PLANNING PROPOSAL

- Lot 12, DP:192526, 14 Burbank Crescent, HUNTERVIEW

Version:	0.2.
Date:	06/12/2012
Council File Reference:	LA11/2012

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SITE DESCRIPTION

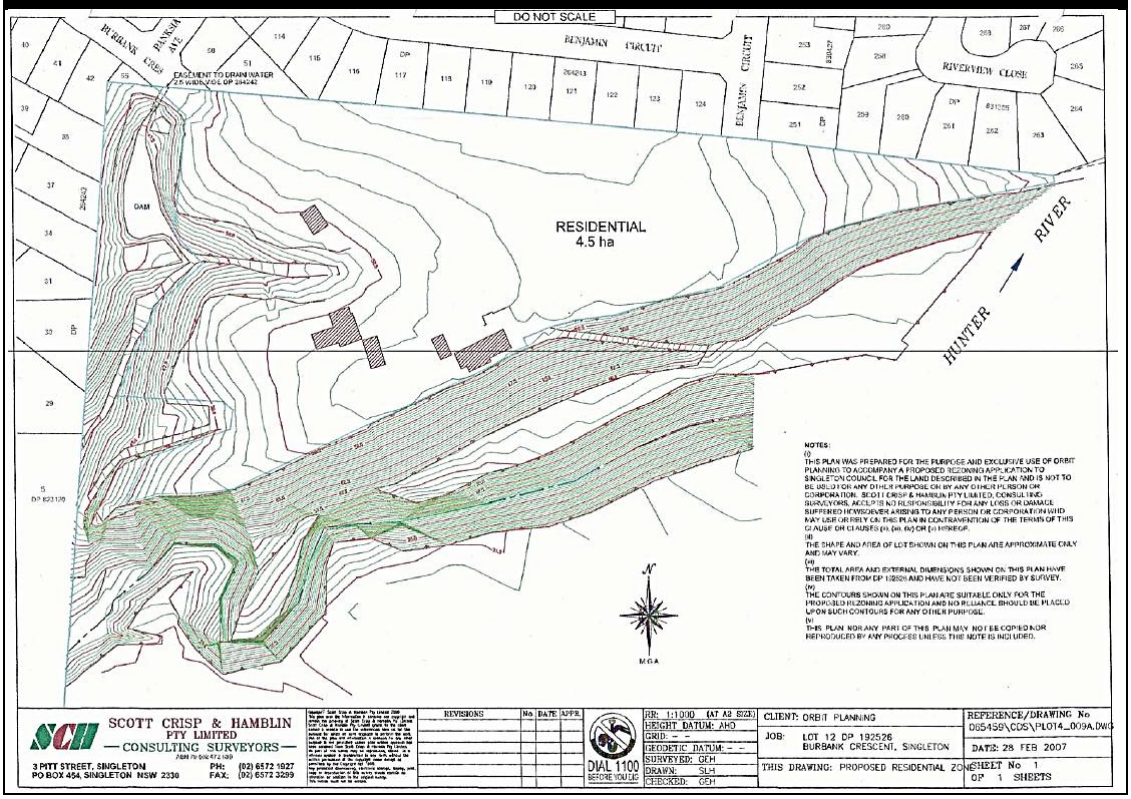
The site subject of this planning proposal is identified in the plan which follows.

Land Subject of Planning Proposal

Lot 12, DP192526, 14 Burbank Crescent, HUNTERVIEW is approximately 18.62Ha in area. It is relatively cleared of significant vegetation, comprising mainly unimproved grassland and scattered groups of trees.

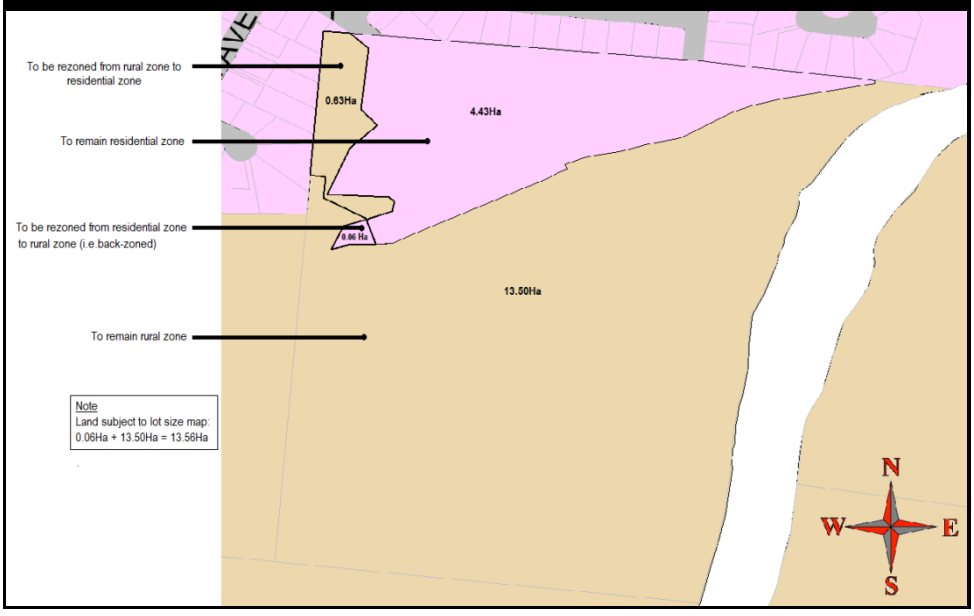
The northern portion of the site contains a dwelling-house and sheds. It is irregular in shape and is relatively elevated. The larger southern portion of the site is much lower, adjoins the Hunter River and forms part of the Singleton floodplain.

Contour Plan



The component of Lot 12, DP192526 that is subject to changes sought by this planning proposal is approximately 14.19Ha in area. Approximately 6,336m^2 is intended to be rezoned from a rural zone to a residential zone. Approximately 632m^2 of existing (recently rezoned) residential land is proposed to be back-zoned to a rural zone. A lot size map is intended to be prepared for the (eventual) rural-zoned component of the site (approximately 13.56Ha).

Plan Indicating Proposed Changes



PART 1 – OBJECTIVES OR INTENDED OUTCOMES

This planning proposal (Council file reference: LA11/2012) seeks to:

(a) Rezone part of Lot 12, DP; DP192525 to "2 (Residential Zone)" if the amendment occurs to the *Singleton Local Environmental Plan 1996* or "R1 General Residential Zone" if the amendment occurs to Council's Standard Instrument Local Environmental Plan.

(b) Rezone part of Lot 12, DP; DP192525 to "1(a) (Rural Zone)" if the amendment occurs to the *Singleton Local Environmental Plan 1996* or "RU1 Primary Production Zone" if the amendment occurs to Council's Standard Instrument Local Environmental Plan.

(c) Implement a Lot Size Map for the rural component of the site.

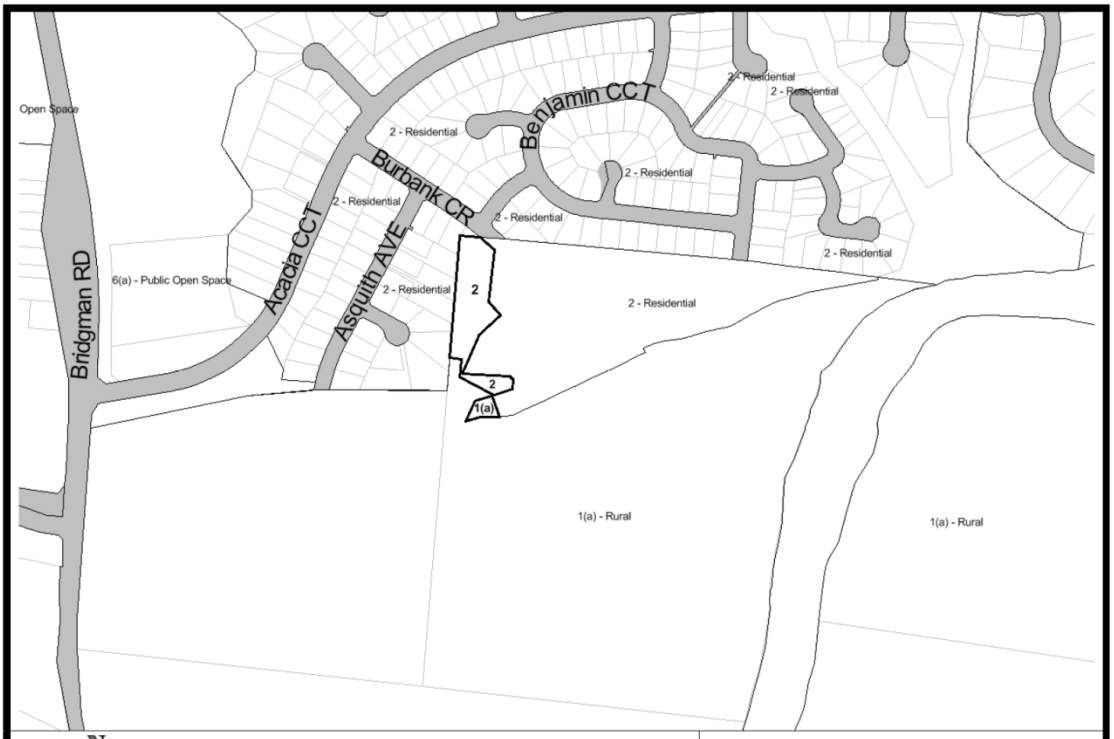
PART 2 – EXPLANATION OF THE PROVISIONS

Amendment of Singleton Local Environmental Plan 1996 (SLEP 1996)

If the amendment sought by this planning proposal occurs to the SLEP 1996, the intended outcomes/objectives would be achieved by:

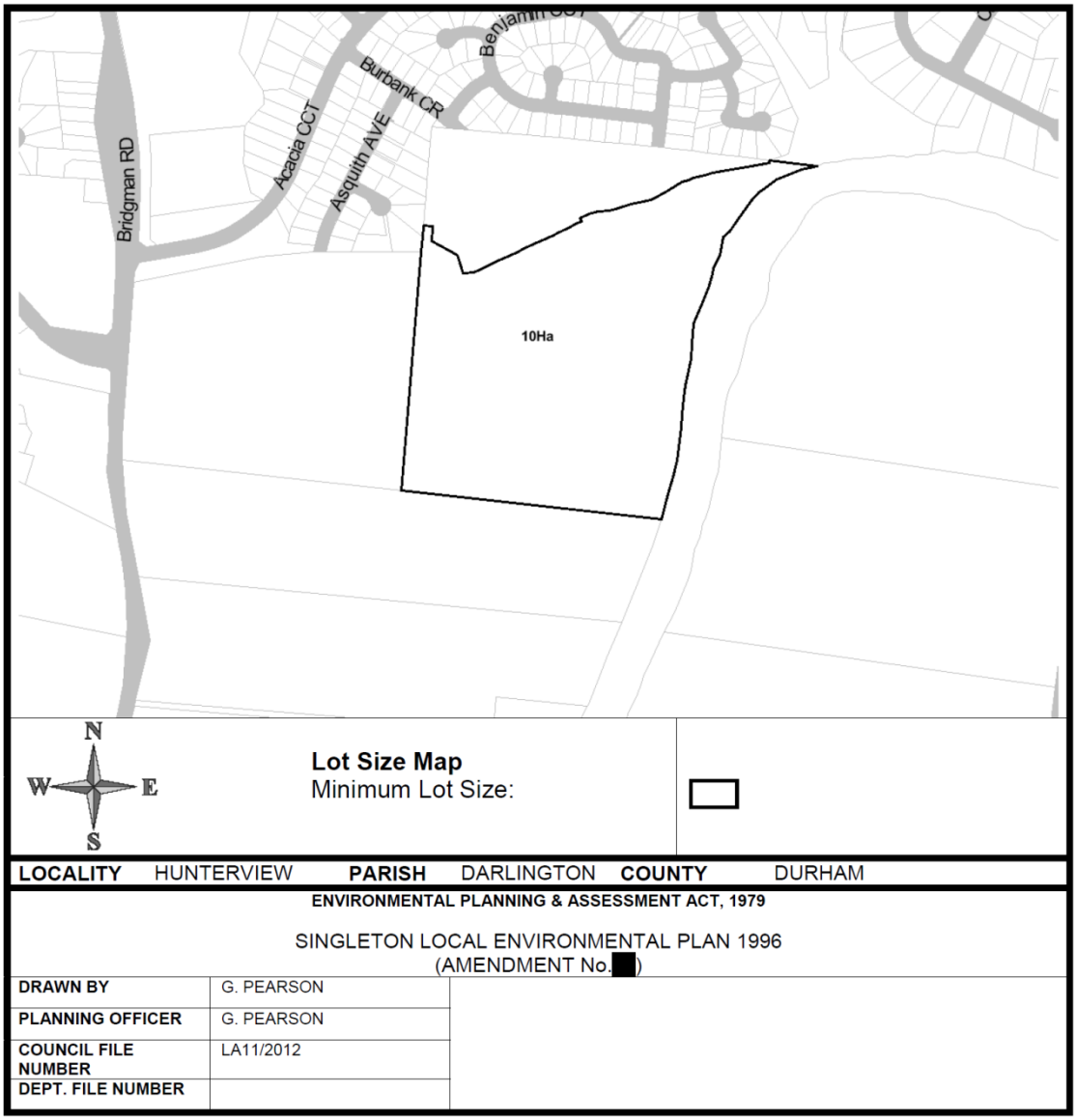
- **Amendment to the definition of "the map" to include a zoning map for the subject site.**

  The zoning map is to show the respective areas of the site being zoned 2 (Residential Zone) and 1(a) (Rural Zone) as illustrated in the plan which follows.



- **Amendment to the definition of "Lot Size Map" to include a lot size map for the subject site.**

  The Lot Size Map for this planning proposal is to be prepared for the component of the site to be zoned 1(a) (Rural Zone).



Amendment to Standard Instrument Local Environmental Plan (SI LEP)

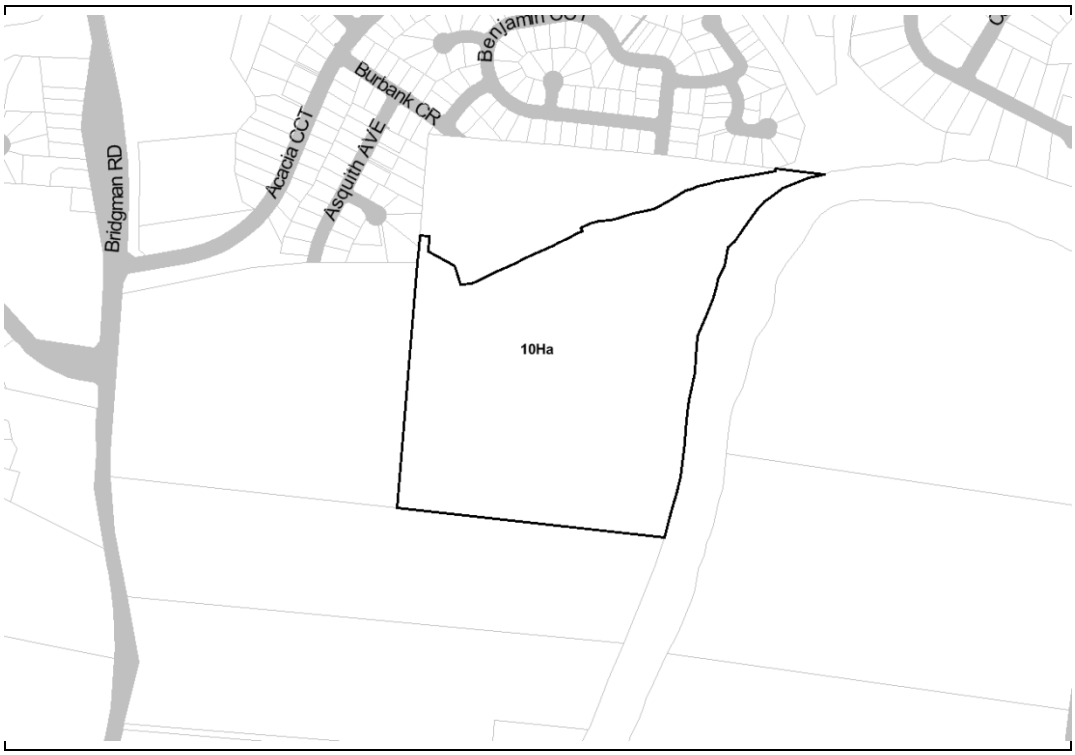
If the amendment sought by this planning proposal occurs to the SI LEP, the intended outcomes/objectives would be achieved by:

- **Amendment to the definition of "the map" to include a zoning map for the subject site.**

  The zoning map is to show the respective areas of the site being zoned R1 General Residential Zone and RU1 Primary Production Zone as illustrated in the plan which follows.

- **Amendment to the definition of "Lot Size Map" to include a lot size map for the subject site.**

  The Lot Size Map for this planning proposal is to be prepared for the component of the site to be zoned RU1 Primary Production Zone, which applies a minimum lot size of 10Ha to subdivision of the land.



PART 3 – JUSTIFICATION

Section A - Need for the Planning Proposal

1. Is the planning proposal a result of any strategic study or report?

Section 6.1. of the *Singleton Land Use Strategy* (**Attachment 1**) details that sufficient existing residential zoned land (i.e. Gowrie Links, Bridgman Ridge and Hunter Green Urban Expansion Areas) exists to meet demand until 2023 (15 years from the date of adoption of the strategy). It cautions that infrastructure capacity limitations and the investment needed to upgrade infrastructure could however, adversely impact on the ability to actually satisfy market demand.

At the time of preparation of this planning proposal, development of the Hunter Green and Gowrie Links Urban Release Areas had still not commenced, even though the sites had been zoned for residential purposes since 2007. Up-front infrastructure servicing costs and the impacts of the Global Financial Crisis (GFC) on investment in the development industry are viewed to be key reasons for development of these sites not commencing.

As evident from the table which follows, residential dwelling targets are not being met. Residential Greenfield sites are not being developed at rates required to meet the residential targets of the SLUS.

Residential Dwelling Statistics		
Financial Year	**Residential Dwelling Approvals** (source: State of the Environment Report)	**Comparison against SLUS target**
2008/2009	39	131-191 shortfall
2009/2010	0	170-230 shortfall
2010/2011	55	115-175 shortfall
2011/2012	62	108-168 shortfall
Total:	**156**	**524-764 shortfall**

The *Strategic Actions* of Section 6.1. of the *Singleton Land Use Strategy* (SLUS) recommends facilitation of LEP amendments that will help meet an ongoing future development potential of 5 years.

The subject planning proposal seeks to rezone approximately 6,336m^2 of land to a residential zone and is expected to provide for the creation of

approximately 10 residential lots. The subject proposal would be expected to have a positive impact on providing lots for housing development and would not generate an oversupply of residential lots. Connection to infrastructure is relatively available and not considered to present a significant constraint to development of the site. As such, it is expected that the proposal would be conducive to providing supply of residential lots in the short-medium term.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Placing land use and minimum lot size provisions for subdivision in Council's LEP, in conjunction with existing design controls in Council's DCP; is considered to be the most appropriate method for managing subdivision and land use in the locality. This method is supported by the adopted SLUS (2008) and is consistent with the method of managing land use for similar proposals in the Singleton LGA.

Section B - Relationship to Strategic Planning Framework

3. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

The Upper Hunter Strategic Regional Land Use Plan (UHSLUP) is the regional strategy applicable to the proposal. The table which follows evaluates consistency with the relevant objectives of the UHSLUP.

Review of Consistency with the *Housing and Settlement* Objectives of the *Upper Hunter Strategic Regional Land Use Plan*		
Objectives	**Subject Planning Proposal**	**Consistency of Planning Proposal with Objectives**
Ensure an adequate supply of housing to meet community needs.	The intention of this planning proposal is to rezone land to provide for creation of residential lots for housing development to help meet identified demand.	Consistent: Yes
Ensure a greater diversity of housing types, including smaller housing types, rental housing and temporary housing.	As at the time of preparation of this planning proposal, rates of release of new residential housing stock were significantly below supply targets. This low supply of new residential houses reduces the overall diversity of housing options available to	Consistent: Yes

	consumers. The residential rezoning sought by this planning proposal would provide for creation of residential lots for housing development to help meet identified demand. The more lots available for housing development, the more opportunities there are for diversity in housing types.	
Improve the supply and range of affordable housing.	The inflated house prices and rents in Singleton are indicative of high demand and undersupply of new dwellings. The residential rezoning sought by this planning proposal would provide for creation of residential lots in the short-medium term, with minimal infrastructure implications. This would help increase the rate of release of residential lots for housing development (supply) and thus improve overall housing development rates. This is expected to help improve housing affordability by reducing the strain on the existing (owner-occupied and rental) housing stock and improving housing options available.	Consistent: Yes
Build cohesive and liveable communities by ensuring towns and villages are well designed, liveable and provide a range of housing types.	This proposal seeks to rezone land to provide for residential development. Development of the land would be subject to the provisions of Council's Development Control Plan (DCP), which comprises provisions aimed at achieving high quality design outcomes. Increases in the supply of housing as a result of the rezoning sought by this proposal, would be conducive to increasing the range of types of housing available. The proposed residential zoning provides for a variety of housing forms.	Consistent: Yes

The table which follows evaluates consistency with the relevant actions of the UHSLUP.

Review of Consistency with the *Housing and Settlement* Actions of the *Upper Hunter Strategic Regional Land Use Plan* (where Council is the lead agency)		
Action	**Subject Planning Proposal**	**Consistency of Planning Proposal with Actions**
Local councils will zone land through their local environmental plans to ensure an adequate supply of land for residential development and to facilitate delivery of a range of housing types.	This planning proposal seeks to amend Council's Local Environmental Plan (LEP) to rezone land for residential development. The residential zoning sought by this proposal provides for delivery of a range of housing types on the land.	Consistent: Yes
Local councils will ensure that new residential development makes a positive contribution to liveability and character by ensuring residential areas are planned in accordance with the settlement planning principles in this (the UHSLUP) plan.	This planning proposal is considered to be consistent with the UHSLUP settlement planning principles as discussed further in this proposal.	Consistent: Yes

The table which follows evaluates consistency with the relevant settlement principles of the UHSLUP.

Review of Consistency with the *Housing and Settlement* Principles of the *Upper Hunter Strategic Regional Land Use Plan*		
Principle	**Subject Planning Proposal**	**Consistency of Planning Proposal with Principles**
Development will contribute to the diversity of housing types available. Any medium or higher density housing should be located in central and accessible locations to ensure access to a full range of services within a reasonable walking distance.	The subject proposal provides a natural infill to the exiting adjoining residential zoned land. This proposal does not propose a particular form of housing; however the site would have a similar level of access to services and facilities to the adjoining residential zoned land.	Consistent: Yes
Development will be located to maximise the efficiency of essential urban infrastructure,	This planning proposal seeks to rezone land to provide for residential development. The site is considered to be	Consistent: Yes

services and facilities, including transport, health and education.	suitably located for access to utilities and infrastructure.	
Development will respect and respond to the character of the area and the identified settlement hierarchy of the region.	The subject proposal provides a natural infill to the exiting adjoining residential zoned land and is consistent with the settlement hierarchy of the area.	Consistent: Yes
New residential areas will be planned with streets that make it easy for people to walk and cycle and with recreational and open space.	Master planning undertaken for the "Burbank Crescent Residential Estate" proposes streets which comprise footpaths and connection to Earibee Reserve.	Consistent: Yes
New residential and rural residential areas will respect environmental and cultural heritage and avoid areas most affected by natural hazards or having high cultural significance.	Further investigations in relation to potential indigenous heritage should be undertaken subsequent to positive gateway determination being issued for the proposal.	Consistent: Yes
New residential and rural residential areas should minimise the potential for land use conflict with land needed for valuable economic activities, such as valuable agricultural lands and natural resource lands. This includes avoiding locations where possible adverse impacts associated with industry (such as noise, dust, visual impacts or other amenity impacts) are likely to affect future residents.	Rezoning of the land would not result in a loss of prime agricultural land or employment lands. The topography of the site and the Hunter River naturally separate the proposed residential land from the rural land. The proposal is designed such that there is a suitable flood-free house site adjoining the proposed residential land. The rest of the rural land is predominantly within the floodplain. The design of the proposal minimises the likelihood of land use conflict.	Consistent: Yes
New rural residential areas should be located adjacent to, or in close proximity to, existing urban centres and be within easy access of relevant infrastructure and services.	N/A	Consistent: N/A

This planning proposal is considered to be consistent with the objectives and actions of the Upper Hunter Strategic Regional Land Use Plan.

4. Is the planning proposal consistent with the local Council's Community Strategic Plan, or other local strategic plan?

Our Place: A Blueprint 2022 – Singleton Community Strategic Plan (March 2012)

The Community Strategic Plan identifies that Singleton has experienced a prolonged period of steady population growth and growth in business and industry, resulting in a predominantly young, employed labour force and an unemployment rate of less than 2% which is significantly lower than the Hunter Regional Average. It further states that Singleton is a prosperous rural community with a strong economy supported by a diverse range of business and industrial enterprises, including viticulture, education, engineering, fabrication, trades services, tourism, hospitality, mining, power generation, agriculture and retail.

The Community Strategic Plan highlights the following key changes that will shape the future of the community:

- Completion of the Hunter Expressway, which is expected to improve accessibility between Singleton and Sydney and reduce traffic between Singleton and Newcastle; and

- Significant expansion of the Defence Base in Singleton, which is likely to increase the number of defence personnel in the region; and

- CBD Master Plan being developed to improve the retail experience options in Singleton and encourage economic participation.

