



# The Belmore Road Precinct

## Biodiversity Assessment

CKDI Bringelly Pty Ltd

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## DOCUMENT TRACKING

<b>Project Name</b>	The Belmore Road Precinct – Biodiversity Assessment
<b>Project Number</b>	21SYD - 18177
<b>Project Manager</b>	Rebecca Ben-Haim
<b>Prepared by</b>	Rebecca Ben-Haim, Carolina Mora, and Alex Gorey
<b>Reviewed by</b>	David Bonjer
<b>Approved by</b>	David Bonjer
<b>Status</b>	<b>Final</b>
<b>Version Number</b>	<b>6</b>
<b>Last saved on</b>	<b>6 October 2023</b>

This report should be cited as ‘Eco Logical Australia 2022. *The Belmore Road Precinct – Biodiversity and Riparian Land Assessment*. Prepared for CKDI Bringelly Pty Ltd atf.’

## ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from CKDI Bringelly Pty Ltd atf.

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Template 2.8.1

# Contents

<b>1. Introduction .....</b>	<b>1</b>
1.1 Description of the Project .....	1
1.2 Subject Site .....	1
1.3 Methodology Overview .....	1
<b>2. Statutory Framework .....</b>	<b>4</b>
2.1 Statutory Framework .....	4
2.2 Strategic Plans .....	6
<b>3. Methods .....</b>	<b>12</b>
3.1 Literature Review .....	12
3.2 Desktop Assessment .....	12
3.3 Field Survey .....	12
<b>4. Existing Environment .....</b>	<b>13</b>
4.1 Vegetation Communities .....	13
4.1.1 Cumberland Plain Woodland .....	13
4.1.2 River-Flat Eucalypt Forest .....	17
4.1.3 Exotic Cover .....	17
4.1.4 Vegetation Community and Condition Assessment Area Calculations .....	19
4.2 Validated ENV Area Calculations and Identification of any Further AHCVV .....	19
4.3 Recovery Potential .....	21
4.4 Ecological Constraints Assessment .....	23
4.5 Threatened Species Habitat .....	25
<b>5. Recommendations for Indicative Layout Plan .....</b>	<b>28</b>
5.1 Recommendations for Consistency with the Biodiversity Certification Order .....	28
5.2 Zoning, Ownership and Management .....	28
<b>6. Conclusion .....</b>	<b>33</b>
<b>Appendix A Methodology .....</b>	<b>34</b>
A1 Field Survey .....	34
Survey limitations .....	34
A2 Recovery potential .....	34
A3 Ecological constraints .....	37

## List of Figures

Figure 1-1: Subject site location .....	3
Figure 2-1: Biodiversity Certification in the subject site .....	9
Figure 2-2: South West Growth Area Protected Lands from Draft Growth Centres Conservation Plan (Growth Centres Commission 2007) .....	10
Figure 2-3: ENV as per Figure 5 of the Growth Centres Conservation Plan within the subject site .....	11
Figure 4-1: Vegetation communities and condition (as assessed during field survey).....	18
Figure 4-2: ENV and AHVCC within the subject site.....	20
Figure 4-3: Recovery potential .....	22
Figure 4-4: Ecological constraints analysis, excluding the effect of biodiversity certification.....	24
Figure 4-5: Threatened species habitat and habitat features in the survey area.....	27
Figure 5-1: Proposed ILP (Urbis, 2023).....	30
Figure 5-2: Vegetation communities protected within ILP .....	31
Figure 5-3: ENV and AHCVV protected within ILP.....	32
Figure 6-1: Ecological Constraints Flowchart .....	38

## List of Tables

Table 2-1: Statutory framework and relevance to this study .....	4
Table 2-2: Strategic plans and relevance to this study .....	6
Table 4-1: Summary of Cumberland Plain Woodland (Moderate potential EPBC Act) .....	14
Table 4-2: Summary of Cumberland Plain Woodland (Moderate BC Act).....	15
Table 4-3: Summary of Cumberland Plain Woodland (Poor).....	16
Table 4-4: Validated vegetation communities present in the subject site .....	19
Table 4-5: Amount of ENV and AHCVV in subject site (ha).....	19
Table 4-6: Area of different recovery potential classes identified within the subject site. ....	21
Table 4-7: Constraints summary within the subject site.....	23
Table 4-8: Threatened fauna species likely or with the potential to occur in the subject site.....	25
Table 5-1: Amount of native vegetation proposed to be protected in ILP .....	28
Table 5-2: Potential Environmental Zones.....	28
Table 6-1: Recovery potential matrix (ELA 2003).....	35
Table 6-2: Conservation significance matrix (NSW NPWS, 2002) .....	38
Table 6-3: Decision matrix step one.....	39
Table 6-4: Decision matrix step two.....	39

## Abbreviations

Abbreviation	Description
AHCVV	Additional High Conservation Value Vegetation – vegetation meeting the requirements for ENV that was not mapped in the Growth Centres Conservation Plan
BC Act	<i>Biodiversity Conservation Act 2016</i>
CEEC	Critically Endangered Ecological Community
DCCEEW	Department of Climate Change, Energy, Environment and Water
DCP	Development Control Plan
DotEE	Department of the Environment and Energy (now DCCEW)
DPIE	Department of Planning, Industry and Environment
ELA	Eco Logical Australia Pty Ltd
ENV	Existing Native Vegetation, as defined in the Growth Centres Conservation Plan
EP&A Act	<i>NSW Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
IPC & AES	Ian Perkins Consultancy Services and Aquila Ecological Surveys
MNES	Matters of National Environmental Significance
NPWS	NSW National Parks and Wildlife Service
OEH	NSW Office of Environment and Heritage (known now as DPIE)
TSC Act	<i>Threatened Species Conservation Act 1995</i>
TSSC	Threatened Species Scientific Committee



## Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by CKDI Bringelly Pty Ltd atf (CKDI) to undertake a Biodiversity Assessment for Precinct Planning of the Belmore Road Precinct. The aim of this report is to identify key ecological constraints to assist design of an Indicative Layout Plan (ILP).

Biodiversity Certification of the Growth Centres Conservation Plan identifies a regional offsets package, effectively facilitating the strategic loss of ecological values on ‘certified lands’ without triggering further assessment under the former *Threatened Species Conservation Act 1995* (TSC Act). This strategic loss is offset through the retention and management of areas of higher ecological value across the Growth Centres and through a levy that will be used to protect and manage areas of high ecological value outside of the Growth Centres. A Strategic Assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was approved by the Commonwealth (Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), now referred to as the department of Climate Change, Energy, Environment and Water (DCCEEW). Therefore, provided development proceeds in accordance with the Growth Centres Biodiversity Certification Order, the assessment and approval of threatened species and endangered ecological communities under Commonwealth legislation is not required.

The site was found to contain several significant environmental features, including Cumberland Plain Woodland (a critically endangered ecological community under both the *Biodiversity Conservation Act 2016* (BC Act) and EPBC Act), River-Flat Eucalypt Forest (an endangered ecological community under the BC Act and a critically endangered ecological community under the EPBC Act) and habitat features associated with potential habitat for several threatened flora and fauna species.

Approximately 34.55 ha of vegetation in the precinct was identified in the Draft Growth Centres Conservation Plan 2007. Desktop assessment and field survey validated 24.98 ha of previously identified Existing Native Vegetation (ENV) and identified 33.87 ha of Additional High Conservation Value Vegetation (AHCVV).

The Belmore Road Precinct is mostly biodiversity certified. Under the Draft Growth Centres Conservation Plan, no ENV within the study area was counted towards achieving the 2,000-hectare conservation outcome. 1.58 ha of AHCVV was identified within non-biodiversity certified land.

The vegetation on site does however have high biodiversity value and Precinct Planning has therefore considered opportunities to protect vegetation where possible, particularly where synergies with riparian protection and improved amenity can be achieved. The ILP will protect 8.73 ha of Cumberland Plain Woodland and 0.60 ha of River-flat Eucalypt Forest within the proposed ‘Riparian Corridor’. Note this does not include areas proposed as ‘Raingardens’ as it is understood that these areas will be cleared and re-planted with wetland species that will be able to withstand regular inundation. Further, an additional 8.18 ha of the canopy layer of Cumberland Plain Woodland will be protected within the proposed ‘Open Space (Tree Retention)’ areas, of which 1.37 ha is within non-biodiversity certified land. This equates to 4.36 ha of validated ENV and 4.71 ha of validated AHCVV being protected within the proposed ‘Riparian Corridor’ (not including the area proposed as ‘Raingardens’) and the canopy layer of 4.89 ha of validated ENV and 3.28 ha of validated AHCVV within the proposed ‘Open Space (Tree Retention)’ areas, of which 1.37 ha of AHCVV is within non-biodiversity certified land.

# 1. Introduction

## 1.1 Description of the Project

Eco Logical Australia Pty Ltd (ELA) was engaged by CKDI Bringelly Pty Ltd atf (CKDI) to undertake a Biodiversity Assessment for Precinct Planning of the Belmore Road Precinct within the South-West Growth Centre.

The vision for the Belmore Road Precinct as stated by DPIE includes ‘...a Green Grid linking growing suburbs, rehabilitating waterways, and providing recreation and community areas. This Green Grid, along with the protection of key biodiversity areas, riparian corridors, and innovative integrated water cycle management will assist in the delivery of the GSC’s vision for a green, cool, parkland city’.

The aim of this assessment is to identify key ecological features and constraints of the site to inform the rezoning process, as well as to provide recommendations with respect to terrestrial and aquatic ecosystem management.

Specific objectives of this project are to:

- Undertake a biodiversity assessment to inform the precinct planning process and development of the Indicative Layout Plan (ILP). This will involve identifying and assessing the existing ecological constraints within the Precinct. This will involve analysis of ecological values particularly regarding identifying areas of high, moderate, and low ecological value.
- Ensure the statutory requirements for the protection, restoration and enhancement of threatened species, populations, ecological communities, and their habitats will be met.
- Provide recommendations for achieving innovative and cost-effective management frameworks for ecological issues, which enable long term conservation and management while facilitating development outcomes for the Precinct identified in the South West Structure Plan.
- Ensure the precinct planning is consistent with the terms of the Biodiversity Certification granted under the State Environmental Planning Policy (Sydney Region Growth Centres) 2006
- (Sydney Region Growth Centres SEPP), which includes the Relevant Biodiversity Measures outlined in the Biodiversity Certification Order.
- Ensure that precinct planning is consistent with the endorsed Sydney Growth Centres Strategic Assessment Program under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), including the Commitments for matters of national environmental significance protected under the EPBC Act.

