IPART

Independent Pricing and Regulatory Tribunal
New South Wales

Appendix C13

Network Operator and Retail Supplier Licence
Water Industry Competition Act 2006 (NSW)

Application
Kyeema Wastewater Pty Ltd

November 2019

Table C13 Development consents and determinations

Has the scheme been dealt with under either Part 3A (now repealed), Part 4 or Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act)? Refer to section 3.2 and Appendix C of the Guidance Document to inform your answer to this question.

Provide details of all relevant details in Appendix C13.

The subdivision of Lots 1 and 2 DP 850916 and installation of a sewage treatment plant was assessed and approved under Part 4 of the *Environmental Planning and Assessment Act 1979* by Yass Valley Council. The development applications included the details of the sewage treatment plant and its associated supporting documentation. Including:

- *Kyeema Subdivision: Sewage Management Plan* dated 18 January 2019
- *Subdivision of 4056-4078 Gundaroo Road, Gundaroo NSW Biodiversity Management Plan* dated March 2019
- *Land Capability Assessment* dated July 2018
- *Statement of Environmental Effects* dated January 2019

All listed documents, along with the associated maps and development application form were publically exhibited prior to Yass Valley Council making their final determination on the applications.

The proposed Sewage Treatment Plant is located on Lot 5 DA1850902 which is prescribed RU1 Primary Production. The Sewage Treatment Plant is permissible in the prescribed zone RU1 Primary Production (Clause 105) under the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP).

It is proposed to utilise Clause 106(2) of the Infrastructure SEPP to allow for the creation of the sewage treatment plant.

Environmental approvals summary table

Infrastructure Component	Part 3A applicable?	Part 4 consent required or given?	Part 5 applicable?
Reticulated Sewage System	No	Yes	No – development consent was required under Part 4
Sewage Treatment Plant	No	No - development consent is not required Clause 106(2) of the Infrastructure SEPP as the land where the Sewage Treatement Plant is located is prescribed zone RU1 Primary Production.	Yes – development consent is not required Clause 106(2) of the Infrastructure SEPP as the land where the Sewage Treatement Plant is located is prescribed zone RU1 Primary Production.

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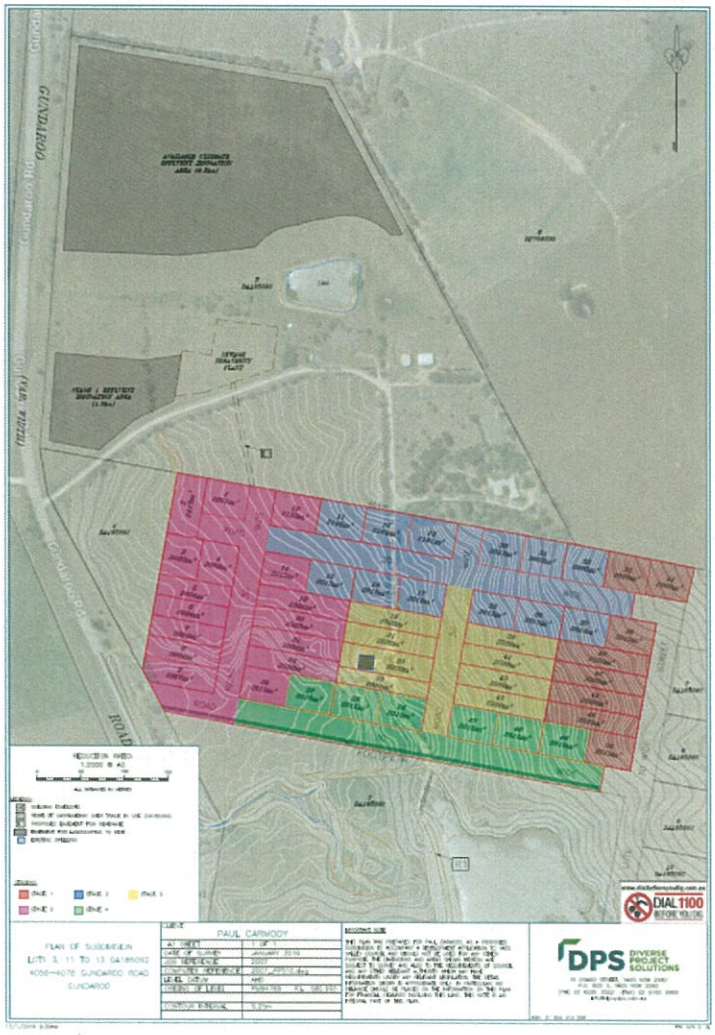
DEVELOPMENT APPLICATION

YASS VALLEY COUNCIL

PROJECT: Subdivision of Lots 3, 5, 11, 12 & 13 DA185092
(Lots 1 & 2 DP850916)
4056 & 4078 Gundaroo Road, Gundaroo



REF: 2007_YVC2_Cover
January 2019

Prepared for Paul Carmody

DPS

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Telephone 02 6226 3322
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Email info@dpsyass.com.au
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18th January 2019

Our Ref: 2007_YVC4

The General Manager
Yass Valley Council
PO Box 6
YASS NSW 2582

Attention: Mr Chris Berry

Dear Sir,

DEVELOPMENT APPLICATION

PROJECT: Subdivision of Lots 1 and 2 DP850916
4056 & 4078 Gundaroo Road, Gundaroo

We act on behalf of our client, Paul Carmody, who wishes to subdivide the above properties into fifty lots in the zone R2 Low Density Residential.

In support of this application we enclose the following:

1. Signed Development Application form
2. Statement of Environmental Effects, reference 2007_SEE2
3. One (1) copy of the Plan of Proposed Subdivision, reference 2007_PPS10
4. The Client is aware of the Yass Valley Council's Development Application fees, upon receiving payment advice this will be forwarded to the client for payment.

We recommend this proposed subdivision to Council and await advice on Council's determination of the application.

Please call this office if you have any queries on the above.

Yours Faithfully
DPS YASS Pty Ltd

.....
Jamie Bush
Project Surveyor

yass valley council

the country the people

1

Development Application Form

Part 1 – Applicant, Site and Owners Details

1. Applicants Name and Address

***An email and postal address must be provided*

Title – Mr ☒ Mrs ☐ Miss ☐ Ms ☐ Other

Family Name (or company) Carmody

Given Names (or ABN) Alan Paul

**Postal Address c/- DPS YASS

P.O. Box 5 YASS Postcode 2582

Signature of Applicant

Phone (02) 6226 3322 Mobile ( ) 0408 622 146

**Email jamie@dpsyass.com.au

Only if a company

Contact Person Jamie Reference 2007

2. Location and Title Description of the Property

We need this to correctly identify the land

Lot(s) 1 & 2 Section No ____ DP(s) 850916

3, 5, 11, 12 & 13 DA 185092

Street Address 4056 & 4078 Gundaroo Road, GUNDAROO NSW.

Attach list if insufficient space

3. Who Owns the Land?

*Please give the name of **every** owner. Attach a list if there is insufficient space.*

In signing this form the owner consents to its lodgement with Yass Valley Council.

Name Alan Paul Carmody

Address 4078 Gundaroo Road, GUNDAROO NSW

Postcode 2620.

Signature

Name Marjorie Paulene Carmody

Address 4078 Gundaroo Road, GUNDAROO NSW

Postcode 2620.

Signature

4. Site Access	In signing this Development Application form do you grant consent for Council Officers to enter upon the land the subject of the application for the purposes of assessing the proposed development? Note: In the majority of cases this will be an unannounced visit.	**Yes** ☑	**No** ☐

5. Pecuniary Interest	Does Yass Valley Council employ the applicant or is the application being submitted on behalf of an employee of Council?	**Yes** ☐	**No** ☑
	Does the applicant or owner have any relationship to the staff or Councillors of Yass Valley Council or is the application being submitted on behalf of someone who has such a relationship?	**Yes** ☑	**No** ☐
	If you have answered yes to either of the above questions you must disclose this relationship Councillor Cecil Burgess is an old business partner of the applicant.		

Part 2 – Development Details

6. What are the Present and Previous Uses of the Land?

Present use Farming

Previous known use(s) Farming

7. Type of Development

- ☐ Erection of a Dwelling House
- ☐ Erection of a Shed / Carport or Deck
- ☐ Erection of any other Building or Structure
- ☐ Construction / Installation of a Swimming Pool
- ☐ Demolition
- ☐ Earthworks
- ☑ Subdivision
- ☐ Change of Use
- ☐ Advertising Sign
- ☐ Other (Specify) _____

8. Summarise the proposed Development

If there is insufficient space please attach a written description of your proposal.

Please give a **detailed** outline of what you are proposing.

- A fifty lot Subdivision
- A Sewage Treatment Plant

If the development **includes a building** what will it be used for?

9. Are you applying for approval under Section 68 of the Local Government Act 1993	**Yes** ☐	☐ Domestic oil/fuel heater ☐ Temporary Structure ☐ Place of Public Entertainment ☐ 2nd Hand Transportable Dwelling ☐ On-Site Sewage Management System ☐ Connect to Council's sewer or water supply ☐ Other (specify) _____
	No ☑	
11. Size of Proposed Development	What is the floor area of the proposed development? Area: M²	
12. Estimated Cost of Works	Estimated Cost $ _____ *Note: The estimated cost of works must include the full cost of all materials and labour for all proposed structures, which are the subject of the application.*	
13. Staged Construction	Are you applying for development consent in stages?	**Yes** ☑ **No** ☐
	If yes, please **detail how the application will be staged:** Stage 1 – Lots 33, 34, 38, 40, 42, 44 & 46 & 50 Stage 2 – Lots 1 to 10, 14, 18, 20, 22 & 24 & 26 Stage 3 – Lots 11 to 13, 15 to 17, 30 to 32 & 35 to 37 Stage 4 – Lots 27 to 29 & 47 to 49 Stage 5 – Lots 19, 21, 23, 25, 39, 41, 43 & 45.	

Part 3 – Development Application

14. Do you want to Apply for a Development Application now?	YES ☑	NO ☐

15. The Environmental Effects of your development	Will your proposal have minimal environmental impact?	**Yes** ☑	**No** ☐
	Have you prepared a Statement of Environmental effects?	**Yes** ☑	**No** ☐
	Is your proposal likely to significantly impact on threatened species, populations, ecological communities or their habitats?	**Yes** ☐	**No** ☑
	Has a 5 Part Test been undertaken to determine if there is likely to be a significant impact? Note: If yes attach a Species Impact Statement is required to be submitted	**Yes** ☐	**No** ☑

	Is the land the subject of the application Bushfire prone? If so has a Bushfire Threat Assessment been undertaken in accordance with the provisions of Planning for Bushfire Protection 2001?	**Yes** ☐ **Yes** ☐	**No** ☑ **No** ☑
16. Will your Development Require Concurrence	Does Yass Valley Council require the concurrence of a State Agency under in order to approve the proposed development? Note: It is your responsibility to ascertain which approvals are required. Council Staff will however provide some guidance.	**Yes** ☐	**No** ☑
17. Is the proposal Designated Development?	Note: If yes an Environmental Impact Statement (EIS) will need to be submitted with your application.	**Yes** ☐	**No** ☑
18. Is your proposal an Integrated Development.	**Note: It is your responsibility to ascertain which approvals are required. Council Staff may however provide some guidance. Agencies from which you may need an approval include:** • The NSW Heritage Council under the Heritage Act 1977; • NSW Fisheries under the Fisheries Management Act 1994; • Department of Mineral Resources under the Mine Subsidence Compensation Act 1961; • NSW Department of Environment and Conservation under the National Parks and Wildlife Act 1974; • NSW Department of Environment and Conservation under the Protection of the Environment Operations Act 1997; • Roads and Traffic Authority under the Roads Act 1993; • NSW Rural Fire Service under the Rural Fires Act 1997; and • Department of Infrastructure, Planning and Natural Resources (formerly Planning NSW and DLWC) under the Water Management Act 2000. We strongly recommend that you consult with the relevant agencies prior to lodging your application.		
	Under which Act listed Above is an integrated approval required: RMS - OEH - NRAR - IPART	**Yes** ☑	**No** ☐

Office Use Only

Note: You are required to provide accurate and honest details, if not your application will be delayed and legal avenues may be pursued

Fees DA No _____	DA (T36) _____ Dwell Bond (T407) _____ Inspect (T39) _____ 2nd Hand Insp (T39)_____ Septic/Drain (T42) _____ Integrated Fee _____ Long Ser (40) _____ Concurrence Fee _____ Plan 1st (T176)_____ Other _____ Total _____ Date _____ Receipt _____ *Fees are calculated in accordance with Councils Fees and Charges which are available to view on Councils website - www.yassvalley.nsw.gov.au/fees-charges.* *After submission you will be emailed with a payment request (maximum 5 days to make payment). Assessment on your application will not commence until payment is made.*

yass valley council

the country the people

Pre-lodgement Development Application Checklist

This checklist is provided to ensure that all of the required details are submitted with your application. If you need further assistance to complete the checklist please contact Council's Development Services Section. Note: Council **will not accept** a development application unless all relevant information on the checklist is provided and the applicant signs the checklist.

No	Criteria	Applicant		Council Use Only	
		Yes	No	Yes	No
1.	Is the application form fully completed?	☑	☐	☐	☐
2.	Have all registered owners of the land (see rates notice) signed the **"OWNERS CONSENT"** section on the Development application form?	☑	☐	☐	☐
3.	Can Yass Valley Council Officers gain access to the property / development site? Do you have dogs or a locked gate? Are there any other hazards / risks that Council should be advised of?	☑	☐	☐	☐
4.	Is the description of your proposal on the development application form clear and comprehensive?	☑	☐	☐	☐
5.	Do you have a Statement of Environmental Effects to submit with the development application?	☑	☐	☐	☐
6.	Is the proposal Integrated Development?	☑	☐	☐	☐
7.	If the proposal is Designated Development do you have an Environmental Impact Statement to submit with the development application?	☐	☑	☐	☐
8.	Do you have **1 complete** set of plans and supporting information in one of the following formats: • Hard Copy *(Either A3 or A4);* or • Electronic *(Unprotected PDF Format with separate files for each type of document (ie. Architecturals, effluent report, Basix Cert etc. Where documents must be in a protected format Floor Plans need to be separated from the architectural set)*	☑	☐	☐	☐

No	Criteria	Applicant		Council Use Only	
9.	Do you have a **Site Plan(s), Floor Plans, a Section View and Elevations** or a **Subdivision Plan** that is clear, legible, drawn in ink, to scale, in the case of a building indicates how high the development is in relation to land and indicates the following information as it is applicable to the proposed development. 1. The location and size of the land; 2. Setbacks of the proposed development (clearly shown with accurate distances); 3. The contours of the land 4. All existing vegetation; 5. The location and uses of existing buildings on the land the subject of the application; 6. The location of any easements (sewer etc) 7. The location and uses of buildings on adjoining properties; 8. The location of waterways (both intermittent, permanent and dams); 9. Any changes that will be made to the level of the land through excavation or filling; 10. Parking arrangements, vehicle entry/exit points, onsite manoeuvring; 11. Indicative landscaping (including species, maturity, numbers etc) and 12. Proposed method of draining the land. Note: Where additions/alterations are proposed to an existing building – any plan submitted must show the existing building, (drawn to scale) with the alterations/additions coloured to distinguish from existing or approved structure.	**Yes** ☑	**No** ☐	Yes ☐	No ☐

No	Criteria	Applicant		Council Use Only	
10.	**Have you obtained a "BASIX Certificate" for your development?** Note: From July 1 2005 BASIX applies throughout NSW for: • New single dwellings and dual occupancy; and • New boarding houses, guest houses, hostels, lodging-houses and backpacker accommodation under 300m^2. From October 1 2006 BASIX applies throughout NSW for: • All new residential dwellings, including single dwellings, villas, townhouses and low-rise, mid-rise and high-rise developments in NSW; and • All residential alterations and additions with a value of $50,000 or more; and • Swimming pools/spas with a capacity greater than 40,000 litres. "BASIX" (the Building Sustainability Index) is a new planning tool that affects everyone building a new home. "BASIX" ensures there is the potential to save both water and energy. To get a BASIX Certificate go to www.basix.nsw.gov.au	**Yes** ☐	**No** ☑	Yes ☐	No ☐
11.	Have you submitted an application to operate an On-site Sewage Management System that is accompanied by an Effluent Report (which includes soil testing) that has been prepared by a suitably qualified and experienced person?	**Yes** ☐	**No** ☑	Yes ☐	No ☐

No	Criteria	Applicant		Council Use Only	
12.	Have you provided the following information if you are seeking approval for **Demolition:** 1. Details of the age and condition of the existing building(s); 2. Details indicating the heritage value of the building; 3. Details to indicate if the building contains asbestos products or any other potentially hazardous material; 4. The methods to be used to protect the site during demolition; and 5. A dilapidation report indicating the condition of all buildings on adjoining properties.	**Yes** ☐	**No** ☑	Yes ☐	No ☐
13.	Have you provided the following information if you are seeking approval for **Subdivision:** 1. Details of existing and proposed subdivision pattern; 2. Details of any roads to be constructed; 3. The number of lots and their areas; 4. The location of roads and access points to each proposed lot; 5. Preliminary engineering drawings showing, roads, sewers earthworks; 6. Existing and proposed ground levels; 7. Details of the location and use of any existing buildings; and 8. Details of any clearing required to facilitate the subdivision.	**Yes** ☑	**No** ☐	Yes ☐	No ☐

No	Criteria	Applicant		Council Use Only	
14.	Have you provided the following information if you are seeking approval for **Shops, Offices, Commercial or Industrial Development:** 1. Hours of operation (including deliveries); 2. Details of the type of plant and machinery to be installed and used; 3. Details of the type / size of goods to be made, stored or transported; 4. Details of loading and unloading bays; 5. Number of employees; 6. Details of any proposed signage; 7. Levels of clientele visiting site; 8. Service vehicle maneuverability; and 9. Parking arrangements, vehicle entry/exit points, onsite manoeuvring.	**Yes** ☐	**No** ☒	Yes ☐	No ☐
15.	Have you provided the following information if you are seeking approval for **Home Businesses**: 1. Hours of operation; 2. A floor plan of the business area; 3. Number of employees; 4. Levels of clientele visiting site; 5. Car parking; and 6. Details of any proposed signage.	**Yes** ☐	**No** ☒	Yes ☐	No ☐
16.	Have you provided the following information if you are seeking approval for **Advertising Structures**: 1. Size, colour, type of material proposed; 2. The position of the sign on - buildings, structures or land; 3. Elevations of the building showing the proposed signage or the sign; and 4. Details of any lighting.	**Yes** ☐	**No** ☒	Yes ☐	No ☐

Applicant's Signature 21 Jan 2019. **Date**

CSO Signature _____ **Date** _____

Council Use Only
Matters requiring attention prior to accepting application:

_____

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STATEMENT OF ENVIRONMENTAL EFFECTS

PREPARED BY:

DPS YASS PTY LTD
10 CRAGO STREET
YASS NSW 2582

PO BOX 5
YASS NSW 2582

PROJECT:	Relating to the Development Application for a 50-lot subdivision of Lots 3, 11, 12, 13 DA185092 (part of Lots 1 & 2 DP850916) and the Sewage Treatment Plant on Lot 5 DA185092, 4056 & 4078 Gundaroo Road, Gundaroo.
CLIENT:	Paul Carmody
OUR REFERENCE:	2007_SEE2
DATE:	January 2019
AUTHOR:	Joshua Laurie
SIGNATURE:	

CONTENTS

1. INTRODUCTION

This Statement of Environmental Effects has been prepared for Paul Carmody by DPS. This statement is to accompany a development application to Yass Valley Council for a 50-lot subdivision at 4056 & 4078 Gundaroo Road, Gundaroo and the associated Sewage Treatment Plant.

1.1 OWNER AND APPLICANT DETAILS

The Applicant

Paul Carmody
c/- DPS
PO Box 5
YASS NSW 2582

Contact: Jamie Bush
Phone: (02) 6226 3322
Email: jamie@dpsyass.com.au

The Owner

Alan Paul Carmody and Marjorie Paulene Carmody

4078 Gundaroo Road,
Gundaroo NSW 2620

Site Address

The subject site of this application is identified as Lots 1 and 2 DP850916, 4056 & 4078 Gundaroo Road, Gundaroo. The proposed subdivision proposes to utilise Lots 3, 5, 11, 12 and 13 of DA185092 to create fifty allotments and Sewage Treatment Plant.

Confidentiality

This document is to be treated as Commercial-in Confidential.

1.2 SITE AND LOCATION

Site Description

The subject site is located to the north of the village of Gundaroo, within the Yass Valley Local Government Area. The site is surrounded by rural residential properties to the north, south and east, Gundaroo Road to the West. We proposed to utilise subdivide Lots 3, 11, 12 and 13 DA185092 in to 50 allotments and provide a Sewage Treatment Plan on Lot 5 DA185092. The land is zoned R2 Low Density Residential and RU1 Primary Production in the Yass Valley Local Environmental Plan 2013.

Figure 1.1 demonstrates the location of the site.

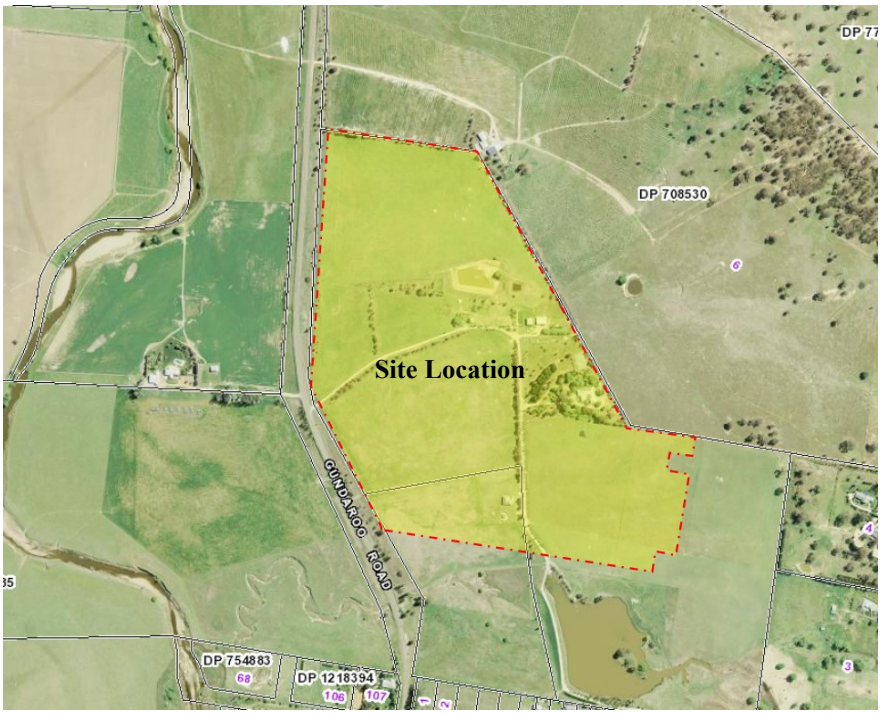

Figure 1.1 Location Map (SIX 2017)

Existing Easements and Restrictions

Lot 2 DP850916 is burdened by a Caveat.