This planning proposal is viewed to be consistent with the relevant themes and outcomes of the Community Strategic Plan. The proposal seeks to make land available to enable residential growth.

The site is largely free of natural constraints and could be developed with minimal environmental impact and infrastructure implications. The proposed residential land is not within a designated floodplain.

The community will be kept informed of the proposal as part of the exhibition process and through relevant reports to Council meetings. Overall, this planning proposal is viewed to be consistent with Council's Community Strategic Plan.

Singleton Land Use Strategy (2008)

The proposal is considered to be consistent with the SLUS. The *Strategic Actions* of Section 6.1. of the *Singleton Land Use Strategy* (SLUS) recommends facilitation of LEP amendments that will help meet an ongoing future development potential of 5 years.

The subject planning proposal seeks to rezone approximately 6,336m^2 of land to a residential zone and is expected to provide for the creation of approximately 10 residential lots.

This would contribute to providing lots for housing development and would not generate an oversupply of residential lots. Connection to infrastructure is relatively available and not considered to present a significant constraint to development of the site. As such, it is expected that the proposal would be conducive to providing supply of residential lots in the short-medium term.

5. Is the planning proposal consistent with applicable state environmental planning policies?

This planning proposal is considered to be consistent with relevant State Environmental Planning Policies:

State Environmental Planning Policy No. 44 – Koala Habitat Protection

The site is not known to comprise core koala habitat. The land proposed to be rezoned is relatively void of trees. The majority of trees on the site are within the riparian corridors of the Hunter River, which is within the component of the site to remain zoned rural.

The 10Ha minimum lot size provisions sought to be applied to the rural component of the site would enable it to be separated from the residential land through subdivision but would not enable it to be further segregated.

This planning proposal does not seek to remove trees and it not considered to impact upon core koala habitat.

State Environmental Planning Policy No. 55 – Remediation of Land

The proposed residential land has historically been used for some limited livestock grazing activities; there is minimal likelihood that contamination would be generated by such activities which would pose a risk to the residential rezoning.

The land intended to be rezoned for residential use has been used to convey stormwater drainage from Burbank Crescent (note: it is now intended to pipe stormwater drainage via a different alignment). There may be traces of oils and contaminants as a result of the stormwater drainage; however these are not expected to be at levels that would prevent residential development;

particularly given that the gully would need to be filled to provide for residential development. Any impacts of septic disposal on the allotment need to be considered.

The geotechnical assessment report (**Attachment 3**) submitted by the proponent for this proposal does not identify any constraints to the proposed residential rezoning on the basis of contamination.

State Environmental Planning Policy (Rural Lands) 2008

This planning proposal affects land within an existing rural zone. It also seeks to change the existing minimum lot size for subdivision of the land.

The proposal is considered to be generally consistent with the Rural Planning Principles and Rural Subdivision Principles listed in *State Environmental Planning Policy (Rural Lands) 2008*.

6. Is the proposal consistent with applicable Ministerial Directions (s.117 directions)?

The table which follows contains a response to each of the s117 directions in relation to the planning proposal.

Compliance with Section 117 Directions			
Ministerial Direction		**Relevance** (Yes/No)	**Consistency and Implications**
No.	**Title**		
1.1	**Business and Industrial Zones**	No	This planning proposal does not affect land within an existing or proposed business or industrial zone.
1.2	**Rural Zones**	Yes	The proposal affects land within an existing rural zone. The 6,336m^2 of land proposed to be rezoned from a rural zone to a residential zone is not considered to be suitable for agriculture due to its topography and proximity to existing residential zoned land. Any inconsistencies with this direction are considered to be of minor significance. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and is of minor significance.
1.3	**Mining, Petroleum Production and Extractive Industries**	No	The proposal would not have the effect of prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials. The proposal is not viewed to restrict the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance.

1.4	**Oyster Aquaculture**	No	The planning proposal does not seek a change in land use which could result in adverse impacts on a Priority Oyster Aquaculture Area or a "current oyster aquaculture lease in the national parks estate". The planning proposal does not seek a change in land use which could result in incompatible use of land between oyster aquaculture in a Priority Oyster Aquaculture Area or a "current oyster aquaculture lease in the national parks estate" and other land uses.
1.5	**Rural Lands**	Yes	This planning proposal affects land within an existing rural zone. It also seeks to change the existing minimum lot size for subdivision of the land. The proposal is considered to be generally consistent with the Rural Planning Principles and Rural Subdivision Principles listed in *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP). Any perceived inconsistencies with this direction are considered to be of minor significance and justified. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and of minor significance.
2.1	**Environment Protection Zones**	No	This planning proposal does not affect land in an environmental protection zone. This proposal does not seek to reduce the environmental protection standards applying to the land.
2.2	**Coastal Protection**	No	This direction does not apply to the planning proposal because it does not affect land in the coastal zone.
2.3	**Heritage Conservation**	Yes	The planning proposal is considered to be consistent with this direction. Any perceived inconsistencies with this direction are considered to be of minor significance and justified by the fact that: • The *Singleton Local Environmental Plan 1996* (SLEP 1996) and draft Standard Instrument Local Environmental Plan (SI LEP) comprise provisions to protect items of environmental heritage. • The *National Parks and Wildlife Act 1974* comprises provisions to protect objects and places of Indigenous heritage. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and of minor significance.

2.4	**Recreation Vehicle Areas**	No	This planning proposal does not seek to enable land to be developed for the purpose of a recreation vehicle area within the meaning of the *Recreation Vehicles Act 1983*.
3.1	**Residential Zones**	Yes	This planning proposal affects land within an existing residential zone. It seeks to back-zone approximately 632m^2 of existing (recently rezoned) residential land to a rural zone. This will result in a slight change to the dividing boundary between the rural and residential zones. It will provide for the rural land to be incorporated into the larger rural component of the site. This would rationalise the rural zone boundary with the minimum 10Ha lot size boundary and provide for a suitable rural dwelling-house site outside of the area of flood affectation.. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and of minor significance.
3.2	**Caravan Parks and Manufactured Home Estates**	No	This planning proposal is not for the purposes of identifying suitable zones, locations or provisions for caravan parks or manufactured home estates.
3.3	**Home Occupations**	Yes	The mandatory provisions of the SI LEP make home occupations exempt from requiring development consent in the *R1 General Residential Zone*. "***Home activity***" is the equivalent definition for "***home occupation***" in the SLEP 1996. Home activities are exempt from requiring development consent in the *2 (Residential Zone).* The objectives of this direction are considered to be addressed by this planning proposal. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and of minor significance.
3.4	**Integrating Land Use and Transport**	Yes	This planning proposal seeks to back-zone approximately 632m^2 of existing (recently rezoned) residential land to a rural zone. As at the time of preparation of this planning proposal, the site had not been used for urban development. The proposal is not considered to have an adverse impact in regard to integrating land use and transport. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and of minor significance.
3.5	**Development Near**	No	This planning proposal does not seek to

	Licensed Aerodromes		create, alter or remove a zone or a provision relating to land in the vicinity of a licensed aerodrome.
3.6	**Shooting Ranges**	No	This planning proposal does not seek to create, alter or remove a zone or a provision relating to land adjacent to and/or adjoining an existing shooting range.
4.1	**Acid Sulfate Soils**	No	This planning proposal does not apply to land having a probability of containing acid sulfate soils as shown on the Acid Sulfate Soils Maps held by the NSW Department of Planning and Infrastructure.
4.2	**Mine Subsidence and Unstable Land**	No	The land subject of this planning proposal is not within a designated mine subsidence district and is not identified as being unstable.
4.3	**Flood Prone Land**	Yes	This planning proposal seeks to apply a minimum lot zone of 10Ha to subdivision of the rural component of the site. This rural component comprises land within the floodplain of the Hunter River. This planning proposal does not propose provisions which would permit an increase in development of flood-prone land and is considered to be generally consistent with this direction. This planning proposal seeks confirmation from the Director-General (or delegate) that any inconsistency with this direction is justified and of minor significance.
4.4	**Planning for Bushfire Protection**	No	The land subject of this planning proposal is not mapped as being bushfire prone land on Council's bushfire prone land mapping.
5.1	**Implementation of Regional Strategies**	No	The regional strategies do not apply to the land subject of this planning proposal.
5.2	**Sydney Drinking Water Catchments**	No	The land subject of this planning proposal is not within the Sydney Drinking Water Catchment.
5.3	**Farmland of State and Regional Significance on the NSW Far North Coast**	No	This direction does not apply to Singleton Council.
5.4	**Commercial and Retail Development along the Pacific Highway, North Coast**	No	This direction does not apply to the Singleton Local Government Area.
5.5	**Development in the vicinity of Ellalong, Paxton and Millfield (Cessnock LGA)**	No	This direction has been revoked.
5.6	**Sydney to Canberra Corridor**	No	This direction has been revoked.
5.7	**Central Coast**	No	This direction has been revoked.

5.8	**Second Sydney Airport: Badgerys Creek**	No	The land subject of this planning proposal is not within the boundaries of the proposed second Sydney airport site or within the 20 ANEF contour as shown on the map entitled "Badgerys Creek–Australian Noise Exposure Forecast–Proposed Alignment–Worst Case Assumptions".
6.1	**Approval and Referral Requirements**	Yes	This planning proposal is considered to be consistent with this direction. This planning proposal does not include provisions that require the concurrence, consultation or referral of development applications to a minister or public authority and does not identify development as designated development.
6.2	**Reserving Land for Public Purposes**	Yes	This planning proposal is considered to be consistent with this direction. It does not seek to create, alter or reduce existing zonings or reservations of land for public purposes.
6.3	**Site Specific Provisions**	Yes	This planning proposal is considered to be consistent with this direction. The proposal does not intend to amend another environmental planning instrument in order to allow a particular development proposal to be carried out. The planning proposal does not refer to drawings for any such development.
7.1	**Implementation of the Metropolitan Plan for Sydney 2036**	No	This direction does not apply to the Singleton Local Government Area.

Section C - Environmental, Social and Economic Impact

7. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

Threatened Flora

An ecological assessment has been prepared for Lot 12, DP192526 (**Appendix 3**). The rural component of the site comprises Slaty Redgum, which is listed as a threatened species under the *Threatened Species Conservation Act 1995*. This is comprised within the riparian corridor of the Hunter River and is not proposed to be impacted by the proposed residential rezoning.

Threatened Fauna Species

The ecological assessment indicates that the following threatened fauna species have the potential to occur on the site:

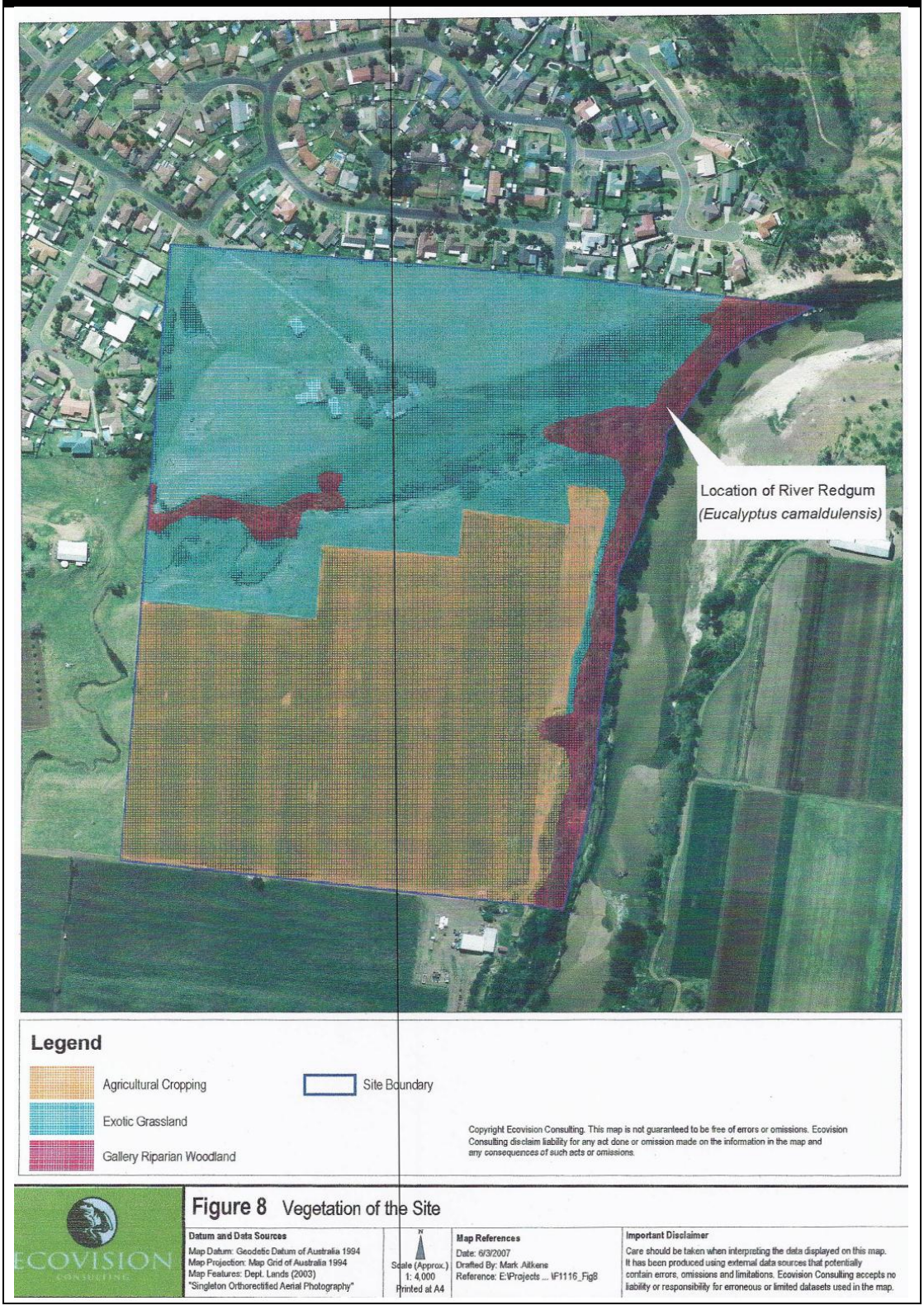
- Speckled Warbler – *Pyrrholaemus sagittatus*
- Grey-crowned Babbler – *Pomatostomus temporalis*
- Spotted-tail Quoll – *Dasyurus maculatus*
- Brush-tailed Phascogale – *Phascogale tapoatafa*
- Grey-headed Flying Fox – *Pteropus poliocephalus*
- Eastern Bentwing Bat – *Miniopterus shreibersii*

Of these species, the Grey-headed Flying Fox has the greatest potential to occur on the site. It is considered that the site comprises limited foraging habitat for the Grey-headed Flying Fox. The residential rezoning would not impact upon such habitat. The proposal is not expected to impact upon threatened fauna species.

Endangered Ecological Communities (EECs)

The limited vegetation on the site is predominantly within the rural component of the site. The ecological assessment indicates that the site comprises some species representative of the Central Hunter Spotted Gum Grey Box Woodland. The land proposed to be rezoned for residential development does not comprise this woodland.

Flora Assemblages



8. Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

Bushfire

The site is not identified as being bushfire prone land on Council's Bushfire Prone Land mapping. The proposal should not have a significant adverse impact in regard to bushfire.

Flooding and Drainage

The rural component of the site comprises flood-prone land. This planning proposal does not comprise provisions that would permit an increase in development of the flood-prone land.

A stormwater drainage gully runs through the land proposed to be rezoned to a residential land use zone. This gully would need to be filled to provide for residential development. It is intended to pipe stormwater flows. The proposal should not have a significant adverse impact in regard to flooding or drainage.

Native Vegetation

The component of the site to be rezoned for residential development is relatively cleared of significant vegetation. This planning proposal does not seek to remove native vegetation.

Soils

A geotechnical assessment has been conducted for the site. The report indicates that there is not a risk to residential development of the site on the basis of contamination. The planning proposal should not have a significant adverse impact in regard to soils.

Loss of Rural Lands

The 6,336m2 of land proposed to be rezoned from a rural zone to a residential zone is not considered to be suitable for agriculture due to its topography and proximity to existing residential zoned land. This planning proposal is not considered to result in a significant loss of rural lands.

Traffic Access and Transport

The proposal is expected to provide for the creation of approximately 10 additional residential lots. Access to the residential lots would be via the internal road proposed as part of the Burbank Crescent Residential Estate. The proposal should not generate any significant adverse impacts in regard to traffic and transport.

European Heritage

No items of European heritage significance have been identified on the site.

Indigenous Heritage

An Archaeological Due Diligence Assessment should be prepared for the component of the site to be rezoned for residential development.

9. How has the planning proposal adequately addressed any social and economic effects?

The proposal forms a logical extension to the existing residential zoned land. No significant adverse social or economic impacts have been identified as likely to result due to the proposal.

Section D - State and Commonwealth Interests

10. Is there adequate public infrastructure for the planning proposal?

The site subject of this planning proposal has access to electricity, telecommunications, road, sewer and reticulated water supply infrastructure.

It is recommended that Ausgrid be consulted in regard to electricity infrastructure and Telstra be consulted in regard to telecommunications infrastructure.

11. What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

The following public authorities should be consulted in relation to this planning proposal:

- Ausgrid
- Telstra
- NSW Office of Environment and Heritage

PART 4 –COMMUNITY CONSULTATION

The public would have the opportunity to view and comment on the planning proposal once the NSW Department of Planning and Infrastructure endorses the proposal to go on public exhibition. It is submitted that the proposal does not fit the definition of a "Low impact Planning proposal" and as such, it should be exhibited for a period of not less than 28 days.

RECOMMENDATION

Prior to undertaking consultation with public authorities, it is recommended that this planning proposal be supported and that an archaeological due diligence assessment be prepared for the land to be rezoned for residential development.

Note:

It is expected that it will take approximately 18 months to finalize this planning proposal. This estimation is based on the expectation that the archaeological due diligence assessment will be completed by the proponent and lodged with Council within 6 months of the date of issue of the gateway determination and that no significant matters arise during public authority and community consultation.

Attachment 1 – Singleton Land Use Strategy

SINGLETON
LAND USE STRATEGY

SINGLETON COUNCIL

Adopted by Council: 21 April 2008

Endorsed by Department of Planning: 8 June 2008

SINGLETON
LAND USE STRATEGY

PREPARED FOR

SINGLETON COUNCIL

The Singleton Land Use Strategy (April 2008) has been prepared for Singleton Council by Planning Workshop Australia, in association with Land and Environment Planning.

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1 INTRODUCTION

The Singleton Land Use Strategy has been prepared for Singleton Council.

The Strategy outlines key land use policies and principles for the Singleton local government area (LGA), and provides the planning context for the preparation of local environmental plan provisions. The Strategy has a time frame of 25 years, to 2032. The area to which the Strategy applies is shown in Map 1.1.

The intent of the Strategy is to:

- Recommend actions for achieving the land use objectives of the Singleton community, consistent with the Council vision.
- Recommend changes to Singleton Local Environmental Plan (LEP) 1996 to reflect the Singleton Council and community vision, the adopted 2030 Strategy, and the land use objectives, consistent with NSW Government planning requirements, including the Standard LEP provisions.

The Strategy identifies where growth and change is expected to occur, and land use planning objectives and strategies to guide this growth and change. It also identifies infrastructure requirements to support development, and will help inform local and state government budget processes.

The Strategy has been prepared with funding under the NSW Department of Planning's *Planning Reform Funding Program*. Preparation of the Strategy has been overseen by representatives from the Council and the Department, and has involved the following steps:

1. Review of the key planning issues
2. Consultation with Council and relevant NSW Government agencies
3. Preparation of a *Situation Analysis* report
4. Community consultation workshops
5. Preparation and public exhibition of the draft Strategy.

The Situation Analysis report provides a profile of Singleton LGA. It has established the key land use planning issues and strategic priorities and actions to be considered in the preparation of the Strategy and subsequent local environmental plan. A summary of the information in the Situation Analysis has been included in relevant sections of the Strategy.

Singleton Land Use Strategy

LOCATION MAP & TOPOGRAPHY

Fig 1.1

2 VISION

The Strategy aims to provide clear direction for Council and NSW Government agencies to guide decisions relating to future use of land within the Singleton LGA, and to inform the preparation of a comprehensive local environmental plan (providing regulatory land use controls). It establishes a policy framework to facilitate opportunities as they emerge in the future.

The proposed vision for the Strategy is 'to create a progressive community of excellence and sustainability'. This is based on the vision statement outlined in Singleton Council's Management Plan, and complements Council's adopted 2030 Strategy. The Strategy takes into account the objects of Section 5A of the *Environmental Planning and Assessment Act 1979* in identifying proposed actions to implement the vision. This legislation provides the legal framework for the preparation of local environmental plans.

3 STRUCTURE OF STRATEGY

The Strategy is based on the information and land use planning issues identified in the Situation Analysis and during the consultation process. Its priority is those issues that are within the scope of local environmental plan (LEP) provisions.

Key land use planning issues for the Strategy were identified in the Situation Analysis, and were classified according to whether they were mainly urban or rural issues, as follows:

URBAN ISSUES

- Catering for settlement needs
- Providing and maintaining urban infrastructure
- Reviewing development on highway frontage land
- Providing for industrial and commercial development
- Planning for risks and economic vulnerability to flooding
- Providing for social infrastructure and urban amenity

RURAL ISSUES

- Catering for rural residential subdivision and development
- Promoting agricultural development, protection of employment opportunities and the natural resource base
- Planning for rural servicing requirements (costs and maintenance)
- Planning for rural highway frontage development
- Identifying environmental values, constraints and protection requirements

The omission of reference to an issue does not mean that it has not been considered in the Strategy or is not of importance. While it may not be regarded as a key issue, it is likely to have been considered in conjunction with another issue.

The themes used in structuring the Strategy take into account the key land use planning issues, and are as follows:

- Urban settlement
- Villages and rural residential development
- Rural areas
- Environmental values and constraints.

A summary of the present situation is presented for each theme, followed by background information on each issue and objectives that can be considered for the subsequent local environmental plan. This is followed by a policy indicating how the Council should respond to each issue in a consistent manner, and strategic actions which would direct future planning and identify implementation responsibilities. Further background detail on each of the planning issues and themes can be found in the accompanying Situation Analysis report.

4 PLANNING CONTEXT

This section summarises important attributes of the LGA, and key characteristics which will affect future land use. It includes information on what is important about the area, and an overview of existing strategies and land use planning provisions.

Information is provided for the whole LGA as well as for 11 planning areas which enable spatial differences to be identified. This information is based on the Situation Analysis report, and more detailed information is included in that report.

Singleton is a large LGA with an area of 4,896km^2, comprising about 16% of the Hunter Region. It had an estimated resident population of 23,258 persons on 30 June 2007 (around 3.5% of the regional population) and has shown a steady growth. The increase in population over the previous year was 253 persons, representing a growth rate of 1.1%.

Important characteristics of Singleton LGA in 2008 which will influence future land use are summarised in Table 1, focusing on demographic and economic factors. These show that Singleton is a relatively prosperous area with a diverse economic and natural resource base, and has a relatively young population.

Table 1: Important existing characteristics of Singleton LGA

Characteristic
Outside the urban areas the main land uses are agriculture, national parks, and coal mining
Prosperous economy and employment opportunities (high dependence on coal mining and metropolitan spillover)
Compared to the Hunter Region and NSW, population is relatively well off and a relatively young average age
Adequate urban water and sewer infrastructure, and provision adequate for maintenance (in existing service areas)
Over the last 20 years new housing development has occurred at about 160 dwellings per year, with about 40% in residential areas and balance rural/rural residential.
Locational and transport advantages through location on New England Highway and Main Northern Railway Line. Increasing traffic flows (mainly New England Highway, Singleton town, and areas SE and E of Singleton), and high level of commuting by car to work. Rural road infrastructure improvement and maintenance pressures
Potential new infrastructure provision (F3 Freeway extension, gas supply)
Relatively poor public transport accessibility

Characteristic
Decline and uncertainty in agricultural sector
Identification of important remnant native vegetation within LGA, including endangered ecological communities (e.g. floodplain vegetation, Lower Hunter Spotted Gum Ironbark Vegetation, Warkworth Sands, and Weeping Myall Woodland)
Uncertainty in relation to industrial land demand and supply (largely driven by Lower Hunter situation)
Limits on availability of water supplies at the regional level
Significant area of land in LGA subject to natural hazards (flooding and bush fires)

The distribution of population within the Singleton LGA is shown on Map 4.1, together with the planning areas used for demographic analysis in the Situation Analysis.