## 1.2 Subject Site

Figure 1-1 illustrates the broad location of the precinct (‘subject site’). The ‘survey area’ refers to the portion of the subject site that was field validated.

## 1.3 Methodology Overview

An overview of the methodology is provided below. For full details see Appendix A.

- Database search for threatened species, populations and ecological communities under the Biodiversity Conservation Act and Matters of National Environmental Significance (MNES) under the EPBC Act.
- Assessment of State and Federal statutory requirements.
- Field validation of Existing Native Vegetation (ENV), threatened species habitat condition mapping. Assessments include the identification of additional high conservation value vegetation (AHCVV).
- Assessment of biodiversity values and mapping including analysis and identification of ecological constraints.
- Desktop assessment of subject site outside of the survey area.
- Recommendations for the development.





Figure 1-1: Subject site location

## 2. Statutory Framework

A substantial array of strategic plans, legislation, policies, and guidelines apply to the planning and management of biodiversity issues within the study area. This information was reviewed and used to identify priority issues and approaches for the study area and are summarised below.

### 2.1 Statutory Framework

Table 2-1 summarises the relevant legislation and policies that apply to the study area, which are required to be considered within the Planning Proposal.

**Table 2-1: Statutory framework and relevance to this study**

Legislation / Policy	Relevance
<b>Commonwealth</b>	
<i>Environment Protection &amp; Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>The Commonwealth EPBC Act establishes a process for assessing the environmental impact of activities and developments where Matters of National Environmental Significance (MNES) may be affected. The EPBC Act lists endangered ecological communities, threatened and migratory species that have the potential to occur, or are known to occur on a site.</p> <p>On 28 February 2012, the Commonwealth Minister for the Environment announced the program of development related activities within the Growth Centres that had been approved under the Growth Centres Strategic Assessment. Specifically,</p> <p><i>“All actions associated with the development of the Western Sydney Growth Centres as described in the Sydney Region Growth Centres Strategic Assessment Program Report (Nov 2010) have been assessed at the strategic level and approved regarding their impact on the following matters of national environmental significance (MNES):</i></p> <ul style="list-style-type: none"> <li>• <i>World Heritage Properties</i></li> <li>• <i>National Heritage Places,</i></li> <li>• <i>Wetlands of International Importance,</i></li> <li>• <i>Listed threatened species, populations and communities, and</i></li> <li>• <i>Listed migratory species.”</i></li> </ul> <p>This approval essentially means that the Commonwealth is satisfied that the conservation and development outcomes that will be achieved through development of the Growth Centres Precincts will satisfy their requirements for environmental protection under the EPBC Act. Therefore, provided development activity proceeds in accordance with the Growth Centres requirements (such as the Biodiversity Certification Order, <i>the State Environmental Planning Policy (Precincts – Western Parkland City) 2021</i> (Western Parkland City SEPP), Development Control Plans (DCPs) and Growth Centres Development Code), then there is no requirement to assess the impact of development activities on MNES and hence no requirement for referral of activities to the Commonwealth. The requirement for assessment and approval of threatened species and endangered ecological communities and the other MNES issues listed above under the EPBC Act has now been ‘turned off’ by the approval of the Strategic Assessment.</p>
<b>State</b>	
<i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>In November 2016 the NSW parliament passed the BC Act. This new legislation repealed the TSC Act and took effect 25 August 2017. Among other things, the BC Act introduces new requirements for biodiversity assessment and requires proponents to offset significant biodiversity impacts through the purchase and retirement of biodiversity</p>

Legislation / Policy	Relevance
	<p>credits. The government has recently exhibited regulations that provide further detail on the changes as well as establish the transitional arrangements.</p> <p>Like the TSC Act, the BC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The BC Act is integrated with the <i>Environmental Planning and Assessment Act 1979</i> (EP&amp;A Act) and requires consideration of whether a development (Part 4 of the EP&amp;A Act) or an activity (Part 5 of the EP&amp;A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.</p> <p>The schedules of the Act list species, populations, and communities as endangered or vulnerable. New species, populations and communities are continually being added to the schedules of the BC Act. All developments, land use changes or activities need to be assessed to determine if they will have the potential to significantly impact on species, populations or communities listed under the Act.</p> <p>Biodiversity certification was introduced under the TSC Act (s.126G) to confer certification on an environmental planning instrument if the Minister is satisfied that it will lead to the overall improvement or maintenance of biodiversity values – typically at a landscape scale. Under the new BC Act, existing biodiversity certified areas remain valid following the repealed TSC Act.</p> <p>The effect of granting certification is that any development or activity requiring consent (Under Part 4 and 5 of the EP&amp;A Act) is automatically ‘development that is not likely to significantly affect threatened species’. This certification removes the need to address threatened species considerations and the test of significance (s.7.3 of the BC Act), including the preparation of Species Impact Statements (SIS) for Part 5 activities or triggering the Biodiversity Offset Scheme (BOS) for Part 4 developments.</p> <p>Biodiversity Certification has three main functions. It requires the protection of 2,000 ha of Existing Native Vegetation (ENV) within the Growth Centres; it allows for development to proceed without further biodiversity assessment at the Development Application stage on land that is ‘biodiversity certified’, and it establishes a funding mechanism for conservation outcomes outside of the Growth Centres.</p> <p>The Sydney Region Growth Centres was ‘bio-certified’ by order of the Minister for the Environment under s.126G of the TSC Act. Under the BC Act, existing biodiversity certified areas remain valid following the repealed TSC Act. The Minister’s certification was based on the overall improvement or maintenance of biodiversity values and the mechanism for achieving this is outlined in the <i>Growth Centres Conservation Plan</i> (Eco Logical Australia, 2007) and the conditions for bio-certification are documented in the Ministers order for consent.</p> <p>Areas which are currently biodiversity certified and non-biodiversity certified are shown in Figure 2-1. The study area is required to be assessed against the conditions of the Biodiversity Conservation Order to ensure that the planned rezoning and subsequent development of the study area complies.</p>

#### Environmental Planning Instruments and Other Policies

<i>State Environmental Planning Policy (Precincts – Western Parkland City) 2021</i> (Western Parkland City SEPP)	<p><b>Cumberland Plain Conservation Plan</b></p> <p>Although the study area is within land subject to the Cumberland Plain Conservation Plan, it is not within any of the respective land categories (i.e., urban capable land or non-certified land) nor is it within a Strategic Conservation Area.</p>
<i>Sydney Region Growth Centres Biodiversity Certification Order (2007)</i>	<p>Key to the assessment and protection of biodiversity values in the Sydney Region Growth Centres is the Biodiversity Certification (under the BC Act) of the Western Parkland City SEPP.</p> <p>The Biodiversity Certification has three main functions. It requires the protection of 2,000 ha of existing native vegetation with the Growth Centres; it allows for development to</p>



Legislation / Policy	Relevance
	<p>proceed without further biodiversity assessment at the Development Application (DA) stage on land that is 'biodiversity certified', and it establishes a funding mechanism for conservation outcomes outside of the Growth Centres.</p> <p>To achieve the 2,000-ha protection target, each precinct must protect the 'existing native vegetation' on non-biodiversity certified land, or an equivalent amount on certified land.</p> <p>The (Draft) Growth Centres Conservation Plan (2007) assessed native vegetation across the entire Growth Centres area (Figure 2-2) and identified Existing Native Vegetation (ENV), defined as areas of indigenous trees (including mature and saplings) that:</p> <ul style="list-style-type: none"> <li>• Had 10 % or greater over-storey canopy cover present, Were <math>\geq 0.5</math> ha in area, and</li> <li>• Were identified as "vegetation" on maps 4 and 5 of the (Draft) Growth Centres Conservation Plan, at the time the biodiversity certification order took effect, subject to condition 13.</li> </ul> <p>The majority of the study area is biodiversity certified as shown in Figure 2-1. The draft ENV mapped within the precinct is also shown in Figure 2-3, which shows that there was no 'existing native vegetation on non-certified land' within the precinct and therefore no vegetation within the precinct contributes to the 2,000-ha target.</p> <p>Clause 13 of the biodiversity-certification details the ground-truthing requirements for ENV; namely, if new information becomes available after the biodiversity certification order took effect that demonstrates that the vegetation within an area does not otherwise meet the definition of existing native vegetation, then for the purposes of conditions 7-8 and 11-12 only the area of validated existing native vegetation shall be considered.</p>

## 2.2 Strategic Plans

Table 2-2 summarises the relevant strategic assessments that apply to the study area, which should be considered within the Planning Proposal.

**Table 2-2: Strategic plans and relevance to this study**

Strategic Plan	Biodiversity / Sustainability Objectives
The Greater Sydney Region Plan, <i>A Metropolis of Three Cities</i> (Greater Sydney Commission, 2018)	<p>The Greater Sydney Region Plan, <i>A Metropolis of Three Cities</i> (Greater Sydney Commission, 2018) is built on a vision of three cities where most residents live within 30 minutes of their jobs, education and health facilities, services, and great places. To meet the needs of a growing and changing population the vision seeks to transform Greater Sydney into a metropolis of three cities:</p> <ul style="list-style-type: none"> <li>• The Western Parkland City.</li> <li>• The Central River City.</li> <li>• The Eastern Harbour City.</li> </ul> <p>The Plan includes directions and objectives for liveability and sustainability, productivity, and infrastructure within Greater Sydney, including two sustainability objectives, which are most relevant to this study, being:</p> <ul style="list-style-type: none"> <li>• biodiversity is protected, urban bushland and remnant vegetation is enhanced;</li> <li>• urban tree canopy cover is increased; and</li> <li>• the Green Grid links parks, open spaces, bushland and walking and cycling paths.</li> </ul> <p>The Plan is supported by five District Plans, which provide greater details regarding conservation objectives, including the Western Sydney District Plan.</p>
Our Greater Sydney 2056 – Western Sydney District Plan	<p>The Western Sydney District Plan is a 20-year plan to manage economic, social, and environmental growth and provides a guide for implementing the Greater Sydney Region Plan at a district level. The Plan outlines two relevant sustainability planning priorities,</p>