Proposed Easements and Restrictions

- Easement for Landscaping 10 wide
- Easement for sewerage

Proposed Development

The applicant seeks Council consent for the subdivision of Lots 3, 11, 12 and 13 DA185092 (Lots 1 and 2 DP850916) into 50 lots and Lot 5 DA185092 for the purposes of the Sewage Treatment Plant. The fifty lots will all be above the 2000m2 minimum lot size required and as a result a Sewage Treatment Plant is proposed on Lot 5 DA185092 to comply with Clause 6.12 of the YVLEP. The subdivision proposes to construct 50 allotments off the Lute Street extension and proposes a new intersection from Gundaroo Road to service the proposal. The land has been used for primary production for many decades and has an existing dwelling which is proposed to remain on Lot 23.

All proposed allotments meet the minimum lot size applicable to the subject site of 2000m^2, resulting in an appropriate planning decision for the Gundaroo Village. It is intended that the proposed new roads will provide appropriate area to contain all proposed services within the road reserves. The information provided for this application is provided to Yass Valley Council for the Waste Management System. As stated in the DWC Report attached in Appendix B Council do not approve the systems, rather it is supplied to demonstrate the suitability for the 'Kyeema Subdivision.' DWC state:

'The detailed assessment and approval for construction of water industry infrastructure for Kyeema Subdivision will be co-ordinated by IPART (Independent Pricing and Regulatory Tribunal of New South Wales) under WICA (Water Industry Competition Act 2006). This SMP is provided to Council as supporting information to demonstrate that the subdivision will be serviced by a safe, sustainable and independently regulated sewage service that is consistent with planning and regulatory requirements. It also provides details on the extent of works associated with construction of the Sewerage System.'

It is expected that Council will provide comments on the proposed Sewage Treatment Plant with the assessment and licensing of the system being undertaken by IPART in accordance with the Water Industry Competition Act 2006 (WICA) following Council's conditional Consent being issued.

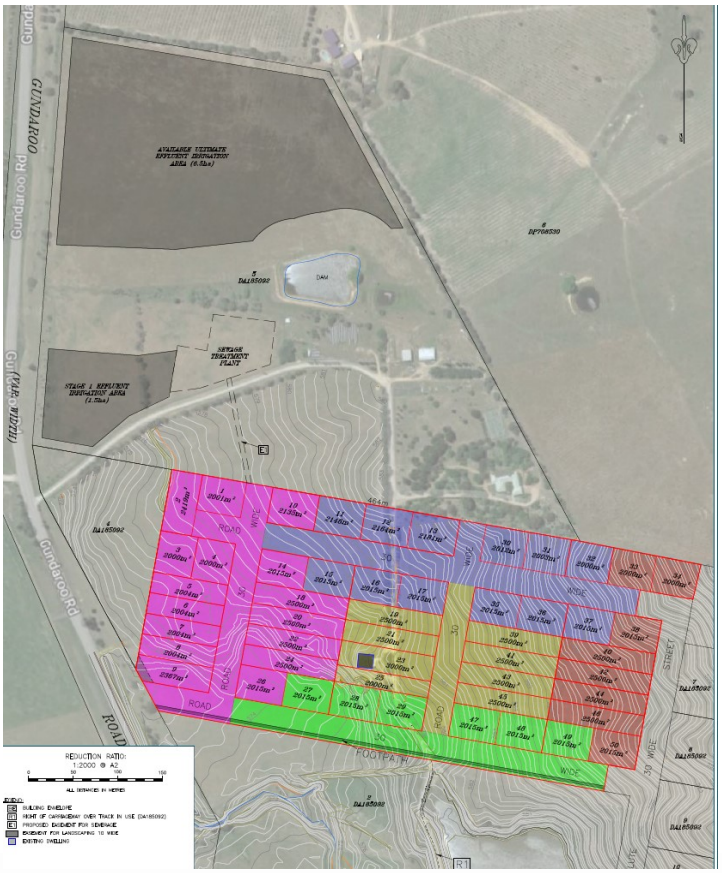

Figure 1.2 Plan of Proposed Subdivision

Proposed Staging

It is proposed to stage the development in 5 stages, as outlined below:

- Stage 1: Lots 33, 34, 38, 40, 42, 44 and 46 & 50
- Stage 2: Lots 1 to 10, 14, 18, 20, 22 and 24 & 26
- Stage 3: Lots 11 to 13, 15 to 17, 30 to 32 and 35 to 37
- Stage 4: Lots 27 to 29 and 47 to 49
- Stage 5: Lots 19, 21, 23, 25, 39, 41, 43 and 45

2. ASSESSMENT

This section deals with the proposal's consistency with the various statutory and non-statutory provisions.

2.1 ENVIRONMENTAL PLANNING INSTRUMENTS

Yass Valley Local Environmental Plan 2013

The following details the proposal against the zone objectives and clauses 4.3, 6.2 – 6.8 of the Yass Local Environmental Plan 2013 (YVLEP).

Zone R2 Low Density Residential

1. *Objectives of zone*
    - To provide for the housing needs of the community within a low-density residential environment.
    - To enable other land uses that provide facilities or services to meet the day to day needs of residents.
    - To ensure that development is provided with an adequate water supply and the disposal of sewage.
2. *Permitted without consent:*
3. Environmental protection works; Home-based child care; Home businesses; Home occupations
4. *Permitted with consent:*
5. Attached dwellings; Bed and breakfast accommodation; Boarding houses; Centre-based child care facilities; Dual occupancies; Dwelling houses; Emergency services facilities; Environmental facilities; Exhibition homes; Group homes; Home industries; Recreation areas; Respite day care centres; Roads; Signage; Water supply systems
6. *Prohibited:*
   Any development not specified in item 2 or 3

It is proposed to create 50 lots as a result of this subdivision. All proposed allotments meet the minimum lot size specified in the YVLEP 2013. The proposal offers a varied lot size and is an extension to the existing village of Gundaroo, which demonstrates the consistency of the minimum lot size within the existing village. The proposed lots range in size from 2000m^2 to 3000m^2 to ensure a flexible extension to the existing village core. The proposed subdivision utilises residential zoned land highlighted by the Gundaroo Village Master Plan and the YVLEP amendment 2017. This land is adjacent to the original village, however, has remained undeveloped.

The proposed lots are all intended for the purpose of residential lifestyles and have been designed to provide an extension to the Gundaroo village as a transitional zone from village to rural lifestyle. The intended land use for all lots satisfy the land uses are highlighted in the YVLEP and the Gundaroo Village Master Plan 2017.

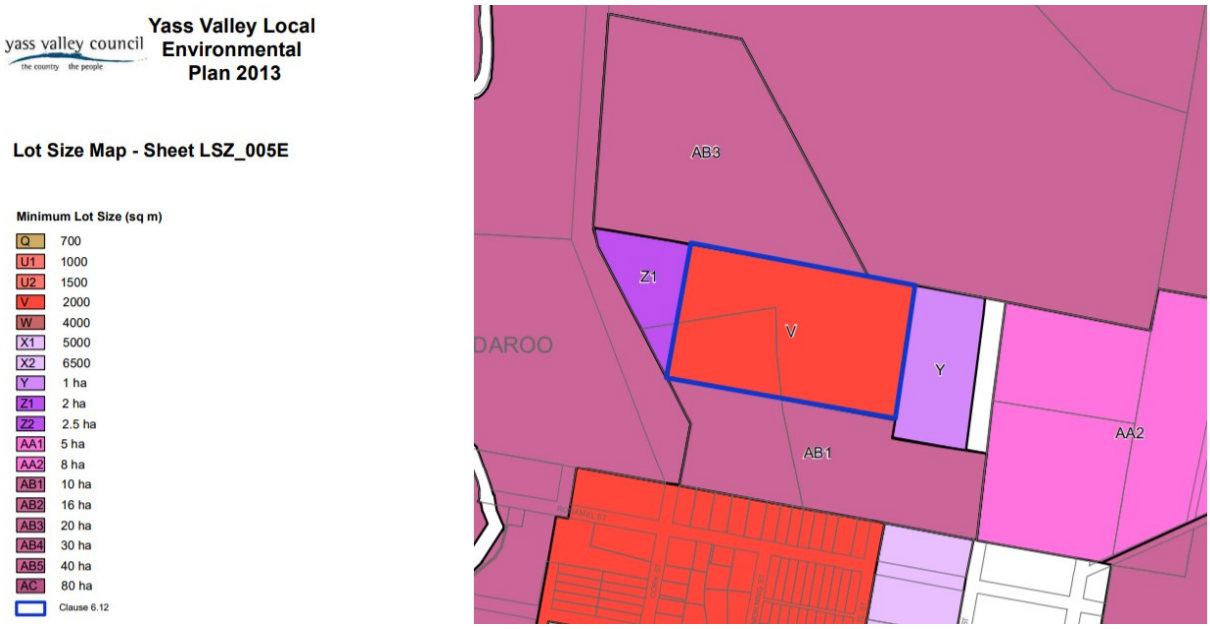

Figure 1.4 Plan of Lot Size Map (LSZ_005E)

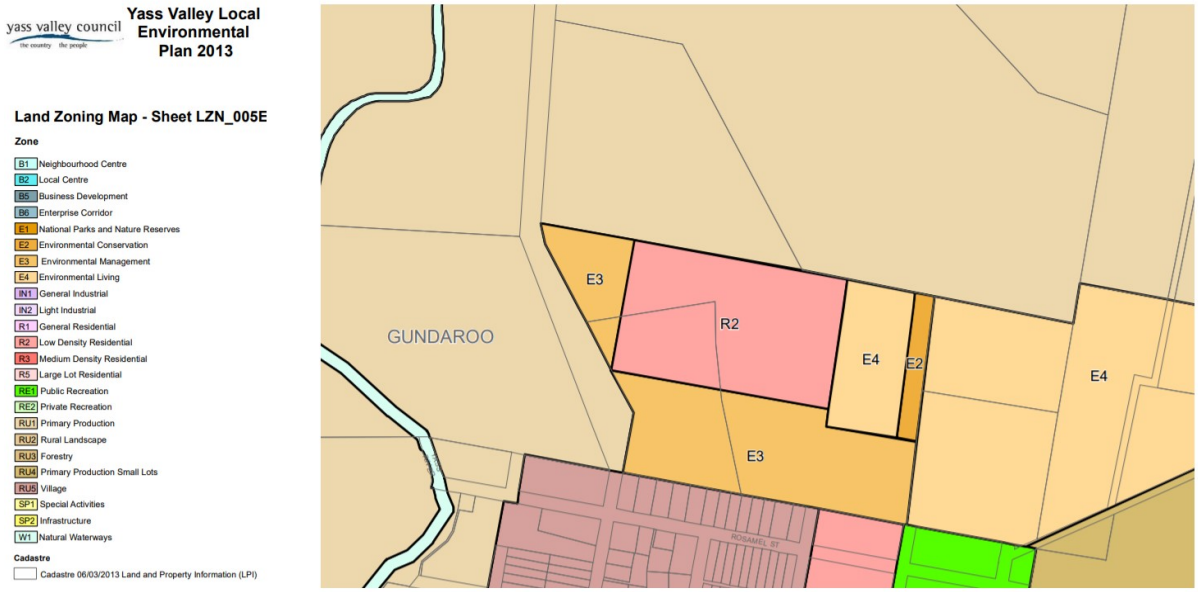

Figure 1.5 Plan of Lot Zoning Map (LZN_005E)

Zone RU1 Primary Production

1. *Objectives of zone*
   a. *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
   b. *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
   c. *To minimise the fragmentation and alienation of resource lands.*
   d. *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
   e. *To protect and enhance the biodiversity of Yass Valley.*
   f. *To protect the geologically significant areas of Yass Valley.*
   g. *To maintain the rural character of Yass Valley.*
   h. *To encourage the use of rural land for agriculture and other forms of development that are associated with rural industry or that require an isolated or rural location.*
   i. *To ensure that the location, type and intensity of development is appropriate, having regard to the characteristics of the land, the rural environment and the need to protect significant natural resources, including prime crop and pasture land.*
   j. *To prevent the subdivision of land on the fringe of urban areas into small lots that may prejudice the proper layout of future urban areas.*
2. *Permitted without consent:*
   Environmental protection works; Extensive agriculture; Forestry; Home-based child care; Home businesses; Home occupations; Intensive plant agriculture; Water storage facilities
3. *Permitted with consent:*
   Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Correctional centres; Crematoria; Depots; Dual occupancies; Dwelling houses; Eco-tourist facilities; Environmental facilities; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Function centres; Helipads; High technology industries; Home industries; Industrial retail outlets; Industrial training facilities; Information and education facilities; Intensive livestock agriculture; Landscaping material supplies; Markets; Open cut mining; Places of public worship; Recreation areas; Recreation facilities (major); Recreational facilities (outdoor); Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Serviced apartments; Signage; Timber yards; Transport depots; Truck depots; Turf farming; Waste or resource management facilities; Water recreation structures; Water supply systems.
4. *Prohibited:*
   Any development not specified in item 2 or 3.

It is proposed to situate the Sewage Treatment Plant on Lot 5 DA1850902 marked RU1 Primary Production, by allowing for the application of effluent from the proposed subdivision. We are aware that a Sewage Treatment System is not listed as a prescribed use, although we believe it is the intention of Clause 6.12 (refer to page 15) outlined in the YVLEP. The Sewage Treatment Plant however is permissible in the prescribed zone RU1 Primary Production (Clause 105) under the State Environmental Planning Policy (Infrastructure) 2007. As a result, we propose to utilise Clause 106(2) of the Infrastructure SEPP to allow for the creation of a sewage treatment plant on the land known as Lot 5 DA185092.

Clause 4.3 Height of buildings

1. *The objectives of this clause are as follows:*
    a. *To ensure that the heights of buildings are consistent with the existing streetscape of character of the area in which the buildings are to be located,*
    b. *To nominate heights that will provide a transition in built form between business, residential and recreation zones*
    c. *To protect the character and significance of heritage items and heritage conservation areas identified in this plan,*
    d. *To encourage well designed, accessable and viable retain and commercial development of a scale that is consistent with existing retail and commercial development,*
    e. *To minimise the loss of solar access and privacy for neighbouring development.*
2. *The high of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.*

Within the precinct of Gundaroo, the existing rural residential character is single story dwellings with a small number of multi storied dwellings scattered throughout the village. The Gundaroo Village Master Plan 2017 recommended in section 'Building Form' that double storey buildings are generally not appropriate where visible from the public domain. The subject site is some 500 metres from the existing public domain and will not be visible from those facilities due to the existing vegetation apparent throughout the village. Due to the extended proximity from the village core and low density rural residential living offered by this development, all buildings will meet the Gundaroo Village Master Plan No. 4.4 Height of Buildings with a maximum building height of 6 metres.

Clause 6.1 Earthworks

1. *The objectives of this clause are to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items of features of the surrounding land.*
2. *Development consent is required go earthworks unless:*
   a) *The earthworks are exempt development under this Plan or another applicable environmental planning instrument, or*
   b) *The earthworks are ancillary to development that is permitted without consent under this Plan or to development for which development consent has been given.*
3. *Before granting development consent for earthworks (or for the development involving ancillary earthworks), the consent authority must consider the following matters:*
   a) *The likely disruption of, or nay detrimental effect on, drainage patterns and soil suitability in the locality of the development,*
   b) *The effect of the development on the likely future use or redevelopment of the land,*
   c) *The quality of the fill or the soil to be excavated, or both,*
   d) *The effect of the development on the existing and likely amenity of adjoining properties,*
   e) *The source of any fill material and the destination of any excavated material,*
   f) *The likelihood of disturbing relics,*
   g) *The proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area,*
   h) *Any appropriate measures proposed to avoid, minimize or mitigate the impacts of the development.*

Earthworks will be required as part of this rural residential subdivision. The construction of roads, footpaths and other regrading works will be implemented to provide for the future use of the allotments. As stated in the Biodiversity Development Assessment Report attached in Appendix C, no detrimental impact will be felt by this development. The Archaeological Due Diligence Report in Appendix E provides an impact assessment on the development site with no impact observed in the subject area.

A full set of Engineering Construction Drawings will be supplied at the Construction Certificate Stage of the Development, it is however proposed that the road to the south, running east to west connecting Gundaroo Road with Lute Street will be built up to mitigate any flooding concerns of McLeod's Creek. This may include bringing in fill to use in building up the road and to assist in the overall works required for the proposed subdivision. All information required for construction will be outlined in the Construction Certificate with all sourced material being VENM (Virgin Excavated Natural Material). All appropriate erosion control infrastructure will be implemented to avoid and minimise any risk.

The detailed design stage will take into account the 1:100 year flood levels to ensure appropriate infrastructure is constructed to ensure all proposed lots are fully protected in a 1:100 year flood event.

Clause 6.2 Flood Planning

1. *The objectives of this clause are as follows:*
   a) *to minimise the flood risk to life and property associated with the use of land,*
   b) *to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,*
2. *This clause applies to land at or below the flood planning level.*
3. *Development consent must be be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:*
   a) *Is compatible with the flood hazard of the land, and*
   b) *Will not significantly adversely affect flood behaviour resulting in detrimental increase in the potential flood affectation of other development of properties, and*
   c) *Incorporates appropriate measures to manage risk to life from flood, and*
   d) *Will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and*
   e) *Is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.*
4. *A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause.*
5. *In this clause:*
6. *Flood planning level mean the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.*

As can be seen in the site specific Flood Study prepared by OCRE in Appendix D, the report confirms that neither the Q100 or PMF extents impact on the residential block proposed, other than part of Road 2 adjacent to Lots 28 and 29. It is proposed to take this into consideration within the Road 2 engineering design with some regrading introduced to mitigate any impact of a PMF event.

Recommendations from this report contributed to the rezoning of the subject land including R2 Low Density Residential zone and the 2000m^2 minimum lot size specified by YVLEP.

Clause 6.3 Terrestrial Biodiversity

1. *The objective of this clause is to maintain terrestrial biodiversity by:*
    a. *Protecting native fauna and flora, and*
    b. *Protecting the ecological processes necessary for their continued existence, and*
    c. *Encouraging the conservation and recovery of native fauna and flora and their habitats.*
2. *This clause applies to land identified as "Biodiversity" on the Natural Resources Biodiversity Map.*
3. *Before determining a development application for development on land to which this clause applies, the consent authority must consider:*
    a. *Whether the development is likely to have:*
        i. *Any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and*
        ii. *Any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and*
        iii. *Any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and*
        iv. *Any adverse impact on the habitat elements providing connectivity on the land, and*
    b. *Any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*
4. *Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*
    a. *The development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*
    b. *If that impact cannot be reasonably avoided by adopting feasible alternatives – the development is designed, sited and will be managed to minimise that impact, or*
    c. *If that impact cannot be minimised – the development will be managed to mitigate that impact.*

As can be seen on NRB_005, none of the subject land has been highlighted as having biodiversity value on the Yass Valley Biodiversity mapping shown below in Figure 2.1. A Biodiversity Development Assessment Report has been prepared for this Development Application and is included in Appendix C. This report outlines the proposal and the minimal impact that the proposal has upon the surrounding biodiversity of the site.

The proposed site has been farmed extensively for several decades and this has included being sown to pasture (i.e. Lucerne) and extensive irrigation infrastructure to service the farming practices. The ongoing cultivation techniques of the site has extensively impacted upon the grasslands and the native biodiversity of the site, as highlighted by the Biodiversity Development Assessment Report attached in Appendix C.

Some grasslands will be altered as a result of the proposed fifty lot subdivision. Some vegetation removal will occur along the existing driveway leading to Lot 5 DA185092, this vegetation was planted by the applicant in the late 1980's. The trees are native eucalypts and it is expected that some of these trees will be removed as part of the earthworks of the site. All large established vegetation will be retained.

Figure 2.1- Yass Valley Council Biodiversity Mapping

Clause 6.4 Groundwater vulnerability

1. *The objectives of this clause are as follows:*
    a. *To maintain the hydrological functions of key groundwater systems,*
    b. *To protect vulnerable groundwater resources from depletion and contamination as a result of development.*
2. *This clause applies to land identified as "Groundwater vulnerability" on the Groundwater Vulnerability Map.*
3. *Before determining a development application for development on land to which this clause applies, the consent authority must consider the following:*
    a. *The likelihood of groundwater contamination from the development (including from any on-site storage or disposal of solid or liquid waste or chemicals).*
    b. *Any adverse impacts the development may have on groundwater dependent ecosystems,*
    c. *The cumulative impact the development may have on groundwater (including impacts on nearby groundwater extraction for a potable water supply or stock water supply),*
    d. *Any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*
4. *Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*
    a. *The development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*
    b. *If that impact cannot be reasonably avoided – the development is designed, sited and will be managed to minimise that impact, or*
    c. *If that impact cannot be minimised – the development will be managed to mitigate that impact.*

Clause 6.5 Riparian land and watercourses

2. *This clause applies to all of the following:*
    a. *Land identified as "Watercourse" on the Riparian Lands and Watercourses Map.*
    b. *All land that is within 40 metres of the top of the bank of each watercourse on land identified as "Watercourse" on that map.*

As can be seen on CL2_005, areas of the subject land have been highlighted as having Groundwater Vulnerability with no watercourse highlighted on the subject land. This proposal is unique within the Yass Valley Council as it is introducing a Sewer Treatment Plan in line with Clause 6.12 of the YVLEP 2013. This will be accompanied with a Sewage Management System to assist in the ongoing management of the site and to provide a sustainable outcome to Yass Valley catchment. The report carried out by DWC in Appendix B, provides information to support the proposed sewerage management system. As a result, the development will not have any detrimental effect on the groundwater or nearby watercourses. The construction of the proposed Sewerage Treatment Plant will ensure that there is no effluent disposal on the proposed 50 lots.

Clause 6.6 Salinity

2. *This clause applies to land identified as "Dryland Salinity" on the Natural Resources Land Map.*

Clause 6.7 Highly erodible soils

2. *This clause applies to land identified as "High Soil Erodibility" on the Natural Resources Land Map.*

As can be seen on NRL_005, none of the subject land has been identified as Dryland Salinity or as having Highly Erodible Soil. Although some earthworks will be undertaken as part of the road construction, the works will not adversely change the layout of the land. Erosion and control measures will be put in place to minimise soil disturbance and any runoff into the existing stormwater network.

Clause 6.8 Essential Services

Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required:

(a) the supply of water,

It is intended that rainwater will be the main supply of water for all the proposed allotments, with the existing residence on Lot 23 already utilising a rainwater tank to supply the dwelling. Any new residences to be constructed on the additional allotments will have a rainwater tanks attached, for the purposes of water supply. The water arrangements to supply any future dwelling will be as per Yass Valley Council Policy WS-POL-2 which outlines and is consistent with the remaining Gundaroo Village.