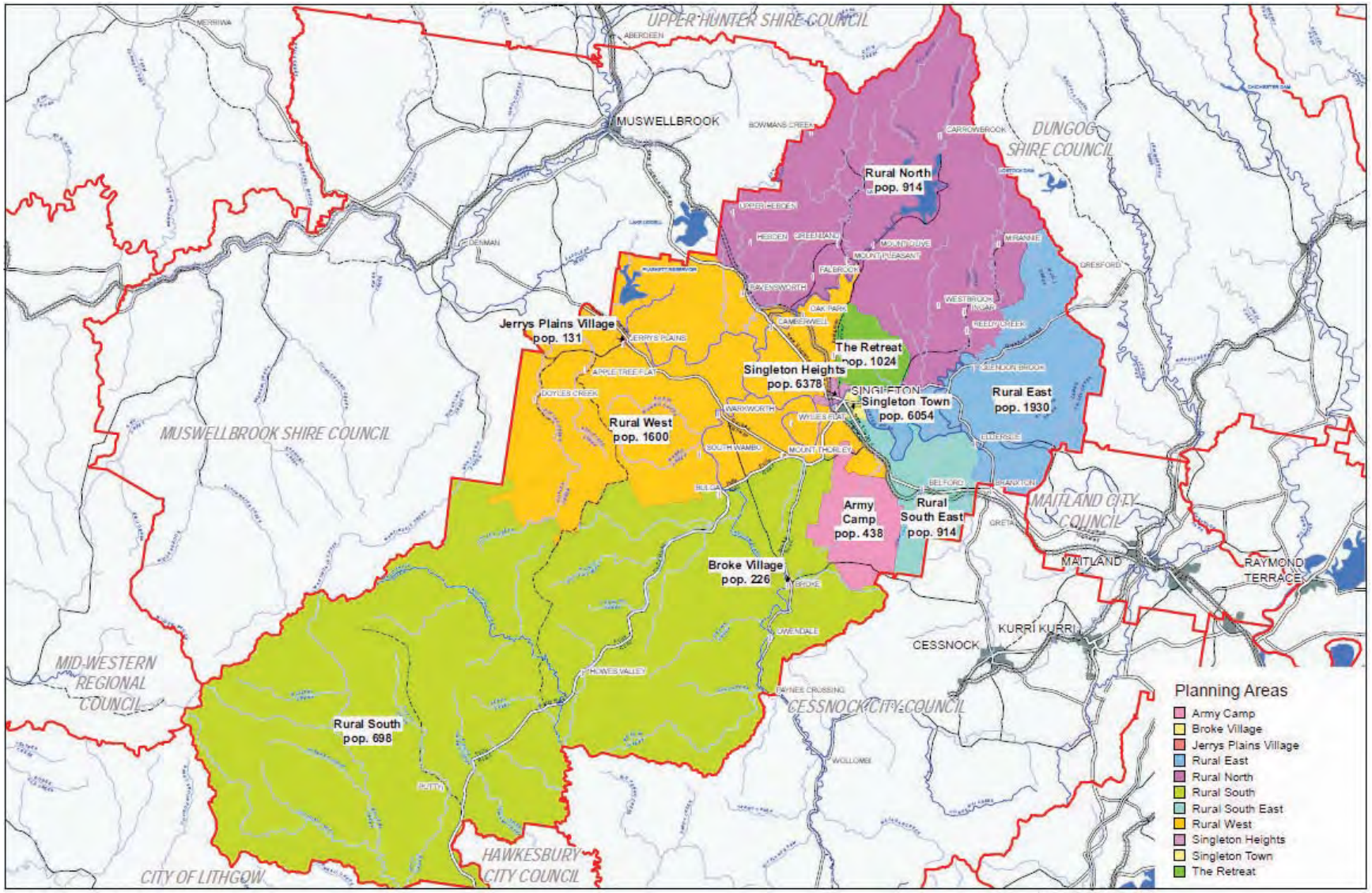
The planning areas have been used to differentiate between varying social, economic and land use characteristics occurring within the LGA. The boundaries of these planning areas are shown on Map 4.1, and are based on ABS Census Collection Districts amalgamated to group areas that have common characteristics. These planning areas correspond with those identified in the Singleton Community Social Plan, except that urban areas have been consolidated.

There are significant variations in the characteristics of each planning area, and land use issues vary between the areas as summarised in Table 2. Overall, in urban areas there is continuing pressure for urban development. Urban areas have accommodated about 50% of population growth over the last 10 years. Pressure for rural residential development is primarily within 20 km of Singleton and near Branxton, while more distant rural areas are stable.

Table 2: Singleton LGA planning areas and key land use issues

Planning area name	Description and key land use issues (e.g. growth expectations, land use constraints)
Urban	
Singleton Town	Focus of ageing population, flood liable land, commercial areas and consolidation of CBD, major transport and services, limited expansion potential, heritage issues, urban infill development, servicing and infrastructure issues (especially urban stormwater). Provision of industrial land.
Singleton Heights (North Singleton)	Relatively young population. Future urban growth will be concentrated in this area. Long term residential land opportunities need to be provided for and sites need to be identified for urban support uses (e.g. schools, health and social facilities).

Planning area name	Description and key land use issues (e.g. growth expectations, land use constraints)
	Consideration needs to be given to provision of retail areas and potential for additional industrial land. Transport accessibility is largely reliant on private transport, and there is limited accessibility to major transport links and Singleton Town.
Villages, rural residential and other	
Retreat	Relatively young, well off rural residential population. High car dependency. Increasing population requiring services. Some demand for additional rural residential development.
Broke Village	Reticulated water supply soon available. Lack of reticulated sewer limits development potential. Some flood liable land. Potential for mining impacts.
Jerrys Plains Village	Stable or slightly declining population with low urban growth, limited facilities and services. Potential land available for further urban development, but little land use change expected. Heritage issues for infill development. Potential coal mining in the vicinity.
Army Camp	Commonwealth land outside Council control.
Rural	
Rural North	Most stable planning area in LGA in terms of agriculture, land use and population change. Includes most important grazing enterprises and largest rural landholding sizes.
Rural East	Greatest pressure for rural residential development and small rural subdivision.
Rural South East	Pressure for more rural and rural residential development due to accessibility to Maitland, Cessnock and Greater Sydney Metropolitan area. Limited water availability. Lower Hunter Regional Strategy identifies potential for urban development in part of this area.
Rural South	Many absentee landowners due to accessibility to Greater Sydney Metropolitan area. Pressure for more rural and rural residential subdivision. Some mining impacts. High bush fire hazards on land in vicinity of Wollemi and Yengo National Parks.
Rural West	Stable population, with considerable open cut mining activity and associated land use change and environmental impact. A large proportion of the area is in mining ownership. Includes areas of Wollemi National Park.



Singleton Land Use Strategy

PLANNING AREAS & POPULATION DISTRIBUTION (2006)

Fig 4.1

Projected or anticipated changes, trends or pressures for the next 15 years which should be taken into account are summarised as follows:

- Pressure for extension to existing urban infrastructure (especially water service areas)
- Continuing coal mining production, and rehabilitation of coal mining areas with potential for subsequent post mining uses
- Increasing urban development pressure (including rural residential) around Branxton and near areas with transport accessibility and services (Singleton)
- Increasing pressure for improved public transport and accessibility to Newcastle for services
- Continuing population growth, with further ageing of population
- Increasing inadequacy of housing suited to ageing of population and reduced number of persons per dwelling (possible mismatch in housing supply and demand)
- Pressure for increasing intensive agriculture and consolidation of agricultural holdings (where this has not been prevented by subdivision and development)
- Increasing cost pressures for services (provision of roads and service infrastructure in rural/rural residential areas, transport costs) leading to less commuting
- Increasing demand for maintaining environment and amenity and 'tree change' lifestyle
- Reduced population 0 – 24 years, requiring fewer services and measures to maintain population and skills
- Requirement to improve landscape connectivity for biodiversity and maintain native vegetation (increased pressure from non-native species)
- Climate change leading to more variability in climate and reduced water security

Key matters that will affect land use in the area are the ability to maintain viable economic activities; the ability to maintain an attractive lifestyle; and the ability to attract new residents to the region. This will primarily be affected by providing and maintaining high quality key infrastructure and reasonable cost of provision (transport, water, and urban), community services (especially education and health), and amenity (landscape and environment).

4.1 Growth trends

Singleton's growth scenario anticipated for the 25 years to 2032 is for a population increase in the range 1.0 – 1.5% per annum. This Strategy adopts a population growth forecast of 1.5% per annum, and forecasts new dwelling demand averaging 200 dwellings per year. Growth is expected to substantially result from in-migration for

lifestyle and employment reasons. Dwelling requirements are expected to grow faster than population growth, based on lower dwelling occupancy rate trends. A large proportion of the workforce is employed in the mining industry which is expected to maintain its employment level over the Strategy period.

The population in most areas of the Singleton LGA is expected to increase, but some parts of the area will grow more quickly, especially Singleton Heights/North Singleton and the Rural East Planning Area. The increasingly ageing population structure reflects regional and national trends and contributes to a reduction in the dwelling occupancy rate. This is expected to result in additional demand for housing. An increasing proportion of the population is expected to live in urban areas. New dwellings in rural areas are expected to decline from up to 70% of all dwellings (e.g. 2000 and 2001) to about 35% of all dwellings, largely as a result of a reduction in the supply of rural lots, adequate supply of residential lots in Singleton, and trends towards increasingly expensive transport costs. These estimates do not take into account demand and supply in the Branxton area, since no timing is available for land supply in this area, and it is unlikely that this would occur within 5 years.

4.2 Planning framework

The Singleton LGA's existing planning framework is outlined in the Situation Analysis. There is a single existing local environmental plan (Singleton LEP 1996) and a range of development control plans.

The current regional planning framework for Singleton LGA is provided by Hunter Regional Environmental Plan 1989. This outlines a range of land use objectives and principles at the regional scale.

The Lower Hunter Regional Strategy 2006, prepared by the NSW Department of Planning, provides a broad land use planning framework for the Lower Hunter Sub Region, focusing on projected land requirements for housing and employment generating development. This Strategy is a policy document which updates the strategy and population projections outlined in the Hunter Regional Environmental Plan 1989, but does not replace the objectives, strategies and statutory requirements of the Plan. Under a Section 117 direction, LEPs are required to be consistent with a regional strategy.

The Lower Hunter Regional Strategy has implications for the Singleton Land Use Strategy, as follows:

- Growth projections for the Lower Hunter sub region can be expected to affect parts of Singleton LGA because the area forms part of a larger regional housing market. Historical data has shown that Singleton is substantially aligned to Lower Hunter trends.
- It identifies additional urban expansion areas south of Branxton, including up to around 2000 lots in Singleton LGA as part of a new urban area having around 7000 lots, and a new overall potential population of 15-20,000 people. It indicates a national park proposal within Singleton LGA south west of Branxton, which forms part of a separate agreement between a private land owner and the NSW Government to allow urban development.

- It limits rural residential development within the Lower Hunter Region to existing zoned areas, potentially leading to greater demand for this type of development within Singleton LGA in the longer term.
- It identifies adequate medium to long term industrial land supply within the sub region, with large areas currently zoned industrial. This supply may reduce industrial land requirements elsewhere in the region, including Singleton.

This Strategy supports the implementation of a consistent planning framework for Singleton and has taken into account relevant State planning policies and directions under Section 117 of the *Environmental Planning and Assessment Act 1979*.

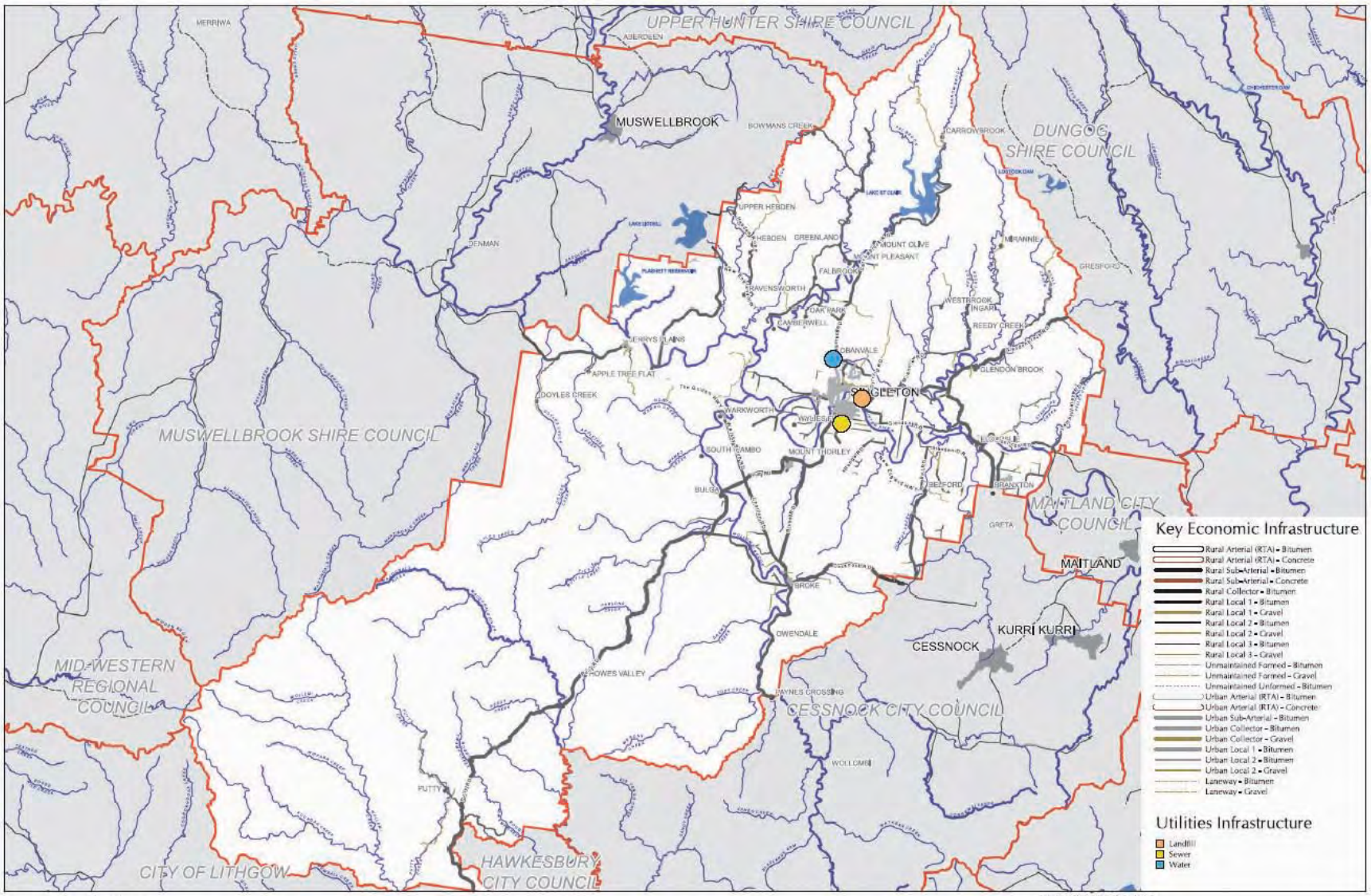
The format and content of the LEP resulting from the Strategy will be substantially determined by the NSW Government standard provisions for plans. Other specific agency requirements will also affect the LEP provisions.

4.3 Settlement structure and infrastructure

Major economic activities within the LGA are coal mining, agriculture, defence and tourism, in addition to urban support activities such as business and industrial land. Information on the characteristics, economic value and land use requirements of these activities are included in the Situation Analysis report. Background information on these and other infrastructure and settlement structure issues identified in the Situation Analysis, such as climate and infrastructure, is presented in the relevant sections of the Strategy.

Housing characteristics and availability are important for future land use and development. ABS Census data for 2006 shows a total of 8374 private dwellings within the Singleton LGA, with an average increase of around 160 per year over the last 25 years. About 9% of the dwellings were unoccupied, which is average for NSW, but lower than the Hunter Region average. In 2001, separate dwelling houses accounted for 80.5% of all dwellings and there were 0.38 dwellings per capita, which is lower than most LGAs in the Hunter Region. Shortages of rental accommodation have periodically occurred in Singleton, and there are potential issues associated with provision of affordable housing, and changes in housing requirements associated with the overall ageing of the population.

Singleton LGA is well accessed by roads and transport routes and is adequately serviced with infrastructure. The Situation Analysis report reviewed key infrastructure issues within the Singleton LGA, including water supply, sewer, transport, stormwater, waste management, bushfire facilities and open space. Summary information is presented in Maps 4.2 to 4.4 and Table 3.



Singleton Land Use Strategy

Source: Singleton Shire Council 2007

RURAL ROAD INFRASTRUCTURE & UTILITIES

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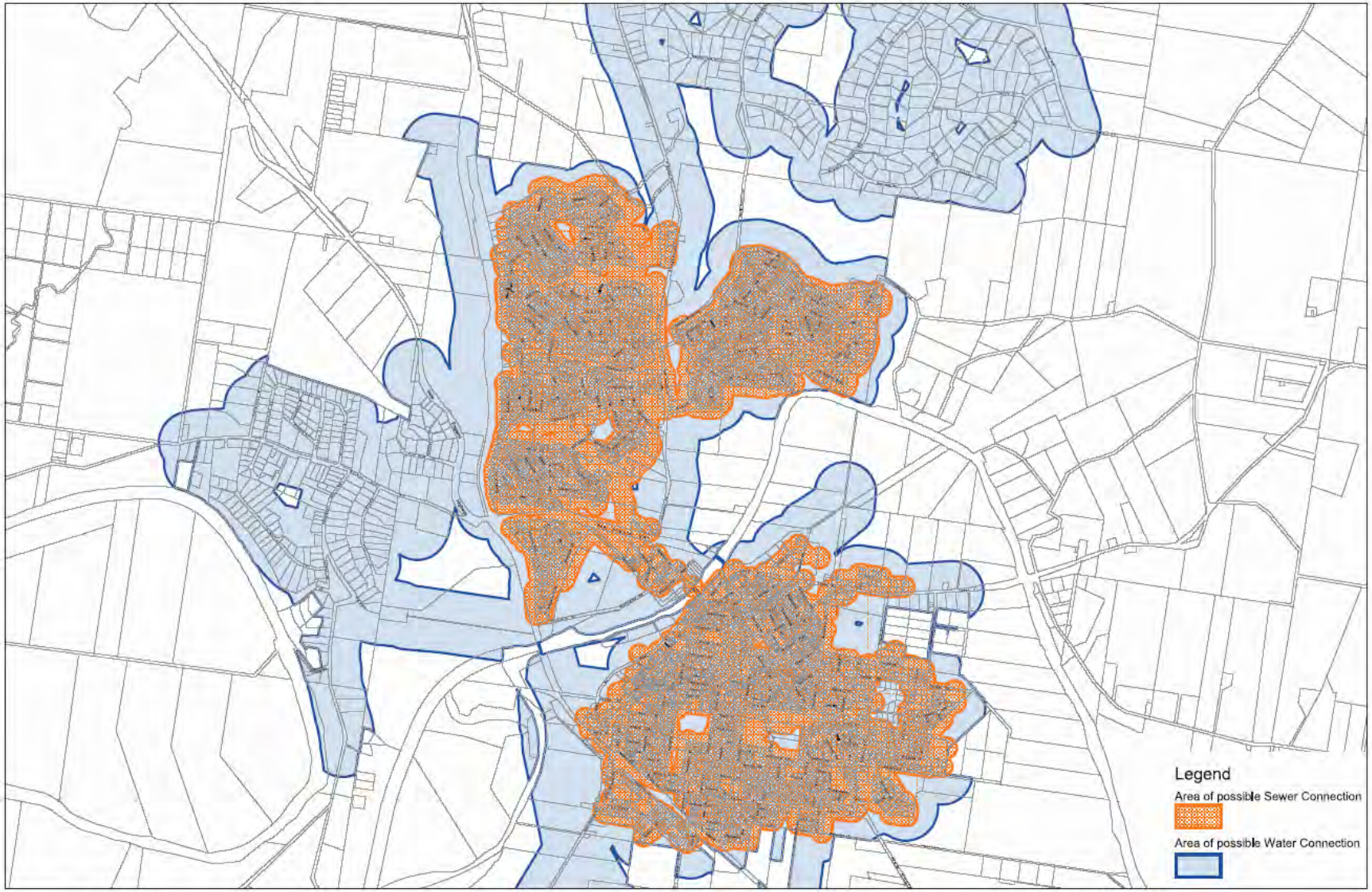
Fig 4.2



Source: Singleton Shire Council 2007

Singleton Land Use Strategy

WATER AND SEWER SERVICE AREA - SINGLETON

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issued 11 June 07

Fig 4.3A

Singleton Land Use Strategy

WATER SERVICE AREA - JERRYS PLAINS

Fig 4.3B

Source: Singleton Shire Council 2007

Singleton Land Use Strategy

WATER SERVICE AREA - BROKE

prepared by planning workshop australia
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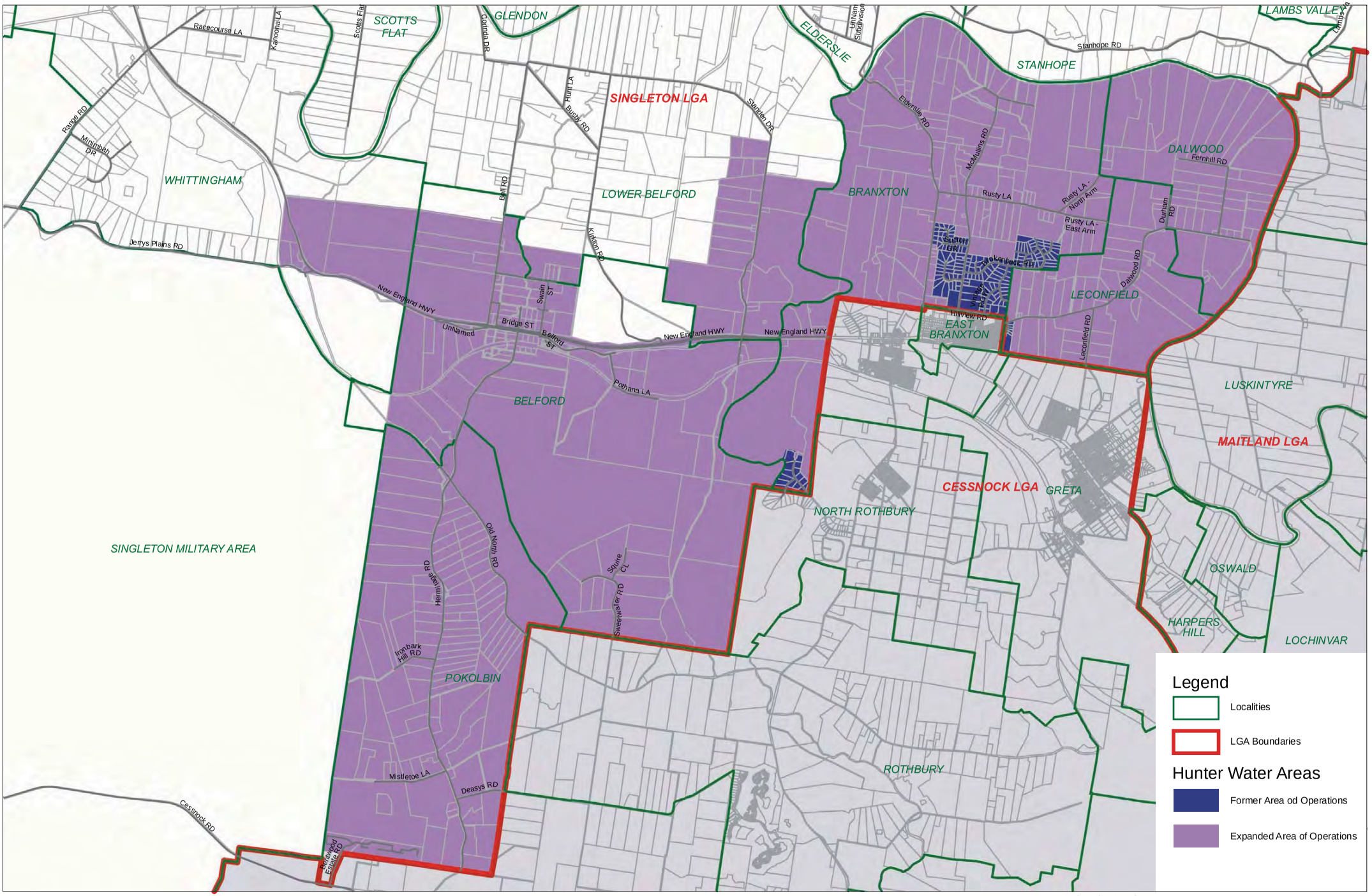
Issued 11 June 07

