N

LEGEND

- Lowland Rainforest
- Lowland Rainforest on Floodplain
- Swamp Sclerophyll Forest on Floodplain
- Swamp Oak Floodplain Forest
- Freshwater Wetland (Degraded)
- Saltmarsh
- Proposed Development Areas
- Site Outline

SOURCE:
EEC's - James Warren & Associates Pty Ltd
Impact area - Design Forum Architects
(Ref: DA 01.01 E Master Plan.dwg)
Aerial - Michel Group Services (Ref: 6400-197.dwg)
- photo taken March 2010

0 500m

SCALE: 1 : 12 500 @ A3

JAMES WARREN & ASSOCIATES PTY LIMITED
Environmental Consultants

CLIENT
Leda Developments Pty Ltd

PROJECT
Revised Assessment of Significance
Cobaki Lakes, Cobaki, NSW
Tweed Shire Council

FIGURE 12

PREPARED: BW
DATE: 05 April 2013
FILE: 97038_SA_Base.dwg

TITLE
IMPACT ON ENDANGERED ECOLOGICAL COMMUNITIES

(i.e. riparian forest) (**FIGURE 7**). Lowland rainforest on floodplain covers a total area of approximately 1.75 hectares on the Subject site.

The conservation significance of these communities has been compromised by historical clearing activities, which have resulted in the fragmentation of rainforest communities.

The proposed development will result in the removal of 0.01ha (0.57%) of Lowland rainforest on floodplain EEC (**FIGURE 12**).

Lowland rainforest

This EEC occurs on Mt. Woodgee and associated slopes in the northern portion of the Subject site (**FIGURE 7**) and covers a total area of approximately 9.24 hectares. Vegetation on Mt. Woodgee (i.e. Community 2a) is relatively intact and is considered to represent one of the most ecologically significant vegetation communities on the Subject site, particularly in terms of habitat value for Threatened flora species.

The proposed development will result in the removal of 0.10ha (1.08%) of Lowland rainforest EEC (**FIGURE 12**).

Freshwater wetlands

This EEC is comprised of areas of Rushland/sedgeland/grassland (i.e. Community 12) on the Subject site covering a total area of approximately 35.39 hectares (**FIGURE 7**). The Freshwater wetlands on the site have been heavily degraded by past and existing land use including drain construction and maintenance, grazing and slashing.

In total, 24.12 hectares (68.15%) of Freshwater wetland will be removed from the Subject site during construction activities (**FIGURE 12**). Offsets to ensure no net loss are discussed below.

Swamp oak floodplain forest

This EEC occurs in the south-eastern potion of the Subject site in association with drainage lines and covers an area of approximately 4.52 hectares (**FIGURE 7**). This community occurs in an area that is currently subject to tidal inundation via the main constructed drain in this portion of the site (i.e. Dunn's drain) and also through a breach in the constructed levy bank adjacent to the creek. This community occurs as linear stands of trees along the edges of constructed drains. Additionally, this area is currently actively grazed by cattle under existing use rights (i.e. routine agricultural activities) which has resulted in the prevalence of introduced grasses and common agricultural weeds in some areas.

In total, 0.73 hectares (16.15%) of Swamp oak floodplain will be removed from the Subject site during construction activities (**FIGURE 12**). Offsets to ensure no net loss are discussed below.

Coastal saltmarsh

This EEC occurs in the south-eastern potion of the Subject site adjacent to Cobaki Creek and covers an area of approximately 54.63 hectares (**FIGURE 7**). This area is currently subject to tidal inundation via the main constructed drain in this portion of the site (i.e. Dunn's drain) and also through a breach in the constructed levy bank adjacent to the creek. It is worth noting that this area is currently actively grazed by

cattle and slashed in some areas, under existing use rights (i.e. routine agricultural activities). This has resulted in the prevalence of introduced grasses and common agricultural weeds in some areas.

In total, 9.69 hectares (17.73%) of Coastal saltmarsh will be removed from the Subject site during construction activities (**FIGURE 12**). Offsets to ensure no net loss are discussed below.

Amelioration/Offsets for EEC's

The major amelioration strategy for EEC's on the Subject site is the retention and long-term protection of these vegetation communities within Environmental Protection Areas. Offsets, both on-site and off-site, are proposed to ensure no net loss of EEC's.

A number of Management Plans have been prepared for the Cobaki Lakes development to ensure that the retained EEC's are adequately managed:

- Regeneration & Revegetation Plans - A Revised Site Regeneration & Revegetation Plan has been prepared for the Cobaki Lakes development (JWA 2013a). The proposed conservation areas on the Subject site have been divided into thirteen (13) rehabilitation/management precincts (**FIGURE 13**). Detailed regeneration and revegetation plans are to be completed for each of the precincts at the Operational Works stage.

- Buffer Management Plans (BMP's) - An Overview Buffer Management Plan has been prepared for the Cobaki Lakes development (JWA 2009a) and includes the principles and management procedures that will be fundamental in future detailed BMP's prepared for all relevant stages of the proposed development.

- Revised Freshwater Wetland Rehabilitation Plan - A Revised Freshwater Wetland Rehabilitation Plan has been prepared for the Cobaki Lakes development (JWA 2010). This plan is no longer considered valid, as Condition 12 of DA10/0801 specifies that the low flow component of the central drainage reserve is to be maintained by council for drainage purposes only and not utilised for any environmental offsets. This has obviated the need to rehabilitate Freshwater Wetland onsite within the Central Open Space area. Offsets for the removal of highly degraded Freshwater wetland vegetation from the Subject site will now, largely, be provided off-site. However, the location of this off-site offset is still being determined and will therefore be detailed in subsequent reports.

- Freshwater Wetland Compensatory Habitat Management Plan - (SMEC 2012) Provides details for the proposed onsite offset of a 2ha area of Freshwater Wetland.