(b) the supply of electricity,

There is existing three phase electricity infrastructure traversing through the site, servicing the existing dwelling on proposed Lot 23. These services will be extended to provide power to all the additional allotments and will meet the requirements of the requirements set out by Yass Valley Council's DA-POL-17 for electricity and telecommunication infrastructure.

(c) the disposal and management of sewage,

The disposal of and management of sewage is outlined extensively in the DWC Report provided in Appendix B. The proposal offers an opportunity for a Sewerage Management System to be implemented that will service all proposed 50 lots. This system has been compared and scrutinised against other options to ensure that this is the most appropriate outcome for the proposed application.

As outlined in the Gundaroo Village Master Plan 2017, all development should develop strategies to deal with sewerage treatment to ensure that the current problem of contamination into the Yass River does not occur. With the Sewerage Management Facility proposed, all precautions are made to ensure that no further contamination occurs onto the existing Yass River Catchment.

(d) stormwater drainage or on-site conservation,

The proposal will have minimal effect on the existing natural overland flow path for stormwater runoff. Associated works for the new road and infrastructure proposed will mitigate any effects on the surrounding creek line.

(e) suitable vehicular access,

All proposed lots will have access from Gundaroo Road and Lute Street. These two accesses will provide sufficient intake from the proposed road network to the existing network. This is further outlined in the Traffic Assessment Report in Appendix F.

(f) connection to a communications network with voice or data capability (or both).

Existing communication lines along Lute Street and Gundaroo Road will be utilised for the proposed subdivision. Proposed Lot 23 has existing services for telecommunications connected to the residence.

Clause 6.12 Development on certain land in Gundaroo in Zone R2 Low Density Residential

1. *This clause applies to land in Zone R2 Low Density Residential and shown edged blue Lot Size Map.*
2. *Despite any other provisions of this Plan, the size of any lot resulting from a subdivision of land to which this clause applies in not to be less then 5,000 square metres unless the lot is connected to a reticulated sewerage scheme.*
3. *Development consent may be granted to development for the purposes of dual occupancy on land to which this clause applies, where the land is not connected to a reticulated sewerage scheme, only if the size of the lot on which the development is to be carried out is at least 10,000 square metres.*
4. *Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development is designated, sited and will be managed to avoid contamination of groundwater.*

It is proposed to have reticulated sewerage connected to all the allotments and as such the minimum lot size of 2000m^2 has been implemented for the proposed subdivision. The reticulated sewerage system will service all 50 allotments and provide adequate provisions for reticulated sewerage scheme. All allotments will be created to have dual occupancy as per the R2 Low Density Residential zoning of the subject land.

Gundaroo Village Master Plan 2017

The following outlines the proposed development against the implementation measures outlined in the Gundaroo Village Master Plan 2017.

1. Gundaroo Village Heart

1.1. Cork Street - not applicable.
1.2. Village- River Pedestrian Loop - not applicable.
1.3. Heritage walk - not applicable.
1.4. Butcher's Shop Rise Ruin - not applicable.
1.5. Weekend Parking - not applicable.
1.6. Management Plans for Gundaroo community/ public spaces - not applicable.

2. Gundaroo Village Domain

2.1. Gundaroo Entrance Avenues – the western edge of the subject site fronts Gundaroo Road. It is proposed to create a 10 metre wide landscaping easement as outlined by the Gundaroo Master Plan as part of this development. This will provide an adequate buffer between Gundaroo Road to any future dwelling. This will also create a 'sense of arrival' as suggested in the Gundaroo Village Master Plan once implemented. It is not expected that the applicant will implement the 5 metre wide avenue plantings within the road reserve. It would be expected that the applicant will provide a landscape plan to satisfy a condition of development consent and Yass Valley Council will provide the funding for the vegetation of the site in the future, as indicated within Gundaroo Village Master Plan.

A restriction on the title shall be created over Lot 9 stating:

> *A restriction on the use of land pursuant on the provisions of Section 88B of the Conveyancing Act 1919 shall be placed on proposed Lots 2 & 4 that prohibits the erection of solid fence (paling, timber or colorbond) and direct access onto Gundaroo Road. The registered proprietors of Lot 8 shall be responsible for maintenance of the landscape easement in accordance with the approved plan at all times to the satisfaction of Council.*
>
> *The name of the Authority having the power to release vary or modify this restriction shall be Yass Valley Council.*

2.2. New roads connect to existing village grid - the proposed subdivision picks up the existing orthogonal street alignment and continues the linear nature through the site to ensure contiguous development. This orthogonal pattern has been implemented in such a way to complement the existing village grid pattern and the wider Gundaroo Village.

2.3. New pedestrian links to north and south of the village core - as part of this extension of the existing village we are proposing to create a gravel footpath that runs north along the southern road as outlined in the Proposed Plan of Subdivision. This is to link the proposal to the wider Gundaroo Village and encourage public access and connectivity.
2.4. Yass River - Gundaroo Park Loop - not applicable
2.5. Landscape buffer to major roads - as per the Gundaroo Village Master Plan recommendation, we are proposing a 10 metre wide landscape easement along the Gundaroo Road alignment to screen from any residence on the proposed lots and to prevent any access to Gundaroo Road in the future.
2.6. Ridgeline above McLeod's Creek – not applicable as this land is well below the ridgeline
2.7. Zucchini Farm - not applicable.
2.8. Gundaroo Park RV and Camping facilities – not applicable.

Gundaroo Village Environment

3.1. Yass River Riparian restoration - not applicable.
3.2. Yass River water quality - The proposed subdivision takes great care in managing and protecting the current water way of McLeod's Creek (Yass River Catchment) to the south of the land. This is to ensure mitigation is applied to minimise any impact on to Yass River. As a result, no impact will be felt from the water quality of the McLeod's Creek which flows into the Yass River.
3.3. McLeod's Creek and Harrow Creek – McLeod's Creek runs to the south of the subject site and extensive revegetation works have occurred within the creek corridor over the last decade, which is apparent onsite today. It is expected that these regeneration works will continue after subdivision to appropriately manage the McLeod's Creek corridor.
3.4. Flood management - as apparent within the Gundaroo Flood Study areas of the property have been identified as having the potential for flooding. OCRE have prepared a Flood Study as supplied in Appendix D.
3.5. Lot Street - Yass River Picnic Area - not applicable.
3.6. Effluent Disposal – the proposal ensures 'new systems are designed and/ or located to reduce/ remove pollution risk in flood events' by proposed a Sewage Treatment System to operate on site. This will mitigate any effects in terms of pollution and will provide a system fit for the future of the development. As a result, ensuring that we 'improve water quality'.
3.7. Renewable Energy - At this stage nothing has been proposed on a large scale as part of this proposal.
3.8. Waste reduction - although open to ideas of kerbside waste and recycling services, at this stage nothing is proposed as part of this subdivision. The lots created will utilise the Gundaroo Waste Transfer Station.

Future Gundaroo Growth

4.1. New areas for village growth - as part of this subdivision we are utilising existing zoned land to grow the village of Gundaroo. The minimum lot size specified of 2000m^2 is being utilised, as we are proposing a reticulated sewerage system and sustainable water supply will be provided at the time of dwelling construction as per WS-POL-2.
4.2. E4 Environmental Living Zone – not applicable.
4.3. Superb Parrot Nesting – not applicable.
4.4. Height of Building - as a result of the subdivision all buildings will retain low scale built form and character of the existing village with a maximum height of 6 metres.

<u>Lot Layout</u>

The proposal complements the existing grid of the village with all patterns continued. This has included the traditional grid that is seen throughout the existing village which has been continued throughout this proposal. Some vegetation along the existing driveway will need to be removed during construction, these trees are not established and have been planted by the applicant over the past 30 years. Due to their maturity and that they were implanted to provide for the agricultural purposes of the site it is not expected that this will have detrimental impact the land. Furthermore, attached in Appendix C is the Biodiversity Development Assessment Report that outlines that minimal impact will occur as part of this subdivision.

The proposed subdivision offers a wide range of residential allotments that will provide for an increase in availability of land and provide differing opportunities of affordability to the village. The proposed lot sizes offer a large variety of dwelling locations to implement solar passive principles while also appropriately giving access and other essential services to the proposed lots. All allotments offer a west to east orientation providing appropriate solar access to the proposed allotments.

Drainage

The proposed allotments ensure the appropriate drainage design can be implemented. No impact will be felt to the existing drainage channel as a result of this subdivision as outlined in Appendix D of this document. Further drainage details will be outlined during the Construction Certificate stage of the proposed development, it is however expected that no impact will be felt as a result of the subdivision.

The proposed road network will provide for the needs of drainage and will flow the water into the appropriate areas for run off. The 30 metre Road Reserves provides sufficient area to contain all drainage within the public road reserve.

Public Open Space

Throughout the existing proposal there is no designated public space although due to the large road reserves proposed, these will offer a street scape like the existing village. The proposal does however add to the public open space with the integration of a gravel path from the existing village through the site. With large public open space existing in the village already it is not expected that this would be required apart of the proposal.

Pedestrian and Cycle network

We have included within the proposal a gravel path that links the proposed subdivision to the existing Gundaroo Village. This is to encourage healthier lifestyles within the neighborhood of Gundaroo and to allow for continuity of pedestrian access from the village.

Road Access

Within the proposal we have included all roads to have a road width of 30 metres, reflective of the existing Gundaroo Village grid pattern and the recommendation of the Gundaroo Village Master Plan 2017. The proposed roads will link back to Lute Street and Gundaroo Road provide a through road connection. The existing grid pattern of the Gundaroo precinct is continued throughout the whole subdivision.

Street Trees

Street trees will be planted along the proposed new road as outlined by the Gundaroo Village Master Plan. This will enhance the local street character and reinforce the streetscape to match with the existing Gundaroo Village. The planting pattern will follow the ‘informal’ planting pattern outlined by the Master Plan with a varied sizing of trees to variance to the over all proposal.

Neighborhood Character

The proposal enhances the existing neighborhood character by continuing the existing orthogonal lot configuration. Due to the size of the proposed allotments and lot sizes there will be minimal impact felt to the existing character and amenity of residential areas within the Gundaroo village. The proposal reflects the surrounding streetscape of Gundaroo and the wider Yass Valley. The development is some 250 metres from the existing village and we would predict minimal impact would be felt to the existing village.

Water Supply

Water supply will be supplied by rainwater tanks attached to any future residence. The development will encourage sustainable use of this water and provide information to the potential purchases to ensure viability into the future. All future dwellings will need to comply with WS-POL-2 for water supply without a reticulated water supply.

Street Setback

All the proposed lots will comply with an 8 metre offset to the front of the boundary as per the development standard outlined in the Gundaroo Village Master Plan 2017. This provides for an appropriate offset from the proposed road and fits in with the existing rural village characteristics.

Due Diligence

As all parties are aware of the significance of Gundaroo to the Aboriginal Peoples, we have had an Archaeological Due Diligence Assessment carried out, this is provided in Appendix E.

Riparian Land and Waterways

All existing waterways have been taken into consideration when planning the proposed subdivision. During the Planning Proposal stage of this development there was extensive mitigation measures put in place to reduce the minimum lot size and implement appropriate zoning to reflect these findings. That the implementation of this proposed plan will not impact any of the existing riparian land.

Gundaroo Conservation Area

This is not applicable to our land.

Strategies for managing Gundaroo's heritage character

It is expected that this subdivision will grow on the existing rural character of the village. All proposed works are to be developed in relation to the existing village with no large change expected.

Setback

Although the proposed development is a significant distance from the village's historical buildings, the setback of 8 metres proposed earlier will be maintained onsite.

Building Form

Although no buildings are proposed as part of the subdivision, it is expected that following completion of the subdivision, dwellings would be built on the allotments. It is expected that these residences will retain the low scale character of Gundaroo's built form and will work to retain the character of the Gundaroo Village.

Character and Style

It is expected that any proposed dwelling will be sympathetic to the historical nature of the Gundaroo Village.

Building Materials

It is expected that any proposed dwelling will be sympathetic to the historical nature of the Gundaroo Village.

Fencing

It is proposed that all fencing will comply with the Gundaroo Village Master Plan and match in with the existing village characteristics.

Yass Valley Town and Villages Study 2010

As per the town and villages study the land was identified as a future investigation area for the expansion of the village. This initiated the original planning proposal for 'Kyeema' and the initial interest in a sewage treatment plant. With nearly 10 years off consideration for the 'Kyeema' subdivision we see this as the best outcome for the Yass Valley, Gundaroo and furthermore the future of the area.

Yass Valley Settlement Strategy

The future role of Gundaroo as stated in the *Yass Valley Settlement Strategy* (the Strategy) adopted by Council in December 2017, was that it would remain as a rural village, with a recommended population of 1,981 people by 2036.

To accommodate an extra 750 people as recommended by the strategy, it would require approximately 300 new homes by 2036, based on an average household occupancy of 2.5 residents. Looking at the immediate surrounding area of the village, there is minimal land where such an increase in lots is possible. As outlined in the Gundaroo Village Master Plan, the area for development would likely be to the north and south of the existing village only. Subdivision of rural land will not be able to generate this lot increase alone, with the current permissible zoning of the subject land it seems appropriate to extend the village to the north with some residential land holdings.

One of the major challenges of development within the Village of Gundaroo is to achieve the supply of water and sewer. Yass Valley Council has indicated that a Sewerage Treatment Works would be an appropriate outcome for the Village of Gundaroo. Yass Valley Council have been looking into a Sewage Treatment Plant and how to appropriately achieve this into the future.

This Development Application proposes a Sewerage Treatment Works for the proposed development only. The DWC Report in Appendix B outlines the proposal and the appropriate application of this in the future to service the proposed development. Any proposed dwelling in the future will have rainwater tanks attached for the supply of water to comply with WS-POL-2. This is consistent with the existing village of Gundaroo and will provide sufficient water supply to residences as per the Yass Valley Council Policy.

The development reflects the direction of the Yass Valley Settlement Strategy in expanding the village core while providing alternative living, assisting with affordable housing, assisting to increase local demand for services within the Village centre and allows for additional standard residential blocks.

We believe the proposed development is in line with the future role of Gundaroo as suggested in the Strategy and the Gundaroo Village Master Plan 2017.

Sydney - Canberra Corridor Regional Strategy 2006-2031

We have looked at our proposal regarding the Threshold Sustainability Criteria:

1. Infrastructure Provision

Strict compliance has been provided in terms of utilities to each proposed allotment, with adequate provisions for transport, open space and communication.

2. Access

Two points of entry will be provided to service the proposed Kyeema Subdivision for vehicle access. A footpath will connect the proposal to the existing Gundaroo Village. The proposal will allow appropriate access to be obtained through the proposal to all existing services within the village.

3. Housing Density

The housing density of the land is moderately low as a result of the zoning of the land. All lots comply with the minimum lot size of the land and provides an appropriate density to extend onto the existing Gundaroo Village.

4. Employment Lands

Employment in the Gundaroo township will increase with the increased 50 households and estimated 125 people that will join the community. The demand on local services will grow and as a result employment opportunity within the village will also grow offering the community greater opportunities.

5. Avoidance of Risk

All flood planning levels have been considered and a site-specific flood study has been carried out to avoid risk through the whole development. This has allowed for appropriate planning outcomes to be implemented across the entire site.

There are no areas of high slope within the property constraints and no areas of erodibility visible onsite.

6. Natural Resources

The natural resources of the land will not be placed under unacceptable pressure.

7. Environmental Protection

A Biodiversity Development Assessment Report was carried out on the site to ensure that we were not having an irreversible impact on any threatened species of flora or fauna. No impact was recorded. An Archaeological Due Diligence Report was carried out over the site with three sites recorded east of the subject site. As a result, all environmental protection measures have been taken to ensure environmental protection.

8. Quality and Equity in Services

The applicant will implement the required upgrade for access to service the proposal. As part of this proposal is a Sewage Treatment Plant which will services all allotments. There is an existing primary school in the village which will offer primary school education. Quality health services, secondary education, legal, recreational, cultural and community development and other government services are all available in surrounding areas of Canberra and Yass.

Environmental Planning and Assessment Act 1979

Section 94 of the Environmental Planning and Assessment Act 1979, Contribution towards provision or improvement of amenities or services, states that *if a consent authority is satisfied that development for which development consent is sought will or is likely to require the provision of or increase the demand for public amenities and public services within the area, the consent authority may grant the development consent subject to conditions.*

The applicant is aware that, as the proposed development allows for multiple new dwellings, Section 94 contributions for open space, community facilities, traffic management and administration for the Gundaroo village will be required.

2.2 THE LIKELY IMPACTS OF THE DEVELOPMENT

There are significant physical works required for this development, mainly the construction of the new road network. However, we believe that suitable erosion and control measures can be put in place during construction to minimise any effect on the surrounding environment.

The proposed subdivision allows for growth to the Gundaroo village. The subdivision will provide residential lots that are sympathetic to the traditional orthogonal lot pattern and minimum lot size outlined. The applicant is aware that this will increase the number of village lots within Gundaroo, although the proposal has been designed to complement the existing village and amenity of Gundaroo.

Vegetation Removal

Minimal vegetation removal will be required for the construction of the roads with no large established vegetation to be impacted.

Noise

Any noise disturbances during the construction of the road and associated infrastructure for the subdivision will be closely monitored and managed. All noise generated activities will be undertaken during hours of operation determined by Yass Valley Council.

Vehicular Access and Traffic

Vehicular access for all proposed allotment will come off Gundaroo Road and Lute Street. The proposal will require upgrade works and construction to service the allotments. All lots will have the option of taking the Gundaroo Road intersection or Lute Street Intersection. Further information is provided in the Traffic Impact Assessment in Appendix F outlining the volumes of traffic expected.

2.3 THE SUITABILITY OF THE SITE FOR THE DEVELOPMENT

The proposed subdivision is allowing for the expansion and future development of the Gundaroo village, acknowledging the provisions under the current zoning. Environmental concerns of the site have been assessed accordingly and measures have been put in place to mitigate these concerns.

As this subdivision reflects the provisions allowed for under the lot zoning is intending to mitigate any effects on the environment and surrounding village, we believe the site to be suitable for this development.

3. CONCLUSION

The proposed subdivision has been prepared having regard to the environmental sensitivities of the site and will have manageable environmental impacts. It is the intention of the applicant to ensure that the character of the Gundaroo village is maintained. All measures and controls put in place during construction and future development will ensure that the subdivision will not have a significant impact upon the built or natural environment.

Yass Valley Council planning controls, Gundaroo Village Master Plan and current and past community consultation has all been consider during the planning of the northern extension of Gundaroo.

LAND CAPABILITY ASSESSMENT

Version 4
July 2018

Kyeema
Lots 1 and 2 DP850916
4056-4078 Gundaroo Road
GUNDAROO NSW 2620

COMMERCIAL-IN-CONFIDENCE

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SOILANDWATER

Confidentiality

This report is to be treated as Commercial-in-Confidence.

The report was prepared by Franklin Consulting Australia Pty Limited trading as Soil and Water within the terms of its engagement by Kyeema Management Pty Ltd.

All enquiries should be directed to Franklin Consulting Australia Pty Limited.

Our Company

Franklin Consulting Australia Pty Limited, trading as Soil and Water, offers expert advice and services to the agriculture, development and environmental conservation sectors. We provide soil and water management advice, undertake land capability and soil assessment, erosion and sediment control, and soil conservation, catchment and property management planning. We have extensive experience in both government and private sectors in senior management and consulting roles.

We provide our services to individual land holders, sub-division developers, surveyors, commercial business owners, and land development and regulatory agencies.

Principal Consultant
John Franklin M App Sc, BSc, EIANZ

John Franklin has over 26 years' experience in natural resource management in the ACT, the Upper Murrumbidgee region in New South Wales and the tropical farming regions in North Queensland.

This experience includes providing extensive soil and water management advice to land holders, businesses, State and Local Governments and the urban / rural residential development sector across the region.

John has detailed knowledge of water resource policy and developed the NSW Farm Dams Policy in 1999 for the Department of Land and Water Conservation and provided strategic support and direction to the NSW water reform process.

Franklin Consulting Australia Pty Ltd holds current Workers Compensation Insurance with CGU (Policy Number O/16-5885) and Professional Indemnity cover of $10,000,000 and Public Liability cover of $10,000,000 with Lloyds.

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Contents

PROJECT DESCRIPTION

This report provides an assessment of the capability of land for on-site management of sewage associated with the rural residential subdivision on Lots 1 and 2 DP850916 located at 4056-4078 Gundaroo Road, Gundaroo, NSW. The "Kyeema" development covers approximately 40 hectares and is located on the northern side of Gundaroo, refer **Figure 1**.

The effluent generated by the proposed sixty (60) lots will be managed by a proprietary "AdvanTex" wastewater treatment system (by Orenco Systems) comprising the following elements:

- 4,000L interceptor tank (septic tank) on each lot providing primary treatment (settlement)
- Gravity and/or pumped connection to the centralised advanced treatment system (ie. the Orenco Advantex Treatment System)
- Advanced biological effluent treatment and filtering in underground process units
- UV disinfection of effluent via an artificial UV system
- Treated and disinfected effluent dispersal by subsurface irrigation
- Treated effluent storage capacity to manage excess effluent during periods of extended wet weather and/or maintenance and breakdowns.

This report assesses the capability of the northern section of Lot 2 DP850916, refer **Figure 1**, as an effluent disposal site for the treated waste water from the proposed system. It includes the assessment of site and soil constraints to effluent disposal in accordance with AS 1547:2012.
The capability of the remaining areas of Lot 1 & 2 DP850916 has been previously assessed in *Capability Assessment for On-site Effluent Disposal, Stages 1 & 2, proposed subdivision of Part lot 1 & lot 2, DP 850916 4076 Gundaroo Rd, Gundaroo,* Soil and Land Conservation Consulting, May 2011.

SUMMARY RECOMMENDATIONS

The assessment considers that the land proposed for the irrigation of treated effluent is suited for this purpose with adequate areas of unconstrained land and soils.

The constraints to effluent dispersal on the site include:

- Small areas of steep land adjacent to the drainage depression
- Small areas of convergent slope form which may be prone to seasonal waterlogging
- Drainage buffer around watercourse
- Dam buffer
- Boundary buffer

It is recommended that the effluent dispersal system be designed to accommodate the soil parameters detailed in this report and that irrigation practices be restricted to areas outside identified buffers.

It is further recommended that this land capability and constraints assessment be considered in conjunction with other assessment reports, to refine the development proposal and inform the final location of lots and effluent management practices across the site.

TECHNICAL REFERENCES

The report refers to, or relies on, standards and technical references listed below.

Gundaroo Sewerage Scheme Options Study, Report Number WSR 17027 (2017)

On-site Sewage Management for Single Households (The Silver Book) NSW Govt, 1998.

Soils and Construction: Managing Urban Stormwater - 4th Ed. Landcom NSW Government, 2004.

AS/ANZ Standard 1547:2012 On-site Domestic Wastewater Management.