Fig 4.3C



Singleton Land Use Strategy

Source: Singleton Shire Council 2007

WATER AND SEWER SERVICE AREA - BRANXTON

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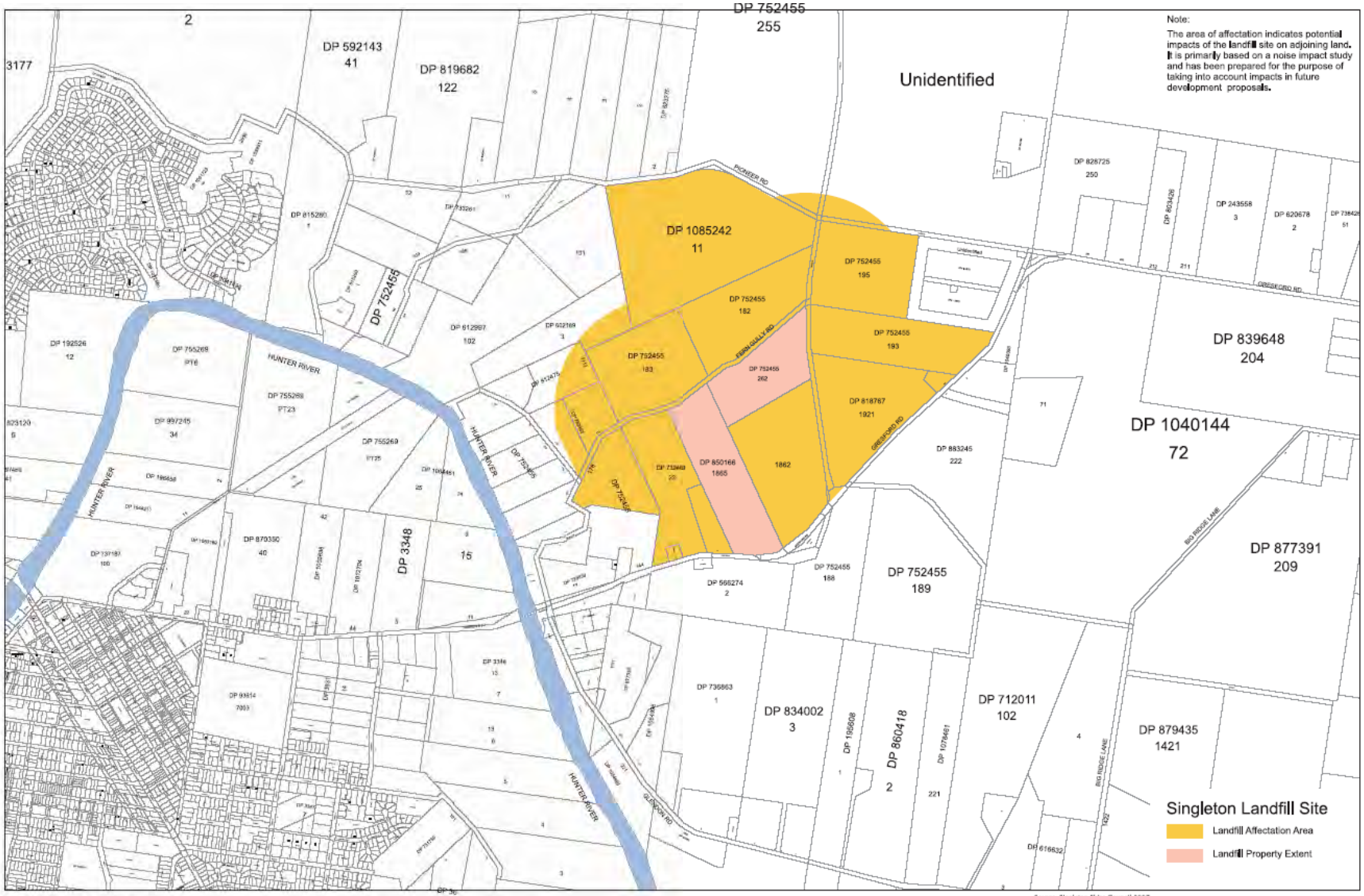
Fig 4.3D



Singleton Land Use Strategy

SINGLETON WASTE DISPOSAL AREA INFRASTRUCTURE

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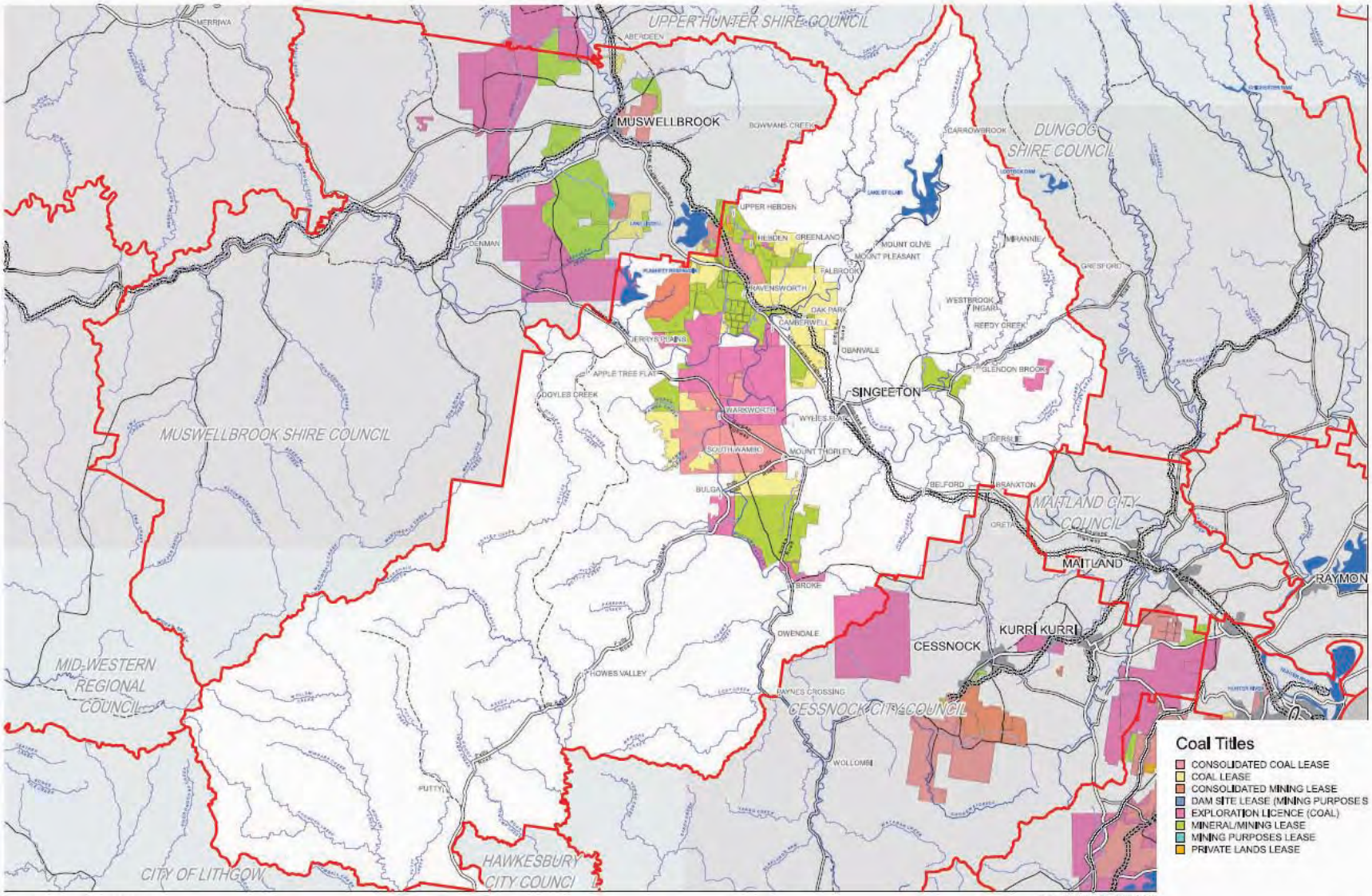
Fig 4.4

Table 3: Summary of key infrastructure issues

WATER SUPPLY	
Singleton	The town of Singleton is well placed in relation to existing urban water supply, and potential future demands with a supply from the Glennies Creek Dam via a pipeline. Residential and surrounding rural residential areas currently have an adequate water supply of good quality. All existing residences in the town area are supplied with treated water, plus some outside but close to the boundary. A non potable water supply is provided to some properties along the Glennies Creek Dam pipeline route.
Mt Thorley	A potable water supply is provided to the Mt Thorley Industrial Estate from Obanvale Water Treatment Plant via trunk mains.
Jerrys Plains	A potable supply was provided to the Jerrys Plains Village area, only, in 2004.
Broke	A potable water supply for Broke was provided in July 2007 from Obanvale Water Treatment Plant, via trunk mains.
Branxton (rural residential)	Water supply to rural residential allotments is provided by Hunter Water Corporation under an agreement with Singleton Council. The Hunter Water Corporation area of operations within Singleton LGA has been extended. The extension of the area of operation will not guarantee that land will be serviced.
SEWERAGE	
Singleton	Sewerage is connected to all dwellings within the town boundaries where economically feasible, and only a small number of properties are not connected. Council operates one sewage treatment plant at Doughboy Hollow south of Singleton. Sewage is now collected from Maison Dieu Industrial Estate and surrounding rural residential areas via a low pressure pump out system. Limited private pump out systems available to town sewerage immediately adjoining town boundaries.
Branxton	Sewerage service to some rural residential allotments is provided by Hunter Water Corporation under an agreement with Singleton Council. The future boundary of sewerage supply has not been determined, and is subject to further agreement.
ACCESSIBILITY AND TRANSPORT	
Highway	The sections of National and State Highway within the Singleton LGA are the responsibility of the Roads and Traffic Authority (RTA). Singleton Council maintains sections of these roads under contract to the RTA. Consideration needs to be given to proposing a Singleton bypass for the New England Highway.
Urban roads	Urban roads are in reasonable condition, although there are some limitations on capacity. A traffic and parking study and plan is in the process of being undertaken to determine a plan to address these issues, and will assist in determining the future road hierarchy and traffic management measures. A proposal for a link road concept is in the process of implementation. This is an important infrastructure link which will connect future urban development opportunities.

Rural roads	Existing road network adequate to cater for expected demand with ongoing sealing program for gravel roads, and developer upgrading associated with individual development proposals. The main issues relate to the provision of adequate carriageway width, sealing of unsealed roads and level of service of intersections. Growth in traffic volumes on rural roads is primarily limited to areas in the east and south of the LGA, especially in the Branxton/Stanhope and Broke/Fordwich areas.
Public transport	Public transport includes limited rail services and regional and interstate buses provided by private providers. A limited private town bus service operates, together with an extensive school bus network servicing a large proportion of the LGA.
Bikeways	A small network of recreational bikeways exists, which is proposed to be progressively extended in accordance with the Singleton Bike Plan.
STORMWATER	
Singleton	Issues with stormwater infrastructure are ageing capacity and water quality. Works are underway to improve provision of stormwater infrastructure.
Villages	Generally no formal trunk reticulated stormwater drainage system. Relies on natural drainage and soil infiltration.
WASTE MANAGEMENT	
Whole LGA	Provision of waste management facilities is a Council function in the Singleton LGA. Singleton Council operates one licensed waste management facility off Dyrring Road, about 5km from Singleton. The Council's Capital Works Program includes provision for new landfill extensions, together with a range of resource recovery services over a period of several years, to 2015. Waste services will continue on the current landfill site potentially to at least 2025, although the makeup and extent of services on the site may be modified. A building exclusion zone around Singleton landfill has been proposed to provide a buffer to prevent incompatible uses. Council has advised that it now intends to establish a residential dwelling exclusion zone within the "Landfill Affectation Area" identified in Figure 4.4.
BUSHFIRE FACILITIES	
Whole LGA	Reasonable provision exists for bushfire service provision within the LGA. This is provided by the NSW Rural Fire Service in conjunction with Singleton Council.
OPEN SPACE	
Singleton	Active and passive open space needs are currently well catered for. Key issue is the quality of the open space and maintenance costs. In new development areas, future consideration needs to be given to protection of biodiversity values on Council open space land (need for adequate size, shape and connectivity).
Rural areas	Active and passive open space needs are currently well catered for in rural areas.

The substantial coal resources within Singleton LGA significantly affect land use and settlement structure. Current mining titles and Mine Subsidence Districts are shown on Map 4.5.



Singleton Land Use Strategy

COAL MINING TITLES & MINE SUBSIDENCE DISTRICTS

prepared by planning workshop australia

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issued 10 June 07

Fig 4.5

Climate conditions are an important factor for settlement and are closely related to economic development opportunities. Over the life of the Strategy, there is an identified need for the community to adapt to climate change, and also to respond to the causes of climate change. Overall, Singleton LGA is poorly adapted to cope with climate change, for the following reasons:

- The urban structure is relatively dispersed, relies on high energy use (primarily motor cars), and there is a high degree of long distance commuting for employment.
- Water availability is limited but demands for all land uses are increasing. Agriculture on prime agricultural land is largely dependent on irrigation.
- The economic structure of the area is highly dependent on high carbon emission industries (coal mining and electricity generation).
- Anticipated new developments are not greenhouse gas neutral.

Combined with other initiatives, the Singleton Land Use Strategy can provide a framework for responding and adapting to climate change. In particular, to respond to climate change and reduce greenhouse gas emissions caused by the present economic and land use structure, it would be desirable to implement targets and approaches including:

- Support and provide incentives for new industrial and commercial development that is located close to the town, is carbon neutral, and provides onsite water servicing.
- Support enhanced public transport and accessible access networks (including pedestrian and cycle networks).
- Require future urban development and subdivision design to ensure that 100% of lots provide suitable orientation for passive energy efficiency.
- Ensure that economic impacts of rural residential development areas are fully costed, and that costs are recovered through financial contributions arrangements at the subdivision stage.
- Proactively promote a greenhouse gas neutral approach to coal mining within the LGA, including limiting further geographic extension of coal mining to present approved areas.

4.4 Biodiversity and natural ecosystems

Singleton LGA supports extensive biodiversity as a result of its topography, geology and climate. It includes parts of the North Coast and Sydney Basin Bioregions and supports extremely diverse biodiversity as a result of its varied topography, geology and climate. The area is botanically significant because it represents a zone of transition between the coast and inland, and between northern and southern botanical regions. As a consequence, it includes the eastern limit of distribution of some species, and the northern and southern limits of distribution of other species.

Significant proportions of some vegetation communities have been cleared, with the result that much of the remaining native vegetation is of significance (especially in the central Hunter Valley Lowlands). Although approximately 34% of the total area of

the Singleton LGA is included within dedicated conservation reserves (mainly in Wollemi, Yengo and Mt Royal National Parks), this protects only a limited range of the vegetation types and ecosystems occurring within the area.

Some significant characteristics of biodiversity and natural ecosystems occurring within the Singleton LGA are as follows:

- Seven listed endangered ecological communities, 53 fauna species, and 15 flora species listed as threatened under the Threatened Species Conservation Act 1997 (NSW).
- Three of the national parks have World Heritage listing (Central Eastern Rainforest Reserves and the Greater Blue Mountains World Heritage areas).
- Two listed threatened ecological communities and 45 flora and fauna species listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).

The number of listed threatened species and threatened/endangered ecological communities has progressively increased over time, and this trend is expected to continue. Land use responses require improved and regularly updated information, especially in areas likely to be subject to land use change and development pressure. Land use and development are required by State and Commonwealth legislation to take into account environmental impacts on biodiversity, including threatened species and endangered ecological communities.

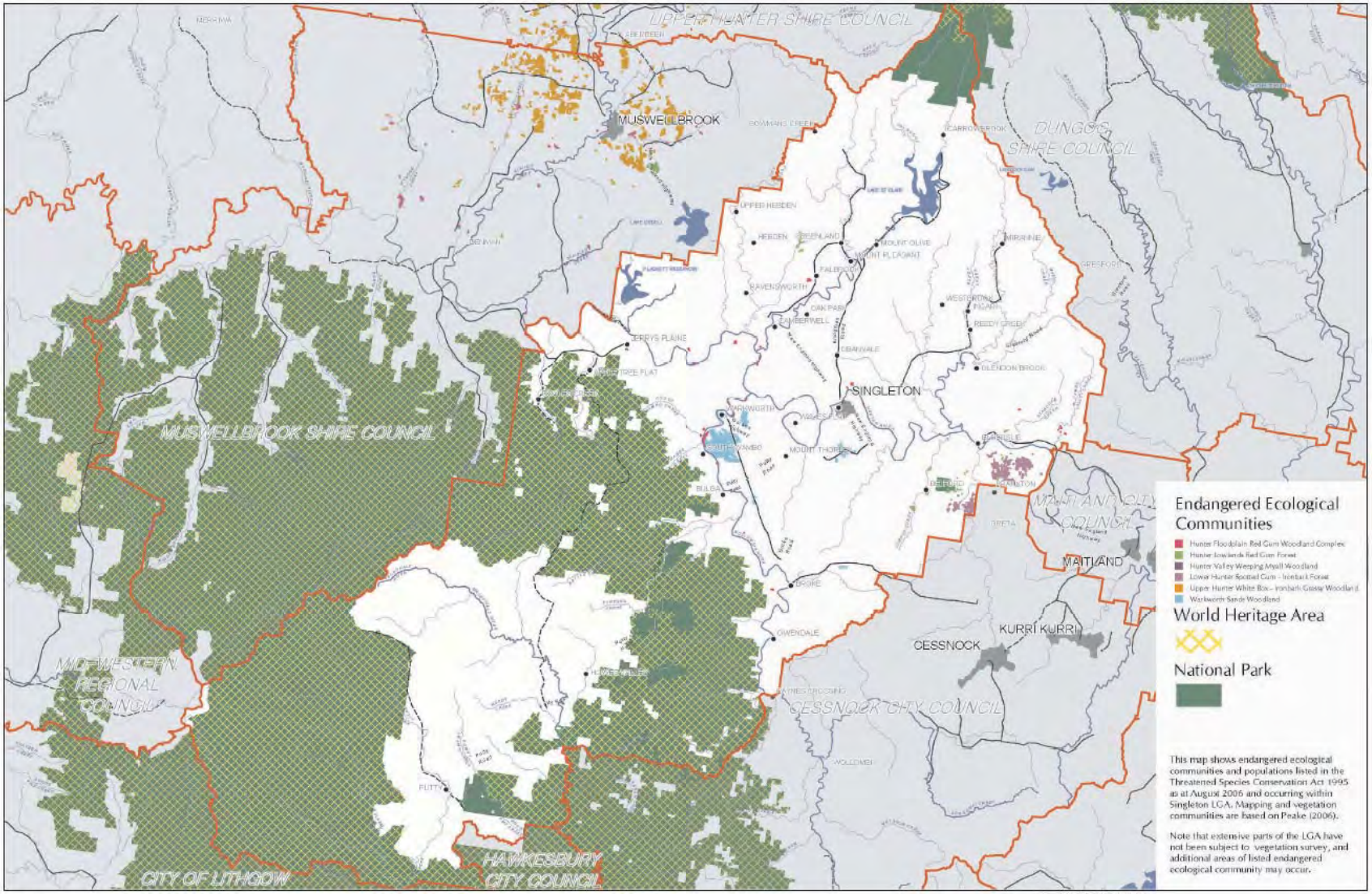
Map 4.6 shows key biodiversity constraints including conservation areas, and some areas identified as endangered ecological communities in the central Hunter Valley Lowlands geographic areas of the Singleton LGA.

4.5 Land and water

Land and water issues are closely related to land use, especially economic activities such as agriculture and urban settlement. In affecting land use change, the Strategy must consider important issues including land capability and land degradation, water availability and quality, flooding and bushfires. The characteristics of the LGA are summarised in the Situation Analysis report, and some of the key characteristics (river sub-catchments, land capability, and bushfire prone vegetation) are shown on Maps 4.7 and 4.8. Separate mapping of flood prone land is also available for some areas.

4.6 Design issues

Design issues apply primarily at the site development scale, and in the Strategy are secondary in importance to the issues of settlement structure and infrastructure, biodiversity and natural ecosystems, and land and water. Background to these issues is included in the Situation Analysis report, and the framework for consideration of these issues needs to be included within the Strategy. Important design issues include heritage conservation and environmental design, and Maps 4.9A and 4.9B show the boundaries of heritage conservation areas recognised in urban areas of the LGA. Heritage conservation issues have been included in relevant sections of the Strategy, as they apply to the key issues.



Singleton Land Use Strategy

Source: Singleton Shire Council 2007

CONSERVATION AREAS & ENDANGERED ECOLOGICAL COMMUNITIES

prepared by planning workshop australia
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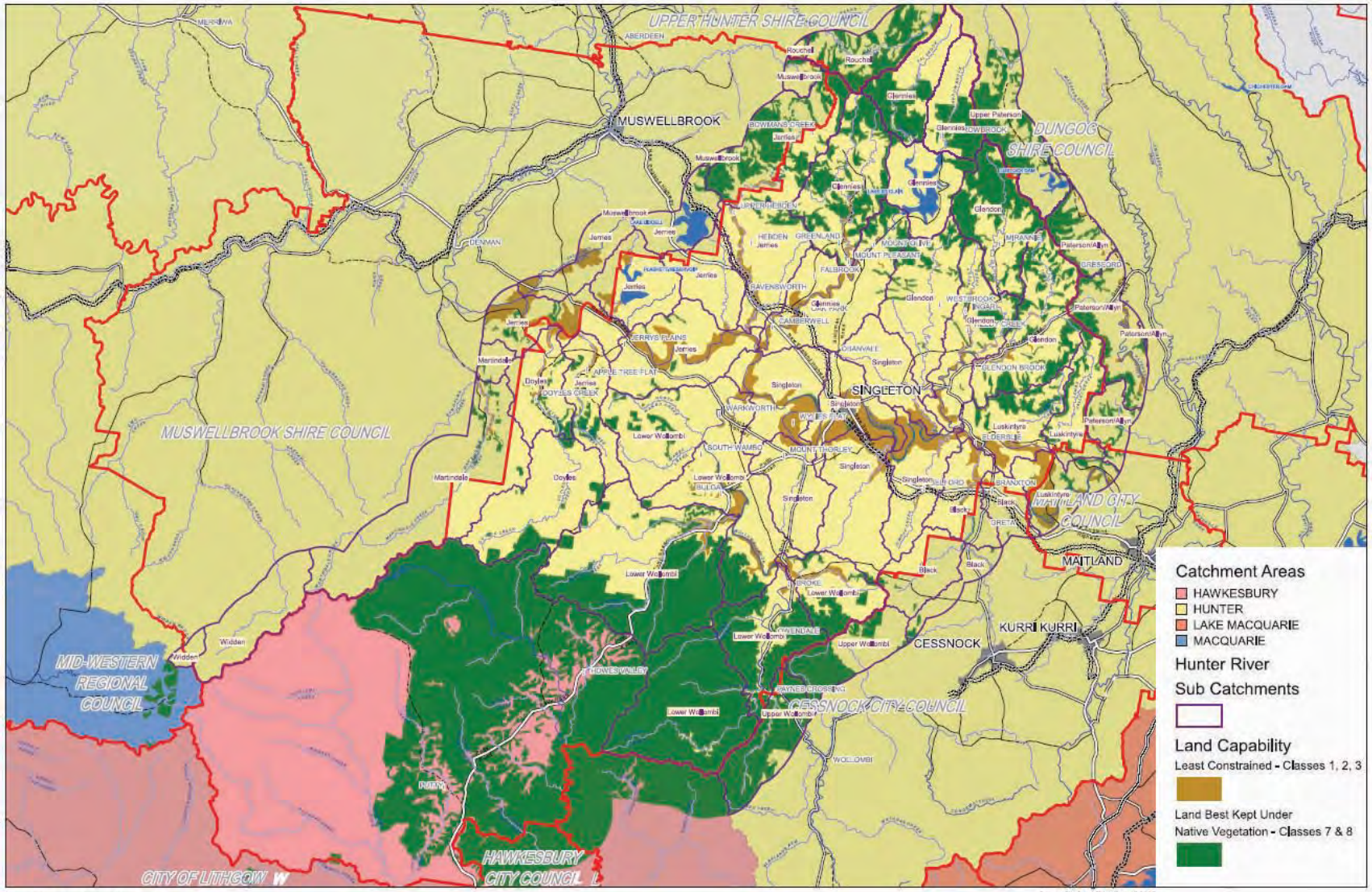
Fig 4.6



Source: Singleton Shire Council 2007

Singleton Land Use Strategy

WATER CATCHMENTS AND LAND CAPABILITY

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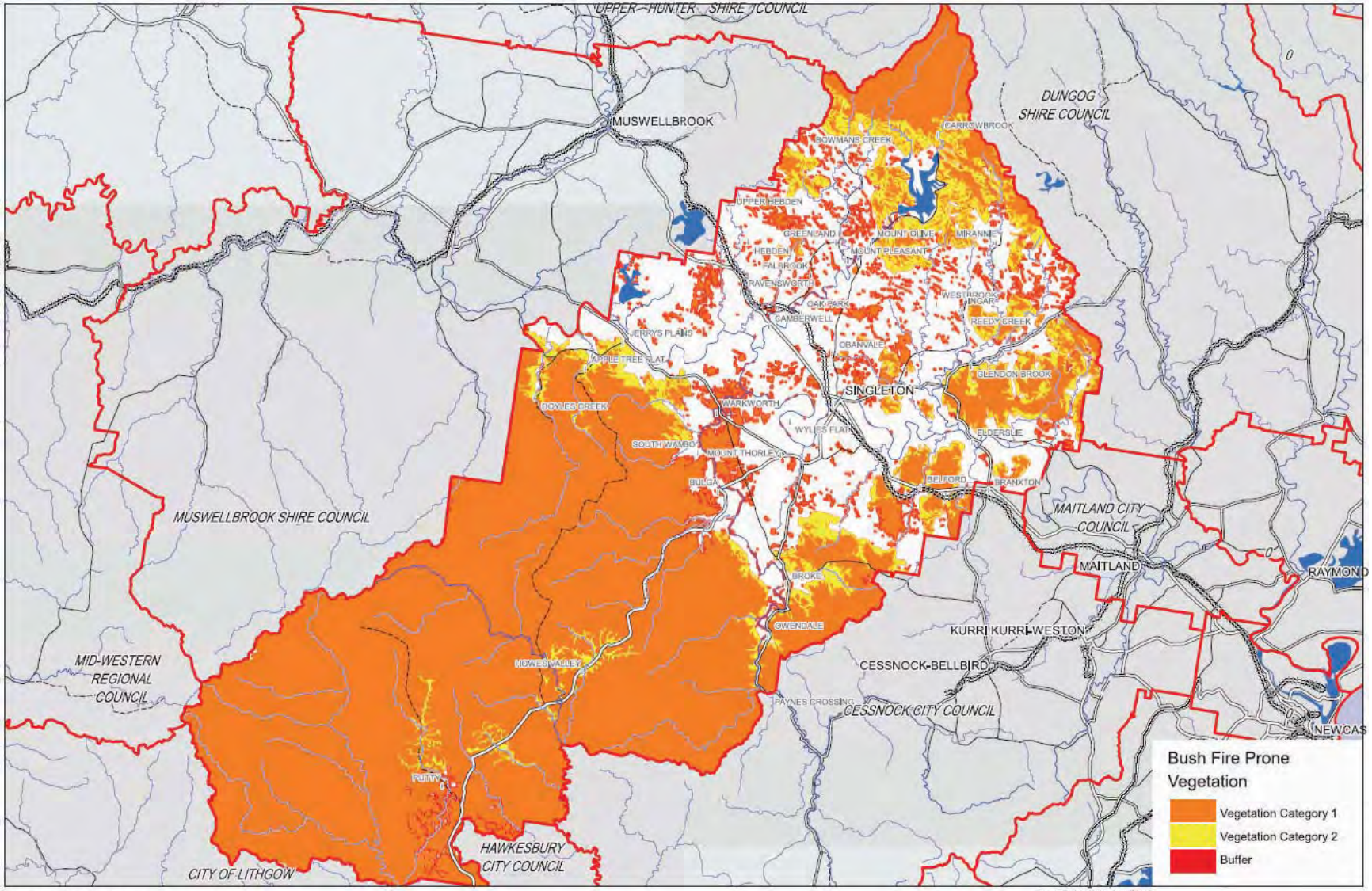
Fig 4.7