- Revised Saltmarsh Rehabilitation Plan - A Revised Saltmarsh Rehabilitation Plan (RSRP) has been prepared for the Cobaki Lakes development (JWA 2013b). The Saltmarsh communities on the Subject site are currently degraded due to a history of cattle grazing. The RSRP includes details of the following measures to ensure the persistence of Saltmarsh communities within the Saltmarsh Rehabilitation Area (**FIGURE 14**) on the Cobaki Lakes site:

N

LEGEND

- Proposed Revegetation Areas
- Proposed Natural Regeneration Areas
- Retained Vegetation
- Rehabilitation & Management Precincts
- Salt Marsh Rehabilitation Area
- Site Outline

SOURCE:
Regen/Reveg - James Warren & Associates Pty Ltd & SMEC
Aerial - Michel Group Services (Ref: 6400-197.dwg) - photo taken March 2010

0 500m

SCALE: 1 : 12 500 @ A3

JAMES WARREN & ASSOCIATES PTY LIMITED
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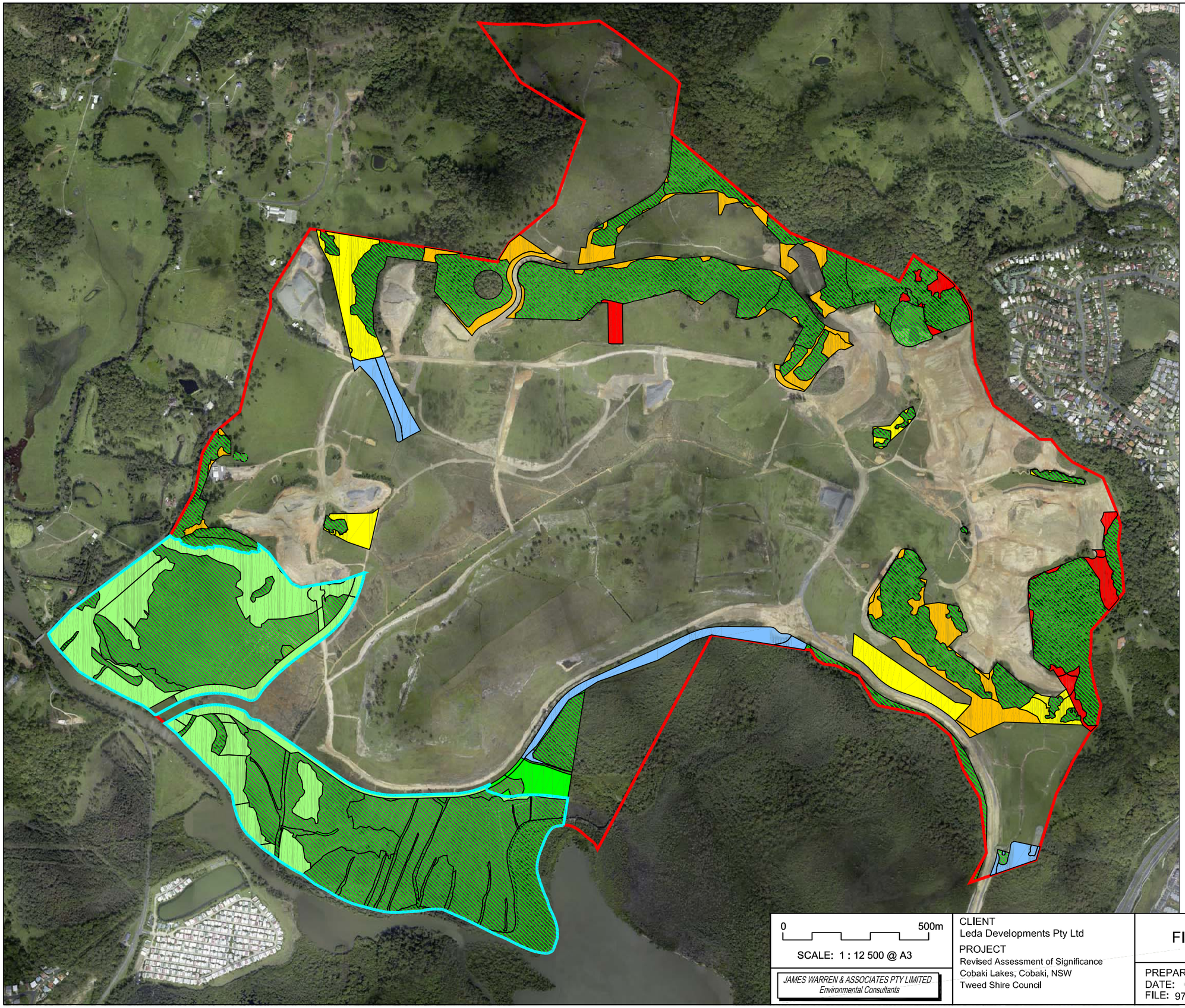
Revised Assessment of Significance
Cobaki Lakes, Cobaki, NSW
Tweed Shire Council

FIGURE 13

PREPARED: BW
DATE: 05 April 2013
FILE: 97038_SA_Base.dwg

TITLE

REHABILITATION & MANAGEMENT PRECINCTS



N

LEGEND

ENDANGERED ECOLOGICAL COMMUNITIES (EEC) OFFSET AREAS

- Lowland Rainforest
- Lowland Rainforest on Floodplain
- Swamp Sclerophyll Forest on Floodplain
- Freshwater Wetland
- Swamp Sheoak Floodplain Forest / Saltmarsh

OTHER

- Mixed Sclerophyll Forest
- Retained Vegetation
- Salt Marsh Rehabilitation Area
- Site Outline

SOURCE:
EEC's - James Warren & Associates Pty Ltd & SMEC
Aerial - Michel Group Services (Ref: 6400-197.dwg)
- photo taken March 2010

0 500m

SCALE: 1 : 12 500 @ A3

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Revised Assessment of Significance
Cobaki Lakes, Cobaki, NSW
Tweed Shire Council