Use of effluent by irrigation. Department of Environment and Conservation (NSW), 2004

Soil Landscapes of the Canberra 1:100,000 Sheet. Jenkins, B.R. (2000) Department of Land and Water Conservation, NSW.

Yass Valley Environmental Plan (2013)

Water NSW (2018) Groundwater Site details, Greater Sydney Region, Wollongong basin https://realtimedata.waternsw.com.au/

Capability Assessment for On-site Effluent Disposal, Stages 1 & 2, proposed subdivision of Part lot 1 & lot 2, DP 850916 4076 Gundaroo Rd, Gundaroo, Soil and Land Conservation Consulting, May 2011

Figure 1: Proposed Subdivision Layout – proposed effluent irrigation investigation area highlighted

METHODOLOGY

The effluent irrigation investigation area was inspected on 29 June 2018 and key constraining features with potential to impact on-site effluent disposal were identified and mapped.

Slope measurements were taken using a hand-held clinometer. Other constraints were assessed visually.

The site was stratified into broad soil landscapes within which soil types were considered to be relatively homogenous. Soil from within these soil landscapes were assessed on-site using a hand auger and field tests to determine attributes relevant to effluent disposal (as per AS 1547:2012).

Within the proposed effluent dispersal area, a soil sample was taken from each of the landscape units and sent to a NATA accredited laboratory for analysis, refer **Appendix 2**.

Testing included:

- Cation exchange capacity and exchangeable cations
- Electrical conductivity
- Emerson aggregate test
- pH
- Phosphorous sorption capacity
- Texture.

Soil test results were used to validate field testing and to ensure adequate information was available to inform the design of an appropriate treated effluent disposal system.

An audit of groundwater bores near the development was also undertaken to develop an understanding of the groundwater resource in the area and therefore enable an assessment of the potential impacts posed by the development.

SITE INFORMATION

Local Government Area:

Yass Valley Council

Address/locality:

Lots 1 and 2, DP850916
4056-4078 Gundaroo Road
Gundaroo, NSW

Owner/Developer:

Paul Carmody

Location:

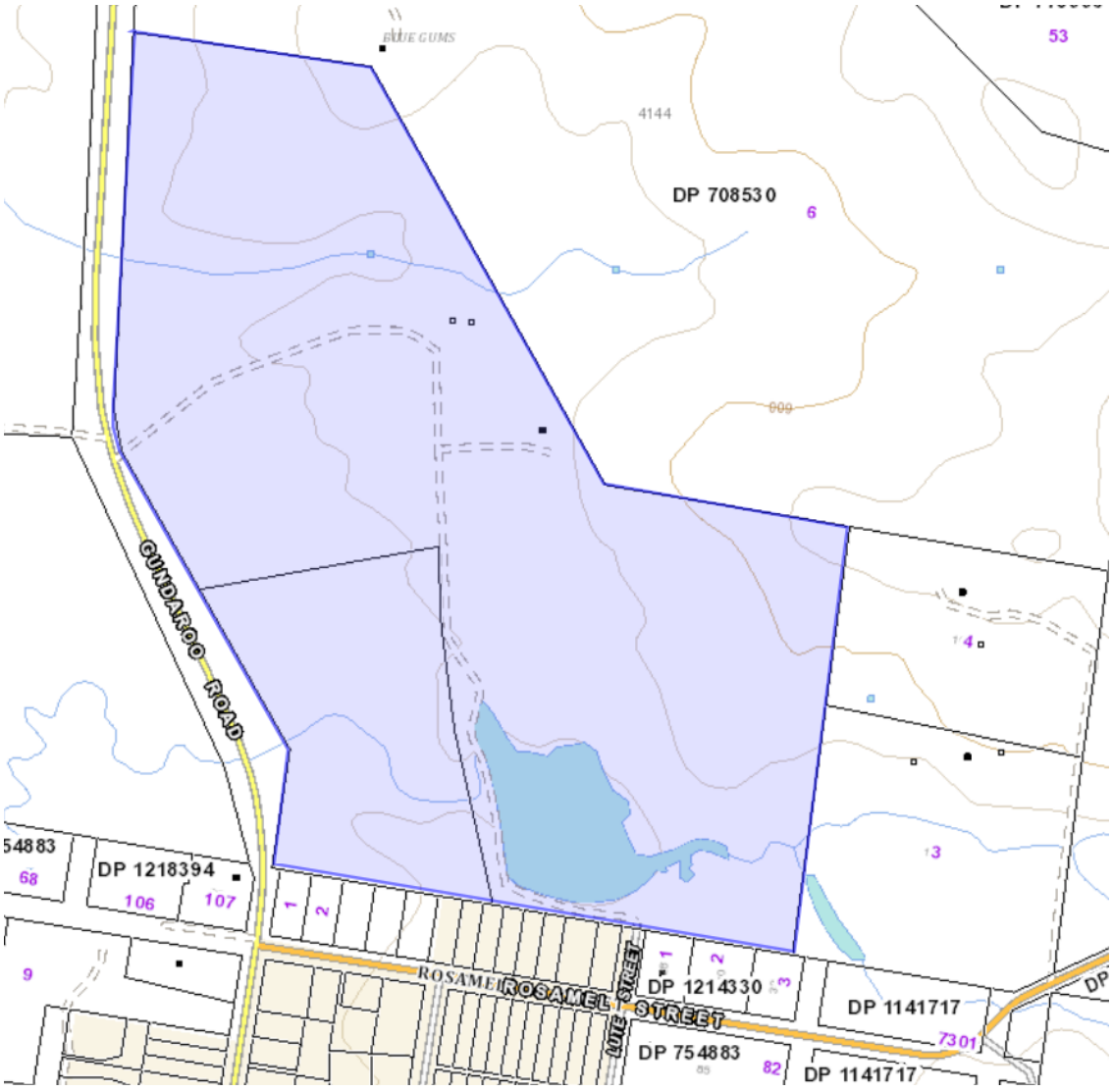

Figure 2: Lots 1 and 2, DP850916

SITE & SOIL SUITABILITY

Climate

Cool temperate climate with mean annual rainfall of approximately 650mm, pan evaporation 1200mm; large moisture deficit typically occurs in summer months, small moisture surplus typically occurs in winter months.

Climate is well suited to treated effluent dispersal by subsurface drip irrigation with distribution lines buried and protected from frost impacts.

Exposure

The majority of the proposed irrigation area is cleared and highly exposed. Shelter belt plantings exist along boundaries and roadways within the site. The areas of low to moderate exposure are contained in the boundary and road buffers and are therefore already constrained for effluent irrigation.

The level of exposure is favourable for dispersal of secondary treated effluent via subsurface irrigation.

Slope

The majority of the proposed irrigation area is gentle to moderately sloping land with slopes up to 15%. There is a small localised area of steep land (above 15%) adjacent to the drainage depression and dam.

Effluent disposal by subsurface irrigation is not constrained by slope gradients across most of the site. In limited areas slope would present a moderate constraint to effluent disposal however these fall within the drainage and dam buffer and are therefore already constrained for effluent irrigation.

Landscape

The landscape is dominated topographically by a ridge which runs south west to north east. Adjacent to this ridge is a minor 1st Order Stream which flows west to meet the Yass River approximately 470m to the west of the boundary. The stream includes a large farm dam and a small silt trap upstream of the dam.

The site slopes generally to the south west as part of the eastern side of the Yass Valley. The landscape includes alluvial terrace landforms associated with Yass River and Mc Leods Creek to the south. The main landscape units represented on the site are low and upper terrace structures and hillslope/crest areas.

The topography is described in the *Soil Landscapes of the Canberra 1:100,000 Sheet.* Jenkins, B.R. (2000) Department of Land and Water Conservation, NSW, as part of the Gundaroo Soil Landscape Unit with narrow floodplains and terraces on Quaternary alluvium with local relief <30m, elevations between 550-620m and slope generally <3% rising to 3-10% between terraces. The hillslope/crest areas are part of the Winnunga Soil Landscape Unit with waning slopes and alluvial fans on Ordovician metasediments and local relief of 9-30m with slopes of 3-10%.

Landscape features do not present a constraint to the dispersal of treated effluent provided appropriate drainage buffers are incorporated in the design.

Surface Rock and Outcrop

The underlying geology of the hillslope/crest is Ordovician metasediments and includes interbedded sandstone, siltstone, shale and minor black shale, chert and impure calcareous sandstone, spotted

and prophyroblastic hornfels. In this landscape and geology scattered surface rock is common however not to the extent that it is a constraint to effluent dispersal by subsurface irrigation.

The lower and upper terrace landscape is underlain by Quaternary alluvium and loose or outcropping rock is not common in this landscape due to the overlying deep soil sequences.

Outcropping or surface rock is not a constraint to subsurface effluent irrigation.

Hydrology

The weak to moderately structured sandy loam textured topsoil across the site has a permeability ranging from 1.4 to 3.0 m/day. The weak to moderately structured sandy clay loam to light/medium clay subsoils have a lower permeability in the range of 0.06-0.5 m/day (from table L1 of ANZ STD 1547:2012).

Approximately 5-10% of rainfall forms surface runoff, although during individual high intensity storm events over 50% of rainfall may runoff. Rainfall that does not form surface runoff is either lost through evaporation and transpiration or infiltrates the soil. Rainfall which infiltrates soil generally drains vertically through the soil profile until it meets a less permeable subsoil layer (e.g. hard pan or clay layer), where a significant proportion drains laterally downslope as subsurface flows.

In very permeable highly fractured and vertically dipping bedrock, such as the Ordovician metasediments underlying the hillslope/crest landscape, a substantial amount of rainfall infiltrating the soil can move into the local groundwater table. Local groundwater tables can then rise to the point that discharge of groundwater occurs on the surface at points of topographical change (i.e. break of slope) or subsurface bottle necks caused by topography and / or geology. These cause local seasonal waterlogging and dryland salinity issues which are compounded by upslope subsurface flows which generally move perpendicular to the contour of the slope and also concentrate in lower parts of the landscape. Drainage in the lower parts of the landscape is also inherently slower due to lower slopes. The cumulative impact of the concentration of surface water, groundwater discharge, and subsurface flows in these parts of the landscape, can result in seasonal waterlogging and saline discharge. Given the deeper and better drained alluvial soil sequences associated with the terrace features, it is considered that the risk of waterlogging or saline discharge in the lower and flatter parts of this area is low.

Effluent dispersal through subsurface irrigation will need to be properly designed to minimise hydrological impacts such as effluent run-off or effluent drainage through permeable soil profiles into groundwater systems. Areas mapped as potentially waterlogged are hydrologically constrained for effluent disposal. These sites mostly occur within the already constrained drainage buffers.

Soils

Detailed soil profile descriptions are provided in **Appendix 1**. The results from laboratory soil test are provided in **Appendix 2**.

The soils on the land proposed for effluent irrigation range are Red Chromosols. These were formed on Quaternary alluvium in the areas occupied by the terraces, and insitu from the metamorphosed Ordovician and Silurian sedimentary parent material in the hillslope/crest areas.

Soils comprise a sandy loam textured upper layer with structures ranging from massive to weak. Soil profiles on the upper terrace grading to hillslopes/crest include a bleached A2 horizon which is absent in the mid to lower terrace soil (as analysed).

Subsoils range from red light to medium clay to sandy clay loams, with structures ranging from massive to moderate.

Soil depths range from 60 cm on hillslope/crest to > 100cm on the upper and lower terraces.

Extrapolating from the soil survey of the Canberra 1:100,000 sheet (Jenkins, B.R, 2000), the representative analytical data in the survey report shows subsoils with a moderate to high phosphorous sorption level, very low salinity and medium exchangeable sodium levels. As such the soils are free of any significant chemical limitations to effluent dispersal.

Soils are generally unconstrained for the dispersal of secondary treated effluent through subsurface irrigation.

CONSTRAINTS ANALYSIS

Erosion

The soil types which occupy the proposed effluent dispersal area are highly erodible and susceptible to gully erosion. The site inspected did not exhibit significant areas of active erosion and retained a good groundcover. The area is not mapped on the Yass Valley Council Local Environment Plan (2013) Natural Resource Land Map NRL_005.

The areas of moderate slope will be particularly susceptible to erosion and care will need to be exercised with the installation of subsurface irrigation infrastructure to ensure potential erosion and sedimentation risks are addressed. Steep areas are limited and are generally constrained for the subsurface irrigation of effluent and should therefore be maintained with a good groundcover of vegetation, refer constraints mapping later in this report (**Figures 7a-b**).

Recommendations

- Greater than 70% groundcover be maintained across the property as far as practical.
- Effluent irrigation should not be installed in mapped steep areas.
- Areas of erosion potential around drainage depressions and steep slopes should be monitored and remedial measures implemented should erosion issues persist or worsen.

Salinity

Dryland salinity is a significant issue across many parts of the Yass Valley Local Government Area (LGA), and is related to changed landscape hydrology, climate, geology, soils and land management.

Salinity impacts grazing and crop production, water quality and contributes to increased erosion which in turn further reduces production and water quality. It is caused by changed land use, including clearing of native perennial deep-rooted vegetation and agricultural land management activities, resulting in increased accessions (recharge) to groundwater tables from rainfall. This results in groundwater tables rising and bringing salts which are contained in geology and subsoil stores into the root zone of vegetation impacting growth and production. In certain parts of the landscape groundwater tables may discharge on the surface in what are called discharge sites. These are particularly vulnerable to reduced vegetative growth and can eventually deteriorate until they are denuded of groundcover and become saline scalds. Once bare, these sites are prone to erosion, particularly given they often coincide with drainage lines and areas of overland flow.

Areas which are impacted by dryland salinity are constrained for the irrigation of treated effluent. No areas of salinity mapped in the Yass Valley Council Local Environment Plan (2013) Natural Resource Land Map NRL_005 occur within the area proposed for effluent irrigation, refer **Figure 3**. There is however an area of salinity mapped on Mc Leods Creek within the development site and south of the irrigation area. The following recommendations will limit the potential for effluent irrigation practices to exacerbate these existing salinity issues, or for these practices to contribute to salinity issues lower in the catchment.

Recommendations

- Effluent irrigation practices should be matched to the permeability of soils within the irrigation area and compensate for variable soil capacity to accommodate irrigation loading across seasons, climatic events and pasture conditions.
- The area and vigor of deep rooted perennial pasture should be maximised as far as practical and greater than 70% groundcover retained.
- Trees and shrubs should be retained as far as practical.

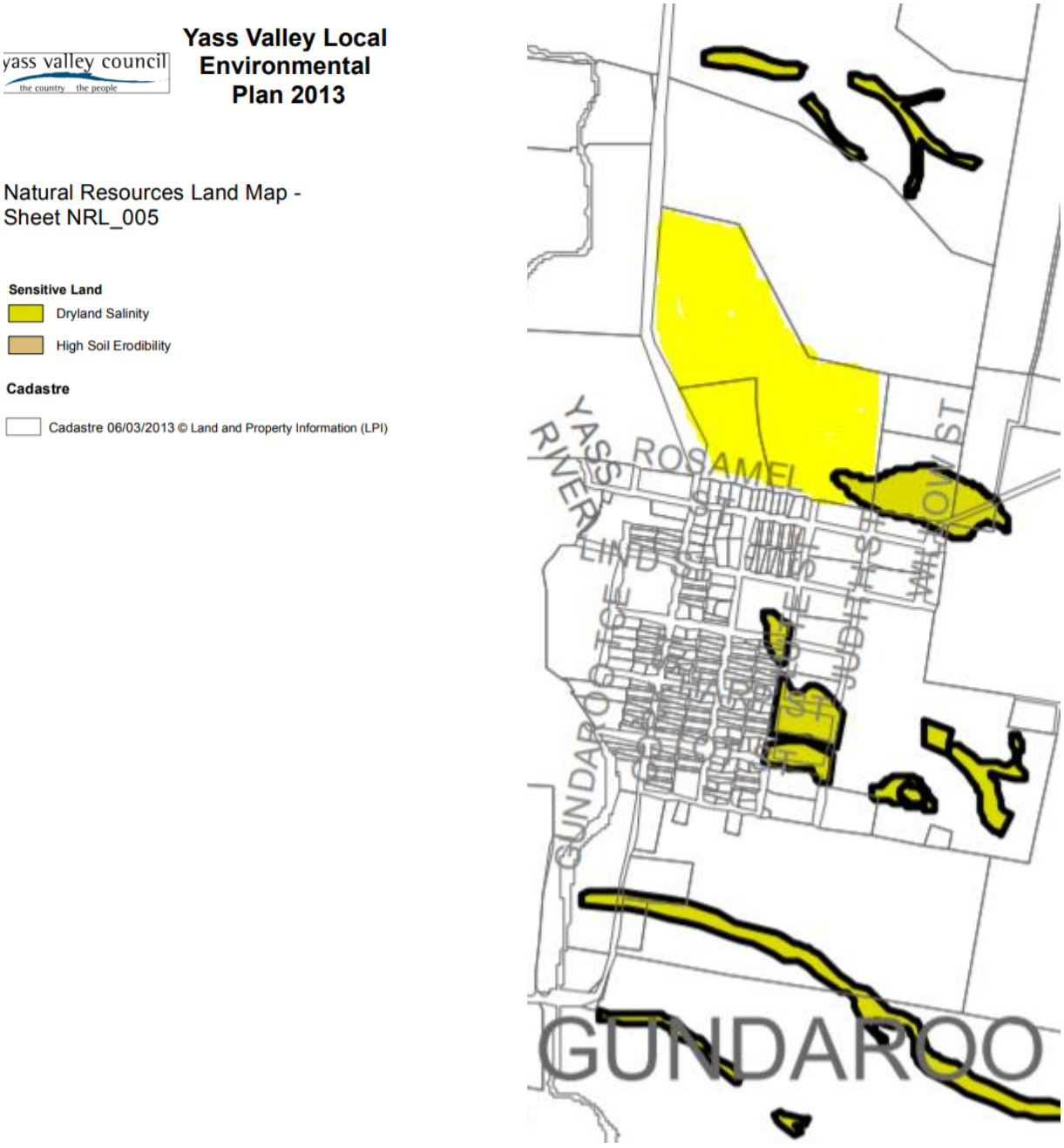

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Figure 3: Areas of Dryland Salinity

Groundwater

The entire effluent irrigation area is mapped as having Groundwater Vulnerability on the Yass Valley Local Environmental Plan (2013) on the Groundwater Vulnerability Map-Sheet CL2_005 (refer **Figure 4**) and therefore requires that the consent authority (Yass Valley Council) consider the following heads of consideration issues:

(a) the likelihood of **groundwater contamination** from the development (including from any on-site storage or disposal of solid or liquid waste and chemicals),
(b) any **adverse impacts on groundwater dependent ecosystems**,
(c) the **cumulative impact** the development may have on groundwater (including impacts on nearby groundwater extraction for a potable water supply or stock water supply),
(d) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development (addressed under each issue).

The scope of the following assessment is based on the heads of consideration listed in the Yass Valley LEP (2013) (see previous points a., b. & c.).

For each of the heads of consideration the report considers:

1. potential development related impacts
2. likelihood, consequence and significance of potential impacts identified
3. avoidance and/or mitigation measures available

Conclusions are made as to the overall impact of the proposed effluent irrigation practices on the local and regional groundwater system and any actions required to avoid or mitigated impacts re recommended.

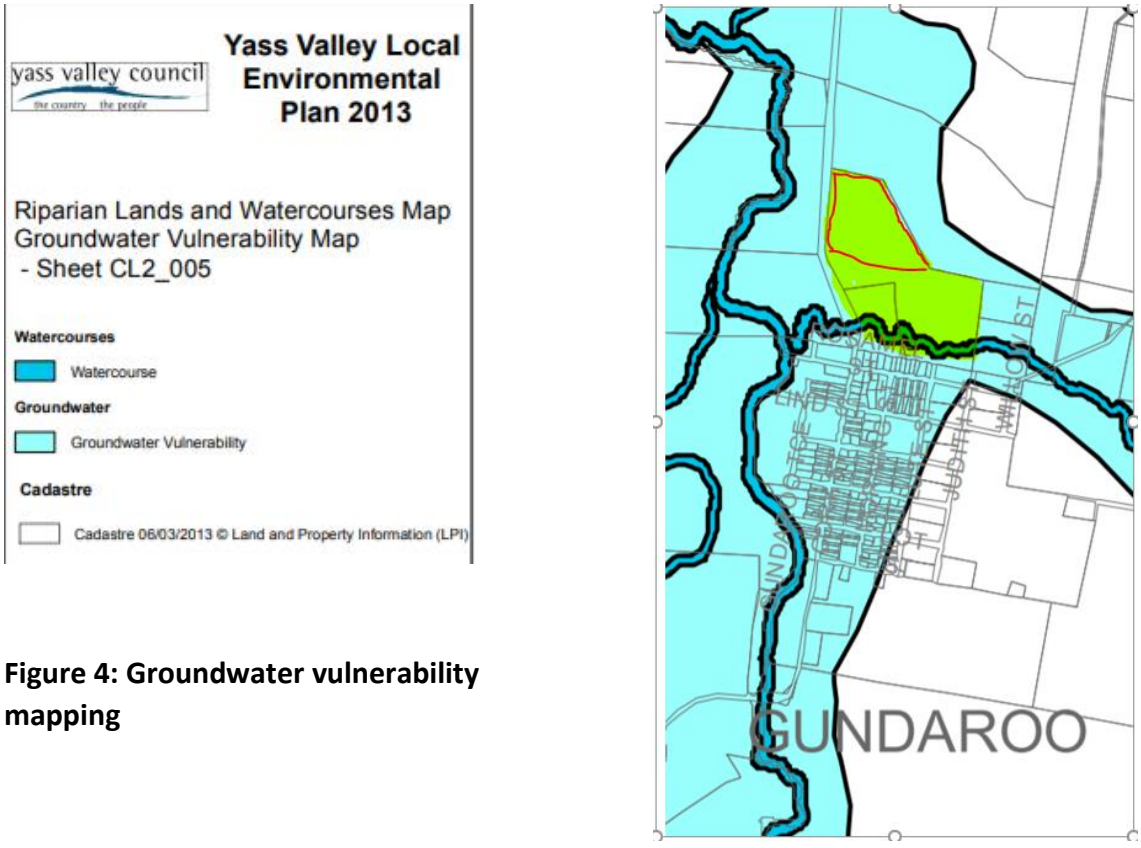

Figure 4: Groundwater vulnerability mapping

Groundwater Contamination

1. potential development related impacts

The greatest post construction potential for development related groundwater contamination comes from the onsite disposal of effluent.

2. likelihood, consequence and significance of potential impacts identified

Groundwater contamination resulting from onsite effluent disposal is a low risk. This is because the main source of effluent contamination of groundwater comes from surface water contaminated with effluent (runoff from poorly managed surface effluent irrigation areas) moving across the landscape and contacting existing surface water bores then moving down the casing of the bore directly into the deep groundwater system.