Singleton Land Use Strategy

BUSH FIRE PRONE VEGETATION

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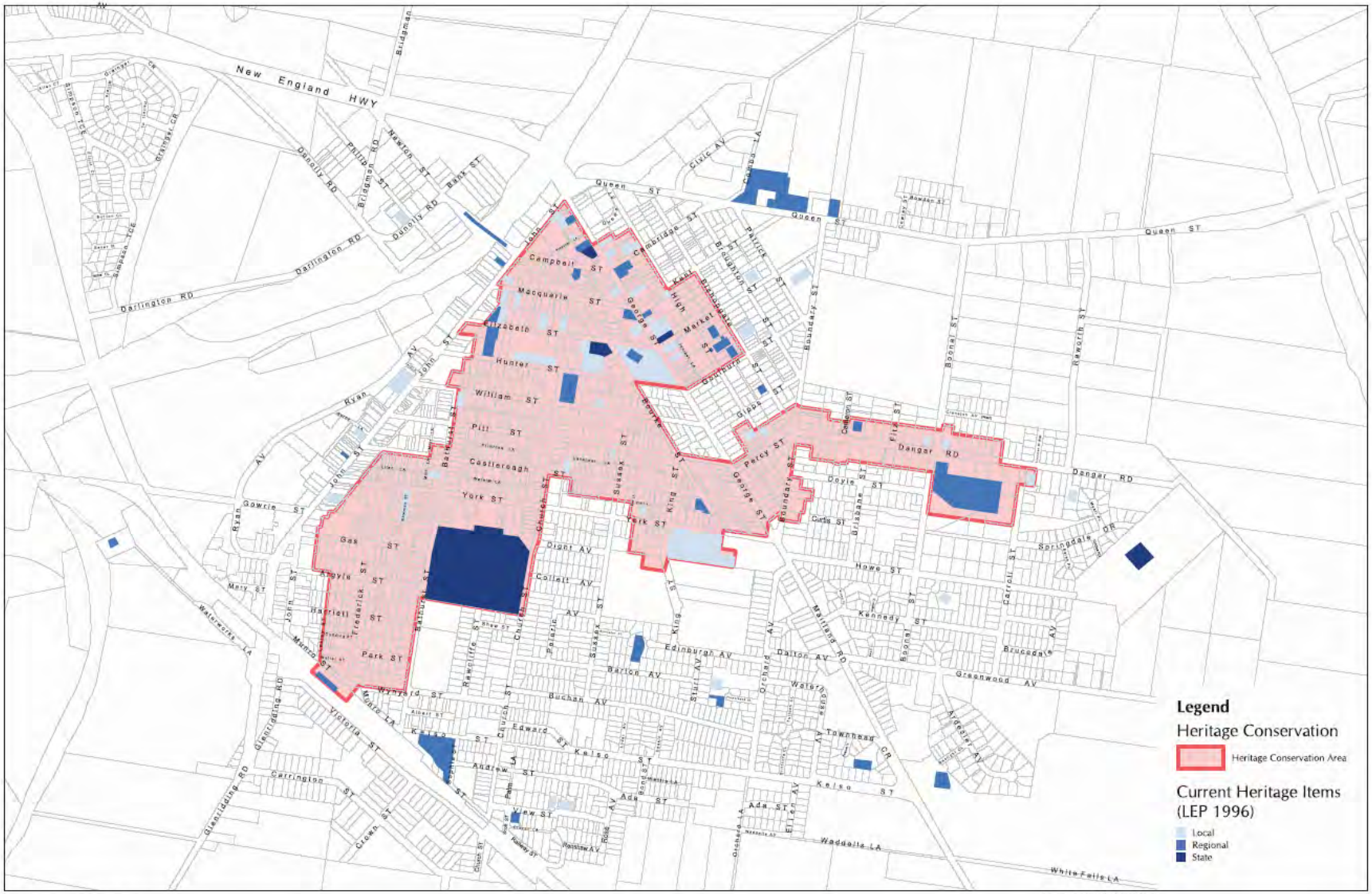
Fig 4.8



Source: Singleton Shire Council 2007

Singleton Land Use Strategy

HERITAGE CONSERVATION AREA - SINGLETON

prepared by planning workshop australia
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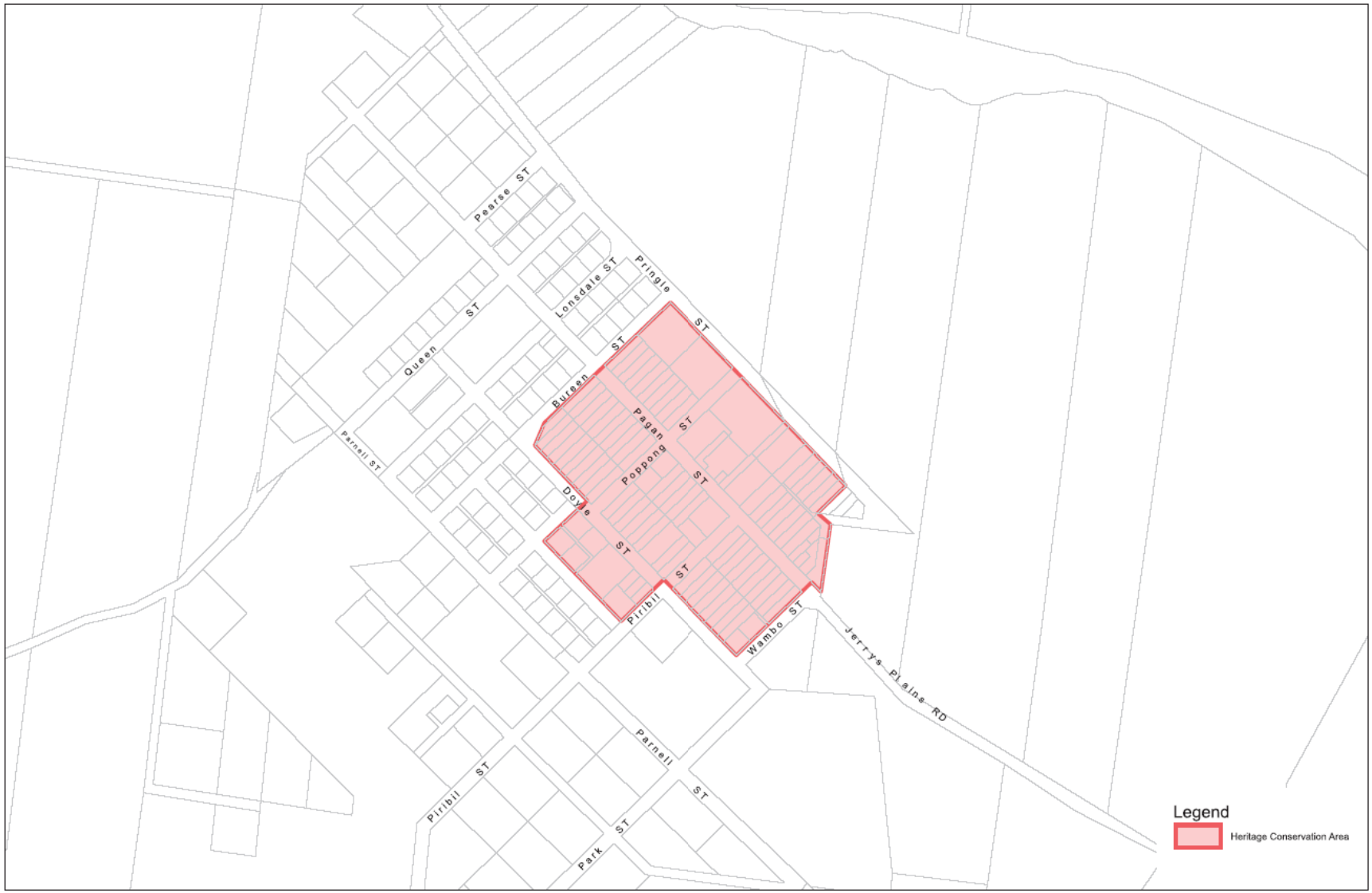
Fig 4.9A



Source: Singleton Shire Council 2007

Singleton Land Use Strategy

HERITAGE CONSERVATION AREA - JERRYS PLAINS

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Fig 4.9B

5 GENERAL AIMS AND OBJECTIVES

General aims and objectives for land use within Singleton are outlined in this section. These aims and objectives take into account the vision expressed by the Council, the strategic objectives of existing plans applying within the LGA, and the objects of the *Environmental Planning and Assessment Act 1979*.

The Strategy provides a consistent direction for land use and community decision-making, and allows flexibility to respond and adapt to variations in the actual growth rate over time.

The Strategy's general aims and objectives are outlined below. These are largely based on the Singleton LEP 1996 objectives. They have been prepared in a form to enable incorporation into subsequent LEP provisions, and to align with Council's 2030 Strategy. The aims and objectives are:

(a) to provide a framework for controlling and co-ordinating development within the Singleton local government area

(b) to ensure the most appropriate and efficient use or management of land and natural resources

(c) to co-ordinate economic development so that there is optimum and equitable economic and social benefit to the local community

(d) to ensure that the environmental impact of development is adequately assessed, including the consideration of alternatives

(e) to establish a pattern of broad development zones as a means of:

  (i) separating incompatible uses

  (ii) minimising the cost and environmental impact of development

  (iii) maximising efficiency in the provision of utility, transport, retail and other services

(f) to retain options for alternative land use strategies so that flexibility to allow economic, social and environmental change can be accommodated

(g) to encourage adoption of land management practices which are sustainable over long periods of time without degradation of natural environmental systems

(h) to provide adequate protection and minimise risk for the community (as far as possible) from environmental hazards, including flooding, soil erosion, bush fires and pollution

(i) to enable public involvement and participation in environmental planning and assessment

(j) to progress development in an ordered and economic manner.

In addition to the general aims and objectives outlined above, local environmental plans are required to have specific objectives for each land use zone identified within the scope provided by the NSW Government standard plan provisions.

6 URBAN SETTLEMENT

This part outlines the land use policies and strategies for urban settlement, and requirements for accommodating urban growth and change. Key issues are the provision of additional urban land, suitable housing to cater for the ageing population, and provision of industrial land and service infrastructure. The population of Singleton LGA is expected to increase in the Strategy time frame (25 years to 2032), and housing and settlement requirements are also expected to change. The population forecasts used in the Strategy are for a 15 year time frame, within the context of a 25 year Strategy, to provide sufficient infrastructure and urban land for future long term requirements. The population forecasts should be reviewed and updated after 5 to 10 years. The approach taken in the Strategy will affect how large Singleton will grow, and its long term structure.

Growth will be influenced by national and Sydney metropolitan conditions and trends, as well as growth in local and regional employment and changes in commuting patterns. It could be expected that factors influencing commuting patterns (e.g. increasing transport costs) may affect housing demand, and the spatial location of this demand within the LGA (e.g. the relative proportion located within residential and rural locations). As family sizes decline, it is likely that a higher growth rate for smaller sized dwellings will occur, including single storey dwellings for aged persons.

Additional residential zoned land is expected to be available in the near future following the amendment of the existing LEP provisions in Singleton Heights. This relates to the Huntergreen, Bridgman Ridge, and Gowrie Links proposals, and will ensure an adequate supply of residential land for at least 10 to 15 years. The Strategy needs to consider development options for the town over a longer period as well.

There is currently reasonable provision of urban infrastructure and services (e.g. roads, electricity, water and sewer) for the town of Singleton. Water supply limits and economic limits on service extensions have been taken into account in formulating the Strategy. Minimal growth is expected in villages, and there are servicing limits in all village areas.

Social infrastructure, community services and recreational facilities are reasonably well catered for within Singleton, although the trend for increasing centralisation of many specialist services means that these are located in Maitland and Newcastle, and transport must be available to access these. Housing affordability and providing adequate suitable aged persons accommodation are expected to continue to be significant issues over the life of the Strategy. These and other matters relating to housing needs were reviewed in the Singleton Community Housing Forum held in November 2006, which emphasised the importance of taking into account the full range of community housing needs in future planning for residential development. The Forum recommended strategies and ongoing actions which have been taken into account in the preparation of this Strategy.

A significant issue over the life of this Strategy is the proposed urban area identified south of Branxton by the Lower Hunter Regional Strategy, including some land within Singleton LGA. While this has potential for around 2000 residential lots in Singleton, planning processes have been established to determine a structure plan, and the urban boundaries are to be defined through future local planning. Planning and

development within this area will primarily be aligned to growth within the Lower Hunter Region, and is not expected to significantly impact on growth and demand projections for Singleton identified in this Strategy. Policies and strategies for the South Branxton area are included in Section 8.8.

The following estimates in Table 4 are adopted/assumed for the purposes of the Strategy. These estimates are based on the Situation Analysis report, and it should be noted that these are for the LGA as a whole, and that there is considerable variability between different planning areas.

Table 4: Summary of Singleton LGA projections and trends

Strategy forecast	Estimate (25 years to 2032) - update	Comment
POPULATION CHANGE	Estimated 1.5% per annum growth (average 300 persons per year). Approximate population 27,500 in 2021.	Significant fluctuations from year to year would be expected. Most growth would occur in Singleton Heights (North Singleton).
Dwelling occupancy rate	Decline from 2.8 persons per dwelling to 2.5 persons per dwelling	Ongoing decline in occupancy rate, alone, creates demand for an average additional 43 dwellings per annum.
RESIDENTIAL DEMAND	Average 170 to 230 new dwellings per year	Depends substantially on dwelling occupancy rate and dwelling type availability.
Changes in type of dwellings required	Increase in small single dwellings, aged persons accommodation (especially single storey), and units/townhouses	Lower demand for large houses (i.e. 3 to 4 bedrooms) likely in long term
Urban/rural split	By 2021, urban Singleton is expected to have a population of 17,750 with 9,750 in rural areas.	It is anticipated that 60% of additional dwellings provided to 2021 will be in the Singleton Heights/North Singleton urban area, 5% in Singleton town area, and 35% in rural areas.
INDUSTRIAL LAND	Projected annual demand for light industrial land (3 to 6 ha per annum).	Variable depending on regional demand and supply.
URBAN WATER DEMAND	Average yearly urban water demand is 350kl/annum	Long term trend in water use is not clear, but usage has been reduced by recent water restrictions.

Strategy forecast	Estimate (25 years to 2032) - update	Comment
AVERAGE URBAN TRANSPORT ACCESSIBILITY (index of people within walking distance of bus route or CBD)	Figures currently unavailable, but trend is for declining transport accessibility.	Continuing relative population dispersal (especially in rural areas) is expected to increase reliance on car transport, and reduce opportunities for viable public transport.

Key land use planning issues regarding urban settlement in the Singleton LGA were identified in the Situation Analysis as follows:

- Projected residential land requirements
- Identification of areas for long term urban expansion around Singleton
- Town infill development opportunities and constraints
- Water and sewer capacity and service areas
- Road hierarchy, transport links and accessibility
- New England Highway Bypass for Singleton
- Development guidelines for highway frontage land
- Adequacy of land for industry and commerce, and requirements for additional land and services
- Floodplain development and management
- Availability of suitable sites for future institutional use

Objectives, policies and strategies for each of these are presented individually below.

6.1 Projected residential land requirements

This section relates to how much residential land and housing will be required, its type and characteristics. Section 6.2 relates to where future urban land is best located.

Housing in Singleton is principally in the form of individual detached dwellings, representing 88% of the housing stock in 2006. This contrasts with NSW as a whole where 70% of dwellings were separate dwellings. The NSW proportion of medium density housing is 29% with Singleton having a much lower 10% of dwellings in this category. The dwelling occupancy rate for the LGA has shown a steady decline and was estimated at 2.9 persons per dwelling in 2006, slightly above the NSW figure of 2.7.

Future dwelling approvals of between 170 and 230 per year could be anticipated for the next 10 - 15 years assuming a continuation of current economic conditions.

Approximately 60% of total LGA population growth would be expected to occur within Singleton Heights/North Singleton and 5% in Singleton Town.

A local environmental plan amendment which has recently been finalised zones additional land for residential purposes in North Singleton is expected to ensure an adequate supply of zoned residential land for the next 15 years. Existing local environmental plan zones are shown on Map 6.1. The Huntergreen and Bridgman Ridge residential areas are located to the north of the existing Hunterview area, and have a combined area of approximately 240 ha, and an expected residential lot yield of between 1,100 and 1,200 lots. In addition, the proposed Gowrie Links residential area could supply an additional 450 to 550 lots. However, there are potential limits on water and sewer provision to service these residential areas which will require investment and upgrading of infrastructure, and may limit the land actually available to the market.

While a key feature of the Strategy is to provide for additional residential development in the urban area of Singleton, there are also a range of other housing issues that need to be considered in conjunction with this, that relate to housing affordability and suitability for anticipated demographic changes. These are considered in Section 6.3.

Objectives – residential land requirements

- Singleton will have urban land that is zoned and serviced to meet projected housing needs up to 2032.
- Housing will vary in size and form to meet changing household formations and the needs of an ageing population.

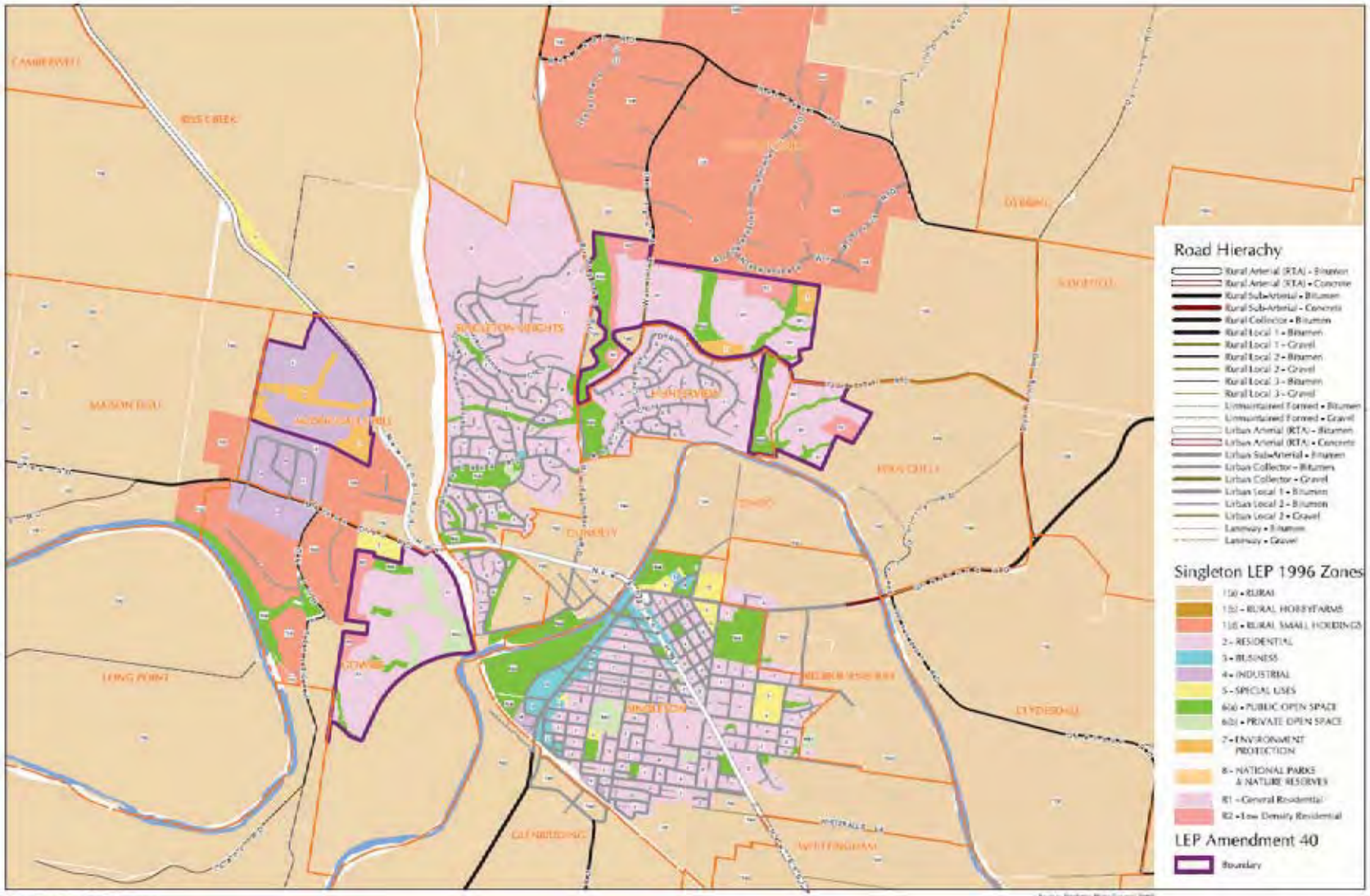
Policies – residential land requirements

- Maintain a minimum of 5 years supply of zoned residential land.
- Encourage aged persons accommodation (with suitable style, location and access to services).
- Support the provision of affordable housing requirements by maintaining adequate residential land.
- Facilitate medium density in existing residential areas, subject to accessibility, urban design, amenity and sustainability criteria.
- For new greenfield residential development, consider seeking planning agreements with developers to provide for residential development of a certain type, and/or affordable housing (e.g. medium density and single storey aged persons accommodation).
- Recognise the need to cater for different sectors (youth, aged persons and construction workforce accommodation).
- Ensure public transport accessibility for all residential development, and provision of shopping and other facilities within walking distance.

- Urban sustainability issues will be considered in the determination of new areas for urban expansion (e.g. future water recycling, protection of biodiversity values, road and subdivision layout to provide optimum orientation for solar access).
- Maintain existing residential character by limiting subdivision.

Strategic Actions – residential land requirements

- Facilitate LEP amendments to supply a minimum of 5 years of residential development potential through zoning based on demand/supply analysis undertaken.
- Ensure demand and supply analysis also considers available infill opportunities.
- Implement zoning consistent with Standard LEP recommended zones.
- Undertake periodic review and updating of growth projections to coincide with the release of ABS Census data.
- Ensure appropriate LEP provisions to encourage/enable smaller, single storey residential development in close proximity to transport and facilities, and located on flatter sites.
- Prepare a DCP to identify appropriate sequencing of development.
- Recognise Aboriginal heritage protection requirements in LEP provisions.
- Take into account future limits on water availability and anticipated requirements for increased energy efficiency by adopting sustainability criteria (e.g. 100% energy efficiency lot orientation, and suitable street layout) in LEP or DCP
- Provide for parks within walking distance of all homes in accordance with Open Space and Recreation Needs Study (2002).
- Maintain existing residential character by including minimum subdivision area requirements in LEP provisions. Resubdivision is to be consistent with existing character (e.g. 450m^2, 1200m^2, and 2500m^2 minimum areas in Bridgman Ridge area).
- Ensure appropriate LEP provisions to enable smaller, single storey residential development in close proximity to transport and facilities on flatter sites.
- Consider introducing sustainability targets for new buildings (e.g. energy efficiency, onsite renewable electricity generation, building recyclability and durability, carbon neutrality etc.



Singleton Land Use Strategy

SINGLETON - CURRENT ZONING

Fig 6.1

6.2 Identification of areas for long term urban expansion around Singleton

As outlined in Section 6.1, there is adequate existing provision for residential land within the time period of the Strategy. While there is no immediate need for further residential land in the Strategy time frame, it is essential to review the long term (25 to 50 year) urban expansion opportunities for Singleton, and to ensure that these are not prejudiced by short term development. This section focuses on the future urban structure of the town, major servicing and accessibility requirements, and the criteria that should be applied to future development proposals that may arise in long term urban growth areas.

The town of Singleton is particularly constrained by its physical setting, and surrounding land uses (i.e. coal mining and army camp). While the future long term growth of Singleton cannot be predicted, there are options that would provide for substantial future urban growth if this was ever required (e.g. doubling of the urban population in 50 years). These options are reviewed in Table 5 and could secure future land in the event that this is ever required. No detailed investigations have been undertaken.

Table 5: Summary of long term urban expansion options

Option	Comments
Singleton North East	The 1974 Singleton Planning Study found that north east expansion was the best long term urban expansion option. Since that time, this option has been made more difficult by land fragmentation, and is affected by the Singleton Waste Management facility. Physical constraints include undulating slopes, salinity and erodible soils, and presence of native vegetation. Development of this area would require improved road links, including upgrading Pioneer Road to Dyrring Road. This area has reasonable potential for servicing with water and sewer. It also may be affected by the continuation of or future land use on the current Singleton Landfill site.
Singleton West	The Singleton Planning Study ruled out urban expansion to the west as a result of proposals for open cut mining. Mining commenced in about 1990 and could be expected to be substantially completed within 20 – 30 years. This would make land potentially available for urban development. Advantages of this option are that land is generally flatter and would have better highway access, with opportunities for commercial development sites.

