatic and terrestrial habitats through threatening processes such as physical removal, weed invasion, water quality decline, soil erosion and compaction;
- minimising loss and damage to habitat trees and maximise reuse;
- developing and implementing measures aimed at increasing the total amount of habitat available to other biota;
- ensuring disposal of cleared vegetation is undertaken in an environmentally responsible manner;
- ensuring all personnel understand their role in implementing the management protocols set out in this VMP.

This VMP is intended to provide a practical guide to mitigating identified potential impacts to vegetation through:

- Compliance with the obligations set out in the EIA statement of commitments;
- Identification of legislation requirements and actions to ensure compliance for vegetation management in association with the proposed development;
- Mapping of Threatened species and habitat to be retained;
- Identification of the potential impacts to vegetation associated with the proposed development;
- Identification of management issues, mitigation measures and monitoring requirements for the protection of aquatic and terrestrial ecosystems;
- Identification of specific management programs and procedures for priority issues such as threatened species;
- Mitigation of impacts of earthworks on vegetation and threatened flora within and adjacent to the earthworks zone.

2.3 VMP Targets

The following targets have been established as part of this VMP to provide benchmarks for the mitigation of potential impacts to vegetation during earthworks within Precincts 9 and 11:

- No loss or damage to Threatened flora species, retained Endangered Ecological Communities or significant impact on native vegetation outside of the earthworks boundaries;
- No infringements of the regulatory requirements relevant to flora.

3 PLANNING AND LEGISLATION

3.1 Relevant Legislation

3.1.1 Legislative Requirements

Key environmental legislation specifically relating to vegetation management for the proposed development includes:

- **Commonwealth Legislation**
  - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

- **New South Wales Legislation**
  - *Environment Planning and Assessment Act 1979 (EP& A Act)*
  - *Threatened Species Conservation Act 1995 (TSC Act) and amendments*
  - *National Parks and Wildlife Act 1974 (NPWA)*
  - *Noxious Weeds Act 1993 (NW Act)*
  - *Native Vegetation Conservation Act 1997 (NVC Act)*
  - *Native Vegetation Act 2003 (NV Act)*
  - *Vegetation Regulation 2005 (NV Regulation)*

It is noted that the Cobaki Estate Development was assessed under Part 3A of the EP&A Act. Section 75U of the EP&A Act provides that a range of NSW legislative approvals are not required for projects approved under Part 3A. However, the relevant regulator will be consulted and where deemed necessary, inspections and ongoing advice will be sought during the course of the proposed development.

- **Other Statutory Instruments**
  - Tweed Local Environment Plan (2000)
  - Draft Tweed Local Environment Plan (2012)
  - Tweed Shire Council Development Control Plan (2008).

3.2 Compliance with Legislative Requirements

Table 1 specifies compliance details of all relevant conditions of approval and statements of commitment for the proposed development.

Table 1 Summary of all relevant vegetation related conditions of approvals and statements

Condition/ Commitment Reference	Details of Condition/Commitment	Details of Compliance
EPBC		
1	The person taking the action may not clear more than 197.64 ha of vegetation that includes no more than: • 13.54 ha of foraging habitat for Grey headed Flying fox (*Pteropus poliocephalus*) • 3.8 ha of Swamp sclerophyll forest (providing potential habitat for the Swamp orchid (*Pahius australIs*); and • 0.14 ha of suitable habitat for: ○ Scented acronychia (*Acronychia littorialis*) ○ Spiny gardenia (*Randia moorei*) ○ Rough-shelled bush-nut (*Macadamia tetraphylla*) ○ Stinking cryptocarya (*Cryptocarya foetida*); and ○ Coolamon (*Syzgium moorei*)	Currently being developed between Leda and OEH.
4	To minimise impact on the Scented acronychia (*Aconychia littoralis*), the person taking the action must not include White Aspen, Silver Aspen and Logan Apple in its revegetation or rehabilitation works.	Site Regeneration and Revegetation Management Plan Species lists
5	The person taking the action must manage stormwater discharge from the Cobaki Lakes residential development site into the Cobaki Broadwater consistent with: • Any plans or standards governing the quality of storm water adopted by the Tweed Shire Council; • The salt marsh rehabilitation plan as approved by the NSW government.	Saltmarsh Rehabilitation Management Plan is currently being developed.
Concept Plan Approval 06_0316 Mod 1		
C4 (1)	All future applications are to include, where relevant, draft stage-specific management plan updates to the Preliminary Vegetation Management Plan. Each plan is to consider all other existing plans for the site to ensure management strategies do not conflict.	Vegetation Management Plan (2013)
Revised Statement of Commitments (8 May 2013) – Concept approval		
4.4.1	The provisions of the Vegetation Management Plan, Cobaki Lakes, Preferred Project Report (James Warren & Associates, 2009) will be implemented.	Vegetation Management Plan (2013)

4 COBAKI BIOPHYSICAL CHARACTERISTICS

4.1 Vegetation

Construction activities associated with Precints 9 and 11 will involve the removal of some native vegetation. Further, activities have the potential to indirectly affect adjacent native vegetation through the introduction of weeds, sediment flow and alteration of hydrology regimes.

Vegetation surveying (JWA, 2013) mapped twenty-two (22) vegetation communities on the Cobaki site. **Table 2** lists the vegetation communities recorded within precincts 9 and 11. The location of these Vegetation Communities is shown in **Figure 2**.

Table 2 – Vegetation Communities associated with Precincts 9 and 11.

Vegetation Community	Precinct	Area removed/ to be removed from site	Area to be removed from Precincts 9 & 11
Community 1a – very tall open/closed sclerophyll forest (*Eucalyptus pilularis +/- Corymbia intermedia*)	9 &11	3.08 ha (9.6%)	0.08 ha (0.3%)
Community 1d – Tall open sclerophyll forest (*e. pilularis +/- E. siderophloia +/= E. teriticornis*)	9	0.78 (30.2%)	0 ha (0%)
Community 2b – Tall open forest (*Archontophoenix cunninghamii)*	9	0 (0%)	0 ha (0 %)
Community 10 – Low closed grassland with scattered trees (pastoral grasses -/- mixed species)	9 & 11	215 ha (86%)	1.51 ha (0.6%)
Community 12 – rushland/sedgeland/grassland (mixed aquatic species)	9 & 11	24.12 (68%)	0 ha (0%)
Community 14 – Dams and drainage (mixed aquatic species)	9	0.77 ha (25%)	0 ha (0%)

Community 1a - Very Tall Open/Closed Sclerophyll forest (*Eucalyptus pilularis +/- E. microcorys +/- E. propinqua +/- Corymbia intermedia)*

This community occurs in the western portion of Precinct 11 and the south-eastern portion of Precinct 9 covering a total area of approximately 1.57 hectares. Winning of fill from the proposed borrow areas will result in the removal of approximately 0.08 hectares from Precincts 9 and 11 (0.03 ha and 0.05 ha, respectively).

The canopy is dominated by mature Blackbutt standing approximately 25-30m in height. The condition of the midstorey is variable, with the sparse vegetation around the edges of this

community mostly comprised of dry Sclerophyll species. The ground cover is comprised of grasses, rushes and sedges (JWA, 2013).

The conservation status of this community is considered to be moderate to high due to the diverse species composition, a relative high abundance of large tree hollows and mature native trees.

Community 1d - Tall Open Sclerophyll Forest *(E. pilularis, +/-, E. siderophloia, +/- E. tereticornis)*

This community occurs along the southern boundary of Precinct 9 and covers an area of approximately 0.78 hectares. The proposed earthworks within the borrow area will not involve the removal of this community.

The canopy is dominated by Blackbutt standing approximately fifteen 15 -20 metres in height. Other species commonly occurring in the canopy include Northern grey Iron bark, and Forest red gum.

The condition of the midstorey is variable. Around the edges of this community the midstorey vegetation is sparse, and comprised of species including Camphor laurel, Sweet pittosporum, Umbrella cheese tree, Blunt-leaf bitter-pea, Geebung, various *Acacia* species, Tree heath, Red ash, Lantana and regenerating *Eucalyptus* species. The ground cover is dominated by grasses, ferns and weeds amongst leaf litter, barks and twigs (JWA, 2013).

The CRA classification for this community is Low Relief Coastal Blackbutt and is considered to be Rare. The conservation status of this community is considered to be low to moderate due to the occurrence of exotic species and the reduced structural complexity.

Community 2b - Tall Open Forest (*Archontophoenix cunninghamiana*)

Community 2b occurs adjacent to the northern boundary of Precinct 9. An area of approximately 0.04 hectares occurs within the boundary of Precinct 9. This area is covered by a covenant area and will not be cleared.

The canopy of this community is dominated by Bangalow palms reaching a height of approximately twelve (12) – fifteen (15) metres. Broad-leaved paperbark is present as a minor occurrence.

The midstorey is sparse in the north of this community, with only Bangalow palm trunks occurring. The ground cover is uneven, muddy and degraded by cattle. The midstorey is dense in the south of this small patch of vegetation and consists of Common lilly pilly, Whalebone, Umbrella cheese trees, Pink euodia, Bolwarra, Creek sandpaper fig, Fine-leaved tuckeroo, Hard quandong, Camphor laurel, Lantana and Blackwood wattle and common climbers.

The ground cover vegetation is dominated by ferns and grasses including amongst decomposing Bangalow palm fronds. Two (2) stems of the Threatened Fine-leaved tuckeroo (*Lepiderema*

pulchella) occur within this community (JWA, 2013).Under the CRA classification, this community is best described as Rainforest (CRA 1999).

This community is considered to be representative of the Endangered Ecological Community 'Lowland Rainforest on Floodplain' which has a high conservation value.

The conservation value of this community is reduced due to its small size, degradation by cattle, fragmentation and a reduced structure. The conservation status of this community is considered to be moderate.

Individual Threatened species have an elevated conservation value.

Community 10 - Low Closed Grassland with Scattered Trees (Pastoral grasses +/- Mixed species)

Community 10 occurs over much of Precincts 9 & 11, and covers an area of approximately 15.73 hectares. Of this, approximately 1.51 hectares lies within the Precinct 9 and 11 borrow areas (1.49 and 0.02 ha, respectively).

The grassland is dominated by a mixture of species that vary with location. The foot slopes and grassy areas adjacent to the forests and woodlands are dominated by species including Kangaroo grass, Blady grass, Bracken fern, Broad leaved paspalum and Setaria (JWA, 2013).

The flat areas east of Sandy Lane have been consistently slashed, and consist of introduced pasture species. Several species of trees are scattered within this community, including Northern grey iron bark, Scribbly gum, Figs, Camphor laurel, Blackwood wattle, Blackbutt, Tallowwood, Pink bloodwood, Grey gum and Swamp oak (JWA, 2013).

The conservation status of this community is considered to be low.

Community 12 - Rushland/sedgeland/grassland (Mixed aquatic species)

Community 12 occurs along the eastern boundary of Precinct 11 (0.20 ha). A Patch of approximately 0.026 ha occurs in the northern portion of Precinct 9. Earthworks within the proposed borrow areas will not involve the removal of this community.

Community 12 is comprised of aquatic and semi-aquatic vegetation such as Mangrove Fern, *Cyperus sp*, sedges and rushes.

The conservation status of Sedgeland/Rushland/Grassland communities has not been specifically discussed in the Regional Forestry Agreement document. The most appropriate analogue is NFE 141 Swamp (JWA, 2013). It is noted that Swamp ecosystems are Rare in the upper north east section of the NSW North Coast Bioregion.

This vegetation community is considered to represent the Endangered Ecological Community (EEC) 'Freshwater Wetland on Coastal Floodplains' (DECC 2008). Endangered Ecological Communities (EEC) are considered to be of high conservation value.

Community 14 - Dams & Drainage Lines (Mixed aquatic species)

Community 14 occurs as a constructed dam in the central portion of Precinct 9. The proposed bulk earthworks within the Precinct 9 borrow area will not involve the removal of this dam.

Community 14 is comprised of aquatic and semi-aquatic vegetation. The vegetation in the constructed dam includes, Water lilly and *Cyperus* sp.

Several Drainage lines occur across the site, with several species of sedges and rushes commonly occurring.

The conservation status of this community has not been specifically discussed in the Regional Forestry Agreement document. The most appropriate analogue is NFE 141 Swamp. It is noted that Swamp ecosystems are Rare in the upper north east section of the NSW North Coast Bioregion.

The conservation value of this community is considered to be low.

With implementation of the actions contained within Section 6, the likelihood of significant impacts on adjacent native vegetation is considered low.

4.2 Threatened Flora Species

Flora surveys undertaken by James Warren & Associates (2008) recorded the presence of one Threatened flora species, Fine-leaved tuckeroo (*Lepiderema pulchella),* within close proximity to Precincts 9 and 11. Further, a single individual of Brush cassia (*Cassia brewsteri var. marksiana*) was detected during a recent rehabilitation assessment (SMEC, 2013), approximately 100 m south of the southern boundary of Precinct 11.

The location of these threatened flora species is shown in **Figure 3**.

Table 3. Threatened Flora within or adjacent to Precincts 9 and 11

Common name	Species name	Conservation Status		Adjacent to Precinct
		TSC	EPBC	
Fine-leaved Tuckeroo	*Lepiderema pulchella*	Vulnerable	-	9
Brush Cassia	*Cassia brewsteri. marksiana*	Endangered	-	11

Fine-leaved Tuckeroo *(Lepiderema pulchella)*

Fine-leaved Tuckeroo is a small rainforest tree, found north of Brunswick Heads, and in Queensland. Most records in NSW are from the Tweed Valley, and the majority of known populations are on private land (DECC, 2005b). The species is listed as Vulnerable under the *TSC Act 1995.*

The NPWS database (October 2011) contains ninety-five (95) records of this species within 10 km of the Subject site. One hundred and sixteen (116) records occur within the Tweed LGA. A total of thirty-nine (39) stems of Fine-leaved tuckeroo have been recorded on the subject site, the majority of which occur within the rainforest communities associated with Mt. Woodgee, in the north of the Site. One (1) stem has been identified within a patch of vegetation on the northern boundary of Precinct 9. This stem is located within Rehabilitation and Management Area 8 and will be protected by a minimum 5-metre buffer.