FIGURE 14

PREPARED: BW
DATE: 05 April 2013
FILE: 97038_SA_Base.dwg

TITLE
ENDANGERED ECOLOGICAL COMMUNITIES OFFSET AREAS

1. Measures to compensate for any loss of Saltmarsh communities during construction through the creation of an additional 20ha of Saltmarsh in a degraded pasture area adjacent to the existing Saltmarsh communities. In conjunction with approximately 64.28ha of Saltmarsh regeneration, this will ensure a net gain of 34.59ha of Coastal saltmarsh on the Cobaki Lakes site;
2. Measures to compensate for the loss of Swamp-oak floodplain forest EEC from the development site. Approximately 5.66ha of Swamp-oak floodplain forest will be revegetated to offset the loss of 0.73ha;
3. Restoration of the entire existing Saltmarsh area;
4. Provision of Saltmarsh retreat areas in the event of future sea-level rises; and
5. A detailed monitoring and maintenance program.

As discussed above, revegetation/regeneration completed in accordance with these management plans will offset the loss of EEC's on the Subject site (**FIGURE 14**). A summary of the proposed onsite EEC offsets is provided in **TABLE 2.**

TABLE 2
PROPOSED EEC OFFSETS IN ACCORDANCE WITH RELEVANT MANAGEMENT PLANS

EEC Offset Areas	Area of existing EEC (ha)	Area of EEC to be removed/ modified (ha)	Proposed Onsite Offset (ha)	Total Area at completion of development (ha)	Net gain/loss (ha)
Swamp sclerophyll forest on coastal floodplain	3.80	3.80	6.77	6.77	+2.97
Lowland rainforest on floodplain	1.75	0.01	9.59	11.33	+9.58
Lowland rainforest	9.24	0.10	3.71	12.85	+3.61
Freshwater wetlands	35.39	24.12	2.00	13.27	-22.12
Coastal saltmarsh	54.63	9.69	20.00[4]	89.22[5]	+16.24
Swamp oak floodplain forest	4.52	0.73	5.88[4]	9.67	+5.15

It is noted that some of the offsets proposed in **TABLE 2** will not adequately address the necessary offset and as such, the balance of the required offsets will be provided offsite. However, the location of these off-site offsets is still being negotiated and management of these areas will therefore be detailed in subsequent reports.

Swamp sclerophyll forest on coastal floodplain

Amelioration for the removal of the degraded Swamp sclerophyll forest on coastal floodplain will be provided through revegetation works on the Subject site. The Revised Site Regeneration and Revegetation Plan (JWA 2013a) includes measures to offset the loss of this EEC from the Subject site.

[4] The revegetation of Saltmarsh and Swamp oak floodplain forest will occur in areas of the Saltmarsh Rehabilitation Area with exact locations based on topography. Swamp oak forest will be revegetated in areas of higher elevation and saltmarsh in lower lying areas. These areas will be determined at the completion of bulk earthworks.
[5] This includes approximately 64.28ha of natural regeneration of Coastal Saltmarsh in accordance with the Revised Saltmarsh Rehabilitation Plan (JWA 2013).

In total, 6.77 hectares of Swamp sclerophyll forest will be regenerated/revegetated on the Subject site (**FIGURE 14**) to offset the loss of 3.8 hectares. The proposed offsets will result in a net gain of 2.97ha of this EEC on the Subject site.

The Revised Site Regeneration and Revegetation Plan (JWA 2013a) includes specific performance criteria as well as detailed maintenance and monitoring programs. Additionally, the Overview Buffer Management Plan (JWA 2009a) provides details of the principles that will be fundamental in future detailed Buffer Management Plans (BMP's). Detailed BMP's will be prepared for all stages of the proposed development, as part of related Development/Project Applications. The overall objectives of the ecological buffers and related provisions at the Cobaki Lakes development site include the protection of Endangered Ecological Communities.

It is therefore considered that the compensatory Swamp sclerophyll forest on coastal floodplain will be more likely to persist in the long-term compared to the existing communities.

Lowland rainforest on floodplain

Amelioration for the removal of a very small area of Lowland rainforest on floodplain (i.e. 0.01ha) will be provided through revegetation works on the Subject site. The Revised Site Regeneration and Revegetation Plan (JWA 2013a) includes measures to offset the loss of this EEC from the Subject site. Furthermore, retained patches of this EEC will be buffered from the proposed development and embellished to increase the overall extent of isolated patches and reduce existing anthropogenic impacts. All retained areas of this EEC will be protected in Environmental Protection Areas or by relevant Environmental Covenants. The Revised Site Regeneration and Revegetation Plan (JWA 2013a) includes specific performance criteria as well as a detailed maintenance and monitoring program to ensure the persistence of this EEC in the long-term.

Additionally, the Overview Buffer Management Plan (JWA 2009a) provides details of the principles that will be fundamental in future detailed Buffer Management Plans (BMP's). Detailed BMP's will be prepared for all stages of the proposed development, as part of related Development/Project Applications. The overall objectives of the ecological buffers and related provisions at the Cobaki Lakes development site include the protection of Endangered Ecological Communities.

In total, 9.59 hectares of Lowland rainforest on floodplain will be regenerated/revegetated on the Subject site (**FIGURE 14**) to offset the loss of 0.01 hectares. The proposed offsets will result in a net gain of 9.58ha of this EEC on the Subject site.

Lowland rainforest

Amelioration for the removal of a very small area of Lowland rainforest (i.e. 0.1ha) will be provided through revegetation works on the Subject site. The Revised Site Regeneration and Revegetation Plan (JWA 2013a) includes measures to offset any loss of this EEC from the Subject site. Furthermore, retained patches of this EEC will be buffered from the proposed development and embellished to increase the overall extent of isolated patches and reduce existing anthropogenic impacts. All retained areas of this EEC will be protected in Environmental Protection Areas or by relevant Environmental Covenants. The Revised Site Regeneration and Revegetation Plan (JWA

2013a) includes specific performance criteria as well as a detailed maintenance and monitoring program to ensure the persistence of this EEC in the long-term.