Option	Comments
Town infill	Although there are larger sites with potential for additional residential development, substantial increases in density within Singleton Town should be discouraged as a result of flooding potential. Heritage conservation issues also would support retaining existing density. Opportunities exist for increased densities and alternative housing types in Singleton Heights, but may require reconsolidation of existing lots. Further investigation would need to be undertaken, but it appears that there are limited opportunities available.
Singleton North	Urban expansion to the north between the railway line and Bridgman Road is a possibility, but would result in a narrow, linear urban area. As a long term option with an additional New England Highway link, and the opportunity of providing a future railway station, there may be some accessibility benefits arsing from this proposal. It would also allow incremental growth and future expansion to the west of the railway line. Location of suitable commercial land and schools represents a challenge. Council has also advised that the area may be impractical to sewer due to limited mains capacity through existing residential areas back to the treatment works.

Map 6.2 shows the conceptual location of the long term urban expansion options for Singleton. Map 6.3 shows current and proposed accessibility and transport links, and additional desirable links for investigation. This map does not include a long term highway bypass for Singleton, which is discussed in Section 6.6. Water, sewer and servicing are key issues requiring further investigation, and future access requirements and locations of commercial and industrial land also need to be taken into consideration.

The Strategy addresses this issue as outlined below, and should identify a preferred concept for long term urban expansion.

Objectives – Identification of areas for long term urban expansion around Singleton

- To limit the exposure of the town to major flood events, by preventing additional land being developed for residential purposes on the floodplain.
- To consolidate existing urban areas and increase the density within existing flooding and infrastructure capacity constraints.
- To identify land which should be investigated for long term future expansion and to zone this appropriately to prevent subdivision and inappropriate land use.

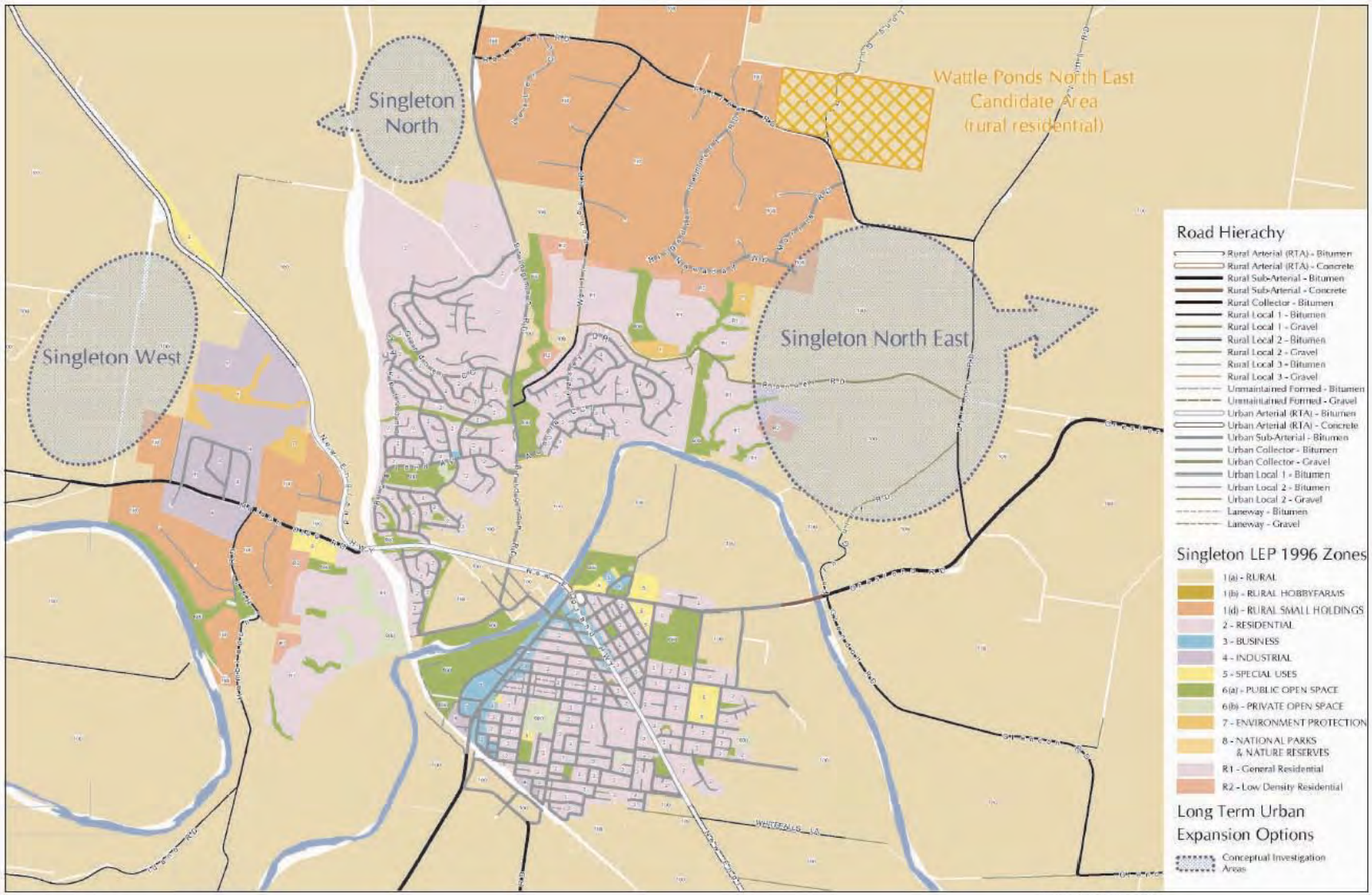
Policies – Identification of areas for long term urban expansion around Singleton

- Potential urban expansion areas shown on Map 6.2 should be investigated, with preference given to the Singleton North East option.
- Review and finalise transport hierarchy and accessibility proposals based on Map 6.3.
- Provide land for residential development (to ensure 5 years supply) based on following attributes:
    - Flat-moderate grades
    - Service and infrastructure capacity/staging
    - Access to community services and facilities
    - Access to convenience/other retail
    - Road access
- Direct urban growth to areas where effective use could be made of existing urban infrastructure/reserve where capacity is available (see also sections 6.3 and 6.4).
- Maintain a minimum of two development fronts to maintain competition.
- Prevent further subdivision or non-reversible land use within the identified preferred investigation area for future urban expansion.
- Maintain a future urban growth corridor. Prevent subdivision and limit development within the possible future corridors for urban expansion as identified on Map 6.2.

Strategic Actions – Identification of areas for long term urban expansion around Singleton

- Make detailed investigations of each of the potential urban expansion shown on Map 6.2 and listed in Table 5 by 2010.
- Review LEP zoning options within potential urban areas.
- Consider desirable LEP provisions to limit subdivision within potential urban investigation areas to prevent future fragmentation of land.
- Finalise future transport hierarchy and accessibility requirements based on Map 6.3.
- Determine criteria limiting consideration of future proposals for urban rezoning, unless it is in an identified long term investigation area, and facilitates economic water and sewer servicing, and supports future transport hierarchy and accessibility requirements.
- Review Section 94 plans to ensure that long-term growth is financially sustainable and facilitates the preferred urban structure.

- Prepare policies for facilitating planning agreements for large development proposals which support the preferred long term urban structure.
- Identify a buffer around the Singleton waste management facility, and review options for future long term urban/industrial use. As an interim measure, implement a residential exclusion zone within the "Landfill Affectation Area" shown in Figure 4.4.
- By 2015, undertake detailed investigation for long term urban development options/town boundary in the north-west, taking into account future coal mining prospects and impacts.
- Consider the following LEP zones and minimum lot sizes for residential development:
    - R1 General Residential with a minimum lot size of 450m^2
    - R2 Low Density Residential with 2 minimum lot sizes (indicated on the lot size map), being 1200m^2 and 2500m^2.



Singleton Land Use Strategy

SINGLETON - LONG TERM URBAN EXPANSION OPTIONS

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Fig 6.2

6.3 Town infill development opportunities and constraints

Although there is still a clear market preference for conventional detached housing on the fringe of the existing urban area, infill residential development is an important consideration. Key issues related to infill are:

- Urban design and development scale (especially for 2 or 3 storey development).
- Heritage.
- Infrastructure servicing (especially water, sewer and stormwater).
- Minimum subdivision size and dimensions, and opportunities to facilitate consolidation of existing lots.
- Dual occupancy design and siting guidelines.
- Potential for integration into mixed use commercial/residential developments.
- Flood issues.

Singleton Council's Heritage Advisory Committee has reviewed and updated the schedule of heritage items listed in the existing local environmental plan, and is also undertaking a review of heritage conservation area boundaries.

Objectives – urban infill development

- Support urban infill development subject to an appropriate planning framework.
- Ensure planning controls allow appropriate residential infill development, taking into account important issues including flooding, adequacy of servicing, streetscape and urban character, heritage, and water sensitive urban design.

Policies – urban infill development

- Residential infill development in Singleton Heights will be encouraged in addition to further greenfield development outside the existing urban area.
- Residential infill development in Singleton Town will be subject to ensuring that the number of dwellings subject to flooding potential will not be increased, heritage conservation guidelines are to be implemented.
- Development should recognise existing infrastructure constraints (e.g. sewer and drainage) and ensure that best use is made of current infrastructure provision.
- Infill development should recognise the character and scale of existing development.

- Future development will take into account policies developed as part of any future housing strategy, including type size, affordability and locational requirements for housing to meet demands.

Strategic Actions – urban infill development

- As part of any proposed infill development, ensure that servicing capacities are assessed and are adequate, particularly water supply, sewerage and stormwater drainage.
- Undertake a review of infill potential and identify constraints to infill development (e.g. flooding, heritage).
- Review minimum lot sizes and DCP controls on infill development to ensure the protection of urban character and residential amenity.
- Establish a significant tree register, and include appropriate tree preservation provisions in the LEP.
- Update heritage registers and information, and incorporate an overlay map in the LEP.

6.4 Water and sewer capacity and service areas

Singleton Council holds a surface water town and water supply licence totalling 5,000 megalitres per annum. The current commitments to supply water, plus an estimate of additional commitments for existing and proposed development areas expanding at current growth rates, indicates that in 10 to 15 years time further water entitlements and alternative sources may be needed.

Short to medium term urban growth areas are catered for in respect of the provision of water and sewer services.

Augmentation of the Waste Water Treatment Works is scheduled for 2010 to 2012, subject to growth rate assessment and a final demand analysis study.

The Council has resolved to investigate supplying the Village of Bulga with water in the longer term, but is yet to commit to providing such services.

The Council has also resolved to investigate supplying sewer services to the Villages of Jerry's Plans and Broke in the long term, but has made no commitment to provide such services.

The recent extension of the Hunter Water Corporation area of operations in the Singleton LGA (Map 4.3d) has potentially significant implications for future urban growth opportunities, and for rural development, particularly around Branxton. Singleton Council should actively be involved in planning for future infrastructure servicing in this area to ensure that future land use is appropriately planned for.

Objectives – water and sewer services

- Provide high quality water and sewer services to urban areas of Singleton (including residential, commercial and industrial land) to meet reasonable demands.

- Provide town water services to the unserviced villages in Singleton LGA, where practical and financially sustainable, and investigate provision of sewer services.
- Ensure provision of additional water and sewer services is financially sustainable.
- Ensure adequate security of water supply by securing additional water entitlements and alternative sources prior to existing allocations becoming fully committed.

Policies – water and sewer services

- Limit the extension of existing water and sewer services around Singleton to areas identified in the Strategy for future urban development.
- Investigate securing additional water entitlements and alternative sources of water to provide for the medium to long term.
- Manage water and sewer services in a financially sustainable manner.

Strategic Actions – water and sewer services

- Investigate the establishment of an agreement between Hunter Water Corporation and Singleton Council in regard to the following:
    - Interconnection of the Hunter Water Corporation and Singleton water supply systems for the purpose of providing drought security and additional water to the Singleton Local Government Area; and
    - Coordination of infrastructure staging to meet the land and settlement policies and actions identified in the Strategy.
- Investigate provision of alternative water yield for Singleton in the long term.
- Investigate the feasibility of supplying the villages of Jerrys Plains and Broke with reticulated sewer in the longer term.

6.5 Road hierarchy, transport links and accessibility

The Situation Analysis report identified the current situation relating to roads, transport and accessibility and noted important matters requiring consideration. While existing roads and access links are satisfactory overall, there are long term capacity limitations and measures need to be taken to support improved accessibility in the long term.

Table 6 outlines major proposals for implementation or investigation over the life of the strategy. These are shown on Map 6.3 and support the proposed long term settlement structure for Singleton as outlined in section 6.2.

The proposals identified in this section do not include consideration of a New England Highway bypass of Singleton which would significantly impact on transport and accessibility in the long term. Intersection upgrading works and other measures to improve road capacity have been separately investigate in the Singleton Traffic and Parking Study and are consistent with the proposals in the table.

Table 6: Road, transport and accessibility proposals

Proposal	Priority/Importance	Strategy
Singleton Heights Link Road (Pioneer Road extension)	High. Important to support long term future urban growth in Singleton Heights	Implement adopted Council proposal
Identify bus routes as part of future public transport strategy	Medium. Important	Identify and plan for bus routes as part of implementation of urban structure plan
Dedicated cycle and pedestrian link from Singleton Heights to Singleton via Combo Land	Medium. Important in providing alternative local transport options	Update Singleton Bike Plan
Singleton North – New England Highway Link Road to the west	Medium. Relatively high strategic importance. Provides alternative flood free link to New England Highway via Rix's Creek Lane	Investigate and determine preferred routes, and integration with potential new long term railway station location
Passenger rail service improvement	High. Important for providing long term access to Sydney and Newcastle	Investigate mechanisms to improve frequency of passenger rail services
New railway station for Singleton Heights	Low. Important for long term accessibility	Investigate suitable locations, and plan future road hierarchy to accommodate preferred site
Links to improve cycle and pedestrian movement	Medium. Important.	Update Singleton Bike Plan
Pioneer Road – Fern Gully Road Link	Low. Medium importance. Long term potential to support urban development.	Investigate possible options in medium term in conjunction with review of long term urban expansion options

Objectives – road hierarchy, transport links and accessibility (Singleton and Singleton Heights)

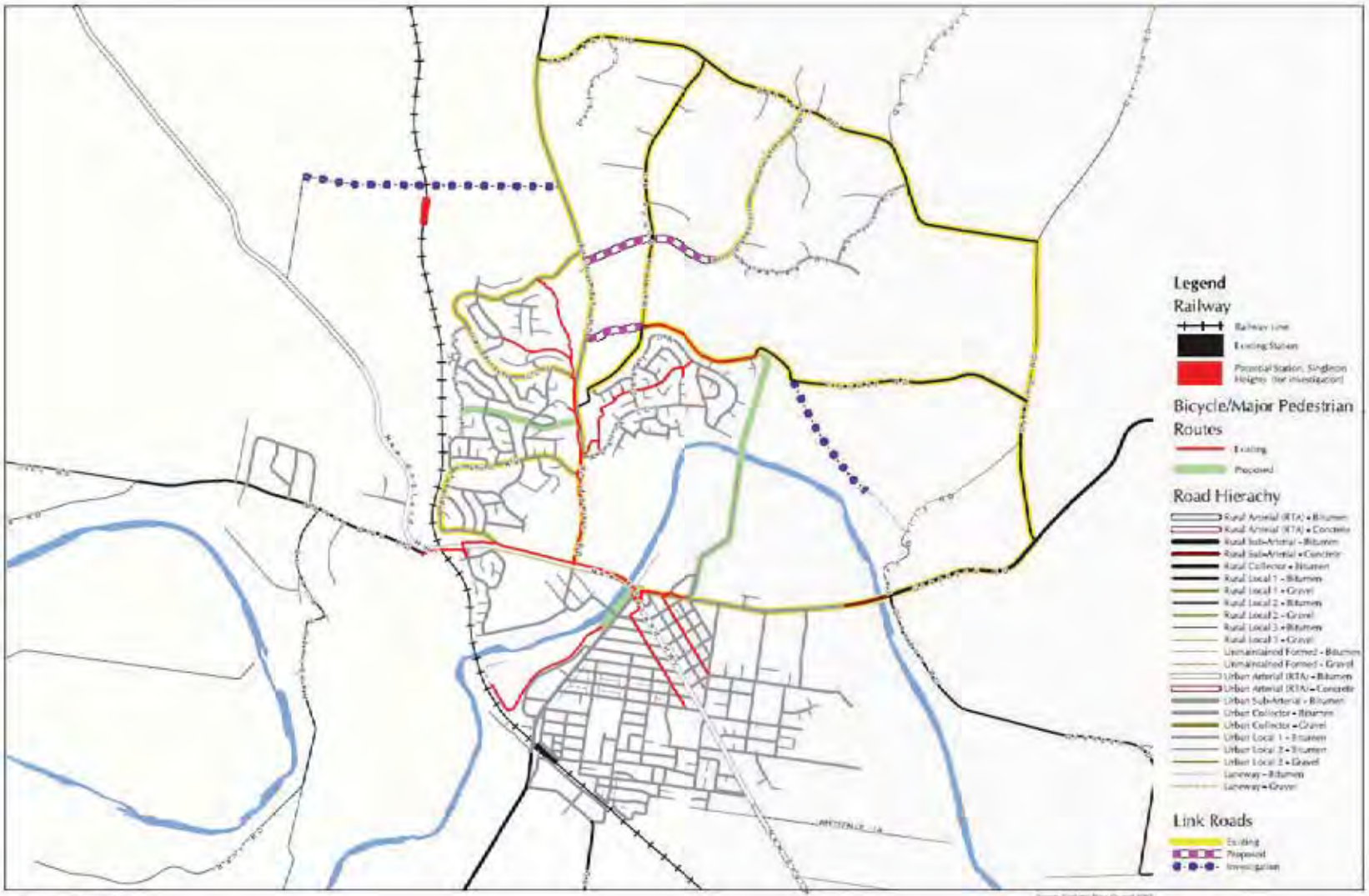
- Provide a system of roads, transport and access links to support existing and future land use and social needs.
- Ensure that access provision is economically efficient, and enables provision of public transport in the long term.
- Facilitate the provision of telecommunications infrastructure in the LGA to provide accessible, high speed communications technology.

Policies – road hierarchy, transport links and accessibility (Singleton and Singleton Heights)

- The long term transport and accessibility concepts and road hierarchy will be implemented as shown on Map 6.3.
- Implement mechanisms to ensure that costs for the provision of roads, transport and access are equitably shared by the community. Suitable mechanisms include developer contributions towards facilities using Section 94 plans or planning agreements.
- Ensure land use decisions consider and support the long term transport and accessibility concept for Singleton.
- Promote early introduction of accessible, high bandwidth telecommunications infrastructure across the LGA to facilitate economic development opportunities.

Strategic Actions – road hierarchy, transport links and accessibility (Singleton and Singleton Heights)

- Implement the road, transport and accessibility proposals outlined in Map 6.3 and Table 6.
- Recognise classified roads in the LEP map and include relevant clause (28) from Standard Instrument relating to classified roads.
- Develop principles and mechanisms for implementing transport and accessibility concepts, including funding through Section 94 contributions.
- Implement measures identified in Singleton Traffic and Parking Study.



Singleton Land Use Strategy

SINGLETON - TRANSPORT HIERARCHY AND ACCESSIBILITY

Fig 6.3

6.6 New England Highway Bypass for Singleton

Traffic volumes on the New England Highway through Singleton are increasing at a much higher rate than the rate of population growth, and are expected to continue growing with the completion of the F3 Freeway extension to Branxton. Increased traffic will affect the adequacy and safety of existing traffic arrangements within Singleton, and consequently options for a New England Highway Bypass of Singleton require consideration.

Bypass options are expected to be considered as part of the Singleton Traffic and Parking Study and Plan currently being undertaken. A highway bypass would have significant implications for future land use, and ongoing growth and development of the town.

While no routes have been determined for a possible bypass, potential options are summarised in Table 7. As a result of land use constraints, limited options are available, and all have significant engineering, economic, social and land use limitations and implications.

The benefits of determining a suitable bypass route are that provision can be made in future planning, particularly in determining the location and layout of future residential and commercial land. Future commercial and industrial development in Singleton will depend on providing certainty in relation to long term transport accessibility. Facilitating a decision on a highway bypass is therefore an important element of the Singleton Land Use Strategy.

Table 7: Potential options for Singleton highway bypass

Potential option	Comments
A Whittingham – Glenridding (From Cemetery Lane along railway to McDougalls Hill)	Shortest option. Disadvantages include engineering problems traversing major floodway, adverse impact on agricultural land, and amenity impacts to large number of existing residential properties. Requires railway overpass and Hunter River bridge.
B Western Route 1 (Mitchell Line Road, Putty Road, Hambledon Hill Road to McDougalls Hill)	Longer option, with 3km additional distance. Major benefit of route is minimal distance affected by flooding. Adverse effects on existing rural residential properties. Difficulty in route selection at McDougalls Hill due to existing development pattern. Requires relocation of Putty Road/Mitchell Line road junction and Hunter River bridge.
C Western Route 2 (Mitchell Line Road, Putty Road, Glenridding railway line to McDougalls Hill)	Longest realistic route option, with 5 km additional distance. Disadvantages include engineering problems traversing floodway and extensive flood liability. Primarily utilises existing road alignment. Relatively poor alignment, with adverse impacts on agricultural and rural residential properties as a result of development pattern. Requires relocation of Putty Road/Mitchell Line road junction and Hunter River bridge.
D Northern Route (North of existing town)	Major relocation of transport arrangements, increasing travel distance significantly. No suitable alignment apparent which would avoid conflict with potential future development.

Potential option	Comments
	Requires railway bridge and new Hunter River bridge. Most suitable route to avoid flood liable land would be via Elderslie or Belford. Not considered feasible. Requires Hunter River bridge.
E Upgrade existing alignment (New England Highway widening)	Major impacts on town amenity, and does not resolve accessibility and transport problems within Singleton. Significant adverse impact on Singleton commercial areas and residential amenity, including heritage. Retains existing problems of flood liability and traffic capacity.

Flood liability and risk is a significant cost and implication in determining the preferred route, and will be a key factor in determining a route alignment. The western routes appear to offer the most significant land use and development benefits to Singleton, and potentially provide some commercial and residential expansion opportunities that are not available with other routes.

Objectives – New England Highway Bypass for Singleton

- To ensure that regional and interstate traffic is provided with a suitable highway bypass of Singleton.
- To provide a bypass to enable improvements to road accessibility and safety within Singleton, and to maintain urban amenity.

Policies – New England Highway Bypass for Singleton

- To include highway bypass investigation routes in the Singleton Land Use Strategy concept map, and to indicate a preferred concept.
- To encourage NSW and Commonwealth Government support for the concept of a New England Highway Bypass of Singleton, and to secure necessary funding for its implementation.

Strategic Actions – New England Highway Bypass for Singleton

- To undertake a joint feasibility study of the potential route options identified, in conjunction with the NSW Roads and Traffic Authority with a view to reaching agreement on a preferred alignment.
- To provide funding for voluntary acquisition of land to facilitate the bypass.
- To recognise the preferred highway bypass alignment in the Singleton Local Environmental Plan.

6.7 Development guidelines for highway frontage land

There has been progressive land use change on highway frontage land within Singleton, and increasing demand for commercial development. Planning controls should encourage and provide for future uses which maintain the level of safety and service required of the National Highway, and accommodate adverse environmental and amenity impacts from highway traffic.

Based on current trends, it is likely that traffic volumes on the New England Highway will significantly increase in the future. An important consideration in determining the planning controls for highway frontage land will be the feasibility and timing of any highway bypass of the town. Until this matter is resolved, it is appropriate to limit further intensification of development and especially traffic generating development.

The provisions in the Standard LEP prepared by the NSW Government allow for flexible use within the R1 General Residential zone, and is the most appropriate zone for existing residential areas. An option for current commercial zones would be the B2 Local Centre zone or the B4 Mixed Use zone along some sections of the urban highway frontage.

Suitable land uses would include existing residential scale development, serviced apartments, motels, 1 - 2 storey residential flat buildings with suitable noise attenuation and traffic and parking arrangements, adaptive reuse of heritage buildings, use of existing residences for professional consulting rooms, mixed use office/residential development and community facilities.

Objectives – Development guidelines for highway frontage land

- To maintain the level of safety and service required of the National Highway, by encouraging new development which does not increase traffic demands.
- To allow new development subject to criteria which limits traffic impacts and maintains urban amenity.

Policies – Development guidelines for highway frontage land

- Maintain built form scale and character of existing highway frontage land and development by applying criteria set out in Table 8.
- Prevent adverse impacts of new development on adjacent rear residential properties (e.g. height, privacy, noise, overshadowing and other amenity impacts).
- Support consolidation of existing lots and provision of non-highway frontage road access (e.g. via side road or rear lane).
- Ensure no additional highway accesses.
- Consult with Roads and Traffic Authority in relation to new development proposals that do not meet the criteria.

- Shops or similar commercial uses should be consolidated within existing commercial zones. Highway frontage land is not recommended for bulky goods retailing or shopping centres.

Strategic Actions – Development guidelines for highway frontage land

- Develop specific DCP/development guidelines for land uses that comply with the criteria proposed in Table 8.