It is worth noting that this species is particularly common within the locality with several hundred having been recorded at Terranora and Bilambil (JWA, 2008). It is considered that the proposed development is highly unlikely to result in the local extinction of this species (JWA, 2013).

Brush Cassia *(Cassia brewsteri var. marksiana)*

Brush Cassia is found in littoral and riverine rainforest and in regrowth vegetation on farmland and along roadsides north from Brunswick Heads, around Murwillumbah (DECC, 2005e). It is listed as Endangered under the *TSC Act 1995*.

The NPWS database (October 2011) contains nineteen (19) records of this species within 10 km of the Subject site. Eighty-seven (87) records occur within the Tweed LGA. A single individual of this species was detected during a recent rehabilitation assessment (SMEC, 2013), approximately 100 m south of the southern boundary of Precinct 11. This stem is located within Rehabilitation Area 7 and will be protected by a further 5-metre buffer.

4.3 Endangered Ecological Communities (EEC's)

Six (6) Endangered Ecological Communities (EEC) listed under Schedule 1 of the TSC Act have been recorded on the site, two (2) of which occur within the vicinity of Precincts 9 and 11. These communities include:

- Lowland rainforest on floodplain – occurring at various locations generally in associations with drainage lines and depression.
- Freshwater wetlands – occurring in the central and eastern portions of the site.

The area of impacts for each EEC is shown in Table 5 below.

Table 4. Extent of impact of each Endangered Ecological Community

Endangered Ecological Community	Precinct	Area of Existing EEC (ha)	Area cleared/ to be cleared from Entire Site (ha)	Area cleared/ to be cleared from P9 and 11 (ha)
Freshwater wetland	9 and 11	35.39	24.12 (68%)	0 (0%)
Lowland rainforest on floodplain	9	1.75	0.04 (2%)	0 (0%)

The location of these Endangered Ecological Communities is shown in **Figure 4**.

Lowland Rainforest on Floodplain

This EEC covers approximately 1.75 hectares of the site and occurs as several small, isolated and highly degraded patches on the southern and northern ends of the site which also contain Threatened flora. This vegetation type generally occurs in association with drainage lines and depressions (i.e. riparian forest).

The conservation significance of this vegetation type on the site has been compromised by historical clearing activities and ongoing grazing activities resulting in fragmentation and degradation, especially within the isolated patches and edges of more extensive areas.

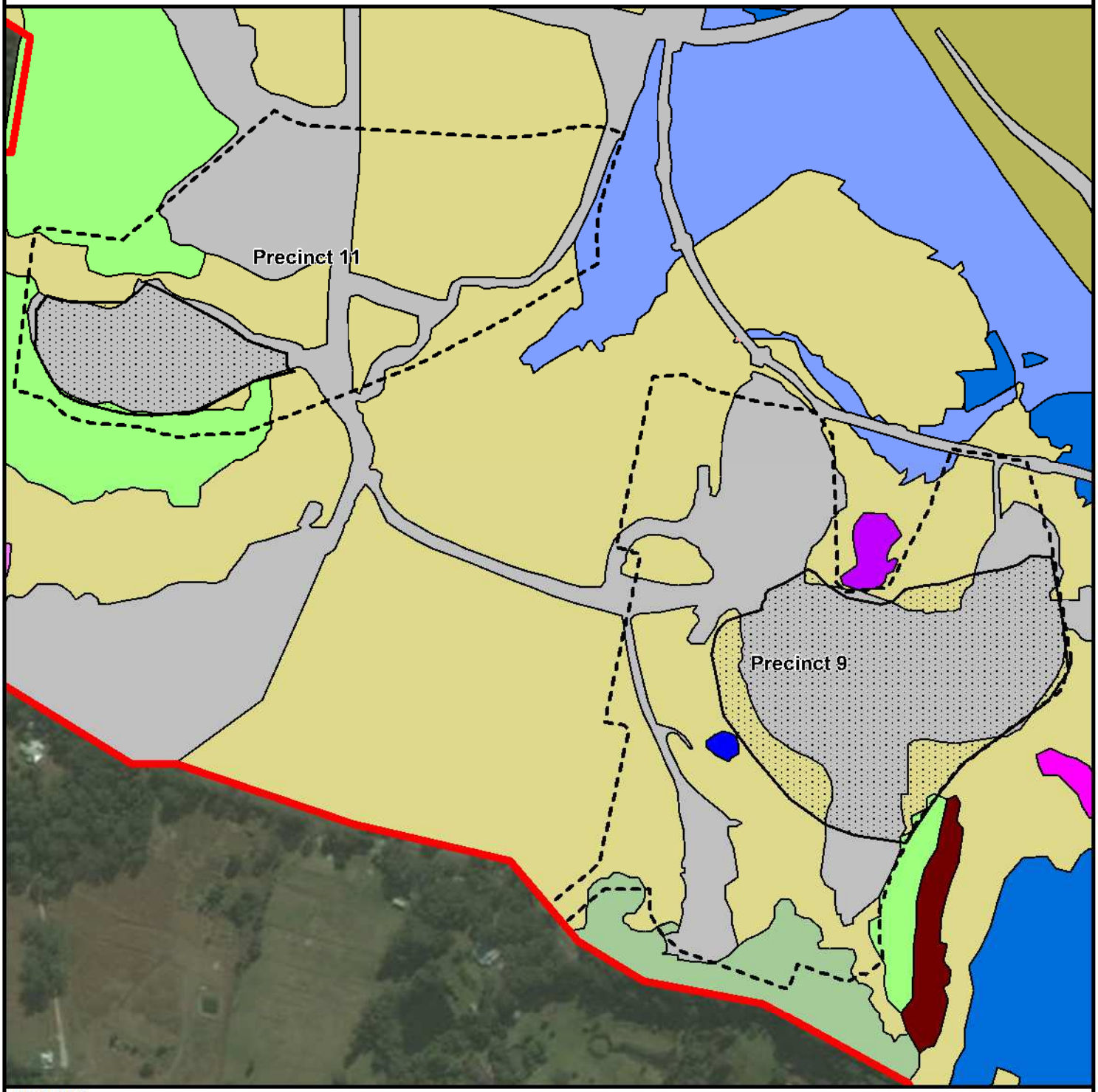
A 0.35-hectare patch is located in Rehabilitation and Management Area 8 on the northern boundary of Precinct 9. An area of approximately 0.04 hectares occurs within the boundary of Precinct 9. This area is covered by a covenant area and will not be cleared

Freshwater Wetland

The Freshwater Wetland EEC on the site is comprised of vegetation community 12 - rushland/ sedgeland/ grassland (mixed aquatic species) and covers a total area of approximately 35.39 hectares.

0.23 hectares (0.6%) of Freshwater Wetland occurs within Precincts 9 and 11 (0.03 ha and 0.20 ha, respectively). Earthworks within the proposed borrow areas will not involve the removal of this community. Further, these areas of Freshwater wetland have been heavily degraded due to historical and existing land use including drain construction and maintenance, grazing and slashing. As such the proposed works are not considered to represent a significant impact in relation to the regional distribution of this community.

Figure 2: Vegetation Communities



LEGEND:

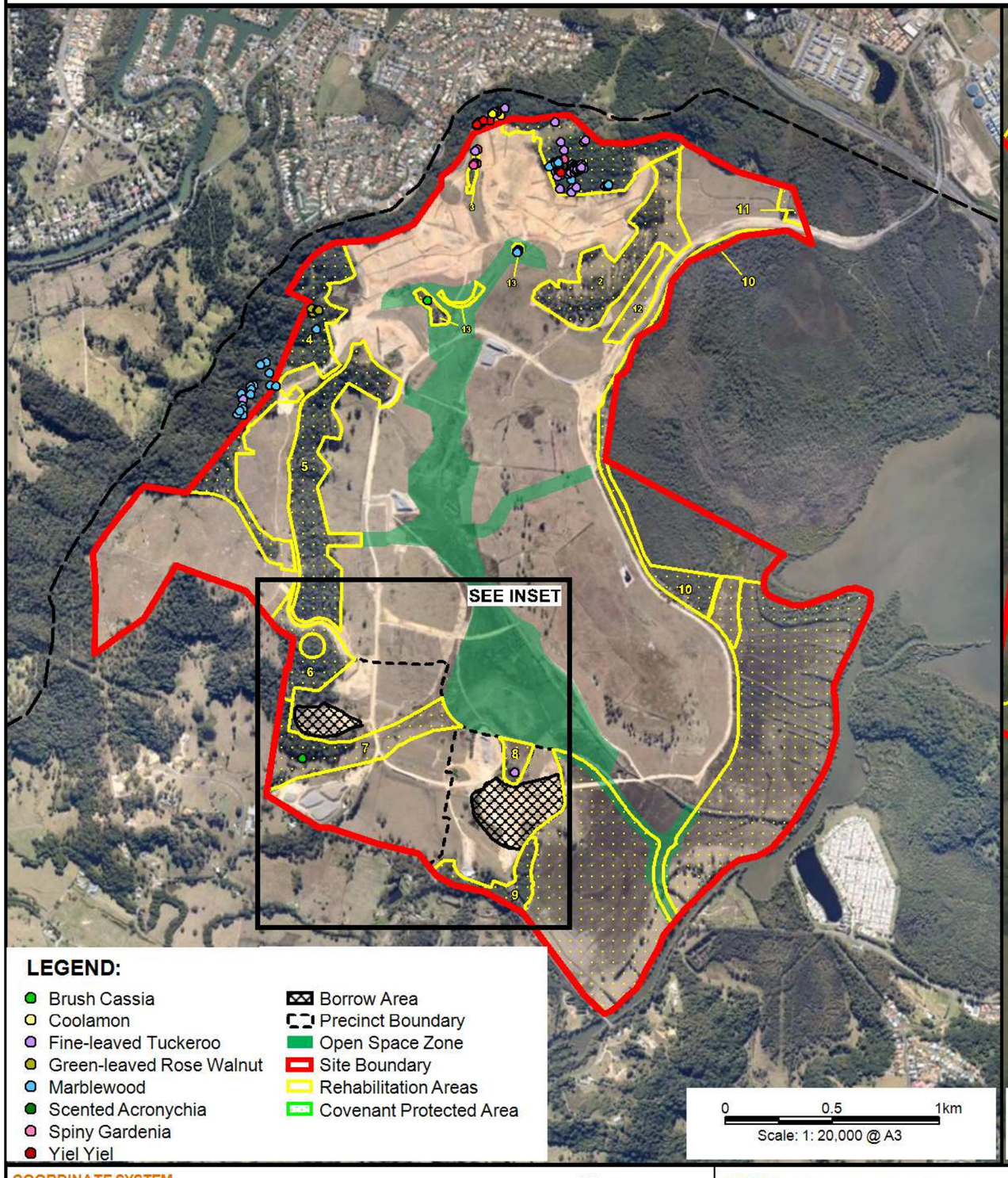
Community 1 - Dry sclerophyll communities
- Community 1a - Very tall open/closed sclerophyll forest (*Eucalyptus pilularis +/- E. microcorys +/- E. propinqua +/- Corymbia intermedia*)
- Community 1b - Tall open/closed sclerophyll forest (*E. propinqua*)
- Community 1c - Tall open sclerophyll woodland (*E. pilularis*)
- Community 1d - Tall open sclerophyll forest (*E. pilularis +/- E. siderophloia +/- E. tereticornis*)