As subsurface effluent irrigation is proposed the likelihood of the contamination of surface water runoff is low. Additionally, there is only one existing groundwater bore (GW 402728) downslope of the proposed effluent irrigation, see below. This bore is approximately 290m west of the western boundary of the proposed effluent irrigation area which exceeds the buffer distance required by the *On-site Sewage Management for Single Households* (The Silver Book) NSW Govt, 1998 and the rules contained in the *Water Sharing Plan* for this aquifer which requires that bores be located more than 250m from any potential source of contamination which includes effluent dispersal areas.

Surface water from the effluent irrigation area is also separated from GW 402728 by the Gundaroo Road which restricts the downslope movement of water and concentrates flows into culverts and defined drainage depressions. The bore records for GW 402728 also indicate a total depth of 66m with water bearing zones located at 20-23/34-39/48-66m, which are separated from the surface by lower permeability clay subsoils between 2-6m.

This vertical separation between effluent irrigation and the groundwater table below and/or downslope of the point of application (at 150-300mm depth), ranges between 5.8 and 54 metres for bores in the vicinity of the proposed effluent irrigation practices, refer **Table 1 & Figure 5.**

The low permeability subsoil which separate effluent irrigation and water bearing zones is relatively consistent across the area, refer soil profile descriptions and soil test results in **Appendix 1 & 2**.

Table 1: Detail of bores in the vicinity of the proposed effluent irrigation area

Bore ID	Depth (m)	Water bearing zones (m)	Yield (L/s)	Salinity yield
GW403786	60	23-24 43-45 54-56	0.19 0.69 0.38	1.250
GW400696	40	32-33	0.31	0.310
GW403668	66	39-45	0.19	1.438
GW404991	36	n/a	n/a	1.200
GW047270	30.5	5.8-6.4	0.22	n/a
GW402903	96	n/a	n/a	0.850
GW047086	30.5	16.2-20.1	1.76	n/a
GW068758	40	20-25 30-32	0.27 0.56	n/a
GW400647	56	8.0-8.2 48-48.1	0.19 0.19	0.379

GW402411	48	26-26.1	0.31	0.310
GW403661	80	n/a	n/a	0.300
GW400653	51	16-16.2	0.63	0.630
GW402728	66	20-23 34-39 48-66	4.063	n/a

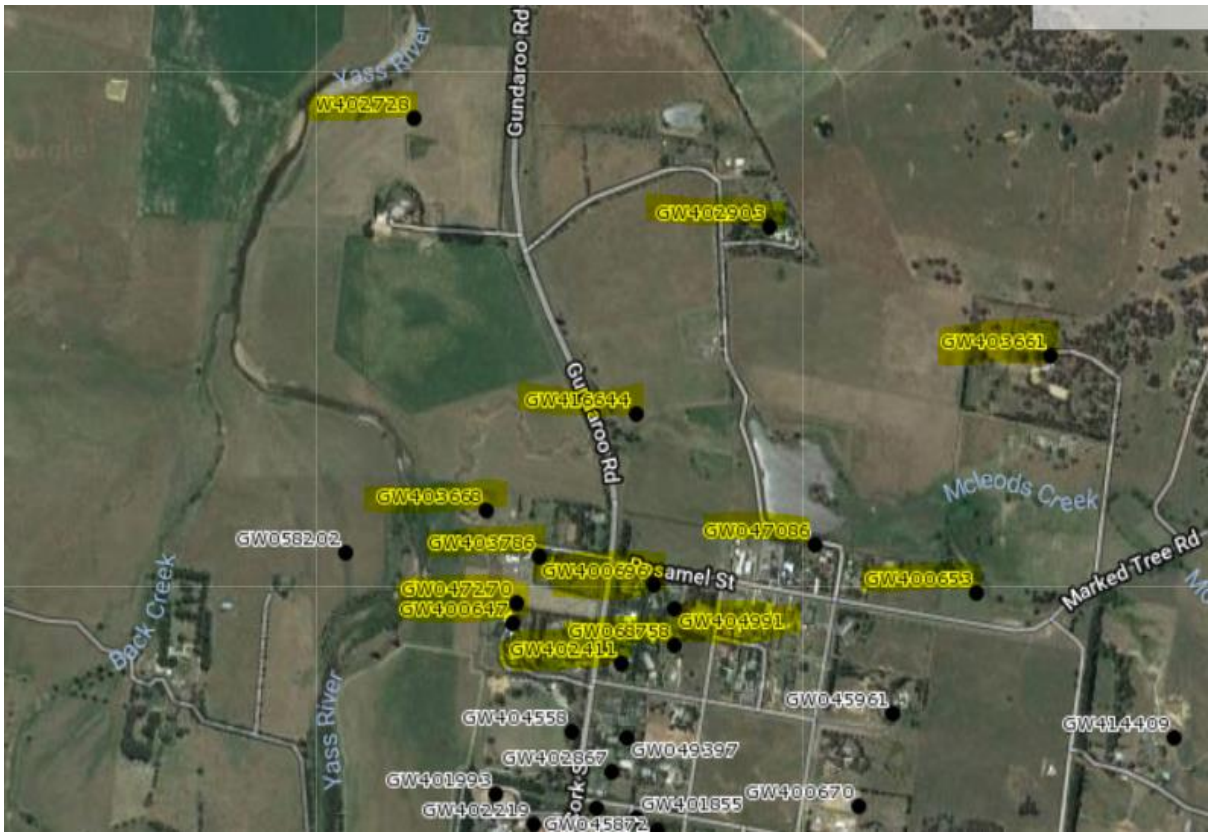

Figure 5: Location of bores assessed in the bore audit

NB: Location of GW 402903 is incorrectly in the NSW bore database (shown) and should be adjacent to the dam on Mcleods Creek

3. avoidance and/or mitigation measures available

Measures to avoid or mitigate potential contamination of the groundwater system include:

- High quality secondary treated and disinfected effluent
- Effluent dispersal systems restricted to shallow subsurface irrigation
- Maintain a minimum 250m buffer between effluent irrigation practices and groundwater bores, refer constraints mapping later in this report (**Figures 7a-b**).

Impacts on groundwater dependent ecosystems

1. potential development related impacts

Groundwater dependent ecosystems are classified into six types including: karst and caves; groundwater dependent wetlands; aquifers; baseflow rivers and streams; terrestrial vegetation and; estuarine and near shore marine ecosystems

There are no priority groundwater dependent ecosystems identified in the area, refer **Figure 6**. Therefore, the potential for the proposed effluent irrigation practices to contaminate groundwater and subsequently damage downstream ecosystems which are dependent, is considered very low.

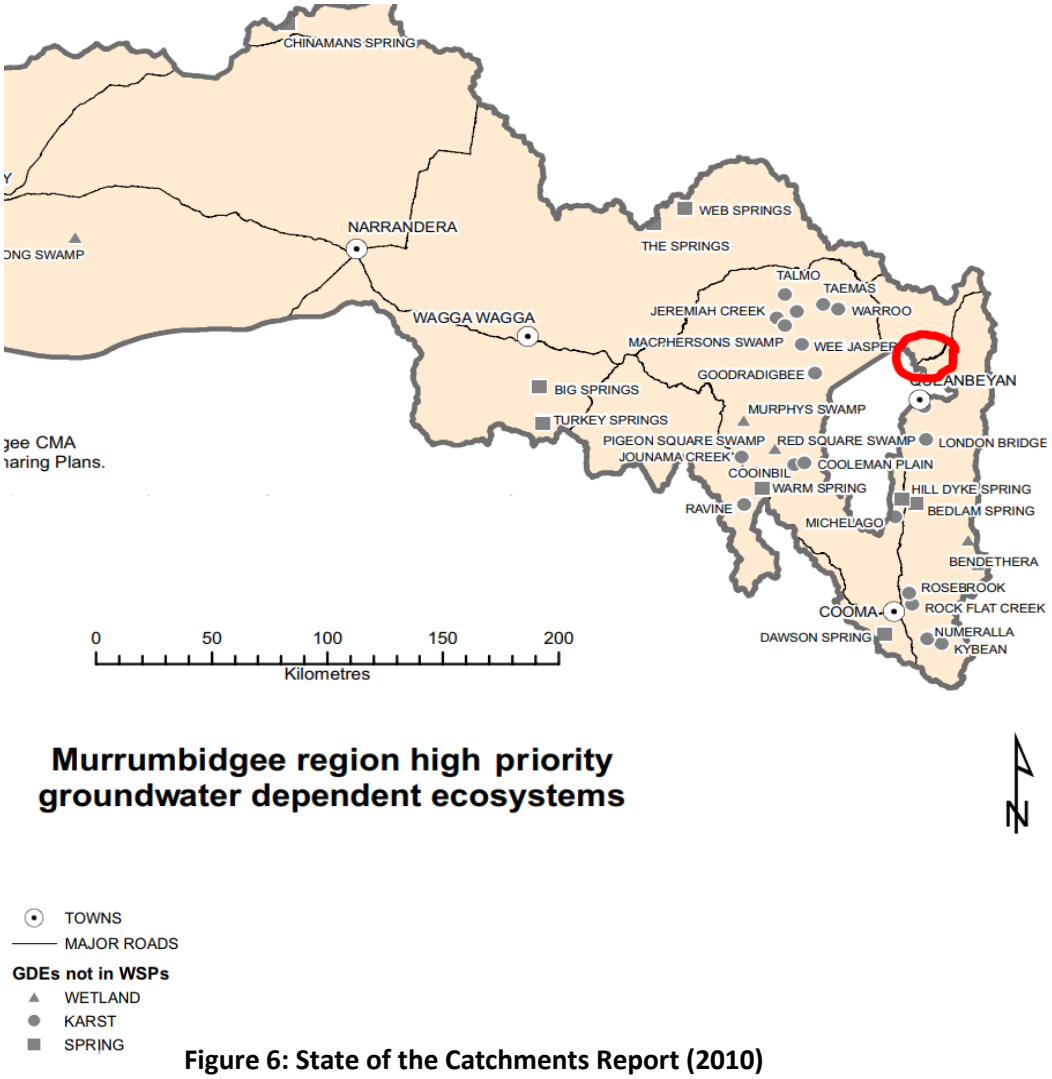

Figure 6: State of the Catchments Report (2010)

2. likelihood, consequence and significance of potential impacts identified

There is a very low likelihood that effluent irrigation would contaminate groundwater sources upon which downstream ecosystems are dependent. The extent of potential contamination, and the separation from downstream groundwater dependent ecosystems, would result in relatively insignificant impacts.

3. avoidance and/or mitigation measures available

The following measures may mitigate any potential for the development to impact groundwater dependent ecosystems:

- High quality secondary treated and disinfected effluent
- Effluent dispersal systems restricted to shallow subsurface irrigation

Cumulative impact the development may have on groundwater (including impacts on nearby groundwater extraction for a potable water supply or stock water supply

1. potential development related impacts

The potential for the development related effluent irrigation practices to contribute to a cumulative impact on the local and regional groundwater systems through decreased water quality is low due to the proposed high-quality secondary treated and disinfected treatment system combined with the subsurface irrigation.

2. likelihood, consequence and significance of potential impacts identified

The likelihood of the effluent irrigation practices having a cumulative impact on local and/or regional groundwater resources available to other users is considered low due to the low risk of contamination.

The concentration of bores in the vicinity of the Gundaroo village is significant, refer **Figure 5**, which increases the potential for cumulative impacts on the groundwater system. The location of the proposed effluent irrigation practices is outside the catchment for most of these bores with only one (GW 402728) being down gradient. This bore is 290m from the western boundary of the effluent irrigation area, is 66m deep with the shallowest water bearing zone at 20m and has low permeability clay subsoils between 2-6m.

The significance of any contribution likely to be made by the proposed effluent irrigation practices, is considered to be very low.

3. avoidance and/or mitigation measures available

The following measures will avoid or mitigate potential cumulative impacts on groundwater resources for existing and future users:

- The location of effluent irrigation practices at the northern end of the development thereby limiting the number downslope users potentially directly impacted, and maximising the separation from the high concentration of bores in the village (>600m from closest village bore GW 403668).

GROUNDWATER CONCLUSIONS

The proposed secondary treatment system, including disinfection, reduces the risk and significance of any potential impacts to the groundwater system. Effluent dispersal through subsurface irrigation further reduces the risk of effluent contamination of the groundwater resource in the area.

The location of the proposed effluent irrigation practices, and the associated surface and groundwater drainage patterns, also minimise the risk of groundwater contamination and reduce the likelihood of cumulative impacts.

There are an adequate range of avoidance and mitigation measures available for potential the impacts identified.

Recommendations

- Impact avoidance and mitigation measures identified be considered in the final plans for subdivision and suitable suite measures be adopted to adequately manage potential impacts.
- A 250m buffer between effluent irrigation practices and new or existing bores be maintained.

Riparian Lands

Yass Valley Local Environment Plan 2013 - Riparian Lands and Watercourses Groundwater Vulnerability Map – Sheet CL2_005 does not include the 1st Order Stream which intersects the effluent irrigation area and includes a farm dam and silt associated trap, refer **Figure 4**. The riparian land associated with Mc Leods Creek in the south of the development site, is included in this mapping and has been discussed in *Capability Assessment for On-site Effluent Disposal, Stages 1 & 2, proposed subdivision of Part lot 1 & lot 2, DP 850916 4076 Gundaroo Rd, Gundaroo,* Soil and Land Conservation Consulting, May 2011.

NSW DPI Office of Water (Guidelines for riparian corridors on waterfront land) defines appropriate riparian buffers for various stream orders to maintain the integrity of these sensitive areas, see below:

Figure 2. The Strahler System

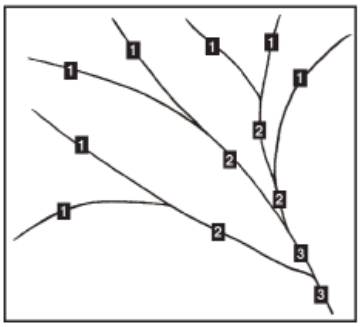

Table 1. Recommended riparian corridor (RC) widths

Watercourse type	VRZ width (each side of watercourse)	Total RC width
1st order	10 metres	20 m + channel width
2nd order	20 metres	40 m + channel width
3rd order	30 metres	60 m + channel width
4th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)	40 metres	80 m + channel width

The 1st Order Stream in the proposed irrigation area will require a 10m buffer. These buffer distances have been mapped as a constraint to proposed subsurface effluent irrigation as the disturbance associated with the construction and installation of irrigation infrastructure would be inconsistent with DPI Water Guidelines, refer constraints mapping later in this report**.**

Recommendations

- Effluent irrigation should not be installed within the 10m riparian buffer on the 1st Order Stream identified in constraints mapping (**Figures 7a-b**).

Effluent Dispersal Buffers

The *ANZ Standard 1547:2012 On-site Domestic Wastewater Management and On-site* and *Sewage Management for Single Households* (The Silver Book) NSW Govt, 1998, require appropriate buffers between drainage depressions, creeks and rivers and effluent dispersal areas. These include a 100 m buffer from major or permanent surface waters including rivers, streams and creeks and a 40 m

buffer from any other water including dams, minor intermittent waterways and drainage channels. The 1st Order Stream which intersects the proposed effluent irrigation area is classed as a drainage depression and therefore requires a 40m drainage buffer. The dams which are located on this stream also require 40m buffers.

The *ANZ Standard 1547:2012 On-site Domestic Wastewater Management and On-site* and *Sewage Management for Single Households* (The Silver Book) NSW Govt, 1998 also requires a buffer distance of 250 m from groundwater bores. The closest bores GW 402903 and GW 402728 are located more than 250 m form the proposed effluent irrigation area and therefore a 250 m buffer will not impinge on the area.

Buffers of 3 m (if upslope) and 6 m (if downslope) are also required between effluent irrigation and property boundaries and buildings.

NB: The existing driveway access which intersects the proposed effluent irrigation area is to be removed as part of the development and therefore will not require a buffer.

Recommendations

- Effluent irrigation should be excluded from the buffer areas mapped in **Figure 7b**.

Figure 7a: Development site, effluent irrigation area, landscape units and Soil Profile locations

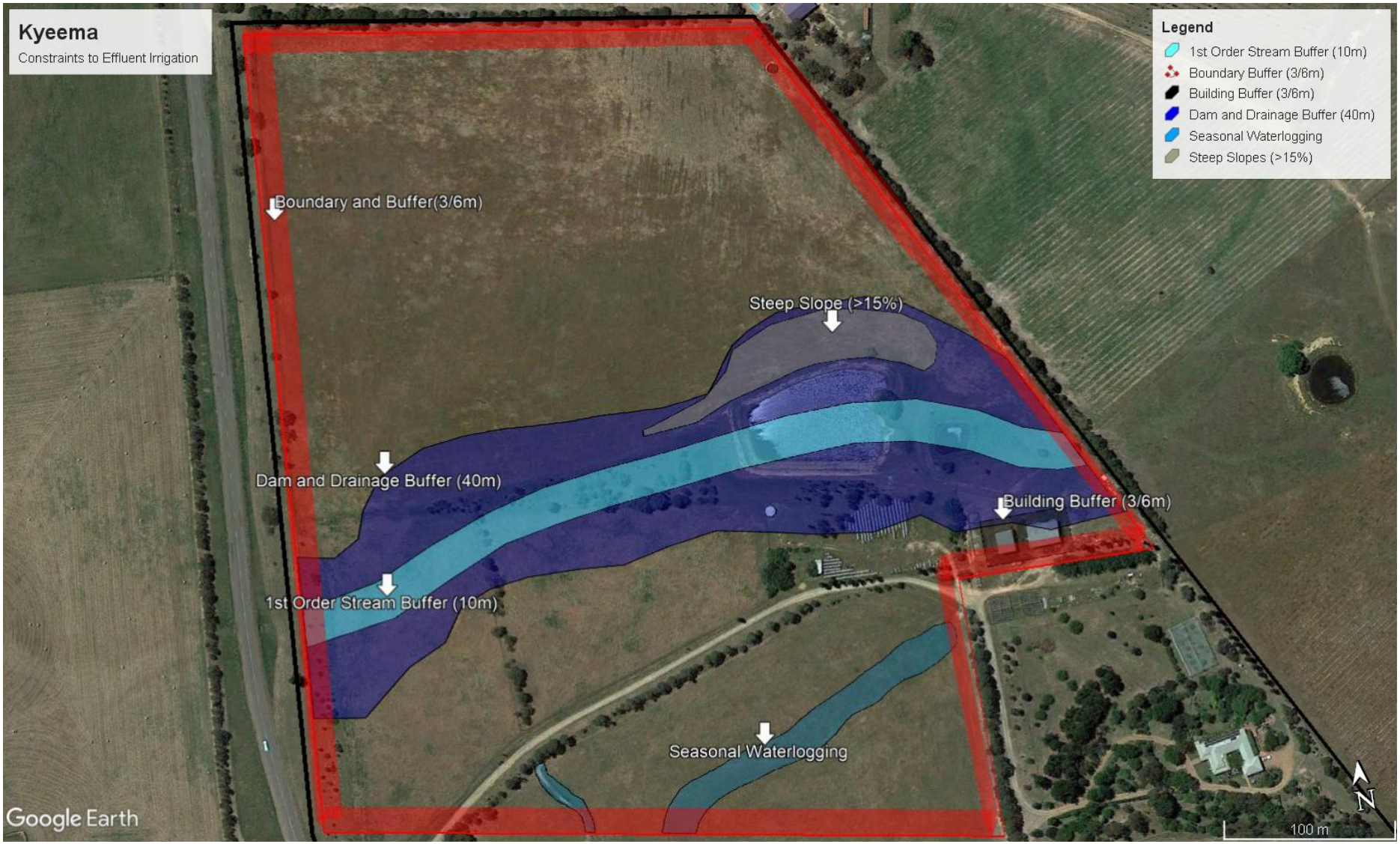

Figure 7b: Effluent irrigation area constraints – unconstrained areas are suited to effluent irrigation practices

SITE AND SOIL LIMITATION ASSESSMENT

The following two limitation tables are a standardised guide to the site and soil characteristics which may limit the suitability of the site for effluent disposal and which would require attention through specific management practices. The tables have been reproduced from *On-site Sewage Management for Single Households* (tables 4 and 6, Anon, 1998). The highlighted categories represent site and soil conditions of the land covered in this report. The tables show that the land designated for effluent application has slight to moderate limitations, but no severe limitations.

Site limitation assessment

Site feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Flood potential	All land application systems	> 1 in 20 yrs.		Frequent, below 1 in 20 yrs	Transport in wastewater off site
	All treatment systems	components above 1 in 100 yrs.		Components below 1 in 100 yrs.	Transport in wastewater off site, system failure
Exposure	All land application systems	High sun and wind exposure		Low sun and wind exposure	Poor evapo-transpiration
Slope %	Surface irrigation	0-6	6-12	>12	Runoff, erosion potential
	Sub-surface irrigation	0-10	10-20	>20	Runoff, erosion potential
	Absorption	0-10	10-20	>20	Runoff, erosion potential
Landform	All systems	Hillcrests, convex side slopes and plains	Concave side slopes and foot slopes	Drainage plains and incised channels	Groundwater pollution hazard, resurfacing hazard
Run-on and seepage	All land application systems	None-low	Moderate	High, diversion not practical	Transport of wastewater off site
Erosion potential	All land application systems	No sign of erosion potential	Erosion Potential	Indications of erosion e.g. rills, mass failure	Soil degradation and off-site impact

Site feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Site drainage	All land application systems	No visible signs of surface dampness		Visible signs of surface dampness	Groundwater pollution hazard, resurfacing hazard
Fill	All systems	No fill	Fill present		Subsidence
Land area	All systems	Area available		Area not available	Health and pollution risk
Rock and rock outcrop	All land application systems	<10%	10-20%	>20%	Limits system performance
Geology	All land application systems	None		Major geological discontinuities, fractured or highly porous regolith	Groundwater pollution hazard

Soil limitation assessment

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Depth to bedrock	Surface and sub surface irrigation	> 1.0	.5-1.0	< 0.5	Restricts plant growth
or hardpan (m)	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Depth to seasonal water table (m)	Surface and sub surface irrigation	> 1.0	0.5-1.0	< 0.5	Groundwater pollution hazard
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Permeability	Surface and sub surface irrigation	2b, 3 and 4	2a, 5	1 and 6	Excessive runoff and waterlogging
Class	Absorption	3, 4		1, 2, 5, 6	Percolation
Coarse fragments %	All systems	0-20	20-45	>40	Restricts plant growth, affects trench installation
Bulk density (g/cc) **SL** **L, CL** **C**	All land application systems	 < 1.8 < 1.6 < 1.4		 > 1.8 > 1.6 >1.4	restricts plant growth, indicator of permeability
pH	All land application systems	> 6.0	4.5-6.0	-	Reduces plant growth
Electrical conductivity (dS/m)	All land application systems	<4	4-8	>8	Restricts plant growth
Sodicity (ESP)	Irrigation 0-40cm;	0-5	5-10	> 10	Potential for structural degradation

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
	absorption 0-1.2mtr				
CEC mequiv/100g	Irrigation systems	> 15	5-15	< 5	Nutrient leaching
P sorption kg/ha	All land application systems	> 6000	2000-6000	< 2000	Capacity to immobilise P
Aggregate stability	All land application systems	Classes 3-8	class 2	class1	Erosion hazard

CONCLUSION

The assessment of the area proposed for effluent irrigation has found the site and soils to be suitable for this purpose. There are small areas that are constrained for effluent irrigation due to proximity to watercourses, boundaries or buildings, and localised areas of steep slope and seasonal waterlogging. These constrained areas have been mapped (refer **Figure 7b**) and the remaining unconstrained areas are considered suitable for effluent irrigation practices.