The following criteria (provided in Table 8 below) are proposed to be applied to determine appropriate uses for highway frontage land. Land use proposals should comply with the location and design criteria outlined. These criteria may be incorporated into LEP zone objectives or further clarified by preparing DCP guidelines and standards as appropriate. It would be appropriate to retain a residential zoning, but to allow additional uses subject to specified the criteria listed in Table 8.

Table 8: Criteria for appropriate uses for highway frontage land within Singleton

Broad Location Criteria	Comment
Water and sewer services for commercial uses over and above residential levels would be subject to availability.	Intensification of development would be limited to availability of existing public utility services.
Existing buildings or items with heritage values are to be retained.	Heritage values and the scale of development contribute to the special character and quality of the town at its entry points.
Traffic generation shall not be greater than equivalent residential use of the land unless no direct highway access can be provided (e.g. rear lane or side street).	Additional traffic generation with direct highway access is to be discouraged, to provide an incentive for alternative rear access. This results in traffic safety and management benefits.
The existing scale, character and density of development shall be generally retained.	Although desirable to maintain existing scale and character, opportunities exist for higher density and mixed use redevelopment, where this is high standard and results in other criteria being met. A general 2 storey height limit should apply. New development should not adversely affect privacy of the adjoining rear yards of residential properties by ensuring adequate design, setbacks and landscaping.
Use of land should be based on both traffic generation potential and the type of land use.	A range of small scale development types may be appropriate where these do not have high traffic generation.
Allow mixed use development which is designed to take into account sensitivity of land uses to air quality	For example, residential development may be compatible as a second storey with rear outlook above, or at the rear of ground floor small office or

Broad Location Criteria	Comment
and traffic noise impacts.	commercial space. Commercial development should not intrude into adjoining residential areas.
Large commercial and illuminated advertisements should be prohibited.	Clear advertising sign guidelines need to be developed which retain residential amenity.
Current lot sizes should not be reduced by further subdivision.	Incentives could be provided to consolidate lots to increase their size and provide greater future development opportunities.

6.8 Adequacy of land for industry and commerce, and requirements for additional land and services

Provision of adequate and appropriate industrial and commercial land is important in catering for future economic activity within the town. A number of studies have been undertaken in the past, which have been taken into account in the preparation of the Strategy, together with the response to community consultation undertaken in relation to the Situation Analysis review.

Commercial land

Commercial development in Singleton as a whole is well catered for under existing zonings. However, sectors that need consideration in future land use planning are the provision of land for bulky goods retailing, and provision for long term commercial land requirements in future urban areas in North Singleton.

Commercial land use in Singleton is concentrated within the town CBD area, with additional local shopping facilities in Singleton Heights. There is a need to provide additional local commercial areas to service future urban development in Singleton Heights, and demand exists for suitable sites with highway exposure for bulky goods retailing on larger sites.

A Review of Options for an Additional Local Retail Facility in North Singleton (Hirst Consulting Services 2007) evaluated 6 location options based on criteria including convenience, commercial attractiveness, investment optimisation, separation from CBD, site size, exposure and character. The review concluded that the only suitable sites are located along the proposed Pioneer Road link to Bridgman Road in North Singleton.

Future investigation on the suitability of, and options for, small scale non-residential facilities within the Clubhouse Precinct of the Gowrie Links Urban Release Area may occur. This will require a formal study.

Bulky goods retailing land options are extremely limited in Singleton. In the short term, this type of development can best be provided for in the Maison Dieu and McDougalls Hill Industrial Areas (an area with appropriate lot sizes and services close to the town), and in the long term by the provision of a specific bulky goods retailing

area. This will require local environmental plan provisions which support mixed use light industrial development in this specific area only. Some uses that occupy large areas of zoned commercial land in the Singleton CBD may be able to relocate to larger sites in the Maison Dieu/McDougalls Hill area. This may free up sites within the CBD and provide commercial redevelopment opportunities. A decision on the preferred long term site for bulky goods retailing development should await finalisation of the route of a future highway bypass, but would be located on the northern approach to the town. Although there has been interest in providing for this type of land on the New England Highway along the southern approaches to the town, sites in this location are not suitable, for the following reasons:

1. Adverse affect on nearby agricultural activities, noting that any development in this area will be on prime agricultural land which should not be developed.
2. The land is subject to significant flood impacts (being part of a floodway), and any development has potential to adversely affect urban areas as a result of changes to flood flows.
3. This area provides the gateway to Singleton for visitors and tourists, and it is essential to retain a high degree of amenity and rural character to be able to market Singleton as a destination with a unique and identifiable character, and as a community of excellence and sustainability.
4. Any premature development on this land has the potential to prejudice and prevent a future New England Highway bypass of Singleton.

Industrial land

The requirements for industrial land within the Singleton LGA are complex, and also require consideration within a regional context. Key elements to be considered in the Strategy are the types of industrial land and services required, existing and projected land supply and demand, the options for future provision for industry, and criteria for the location of new industrial development. The Strategy may also identify and promote employment generating activities for which Singleton is particularly suited.

Future employment generating opportunities where Singleton has locational advantages and which offer high potential to contribute to sustainable employment generation are as follows:

- Tourism
- Development related to transport infrastructure (e.g. railways and highways)
- Home based businesses and clusters
- Energy sector related
- Local and regional food processing and agriculture related (e.g. abattoir)

Regional demand for industrial land has been considered in the Lower Hunter Regional Strategy. Projected demand for general purpose industrial land needs in the Lower Hunter for the 25 years to 2031 is 825 ha and the Lower Hunter Regional Strategy states that there are currently 503 ha for the whole Lower Hunter Region. There is also around 1,200 ha of specialised industrial land available for specialised activities. Five main types of industrial land can be identified in Singleton and are summarised in Table 9.

Table 9: Industrial land types

Industrial land type	Comment
Light industrial/warehouse/bulky goods retailing (up to about 2 ha lot size)	Provided for in existing industrial areas, this comprises the predominant demand.
Large lot/heavy industrial	Generally equates to heavy industrial. Comprises uses requiring separation from other activities. Provided for in Mt Thorley Industrial Area.
Small scale, mixed use or rural industries able to be integrated with other uses (e.g. rural, residential or rural residential)	Includes transport and earthmoving, businesses, processing of rural produce, and small businesses associated with residential use or rural, with few or no non resident employees. Often conducted with no development consent or planning control.
Specialised employment areas (e.g. airport or transport related, and Macquarie Generation land)	Provide specific attributes, but are subject to limitations related to the specialised activities that can be carried out.
Adaptive reuse of sites having suitable infrastructure (e.g. former coal mines)	Have existing infrastructure (e.g. water allocation and supply), wastewater treatment, roads, rail access, electricity, etc.) and are separated from urban areas. Limited by current rural zoning.

Selmon and Broyd (2006) note that the Industrial and Commercial Lands Study of the Cessnock City Wide Settlement Strategy identifies an undersupply of light industrial land, with an additional 50 ha required to provide adequate supply for the next 15 years. Industrial land supply in Newcastle LGA is considered adequate for the short to medium term. Maitland is estimated to have industrial land supply for at least 10 years, but existing land available does not meet all demand characteristics of the market. Muswellbrook has a relatively small land supply and appears to have minor impact on demand and supply issues in Singleton LGA, with the exception of specialised industrial land opportunities around Bayswater and Liddell Power Stations.

Table 10: Summary of current zoned employment/industrial land in Singleton LGA

Name	Characteristics (total area, lot sizes, zoning and occupation)	Infrastructure limitations	Comments
Mt Thorley Industrial Area	115.2 ha zoned 4 Industrial, predominant lot sizes 0.5 to 2.0 ha, 80% of lots occupied	No sewer, water supply at capacity limits. Separated from residential uses.	Currently 20% of land is vacant, but is subject to constraints that limit development with 15.9 ha realistically available, including some large lots. Suited to heavy industrial uses and those with a mining focus
Maison Dieu Industrial Area	64.2 ha zoned 4 Industrial, with 87% occupied, no large lots with predominant sizes 0.3 to 0.5 ha	Low pressure sewer	Vacant land which could realistically be available is 6.7 ha. Site restricted to small and medium users, with no large sites
McDougall's Hill Industrial Area	53 ha zoned 4 Industrial, proposed 0.2 to 0.8 ha lot size, not subdivided or developed	Low pressure sewer	Proposed for development in near future. Some biodiversity constraints
Industrial areas in Singleton town area	Small lots zoned 4 Industrial, all occupied	Sewered	Some lots are occupied by residential uses

Source: Urbis JHD, Selmon and Broyd 2006

Selmon and Broyd (2006) suggest that there is currently about 5 years supply remaining at current development rates at Mt Thorley and Maison Dieu, plus McDougalls Hill. This study suggests planning for additional land provision of 60 ha for next 10 to 20 years. However, the industrial lands analysis prepared by Urbis JHD to support the Whittingham industrial proposal indicates that land sales and demand have been steady, with a significant rise since 2003.

Selmon and Broyd (2006) identified 3 options for provision of additional industrial land:

1. Defer until growth potential of LGA is established in Singleton Land Use Strategy (particularly considering infrastructure requirements and options and locations for industrial growth).
2. Investigation of potential for additional land at Mt Thorley for large lot industrial development.
3. Give further consideration to the Whittingham proposal, noting that this should provide for general industrial uses rather than light industrial, and that bulky goods retailing should be prohibited.

There is a high degree of uncertainty in relation to the demand for large lot medium and heavy industrial land uses. The uptake for these sites in the Hunter Employment Zone and Macquarie Generation lands has historically been very slow, and these uses typically will have a wide range of locational options, both within the region and Australia. To supply current demands, there is no immediate need to rezone further industrial land or to commit to the supply of additional infrastructure. However, the benefit of rezoning additional industrial land would be to provide a more competitive market for industrial land by increasing the number of developers, and to provide an opportunity to attract development by reason of land supply. It should be noted that this situation already exists in the Lower Hunter which currently has a supply of industrial land available, and proposals for additional rezoning of industrial lands appear likely to proceed. Accordingly, the Land Use Strategy proposes to rezone approximately 250 hectares in the Whittingham area as a "land bank" for heavy industrial purposes over a 25 year period. The rate of development of this area during the 25 year Strategy period should be staged to ensure that sequencing occurs in an orderly manner, and that adequate infrastructure such as water and sewer is available prior to subdivision and development taking place.

Proposed criteria for considering land use changes to allow new industrial areas are outlined in Table 11. These take into account the strategic principles proposed by Selmon and Broyd (2006).

Table 11: Criteria for location of additional industrial zonings

Broad location criteria
Located within or adjacent to an existing urban area (or within reasonable proximity to Singleton or Branxton) on relatively flat land which is not visually prominent.
Proximity to major transport facilities such as major roads and with railway access.
No direct access for individual industrial developments to the New England or Golden Highway, but otherwise convenient, suitable standard access.
Must have direct connection to water and sewer, provision for adequate electricity. Require water allocation and reticulated water supply and sewer for all new industrial lots.
Availability, or possible extension, of essential infrastructure such as water, sewer, electricity, sealed road access.
Must support an industrial land hierarchy, with industrial service land located close to town, and large lot industrial/mining related development separated from town.
Located so as to not have any adverse environmental impacts (e.g. visual impacts).
All large new areas for heavy industrial to be serviced by rail access.
Not subject to development constraints such as flooding, bushfire hazard, or biodiversity issues.
Access to industrial areas should avoid traversing residential areas and areas are to be accessible by public transport (if available).

Objectives – Industrial and commercial land

- Provide adequate industrial land bank to meet demand for development and enable employment opportunities.
- Provide adequate land for commercial development in Singleton in suitable locations, while maintaining compact, walkable centres.
- Encourage and support future employment generating opportunities which will contribute to sustainable employment generation.

Policies – Industrial and commercial land

- The LEP will provide adequate industrial zoned land to meet demand for development and enable employment opportunities.
- Additional land adjacent to that currently zoned for industrial purposes to be retained with planning provisions that safeguard adjacent land for prospective industrial zoning for longer term development.
- Support in-principle future heavy industrial development to be located on suitable former mine sites, where significant infrastructure already exists and/or new development can be collocated with existing mines.
- Maintain existing commercial zoned land, and strengthen the integrity of the CBD by adopting planning controls that consolidate commercial development.
- Ensure planning provisions for industrial areas do not support inappropriate commercial development, but allow bulky goods retailing in the Maison Dieu and McDougalls Hill Industrial Areas.

Strategic Actions – Industrial and commercial land

- Provide for medium/heavy industrial zonings, with up to 250 ha of additional zoned industrial land to be provided as a 25 year land bank. Staged release would be subject to demand and provision of infrastructure and services.
- Provide the additional zoned industrial land principally at the proposed Whittingham industrial site, allowing the site to be developed for heavy industrial purposes, subject to the following LEP provisions:
    - Provision and funding of reticulated water and sewer, as well as road transport infrastructure.
    - Establishment of an environmental conservation zoning to protect significant ecological areas of the site.
    - Provisions requiring the land to be directly accessible to the rail network.

    - Prohibit bulky goods retailing.
    - Prohibit light industry unless it supports or is ancillary to the medium/heavy industrial purposes.
- Apply criteria in Table 11 in considering any additional rezoning proposals for industrial purposes.
- Establish an industrial land monitor/database.
- Investigate the potential for encouraging infill development or facilitating more efficient use of existing industrial land supply.
- Undertake further assessment of the opportunities to expand the existing Mt Thorley Industrial Area.
- Initiate discussions with Rix's Creek Mine about the future of the Singleton N-W land use opportunities, primarily for large industrial sites.
- Ensure that available zoned industrial land is not in a single ownership, by enabling at least 2 development fronts.
- Consider including a specific LEP provision to allow industrial use of coal mining sites.
- Implement a Council policy or DCP for bulky goods to limit retailing in industrial areas.
- Implement LEP provisions to allow compatible home businesses in residential zones.
- Review CBD boundaries in preparation of draft LEP to ensure commercial areas are appropriately zoned and avoid oversupply of commercial zoned land. Zoned commercial land in CBD should be expanded to include Department of Housing land on southern end of Ryan Avenue (behind Franklins) and the former Telstra Depot off York Street.
- Consider 'core' and 'peripheral/supporting' commercial zones, subject to Standard LEP template.
- Implement recommended options of Hirst Consulting Services 2007 report on additional local retail facilities in North Singleton.
- Ensure the permissibility of community and cultural facilities in commercial zones.
- Encourage a compact town through infill and mixed use developments.
- Implement CBD Strategic Improvement Project through DCP provisions.

6.9 Floodplain development and management

Extensive areas of the LGA are subject to flooding, including the town of Singleton, parts of Branxton village and surrounds, Broke, Jerrys Plains and rural areas forming part of the Hunter River floodplain. The Floodplain Management Manual 2005 prepared by the NSW Government provides guidance on approaches to floodplain development and management.

The town of Singleton is economically vulnerable to flood impacts, and future new development should seek to reduce this vulnerability by measures such as restricting additional urban zoned land to flood free locations, supporting flood free road links, and limiting infill density within the flood liable areas of the existing town.

Singleton town is located on the natural flood plain. While the constructed levee system can reduce flood impacts from minor to moderate floods, it is not feasible to prevent major flood events impacting on the Singleton town area. As a consequence, the preferred strategy is to minimise further development on the floodplain to prevent impacts. Development in floodways such as at Dunolly and Glenridding is particularly vulnerable to flood impacts which cannot be mitigated except by limiting land use.

Objectives – Floodplain development and management

- To minimise development on the floodplain, especially in areas identified as of high hazard.
- To apply minimum standards to new development on flood liable land, based on the level of hazard.

Policies – Floodplain development and management

- Adopt the 1 in 100 year (1%) flood as the flood standard for Singleton LGA. New residential development and substantial extensions and alterations to existing residential development will be required to have a floor level above this standard.
- A flood hazard and management study is required prior to any future changes to land use (i.e. zoning) being considered by Council. Any study is to have regard to the above objectives.
- Prevent erection of additional new dwelling houses on the floodplain in rural areas.
- Confirm existing policy to prevent additional development at Glenridding, owing to its flood liability and hazard.

Strategic Actions – Floodplain development and management

- Consider formal adoption of the Singleton Floodplain Management Plan 2003.
- Update the Singleton Floodplain Management DCP in conjunction with the new Singleton LEP.

- Undertake data review, mapping and flood modelling to prepare more detailed spatial data showing the extent of the floodplain and estimated flood levels in rural areas of the LGA.
- Include LEP provisions to prevent development on unsuitable sites, to consider risks, and to ensure appropriate design and management.

6.10 Availability of suitable sites for future institutional use

As the population and economy in Singleton grows, it is critical for suitable land to be set aside for the needs of institutional uses, such as aged persons accommodation, health facilities and education facilities.

Key uses which may be anticipated/required as the town expands should be in appropriate locations (e.g. medical facilities, educational facilities, community facilities, nursing homes, childcare etc.). Important sites include Singleton Hospital surplus land which should be retained for institutional use.

Objectives – sites for future institutional use

- To provide suitable land for the future needs of institutional uses (e.g. aged persons accommodation, health facilities and education facilities).

Policies – sites for future institutional use

- Seek to maintain sites with a minimum area of 1 ha in suitable locations for future institutional use.
- Identify future school sites in North Singleton as a priority in the short term.

Strategic Actions – sites for future institutional use

- Reach agreement with Department of Education and Training in relation to future school site requirements in North Singleton.
- Include LEP provisions allowing integration of institutional uses.
- Identify future sites for institutional and nursing home/hostel development and maintain these at an adequate size.
- Ensure new subdivision and development proposals consider retaining suitable sites which are adaptable to a range of future purposes.

7 PROPOSED RURAL RESIDENTIAL DEVELOPMENT AND SUBDIVISION

Current villages within Singleton LGA are Broke, Bulga, Jerrys Plains and Camberwell, which are currently zoned 1(d) Rural Small Holdings under Singleton LEP 1996. There are also areas in rural locations zoned for rural residential development. Villages and rural residential areas currently zoned 1(d) have a total area of about 2,052 hectares, of which the 4 villages referred to above comprise about 30%. Villages and rural residential areas comprise around 7% of the total population of the LGA.

Apart from villages, which were created as part of historic subdivision patterns, current demand exists for two broad types of general rural residential development:

- Rural fringe, generally in estates adjacent to an urban area with services such as sealed roads, water and reticulated sewer, and lot sizes of 4,000 square metres to 2 ha (e.g. Retreat, Hambledon Hill and Branxton rural residential areas);
- Rural living lots comprising residential use within a rural environment, generally with no services and lots 2 ha or larger (e.g. 'concessional' and other lots of less than the current general 40 ha minimum area subdivided since 1966 in rural areas generally, and 1(d) zoned land at Bulga and land off Wine Country Drive south of Branxton with access through Cessnock City Council area).

Purchasers of rural lifestyle lots are seeking lifestyle rather than productive attributes of the land and are generally persons relying on employment in Singleton and adjoining LGAs, or moving from outside the area. Rural residential subdivision and land use is often considered to be in conflict with commercial agriculture, and separation from agriculture is normally desirable.

Rural residential subdivision and development is a key land use planning issue in the Singleton LGA. Demand for small rural subdivision is primarily related to road accessibility, specifically proximity to Singleton, Broke, Branxton and Maitland and to mining related employment opportunities west of Singleton. Its development can affect agricultural land uses and viability, and the provision of services and infrastructure. It can also result in a range of environmental impacts including water availability, traffic, and biodiversity impacts.

The Singleton Rural Residential Strategy has identified short term candidate areas for development and has formed the basis for the proposals in this Strategy for new areas to be identified for rural residential subdivision. As part of the community consultation undertaken in relation to the Situation Analysis, additional further areas for rezoning have also been proposed and require evaluation.

As outlined in Section 6, for planning purposes it is anticipated that around 35% of new dwellings to 2021 will be in rural areas (around 70 per year), but this proportion is substantially dependent on the provision of land for rural residential development. The current demand for rural lifestyle development suggests that demand for rural residential land will exceed supply in the short term, with little further land available under the current LEP and DCP provisions. Singleton Council (December 2005) has estimated a demand for rural residential allotments (as distinct from new dwellings) of 75 per year.

Key land use planning issues were identified in the Situation Analysis as follows:

- Provision of adequate land for rural residential development in suitable locations.
- Future use and development of villages and all 1(d) zoned land.
- Village service provision and maintenance (including roads, water, sewer, groundwater and surface water runoff).

Strategic directions for each of these issues are presented in the sections below.

Appropriate zones for rural residential purposes need to be determined, taking into account the Standard LEP requirements implemented by the Department of Planning. The available zonings need to be considered in conjunction with minimum subdivision sizes. Zone options are RU4 Rural Small Holdings (objectives mainly relate to primary production), RU5 Village (flexible zone allowing uses incompatible with existing rural residential character), R5 Large Lot Residential (primarily supports residential use), and E4 Environmental Living (for areas with special ecological, scientific or aesthetic values). The Large Lot Residential zone most closely reflects the character of most existing rural residential areas in Singleton.

7.1 Provision of adequate land for rural residential development in suitable locations

It is important to provide for certainty in relation to the location of rural residential development to prevent adverse impacts on primary production land and flow on effects of increasing land values for other rural land.

The Strategy recognises the need to provide additional land within the LGA to cater for rural residential purposes. It provides the framework for:

(1) Determining areas for further investigation and rezoning.

(2) The preferred LEP zones (Rural Small Holdings where intensive agricultural production is a key objective, Large Lot Residential, or Environmental Living).

(3) Staging of rural residential development.

(4) Providing criteria for future rezoning requests for rural residential development outside current investigation areas.

(5) Flow on DCPs and Section 94 contributions plans required following rezoning.

The Situation Analysis identified demand and supply issues and future planning options. It is important to note that the drivers of rural residential differ between

Singleton and Branxton, and development rates may vary over the life of the Strategy depending on the availability of suitable land supply.

The Strategy determines what additional areas should be zoned for rural residential development, and the infrastructure servicing requirements for these areas. The proposed areas for rural residential development are shown on Maps 7.1A and 7.1B and in Table 12. These are based on the *Singleton Rural Residential Development Strategy 2005* and subsequent agreements between the Council and the Department of Planning. Based on the estimates in this table, there is a potential yield of 670 lots within these candidate areas, which would provide for just under 10 years demand based on 75 rural residential lots per year.

There is potential for expansion of the identified candidate areas, or for increasing the subdivision density to increase lot numbers. On this basis the Council would not need to consider additional candidate areas for rural residential development over the life of the Strategy.

The objectives, policies and strategic actions for rural residential development in Singleton LGA are as outlined below. This section includes infrastructure provision guidelines for new rural residential areas.