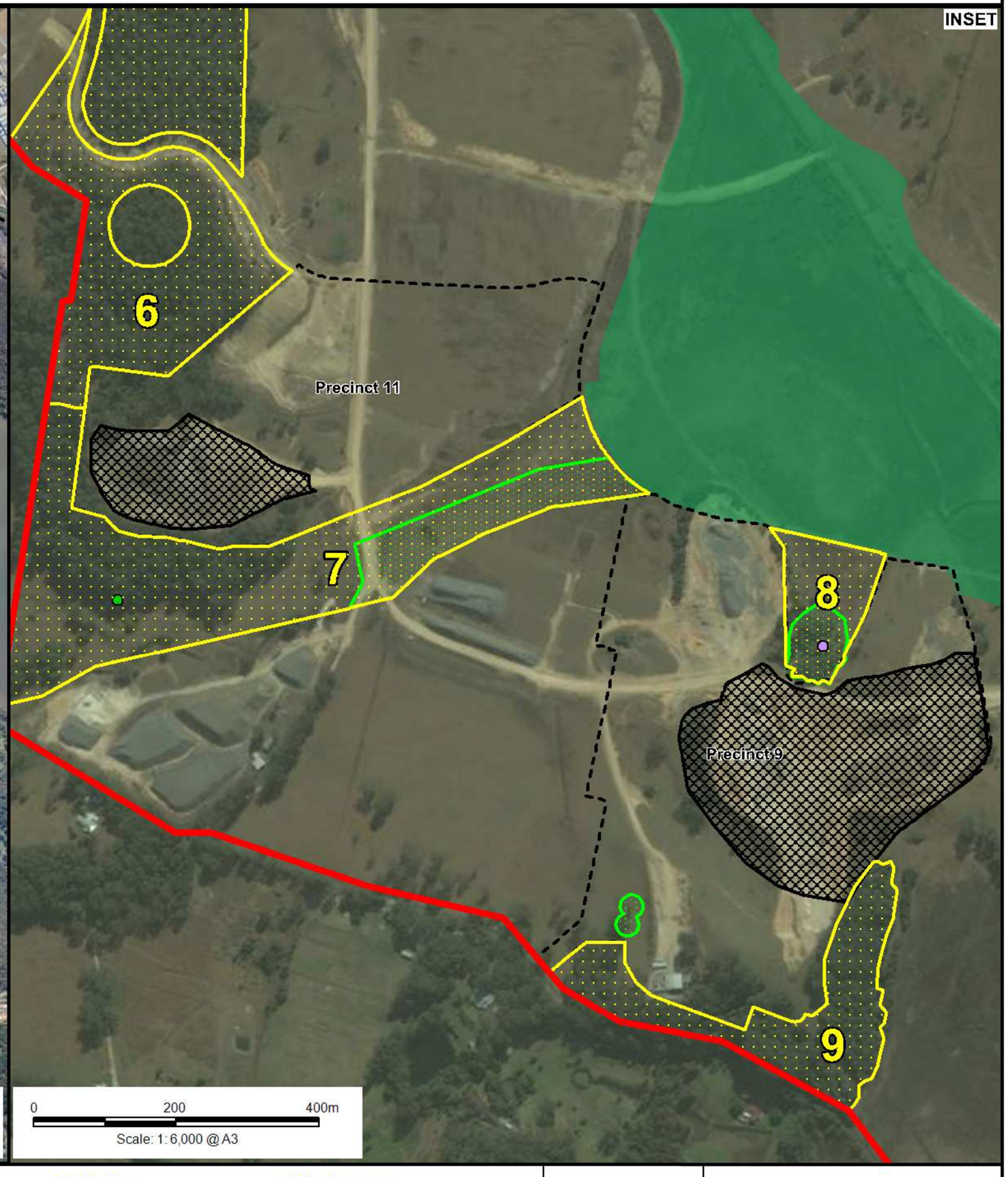
Community 2 - Rainforest communities
- Community 2a - Tall closed forest (*Lophostemon confertus +/- Araucaria cunninghamii*)
- Community 2b - Tall open forest (*Archontophoenix cunninghamiana*)
- Community 2c - Very tall closed forest (*A. cunninghamii*)
- Community 2d - Mid-high open/closed forest (Riparian species +/- Mixed species)
- Community 3 - Tall/very tall open/closed forest (*L. confertus +/-* Mixed rainforest species)
- Community 4 - Low closed forest (Heathland)
- Community 5 - Mid-high open woodland (Mixed rainforest species)
- Community 6 - Mid-high open woodland (*E. robusta*)
- Community 7 - Mid-high open woodland (*E. racemosa*)
- Community 8 - Mid-high open woodland (*E. siderophloia*)
- Community 9 - Low closed forest (Revegetation areas +/- Mixed *Eucalyptus* species)
- Community 10 - Low closed grassland with scattered trees (Pastoral grassess +/- Mixed species
- Community 11 - Low closed grassland (*Sporobolus virginicus, Triglochin striata +/- Casuarina glauca*)
- Community 12 - Rushland/sedgeland/ grassland (Mixed aquatic species)
- Community 13 - Low to mid-high open mangrove forest (*Avicennia marina var australasica / Aegiceras corniculatum +/- Casuarina glauca*)
- Community 14 - Dams & drainage lines (Mixed aquatic species)
- Community 15 - Low open forest/woodland (*Casuarina glauca +/-* Mixed species)
- Community 16 - Slashed grassland/ heathland/sedgeland (Mixed Species)
- Unvegetated land
- Borrow Area Boundary
- Precinct Boundary
- Site Boundary

FIGURE 2 - Vegetation Communities	**REVISION** 2 **STATUS** FINAL	N
CREATED BY AM11482	**DATE** 17/12/2013 **ISSUED FOR INFORMATION**	
PROJECT NO. 30031162	**COORDINATE SYSTEM** GDA 1994 MGA Zone 56	0 100 200m Scale: 1:6,000 @ A4
PROJECT TITLE Cobaki Estate Management Plans	**SOURCE** The State of Queensland (Department of Environment and Resource Management), Copyright 2010 Aerial Imagery from Microsoft Bing, Copyright 2013 Vegetation Communities from James Warren & Associates Pty Ltd	**CONSULTANT** SMEC Australia Copyright SMEC Australia Pty Ltd. All Rights Reserved. **CLIENT** LEDA MANORSTEAD Pty Ltd

PATH: I:\Projects\30031162\007_Spatial\Workspaces\Revegetation & Regeneration Maps.wor

Figure 3: Threatened Flora Records





LEGEND:

- Brush Cassia
- Coolamon
- Fine-leaved Tuckeroo
- Green-leaved Rose Walnut
- Marblewood
- Scented Acronychia
- Spiny Gardenia
- Yiel Yiel
- Borrow Area
- Precinct Boundary
- Open Space Zone
- Site Boundary
- Rehabilitation Areas
- Covenant Protected Area

0 0.5 1km
Scale: 1: 20,000 @ A3

0 200 400m
Scale: 1: 6,000 @ A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

N

FIGURE 3: Threatened Flora Records **REVISION** 1 **STATUS** FINAL

CREATED BY AM11482 **DATE** 17/12/2013 **ISSUE FOR INFORMATION**

CLIENT LEDA MANORSTEAD Pty Ltd

PROJECT NO. 30031162 **PROJECT TITLE** Cobaki Estate Management Plans

SOURCE
The State of Queensland (Department of Environment and Resource Management). Copyright 2010; Aerial Photography provided Microsoft Bing, copyright 2011
Flora records provided by James Warren & Associates Pty Ltd, 2010 & SMEC, 2013

CONSULTANT SMEC Australia

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Figure 4: Endangered Ecological Communities

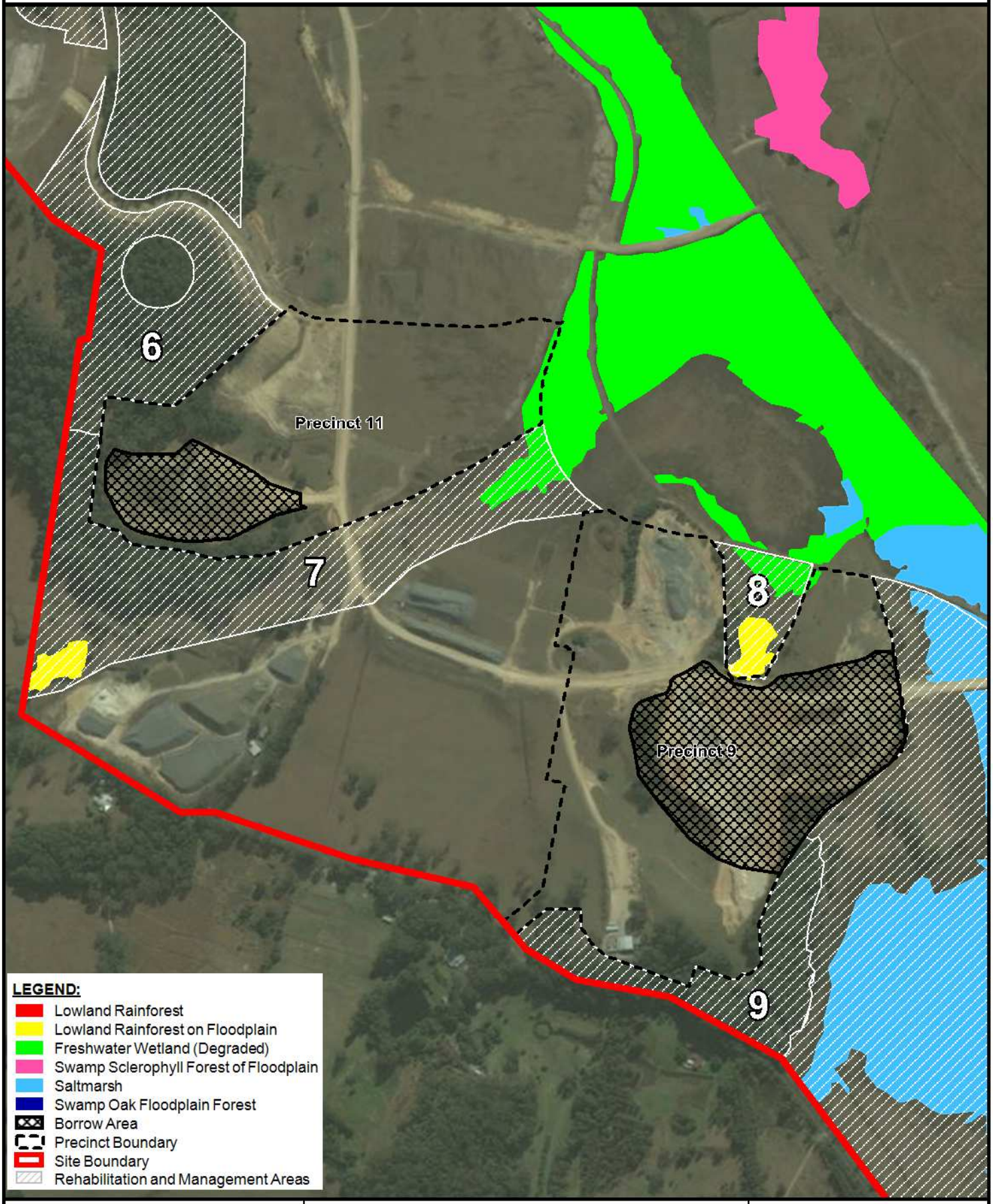

FIGURE 4: Endangered Ecological Communities

CREATED BY AM11482

REVISION 2

STATUS FINAL

DATE 17/12/2013

ISSUED FOR INFORMATION

N

PROJECT NO. 30031162

PROJECT TITLE
Cobaki Estate Environmental Management Plans

COORDINATE SYSTEM
GDA 1994 MGA Zone 56

0 200 400m

Scale: 1: 7,000 @ A4

SOURCE
The State of Queensland (Department of Environment and Resource Management), Copyright 2010
EECs from James Warren & Associates Pty Ltd, 2010
Aerial Imagery by Nearmap Hyperlite, Copyright 2011

SMEC

CONSULTANT SMEC Australia

CLIENT
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5 ENVIRONMENTAL ASPECTS, IMPACTS AND RISKS

Activities associated with large residential developments have the potential to affect native vegetation and their habitats:

- Through direct loss of habitat due to vegetation clearing, earthworks, construction of ancillary structures and indirectly through degraded ecosystems due to the loss of vegetation cover, introduction of weeds and the exposure of soil to erosion.
- By the generation of additional pollutants (e.g. heavy metals, oils, greases, petroleum hydrocarbons, gross pollutants etc.)
- Alteration of hydrology regimes causing a disruption to local flow rates causing habitat alteration, reduced fauna movement, loss of habitat and impacts on downstream ecosystems.

Aspects of the earthworks process that may have an environmental impact on native vegetation are discussed below.

The following table describes the native vegetation aspects, impacts and risks associated with earthworks associated with Precincts 9 and 11.

Table 5 Native Vegetation Aspects, Impacts and Risks

Aspect	Impact	Risk		
		Class 1	Class 2	Class 3
Vegetation clearing	• Reduced plant numbers and diversity • Edge effects allowing weed infestation • Clearing of threatened and significant flora	X X X		
Inadequate or absent erosion and sediment control devices	• Loss of habitat value due to weed invasion		X	
Changes in hydrology, hydrogeology and drainage regimes	• Damage/changes to individual trees due to changes in water availability and quality • damage/changes to freshwater wetland and saltmarsh wetland habitat areas due to changes in water quality and quantity • reduced plant numbers and diversity	X X	 X	
Inadequate rehabilitation/ revegetation of disturbed areas	• Weed infestation • Loss of habitat value	X X		
Inappropriate topsoil management	• Lack of vegetation establishment leading to loss of fauna habitat. • Edge effects allowing weed infestation	X X		

Class 1: Major risk, potential for serious environmental harm; Class 2: Moderate risk, significant environmental harm; Class 3: Minor risk, minor environmental harm.

6 ENVIRONMENTAL CONTROL MEASURES

This section describes mitigation measures that will be implemented during earthworks associated with Precincts 9 and 11. It describes management actions that aim to reduce the impact of earthworks on retained vegetation and also the management of clearing.

6.1 Clearing and Earthworks Protocol

6.1.1 Pre-clearing Protocol

Prior to any clearing within Precincts 9 and 11, the following procedures are to be followed:

- A pre-clearing survey will be undertaken to identify those trees to be removed and those to be protected.
- All retained vegetation will be clearly delineated using parawebbing and/or exclusion fencing prior to any earthworks to ensure that vehicles and other direct disturbances associated with earthworks do not encroach into adjacent habitat containing threatened species.
- Tree protection/exclusion fencing will be checked to ensure it is installed in the correct positions and signed off on the Earthworks Fencing Drawings (Appendix A) by both the Construction Manager, on-site Environmental Officer and botanist.
- Significant habitat trees (as identified within the pre-clearing fauna surveys) to be retained during phase 1 of the 2 phase clearing process specified within the Fauna Management Plan (SMEC, 2013b) are to be flagged, photographed and GPS recorded by the on-site Environmental Officer, fauna specialist and botanist.
- The boundary of the earthworks footprint shall be fenced/parawebbed to ensure that earthworks do not extend beyond the identified area.
- All site personnel are to be made aware of the presence of retained protective flora species through the site induction process.
- A pre-clearing checklist will be completed by the Environmental Officer (Appendix B).