Strategic Plan	Biodiversity / Sustainability Objectives
(Greater Sydney Commission, 2018)	<p>which coincide and build on the objectives listed within the Greater Sydney Region Plan, being:</p> <ul style="list-style-type: none"> <li>• protecting and enhancing bushland and biodiversity; and</li> <li>• increasing urban tree canopy cover and delivering Green Grid connections.</li> </ul>
<p>Greener Places - An Urban Green Infrastructure Design Framework for New South Wales (Government Architect NSW, 2020) and Draft Greener Places Design Guide (Government Architects NSW, 2020)</p>	<p>Greener Places is a design framework to guide the planning, design, and delivery of green infrastructure in urban areas across NSW. It aims to create a healthier, more liveable, and sustainable urban environment by improving community access to recreation and exercise, supporting walking, and cycling connections and improving the resilience of urban areas.</p> <p>The Draft Greener Places Design Guide framework provides information on how to design, plan, and implement green infrastructure in urban areas throughout NSW. The draft guide provides a consistent methodology to help State and local government, and industry create a network of green infrastructure. This study focuses on one of the three major components of the green infrastructure network, being bushland and waterways.</p> <p>Five key strategies have been developed to connect, protect, restore, enhance, and create urban habitat as an integral part of how urban areas are planned, constructed, and maintained, which include:</p> <ul style="list-style-type: none"> <li>• protect and conserve ecological values;</li> <li>• restore disturbed ecosystems to enhance ecological value and function;</li> <li>• create new ecosystems;</li> <li>• connect people to nature; and</li> <li>• connect urban habitats.</li> </ul>
<p>The Cumberland Plain Conservation Plan – A Conservation Plan for Western Sydney to 2056 (DPE, 2022)</p>	<p>The Cumberland Plain Conservation Plan identifies strategically important biodiversity areas within the Cumberland subregion to offset the biodiversity impacts of future urban development, while ensuring a vibrant and liveable city.</p> <p>Like the Sydney Region Growth Centres, The Plan has been developed to meet requirements for strategic biodiversity certification under the BC Act and strategic assessment under the EPBC Act.</p> <p>The Plan is part of the NSW Government’s commitment to delivering the Western Parkland City, consistent with the Greater Sydney Commission’s strategic vision described in its <i>Greater Sydney Region Plan: A Metropolis of Three Cities</i> and Western City District Plan. It will protect the region’s threatened plants and animals and support the needs of the community through the creation of new conservation lands and green spaces close to homes. The Plan will achieve this through a conservation program that includes 26 commitments and 131 actions designed to improve ecological resilience and protect biodiversity.</p> <p>The Conservation Program highlights include:</p> <ul style="list-style-type: none"> <li>• Identify 4,510 ha of high biodiversity land in the nominated areas to be avoided from development through upfront strategic conservation planning and apply development controls to these areas to minimise future impacts on biodiversity.</li> <li>• Protect, in perpetuity, a minimum of 5,325 ha of impacted native vegetation communities within a conservation land and up to 11,900 ha of conservation land to deliver in-perpetuity biodiversity outcomes, improve ecological resilience and connectivity, and increase the area of green space and reserves for the community to enjoy.</li> <li>• Secure important koala movement corridors by establishing the Georges River Koala Reserve and install up to 120 km of koala-exclusion fencing and a safe crossing at Appin Road to protect koalas from increasing threats such as vehicle strike and dog attacks.</li> <li>• Prioritise and investigate the establishment of 2 new reserves in the Wollondilly and Hawkesbury local government areas – Gulguer Reserve Investigation Area</li> </ul>

Strategic Plan	Biodiversity / Sustainability Objectives
	<p>and Confluence Reserve Investigation Area – and encourage landholders to enter into biodiversity stewardship agreements in areas such as Razorback.</p> <ul style="list-style-type: none"><li>• Undertake ecological restoration of threatened ecological communities to reconstruct over-cleared vegetation types</li></ul> <p>It is noted that the Plans certification order excludes parts of Western Sydney that overlap with the South West Growth Area, including the subject site</p>



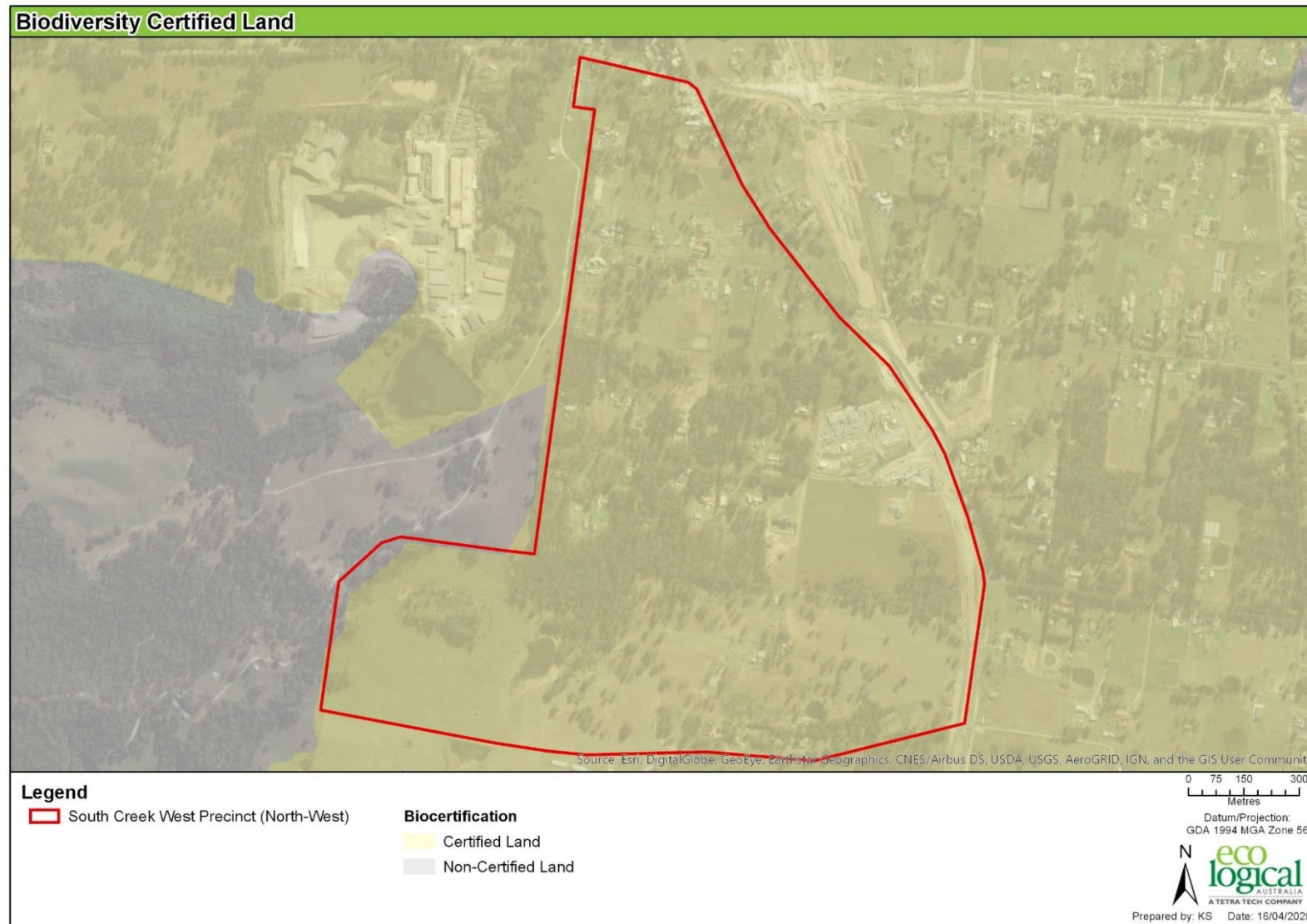


Figure 2-1: Biodiversity Certification in the subject site

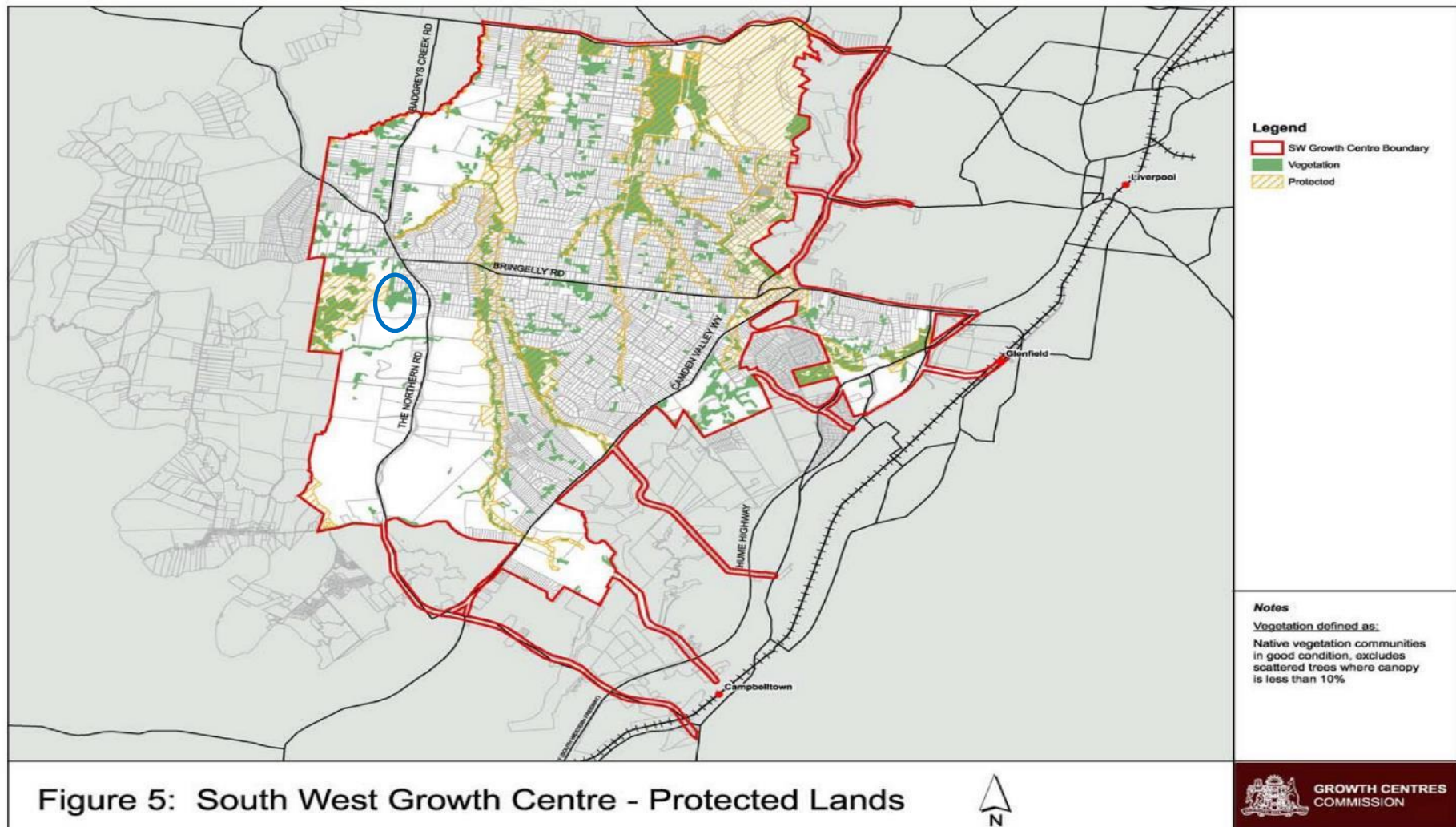


Figure 2-2: South West Growth Area Protected Lands from Draft Growth Centres Conservation Plan (Growth Centres Commission 2007)





Figure 2-3: ENV as per Figure 5 of the Growth Centres Conservation Plan within the subject site

## 3. Methods

### 3.1 Literature Review

A desktop literature review was undertaken by ELA to determine the location and extent of previous surveys, identify the constraints within the subject site and evaluate the presence of any threatened species, populations and ecological communities listed under the BC Act and the Commonwealth EPBC Act that could potentially occur within the subject site. The following documentation and mapping were reviewed:

- Aerial photography of the subject site
- NSW Atlas of Wildlife Database (5 km radius)
- EPBC Act online Protected Matters Search Tool (5 km radius)
- Native Vegetation Maps of the Cumberland Plain – Interpretation Guidelines (DECC, 2000b)
- Draft 'Growth Centres Conservation Plan' prepared by Eco Logical Australia (2007) for NSW Growth Centres Commission
- Office of Environment and Heritage (2013) vegetation mapping.