Additionally, the Overview Buffer Management Plan (JWA 2009a) provides details of the principles that will be fundamental in future detailed Buffer Management Plans (BMP's). Detailed BMP's will be prepared for all stages of the proposed development, as part of related Development/Project Applications. The overall objectives of the ecological buffers and related provisions at the Cobaki Lakes development site include the protection of Endangered Ecological Communities.

In total, 3.71 hectares of Lowland rainforest on floodplain will be regenerated/revegetated on the Subject site (**FIGURE 14**) to offset the loss of 0.1 hectares. The proposed offsets will result in a net gain of 3.61ha of this EEC on the Subject site.

Freshwater wetlands

Offsets for the removal of highly degraded Freshwater wetland vegetation from the Subject site will include the following:

1. Recreation of approximately 2ha of high quality wetland habitats. These compensatory Freshwater wetlands will be offline from the stormwater treatment train and will also be specifically designed to provide core (breeding) habitat for the Wallum froglet. Revegetation and management of Freshwater wetlands will occur in accordance with a Freshwater Wetland Compensatory Habitat Management Plan (SMEC 2012); and

2. Leda Manorstead Pty Ltd is currently in negotiations with OEH with a view to securing appropriate off-site offsets.

In total, 2 hectares of Freshwater wetlands will be regenerated/ revegetated on the Subject site (**FIGURE 14**) to partly offset the loss of 24.12 hectares.

Swamp oak floodplain forest

The removal of approximately 0.73 hectares of the Swamp oak floodplain forest community from the Subject site will be ameliorated by regenerating and revegetating compensatory Swamp oak communities on the Subject site. Areas within and adjacent to the existing Saltmarsh communities on the Subject site are currently comprised of a mixture of exotic grasses and will be restored to Saltmarsh and Swamp oak communities in accordance with the Revised Saltmarsh Rehabilitation Plan (JWA 2013b). Removal of cattle from the area and subsequent relinquishment of existing use rights is considered an integral component of the rehabilitation process.

In total, approximately 5.88 hectares of Swamp oak floodplain forest will be revegetated (in more elevated areas of the Saltmarsh Rehabilitation Area) on the Subject site (**FIGURE 14**) to offset the loss of 0.73 hectares. The proposed offsets will result in a net gain of 5.15ha of Swamp oak floodplain forest on the Subject site. Retained Swamp oak floodplain forest communities will be provided with a 10m vegetated buffer as a minimum.

Coastal saltmarsh in the NSW North Coast bioregion

The removal of approximately 9.69 hectares of Saltmarsh communities from the Subject site will be ameliorated by regenerating and revegetating Saltmarsh communities on the Subject site (**FIGURE 14**). Offsets for the removal of degraded Saltmarsh vegetation from the Subject site will include the following:

1. Large areas adjacent to the existing Saltmarsh communities are currently comprised of a mixture of exotic grasses and will be restored to Saltmarsh communities in accordance with the Revised Saltmarsh Rehabilitation Plan (JWA 2013b).
2. Re-establishment of saltmarsh species will be completed on the batters along the eastern edge of the Cobaki Parkway after construction is complete.
3. The Revised Saltmarsh Rehabilitation Plan (JWA 2013b) also includes the provision of retreat areas for Saltmarsh communities in the event of sea-level rise.
4. Removal of cattle from the area and subsequent relinquishment of existing use rights is considered an integral component of the rehabilitation process.
5. The entire area of the existing Saltmarsh which is to be retained (i.e. 54.63ha) will be rehabilitated in accordance with the Revised Saltmarsh Rehabilitation Plan (JWA 2013b). This will essentially involve restoring a natural tidal regime to the area.

In total, approximately 20ha of revegetation (in lower lying portions of the Saltmarsh Rehabilitation Area) and 64.28ha of natural regeneration of Coastal saltmarsh will result in a net gain of 34.59ha of this community on the Subject site.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The composition of an EEC refers to both the plant and animal species present, and the physical structure of the EEC. The following documents have been prepared to ensure that the composition and ecological function of EEC's on the Subject site are not significantly impacted by development:

- Revised Site Regeneration & Revegetation Plan (JWA 2013a);
- Freshwater Wetland Compensatory Habitat Management Plan (SMEC 2012);
- Overview Buffer Management Plan (JWA 2009a);
- Revised Saltmarsh Rehabilitation Plan (JWA 2013b);
- Revised Fauna Management Plan (JWA 2013); and
- Vegetation Management Plan (JWA 2009b).

With the adoption of the amelioration measures contained within these documents, and the provision of both on-site and off-site offsets, it is considered that the proposed development will not have an adverse affect on the extent, or substantially modify the composition of any EEC such that the local occurrence is likely to be put at risk of extinction. Conversely, proposed rehabilitation works at the Subject site are likely to improve habitat diversity and connectivity across the Cobaki Lakes site.

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

A summary of impacts on EEC's recorded on the subject has been provided in **TABLE 2** above**.** It is worth noting that areas of EEC to be removed from the Subject site occur within existing 2(c) zoned land (i.e. Urban Expansion), land proposed to be rezoned as 2(c), or land that may otherwise be cleared in accordance with existing use rights.