6.1.2 Clearing and Earthworks Protocol

- As detailed in the Fauna Management Plan (SMEC, 2013b), clearing shall be undertaken using a two stage process whereby all non-hollow bearing trees are removed first. Secondary clearing shall involve removal of portions of trees containing suitable roosting/nesting hollows from felled trees, and reattaching these to suitable standing trees nearby.
- No clearing shall occur outside nominated clearing zones.
- The following activities are not to be permitted within the delineated retained vegetation areas:
  - Storage and mixing of materials;
  - Vehicle parking;

- Liquid disposal;
- Machinery repairs and/or refuelling;
- Construction site office or shed;
- Combustion of any material;
- Stockpiling of soil, rubble or debris;
- Any filling or excavation including trench line, topsoil skimming and/or surface excavation, unless otherwise approved by the Project Manager; and
- Unauthorized pesticide, herbicide or chemical applications.

- All activities in an area adjacent to retained vegetation shall be carried out in such a manner as to ensure no damage to the vegetation.
- Clearing shall occur in the sequence of cutting, shearing of felled vegetation and tub grinding.
- Upon completion, grubbing operations shall ensure the site is left free draining with no ponding of stormwater.
- Erosion and sediment control works shall be undertaken in accordance with the ESC Plans (Yeats, 2013) and will not be removed until the site is stabilised.
- Each area requiring erosion and sediment control treatment shall be mulched immediately upon completion of clearing and grubbing works. If insufficient mulch material is available then other alternative treatments such as hydromulching or hydroseeding will be applied to the areas in question. Any alternative treatment proposed must be approved in writing by the site environmental officer and records of the type, timing and location of these treatments must be collected and made available to TSC (if requested).
- Any physical erosion and sediment control measures shall not be dismantled until the disturbed areas have been covered by mulch to a minimum depth of 100mm or alternative treatments such as mentioned above are in place and established.

6.1.3 Two-Stage Post-Clearing and Earthworks Report

Given the potential time lapse between clearing and earthworks activities, the Post-Clearing and Earthworks Report will be completed in two stages. At the completion of clearing activities, the project ecologist/environmental officer in consultation with the fauna specialist will produce a Draft Stage 1 report providing a summary of the results of pre-clearing surveys, clearing operations and hollow relocations. A follow-up Stage 2 report will then be prepared to follow up on any additional issues that may have resulted from Earthworks activities. A seperate Two-Stage report will be prepared for activities within each stage of construction (Precincts 9 and 11).

Details within each report will include:

- Information on clearing and earthworks operations, dates, procedures, areas
- Details of habitat trees
- Information on tree species and tree sizes being used for breeding or roosting by fauna, including location, size, height and girth (i.e. for information base purpose).
- Detailed information about any incursion into no-go zones.
- Assessment against the performance criteria detailed in Section 8.
- Reccommended remediation measures for any incursions into no-go zones.

Final reports will be submitted to TSC at the completion of Earthworks.

6.2 Protection of Significant Vegetation

6.2.1 Threatened Flora

All threatened flora species have been previously identified as part of the field surveys undertaken by JWA (2008 & 2010). Threatened, rare and regionally significant plants located close to the edge of the earthworks zone between the construction buffer and the precinct boundaries will be preserved and protected in situ. Additional to the protocol outlined in section 6.1, the following procedures are to be implemented to protect individuals on site:

- All personnel are to be made aware of the presence of retained protective flora species through the site induction process.
- A 5m radius around all stems of threatened flora shall be measured and clearly delineated as a “no go zone” using fencing to exclude construction traffic. No construction activities are permitted within this fenced off area.
- Temporary protective mesh barriers are to be placed around significant flora individuals located on the edge of the earthworks buffer prior to clearing.
- Protective mesh barriers of a suitably strong material are to be installed at the edge of the tree drip line or extent of foliage.
- Where groups of threatened plants occur near each other, the protective mesh barrier is to be installed so that it protects the whole group.
- The mesh barriers are to be temporary and removed after completion of construction and landscaping.
- If, during the course of earthworks, a threatened species that has not been previously identified is found and is likely to be significantly affected by the proposed works, the Site Environment Officer shall immediately advise OEH (NPWS).
- As soon as possible after the completion of adjacent clearing works, amelioration measures discussed within the Site Regeneration and Revegetation Plan (SMEC, 2013c) shall be undertaken.
- A minimum five-metre revegetated buffer is marked for all known specimens of Threatened flora to be retained, and the cleared parts of these areas are to be revegetated with locally endemic flora species, as detailed in the Site Regeneration and Revegetation Plan (SMEC, 2013c).

6.2.2 Endangered Ecological Communities

The principal management strategy for EEC’s on the site is the retention and long-term protection of these vegetation communities. The EECs to be retained have been protected within “Rehabilitation and Management Areas”. Four (4) Rehabilitation and Management Areas are adjacent to Precincts 9 and 11, of which 2 protect EECs. These include the following Rehabilitation and Management Areas:

- **7**: Protects Lowland Rainforest Community on Floodplain community and very tall open/closed sclerophyll forest (*E. pilularis +/- E. microcorys +/- E. propinqua +/- C. intermedia)* south of Precinct 11.
- **8**: Protects the Lowland Rainforest Community on Floodplain situated on the northern boundary of Precinct 9;

Retained EEC's will be protected and/or restored in accordance with the approved Site Regeneration and Revegetation Management Plan for Precincts 9,and 11(SMEC, 2013c).

During Construction

Additional to the protocol outlined in section 6.1, the following procedures are to be implemented to protect the vegetation within these Rehabilitation and Management Areas:

- The Rehabilitation and Management Areas are to be clearly delineated as "no go zones" using fencing to exclude construction traffic. No construction activities are permitted within this fenced off area.
- Trees located on the edge of the earthworks buffer and deemed by an Ecologist to be likely to be impacted upon, shall be protected by the application of carpet underlay and/or corrugated iron or some other similar material to encase the trunk of the tree.
- Temporary protective mesh barriers are to be placed at the edge of the dripline of trees located on the edge of the earthworks buffer prior to clearing.
- The mesh barriers are to be temporary and removed after completion of construction and landscaping.
- Where sufficient area is not available to provide a buffer, a dense screen of vegetation will be planted to minimise edge effects and the interface of the remnant bushland and development will be subject to assisted regeneration.

Post Construction

A Site Revegetation and Regeneration Plan (SRRP, SMEC 2013c) has been developed to guide rehabilitation within these management areas. This plan identifies areas within each rehabilitation and management area that are to be rehabilitated and stipulates management strategies including planting programs, seed propagation, weed management and maintenance and monitoring. These management actions will not be discussed in detail within the VMP Maintenance or follow up works are vital for the success of enhancing and protecting the vegetation and habitat values within and adjacent to Precincts 9 and 11. Maintenance will be in accordance with any relevant conditions of consent and the approved stage specific SRRP.

6.3 Weed Management

The following procedures are to be followed during construction to prevent the spread of weeds:

- Mulch created from cleared onsite vegetation must not contain fertile weed material. Weeds should be separated from native species where feasible.

- Mulch acquired offsite for use during landscaping or soil stabilisation must be certified as weed free.
- Machinery is to be inspected prior to entering the site and the environmental officer is to establish inspection points and wash down points if required.

Weeds will be strictly controlled within buffer zones and Rehabilitation and Management Areas. Buffers have be designed to form a barrier to prevent weed invasion into the Environmental Protection Zones and will generally consist of planting a dense screen of native vegetation within the edges of the Environmental Protection Zones and within adjacent Asset Protection Zones where compatible with Asset Protection Zone requirements. Detail on weed management is provided in the Site Regeneration and Revegetation Management Plan (SMEC, 2013c).

6.4 Hydrology

The following procedures are to be followed in order to prevent alterations in drainage and the site hydrological regime that may impact on vegetation:

- Upon completion of grubbing operations it will ensured that the site is left free draining with no ponding of stormwater.
- Erosion and sediment control works shall be undertaken in accordance with the ESC Plans (Yeats, 2013).
- Efforts shall be made to reduce the permanent ponding of water within habitat areas and to retain the natural hydrology (i.e. periodic saturation and drying out) of the habitat areas.
- Release of water from any detention basins should occur at suitable rates so as to maintain the water table of the wetland, as outlined in the approved Stormwater Management Plan.
- The onsite environmental officer will conduct fortnightly visual inspections to check for signs of changes in hydrological regimes such as waterlogging. The inspections will be documented and the results made available to TSC (if required).
- Prevention of hydrological alterations within the Saltmarsh communities and freshwater wetland communities will be in accordance with the Saltmarsh Rehabilitation Plan (JWA, 2012b) and the Freshwater Wetland Compensatory Habitat Management Plan (SMEC, 2012) respectively.

7 RESPONSIBILITIES AND RESOURCES

7.1 Personnel Responsibilities

The responsibilities of key staff for the project as they relate to the VMP are outlined below. The wider resposibities of various key personelincluding the Construction Manager and on-site Environmental Officer are outlined in more detail in the CEMP (SMEC, 2013d).

The Proponent, Leda Manorstead Pty Ltd, will ensure that adequate resources are available to carry out and maintain all native vegetation mitigation measures in accordance with relevant Acts and this plan.

The personnel that may be required during the implementation of this VMP include:

- Soil Conservationist
- Local Plant Nursery
- Seed Collectors
- Botanist

Contact details for relevant personnel involved in the implementation of this VMP are shown in Table 6.

Table 6 Contact Details Relevant to this Vegetation Management Plan

Organisation	Name	Contact Details
Construction Manager	Dennis Hughes	Phone:0417 797 099 Email: leda@hughesintermodal.com.au
Project Manager Leda Developments	Reg van Rij	Phone: (07) 5570 5500 Email: rvr@ledagc.com
NSW DECC		Phone: 131 555 Email: info@environment.nsw.gov.au
Tweed Shire Council Rep	Mick Denny	Phone: (02) 6670 2602 Email: MDenny@tweed.nsw.gov.au
Department of Primary Industries		Phone: 02 6618 1800 Email:
Environmental on-site Officer	Jon Alexander	Phone: 0424 152 298 Email: Jon.Alexander@smec.com
Office of Environment and Heritage (OEH) (DECC)	Chris Sayer	(02) 6640 2500 131 555
Fisheries	Pat Dwyer	(02) 6626 1397 1300 550 474
Site Superintendent	TBA	TBA
Botanist	TBA	TBA
Bush Regeneration Contractor	TBA	TBA
Ecologist	TBA	TBA
Fauna Specialist	TBA	TBA

8 PERFORMANCE CRITERIA

A number of criteria will indicate successful management of the vegetation within the development precincts covered by this plan. These include:

- Erection and maintenance of protective fencing prior to and during construction in accordance with the Earthworks Fencing drawings.
- Erection and maintenance of erosion and sediment controls in accordance with ESC Plans (CEMP).
- All threatened flora and retained EECs will be buffered in accordance with the VMP and Site Regeneration and Revegetation Management Plan (SRRMP)
- Vegetation protection included in worker induction and all workers inducted in vegetation protection measures.
- No clearing outside nominated clearing zones.
- No clearing of or damage to threatened flora during construction.
- No clearing of or damage to retained Endangered Ecological Communities.
- No alterations in drainage impacting on retained vegetation.

9 IMPLEMENTATION OF CONTROL MEASURES

This section provides a list of control measures identified to minimise the impact of earthwork activities on flora and identified measures to be implemented prior to construction, during construction and after construction finishes. The table below will act as a schedule to ensure items are completed according to requirements, and to clarify necessary staging of construction works, as a result of environmental requirements.

Table 7 Summary of Mitigation and Management Issues and Responsibility and Timing

Action	Responsibility	Prior to Construction	During Construction	After Construction
Parawebbing/exclusion fencing installation around vegetation protection areas/threatened flora species	Environmental Officer/Ecologist	X		
Installation of sediment and erosion controls to protect drainage lines, freshwater wetland and saltmarsh wetland habitat to be retained	Construction Manager/Site Superintendent Sign off: Environmental officer	X		
Installation of fencing as per Earthworks Fencing Plan (Appendix A)	Construction Manager/Site Superintendent Sign off: Environmental officer	X		
Pre-clearing Flora Survey				
Checking of tree protection/exclusion fencing	Environmental Officer	X		
Significant habitat tree flagging, photographing and GPS recoding (as per Fauna Management Plan, SMEC, 2013b)	Environmental Officer, Botanist, Project fauna specialist	X		
Completion of the Pre-clearing Checklist (Appendix B)	Environmental Officer	X		
Protection of in situ significant plants				
Installation of protection fencing around significant plants/protection areas	Construction Manager/Site Superintendent Sign off: Environmental Officer	X		
Maintenance of protection fencing	Environmental Officer/Construction Manager/Site Superintendent		X	

Action	Responsibility	Prior to Construction	During Construction	After Construction
Fencing inspections	Environmental Officer and Site Superintendent		X	
Assurance that amelioration of site regeneration and revegetation plan occurs as soon as possible after clearing works are completed	Environmental Officer		X	X
Notification of additional threatened species to DECCW (NPWS)	Environmental Officer	X	X	
Endangered Ecological Communities				
Fencing EEC protection areas within buffer	Site Superintendent/Construction Manager Sign off: Environmental Officer	X		
Monitoring of EEC buffer protection	Environmental Officer		X	
Monitoring that activities not permitted within EEC areas do not occur	Environmental Officer		X	
Erosion and sediment control around the EEC protection areas	Site Superintendent/Construction Manager Sign off: Environmental Officer	X	X	
Seed Collection				
Collection of seed material (as detailed in the SRRP)	Landscaping specialist/project botanist			X
Propagation of collected seed (as detailed in the SRRP)	Landscaping specialist/project botanist			X
Germination test (as detailed in the SRRP)	Landscaping specialist/project botanist			X
Vegetation clearing				
Marking of all habitat trees	Environmental Officer and Fauna Specialist	X		
Parawebbing of footprint to be cleared	Construction Manager and Site Superintendent	X		