Soils vary across the proposed irrigation area. This variation corresponds to the three landscape units identified on the site, refer **Figure 7a**. The representative analytical data for the soils in each landscape unit shows subsoils with a moderate to high phosphorous sorption level, very low salinity and medium exchangeable sodium levels. As such the soils are free of any significant chemical limitations to effluent dispersal.

The potential for the proposed irrigation practices to impact on the vulnerable groundwater system which underlies the area, was assessed against the areas of concern identified in the Yass Valley Local Environment Plan (2013). The assessment found there was generally a low risk of impact due principally to the location and type of effluent treatment and dispersal proposed.

Additional effluent treatment and dispersal system design work will be required to establish the exact specifications, including area required, for effluent irrigation. Provided this area is available within the unconstrained parts of the site, the impacts associated with the effluent irrigation practices should be minimal.

Appendix 1: Soil Profile Descriptions

Soil Profile 1 – Hillslope/crest

Soil classification	Depth (cm)	Properties
Red Chromosol	0-10	A1 Medium brown, sandy loam, weak structure, <5% coarse fragments as small gravel, moist and friable, gradational colour change to
	10-25	A2 Bleached light brown, sandy loam, 5-10 % coarse fragments, as gravel, massive to weak structure, dry and friable, moderate colour and textural boundary to
	25-40	B1 Red/light brown fine sandy clay loam, dry and friable, massive to weak structure, <5% coarse fragments as gravel, grades to
	40-60	B2 Yellow/white fine sandy clay loam, dry and friable, massive structure, <5% fragments as gravel, degrades to decomposed meta-sediment parent material.

Figure 8: Soil Profile 1 – Hillslope/crest (Refer Figure 7a)

NB: Soil profiles are presented as expanded profiles (expansion factor approximately X2)

Soil Profile 1 – Physical and Chemical Parameters (B-horizon)

Depth to bedrock or hardpan:	0.6 m
Depth to high soil water table:	>1.5 m
Hydraulic loading rate Soil texture: Soil structure: Permeability (*from table M1 of AS1547:2012)*: Recommended design loading rate for effluent irrigation mm/day *(from table M1 of AS1547:2012)*:	 Sandy **Clay Loam** **Weak** 0.12-0.5 3.5
Coarse fragments:	<5%
Bulk density*	1.8
PH field*:	5.9
Electrical conductivity dS/m*:	0.03
Exchangeable sodium %*:	3
Cation exchange capacity (mequiv/100g)*:	16.6
Phosphorous sorption capacity mg/kg*:	724
Geological feature Discontinuities: Fractured rock	None
Soil landscape reference*	Winunga
Dispersiveness EAT class*:	5

* extrapolated from Jenkins (2000) Soil Landscapes of the Canberra 1:100,000. DLWC

Soil Profile 2– Lower Terrace

Soil classification	Depth (cm)	Properties
Red Chromosol	0-30 30->100	A Medium to dark brown, sandy loam, weak to moderate structure, no coarse fragments, moist and friable, gradational colour change to B Red/orange fine sandy clay loam, dry and friable, massive to weak structure, no coarse fragments, continues

Figure 9: Soil Profile 2 – Lower Terrace (Refer Figure 7a)

NB: Soil profiles are presented as expanded profiles (expansion factor approximately X2)

Soil Profile 2 – Physical and Chemical Parameters (B-horizon)

Depth to bedrock or hardpan:	>1 m
Depth to high soil water table:	>1.5 m
Hydraulic loading rate Soil texture: Soil structure: Permeability (*from table M1 of AS1547:2012)*: Recommended design loading rate for effluent irrigation mm/day *(from table M1 of AS1547:2012)*:	 Sandy **Clay Loam** Massive to **Weak** 0.12-0.5 3.5
Coarse fragments:	None
Bulk density*	1.8
PH field*:	6.3
Electrical conductivity dS/m*:	0.07
Exchangeable sodium %*:	10
Cation exchange capacity (mequiv/100g)*:	6.1
Phosphorous sorption capacity mg/kg*:	351
Geological feature Discontinuities: Fractured rock	None
Soil landscape reference*	Gundaroo
Dispersiveness EAT class*:	3 (1)

* extrapolated from Jenkins (2000) Soil Landscapes of the Canberra 1:100,000. DLWC

Figure 10: Soil Texture Field Analysis – Ribbon length 50mm – Sandy Clay Loam

Soil Profile 3– Upper Terrace

Soil classification	Depth (cm)	Properties
Brown Chromosol	0-15	A1 Medium brown, sandy loam, massive to weak structure, no coarse fragments, moist and friable, gradational colour change to
	15-40	A2 Bleached light brown, sandy loam, no coarse fragments, massive to weak structure, moist and friable, moderate colour and textural boundary to
	40->100	B Red light sandy clay, moist and firm, weak to moderate structure, no coarse fragments, continues

Figure 11: Soil Profile 3 – Upper Terrace (Refer Figure 7a)

NB: Soil profiles are presented as expanded profiles (expansion factor approximately X2)

Soil Profile 3 – Physical and Chemical Parameters (B-horizon)

Depth to bedrock or hardpan:	>1 m
Depth to high soil water table:	>1.5 m
Hydraulic loading rate Soil texture: Soil structure: Permeability (*from table M1 of AS1547:2012)*: Recommended design loading rate for effluent irrigation mm/day *(from table M1 of AS1547:2012)*:	 Sandy **Light Clay** Loam Weak to **Moderate** 0.06-0.12 3
Coarse fragments:	None
Bulk density*	1.8
PH field*:	6.3
Electrical conductivity dS/m*:	0.07
Exchangeable sodium %*:	10
Cation exchange capacity (mequiv/100g)*:	6.1
Phosphorous sorption capacity mg/kg*:	351
Geological feature Discontinuities: Fractured rock	None
Soil landscape reference*	Gundaroo
Dispersiveness EAT class*:	3 (1)

* extrapolated from Jenkins (2000) Soil Landscapes of the Canberra 1:100,000. DLWC

Figure 12: Soil Texture Field Analysis – Ribbon length 70mm – Light Clay

Appendix 2: Soil Test Results

SESL Australia
ABN 70 105 810 708
16 Chilvers Rd Thornleigh NSW 2120
Ph: 1300 30 40 80 Fax: 1300 64 46 89
Info@sesl.com.au www.sesl.com.au

Client:
Urgent TAT +3 days

Certificate of Analysis

Attention: Ryan Jacka

Regarding your booking:

Client Ref No.:	48701	Report Ref No:	182374
Date Received:	13/07/18	Issue Date:	23/07/18
Time Received:	10:45	Lab Due Date:	20/07/18
No. of samples:	3	Turn Around Time:	Normal

Report Details:

Accredited for compliance with ISO/IEC 17025, NATA accreditation number 15633
NATA accreditation does not cover the performance of a service if not indicated

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian standards
This document must not be reproduced except in full
Results are based on the analysis of the sample taken or received by SESL.
Due to the environmental conditions and managerial factors, SESL does not accept any liability for a lack of performance based on its interpretations

Authorised Signatory:

Sample Number	Sample Matrix	Client Sample ID	Sample Name
1	Soil	48701-1	SCO18/080/1
2	Soil	48701-2	SCO18/080/2
3	Soil	48701-3	SCO18/080/3

Sample No: Client Reference: Test	Units	Method	Accredited	1 48701-1	2 48701-2	3 48701-3
Water ratio in as rec'd sample	gH2O/100g as-rec'd	PM0004MC		7.80	19.7	8.20
Solid ratio in as rec'd sample	gSolid/100g as-rec'd	PM0004MC		92.2	80.3	91.8
Moisture of as rec'd sample	gH2O/g oven dry	PM0004MC		0.0840	0.245	0.0900
pH of soil:water mix	pH units	CM0002pH	NATA	6.89	7.52	6.87
EC 1:5 soil:water wtcor	mS/cm	CM0025 extraction	NATA	0.0200	0.0500	0.0200
pH 1:5 in CaCl2	pH units	CM0002pH	NATA	6.32	6.63	6.00
Soil texture by Northcote		PM0003TSC		Fine Sandy Clay Loam	Clay Loam	Fine Sandy Clay Loam
Soil is / isn't gravelly		PM0003TSC		Gravelly	Gravelly	Gravelly
Soil is / isn't organic		PM0003TSC		Not Organic	Not Organic	Not Organic
EAT in water class		PM0010 EAT/mEAT		CLASS 5	CLASS 5	CLASS 5
EAT in water class (CW)		PM0010 EAT/mEAT		CLASS 5	CLASS 5	CLASS 5
X: PS by sample mgP/kg	mgP/kg	CM0016PSI		196.596	696.263	246.531
PO4 in PS blank (mgP/kg)	mgP/kg			760.231	742.385	763.903
Na in soil sol ext	meq %	CM0025 extraction	NATA	0.030	0.340	0.070
K in soil sol ext	meq %	CM0025 extraction	NATA	0.160	0.250	0.160
Ca in soil sol ext	meq %	CM0025 extraction	NATA	<0.10	<0.10	<0.10
Mg in soil sol ext	meq %	CM0025 extraction	NATA	0.170	0.420	0.260
Na in soil by NH4Cl	meq %	CM0025 extraction	NATA	<0.100	1.57	0.110
K in soil by NH4Cl	meq %	CM0025 extraction	NATA	0.190	0.410	0.170
Ca in soil by NH4Cl	meq %	CM0025 extraction	NATA	3.79	6.71	4.36
Mg in soil by NH4Cl	meq %	CM0025 extraction	NATA	1.23	15.6	3.85
Al NH4Cl (mg/kg)	mg/kg	CM0025 extraction		1.85	1.88	1.49
Exch acidity (Al+H) pHAE	meq%	CM0024 AE Buffer		X	X	X
pH AE sample (FMP)	(buff 8.0pH corr)			X	X	X

Method	Method Summary
PM0004 MC	Gravimetric Moisture Content in soil/compost/waste products by oven drying based on AS1289.2.1.1
CM0002 pH	pH of soils, sands, media, composts and waters by automated pH/EC meter based on Rayment & Higginson 4A1, 4B2, C1a
CM0025 extraction	Liquid chemical extraction of soils, media and composts
PM0003 TSC	Texture/Structure/Colour of soils by bolus preparation based on Keith H. Northcote (1992)
PM0010 EAT/mEAT	Emerson class on soils by the Emerson Aggregate Test/Modified Emerson Aggregate Test Method based on AS1289.3.8.1
CM0016 PSI	Phosphate sorption index of soil based on Rayment & Lyons 9I1
CM0024 AE Buffer	Exchangeable acidity of soil by Adams Evans single buffer pH method based on SSSA Methods of Soil Analysis (2007)

Batch N°: 48701	Sample N°: 1	Date Received: 13/7/18	Report Status: ○ Draft ◉ Final

Client Name:	Soil Conservation Service	Project Name:	SCO18/080
		SESL Quote N°:	Contract 17-0720
Client Contact:	Lynn Dunn	Sample Name:	SCO18/080/1
Client Order N°:	800203186	Description:	Soil
Address:	PO Box 3935 Parramatta NSW 2124	Test Type:	SCS_Effluent

TEST	RESULT	COMMENTS
pH in water 1:5	6.9	
pH in $CaCl_2$ 1:5	6.3	
EC dS/m 1:5	0.02	Very low

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
	meq%	Comment	meq%	% of ECEC	Comment
Sodium	0.03		0.023	0.5	
Potassium	0.16		0.029	0.6	
Calcium	0.04		3.75	77.2	
Magnesium	0.17		1.06	21.8	
Aluminium			<0.03	0.4	
		ECEC	4.86		
		Ca/Mg	3.1		

Phosphate Retention Index (%): **PRI (mgP/kg):** **PRI (kg/ha):** -

PHYSICAL CHARACTERISTICS			Comment
Texture:	Fine Sandy Clay Loam	**Field Density (g/mL):**	
Colour:	-	**Emerson Stability Class:**	H20 CLASS 5
Size:	-	**High SAR/Low Iconic Strength:**	
Aggregate strength:	-	**Med SAR/High Iconic Strength:**	
Structural unit:	Did not test		
Approx. Clay Content (%):	20 - 30%		
Potential infiltration rate:	Moderate		
Gravel Content:	Soil is Gravelly		
Additional comments:			

Recommendations

Moisture content: 7.8 %
Phosphate Sorption: 760 mg/kg

Results only requested.

Method References:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: 9H1 of Rayment & Lyons. Wax Block Density: Method 30-4 Black (1983), Emerson's Aggregate Test: Chernan & Murphy (1991), Particle Size Analysis: Modified Black (1983) Method 43-1 to 43-6. Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Consultant: Michelle Murphy

Authorised Signatory: Simon Leake

Date Report Generated
23/07/2018

Batch N°: 48701	Sample N°: 2	Date Received: 13/7/18	Report Status: ○ Draft ◉ Final

Client Name:	Soil Conservation Service	Project Name:	SCO18/080
		SESL Quote N°:	Contract 17-0720
Client Contact:	Lynn Dunn	Sample Name:	SCO18/080/2
Client Order N°:	800203186	Description:	Soil
Address:	PO Box 3935 Parramatta NSW 2124	Test Type:	SCS_Effluent

TEST	RESULT	COMMENTS
pH in water 1:5	7.5	
pH in $CaCl_2$ 1:5	6.6	
EC dS/m 1:5	0.05	Very low

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
	meq%	Comment	meq%	% of ECEC	Comment
Sodium	0.34		1.23	5.3	
Potassium	0.25		0.16	0.7	
Calcium	0.05		6.66	28.7	
Magnesium	0.42		15.1	65.1	
Aluminium			<0.03	0.1	
		ECEC	23.2		
		Ca/Mg	.4		

Phosphate Retention Index (%): **PRI (mgP/kg):** **PRI (kg/ha):** -

PHYSICAL CHARACTERISTICS			Comment
Texture:	Clay Loam	**Field Density (g/mL):**	
Colour:	-	**Emerson Stability Class:**	H20 CLASS 5
Size:	-	**High SAR/Low Iconic Strength:**	
Aggregate strength:	-	**Med SAR/High Iconic Strength:**	
Structural unit:	Did not test		
Approx. Clay Content (%):	25 - 35%		
Potential infiltration rate:	Moderate		
Gravel Content:	Soil is Gravelly		
Additional comments:			

Recommendations

Moisture content: 19.7 %
Phosphate Sorption: 742 mg/kg

Results only requested.

Method References:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: 9H1 of Rayment & Lyons. Wax Block Density: Method 3D-4 Black (1983).
Emerson's Aggregate Test: Charman & Murphy (1991). Particle Size Analysis: Modified Black (1983) Method 43-1 to 43-6. Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Tests are performed under a quality system certified as complying with ISO 9001: 2000. Results and conclusions assume that sampling is representative. This document shall not be reproduced except in full.

Consultant: Michelle Murphy

Authorised Signatory: Simon Leake

Date Report Generated
23/07/2018

Batch N°: 48701	Sample N°: 3	Date Received: 13/7/18	Report Status: ○ Draft ◉ Final

Client Name:	Soil Conservation Service	Project Name:	SCO18/080
		SESL Quote N°:	Contract 17-0720
Client Contact:	Lynn Dunn	Sample Name:	SCO18/080/3
Client Order N°:	800203186	Description:	Soil
Address:	PO Box 3935 Parramatta NSW 2124	Test Type:	SCS_Effluent

TEST	RESULT	COMMENTS
pH in water 1:5	6.9	
pH in $CaCl_2$ 1:5	6.0	
EC dS/m 1:5	0.02	Very low

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
	meq%	Comment	meq%	% of ECEC	Comment
Sodium	0.07		0.047	0.6	
Potassium	0.16		0.015	0.2	
Calcium	0.04		4.31	54.1	
Magnesium	0.26		3.59	45.1	
Aluminium			<0.03	0.2	
		ECEC	7.96		
		Ca/Mg	1.1		

Phosphate Retention Index (%): **PRI (mgP/kg):** **PRI (kg/ha):** -

PHYSICAL CHARACTERISTICS			Comment
Texture:	Fine Sandy Clay Loam	**Field Density (g/mL):**	
Colour:	-	**Emerson Stability Class:**	H20 CLASS 5
Size:	-	**High SAR/Low Iconic Strength:**	
Aggregate strength:	-	**Med SAR/High Iconic Strength:**	
Structural unit:	Did not test		
Approx. Clay Content (%):	20 - 30%		
Potential infiltration rate:	Moderate		
Gravel Content:	Soil is Gravelly		
Additional comments:			

Recommendations

Moisture content: 8.2 %
Phosphate Sorption: 764 mg/kg

Results only requested.

Method References:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: 9H1 of Rayment & Lyons. Wax Block Density: Method 30-4 Black (1983).
Emerson's Aggregate Test: Charman & Murphy (1991), Particle Size Analysis: Modified Black (1983) Method 43-1 to 43-6. Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Consultant: Michelle Murphy

Authorised Signatory: Simon Leake

Date Report Generated
23/07/2018

Subdivision of 4056-4078 Gundaroo Road, Gundaroo, NSW

Biodiversity Management Plan

Final – March 2019

Prepared for Kyeema Management Pty Ltd

Document Information

Report for: Kyeema Management Pty Ltd

Prepared by: Sam Reid and Robert Speirs

Capital Ecology project no.: 2867

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Version	Internal reviewer	External reviewer	Date of issue
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Final version 01	Robert Speirs	-	18/03/2019

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Table of Contents

1 Introduction

Kyeema Management Pty Ltd is progressing with the planning and approval process to subdivide 4056–4078 Gundaroo Road, Gundaroo, NSW (the 'subject land', 63 ha in size, Figure 1 and Figure 2). Capital Ecology Pty Ltd (Capital Ecology) was commissioned by Kyeema Management Pty Ltd during spring 2018 to undertake ecological surveys and prepare a Biodiversity Development Assessment Report (BDAR) (Capital Ecology 2018[1]) to identify the biodiversity values of the subject land and assess the significance of the impacts that the subdivision will have on these values. Reference should be made to the BDAR for the technical information relevant to this Biodiversity Management Plan (BMP).

As shown in Figure 2, the subdivision will create the following.

- Eight new residential lots:
    - Lot 6, a 3.14 ha lot on land zoned 'E4 – Environmental Living'[2] and 'E2 – Environmental Conservation'. The building envelope associated with Lot 6 is located on land zoned 'E4 – Environmental Living' with a minimum lot size of 'Y – 1 ha'[3];
    - Lots 7 to 10, each 1 ha on land zoned 'E4 – Environmental Living' with a minimum lot size of 'Y – 1 ha'; and
    - Lots 11 to 13, ranging from 5,000 m^2 to 8,000 m^2 on land zoned 'R2 – Low Density Residential' with a minimum lot size of 'V – 2,000 m^2'.
- A public road to access the newly created residential lots.
- Two lots zoned 'E3 – Environmental Management':
    - Lot 2, a 15.13 ha lot on land with a minimum lot size of 'AB1 – 10 ha'; and
    - Lot 4, a 2 ha lot on land with a minimum lot size of 'Z1 – 2 ha'.
- Lot 3, a 13.5 ha lot encompassing the remainder of the 'R2 – Low Density Residential' zoned land.
- Lot 5, a 21.75 ha lot which contains the existing dwelling, on land zoned 'RU1 – Primary Production' with a minimum lot size of 'AB3 – 20 ha'.

As detailed in the BDAR, the subject land has been utilised for agriculture for an extended period and the vegetation which occurs today is highly modified. The majority of the subject land is intensively grazed by sheep, and each of the open paddocks has been historically cultivated and sown to crops and/or pasture (Figure 3). Only two paddocks have retained a substantially native groundstorey (i.e. > 25% perennial native groundcover), with the remainder clearly dominated by exotic pasture grasses and forbs. Native trees and shrubs have been planted around the dwellings and along road verges and fence lines. None of planted native species naturally occur in the relevant

[1] Capital Ecology (2018*). Subdivision of 4056-4078 Gundaroo Road, Gundaroo, NSW – Biodiversity Development Assessment Report*. Final – October 2018. Prepared for Kyeema Management Pty Ltd. Authors: R. Speirs & Sam Reid. Project no. 2812.
[2] Yass Valley Local Environment Plan (2013). Land Zoning Map - Sheet LZN_005E.
[3] Yass Valley Local Environment Plan (2013). LEP Lot Size Map - Sheet LSZ_005E.

grassland Plant Community Type (PCT), yet they do meet the definition of native vegetation under the *NSW Biodiversity Conservation Act 2016* (BC Act) as they are native to NSW.

The two small patches of dry sclerophyll forest (i.e. PCT351) have been largely cleared and only three remnant Brittle Gum *Eucalyptus mannifera* trees remain (Figure 3). The midstorey and shrubstorey are entirely absent, and stock grazing has prevented regeneration of the remnant canopy eucalypts. The groundlayer across these patches consists of stock camps dominated by exotic annual grasses and herbaceous weeds, and the only areas of BC Act native vegetation are those defined by the canopy of the three remnant trees. The three remnant trees contain hollows which were occupied at the time of survey for the BDAR by the Common Starling *Sturnus vulgaris* and the Crimson Rosella *Platycercus elegans*. Importantly, no threatened bird species were observed nesting in these remnant trees despite observations occurring at the appropriate time of year, nor were any observed anywhere in or adjacent to the subject land. The three remnant trees in the subject land are unlikely to be important habitat for the Superb Parrot *Polytelis swainsonii* or any other threatened species.

Clearance of vegetation and other construction related impacts will occur for the creation and servicing of Lots 6 to 13 and for the construction of the road and bridge to connect the residential lots to Lute Street (Figure 2 and Figure 3). The segment of Mcleods Creek running through the subject land and the associated large dam will be retained within Lot 2, and the three remnant Brittle Gum will be retained within Lot 6 (the portion of that lot zoned 'E2 – Environmental Conservation') and the north-eastern corner Lot 5 (Figure 2 and Figure 3).