Proposed rehabilitation works on the Subject site will result in a net gain for all EEC's, with the exception of Freshwater wetlands. Offsets for the removal of highly degraded Freshwater wetland vegetation from the Subject site will include the following:

1. Recreation of approximately 2ha of high quality wetland habitats. This compensatory area of Freshwater wetland will be offline from the stormwater treatment train and will also be specifically designed to provide core (breeding) habitat for the Wallum froglet. Revegetation and management of Freshwater wetlands will occur in accordance with a Freshwater Wetland Compensatory Habitat Management Plan (SMEC 2012); and
2. Leda Manorstead Pty Ltd is currently in negotiations with OEH with a view to securing appropriate off-site offsets.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

Areas of EEC on the Subject site are already highly fragmented (**FIGURE 7**) and the site has had a history of disturbance from land clearing, grazing, farm maintenance and other activities on the Subject site. The Proposed development has been designed to utilise disturbed areas of the Subject site and is unlikely to contribute significantly to an increase in the fragmentation of native vegetation communities. The Revised Site Regeneration & Revegetation Plan (JWA 2013a) includes the retention and embellishment of fauna movement corridors throughout the Subject site (**FIGURE 13**). These habitat linkages will ensure suitable movement opportunities are maintained for all native flora and fauna species.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The majority of vegetation to be removed from the Cobaki Lakes site consists of highly disturbed vegetation. The importance of this vegetation is minor when compared to the areas of suitable habitat proposed to be retained, protected and rehabilitated. The assessment of the importance of the habitat to be removed has taken into consideration the stages of relevant flora and fauna life cycles and how reproductive success may be affected. It is considered that, with the adoption of recommended amelioration and management measures, the proposed development will not significantly affect the life cycle or reproductive success of native flora and fauna species.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Critical habitat areas listed under the *Threatened Species Conservation Act (1995)* currently consist of habitat for Mitchell's rainforest snail in Stott's Island Nature Reserve, and habitat for the Little penguin population in Sydney's North Harbour.

There will be no adverse effects on any critical habitat listed, in the Register of critical habitat in NSW, from the action proposed.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No Recovery plans or relevant Threat Abatement Plans has been prepared for the EEC's occurring on the Subject site.

A range of protection measures have been proposed with the objective of retaining and protecting areas of EEC's and reducing impacts on EEC's wherever possible. With the implementation of these measures it is considered that EEC's will continue to persist on the site following development.

In 2004, amendments were made to the TSC Act (1995) that removed the mandatory requirement to prepare recovery plans and threat abatement plans, and instead require the preparation of Priority Action Statements (PAS). The PAS will set out the measures required to promote the recovery of EEC's to a position of viability in nature and for managing each key threatening process. Any PAS will be addressed in relevant management plans prepared for each future stage of the development.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (1995).*

Key Threatening Processes (Schedule 3):

- Invasion and establishment of exotic vines and scramblers
- Invasion of native plant communities by Bitou bush & boneseed
- Invasion of native plant communities by exotic perennial grasses
- Invasion, establishment and spread of *Lantana camara*
- Competition and grazing by the feral European rabbit
- Competition and habitat degradation by feral goats
- Competition from feral honeybees
- Herbivory and environmental degradation caused by feral deer
- Importation of red imported fire ants into NSW
- Introduction of the large earth bumblebee (*Bombus terrestris*)
- Invasion and establishment of the Cane Toad
- Invasion of the yellow crazy ant (*Anoplolepis gracilipes*)
- Predation by feral cats
- Predation by the European Red Fox

- Predation by the Plague Minnow (*Gambusia holbrooki*)
- Predation by the ship rat (*Rattus rattus*) on Lord Howe Island
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*)
- Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands
- Bushrock Removal
- Clearing of native vegetation
- Alteration of habitat following subsidence due to longwall mining
- Ecological consequences of high frequency fires
- Human-caused Climate Change
- Loss and/or degradation of sites used for hill-topping by butterflies
- Loss of Hollow-bearing Trees
- Removal of dead wood and dead trees
- Infection by Psittacine circoviral (beak & feather) disease affecting endangered psittacine species
- Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis
- Infection of native plants by *Phytophthora cinnamomi*
- Death or injury to marine species following capture in shark control programs on ocean beaches
- Entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments

The proposed development has the potential to result in an increase in the **'Invasion and establishment of exotic vines and scramblers'**, **'Invasion of native plant communities by exotic perennial grasses'** and **'Invasion, establishment and spread of *Lantana camara*'**. The Revised Site Regeneration & Revegetation Plan (JWA 2013a) prepared for the Cobaki Lakes development will ensure that these key threatening processes are not exacerbated. The proposed conservation areas on the Subject site have been divided into thirteen (13) rehabilitation/management precincts (**FIGURE 13**). Detailed regeneration and revegetation plans are to be completed for each of the precincts at the Operational Works stage.

The proposed development has the potential to result in an increase in the **'Invasion and establishment of the Cane Toad'**, **'Predation by feral cats'** and **'Predation by the European Red Fox'**. A Revised Fauna Management Plan (JWA 2013) has been prepared for the Cobaki Lakes development and provides measures to monitor and control pest animals to ensure that these key threatening processes are not exacerbated.

The proposed development has the potential to result in an increase in the **'Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands'.** A detailed Stormwater Management Plan has been prepared for the proposed development and will ensure that this key threatening processes is not exacerbated.

The proposed development will contribute towards the **'Clearing of native vegetation'**, a key threatening process listed on Schedule 3 of the *TSC Act (1995)*. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive

species; loss of leaf litter layer; loss or disruption of ecological function (e.g. loss of populations of pollinators or seed dispersers) and changes to soil biota.

Habitat loss is the main threatening process affecting all subject species. The Proposed development will make a minor contribution towards the loss of habitat in the region. However, as previously discussed, the majority of vegetation to be lost has been highly disturbed by past landuse activities. The Revised Site Regeneration and Revegetation Plan (JWA 2013a) prepared for the site includes specific performance criteria as well as a detailed maintenance and monitoring program to ensure the persistence of native vegetation communities in the long-term.

The proposed development has the potential to result in an increase in the **'Ecological consequences of high frequency fires'.** A Bushfire Management Plan will be prepared by a suitably qualified firm at the detailed design stage to ensure that this key threatening processes is not exacerbated.