Action	Responsibility	Prior to Construction	During Construction	After Construction
Two stage clearing ensuring non-hollow bearing trees are cleared first	Environmental Officer /project botanist and fauna specialist	X		
Relocation of hollows (as detailed in the Fauna Management Plan, SMEC, 2013b)	Fauna specialist and Environmental Officer	X		
Presence of spotter/catcher throughout vegetation clearing	Environmental Officer	X		
Ongoing education of site staff through 'toolbox talks', ensuring important information relating to vegetation protection are reiterated regularly. To be signed off by all attendees.	Environmental Officer and Construction Manager	X	X	
Completion of the weekly construction checklist (Appendix C)	Environmental Officer		X	
Post-clearing report to Tweed Shire Council	Environmental Officer		X	
Weed Control				
Hydroseeding of disturbed areas is undertaken	Environmental Officer		X	
Inspection for weed species on a six monthly basis	Environmental Officer		X	
Monitoring of stockpiled materials to ensure weed infested topsoil is stockpiled separately	Environmental Officer		X	
Regeneration and Revegetation (detail provided in the SRRP, SMEC 2013c)				
Control of invasive weeds and grasses	Rehabilitation specialist team		X	X
Monitoring of regeneration and revegetation areas including weeds, nutrient levels	Rehabilitation specialist team		X	X
Repairing of exclusion fencing	Environmental Officer		X	
Staking and propping up of trees	Rehabilitation specialist team		X	X
Replacing dead trees	Rehabilitation specialist team		X	X

Action	Responsibility	Prior to Construction	During Construction	After Construction
Re-mulching and re-fertilising	Rehabilitation specialist team		X	X
Primary, follow-up and maintenance bush regeneration as per the approved SRRP.	Rehabilitation specialist team		X	X
Revegetation within buffers, as per the Site Regeneration and Revegetation Management Plan (SMEC, 2013c)	Rehabilitation specialist team	X		
Revegetation as per the approved SRRP.	Rehabilitation specialist team		X	X
Maintenance of planted trees – watering and weed control as per the approved SRRP.	Rehabilitation specialist team			X
Removal of protection fencing	Site Superintendent			X

10 INSPECTION, AUDITING, MONITORING AND REPORTING

This section includes a detailed description of the inspections and monitoring to be implemented and by whom.

Reporting will include results of these inspections, audits and monitoring events. All inspection reports and non-conformances will be recorded in a centralised register and acted on within two weeks, detailing the action taken or proposed to address the issue.

Table 8 – Inspections and Monitoring

Action	Frequency	Person Responsible	Prior to Construction	During Construction	After Construction
Pre-clearing survey of habitat trees, including flagging and GPS recording	Once prior to clearing	Suitably Qualified Fauna Spotter Catcher	X		
Pre-clearing inspection of tree protection/exclusion fencing and sign off on the earthworks fencing drawings (Appendix A).	Once prior to clearing	Construction Manager, on-site Environmental Office	X		
Inspection of integrity of fencing around retained vegetation during clearing	Daily	Environmental Officer/ Site Superintendent		X	
Inspection of erosion and sediment controls to ensure they are clean and working correctly	Daily	Environmental Officer/ Site Superintendent		X	
General inspection of fencing.	Weekly	Environmental Officer		X	
General inspection of works (a biweekly inspection shall take place during substantial clearing activities)	Weekly	Environmental Officer		X	
Water Quality Monitoring within the Dunns Creek, Cobaki Creek, Cobaki Broadwater and the central drainage line (as detailed in the CEMP)	Monthly	Environmental Officer	X	X	X
Checking the status of protective fences and the on-site hydrological regime (to check for impacts on vegetation associated with any changes.	As required	Suitably Qualified Ecologist			X
Monitoring in accordance with the stage specific SRRP, Freshwater	As required	Suitably Qualified			X

Action	Frequency	Person Responsible	Prior to Construction	During Construction	After Construction
Rehabilitation Management Plan and Saltmarsh Rehabilitation Plan.		Ecologist			
Monitoring of protected vegetation species/communities.	As required	Environmental Officer	X	X	X
Monitoring of aquatic flora (freshwater wetland and saltmarsh wetland)	As required	Suitably Qualified Ecologist	X	X	X
Inspections for weed growth and infestation by the project ecologist (as detailed in the SRRP)	As required	Suitably Qualified Ecologist		X	X
Internal environmental auditing at six months following commencement of substantial earthworks and then at least six monthly intervals thereafter to check compliance with the CEMP, DECCW licence and all approvals.	6-monthly	Environmental Officer		X	X

REFERENCES

Everick Heritage Consultants Pty Ltd. 2010. Aboriginal Cultural Heritage Assessment Cobaki Lakes Tweed Heads, NSW.

James Warren and Associates. 2008. Response to the Director General's Environmental Assessment Requirements. Volume 6 – Vegetation Management Plan.

James Warren and Associates. 2009. Vegetation Management Plan. Cobaki Lakes Preferred Project Report.

James Warren and Associates. 2010a. Revised Fauna Management plan. Cobaki Lakes Preferred Project Report.

James Warren and Associates. 2012a. Revised Site Regeneration & Revegetation Plan. Cobaki Lakes Preferred Project Report.

James Warren and Associates. 2012b. Revised Saltmarsh Rehabilitation Plan. Cobaki Lakes

James Warren and Associates. 2013a. Revised Assessment of Significance (7-Part Test)

James Warren and Associates. 2013b. Revised Ecological Assessment. Cobaki Lakes., Tweed Heads.

JBA Urban Pty Ltd. 2008. Environmental Assessment Report Part 3A Concept Plan. Cobaki Lakes Estate, Tweed Heads, Mixed Use Residential Development.

SMEC. 2013a. Flora and Fauna Monitoring Program. Unpublished report prepared for Tweed Shire Council

SMEC. 2013b. Cobaki Estate Fauna Management Plan – Precincts 9 and 11

SMEC. 2013c. Cobaki Estate Site Regeneration and Revegetation Management Plan – Precincts 9 and 11

SMEC. 2013d. Cobaki Estate Construction Environmental Management Plan – Precincts 9 and 11.

SMEC. 2012. Freshwater Wetland Compensatory Habitat Management Plan.

Yeats. 2010. Stormwater Quality Concept Plan. Cobaki Lakes Development.

Yeats. 2010. Construction Environmental Management Plan – Statement of Intent. Cobaki Lakes Development.

APPENDIX A – VEGETATION PROTECTION DRAWINGS

PRECINCT 11

PRECINCT 9

PIGGABEEN ROAD

LEGEND

- ENVIRONMENTAL PROTECTION AREA (NO-GO ZONE)
- PERMANENT FENCE
- TEMPORARY FENCE
- PROPERTY BOUNDARY
- CENTRAL OPEN SPACE
- VEHICLE GATE

A	Issued for Approval	08.06.16	AM/CH	
REVISION		DATE	DES/DFT	APP'D

LEDA

Principal
Leda Developments
Suite 14, Level 1, 46 Cavill Avenue
Surfers Paradise

Project Leader
S.Sandford
Designed
A. Marsden
Drawn
C. Haywood
Checked

Authorised

Date
June 2016

N

Scale @ A1

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COBAKI ESTATE
OVERALL
Tweed Shire Council

Fencing Plan Precinct 9,11
Drawing No. 3310071E-044 (2) **Rev A**

Sheet No. 1 of 1

Subject to Approval
Not to be used for construction

APPENDIX B - PRE-CLEARING CHECKLIST

Project:	
Inspection Date:	**Area:**

Pre-clearing Checklist

#	Control Measure	Yes	No	N/A	Comment/Corrective Action
1	Has the boundary of the clearing zone been fenced/delineated				
2	Has the ecologist marked the communities and or individuals of threatened plants?				
3	Has the seed and plant material collection been undertaken?				
4	Has the in situ significant plants been fenced?				
5	Have habitat trees been identified?				
6	Has weed mapping and eradication been completed?				
7	Have areas of weed infected topsoil been separated/removed?				
8	Has vegetation and topsoil to be salvaged been identified?				
9	Mulching and chipping plant established?				
10	Have clearing contractors been educated on the no-go/ environmental protection areas?				
11	Have heritage items been identified and protected?				
12	Have permits to remove saltmarsh been gained from Fisheries?				
13	Have threatened fauna surveys been undertaken?				
14	Have all sediment control measures been installed?				
15	Have habitat trees been flagged for removal as stage 2 of the clearing works?				
16	Are WIRES and the spotter/catcher organised for clearing/				
17	Any other issues to add or delete from the checklist?				
Completed by:			**Signature:**		

File in the Environmental Log Folder

APPENDIX C - WEEKLY INSPECTION CHECKLIST

Project:	COBAKI ESTATE
Inspection Date:	Area/Precinct:

WEEKLY CONSTRUCTION CHECKLIST

#	Control Measure	Yes	No	N/A	Comments/Corrective Action
1	Is drainage from the project site being directed through necessary controls prior to entering any watercourse?				
2	Is vegetation being protected with Environmental Protection Zones?				
3	Is the integrity of the delineation fencing along the Environmental Protection Zone buffer satisfactory?				
4	Are fauna structures (koala posts and nest boxes) in place?				
5	Have hollows been salvaged for re-use?				
6	Have hollows been inspected by the fauna specialist?				
7	Has the area been inspected for threatened fauna?				
8	Has flora monitoring been undertaken?				
9	Is monitoring of water quality being undertaken?				
10	Is riparian and wetland monitoring being undertaken?				
11	Are disturbed areas being rehabilitated as soon as practical?				
12	Are suitable sedimentation and erosion control devices in place where necessary?				
13	Are protected areas being protected from sediment and erosion impacts?				
14	Are areas surrounding waterways satisfactorily stable?				
15	Is there evidence to suggest changes should be made to the site induction relating to flora and fauna aspects? (i.e. reoccurring issues, prevention measures, etc)				
16	Have any injuries or death to wildlife been identified or reported?				
17	Have any weed infestations been identified?				
18	Any other issues to add to the checklist?				
Completed by:		**Signature:**			

K3 – Cultural Heritage Management Plan

EVERICK
Heritage Consultants Pty Ltd

ABN 78102206682

April 2010

CULTURAL HERITAGE MANAGEMENT PLAN

Cobaki Lakes
Residential Development

PREPARED FOR LEDA MANORSTEAD PTY LTD

47 Arthur Tce, PO Box 146,
Red Hill Q 4059
Phone 07 3368 2660 | Fax 07 3368 2440
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Innovative Heritage Solutions

TABLE OF CONTENTS

1. DETAILS

Date: 14 April, 2010

Parties

Name	LEDA MANORSTEAD PTY LTD ("Developer")
Short form name	Leda Manorstead
Notice details	Reg Van Rij Regional Manager – Residential Leda Developments Pty Ltd Level 1, 46 Cavill Avenue SURFERS PARADISE QLD 4217 Ph: 07 5570 5500 Fax: 07 5570 5050 Email: ledadev@ledagc.com
Name	TWEED BYRON ABORIGINAL STAKEHOLDERS ("Registered Aboriginal Stakeholders")
Short form name Notice details	See ***Appendix 2***

2. RECITALS

Application has been made by Leda Manorstead Pty Ltd (the "Developer") to the Director General, Department of Planning for consideration of a Concept Plan for the Cobaki Lakes Development Area as a residential community and associated retail, commercial, and recreation amenities. This Cultural Heritage Management Plan ("CHMP") sets out the principles and processes the Developer will adopt for the identification, protection and management of Aboriginal Objects within the Development Area.

The terms of this CHMP have been drafted to reflect the findings of Everick Heritage Consultants Pty Ltd in their Preliminary Aboriginal Cultural Heritage Assessment (2009) and their Summary Excavation Report (2009). Their methodology and findings can be found in the reports submitted with this CHMP. In accordance with the assessment, this CHMP makes general recommendations for all Cultural Heritage of the Development Area and then allows for more detailed management and monitoring processes in an area identified as being of a sensitive nature.

It is envisaged that this CHMP will provide the general principles for Cultural Heritage management for the life of the Development, including where new Development Applications are lodged with the Tweed Shire Council. Should the Developer wish to undertake processes that vary from or are in

addition to those in this document, they will consult with the Registered Aboriginal Stakeholders and produce a new or revised CHMP, in accordance with their legal obligations at the time.

A central principle of Cultural Heritage management is that items of heritage significance should be retained in an appropriate Setting (*Burra Charter*: Article 8). It is not considered appropriate to agree to detailed landscaping and signage practices at Concept Plan stage. However, the CHMP puts in place consultation practices that will ensure the ongoing participation of the Registered Aboriginal Stakeholders in these works.

3. OPERATIVE PROVISIONS

3.1 Definitions

"Aboriginal Cultural Heritage" or **"Cultural Heritage"** means Aboriginal Objects and/or Aboriginal Places, as defined in Paragraph 5 of the *National Parks and Wildlife Act 1974* (NSW).

"Aboriginal Cultural Heritage Site(s)" or **"Site(s)"** means areas exhibiting one or more attributes of Aboriginal Cultural Heritage.

"Aboriginal Place" has the same meaning as that provided in Paragraph 5 of the *National Parks and Wildlife Act 1974* (NSW).

"Aboriginal Object" has the same meaning as that provided in Paragraph 5 of the *National Parks and Wildlife Act 1974* (NSW).

"CHMP" means this Cultural Heritage Management Plan, all Appendices to this CHMP and any subsequent amendments to this CHMP from time to time as agreed by the Parties.

"**CHP"** means a Cultural Heritage Park as required by Paragraph 13 of this CHMP.

"CHP General Area" means the outer boundaries within which a CHP may be situated, as identified in ***Appendix 1: Figures 5-7****.*

"Construction" means any surface and sub-surface disturbance during the Construction works undertaken by the Developer within the Development Area.

"Contractor" means a contractor, including Sub-Contractors, employed by the Developer to provide Construction services for the Development.