As stated in the Yass Valley Council Notice of Determination (dated 19 December 2018), a BMP is one of the conditions of consent for the approval of the subdivision of the subject land (Development Application - DA185092). Specifically, Part D (1) and Part D (2) of the Notice of Determination state:

> *(1) Prior to issue of construction, a Biodiversity Management Plan must be prepared to and approved by Council. The Biodiversity Management Plan may form part of a Construction Environmental Management Plan.*
>
> *(2) The Biodiversity Management Plan must identify:*
>
> - *the development site as per the Biodiversity Development Assessment Report and approved plans.*
> - *areas of land that are to be retained as outlined in the Biodiversity Development Assessment Report.*
> - *Construction impacts must be restricted to the development site and must not encroach into areas of retained native vegetation and habitat. All materials stockpiles, vehicle parking, machinery storage and other temporary facilities must be located within the areas for which biodiversity impacts were assessed in the Biodiversity Development Assessment Report.*
> - *All measures proposed in the Biodiversity Development Assessment Report to mitigate and manage impacts on biodiversity, including performance measures for each commitment.*

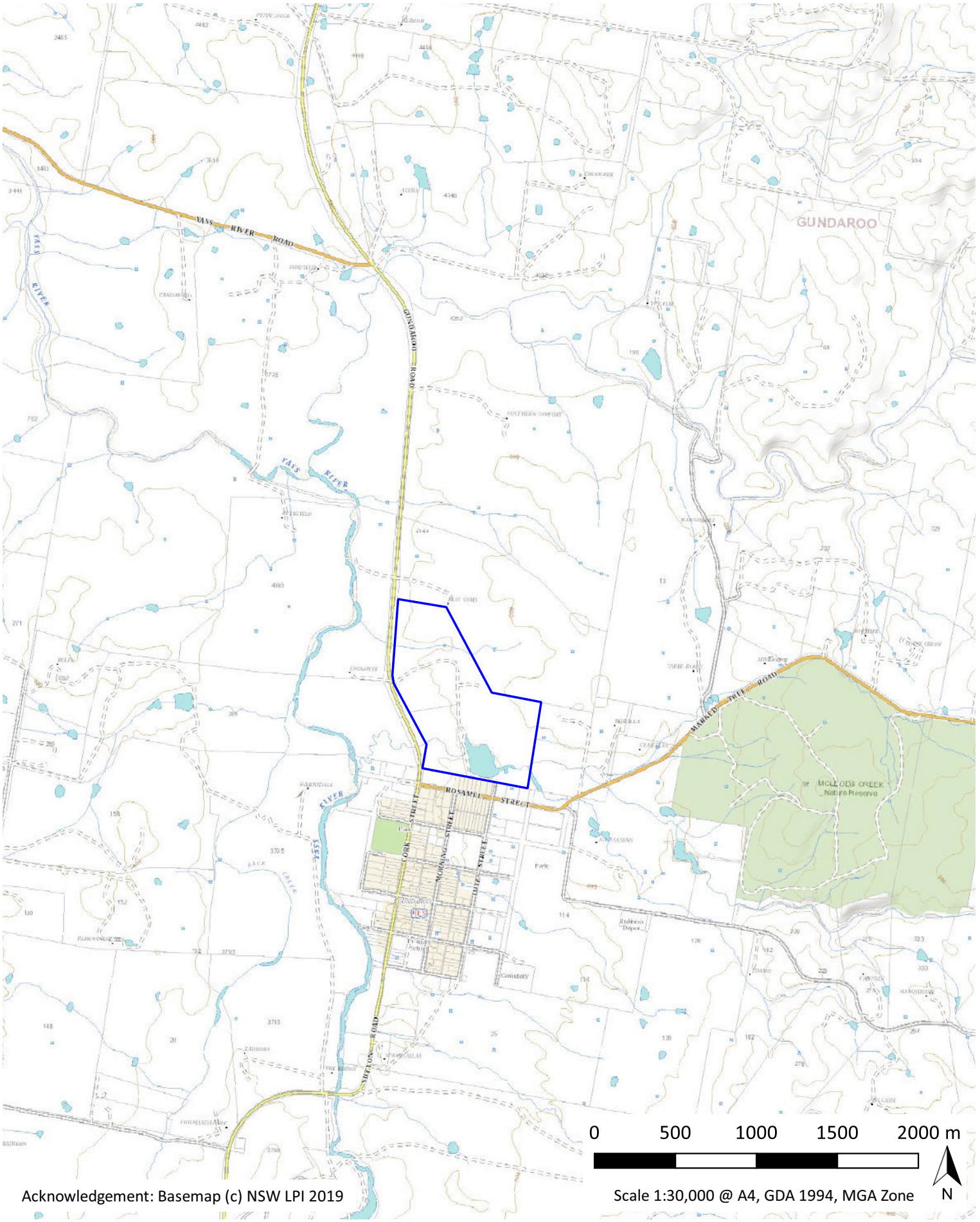
With regard to the above, and as described Section 3.1 of the BDAR, the subdivision's extent and layout have been designed to avoid and minimise impacts upon the biodiversity values of the subject land (significant or otherwise). Notwithstanding this, the implementation of the biodiversity

protection and enhancement measures prescribed in this BMP will be important to conserve and enhance the values of the vegetation outside of the newly created residential lots in the most effective and practicable manner.

This BMP comprises the following two key sections, each of which details a key element of this BMP:

1. Section 2 – Biodiversity Management Plan Area. Section 2 describes the purpose of the Biodiversity Management Plan Area (i.e. Lots 2 to 5 and the portion of Lot 6 zoned 'E2 – Environmental Conservation') and the rationale behind its location and extent.

2. Section 3 – Biodiversity Management Units. Section 3 describes each of the three Biodiversity Management Units (BMUs), the rationale behind their location and extent and the biodiversity conservation and enhancement measures that must be implemented within each.



Acknowledgement: Basemap (c) NSW LPI 2019

Scale 1:30,000 @ A4, GDA 1994, MGA Zone

Figure 1. Locality Plan

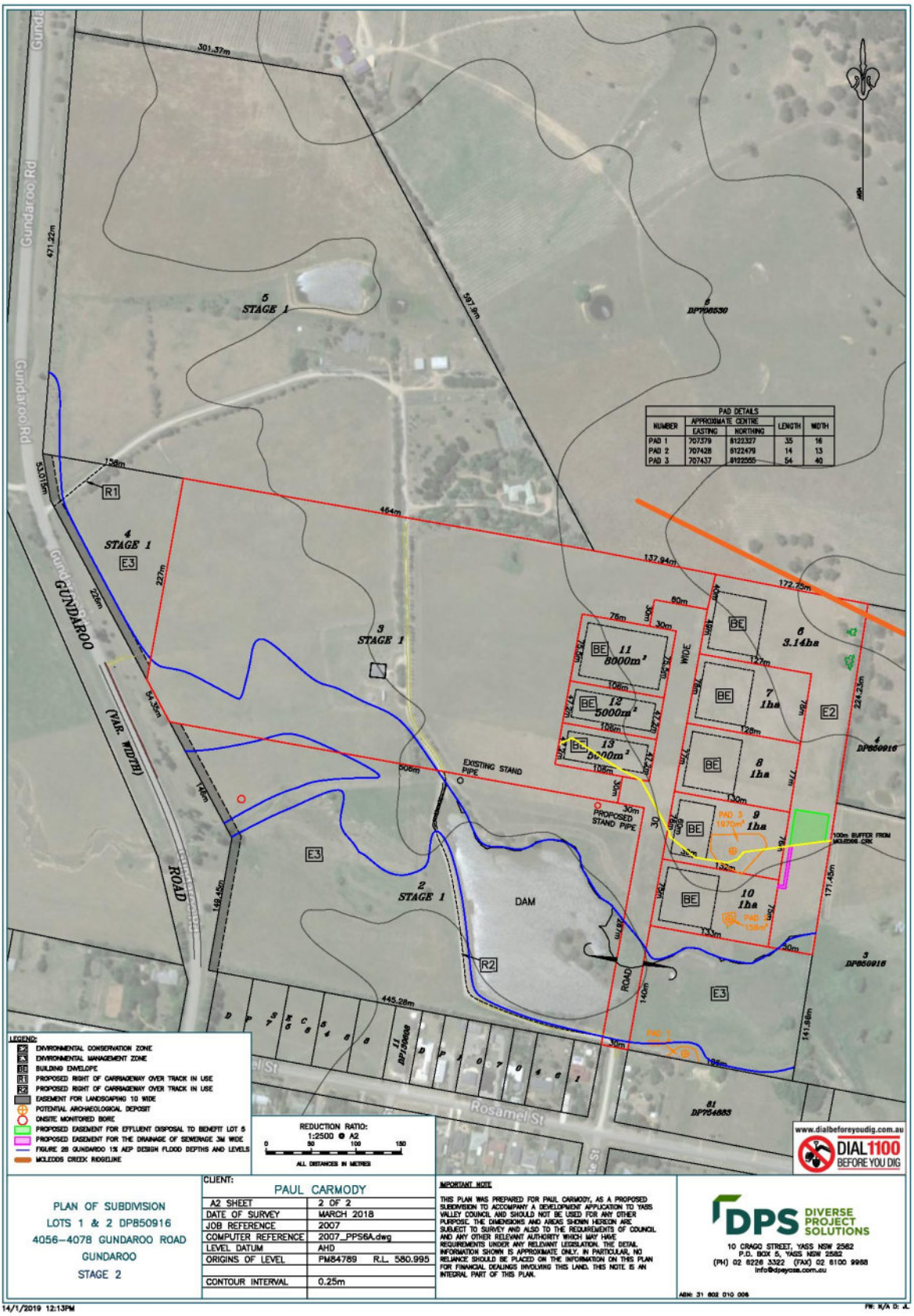
Legend

Subject Land

Capital Ecology Project No: 2867
Drawn by: S. Reid
Date: 7 March 2019

capital ecology

Figure 2. Proposed Development



2 Biodiversity Management Plan Area

As shown in Figure 3 and Figure 4, the Biodiversity Management Plan Area encompasses all of the subject land outside of the newly created residential lots and public road. The Biodiversity Management Plan Area is therefore 54.5 hectares (87% of the subject land, Figure 3 and Figure 4). The mapping presented in Figure 3 is drawn from the BDAR and illustrates the ecological values of the subject land, including the vegetation mapping (Plant Community Types [PCTs] and their constituent Vegetation Zones), the subject land's three mature remnant eucalypt trees, and the proposed development impact area. As shown in Figure 3 and Figure 4, the Biodiversity Management Plan Area will contain the following.

- All (i.e. 100%) of PCT351 Zone 1, characterised by a native canopy over an exotic groundstorey. This zone is the only portion of the subject land which contains mature, remnant trees (i.e. the three remnant Brittle Gum). These trees are likely to provide foraging resources for a variety of birds. The hollows are likely to provide a nesting resource for common birds, bats and marsupials.

- Almost all (i.e. 84%) of PCT351 Zone 2, characterised by a low diversity exotic groundstorey. The exotic groundstorey is likely to provide a foraging resource for common birds, reptiles and herbivorous mammals. Open areas provide hunting resources for raptors and other predatory birds.

- Two-thirds (i.e. 66%) of PCT896 Zone 1, characterised by a low diversity native groundstorey. The native groundstorey is likely to provide a foraging resource for common birds, reptiles and herbivorous mammals. Open areas provide hunting resources for raptors and other predatory birds.

- All (i.e. 100%) of PCT896 Zone 2, characterised by the Common Reed *Phagmites australis*. The Common Reed is likely to provide a limited foraging and/or breeding resource for common native fauna, including waterfowl, frogs, and turtles.

- All (i.e. 100%) of PCT896 Zone 3, characterised by planted native trees and shrubs over an exotic groundstorey. This planted native vegetation is likely to provide a foraging resource to a variety of native and exotic birds.

- Almost all (i.e. 96%) of PCT896 Zone 4, characterised by exotic trees over an exotic groundstorey/riparian area. This exotic groundstorey and riparian area are likely to provide a foraging resource for common birds, reptiles and herbivorous mammals.

- Almost all (i.e. 85%) of PCT896 Zone 5, characterised by an exotic groundstorey. The exotic groundstorey is likely to provide a foraging resource for common birds, reptiles and herbivorous mammals. Open areas provide hunting resources for raptors and other predatory birds.

- 4.21 ha of cleared land (driveways, buildings, waterbodies). The dams and creek are likely to provide a limited foraging and/or breeding resource for common native fauna, including waterfowl, frogs, and turtles.

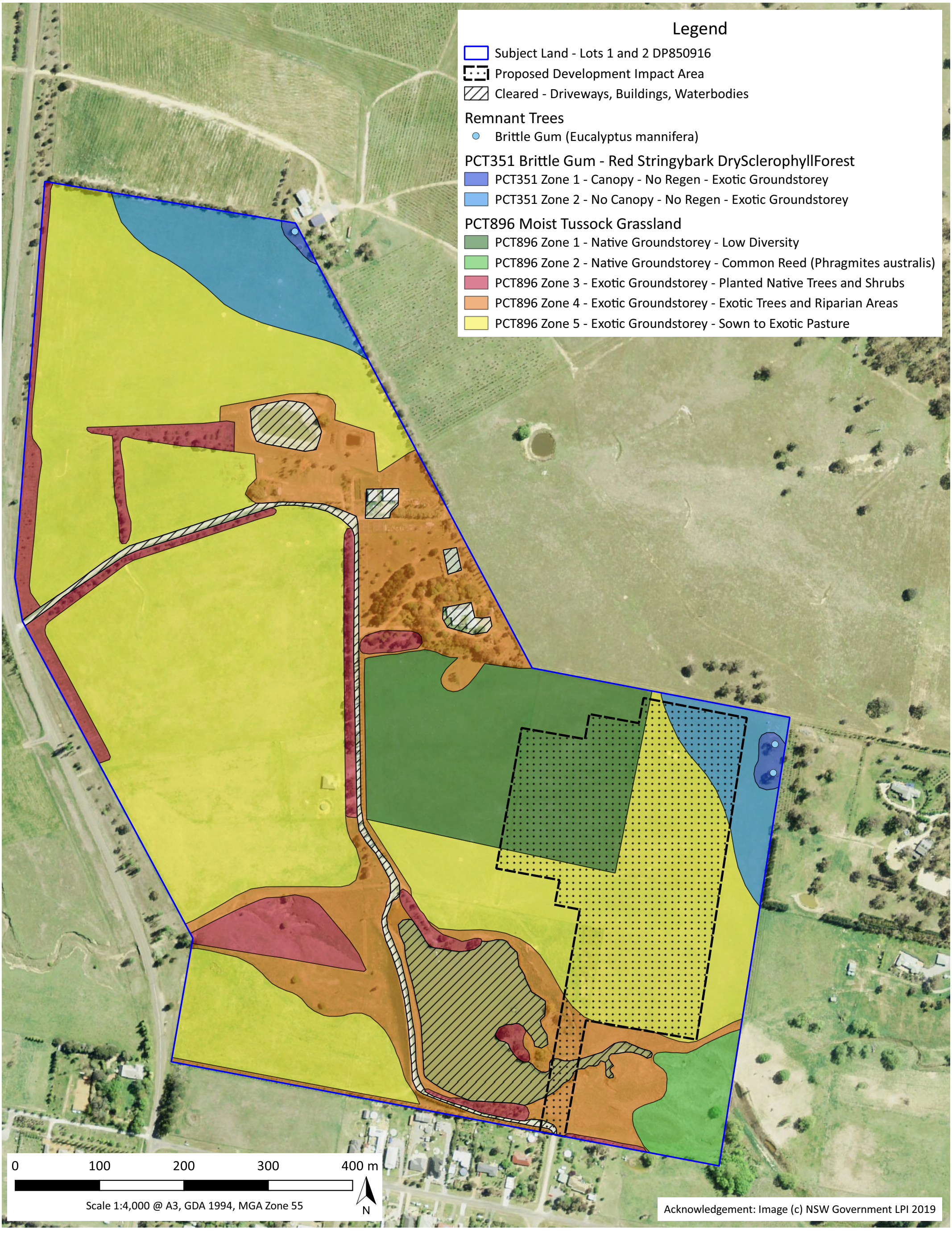


Figure 3. Biodiversity Management Plan Area

Capital Ecology Project No: 2867
Drawn by: S. Reid
Date: 7 March 2019

3 Biodiversity Management Units

As shown in Figure 4, the Biodiversity Management Plan Area will be divided into the following three Biodiversity Management Units (BMUs).

1. BMU 1 – Residential and Agricultural Management Areas.

   BMU 1 will include the majority of the native and exotic pasture, as well as the majority of the planted native and exotic trees and shrubs. BMU 1 will also include the existing residential dwellings, together with all associated buildings, storage areas, spoil piles and other disturbed areas. The land encompassed by BMU 1 is primarily mapped as PCT351 Zone 2 and PCT896 Zones 1, 4 and 5.

   As detailed in Table 1, the BMU 1 areas will be subject to minimal land management restrictions, with the primary measure relevant for BMU 1 being control of noxious weeds and vertebrate fauna pest species.

2. BMU 2 – Environmental Conservation Management Area

   BMU 2 will comprise mostly exotic pasture but includes two of the subject land's three remnant trees. The land encompassed by BMU 2 is primarily mapped as PCT351 Zone 2 and PCT896 Zone 5. It is important to highlight that as outlined in the BDAR, BMU 2 and the two remnant Brittle Gum it contains do not constitute potentially significant threatened species habitat as mentioned in the Notice of Determination for DA185092.

   As detailed in Table 1, active measures will occur within BMU 2 which aim to conserve the two remnant trees, provide a visual buffer from Gundaroo Road, and increase the habitat value of the area for native flora and fauna, notably woodland birds and bats. The measures include initial and ongoing weed control, controlled stock grazing, revegetation/regeneration works, and control of vertebrate fauna pest species.

3. BMU 3 – Environmental Management Areas

   BMU 3 will comprise the portions of the Biodiversity Management Plan Area which contain Mcleods Creek and the large farm dam. The land encompassed by BMU 3 is primarily mapped as PCT896 Zones 4 and 5.

   The land encompassed by BMU 3 has low ecological value. The primary function of BMU 3 is to provide a buffer to Mcleods Creek. As detailed in Table 1, the BMU 3 areas will be subject to minimal land management restrictions, with the primary measure relevant for BMU 3 being control of noxious weeds and vertebrate fauna pest species.

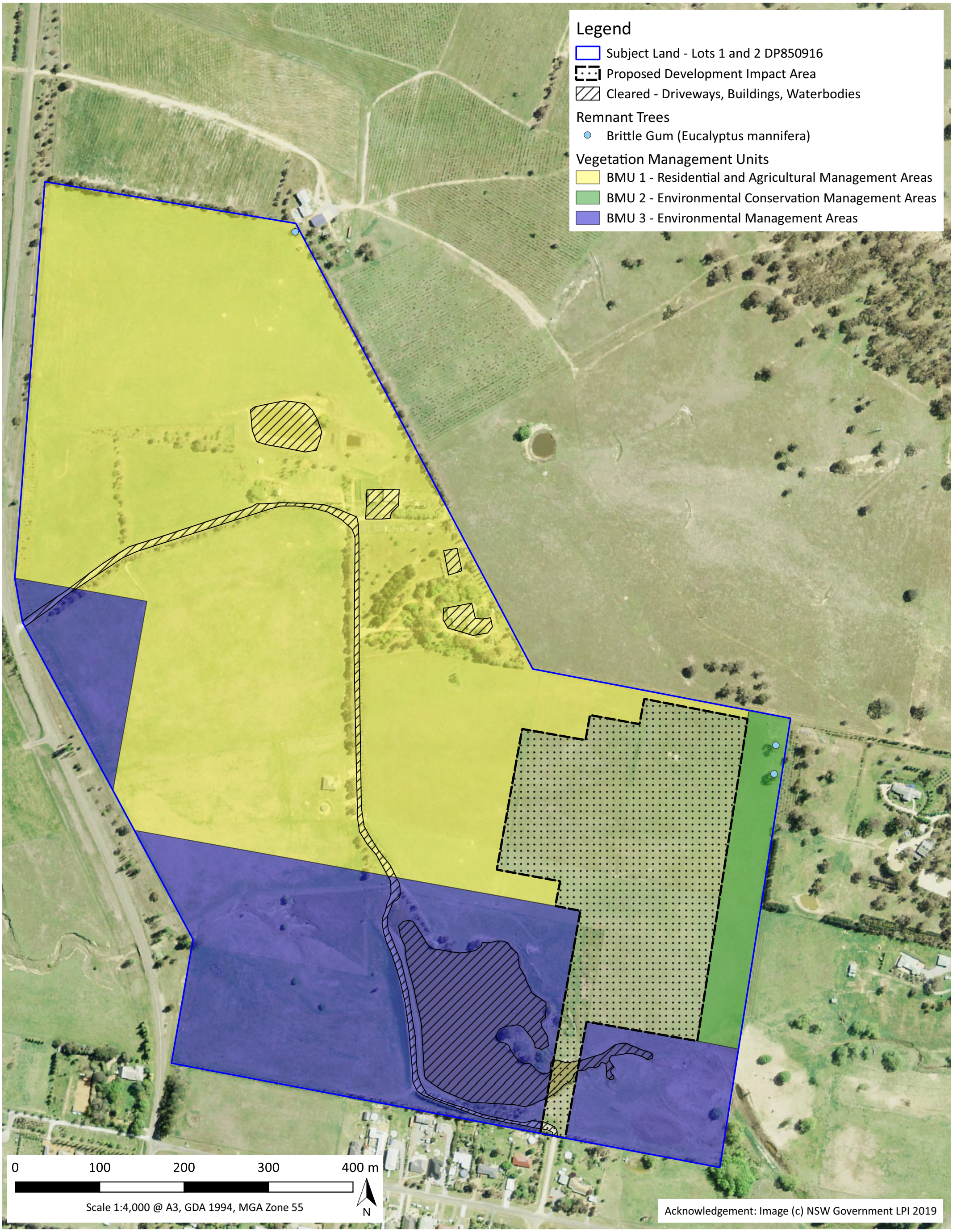


Figure 4. Biodiversity Management Units

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Date: 7 March 2019

Table 1. Biodiversity Management Units – Biodiversity Management Controls and Enhancement Measures

Control / Enhancement Measure	Applicable to Biodiversity Management Unit			Timing	Responsible Party
	BMU 1	BMU 2	BMU 3		
Control					
1. Preservation of all remnant eucalypts All remnant eucalypts, alive or dead, must be preserved. Note: The outcome of this control should be achieved with due consideration of the *Australian Standard – Protection of trees on development sites* (AS4970-2009).	-	Yes	-	During subdivision development and in perpetuity.	Developer, contractors, and owner/s of lots.
2. Restriction on clearing or removal of native vegetation No clearing or removal of native vegetation, including fallen dead timber greater than 20 cm in diameter, shrubs, grasses or groundcovers, unless approval is obtained from Council or other relevant authority.	Yes	Yes	Yes	During subdivision development and in perpetuity.	Developer, contractors, and owner/s of lots.
3. Requirement to maintain native grass groundstorey The 'native grassland' characteristics of the groundstorey must be maintained in those areas identified in the BDAR as having a native dominant groundstorey, unless approval is obtained from Council or other relevant authority.	Yes	Yes	Yes	During subdivision development and in perpetuity.	Developer, contractors, and owner/s of lots.