The proposed development has the potential to result in an increase in the **'Loss of Hollow-bearing Trees'** and **'Removal of dead wood and dead trees'.** The vast majority of mature native vegetation on the Subject site will be retained. Therefore the majority of hollow-bearing trees will be retained within these forested areas. Any hollow-bearing trees to be removed are likely to occur as isolated paddock trees. The Revised Fauna Management Plan (JWA 2013) includes the following measures to ensure this key threatening process is not exacerbated:

- Any hollow-bearing trees within the urban zoned land should be retained where possible (or included within buffers, open space, etc.); and
- Installation of wildlife boxes for bats, birds & other mammals (where appropriate).

3.2.3 Results of Assessment of Significance

On the basis of this assessment, it is considered that the proposed development will not result in any significant impacts on EEC's recorded on the Cobaki Lakes site.

3.3 Threatened flora

3.3.1 Background

An Assessment of Significance will be completed for each Threatened flora species recorded on the Cobaki Lakes site, or considered a potential occurrence over time. The assessment has been completed in accordance with the *Threatened Species Assessment Guidelines: The Assessment of Significance* prepared by DECC (2007).

In total, eight (8) Threatened flora species have been recorded on the Cobaki Lakes site (**FIGURES 8, 8a, 8b & 8c**). An additional five (5) Threatened species have been recorded during surveys on adjacent land (**FIGURE 9**). An Assessment of Significance (7-part test equivalence) has been completed for all of these species.

3.3.2 Factors for consideration

(a) In the case of a Threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

A summary of impacts for each species recorded on and adjacent to the Subject site is provided in **TABLE 3.**

Suitable habitat for Threatened flora to be removed from the Subject site occurs within existing 2(c) zoned land (i.e. Urban Expansion), land proposed to be rezoned as 2(c), or land that may otherwise be cleared in accordance with existing use rights.

TABLE 3
POTENTIAL LOSS OF THREATENED FLORA HABITAT

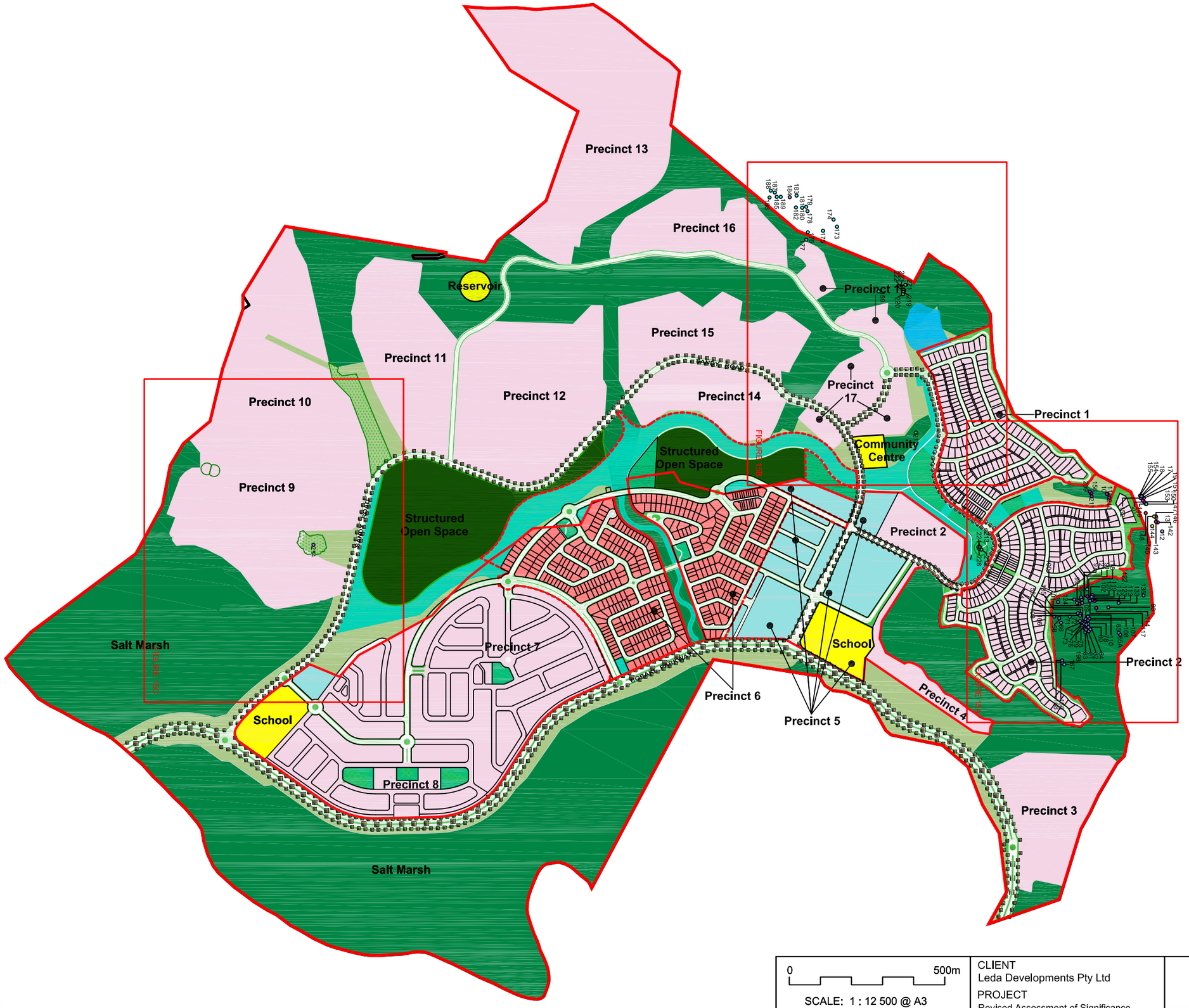
Species	Existing habitat (ha)	Habitat Loss (ha)	Habitat Loss (%)
White yiel yiel	10.99	0.11	1.0%
Scented acronychia	10.99	0.11	1.0%
Fine-leaved tuckeroo	10.99	0.11	1.0%
Spiny gardenia	10.99	0.11	1.0%
Marblewood	10.99	0.11	1.0%
Brush cassia	10.99	0.11	1.0%
Coolamon	10.99	0.11	1.0%
Green-leaved rose-walnut	10.99	0.11	1.0%
White lace flower	10.99	0.11	1.0%
Stinking cryptocarya	10.99	0.11	1.0%
Pink nodding orchid	3.80	3.80	100%
Rough-shelled bush nut	10.99	0.11	1.0%
Swamp orchid	3.80	3.80	100%