"Cultural Heritage Advisor" means a person or organisation, independent from the parties, with specialised archaeological and/or anthropological training and appointed under Paragraph 10 of this CHMP.

"Cultural Heritage Contact" means a person or persons nominated by the Developer to act as the main point of contact between the Developer and the Registered Aboriginal Stakeholders.

"Cultural Heritage Management Protocols" are the specific recommendations for the management of each Aboriginal Place and Aboriginal Object which form part of the Cultural Heritage Survey Report.

"Cultural Heritage Team" means the person or persons appointed by the Registered Aboriginal Stakeholders as Monitor during Construction of the Development at the Sites identified in this CHMP.

"DECCW" means the New South Wales Department of Environment and Climate Change.

"DECCW Guidelines" means the DECCW draft *Interim Community Consultation Requirements for Applicants* (2005) or such other guidelines or regulations issued by the DECCW that may take their place.

"Development" means the Cobaki Lakes Development to which this CHMP applies

"Development Area" means the area detailed in ***Appendix 1*** and referred to in the **Recitals** on which Construction and associated works are taking place.

"Developer" means Leda Manorstead Pty Ltd, including All Staff, and such persons who shall come to own, lease, manage or otherwise exhibit control over the use of land within the Development Area.

"DOP" means the New South Wales Department of Planning.

"Exclusion Zone" means the area, not less than twenty (20) metres, around an Aboriginal Cultural Heritage Site that the Developer may not enter for the purposes of any Construction until appropriate arrangements for the management of the Site have been made in accordance with this CHMP.

"Find" means an Aboriginal Object as defined in Paragraph 5 of the *National Parks and Wildlife Act 1974* (NSW).

"Human Remains" does not include –

a) human remains buried under the authority of a law of the Commonwealth or any State or Territory; or

b) human remains in or from a place recognized as a burial ground for internment of remains as referred to in paragraph (a).

"Induction" means Aboriginal Cultural Heritage induction training sessions developed by the Registered Aboriginal Stakeholders or its representatives in consultation with the Developer and presented by persons with knowledge and experience in Aboriginal Cultural Heritage and the obligations imposed by a CHMP.

"Monitor" means a representative of the Registered Aboriginal Stakeholders who shall perform the functions of a Monitor as outlined in Paragraphs 5 and 7 and ***Appendix 3,*** and when appropriate will work as part of a Cultural Heritage Team.

"Monitoring" means activities undertaken by Registered Aboriginal Stakeholders or their authorized representatives in accordance with Paragraph 7 of this CHMP, and may include Construction works as required by the Developer or Contractors provided such work does not unreasonably interfere with their abilities to identify Cultural Heritage.

"Monitor Roster" means the roster developed in order to effectively monitor the activities to be performed by the Developer in carrying out the Construction.

"Parties" means the Registered Aboriginal Stakeholders and the Developer.

"Project Applications" means Project Applications lodged with the DOP involving

Construction within the Development Area under the Statutory framework of Part 3A Major Projects in the *Environmental Planning and Assessment Act 1979* (NSW).

"Project Construction Manager" means the on-site manager appointed by the Developer to oversee all matters of Aboriginal Cultural Heritage.

"Registered Aboriginal Stakeholders" means Aboriginal persons entitled under the laws and departmental guidelines of New South Wales to be consulted on the management of Aboriginal Cultural Heritage and who are a Party to this CHMP (as listed in ***Appendix 2***).

"Staff" means all employees, Contractors and sub-contractors of the Developers involved in the Development.

3.2 Rules for Interpreting this Document

The following rules also apply in interpreting this CHMP, except where the context makes it clear that a rule is not intended to apply:

(a) a singular work includes the plural, and vice versa;
(b) a word which suggests one gender includes the other gender;
(c) if an example is given of anything (including a right, obligation or concept), the example is for clarity and does not limit the scope of that thing;
(d) the word "agreement" includes an undertaking or understanding, whether or not in writing; and
(e) subject to this clause, the Appendices, whether or not completed at the date of this CHMP will be considered part of this CHMP for all purposes.

4. PRINCIPLES OF CULTURAL HERITAGE MANAGEMENT AND PURPOSE OF THIS CHMP

4.1 Principles of Cultural Heritage Management Plan

The principles of Cultural Heritage management in this CHMP are:

(a) a practice of respect, understanding and value for Aboriginal traditions and Aboriginal Cultural Heritage should be conveyed to relevant employees, agents, consultants, Contractors and sub-contractors of the Developer through Induction training;
(b) Aboriginal traditions should be respected and Aboriginal Cultural Heritage should be conserved and protected;
(c) the Developer accepts that Construction has the potential to damage Aboriginal Places and Aboriginal Objects. Consequently, it is necessary to implement a series

of actions and procedures to avoid or minimise the potential impact of Construction on these Aboriginal Places and Aboriginal Objects; and

(d) the Developer accepts that particular care will be needed for Construction within the Archaeologically Sensitive Areas, requiring monitoring and special Induction training.

4.2 Purpose of this CHMP

With the Cultural Heritage management principles detailed above in mind, this CHMP seeks to:

(a) encourage direct involvement of the Registered Aboriginal Stakeholders in the development and implementation of this CHMP and future agreements to manage Cultural Heritage within the Development Area;

(b) provide an acceptable framework for implementing CHMPs or other agreements to identify and protect Cultural Heritage as part of future Project Applications to be submitted to the DOP for each stage of the Development;

(c) set up a process through which Areas identified in ***Appendix 1*** are the subject of Traditional Owner consultation and further archaeological investigation as soon as possible;

(d) ensure that, as much as possible, any items of Aboriginal Cultural Heritage that are unearthed during Construction are identified and appropriate procedures are in place to ensure that they are protected;

(e) ensure direct involvement for the Registered Aboriginal Stakeholders in all management actions deemed necessary to manage Aboriginal Places and Aboriginal Objects located during Construction within the Development Area;

(f) allow the Developer to fulfill its commercial and corporate obligations and objectives while protecting or otherwise managing Aboriginal Cultural Heritage which exist in the Development Area;

(g) meet the Developer's obligation imposed on the Developer by the DOP and DECCW; and

(h) provide a strong foundation for an ongoing, open and mutually beneficial relationship between the Parties.

4.3 Details of Prior Studies Conducted in the Development Area

Lilley conducted an archaeological survey of the Subject Lands in 1981. He found no sites of Aboriginal Cultural Heritage during his survey. However, he did note that this may have been due in part to poor surface visibility due to dense vegetation in many areas (Lilley 1981:5). Since 1981 there

has been extensive clearing and earthworks in preparation for use of the land for agriculture and then as a residential development.

In 1990 the University of Queensland Archaeological Services Unit carried out a survey and prepared an Archaeological Report in respect of the Cobaki Lakes site (Hall 1990). That report acknowledges that clearing, farming and sand mining together with land reforming has been extensive and few places within the study area have been unaffected by European cultural impacts of some kind. The report states that nothing relating to past Aboriginal cultural heritage was found during the survey.

An Assessment (Robins 2009) has been conducted by Everick Heritage Consultants, incorporating fieldwork and the results of past studies, which forms the basis of this CHMP.

4.4 Details of Prior Studies Conducted on Lands Immediately Surrounding the Development Area

The following assessments have been carried out on lands immediately surrounding the development area. Most of these assessments identified significant deposits of Aboriginal cultural heritage, largely in the form of middens and artefact scatters. When viewed in conjunction with the results of the assessment of the Development Area (Robins 2009), it is evident that the Development Area was and still is part of a significant cultural landscape for the Aboriginal people of the Tweed.

BONHOMME, CRAIB & ASSOC. 2000	Tugun Bypass Environment Impact Statement Stage 2: Technical Paper Number 15: Cultural Heritage Assessment. Unpublished Report for the Department of Main Roads.
COLLINS, J.P. 1999	Pacific Highway, Tugun to Tweed Heads Bypass Route Selection Study: Cultural Heritage Assessment. Unpublished report to Connell Wagner Pty Ltd, Spring Hill QLD.
COLLINS, J.P. 2005	Proposed Country Energy Substation at Cobaki NSW. Far North Coast, Cultural Heritage Assessment. Unpublished report for Sinclair, Knight, Mertz.
CONVERGE 2009	Archaeological Excavation and CHA, Piggabeen Rd, West Tweed. Unpublished report for the Tweed Shire Council.
EASTERN YUGAMBEH LIMITED 2005	Eastern Yugamabah Limited in conjunction with the Tweed Byron Local Aboriginal Land Council Results of a Preliminary Cultural Heritage Survey of the Proposed C4 Tugan Bypass. Unpublished report for the Department of Main Roads.

FOX 1966	Coabaki and Terranora Broadwater Aboriginal Cultural Heritage Management Plan. Unpublished report prepared for the Tweed Shire Council.
HALL, J. 1990(a)	An Assessment of Aboriginal Sites at Coolangatta Airport. Unpublished report to Gutteridge Haskins & Davey Pty Ltd, Brisbane.
OZARK ENVIRONMENTAL HERITAGE MANAGEMENT PTY LTD 2006(a)	Geomorphological and Archaeological Assessment: The Tugan Bypass C4 Corridor (Stage 2- Cultural Heritage Management Plan). Unpublished report to QLD Department of Main Roads.
OZARK ENVIRONMENTAL HERITAGE MANAGEMENT PTY LTD 2006(b)	Archaeological Salvage Excavation Zone 7, Tugan Bypass. Unpublished report to QLD Department of Main Roads.
OZARK ENVIRONMENTAL HERITAGE MANAGEMENT PTY LTD 2006(c)	Draft Protocol for the Management of a Stone Artefact Scatter. Unpublished Report to Gold Coast Airport Pty Ltd, QLD.
OZARK ENVIRONMENTAL HERITAGE MANAGEMENT PTY LTD 2007	Archaeological Salvage Excavation Zone 7, Tugan Bypass. Unpublished report to QLD Department of Main Roads.

5. OBLIGATIONS OF THE REGISTERED ABORIGINAL STAKEHOLDERS

In implementing this CHMP, the Registered Aboriginal Stakeholders will:

(a) where employed by the Developer; work diligently to assist with the implementation of this CHMP and enable it to operate successfully;
(b) provide any reasonable information required by Developer to implement this CHMP;
(c) provide information as required by Monitors to carry out their obligations under this CHMP;
(d) co-operate with the Developer to ensure that it is able to go about its activities in a timely and efficient manner;
(e) assist the operations of the Developer's Staff where they are acting in accordance with this CHMP; and
(f) distribute relevant information on Development Plans, Construction Works, Finds, Monitoring, Design Meetings, employment and business opportunities or other information related to the implementation of this CHMP to other members of the

Tweed Aboriginal community who may have an interest in the cultural values of the Development Area..

6. RESPONSIBILITIES OF THE DEVELOPER

The Developer undertakes to apply the following practices in implementation of this CHMP:

(a) provide progress reports to the Registered Aboriginal Stakeholders, at a frequency of one every 6 months;
(b) ensure that breaches of this CHMP are managed in accordance with the breach procedures as agreed upon by the Parties;
(c) provide the Registered Aboriginal Stakeholders with relevant drawings of the proposed Developments as soon as practicable;
(d) keep the Registered Aboriginal Stakeholders informed as to the progress of the Development;
(e) work diligently to make this CHMP operate successfully;
(f) provide resources as necessary for the implementation of this CHMP;
(g) mark the locations of known Aboriginal Cultural Heritage Sites and the Archaeologically Sensitive Area on working plans of the Development Area and these plans will then be displayed at the site office;
(h) ensure any Contractors employed for any part of the Development are informed of the roles and duties of all Parties involved with the implementation of this CHMP and comply with the Developer's obligations under this CHMP;
(i) ensure safety and first aid equipment are available for use by Monitors when required;
(j) provide workplace health and safety and environmental management induction training to Monitors; and
(k) adhere to the Specific Recommendations contained in Paragraph 12 of this CHMP.

7. CULTURAL HERITAGE MONITORS

7.1 Powers of Monitors

For areas agreed upon by the Parties under this or any subsequent agreement, the Monitors may have the authority to stop machinery working if that machinery is at risk of encroaching into a Cultural Heritage Protection Area or a Cultural Heritage Park where it has not previously been agreed that it may do so, or that the machine is likely to cause damage to Aboriginal Cultural Heritage.

7.2 Monitor Training

The Cultural Heritage Advisor will co-ordinate a Monitor training session whereby Monitor's are given instructions on:

(a) their powers and responsibilities under this CHMP; and
(b) how to identify a Find.

7.3 General Monitoring Procedures

Monitoring may be required from time to time during activities within the Cultural Heritage Protection Areas or the Cultural Heritage Parks (***Appendix 1: Figures 5-7***). The term Monitoring is used in this CHMP to describe a range of activities that may be undertaken by Registered Aboriginal Stakeholders or their representatives in managing Cultural Heritage within the Development Area. The full powers and responsibilities of Monitors are contained in the management procedures in ***Appendix 3***.

The Monitor may be authorised by the Registered Aboriginal Stakeholders to make binding decisions on-site when dealing with Cultural Heritage that directly affects the Development, subject to any applicable statutory requirements.

7.4 Remuneration of Monitors

Remuneration for the services provided by the Monitors will be $50 per hour (excluding any breaks from monitoring activities) plus superannuation. Prior to undertaking any Monitoring activities, Monitors will be required to provide the Developer with:

(a) a completed and signed tax file number declaration form;

(b) their superannuation fund name and membership number;

(c) their date of birth; and

(d) any other such information as required by the Developer under the applicable Commonwealth or State laws.

8. CULTURAL HERITAGE INDUCTIONS

8.1 Briefing on Duties under this CHMP

The Developer will:

(a) ensure that the Developer's relevant staff and Contractors are aware of the Developer's responsibilities under this CHMP and the roles and responsibilities of the Cultural Heritage Team in implementing this CHMP; and
(b) allow sufficient time before Construction commences for this briefing to occur.