### 3.2 Desktop Assessment

The northern portion of the subject site was not field validated. Where land access was not available, the OEH 2013 Vegetation map was updated based on aerial photo interpretation. Vegetation mapping was edited to removed portions mapped over buildings.

A desktop assessment was conducted to determine the following:

- Potential vegetation communities
- Potential for patches of vegetation to meet the definition of AHCVV or ENV
- Potential threatened species habitat
- Potential constraints and recovery potential

### 3.3 Field Survey

Where accessible, vegetation was ground-truthed over one day by two ecologists in March 2020 and again in October 2020. The survey area is shown in Figure 1-1 as 'Field-validated'. A basic floristic survey of the precinct was undertaken to confirm the vegetation communities present, including their condition and extent. This survey included classification of native vegetation communities in accordance with the DPIE profiles (2020b) and the Commonwealth conservation and listing advice (where relevant).

A detailed methodology can be found in Appendix A.

## 4. Existing Environment

### 4.1 Vegetation Communities

Two vegetation communities were identified within the subject site through desktop assessment and field survey:

- Cumberland Plain Woodland in the Sydney Basin Bioregion / Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest
- River Flat Eucalypt Forest.

The northern portion of the site has been subdivided and settled in rural lots. Whilst a native tree canopy characteristic of Cumberland Plain Woodland exists throughout, the vegetation has generally been under-scrubbed and cleared. The southern portion of the site has been managed as agricultural land with large, cleared areas and exotic pasture, which has reduced the structural and species diversity of some areas of remaining vegetation. Some large portions of the site are comprised of remnant patches of Cumberland Plain Woodland.

Figure 4-1 illustrates the extent of each vegetation community within the subject site as well as vegetation that has been cleared. The characteristics of each vegetation community, conservation significance and ecological condition are summarised below.

#### 4.1.1 Cumberland Plain Woodland


Cumberland Plain Woodland in the Sydney Basin Bioregion is a critically endangered ecological community under the BC Act and part of the CEEC listed under the EPBC Act.

Cumberland Plain Woodland is an open eucalypt woodland with an open shrub layer and grassy ground cover and is commonly found on clay-loam soils derived from the Wianamatta shale. This community is restricted to the Cumberland Plain in the Sydney region and typically contains *Eucalyptus moluccana* (Grey Box), *E. tereticornis* (Forest Red Gum), with *E. crebra* (Narrow-leaved Ironbark), *E. eugenioides* (Thin-leaved Stringybark) and *Corymbia maculata* (Spotted Gum) occurring less frequently. The midstorey is comprised of *Bursaria spinosa* (Blackthorn). Typical groundcover species include *Dichondra repens* (Kidney Weed), *Aristida vagans* (Threeawn Speargrass), *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Themeda triandra* (Kangaroo Grass), *Brunoniella australis* (Blue Trumpet), *Desmodium varians* (Slender Tick-trefoil), *Opercularia diphylla*, *Wahlenbergia gracilis* (Sprawling Bluebell) and *Dichelachne micrantha* (Shorthair Plumegrass).

Field survey and desktop assessment identified Cumberland Plain Woodland throughout the subject site. Cumberland Plain Woodland within the survey area was observed in three conditions, each detailed in Table 4-1, Table 4-2 and Table 4-3 below.



**Table 4-1: Summary of Cumberland Plain Woodland (Moderate potential EPBC Act)**

PCT 3320: Cumberland Shale Plains Woodland	
Condition	Moderate (Potential EPBC Act Condition)
Area (ha)	15.66
Corresponding TEC	Cumberland Plain Woodland in the Sydney Basin Bioregion (BC Act) Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (EPBC Act)
BC Act Status	Critically Endangered
EPBC Act Status	Critically Endangered
EPBC Act Condition	Potential. Vegetation Integrity (VI) plots would need to be completed to determine whether the groundcover would consistently meet 30% native groundcover.
Description	Three patches of Cumberland Plain Woodland in this condition were identified within the southern half of the survey area. These patches were characterised by a canopy dominated by <i>Eucalyptus tereticornis</i> (Forest Red Gum) and <i>Eucalyptus moluccana</i> (Grey Box). The midstorey was dominated by <i>Olea europaea</i> subsp. <i>cuspidata</i> (African Olive) and scattered occurrences of <i>Bursaria spinosa</i> . The groundcover was dominated by native species including <i>Paspalidium distans</i> , <i>Sporobolus creber</i> (Western Rat-tail Grass), <i>Glycine tabacina</i> and <i>Einadia nutans</i> (Climbing Saltbush).
Photo	



**Table 4-2: Summary of Cumberland Plain Woodland (Moderate BC Act)**

Cumberland Plain Woodland	
Condition	Moderate (BC Act condition only)
Area (ha)	6.82
Corresponding TEC	Cumberland Plain Woodland in the Sydney Basin Bioregion (BC Act) Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (EPBC Act)
BC Act Status	Critically Endangered
EPBC Act Status	Critically Endangered
EPBC Act Condition	No. Cumberland Plain Woodland in poor condition did not meet condition thresholds because < 30% of the perennial understorey vegetation cover** is made up of native species.
Description	One patch of Cumberland Plain Woodland in moderate condition was present near the southern and western boundary of the survey area. Cumberland Plain Woodland in this condition contained an assemblage of native species, including a canopy dominated by <i>Eucalyptus tereticornis</i> (Forest Red Gum) and <i>Eucalyptus moluccana</i> (Grey Box). The midstorey included <i>Bursaria spinosa</i> (Blackthorn), <i>Lycium ferocissimum</i> (African Boxthorn) and <i>Olea europaea</i> subsp. <i>cuspidata</i> (African Olive), or absent. The groundcover was dominated by native species including <i>Microlaena stipoides</i> (Weeping Grass), <i>Aristida vagans</i> (Three-awn Speargrass), <i>Glycine tabacina</i> and <i>Einadia nutans</i> (Climbing Saltbush).


Photo



\* A PATCH IS DEFINED AS A DISCRETE AND CONTINUOUS AREA THAT COMPRISES THE ECOLOGICAL COMMUNITY.

\*\* PERENNIAL UNDERSTOREY VEGETATION COVER INCLUDES VASCULAR PLANT SPECIES OF THE GROUND AND SHRUB LAYERS WITH A LIFECYCLE OF MORE THAN TWO GROWING SEASONS. COVER EXCLUDES ANNUALS, CRYPTOGAMS, LEAF LITTER OR EXPOSED SOIL.

**Table 4-3: Summary of Cumberland Plain Woodland (Poor)**

Cumberland Plain Woodland	
Condition	Poor
Area (ha)	19.60
Corresponding TEC	Cumberland Plain Woodland in the Sydney Basin Bioregion (BC Act) Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (EPBC Act)
BC Act Status	Critically Endangered
EPBC Act Status	Critically Endangered
EPBC Act Condition	No.  Cumberland Plain Woodland in poor condition did not meet condition thresholds because < 30% of the perennial understorey vegetation cover** is made up of native species. It is noted that this patch adjoins the Moderate (EPBC Act) patch of CPW. In accordance with the EPBC Act Condition Thresholds, this patch should then be considered as Moderate (EPBC Act) condition. However, there was a distinct difference in condition between these two patches and joining the two together would decrease the overall conditions, such that the entire patch would not be considered to meet the EPBC Act condition threshold.
Description	Cumberland Plain Woodland in poor (BC Act) condition was scattered throughout the survey area. Cumberland Plain Woodland in this condition contained an assemblage of canopy and occasional midstorey species like that of the ecological community in good (BC Act) condition. However, Cumberland Plain Woodland in poor (BC Act) condition was characterised by the dominance of exotic groundcover species including <i>Cenchrus clandestinus</i> (Kikuyu Grass), <i>Chenopodium album</i> (Fat Hen) and <i>Chloris gayana</i> (Rhodes Grass). Native species were also present in the groundcover, including <i>Einadia polygonoides</i> , <i>Portulaca oleracea</i> (Pigweed) and <i>Glycine tabacina</i> . Rural lots containing poor condition Cumberland Plain Woodland also contained a mix of planted native and exotic horticultural species, including <i>Callistemon citrinus</i> (Crimson Bottlebrush), <i>Strelitzia</i> sp. (Bird of Paradise) and <i>Agave americana</i> (Century Plant).
Photo	

\* A PATCH IS DEFINED AS A DISCRETE AND CONTINUOUS AREA THAT COMPRISES THE ECOLOGICAL COMMUNITY.

\*\* PERENNIAL UNDERSTOREY VEGETATION COVER INCLUDES VASCULAR PLANT SPECIES OF THE GROUND AND SHRUB LAYERS WITH A LIFECYCLE OF MORE THAN TWO GROWING SEASONS. COVER EXCLUDES ANNUALS, CRYPTOGAMS, LEAF LITTER OR EXPOSED SOIL.

#### 4.1.2 River-Flat Eucalypt Forest

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is listed as an endangered ecological community under the BC Act and critically endangered ecological community under the EPBC Act.