A plan showing the locations of Threatened flora on the Subject site in relation to the proposed development is shown in **FIGURES 15, 15a, 15b & 15c** and a summary of impacts for each species is provided below:

Potential impacts on Threatened flora species & their habitat

White yiel yiel

The NPWS database (June 2010) contains twenty-four (24) records of this species within 10kms of the Subject site. Twenty-eight (28) records occur within the Tweed LGA. One (1) stem of White yiel yiel have been recorded on the Subject site (**FIGURES 8 & 8a**) within the rainforest communities associated with Mt. Woodgee in the northern portion of the Subject site. Two (2) additional stems of this species have been recorded within the border reserve to the north of the Subject site. This species has also been recorded in adjacent habitat to the east of the Subject site (EcoPro 2004) (**FIGURE 9**).



LEGEND

- Marblewood (*Acacia bakeri*)
- Fine-leaved tuckeroo (*Lepiderema pulchella*)
- Spiny gardenia (*Randia moorei*)
- Yiel yiel (*Grevillea hilliana*)
- Coolamon (*Syzygium moorei*)
- Brush cassia (*Cassia brewsteri* var. *marksiana*)
- Scented acronychia (*Acronychia littoralis*)
- Green-leaved rose walnut (*Endiandra muelleri* subsp. *bracteata*)
- Precinct 6 Proposed Residential Area (extent of application shown below)
- Precincts 1, 2, 4 and 6 to 8 Zone Boundary
- Extent of Precinct 6 Application
- Future Residential Development
- Future Retail / Commercial / Mixed Use
- Future Community Facilities / Education / Utilities Development
- Existing Water Body
- Stormwater Treatment and Delivery Areas
- Cultural Protected Area
- Covenant Protected Area
- Environmental Protection Area
- Open Space
- Casual Park
- Structured Open Space
- 2.5m Shared User Path/Maintenance Access
- Site Outline

SOURCE:
Flora - James Warren & Associates Pty Ltd
June/July 2004, July 2006, July/Sept 2007 & Feb 2008
Layout - Design Forum Architects
(Ref: DA 01.01 E Master Plan.dwg)
Aerial - Michel Group Services (Ref: 6400-197.dwg)
- photo taken March 2010

0 500m

SCALE: 1 : 12 500 @ A3

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Environmental Consultants

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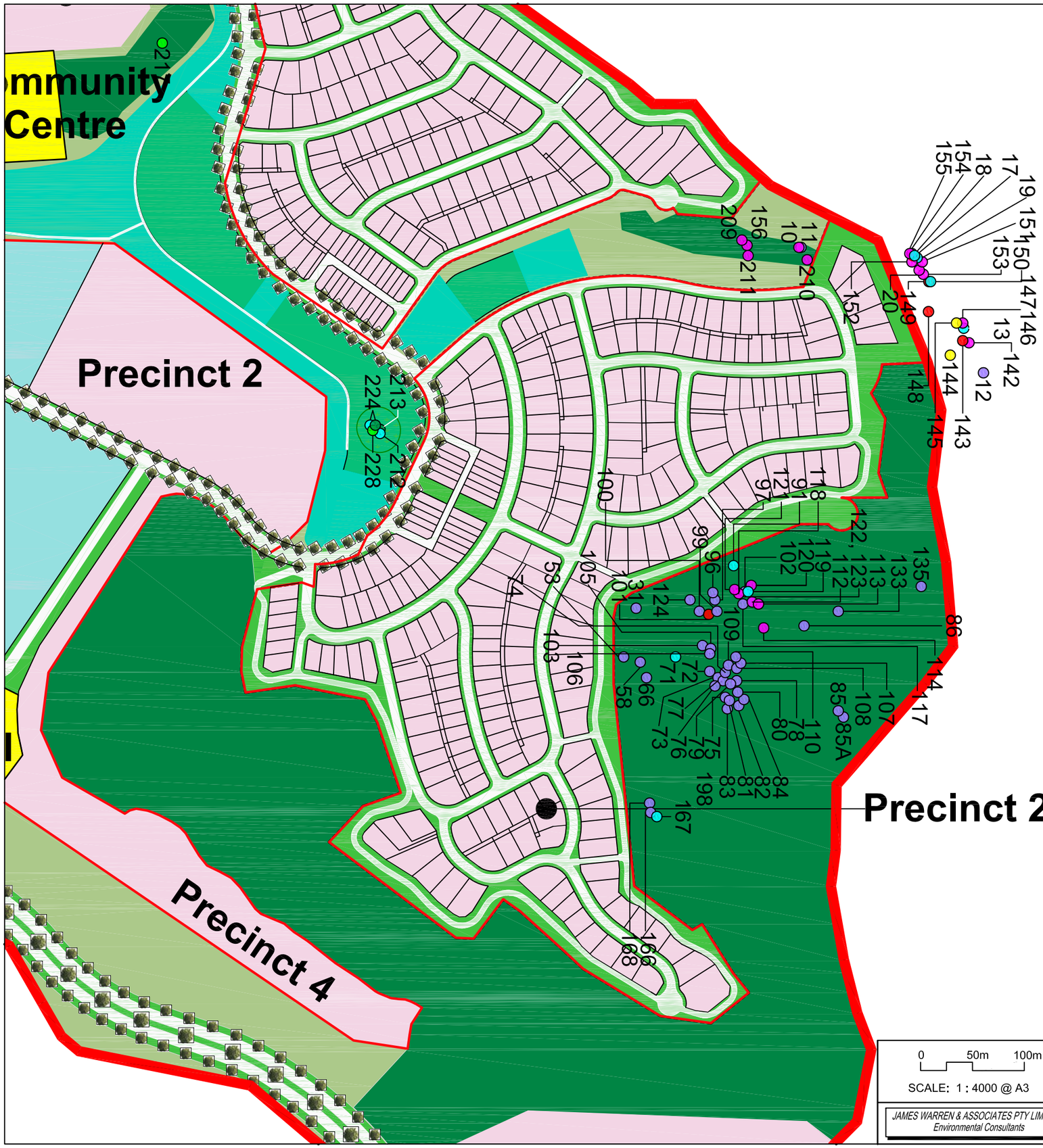
Cobaki Lakes, Cobaki, NSW
Tweed Shire Council