8.2 Cultural Heritage Induction

All Construction Staff engaged in undertaking initial subsurface disturbance will undergo a Cultural Heritage Induction prior to Construction commencing. The Induction will be run by the Tweed Byron LALC and, if required, the Cultural Heritage Advisor. The purpose of the Induction will be to:

(a) instruct Construction Staff on the basic principles of identifying Aboriginal Cultural Heritage;
(b) instruct Construction Staff on areas which are considered potentially likely to contain Aboriginal Cultural Heritage;
(c) familiarise all persons with the culture and traditions of the Registered Aboriginal Stakeholders;
(d) promote an understanding and respect for the culture and traditions of the Registered Aboriginal Stakeholders;
(e) foster good relationships between the Registered Aboriginal Stakeholders and others; and
(f) instill understanding of the principles embodied in this CHMP.

9. COMMUNICATIONS

9.1 Developer's Cultural Heritage Contacts

The Developer will nominate a person within its organisation as Cultural Heritage Contact, who will be the main point of contact between the Developer and the Registered Aboriginal Stakeholders in relation to the implementation of this CHMP (***Appendix 2***). The Developer will also nominate a Cultural Heritage Advisor, who may act on the Developers behalf where requested by the Developer.

9.2 Aboriginal Contacts

The Registered Aboriginal Stakeholders will be requested to nominate their postal address and phone number where they permit the Developer to contact them.

9.3 Communication Protocol

Where possible, all communication between the Parties is to occur via the contact people defined in this Paragraph, unless otherwise agreed by the Parties.

10. INDEPENDENT CULTURAL HERITAGE ADVISOR

An appropriately selected and qualified independent Cultural Heritage Advisor will be used to provide advice to the Developer and the Registered Aboriginal Stakeholders on issues concerning Cultural Heritage:

(a) during the Construction phase;
(b) where there is any conflict or disagreement between the Registered Aboriginal Stakeholders and the Developer; and
(c) at other times when agreed by the Registered Aboriginal Stakeholders and the Developer.

The contact details for the nominated Cultural Heritage Advisor are contained in ***Appendix 2***.

11. FIND PROCEDURE

The Developer acknowledges that further Aboriginal Objects, not already identified by past archaeological surveys or excavations, may be discovered during the course of the Construction. These potential discoveries fall into two (2) distinct categories: Aboriginal human remains and sub-surface Aboriginal Objects.

The Find procedures for Aboriginal Objects (Paragraph 11.2) will not apply to the areas identified as Exclusion Areas (Back Paddock, Front Paddock and Sand Ridge) in ***Appendix 1: Figures 2-4***. These areas have been the subject of Archaeological excavations, and no further Cultural Heritage works are required, other than those required for Cultural Heritage Protection Areas (Paragraph 12) and Cultural Heritage Parks (Paragraph 13).

11.1 Aboriginal Human Remains

Aboriginal human remains will be dealt with as according to the Aboriginal Remains Procedure outlined in ***Appendix 6***, with special regard to the following considerations:

(a) in all cases suitable dignity is required in the handling of the issue;
(b) the primary intention of this strategy is to avoid the unnecessary removal or disturbance of the human remains and to allow appropriate Aboriginal people the final decision-making powers, if the remains should prove to be those of an Aboriginal person; and
(c) where this is not the case the discovery Site will be deemed a crime scene and Contractor and its Sub-Contractors will be subject to police direction.

11.2 Aboriginal Objects

In the event of a potential Cultural Heritage Find the following process will be carried out immediately by Construction Staff, Contractors and/or Monitors:

(a) Construction work must cease in the immediate vicinity of the potential Find and an Exclusion Zone of at least twenty (20) metres radius be established around the identified Aboriginal Object(s). The Exclusion Zone may be established using flags, pins, tape or temporary fencing, as deemed appropriate by the Developer. All other Construction works may continue in other areas.
(b) A Monitor or the Cultural Heritage Advisor must be called to inspect and identify the Find.
(c) If the Monitor or Cultural Heritage Advisor is satisfied that the object is not Cultural Heritage, the Exclusion Zone may then be removed and Construction works may continue.
(d) If the Monitor is unsure of whether the object is Cultural Heritage or not, they may elect to have a Cultural Heritage Advisor inspect the Find.
(e) If the object is Cultural Heritage and:
    a. is not part of a series of Aboriginal Objects of density of greater than five (5) per m^2, the Monitor or the Cultural Heritage Adviser will:
        i. Fill out a Find Sheet; and
        ii. Collect the Objects and store them in accordance with the Keeping Place requirements in Paragraph 15; or
    b. is part of a series of Aboriginal Objects of density greater than five (5) per m^2, the Monitor or the Cultural Heritage Adviser will:
        i. Notify the Registered Aboriginal Stakeholders of the Find;
        ii. Provide a brief report on the contexts of the Find; and
        iii. agree to management strategies for the area surrounding the Find.

(f) Any disputes as to the management of a Find will be dealt with in accordance with the Dispute Resolution Protocols (Paragraph 19).

12. CULTURAL HERITAGE PROTECTION AREAS

12.1 General Management Rational

Archaeological excavations in the Back Paddock (***Appendix 1: Figure 4***), have uncovered a range of Aboriginal stone artefacts scattered throughout the environment. The Parties acknowledge that it is not feasible to salvage all of these artefacts.

Archaeological modeling for the surrounding environment has led to the conclusion that the areas identified in this CHMP as Cultural Heritage Protection Areas will contain a representative sample of the type and distribution of artefacts within the Back Paddock. As many Aboriginal Objects within the Back Paddock will be lost during Construction, it is appropriate that particular care be taken when undertaking activities within the Cultural Heritage Protection Areas.

12.2 Construction Works within Cultural Heritage Protection Areas

The Cultural Heritage Protection Areas are Zoned Environmental Protection Areas within the Development Concept Plan (***Appendix 1: Figure 7***). These areas will generally be the subject of minimal ground disturbance. The type of Construction Works that may occur within Environmental Protection Areas may include:

(a) pathways and walking tracks;
(b) public amenities such as toilets, parks and shelters;
(c) bushfire hazard reduction that is not exempt development;
(d) business identification signs;
(e) earthworks;
(f) environmental facilities;
(g) noxious weed control;
(h) emergency service facilities;
(i) roads;
(a) urban stormwater water quality management facilities; and
(b) works for drainage and landfill.

12.3 Activity Response Hierarchy

The following hierarchy of Construction works and activities and associated action will be used to guide heritage Monitoring within Cultural Heritage Protection Areas:

Disturbance	***Examples***	***Monitoring Activity***
No/Minimal Ground Surface Disturbance	• Noxious weed control using poisons • bushfire hazard reduction • professional surveys or site investigation activities	None Required
Minimal Ground Surface Disturbance	• Pathways and walking tracks not requiring excavation • Erection of signage • Landfill (not Cut)	Pre-Construction survey by one monitor
Ground Surface Disturbance and Minimal Subsurface Disturbance	• Fencing • Paths and Walking Tracks requiring excavation • Construction of public amenities such as toilets and shelters. • Minor drainage or sewage works	Pre-Construction survey by one Monitor. Monitoring of initial subsurface disturbance by two Monitors.
Significant Subsurface Ground disturbance	• Roads • Clearing using a bulldozer • Ground surface modification involving removal of topsoil for the purposes constructing parks or building pads. • Large stormwater or sewage works.	Pre-Construction survey by one Monitor. Hand Test Pits by three Monitors and a qualified archeologist, in accordance with the Test Pit Procedure. Monitoring of initial subsurface disturbance by two Monitors.

13. CULTURAL HERITAGE PARKS ('CHP')

13.1 The Purpose of Cultural Heritage Parks

CHPs will be located within the Development Area in areas which have significant concentrations of Cultural Heritage. The purpose of the CHPs will be to ensure that:

(a) A representative sample of the Cultural Heritage within the Development Area is protected;

(b) the Registered Aboriginal Stakeholders are consulted over the landscaping and appropriate ongoing use of these areas; and
(c) appropriate interpretative works are undertaken that will commemorate the significance of the Development Area to its Traditional Owners.

As this CHMP has been developed at Concept Plan stage, a degree of flexibility has been incorporated into the Management Procedures in Paragraph 13.2.

13.2 Management Procedures: Back Paddock CHPs 1 to 7

All CHPs within the Back Paddock (CHPs 1 – 7) will be a minimum of 400 m^2. The plan in ***Appendix A - Figure 5*** identifies the areas within which the CHPs will be located ('CHP General Areas'). All CHPs within the Back Paddock require adherence to the following procedures:

(a) The CHP General Areas will be marked on all working plans as areas where Construction works are not to be undertaken.
(b) The CHPs will be fenced with temporary fencing around their boundaries as shown in Figure A. At such time as final boundaries are known they fencing may be altered to reflect this.
(c) The CHPs will not be impacted by any Construction works and the temporary fencing will remain in place until:
    a. where CHPs will be covered in soil to a depth greater than 50cm, the Cultural Heritage Consultant and a Monitor is present to supervise the initial deposit and compacting of the fill; or
    b. where the CHPs will be left uncovered or covered in soil to a depth of less than 50cm, at such times as the Signage and Landscaping procedures (Concept Plan CHMP Paragraph 14) have been implemented.

13.3 Management Procedures: Sand Ridge CHPs 8 to 10

All CHPs within on the Sand Ridge (CHPs 8 – 10) are of a fixed minimum size. The plan in ***Appendix A - Figure 6*** identifies the boundaries of CHPs 8 - 10. All CHPs on the Sand Ridge require adherence to the following procedures:

(a) The CHPs will be marked on all working plans as areas where Construction works are not to be undertaken.
(b) The CHPs will be fenced with temporary fencing around their boundaries as shown in ***Appendix A - Figure 6***.

(c) The CHPs will not be impacted by any Construction works and the temporary fencing will remain in place until such times as the Signage and Landscaping procedures (Concept Plan CHMP Paragraph 14) have been implemented.

14. SIGNAGE & LANDSCAPING

14.1 The Purpose of Interpretative Signage and Landscaping

The Registered Aboriginal Stakeholders and the broader Aboriginal community of the Tweed Valley will be invited to participate in the design of open space/public park landscaping and interpretative cultural signage near known Aboriginal Sites and areas of cultural significance. This is viewed by the Registered Aboriginal Stakeholders as an important part of maintaining connections to Country.

Cultural signage can act as an educative tool. It can assist in creating an overall 'story' of Aboriginal occupation within the Subject Lands. It can demonstrate aspects of Aboriginal culture such as language, tools, story, song, dance and the connection between Aboriginal people and their environment. It can also assist in maintaining the connection of the Traditional Owners to the land.

Culturally sympathetic landscaping can serve to enhance the cultural values of an area. This is an important part of retaining an appropriate Setting in which the Cultural Heritage within Cobaki Lakes is to be located.

From the perspective of the Developer, cultural signage and landscaping can play a dual role of acknowledging past Aboriginal occupation of the area and establishing a sense of community for future residents of Kings Forest. In this way, cultural signage and landscaping is viewed as a mutually beneficial partnership between the Developer and the Registered Aboriginal Stakeholders.

14.2 The Implementation of Cultural Signage

The following processes and principles will guide the implementation of cultural signage:

(a) Cultural signage will occur in each of the CHPs.
(b) Signage should be consistent with the general standards and design principles in the rest of the Development Area.
(c) Traditional names or story will not be used where it is objected to by an Aboriginal Stakeholder. Where the Registered Aboriginal Stakeholders cannot agree on appropriate

names or story to be used in cultural signage, the signage may detail the results of archaeological or ethnographic knowledge of use and occupation of the area.

(d) Where agreement as to the final content and location of signage cannot be reached between the Registered Aboriginal Stakeholders, the final decision will rest with the Cultural Heritage Advisor, who may decide either:
    a. the location and the content of the signage; or
    b. that signage in that location should not be built.

14.3 The Implementation of Cultural Landscaping

The following processes and principles will guide the implementation of cultural landscaping:

(a) The Registered Aboriginal Stakeholders will, through the holding of Design Meetings (Paragraph 14.4), be consulted over the landscaping of all CHPs.
(b) The primary purpose of landscaping a CHP is to ensure the Cultural Heritage within that area is preserved. All other landscaping concerns shall be considered secondary.
(c) Landscaping may involve burying artefacts under a suitable layer of topsoil/sand.
(d) The Registered Aboriginal Stakeholders will provide input on appropriate flora species to be planted within CHPs.
(e) Registered Aboriginal Stakeholders will be invited to nominate persons to participate in the cultural landscaping works, in accordance with Paragraph 16.2.

14.4 Cultural Signage and Landscape Design Meetings

All Registered Aboriginal Stakeholders will be invited to attend a minimum of three (3) Design Meetings. Also in attendance will be qualified landscape and graphic designers, a representative of the Developer, and (only if requested by the Parties) the Cultural Heritage Advisor. Should they be unable to attend a landscape design meeting, they will be forwarded on the minutes and the results of any discussions for comment.

The meetings will be staged through the life of the Development to ensure the Registered Aboriginal Stakeholders are consulted at appropriate times over the landscaping and Cultural Signage of CHPs.

15. KEEPING PLACE

Aboriginal Objects originating from the Development Area must at all times be kept in the care and control of the Tweed Byron LALC. The Developer will continue to consult with the Registered Aboriginal Stakeholders and the Land Council over alternative arrangements for the artifacts should

they be requested. Aboriginal Objects originating from the Development Area must at all times be kept in the care and control of the Tweed Byron LALC, until such time as a Native Title Claim is determined over the Development Area.

16. BUSINESS AND EMPLOYMENT OPPORTUNITIES

16.1 Landscaping Employment

The Developer will provide employment for a minimum of four (4) Aboriginal persons to undertake landscaping works within the CHPs.