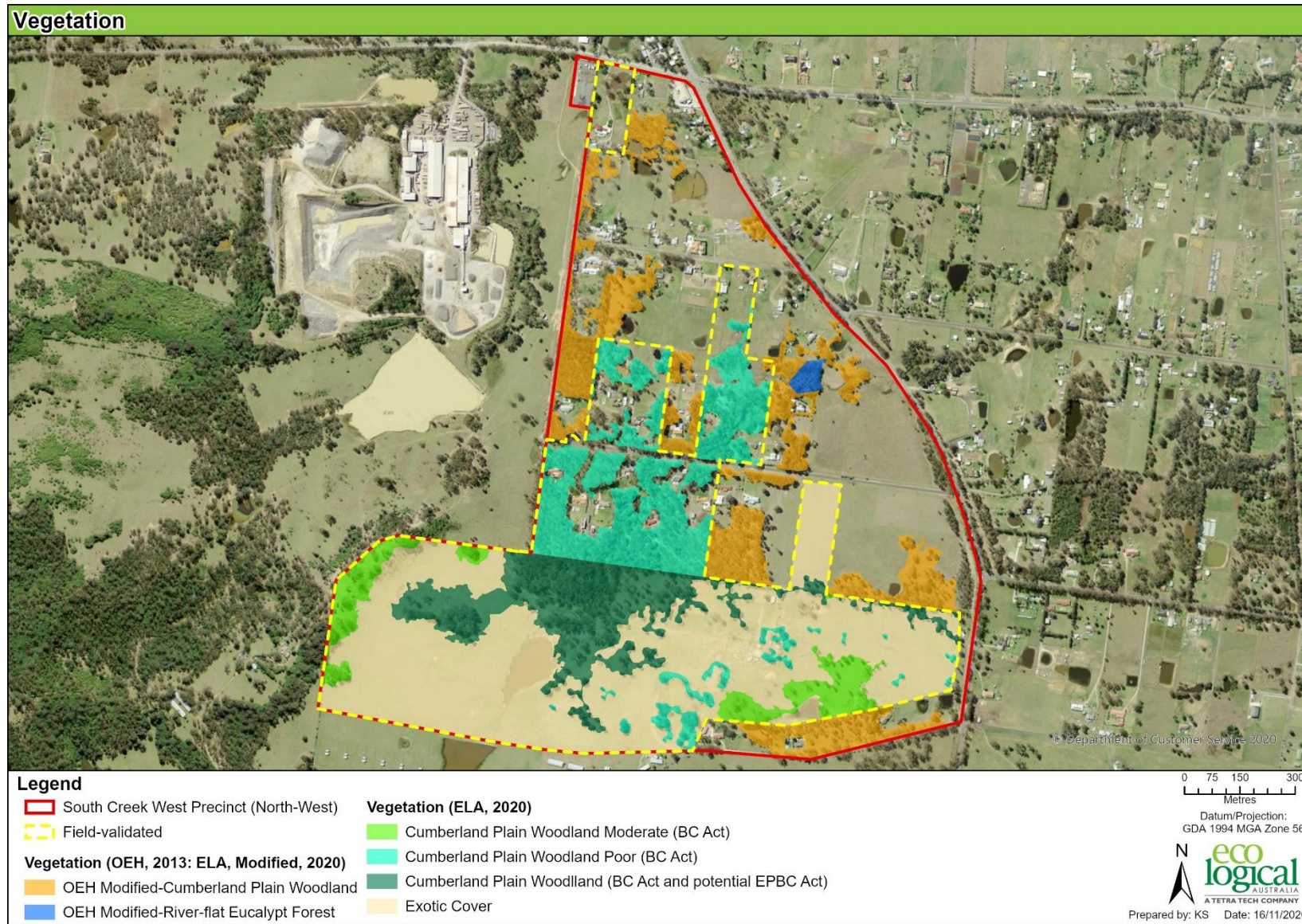
The canopy of this ecological community is typically comprised of *Eucalyptus tereticornis* (Forest Red Gum), *E. amplifolia* (Cabbage Gum) and *Angophora floribunda* (Rough-barked Apple) (DPIE 2020b). The mid-storey contains *Acacia parramattensis* subsp. *parramattensis* (Parramatta Wattle), *Casuarina glauca* (Swamp Oak) and *Melaleuca linariifolia* (Flax-leaved Paperbark). Common groundcover species include *Microlaena stipoides* (Weeping Grass), *Oplismenus aemulus* (Basket Grass), *Dichondra spp.*, *Entolasia marginata* (Bordered Panic), *Solanum prinophyllum* (Forest Nightshade), *Pratia purpurascens* (Whiteroot), *Echinopogon ovatus* (Forest Hedgehog Grass), *Desmodium gunnii* (Slender Tick Trefoil), *Commelina cyanea*, *Veronica plebeia* (Creeping Speedwell).

Desktop assessment identified River-Flat Eucalypt Forest throughout the northern portion of the subject site.

#### 4.1.3 Exotic Cover

This vegetation occurred in cleared/open grassed areas and primarily consisted of exotic pasture grasses including *Paspalum dilatatum* (Paspalum), *Cenchrus clandestinus* (Kikuyu) and *Setaria parviflora* (Pigeon Grass). Exotic cover does not form part of a native ecological community.





**Figure 4-1: Vegetation communities and condition (as assessed during field survey)**

#### 4.1.4 Vegetation Community and Condition Assessment Area Calculations

Area calculations of each vegetation community within the subject site are provided in Table 4-4 and Figure 4-1. The vegetation on site is dominated by Cumberland Plain Woodland and cleared land. The subject site contains 64.07 ha of Cumberland Plain Woodland and 0.60 ha of River-Flat Eucalypt Forest. This patch would need further assessment using vegetation integrity plots to determine whether it meets EPBC Act condition.

**Table 4-4: Validated vegetation communities present in the subject site**

Vegetation Community	Condition	Area (ha)
Cumberland Plain Woodland	Moderate (BC Act and potential EPBC Act)	15.66
Cumberland Plain Woodland	Moderate (BC Act)	6.82
Cumberland Plain Woodland	Poor (BC Act)	19.60
Cumberland Plain Woodland	Desktop Assessment	21.98
<b>Sub-Total</b>		<b>64.07</b>
River-Flat Eucalypt Forest	Desktop Assessment	0.60
<b>Total</b>		<b>64.67</b>

#### 4.2 Validated ENV Area Calculations and Identification of any Further AHCVV

Desktop aerial photo analysis and field survey was undertaken to validate the extent of the mapped 'Existing Native Vegetation' to confirm whether it still existed. This process resulted in the following classifications:

- Validated Existing Native Vegetation
- Additional High Conservation Value Vegetation: Vegetation which meets criteria a) and b) of the definition of ENV (i.e., a 10% of greater canopy cover and a patch size of greater than 0.5 ha) but was not mapped in the original conservation plan. This is a combination of mapping inaccuracies in the original mapping or changes to the condition and size of the vegetation on site since the Conservation Plan map production.

As most of the site is currently biodiversity certified, the 'existing native vegetation' on the site was not counted as a contribution to the 2,000-ha target for the Growth Centres. Areas of ENV and AHCVV within the subject site are presented in Table 4-5 and Figure 4-2.

**Table 4-5: Amount of ENV and AHCVV in subject site (ha)**

	Certified Land	Non-Certified Land	Total
Mapped ENV in Draft Conservation Plan	36.13	0	<b>36.13</b>
Validated ENV	24.98	0	<b>24.98</b>
Validated Additional Native Vegetation (AHCVV)	32.50	1.37	<b>33.87</b>



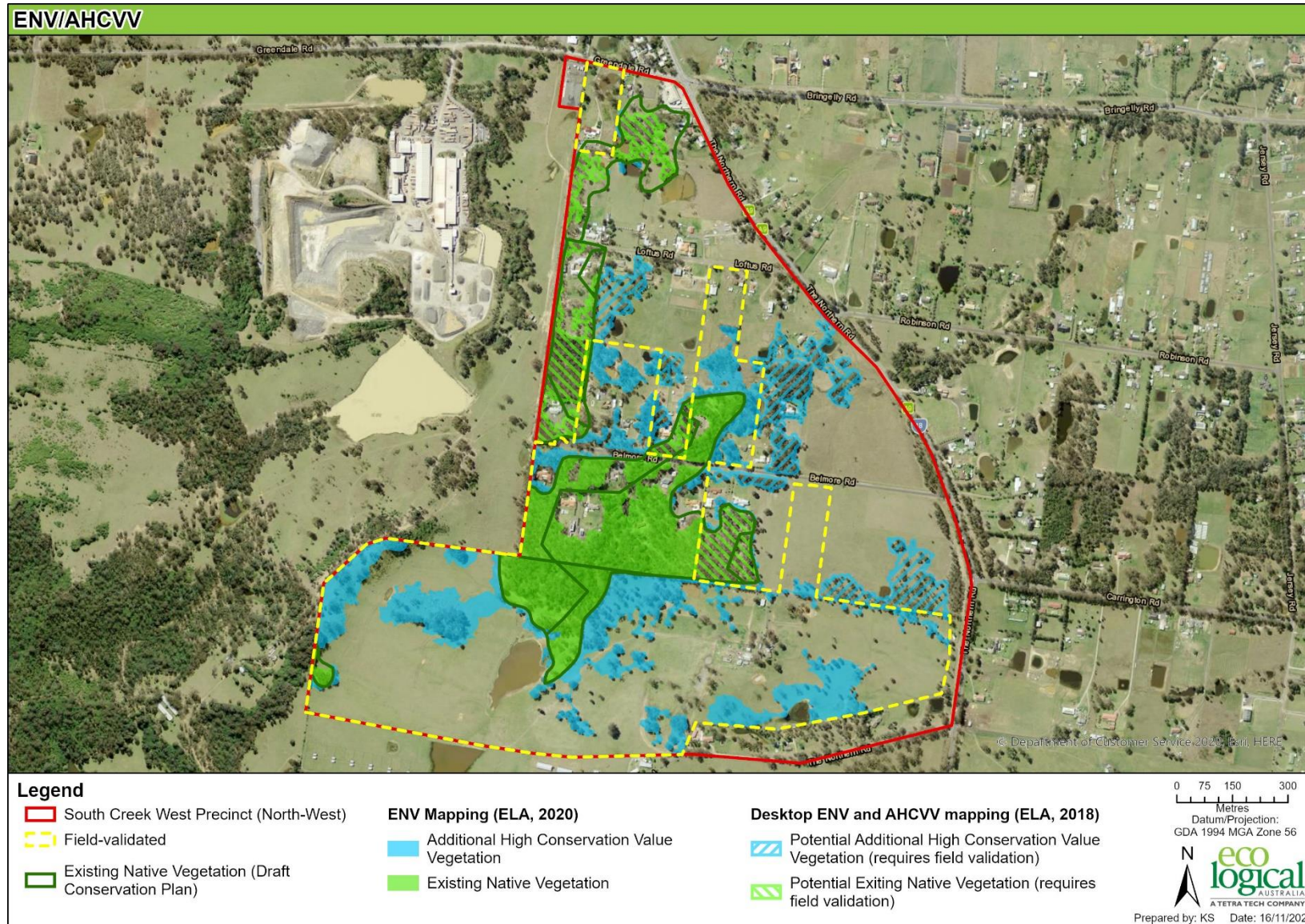


Figure 4-2: ENV and AHCVV within the subject site



### 4.3 Recovery Potential

Recovery potential relates to the ability of the land to be managed for an improvement in the condition of the remnant vegetation and to increase linkages (wildlife corridor) between extant stands of vegetation. Identifying areas of recovery potential is consistent with the aims of the BC Act; to protect and encourage the recovery of threatened species, populations and communities listed under the Act.