Control / Enhancement Measure	Applicable to Biodiversity Management Unit			Timing	Responsible Party
	BMU 1	BMU 2	BMU 3		
4. Fencing As per Part K (4) of the Notice of Determination, a fence will be established around the permitter of Lot 6, of which BMU 2 is part. This will result in Lot 6 being the only lot with direct access to BMU 2. Where new residential lots adjoin BMU 2 the fence will be that constructed along the lot boundary with no access points created from the lot directly into BMU 2. Locked gates will be installed at suitable locations to provide access to BMU 2 for maintenance, emergency or other authorised purposes. The existing stock fence which borders the northern and eastern boundaries of BMU 2 can be retained as it is in a generally good condition and will serve the purpose of fencing BMU 2.	-	Yes	-	In perpetuity, onwards from establishment of Lot 6.	Developer and owner/s of Lot 6.
5. Conditional grazing by hooved animals (stock) Grazing is to occur only when grass height is greater than 100 mm. This will ensure that the identified ecological values are appropriately managed while addressing the potential risk from bushfire.	-	Yes	-	In perpetuity, onwards from establishment of Lot 6.	Owner/s of Lot 6.
6. Prohibition on planting of noxious weeds and potential pest plant species No species listed in Table 3 may be planted.	Yes	Yes	Yes	During subdivision development and in perpetuity.	Developer, contractors, and owner/s of lots.
7. Restriction on plant species used for revegetation, landscaping and other planting Revegetation works, landscaping and other planting may only be carried out if it is complementary to the native indigenous vegetation of the subject land (i.e. PCT351 and PCT896). Recommended species for planting area listed in Table 2.	Yes	Yes	Yes	During subdivision development and in perpetuity.	Developer, contractors, and owner/s of lots.

Control / Enhancement Measure	Applicable to Biodiversity Management Unit			Timing	Responsible Party
	BMU 1	BMU 2	BMU 3		
8. Initial priority weed control The current landowner/developer (or a suitably qualified and experienced weed control contractor) will undertake initial control of current infestations of each priority noxious weed (African Lovegrass *Eragrostis curvula*, Chilean Needle Grass *Nassella neesiana*, and Serrated Tussock *Nassella trichotoma*). The specific weed control techniques employed will be determined by the landowner or weed control contractor, based upon suitability/applicability for the subject species and scale of infestation. The initial weed control works will be timed to maximise the effectiveness of the chosen technique.	Yes	Yes	Yes	During subdivision development and in perpetuity.	Developer.
9. Ongoing weed monitoring and control All 'state priority weeds' and 'regional priority weeds' must be actively monitored and controlled in accordance with the requirements of the South East Region Strategic Weed Management Plan 2017-2022 (RSWMP), available at: http://southeast.lls.nsw.gov.au/__data/assets/pdf_file/0006/722706/South-East-Regional-Weed-Mgmt-Plan.pdf Species of priority are African Lovegrass, Chilean Needle Grass, and Serrated Tussock. Following the establishment of lots, ongoing weed control may be undertaken by the owner of each lot if he/she possesses the necessary knowledge, skills and equipment. Alternatively, a suitably qualified and experienced weed control contractor may be engaged to monitor and treat weeds on a periodic as-needs basis.	Yes	Yes	Yes	In perpetuity, onwards from establishment of lots.	Developer and owner/s of lots.

Control / Enhancement Measure	Applicable to Biodiversity Management Unit			Timing	Responsible Party
	BMU 1	BMU 2	BMU 3		
10. Initial vertebrate pest control The current landowner/developer (or a suitably qualified and experienced vertebrate pest control contractor) will locate vertebrate pests and complete the required control activities. The specific control techniques employed will be determined by the landowner or contractor, based upon suitability. The initial vertebrate pest control will be timed to maximise the effectiveness of the chosen technique.	Yes	Yes	Yes	During subdivision development and in perpetuity.	Developer.
11. Ongoing vertebrate pest control All declared pest animal species in NSW (notably rabbits and foxes) must be actively monitored and controlled in accordance with the requirements of the relevant Pest Control Order. Website: https://www.lls.nsw.gov.au/biosecurity/pest-control Following the establishment of lots, ongoing vertebrate pest control may be undertaken by the owner of each lot if he/she possesses the necessary knowledge, skills and equipment. Alternatively, a suitably qualified and experienced vertebrate pest control contractor may be engaged to monitor and treat vertebrate pests on a periodic as-needs basis.	Yes	Yes	Yes	In perpetuity, onwards from establishment of Lots.	Developer and owner/s of lots.

Control / Enhancement Measure	Applicable to Biodiversity Management Unit			Timing	Responsible Party
	BMU 1	BMU 2	BMU 3		
Enhancement Measure					
1. Natural revegetation/regeneration The primary measures to be implemented to facilitate and encourage revegetation within BMU 2 will be conditional stock grazing (see point 4 above) and control of vertebrate pests. These measures will allow natural recruitment and regeneration to occur as seedlings from the remaining mature eucalypts will be allowed the opportunity to establish and grow unhindered. It is unlikely that seed in the soil seedbank from the two remaining trees will be sufficient to facilitate regeneration of the canopy. Accordingly, supplementary planting of canopy species will occur, as detailed in Point 2 below.	-	Yes	-	In perpetuity, onwards from establishment of Lot 6.	Developer and owner/s of Lot 6.
2. Active revegetation/regeneration works The owner of Lot 6 must undertake revegetation/regeneration works within BMU 2. Recommended species for planting are listed in Table 2. Throughout the remainder of the Biodiversity Management Plan Area, namely BMU 1 and BMU 3, revegetation may occur if desired. Recommended species for planting are listed in Table 2. It is recommended that advice regarding specific species selection is sought from someone with expertise in the flora of the region (e.g. local ecologist, botanist, Greening Australia etc.). This person will be able to match species to the relevant soil type, aspect, hydrology of the planting location.	Optional	Yes	Optional	In perpetuity, onwards from establishment of lots.	Developer and owner/s of lots.

Table 2. Recommended Plant Species for Biodiversity Management Areas

Note: The list of recommended plant species has been developed to provide a list of suitable species for each stratum (i.e. canopy, midstorey, shrubstorey and groundstorey), based on the objective of augmenting or recreating the strata of Plant Community Types mapped for the BDAR.

It is noted that many of the species listed (notably groundstorey species) are not readily available from local suppliers, particularly during certain seasons. Accordingly, whilst the objective of the list is to ensure that only suitable species are planted, it is also important to maximise the species options. Therefore, whilst not exhaustive, Table 2 provides an extensive list of suitable species of which a sufficient diversity should be available.

Scientific Name	Common Name
Canopy	
Eucalyptus bridgesiana	Apple Box
Eucalyptus manniferra	Brittle Gum
Eucalyptus melliodora	Yellow Box
Eucalyptus polyanthemous	Red Box
Eucalyptus rubida	Candlebark
Midstorey	
Acacia decurrens	Black Wattle
Acacia falcata	Sickle Wattle
Acacia implexa	Hickory
Acacia mearnsii	Late Black Wattle
Acacia melanoxylon	Blackwood
Casuarina cunninghamiana	River Sheoak
Shrubstorey	
Acacia buxiflora	Box-leaf Wattle
Acacia dealbata	Silver Wattle
Acacia falciformis	Hickory
Acacia floribunda	White Sallow Wattle
Acacia genistifolia	Early Wattle
Acacia gunnii	Ploughshare Wattle
Acacia rubida	Red-stem Wattle
Acacia siculiformis	Dagger Wattle
Acacia ulicifolia	Prickly Moses
Banksia marginata	Silver Banksia
Bursaria spinosa subsp. lasiophylla	Native Blackthorn
Cassinia aculeata	Common Cassinia
Cassinia longifolia	Cauliflower Bush
Cassinia quinquefaria	Rosemary Cassinia
Dodonaea viscosa	Hopbush
Grevillea rosmarinifolia	Rosemary Grevillea
Hakea decurrens	Bushy Needlewood
Hakea microcarpa	Small-fruited Hakea
Indigofera australis	Austral Indigo
Kunzea ericoides	Burgan

Scientific Name	Common Name
Kunzea parviflora	Violet Kunzea
Leptospermum brevipes	Slender Tea-tree
Leptospermum continentale	Prickly Teatree
Leptospermum lanigerum	Woolly Tea-tree
Leptospermum multicaule	Silver Teatree
Leptospermum myrtifolium	Swamp Teatree
Leptospermum obovatum	River Tea-tree
Lomatia myricoides	Long-leaf Lomatia
Melaleuca paludicola	River Bottlebrush
Pomaderris pallida	Pale Pomaderris
Rubus parvifolius	Native Raspberry
Styphelia triflora	Pink Five-corners
Groundstorey	
Shrub	
Bossiaea buxifolia	Box-leaved Bitter-pea
Bossiaea prostrata	Creeping Bossiaea
Brachyloma daphnoides	Daphne Heath
Correa reflexa	Common Correa
Cryptandra amara	Bitter Cryptandra
Daviesia genistifolia	Broom Bitter-pea
Daviesia latifolia	Hop Bitter-pea
Daviesia leptophylla	Narrow-leaf Bitter-pea
Daviesia mimosoides	Narrow-leaf Bitter-pea
Daviesia ulicifolia	Gorse Bitter-pea
Dillwynia cinerascens	Grey Parrot-pea
Dillwynia glaucula	Michelago Parrot-pea
Dillwynia prostrata	Matted Parrot-pea
Dillwynia retorta	Heathy Parrot-pea
Dillwynia sericea	Showy Parrot-pea
Hardenbergia violacea	False Sarsparilla
Hibbertia obtusifolia	Grey Guinea-flower
Hibbertia riparia	Stream Guinea-flower
Leucopogon fletcheri	Pendant Beard Heath
Leucopogon fraseri	Beard Heath
Leucopogon virgatus	Common Beard Heath
Lissanthe strigosa	Peach Heath
Melichrus urceolatus	Urn Heath
Pultenaea procumbens	Heathy Bush-pea
Sedge, Rush	
Carex appressa	Tall Sedge
Carex inversa	Knob Sedge
Isolepis cernua	Nodding Club-rush
Isolepis hookeriana	Grassy Club-sedge
Isolepis inundata	Swamp Club-sedge

Scientific Name	Common Name
Juncus australis	Austral Rush
Juncus subsecundus	Finger Rush
Lepidosperma laterale	Sword Sedge
Lomandra bracteata	Mat-rush
Lomandra filiformis	Wattle Mat-rush
Lomandra longifolia	Spiny-headed Mat-rush
Lomandra multiflora	Many-flowered Matrush
Grass	
Aristida ramosa	Purple Wiregrass
Austrostipa bigeniculata	Tall Speargrass
Austrostipa densiflora	Dense Spear-grass
Austrostipa scabra	Corkscrew
Bothriochloa macra	Red-leg Grass
Chloris truncata	Windmill Grass
Cymbopogon refractus	Barbed Wire Grass
Dichelachne crinita	Longhair Plumegrass
Dichelachne hirtella	Slender Plumegrass
Dichelachne inaequiglumis	Plume Grass
Dichelachne micrantha	Short-hair Plumegrass
Dichelachne parva	Plume Grass
Dichelachne rara	Plume Grass
Elymus scaber	Wheat Grass
Microlaena stipoides	Weeping Grass
Panicum effusum	Hairy Panic
Poa sieberiana	Snow Grass
Rytidosperma bipartita	Wallaby Grass
Rytidosperma caespitosa	Ringed Wallaby-grass
Rytidosperma carphoides	Short Wallaby-grass
Rytidosperma laevis	Wallaby Grass
Rytidosperma monticola	Small-flower Wallaby Grass
Rytidosperma racemosa	Slender Wallaby Grass
Sorghum leiocladum	Wild Sorghum
Themeda triandra	Kangaroo Grass
Forb, Lily, Orchid	
Acaena novae-zelandiae	Bidgee-widgee
Acaena ovina	Sheep's Burr
Ajuga australis	Austral Bugle
Alternanthera nana	Hairy Joyweed
Arthropodium milleflorum	Vanilla-lily
Arthropodium minus	Small Vanilla Lily
Asperula conferta	Common Woodruff
Asperula scoparia	Prickly Woodruff
Brachyscome aculeata	Hill Daisy
Brachyscome decipiens	Field Daisy

Scientific Name	Common Name
Brachyscome diversifolia	Large-headed Daisy
Brachyscome graminea	Grass Dairy
Brachyscome heterodonta	Lobe-seed Daisy
Brachyscome multifida	Cut-leaved Daisy
Brachyscome rigidula	Leafy Daisy
Brachyscome scapigera	Tufted Daisy
Brachyscome spathulata	Spoon Daisy
Brunoniella australis	Blue Trumpet
Bulbine bulbosa	Bulbine Lily
Bulbine glauca	Rock Lily
Burchardia umbellata	Milkmaids
Caesia calliantha	Blue Grass-Lily
Calocephalus citreus	Lemon Beauty-heads
Calotis cuneifolia	Purple Burr-daisy
Calotis glandulosa	Mauve Burr-daisy
Calotis lappulacea	Yellow Burr-daisy
Calotis scabiosifolia	Rough Burr-daisy
Chamaesyce drummondii	Caustic-weed
Cheilanthes austrotenuifolia	Rock Fern
Chrysocephalum apiculatum	Common Everlasting
Chrysocephalum semipapposum	Clustered Everlasting
Clematis microphylla	Small-leaved Clematis
Convolvulus erubescens	Australian Bindweed
Cotula australis	Common Cotula
Craspedia variabilis	Billy Buttons
Cullen microcephalum	Dusky Scurfpea
Cymbonotus lawsonianus	Austral Bears-ear
Cynoglossum australe	Australian Hound's-tongue
Cynoglossum suaveolens	Sweet Hound's-tongue
Daucus glochidiatus	Native Carrot
Derwentia perfoliata	Digger's Speedwell
Desmodium brachypodum	Large Tick-trefoil
Desmodium varians	Slender Tick-trefoil
Dianella longifolia	Smooth Flax Lily
Dianella revoluta	Black-anther Flax-lily
Dichondra repens	Kidney Weed
Dichopogon fimbriatus	Nodding Chocolate Lily
Dichopogon strictus	Chocolate Lily
Dipodium punctatum	Hyacinth Orchid
Diuris aequalis	Buttercup Doubletail
Diuris behrii	Golden Cowslips
Diuris chryseopsis	Common Golden Moths
Diuris dendrobioides	Long-tail Purple Diuris
Diuris maculata	Leopard Orchid

Scientific Name	Common Name
Diuris ochroma	Pale Golden Moths
Diuris pedunculata	Small Snake Orchid
Diuris punctata	Purple Donkey-orchid
Diuris semilunulata	Donkey-ears
Diuris sulphurea	Tiger Orchid
Drosera peltata	Pale Sundew
Drosera pygmaea	Pigmy Sundew
Eriochilus cucullatus	Parson's Bands
Erodium crinitum	Native Crowfoot
Eryngium ovinum	Blue Devil
Galium gaudichaudii	Rough Bedstraw
Geranium antrorsum	Antrorse Geranium
Geranium retrorsum	Common Cranes-bill
Geranium solanderi	Native Geranium
Glossodia major	Wax-lip Orchid
Glycine clandestina	Twining Glycine
Glycine tabacina	Glycine Pea
Gonocarpus tetragynus	Raspwort
Goodenia hederacea	Ivy Goodenia
Goodenia pinnatifida	Scrambled Eggs
Helichrysum scorpioides	Button Everlasting
Hovea linearis	Creeping Hovea
Hydrocotyle laxiflora	Stinking Pennywort
Hypericum gramineum	Small St John's Wort
Isotoma axillaris	Rock Isotome
Leptorhynchos squamatus	Scaly Buttons
Leucochrysum albicans var. tricolor	Hoary Sunray
Lotus australis	Austral Trefoil
Luzula densiflora	Woodrush
Luzula meridionalis	Common Woodrush
Lythrum salicaria	Purple Loosestrife
Microseris lanceolata	Yam Daisy
Microtis parviflora	Slender Onion-orchid
Microtis unifolia	Common Onion Orchid
Opercularia diphylla	Stinkweed
Ophioglossum lusitanicum	Adder's Tongue
Oreomyrrhis eriopoda	Australian Carraway
Oxalis perennans	Perrenial Oxalis
Pelargonium australe	Native Storks-bill
Pimelea curviflora	Curved Rice-flower
Plantago varia	Variable Plantain
Podolepis hieracioides	Tall Copper-wire Daisy
Podolepis jaceoides	Showy Copper-wire Daisy
Polygala japonica	Dwarf Milkwort

Scientific Name	Common Name
Ranunculus lappaceus	Common Buttercup
Rumex brownii	Swamp Dock
Rutidosis leiolepis	Monaro Golden Daisy
Rutidosis leptorhynchoides	Button Wrinklewort
Schoenus apogon	Common Bog Sedge
Solenogyne dominii	Smooth Solenogyne
Solenogyne gunnii	Hairy Solenogyne
Stackhousia monogyna	Creamy Candles
Stellaria angustifolia	Swamp Starwort
Stellaria filiformis	Thread Starwort
Stellaria pungens	Prickly Starwort
Stylidium despectum	Dwarf Triggerplant
Stylidium graminifolium	Grass Triggerplant
Stypandra glauca	Nodding Blue Lily
Swainsona behriana	Behr's Swainson-pea
Swainsona monticola	Moutain Swainson-pea
Swainsona recta	Small Purple-pea
Swainsona sericea	Silky Swainson-pea
Thelymitra ixioides	Spotted Sun-orchid
Thelymitra malvina	Mauve-tuft Sun-orchid
Thelymitra pauciflora	Slender Sun-orchid
Thesium australe	Austral toadflax
Thysanotus patersonii	Twining Fringe-lily
Thysanotus tuberosus	Common Fringe-lily
Tricoryne elatior	Yellow Rush-lily
Triptilodiscus pygmaeus	Common Sunray
Velleia paradoxa	Spur Velleia
Viola betonicifolia	Arrowhead Violet
Viola hederacea	Native Violet
Vittadinia cuneata	Fuzzweed
Vittadinia gracilis	Woolly New Holland Daisy
Vittadinia muelleri	Narrow-leaved New Holland Daisy
Wahlenbergia communis	Tufted Bluebell
Wahlenbergia gracilis	Australian Bluebell
Wahlenbergia stricta	Tall Bluebell
Wurmbea dioica	Early Nancy
Xerochrysum viscosum	Sticky Everlasting Daisy

Table 3. Prohibited Plant Species

Note: The list of prohibited plant species includes weeds known to occur in the Yass Valley local government area (LGA), together with other species which occur in adjoining/nearby LGAs and have the potential to establish in the Biodiversity Management Plan Area.

Scientific Name	Common Name
Acacia karoo	Karoo Thorn
Acacia paradoxa	Kangaroo Thorn
Acecia balieyana	Cootamundra Wattle
Achillea millefolium	Yarrow
Achnatherum cauda tum	Broad-kernel Espartillo
Ailanthus altissima	Tree of Heaven
Alnus gluttnosa	Black Adder
Alternanthera philoxeroides	Alligator Weed
Cannibis sativa	Indian Hemp
Cardus pycnoncephalus	Slender Thistle
Carduus nutans	Nodding Thistle
Carduus tenuiflorus	Slender Thistle
Cartaderia selloana	Pampus Grass
Carthamus lanatus	Saffron Thistle
Carus tenuiflorus	Slender Thistle
Cassinia arctuata	Sifton Brush
Celtus australis	Nettle Tree
Censchrus longispinus	Spiny Burrgrass
Centaurea caliptrata	Star Thistle
Cestrum pargui	Green Cestrum
Chromolaena ordorata	Siam Weed
Cirsium vulgare	Spear Thistle
Conium maculatum	Hemlock
Cortaderia jubata	Pampus Grass
Cotoneaster franchetti	Cotoneaster
Cotoneaster glaucophyllus	Cotoneaster
Cotoneaster pannosus	Cotoneaster
Cotoneaster salicifolius	Willow-leaf Cotoneaster
Cotoneaster simonsii	Cotoneaster
Crataegus monogyna	Hawthorn
Cuscuta campestris	Golden Dodder
Cyperus eragrostis	Umbrella Sedge
Cytisus scoparius	Scotch Broom
Echium plantagineum	Paterson's Curse
Echium vulgare	Vipers Bugloss
Eichornia crassipes	Water Hyacinth
Equisetum arvense	Horsetail
Eragrostris culvula	African Lovegrass
Erythroxylum coca	Coca Leaf

Scientific Name	Common Name
Foeniculum vulgare	Fennel
Genista monspessulana	Montpellier Heliotrope
Gymnocoronis spilanthoides	Senegal Tea Plant
Hedera helix	English Ivy
Heliotropium europaeum	Common Heliotrope
Hypeicum perforatum	St John's Wort
Kochia scoparia	Kochia
Lagarosiphon major	Lagarosiphon
Ligustrum lucidum	Privet
Ligustrum sinense	Small-leaved Privet
Lonicera japonica	Japanese Honeysuckle
Lycium ferocissimum	Africa Boxthorn
Marrubium vulgare	Horehound
Nassella charruana	Lobed Needlegrass
Nassella neesiana	Chilean Needlegrass
Nassella trichotoma	Serrated Tussock
Onopordum acanthium	Scotch Thistle
Onopordum illyrcum	Stemless Thistle
Orobanche minor	Lesser Broomrape
Papaver somniferum	Opium Poppy
Parthenium hysterophorus	Parthenium Weed
Phyllostachys aurea	Yellow Bamboo
Pinus radiata	Radiata Pine
Pistia stratiotes	Water Lettuce
Populus alba	White Poplar
Populus nigra "Italic"	Lombardy Poplar
Prunus cerasifera	Cherry Plum
Prunus serotina	Black Cherry
Pyracantha angustifloia	a Firethorn
Pyracantha coccinea	a Firethorn
Pyracantha fortuneana	a Firethorn
Robinia pseudoacica	False Acacia
Rosa rubiginosa	Briar Rose
Rubus fruticosus	Blackberry
Salix alba var. vitellina	Golden Upright Willow
Salix caprea	Pussy Willow
Salix cinerea	Grey Sallow
Salix fragilis	Crack Willow
Salix glaucophylloides	Willow
Salix matsudana "Pendula"	Matsudana Willow
Salix matsudana "Tortuosa"	Tortured Willows
Salix matsudana XS alba (all clones)	Matsudana Hybrid Willows
Salix nigra	Black Willow
Salix purpurea	Purple Osier

Scientific Name	Common Name
Salix viminalis	Common Osier
Salix X rubens (S. alba XS S.fragilis)	Golden Crack Willow
Salvinia molesta	Salvinia
Senecio madagascariensis	Fireweed
Solanum linnaeanum	Apple of Sodom
Sollya heterophylla	WA Bluebell Creeper
Sorbus domestica	Service Tree
Spartium junceum	Spanish Broom
Toxicodendron succedaneum	Rhus Tree
Tradescantia albiflora	Wandering Jew
Ulex europaeus	Gorse
Verbascum thapsus	Great Mullein
Vinca major	Periwinkle
Xanthium occidentale	Noogoora burr
Xanthium spinosum	Bathurst Burr