The Registered Aboriginal Stakeholders will be asked to nominate interested Aboriginal persons capable of undertaking these works. The final decision on who is employed to undertake these works will rest with the Developer.

16.2 General Employment Opportunities

The Developer, during the course of the Development, will look to employ Registered Aboriginal Stakeholders, as is practicable, where they are capable of carrying out in a satisfactory manner the particular work or services required, at a competitive price and to the Contractor's usual standards. The Developer will communicate with the Registered Aboriginal Stakeholders, to ensure this takes place.

The Developer will request that the Registered Aboriginal Stakeholders nominate several people as potential employees to be assessed by the Developer. The Developer will select and offer employment to the person or people who are most suitable to the skill mix requirements of the Developer.

The Developer commits that:

(a) except as otherwise agreed between the Parties, general working standards, including rates of pay, hours of work and roster period requirements for Aboriginal employees, will be as for other employees; and

(b) they will consider whether there are areas in which an Aboriginal person(s) or an incorporated Aboriginal body might successfully be employed or contracted for the supply of goods and services; and they will look to provide tenders to these persons or Aboriginal bodies.

16.3 Aboriginal Business Opportunities

The Registered Aboriginal Stakeholders will, at their earliest convenience, provide the Cultural Heritage Contact with a list of local Aboriginal businesses interested in providing services during Construction of the Development. The Developer will invite these businesses to tender for undertaking Construction works that the Developer considers the nominated businesses are capable of fulfilling to a sufficient standard.

17. REMUNERATION

Remuneration of the Registered Aboriginal Stakeholders for services provided under this CHMP, excluding Monitoring services, will be the subject of further negotiations between the Developer and the Registered Aboriginal Stakeholders, having regard to the nature of the work and its duration.

18. OWNERSHIP OF INFORMATION

The Developer will own all information, reports or other documents generated or compiled in the implementation of this CHMP ("the reports"), except where such information is the property of another person or is already in the public domain.

The Registered Aboriginal Stakeholders will be requested to provide any information to the Developer, which is required to meet any requirements of law, including for the purpose of applying for any permits, licences, approvals or other authorities required by law for the Development or for the purpose of any programs associated with this CHMP.

Where information generated in the course of implementing this CHMP is of a confidential nature to the Registered Aboriginal Stakeholders and where the Registered Aboriginal Stakeholders have informed the Developer of this fact, then that information:

(a) may not be used for any purpose other than in fulfillment of the Parties' obligations under this CHMP; and
(b) cannot be supplied to or used by any third Party, or used for any other purpose, other than as required by law, without the express written permission of the Registered Aboriginal Stakeholders.

The Developer, with the consent of the Registered Aboriginal Stakeholders, will look to use traditional names wherever practical and appropriate. Names could be used for streets and parks in the Development Area.

The Registered Aboriginal Stakeholders must be consulted about the appropriateness and spelling of any language names. The Parties agree that traditional names may be used solely for these purposes.

19. DISPUTE RESOLUTION

During the implementation of this CHMP, if disputes occur in relation to the management of CHP, Cultural Heritage Protection Areas or Aboriginal Objects, the following principles and procedures will apply:

(a) wherever possible, issues will be negotiated directly between the Registered Aboriginal Stakeholders and the Cultural Heritage Advisor, with minimum disruption to Construction;

(b) failing resolution under (a), an on-site meeting at a time convenient to the Parties, will be convened between the Developer's Staff, the Registered Aboriginal Stakeholders and the Cultural Heritage Advisor; and

(c) if resolution under (b) is not achieved, a permit under Paragraph 87 or Paragraph 90 of the *National Parks and Wildlife Act 1974* (NSW) will be sought by the Developer.

20. NOTICES

The Developer will, where practicable, provide any notices, consents or other communication under this CHMP in writing, signed and either left at the Registered Aboriginal Stakeholder's address or sent to the Registered Aboriginal Stakeholders by mail or fax.

21. TERM

This CHMP will start at a date to be agreed upon by the Parties, and will continue until alternative agreements or CHMPs are entered into between the Developer and the Registered Aboriginal Stakeholders, and approved by the relevant determining authorities.

22. REVIEW

The Developer and the Registered Aboriginal Stakeholders will review the implementation of this CHMP, either in meetings or through correspondence, on an annual basis.

23. SAFETY ISSUES

The Developer may not direct Monitors to do any act or thing, except in relation to specific issues of workplace health and safety, or other administration issues, as agreed between the Parties from time to time.

The Developer will provide (if required) hard hats, safety glasses, hearing protection, safety vests and sunscreen to the Monitors while the Monitors are in the Development Area. The Monitors must supply their own steel capped boots.

24. COSTING

Costs of the investigation, salvaging and storage of any Aboriginal Cultural Heritage are to be borne by the Developer.

25. APPROVAL OF THE DIRECTOR-GENERAL

The Developer will lodge this CHMP with the Director-General of the Department of Planning for approval.

BIBLIOGRAPHY

Hall, J. 1990. An Archaeological Assessment of a Proposed Development Site at Cobaki, South Tweed Heads NSW. University of Queensland Archaeological Services Unit, Report No. 148. Unpublished report to Prodap Services, Qld.

Lilley, I. 1981. Cobaki Village Assessment. Unpublished report to Cameron McNamara, Qld.

Robins, R. 2009. Preliminary Aboriginal Cultural Heritage Assessment for the proposed Community Residential Development at Cobaki Lakes, Tweed Heads, NSW. Unpublished report for Leda Manorstead Pty Ltd, Surfers Paradise, prepared by Everick Heritage Consultants Pty Ltd.

Robins, R. 2009. Summary Excavation Report for Cobaki Lakes Residential Development. Unpublished report for Leda Manorstead Pty Ltd, Surfers Paradise, prepared by Everick Heritage Consultants Pty Ltd.

APPENDIX 1

Figure 1: Development Area

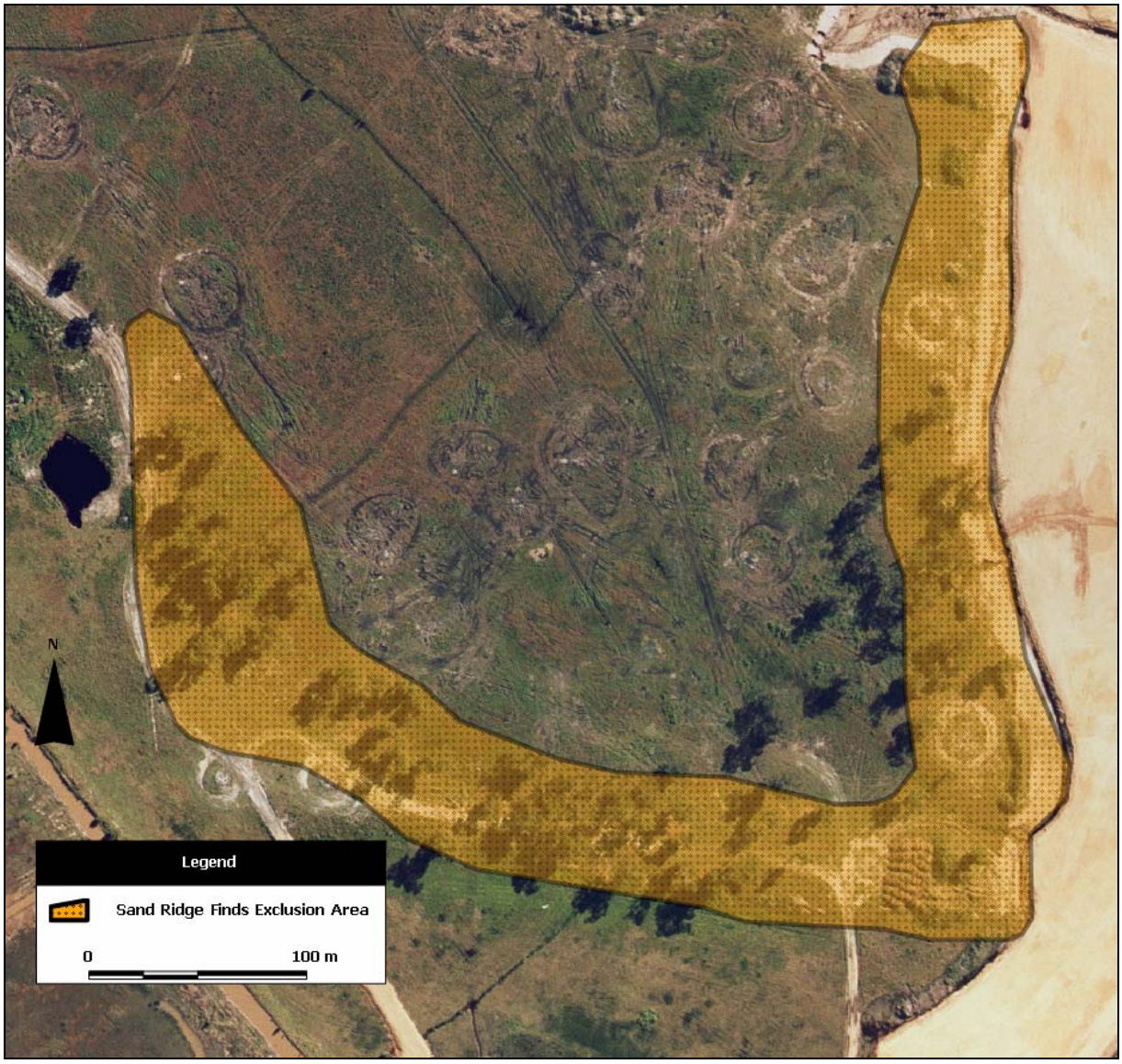

Figure 2: Sand Ridge Finds Exclusion Area

Figure 3: Front Paddock Finds Exclusion Area

Figure 4: Back Paddock Finds Exclusion Area

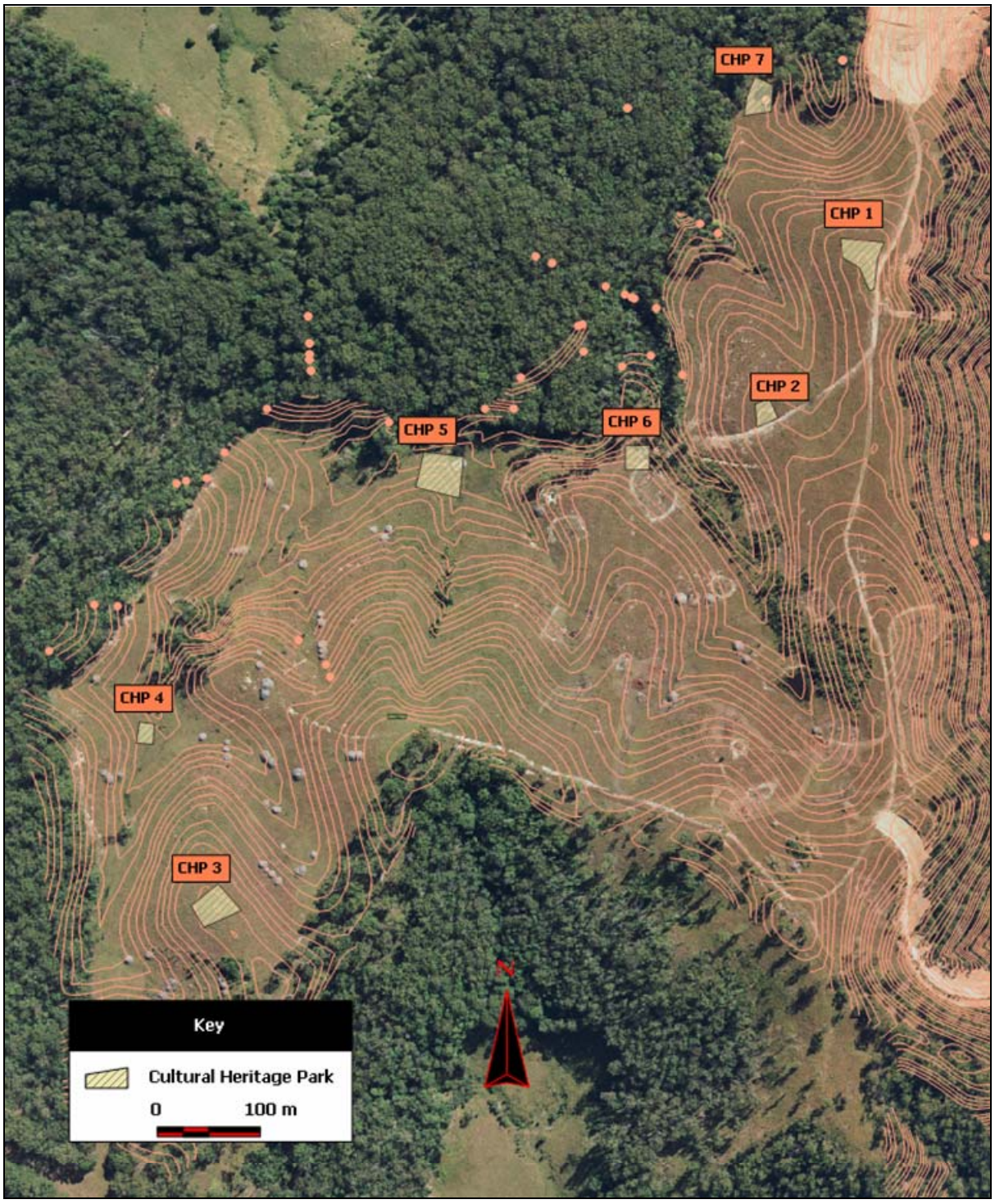

Figure 5: Back Paddock Cultural Heritage Park General Areas

Figure 6: Sand Ridge Cultural Heritage Parks