With appropriate management actions, areas identified as having a moderate recovery potential would improve the condition of threatened species habitat and ecosystem connectivity within the precinct. Management actions would need to be on-going and facilitate the natural regeneration of the over-storey and/or regeneration of native species (grasses, herbs, and forbs) in the seed bank.

Three classes of recovery potential have been identified within the precinct which has been informed by the assessments (desktop and field) conducted in this report. Where land access was not available, the OEH 2013 Vegetation map was used to inform classification. The four classes are shown in Figure 4-3 and are described below:

- **High Recovery Potential:** Native vegetation mapped as areas that meet the definition of ENV or AHCVV which generally have native canopy cover of greater than 10% and contained native species in each structural layer.
- **Moderate Recovery Potential:** Other areas of native vegetation with some canopy, less structural complexity, and a higher level of weed infestation or ongoing disturbance.
- **Low Recovery Potential:** Areas which show some potential for natural regeneration. Some native species present in some structural layers, very high level of weed infestations, not all structural layers present.
- **Very Low Recovery Potential:** All other areas including cleared and heavily cultivated and/or pasture improved areas.

Area calculations of each recovery potential class within the subject site are presented in Table 4-6.

**Table 4-6: Area of different recovery potential classes identified within the subject site.**

Recovery potential class	Area (ha)
High	45.05
Moderate	21.02
Low	1.49
Very Low	119.75

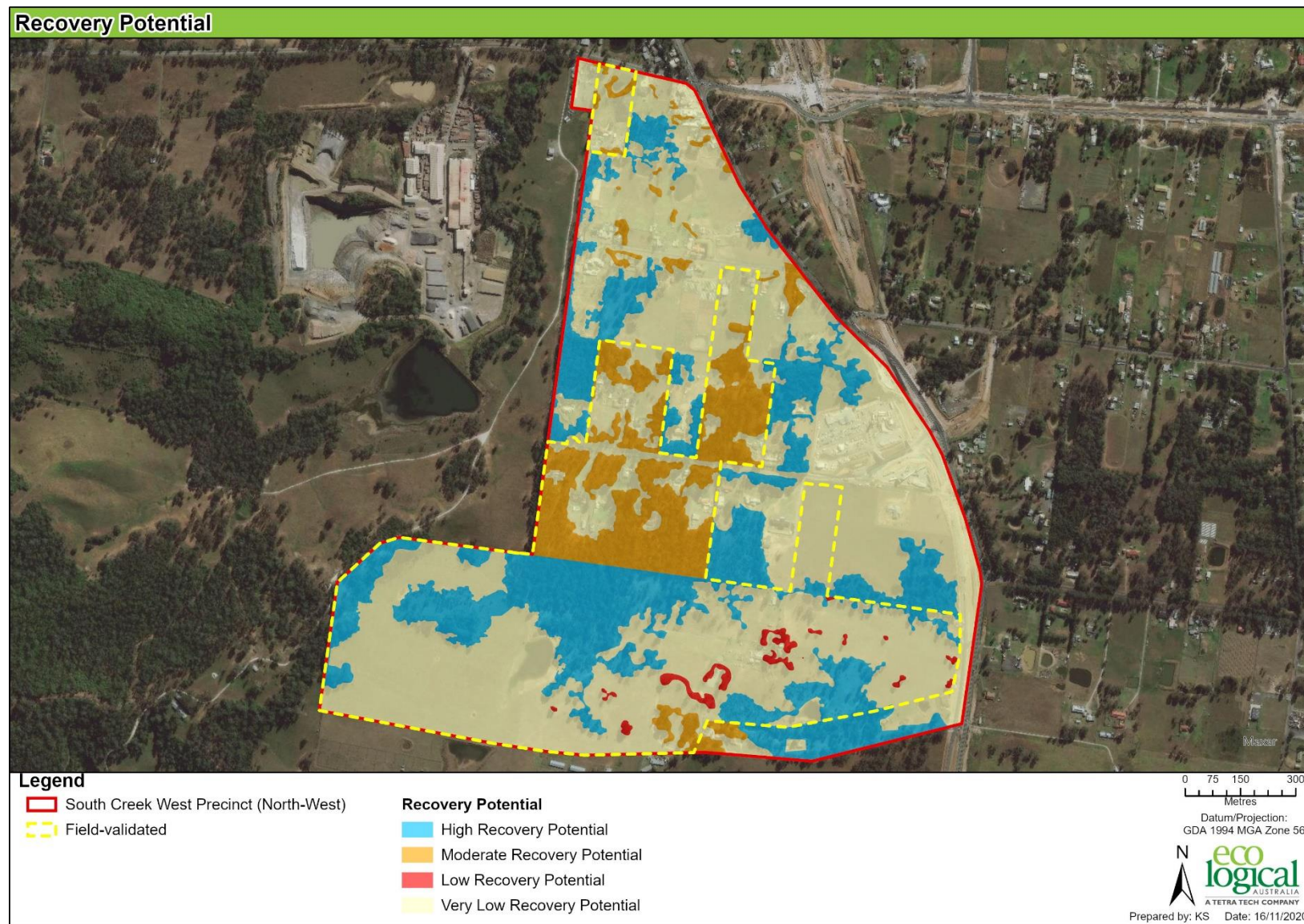


Figure 4-3: Recovery potential

#### 4.4 Ecological Constraints Assessment

An ecological constraint ranking was derived applying an amended methodology that has been used elsewhere in Western Sydney (see Appendix A of this report). This method combines size, condition, connectivity, and recovery potential into a single ecological constraint value. The results of this analysis are in Table 4-7 and Figure 4-4. Most of the vegetation is ranked as having high biodiversity value by virtue of it being Endangered or Critically Endangered Ecological Community. These constraints are based on ecological values and do not take account of the Biodiversity Certification Order which shows that the site is partially biodiversity certified under the BC Act.

Broadly the rankings are as follows:

- **High Constraint:** High ecological value, relatively large areas of good quality, well connected vegetation.
- **Moderate Constraint:** Moderate ecological value, smaller areas of good quality vegetation or large areas of poorer quality vegetation.
- **Low Constraint:** Low ecological value, areas infested with weeds and exotics, with a low recovery potential or completely cleared or developed.

**Table 4-7: Constraints summary within the subject site**

Ecological constraint	Area (ha)
High	62.66
Moderate	5.26
Low	119.39



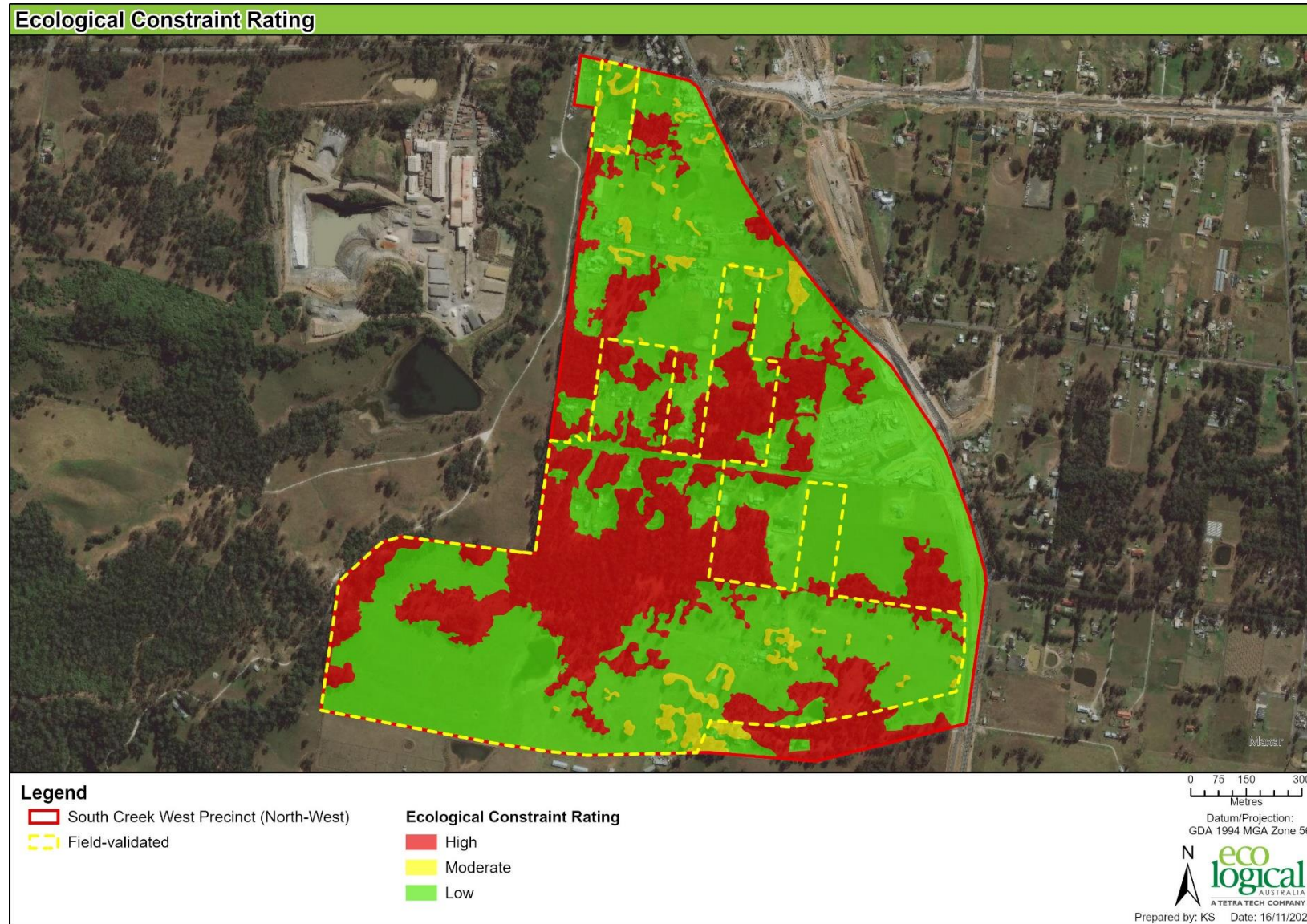


Figure 4-4: Ecological constraints analysis, excluding the effect of biodiversity certification

## 4.5 Threatened Species Habitat

The following threatened flora species are associated with Cumberland Plain Woodland and were therefore identified as having the potential to occur within the subject site (Table 4-8):

- *Grevillea juniperina* subsp. *juniperina* (Juniper-leaved Grevillea), listed as vulnerable under the BC Act
- *Marsdenia viridiflora* subsp. *viridiflora* (Native Pear), listed as an endangered population under the BC Act
- *Pimelea spicata* (Spiked Rice-flower), listed as endangered under the BC Act and EPBC Act.