FIGURE 15

PREPARED: BW
DATE: 05 April 2013
FILE: 97038_SA_Base.dwg

TITLE

IMPACT ON THREATENED FLORA



N

LEGEND

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- photo taken March 2010

0 50m 100m

SCALE: 1 : 4000 @ A3

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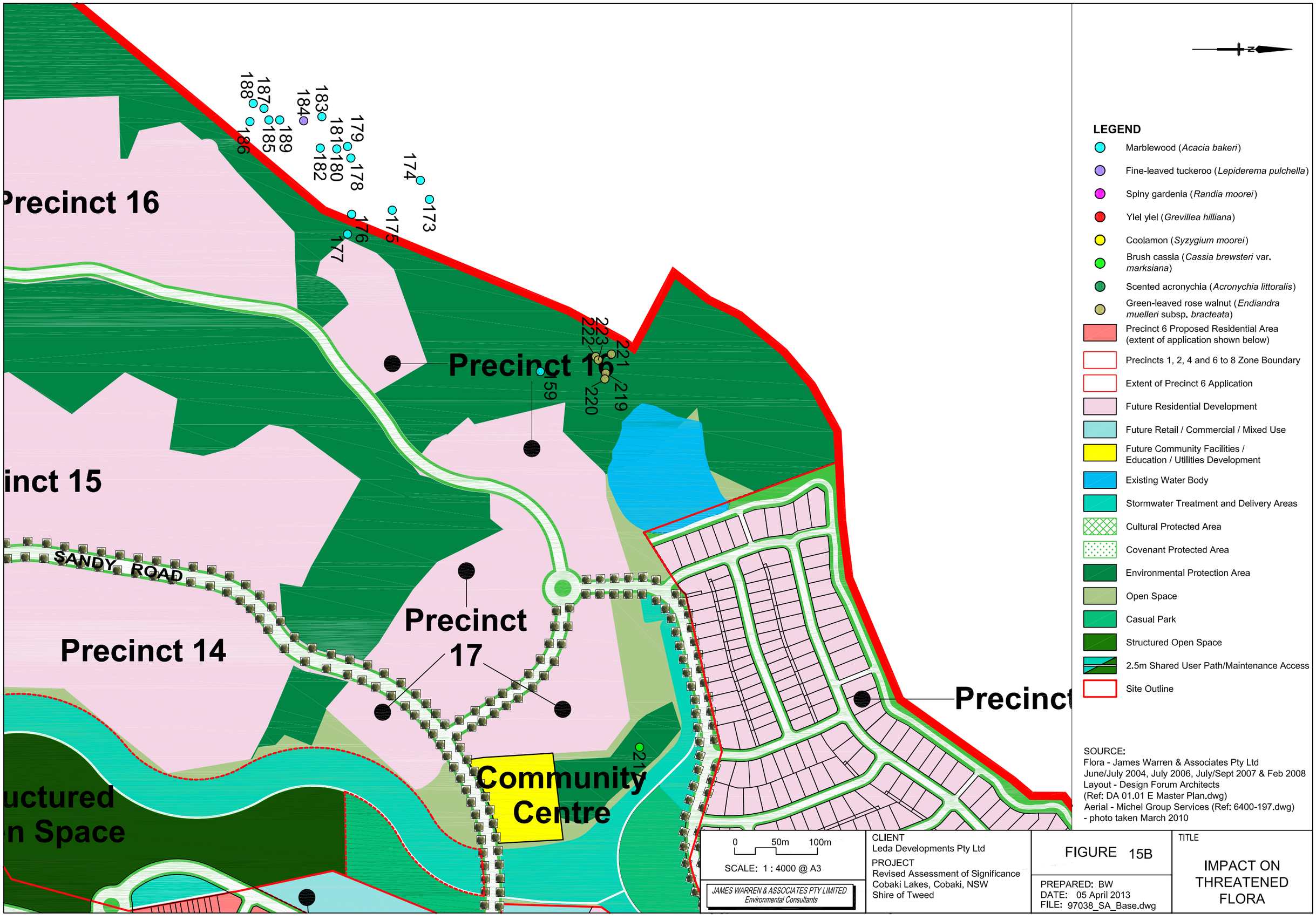
Revised Assessment of Significance
Cobaki Lakes, Cobaki, NSW
Shire of Tweed

FIGURE 15A

PREPARED: BW
DATE: 05 April 2013
FILE: 97038_SA_Base.dwg

TITLE

IMPACT ON THREATENED FLORA


Precinct 16
Precinct 15
Precinct 14
Precinct 17
Precinct 1b
Precinct
SANDY ROAD
Community Centre
uctured
n Space
188
187
186
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217
N
LEGEND
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- photo taken March 2010
0 50m 100m
SCALE: 1 : 4000 @ A3
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Shire of Tweed
FIGURE 15B
PREPARED: BW
DATE: 05 April 2013
FILE: 97038_SA_Base.dwg
TITLE
IMPACT ON THREATENED FLORA