Habitat features for several threatened fauna species were identified within the survey area during field survey. These species have also been recorded within 5 km of the subject site (DPIE 2020a). The species and the habitat features relevant to them are presented in Table 4-8 and Figure 4-5.

**Table 4-8: Threatened fauna species likely or with the potential to occur in the subject site.**

Scientific Name	Common Name	BC Status	Act	EPBC Status	Act	Habitat Features
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		-		The subject site contained open eucalypt woodland and farmland adjoining woodland.
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		-		The subject site contained open eucalypt woodland.
<i>Glossopsitta pusilla</i>	Little Lorikeet	V		-		The subject site contained open eucalypt woodland and riparian areas.
<i>Haliaeetus leucogaster</i>	White-bellied Eagle	Sea- V		-		The subject site contained open eucalypt woodland and riparian areas.
<i>Hieraaetus morphnoides</i>	Little Eagle	V		-		The subject site contained open eucalypt woodland and riparian areas.
<i>Lathamus discolor</i>	Swift Parrot	E		CE		Native canopy in the survey area was dominated by <i>Eucalyptus tereticornis</i> , a favoured feed tree of this species. .
<i>Meridolum corneovirens</i>	Cumberland Land Snail	Plain E		-		Leaf litter was present at the base of trees within Cumberland Plain Woodland.
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V		-		The survey area contained hollow bearing trees and intact sections of native vegetation.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V		-		The subject site contained intact sections of native vegetation.
<i>Myotis macropus</i>	Southern Myotis	V		-		The survey area contained hollow bearing trees and intact sections of native vegetation.
<i>Ninox strenua</i>	Powerful Owl	V		-		The subject site contained intact sections of native vegetation.

Scientific Name	Common Name	BC Status	Act	EPBC Status	Act	Habitat Features
<i>Phascolarctos cinereus</i>	Koala	V		V		The survey area contained favoured feed tree species <i>Eucalyptus tereticornis</i> and <i>Angophora floribunda</i> .
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V		V		The subject site contained intact sections of native vegetation.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V		-		The subject site contained hollow bearing trees and intact sections of native vegetation.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		-		The subject site contained hollow bearing trees and intact sections of native vegetation.

V = VULNERABLE, E = ENDANGERED, CE = CRITICALLY ENDANGERED, - = NOT LISTED





Figure 4-5: Threatened species habitat and habitat features in the survey area

## 5. Recommendations for Indicative Layout Plan

### 5.1 Recommendations for Consistency with the Biodiversity Certification Order

No vegetation in this precinct counted towards the 2,000-ha target for the Growth Centres. However, the precinct does contain Cumberland Plain Woodland and River-Flat Eucalypt Forest in varying conditions, the protection of which would enhance biodiversity outcomes within the precinct and the broader growth centres. The precinct contains a total of 33.87 ha of native vegetation that meets the definition of AHCVV and 24.98 ha of previously mapped ENV.

Riparian habitat throughout the site was predominantly good and included areas of Cumberland Plain Woodland, therefore it is recommended that riparian zones be improved throughout the precinct. Riparian habitat and proposed management strategies is further discussed within the Belmore Road Precinct Riparian Assessment (ELA, 2023).

Table 5-1 outlines the amount of threatened ecological communities and validated ENV and AHCVV that will be protected through the proposed ILP, as depicted in Figure 5-1, Figure 5-2 and Figure 5-3.

**Table 5-1: Amount of native vegetation proposed to be protected in ILP**

		Within Precinct (ha)	Protected Riparian	within Corridor (ha)	Protected Space (Tree Retention) (ha)	Open	Percentage Retained
Cumberland Woodland	Plain	64.07	8.73		8.18 (canopy only)		26.39% (of which 12.77% is canopy only)
River-flat Forest	Eucalypt	0.60	0.60		0.00		100%
Validated ENV		24.98	4.36 (of which was not validated)	0.33 ha field	4.89 (of which not field validated)	0.90 ha was	37.03% (of which 19.58% is canopy only)
Validated AHCVV		33.87	4.71 (of which was not validated)	2.38 ha field	3.28 (of which not field validated)	0.13 ha was	23.59% (of which 9.68% is canopy only)

### 5.2 Zoning, Ownership and Management

Areas of ENV that are to be protected have generally been zoned E2 in other Precinct Plans. In some instances, the Precinct Plan has allowed ENV to be protected via a Recreation zone or an Infrastructure zone, however this has generally been where they were also placed in public ownership and conservation of the ENV was a clear priority for the site. The permissible uses within the E2 zone are shown below.

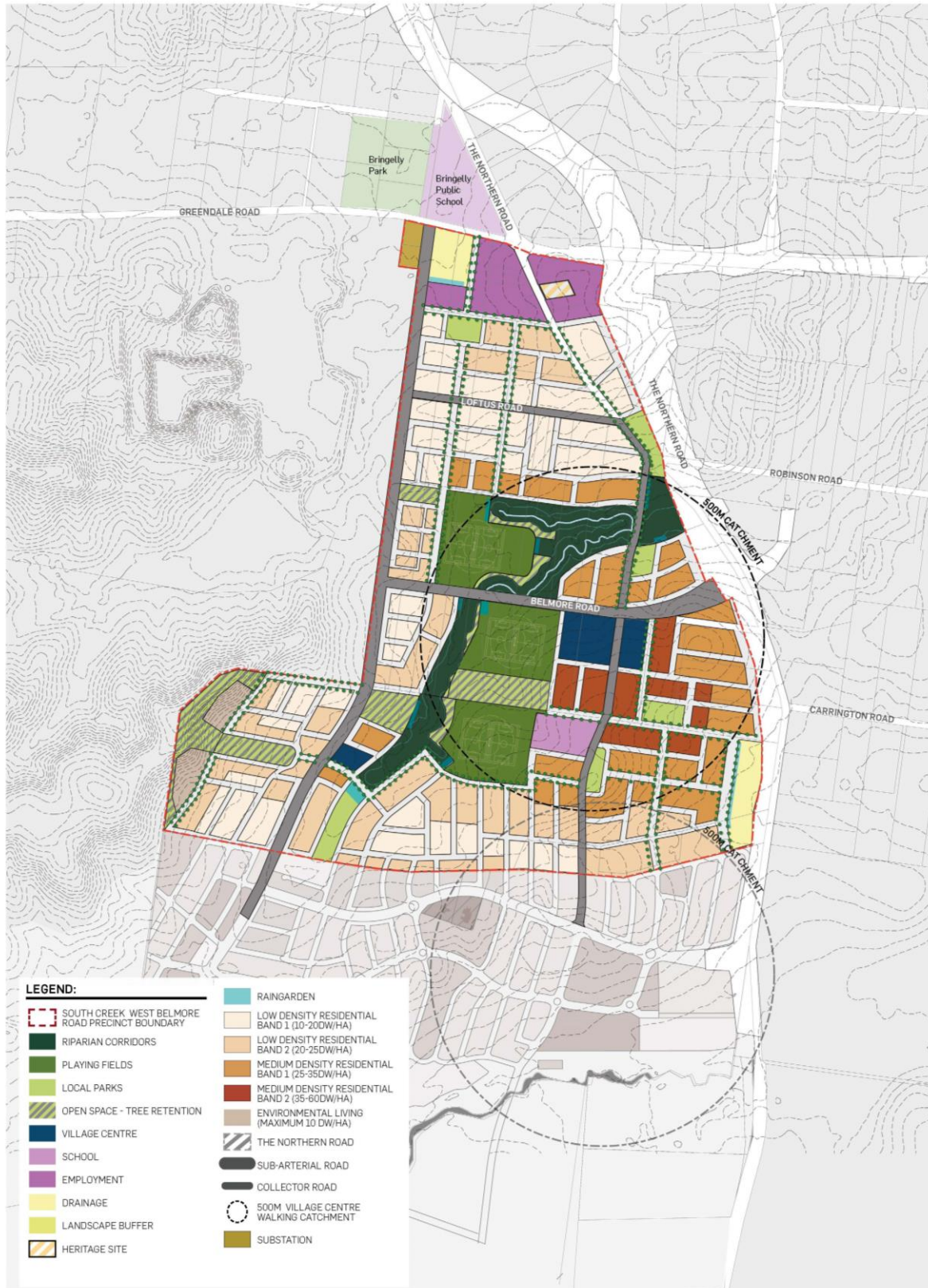
**Table 5-2: Potential Environmental Zones**

Zone	Permitted without consent	Permitted with consent	Prohibited
E2 Environmental Conservation	Nil	Drainage; Environmental Environmental protection works; Flood mitigation works; Information and education facilities; Kiosks;	Earthworks; facilities; protection works; Information facilities; Kiosks; Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service

Zone	Permitted without consent	Permitted with consent	Prohibited
		Recreation areas; Roads; Signage; Waterbodies (artificial)	stations; Warehouse or distribution centres; Any development not specified in item 2 or 3

To ensure biodiversity values are maintained in the areas to be zoned C2 (or similar) management of the vegetation for a minimum of five years is recommended. This allows for weeding, planting, and maintenance in accordance with a Vegetation Management Plan.





## SOUTH CREEK WEST - BELMORE ROAD PRECINCT REVISED FINAL ILP



DATE: 05-09-2023  
JOB NO: P0030401  
DWG NO: -  
REV: H

Figure 5-1: Proposed ILP (Urbis, 2023)





Figure 5-2: Vegetation communities protected within ILP





Figure 5-3: ENV and AHCVV protected within ILP



## 6. Conclusion

The aim of this report is to identify key ecological constraints to assist design of an ILP. The site was found to contain several significant environmental features, including Cumberland Plain Woodland (a critically endangered ecological community under both the BC Act and EPBC Act) and habitat features associated with potential habitat for several threatened flora and fauna species.

The majority of the Belmore Road Precinct is biodiversity certified. A small portion within the south-west of the site is non-certified however, did not contain any vegetation identified for protection in the Draft Growth Centres Conservation Plan 2007. Therefore, the Belmore Road Precinct is not obligated to retain any areas of ENV. The precinct, however, contains a total of 33.87 ha of native vegetation that meets the definition of AHCVV (of which 1.58 ha is within non-biodiversity certified land) and 24.98 ha of previously mapped ENV therefore, providing opportunity to provide biodiversity outcomes beyond what was anticipated by the biodiversity certification by protecting native vegetation in riparian areas and their adjoining lands where possible.

The ILP will protect 8.73 ha of Cumberland Plain Woodland and 0.60 ha of River-flat Eucalypt Forest within the proposed 'Riparian Corridor'. Note this does not include areas proposed as 'Raingardens' as it is understood that these areas will be cleared and re-planted with wetland species that will be able to withstand regular inundation. Further, an additional 8.18 ha of the canopy layer of Cumberland Plain Woodland will be protected within the proposed 'Open Space (Tree Retention)' areas, of which 1.37 ha is within non-biodiversity certified land. This equates to 4.36 ha of validated ENV and 4.71 ha of validated AHCVV being protected within the proposed 'Riparian Corridor' (not including the area proposed as 'Raingardens') and the canopy layer of 4.89 ha of validated ENV and 3.28 ha of validated AHCVV within the proposed 'Open Space (Tree Retention)' areas, of which 1.37 ha of AHCVV is within non-biodiversity certified land.

## Appendix A Methodology

### A1 Field Survey

Field survey was conducted by ELA ecologists Alex Gorey and Carolina Mora. The survey area was traversed using the random meander method (Cropper 2003) and focused on the following:

- Classification of vegetation not previously mapped as ENV
- Identification of additional high conservation value vegetation (AHCVV),
- Identification of condition of native vegetation
- An assessment of habitat significance for threatened flora and fauna species
- Hollow bearing tree (HBT) identification
- Incidental sightings of flora and fauna.

When vegetation community boundaries differed to those previously mapped or were not previously mapped, they were documented using digital maps. Floristic summaries were composed for areas of vegetation not previously mapped to determine the type of native vegetation community (where applicable) and to assess the condition of the vegetation. Occurrences of Cumberland Plain Woodland were assessed against the EPBC Act listing advice.

The presence of threatened fauna species identified as having potential to occur in the survey area was determined through a habitat assessment. Where important habitat features, such as hollow bearing trees, rocky outcrops, deep leaf litter, waterways or abandoned buildings were observed, their location was noted. Hollow bearing trees, where present were marked spatially using a handheld GPS unit.

#### Survey limitations

This assessment was not intended to provide an inventory of all species present across the survey area but instead an overall assessment of its ecological values. The survey was conducted with an emphasis on threatened species, threatened ecological communities and key fauna habitat features. It is important to note that some species may not have been detected within the survey area during the inspection as they may be cryptic or seasonal and only detectable during flowering or during breeding. In this case the likelihood of their occurrence has been assessed based on the presence of potential habitat.

The field survey was undertaken using hand-held GPS units. It should be noted that these units can have errors in accuracy of up to 20 m (subject to availability of satellites on the day).

### A2 Recovery potential

Using information collected in the field ‘recovery potential’ is determined for each area of vegetation. This is defined as “the anticipated capacity of (an) area to recover to a state representative of its condition prior to the most recent disturbance event” (IPC & AES 2002). Table 6-1 outlines the decision rules used in this step, resulting in a ranking of High, Moderate, Low or Very Low recovery potential for each vegetation remnant.

Table 6-1: Recovery potential matrix (ELA 2003)

Current Condition and Land Use	Past Land Use and Disturbance	Soil Condition	Vegetation	Recovery Potential
Cleared (no woodland canopy). Includes <i>Bursaria</i> thickets in grassland	Recently cleared (<2 years)	Unmodified or largely natural. Uncultivated.	Native dominated	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Low
	Historically cleared (>2 years) and consistently managed as cleared.	Unmodified or largely natural. Uncultivated.	Native dominated	Moderate
			Exotic dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Very Low
Wooded/Native Canopy present or regenerating	No recent clearing of understorey	Unmodified or largely natural. Uncultivated.	Native understorey relatively intact or in advanced state of regeneration. Native dominated.	High
			Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Moderate
			Exotic dominated	Low
		Moderately modified by long term grazing or mowing.	Native dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Very Low
			Native understorey present. Heavily weed invaded.	Low
	Understorey patchily intact	Disturbed	Native dominated	Moderate
			Exotic dominated	Low
	Recent clearing of understorey and or native understorey significantly	Unmodified or largely natural. Uncultivated.	Native dominated. If no vegetation present, assume native dominated.	High



Current Condition and Land Use	Past Land Use and Disturbance	Soil Condition	Vegetation	Recovery Potential
	structurally modified due to existing land use (e.g. Mowing, grazing).		Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native dominated	Low
			Exotic dominated	Very Low

### A3 Ecological constraints

An ecological constraints analysis based on a methodology previously used by ELA elsewhere in Western Sydney was applied across the survey area. An ecological constraints analysis is a stepped analysis of the environmental values of an area. It provides a combined measure of ecological values and is increasingly used as a basis for negotiations over locations, types, and densities of land development. It includes measurement of:

- The legislative status of vegetation communities.
- the structural condition of vegetation remnants.
- type and severity of disturbance and associated recovery potential.
- connectivity between remnants on and off site.
- the size of the vegetation remnant.
- the value of the remnant as threatened species habitat.

Vegetation mapping is combined with field survey work, threatened species assessment, recovery potential and the NPWS (2002) conservation significance assessment methodology to determine the relative level of ecological value or constraint across a site.

Information derived from the recovery potential, conservation significance and threatened species calculations are combined to determine ecological constraint. The process for combining this information is detailed in Figure 6-1, Table 6-2, Table 6-3 and Table 6-4.

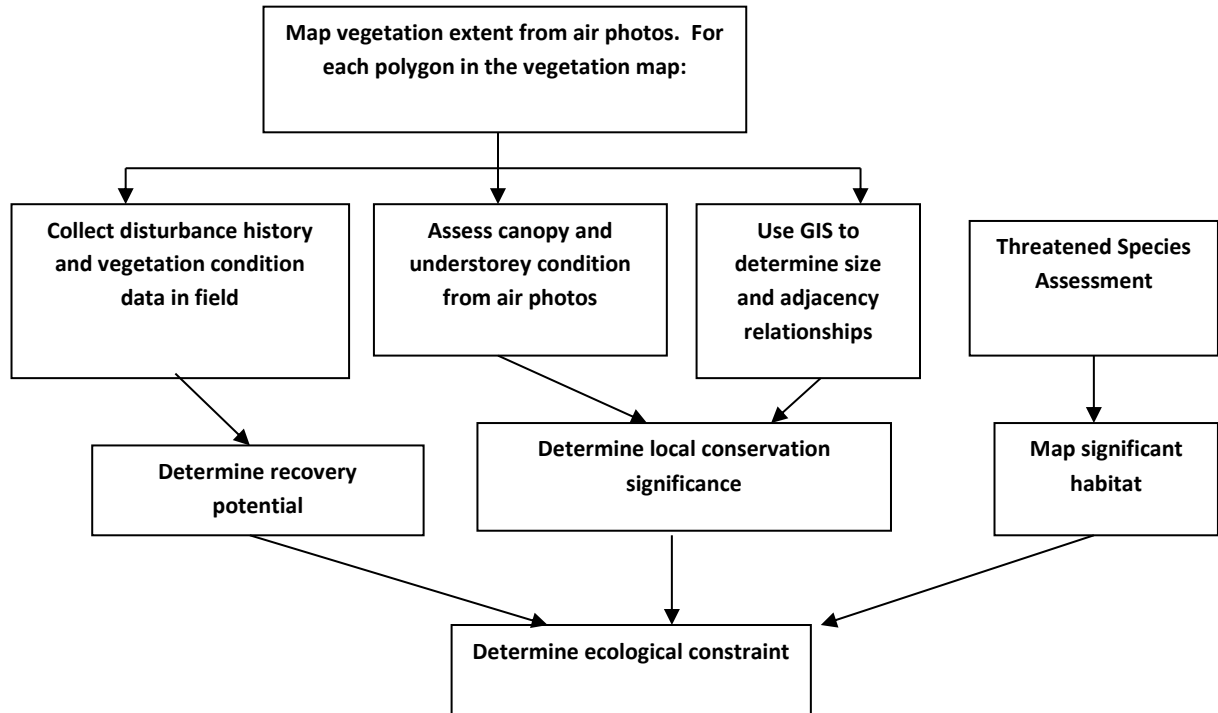


Figure 6-1: Ecological Constraints Flowchart

Table 6-2: Conservation significance matrix (NSW NPWS, 2002)

Community Type	Condition Code	Patch Size <sup>^</sup>	Connectivity	Code	Conservation Significance
Endangered Ecological Community (Critically endangered) (CEEC)	ABC, TX or Txr	Any	Any	C3	Core
	Txu	Any	Any	URT	Urban remnant trees (critically endangered communities)
Endangered Ecological Community (EEC)	ABC (with Understorey in good or moderate condition)	> 10 ha or < 10 ha	Any	C1	Core
			Adjacent to C1 or CEEC	C2	Core
			Adjacent to S1	S2	Support for core
			None	O	Other remnant vegetation
	TX or Txr, ABC (with poor Understorey condition)	Any	Adjacent to any Core	S1	Support for core
			None	O	Other remnant vegetation
	Txu	Any	Any	O	Other remnant vegetation

<sup>^</sup> PATCH SIZE IS BASED ON A 15M ADJACENCY ANALYSIS



**Table 6-3: Decision matrix step one**

Recovery Potential					
Conservation Significance		High	Moderate	Low	Very Low
	Core	High	High	High	High
	Support for core	High	Moderate	Moderate	Low
	Other	Moderate	Moderate	Low	Low

**Table 6-4: Decision matrix step two**

Combined Recovery Potential and Conservation Significance (result of Table above)				
Threatened Species Assessment		High	Moderate	Low
	Known (High)	High	High	High
	Likely (Moderate)	High	Moderate	Moderate
	Nil (Low)	High	Moderate	Low