Table 12: Proposed candidate areas – rural residential

Candidate areas	Description
Lower Belford	Total area 277 ha in 17 existing lots. Proposed zoning Environmental Living, minimum average subdivision area 5 ha. Maximum potential approximately 30 lots. Potential occurrence of listed endangered ecological community requires detailed ecological investigation. Within proposed extension of Hunter Water Corporation service area and subject to service agreement. Consideration should be given to lower minimum lot size and potential reticulated water servicing, which would increase lot yield.
Jerrys Plains	Total area 20 ha. Proposed zoning Large Lot Residential, with minimum average subdivision area of 1 ha. Reticulated water available. Maximum potential 17 lots. Potential occurrence of nationally listed endangered ecological population may require detailed ecological investigation.
Wattle Ponds North East	Total area 88 ha in 4 existing lots. Proposed zoning Large Lot Residential, with minimum average subdivision area of 1 ha. Reticulated water to be provided. Maximum potential approximately 70 lots.
Wattle Ponds North West	Total area is 167 ha in 8 existing parcels. Proposed zoning Large Lot Residential, with minimum average area of 1 ha. Reticulated water to be provided. Maximum potential approximately 134 lots.
Sedgefield	Total area is 922 ha in 57 existing lots. Proposed zoning Environmental Living, minimum average area 5 ha. Maximum potential approx. 100 lots. Reticulated water not available. Rezoning should not progress until master planning of the area,

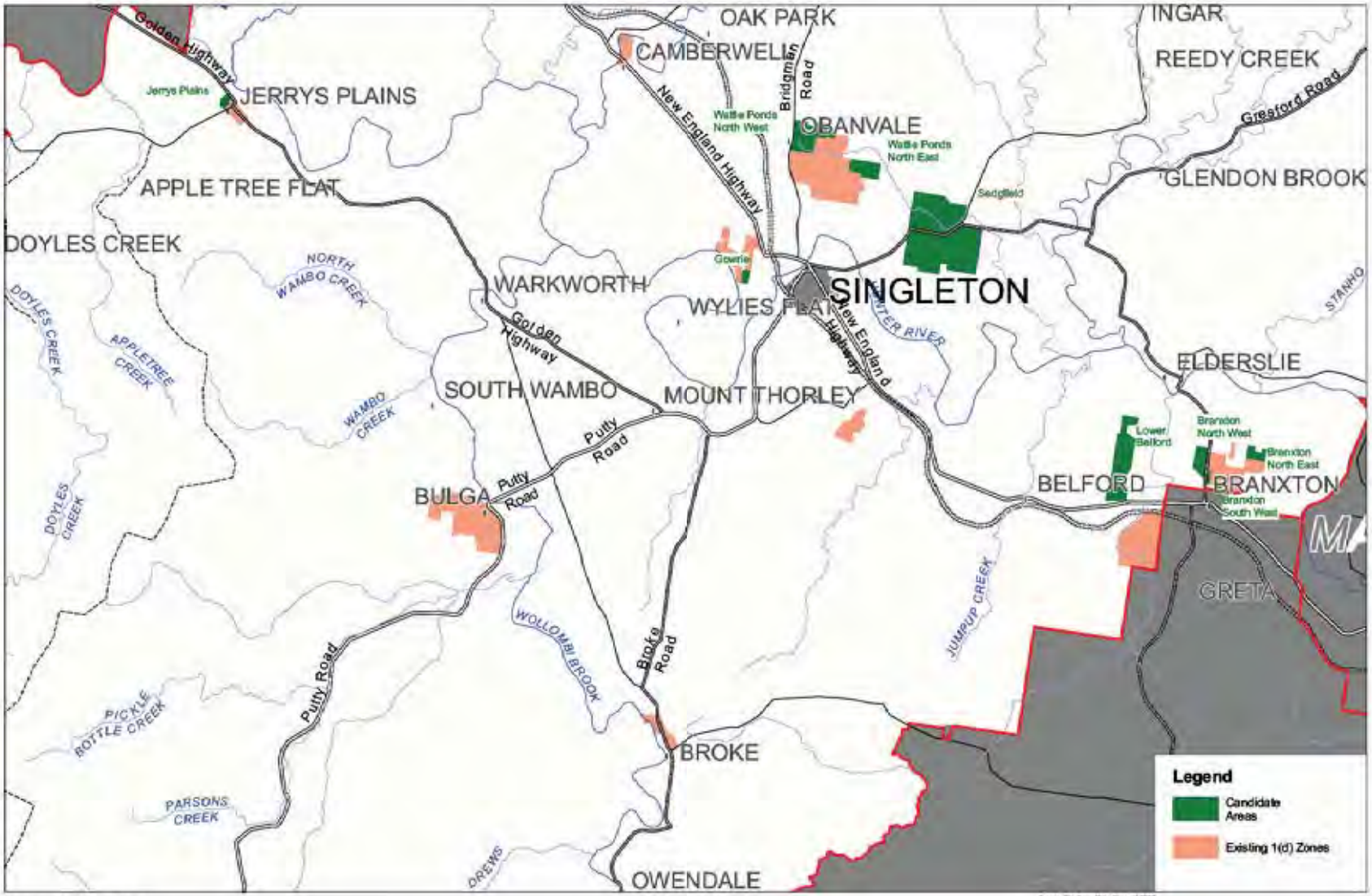
Candidate areas	Description
	required by DoP, is completed.
Gowrie	Total area 18 ha in 2 existing lots. Proposed zoning Large Lot Residential, with minimum average subdivision area of 4,000m^2 with reticulated water and sewerage provided. Maximum potential approximately 35 lots.
Branxton North West	Total area 88 ha in 7 existing lots. Proposed zoning Large Lot Residential, with minimum average subdivision area of 4,000m^2 (if sewer available). Full urban services required to be provided subject to service agreement with Hunter Water Corporation. Potential occurrence of listed endangered ecological community requires detailed ecological investigation. Maximum potential approximately 180 lots. Land adjoining to the south may have potential for rezoning to "Environmental Living" to provide a transition to agricultural lands.
Branxton North East	Total area 41 ha in 5 existing lots. Proposed zoning Large Lot Residential, with minimum average subdivision area of 4,000m^2 (if sewer available). Full urban services required to be provided subject to service agreement with Hunter Water Corporation. Maximum potential approximately 87 lots. Potential occurrence of listed endangered ecological community requires detailed ecological investigation.
Branxton South West	Total area 8 ha in 8 existing lots. Proposed zoning Large Lot Residential, with minimum average subdivision area of 4,000m^2. Full urban services required to be provided subject to service agreement with Hunter Water Corporation. Maximum potential approximately 17 lots. Potential occurrence of listed endangered ecological community requires detailed ecological investigation.

Objectives – Rural residential development

- Provide opportunities for additional rural residential subdivision and development in suitable locations, and enable a range of different types of rural residential development.
- Ensure that adequate services are available for rural residential lots.
- Ensure that the supply of zoned rural residential land does not unreasonably exceed demand.
- Apply criteria to identify the best location for rural residential estates and balance socio-economic goals associated with new rural residential development with the need to preserve areas of high agricultural, scenic or environmental value.
- Identify appropriate development controls for rural residential areas through DCP provisions.

Policies – Rural residential development

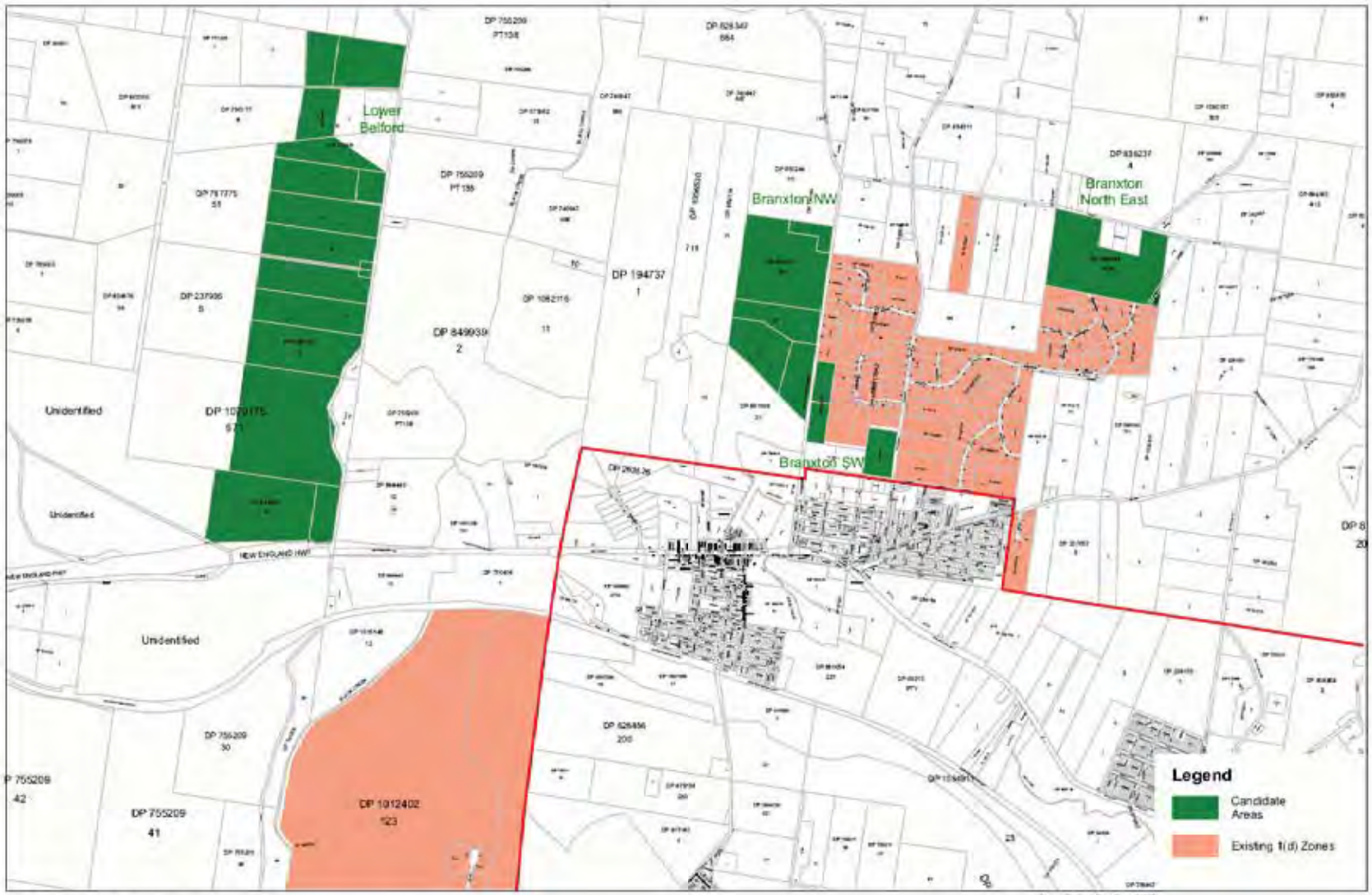
- Provide for a supply of up to 75 rural residential lots per year split 60/40% between Singleton fringe and Branxton.
- Zone adequate land for between 5 and 10 years supply (i.e. up to 400 lots around Singleton and 350 lots around Branxton), with review of land supply being undertaken every 3 years.
- New rural residential areas must relate to the long term preferred settlement structure (i.e. not be located on land with potential for urban development in the long term – 50 year + time frame), and provide adequate transport accessibility.
- The staging and sequencing of new rural residential areas shall be dependent upon the provision of adequate water supply, reticulated sewer (smaller lots less than 8,000m^2) and other infrastructure such as electricity, telecommunications and bush fire services.
- Consolidate further rural residential development of this type of land use in only two locations for each locality within the LGA, so that further services are potentially economic to provide in the long term if sufficient demand exists (i.e. do not disperse areas).
- Propose additional LEP objectives for rural residential under the proposed Standard LEP zoning provisions.
- No rezonings for rural residential in identified constraint areas (use map layers as an overlay for LEP).
- All rural residential development should have a good quality and secure water supply.
- Smaller lots (less than 8,000m^2) shall have reticulated sewer provided.
- Biodiversity and water and sewer infrastructure reviews be undertaken prior to determining final zoning boundaries and minimum lot sizes.
- Subdivision for the purposes of rural residential development should be undertaken in a manner that will not increase the potential for water extraction from streams or groundwater and comply with harvestable water rights requirements.



Singleton Land Use Strategy

EXISTING RURAL RESIDENTIAL AREAS & PROPOSED RURAL RESIDENTIAL INVESTIGATION AREAS - SINGLETON LGA

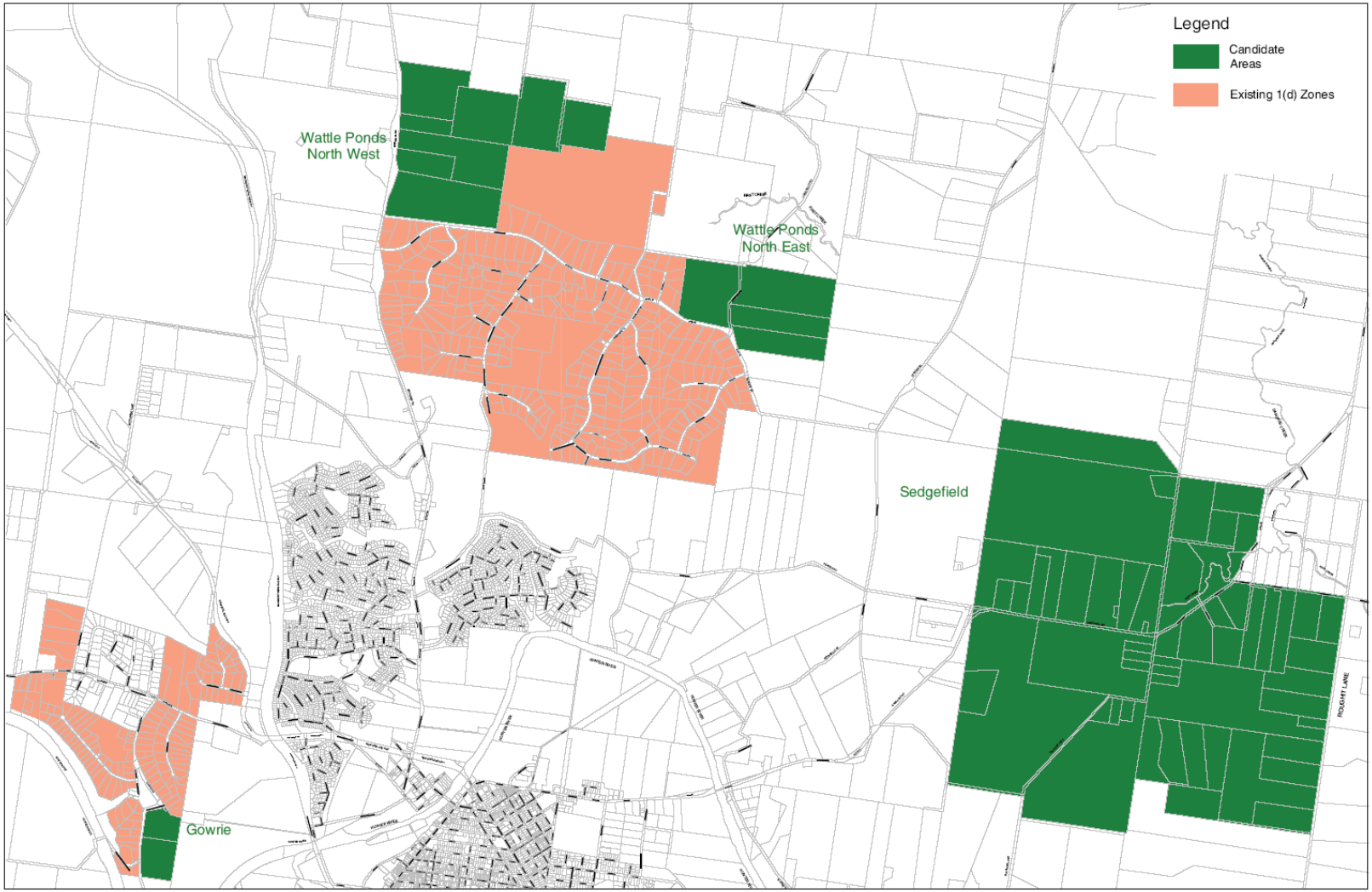
Fig 7.1A



Singleton Land Use Strategy

EXISTING RURAL RESIDENTIAL AREAS & PROPOSED RURAL RESIDENTIAL INVESTIGATION AREAS - BRANXTON

Fig 7.18



Source: Singleton Shire Council 2007

Singleton Land Use Strategy

EXISTING RURAL RESIDENTIAL AREAS & PROPOSED RURAL RESIDENTIAL INVESTIGATION AREAS - SINGLETON

prepared by **planning workshop australia**
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issued 2 Oct 07

Fig 7.1C

The following criteria (provided in Table 13) have been used to identify potential land for rural residential development under the Strategy. The application of these criteria satisfies requirements identified by the Department of Primary Industries for a strategy for rural residential development.

Table 13: Criteria used in identifying potential rural residential land

Broad Location Criteria	Comment
Distance from town	Land should be within a reasonable travel distance/time from the centre of an urban area (e.g. 10 km or 15 minutes from centre of Singleton or Branxton).
Provision of services	Ability to provide reticulated water, sewer, electricity, telecommunications, bush fire services should be considered.
Location	Avoid 'stand-alone' rural residential development unless it is a logical extension of an existing significant rural residential subdivision area that will contribute to achieving a critical mass to support basic services.
Capacity for onsite water storage	This relates to the ability to have supplementary dam water supplies. Additional dam storage may not be feasible due to water resource limits and harvestable water rights.
Minimal impact on existing infrastructure	Sufficient reserve capacity should exist in power, school bus and telecommunications services.
Good sealed road access	Efficient use needs to be made of the existing road network. In general, this is relatively lightly trafficked apart from the New England Highway and some major roads leading to Singleton.
Exclude environmentally sensitive land	This land often has good visual outlooks, vegetation and privacy, all of which are in demand.
Exclude areas of high bushfire hazard	Vegetated land is in demand, but is subject to bushfire hazard constraints.
Exclude known mineral and extractive resources	Includes appropriate buffers to extractive and other non-compatible land uses.
Exclude areas near non-compatible land uses	Includes appropriate buffers to uses such as sewerage treatment works, etc.
Exclude water supply catchment land	This issue predominantly relates to avoiding contamination from onsite treatment systems, but may also relate to water access rights and usage.
Avoid areas with threatened species or	Remaining areas of native vegetation are expected to have biodiversity and ecological values. Presence of endangered ecological communities and threatened species needs

Broad Location Criteria	Comment
EECs	identification.
Avoid areas with high soil erosion risk	Primarily relates to steeper lands, and land with soil characteristics that make it more prone to erosion.
Avoid forestry land and contaminated land	Relates generally to former orchard areas, stock dip areas, and areas with identified forestry resources.
Avoid saline land and areas with soils unsuitable for onsite effluent disposal	Although not an absolute constraint, development of these lands would require reticulated sewer or alternative on site effluent treatment systems.
Avoid flood prone land	Acceptable only if flood free access and building sites/waste disposal areas are available.
Avoid Aboriginal and European heritage areas and sites	Examples include the curtilage surrounding historic dwellings.
Avoid areas with high groundwater tables	Potential problems with on site wastewater disposal, and salinity.
Avoid land with slopes greater than 18 degrees	Increased erosion potential, including from vehicle access.

Strategic Actions – Rural residential development

- Rural residential around Singleton must ensure that future urban growth options are not constrained by rural residential development, and that the road hierarchy allows flexibility for future growth of the town (e.g. maintains options for highway bypass and link roads).
- Determine arrangements with Hunter Water Corporation for provision of water and sewer to service all Branxton Rural residential areas, and Lower Belford candidate area.
- With Cessnock City Council and DoP, review the need for further areas for urban expansion within Singleton LGA adjacent to the Branxton urban area prior to rezoning any additional land for rural residential purposes.
- Adopt criteria for considering further applications for rural residential areas that are not in the currently identified candidate areas (as outlined in Table 13).

- Prepare Section 94 Contributions Plans prior to gazettal of LEP providing for additional rural residential land.
- Establish a land monitor to review rural residential supply and demand, dwelling and subdivision approvals. This monitor represents a compilation of subdivision and development approvals, dwelling completions, land releases and land sales within the rural residential candidate areas.
- Consider sunset clause provisions for rural residential zoned areas. Will prevent long term vacant developable land around villages and urban areas which may hinder future land use options, and also promotes supply of developed land.
- Maintain existing development limits within Village of Camberwell (as per existing Clause 19).
- Consider both minimum and average lot size (and possibly maximum) as a requirement. Allows for more flexible design to reflect environmental and planning constraints.
- Relate minimum subdivision size to servicing and to soil capacity for onsite disposal.
- Ensure appropriate minimum areas for onsite disposal depending upon soil type, slope, proximity to watercourse, and amount of effluent likely to be generated.
- Avoid reliance on groundwater sources as the primary water supply for rural industry or potable uses for dwellings.
- Ensure adequate water supply for fire fighting by way of dams and 20,000 litres minimum dedicated supply for this purpose.
- Consider the following LEP zones and minimum lot sizes for rural residential development:
    - R5 Large Lot Residential where town water is provided, with two minimum average lot sizes (indicated on the lot size map), being 4,000m^2 where both sewer and water are provided, and 1 ha where water only is provided. The absolute minimum lot sizes for these areas being 2,000m^2 and 8,000m^2 respectively.
    - Use of RU5 Village zone is not proposed.
    - Large unserviced rural residential lots (4 ha minimum with 5 ha minimum average) could be an E4 Environmental Living zone, although in most cases provision of services is preferable taking into account the criteria in Table 13.
- Prepare a DCP to identify appropriate sequencing of rural residential development and associated road, water, sewer, electricity, and telecommunications infrastructure. Subdivision layout is to be master planned and investigation made to create

certainty for future residents by use of the LEP Lot Size Map provisions of the Standard Instrument.

7.2 Future use and development of existing villages and all existing 1(d) zoned land

This section addresses the development potential and future zoning of existing rural villages and other existing 1(d) zoned land. There are 9 distinct areas currently zoned 1(d) Rural Small Holdings under Singleton LEP 1996.

The villages of Broke, Bulga, Jerrys Plains and Camberwell villages have individual character and planning issues, and provide alternative residential opportunities to larger urban areas. Villages currently have minimal infrastructure services and historic subdivision patterns with not all lots having a dwelling entitlement under the current planning controls. Section 7.3 reviews infrastructure service provision for these areas.

Other areas currently zoned 1(d) are primarily rural residential subdivisions approved by Singleton Council.

An analysis of lot availability and demand undertaken by Singleton Council (December 2005) found that existing 1(d) zones have little potential to provide further rural residential lots to meet anticipated demands based on historic trends. This analysis assumed that lots of less than 5 ha are unlikely to be developed, notwithstanding the existing LEP minimum subdivision area within 1(d) zones of 1 ha. This was largely due to native vegetation and topographic constraints. The situation for each of the existing zoned areas is summarised in Table 14 and these are shown on Map 7.1.

Table 14: Situation for existing villages and existing 1(d) zoned land

Village or area	Description
Camberwell	Special provisions apply in current LEP (Clause 19) which should be continued. No significant development potential, subject to coal mining impacts.
Jerrys Plains	No significant development potential, subject to possible future coal mining impacts. Potential infill development. Reticulated water supply provided.
Broke	No significant development potential, parts are subject to flooding. Reticulated water supply provided.
Bulga	No significant development potential due to development constraints. Generally has rural small holding character, rather than residential. Environmental Living zone appropriate.
Whittingham	Unlikely to yield significant new infill lots. Currently serviced by low pressure water supply at limit of capacity. Environmental Living zone appropriate.
Branxton	Serviced by Hunter Water Corporation reticulated water supply and pump out sewer system, but no further pump out systems will be approved. Potential for an additional 6 to 15 lots.
Hanwood Estate	Subject to significant development constraints, and unlikely to be

Village or area	Description
	further developed in short term. Included in urban investigation area under Lower Hunter Regional Strategy. Under current planning controls there is potential for an additional 310 rural residential lots to be subdivided.
North West Singleton	Potential for up to 5 additional lots. Subject to servicing constraints, and close proximity to industrial area.
Retreat	Potential for around 50 additional lots.

The following objectives, policies and strategic actions are derived from the Situation Analysis. Strategic directions for issues are presented in the sections below. Future LEP provisions (including zoning) are proposed for existing 1(d) zoned land, and infill or additional development potential should be considered in villages.

Objectives – Development of villages and existing 1(d) zoned land

- Generally retain existing subdivision and development provisions for existing 1(d) zoned land, within the framework provided by the Standard LEP. Provide for 1 ha minimum average lot size and 4,000m^2 minimum average if sewered.
- Review options for infill and consolidation of existing areas (except Camberwell).

Policies – Development of villages and existing 1(d) zoned land

- Review options for consolidating additional rural residential development within existing zones to facilitate more efficient infrastructure utilisation.
- Maintain and enhance the distinctive character and landscape setting of existing villages, and ensure that the character of villages is identified in DCP or LEP supplementary objectives.
- Prepare draft outline for the security of villages from further underground and open cut mining with an emphasis on a buffer zone and the way forward for growth for these villages.
- Seek to maintain or encourage at least two development options in terms of land ownership for each rural residential area where growth is anticipated and provided for.
- Put in place strong controls on incompatible land uses in rural residential zones, including the use of supplementary objectives.
- Minimum lot sizes for each village are to take into account existing lots, character requirements, on-site wastewater servicing requirements, and separation distances from existing dwellings.

Strategic Actions – Development of villages and 1(d) zoned land

- Zone existing 1(d) zones (except Bulga and Whittingham) R5 Large Lot Residential. Retain current 8,000m² minimum subdivision area but implement a 1 ha minimum average.
- Zone Bulga and Whittingham 1(d) zones E4 Environmental Living with 4 ha minimum subdivision area and 5 ha minimum average.
- Update DCPs to reflect updated LEP provisions.

7.3 Village service provision and maintenance (including roads, water, sewer, groundwater and surface water runoff)

This section addresses the infrastructure capacity and maintenance of the rural villages of Broke, Bulga, Jerrys Plains and Camberwell. A review of infrastructure issues relating to each of the villages within the LGA was included in the Situation Analysis report (Table 69).

The Village of Broke is being provided with a reticulated water supply, and is the only village where substantial demand for additional development could be anticipated. There is currently minimal land available for subdivision at Bulga under current LEP and DCP provisions. Further development at Camberwell is restricted by LEP provisions, and historic trends show little demand for new development at Jerrys Plains.

Objectives – Village service provision and maintenance

- Provision of limited urban services within villages (e.g. water, and waste) where demand for growth is identified and service provision is economic.

Policies – Village service provision and maintenance

- Reticulated water is available to Broke and Jerrys Plains, but not Bulga, Camberwell or any other village type areas.
- Reticulated sewer will not be provided to any village, and minimum lot sizes for subdivision and construction of dwelling houses is to be based on on-site wastewater disposal requirements.

Strategic Actions – Village service provision and maintenance

- Review potential for further development at Broke and current Section 94 contributions plan provisions.
- Maintain current level of development potential in LEP provisions for all villages to relate to service provision.

8 RURAL AREAS

Agriculture is one of the main rural land uses within Singleton LGA and continues to significantly contribute to local economic activity. The main agricultural activities are beef cattle grazing, dairying, viticulture, horticulture and equine activities. Singleton has substantial alluvial areas with high levels of agricultural productivity, with 2% of the LGA (over 8,500 ha) identified as Class 1 agricultural suitability. This land is significant at a regional and state level.

The 2001 ABS agricultural census indicates that the economic value of agriculture for the year was $34 million and there were around 600 producers. Average farm size for the Singleton LGA in 2001 was estimated at 356 ha and has been declining, and the total number of farms has been increasing. This does not take into account small holdings on which there is limited agricultural production.

A significant proportion of the LGA is used for coal mining or part of mining company land holdings, predominantly in the Rural West Planning Area. There are land use issues related to the impact of transport of coal and road access, as well as mining impacts on surrounding land and the need for appropriate buffers. Coal mining production and employment are expected to be stable or increase during the period of the Strategy.

The Singleton Military Area comprises an area of about 12,500 ha south of the town. This houses the Infantry Centre and other units, and provides economic benefits. There are also potential adverse impacts on land surrounding this area, primarily from noise and vibration.

Rural tourism is increasingly significant in Singleton LGA, with pressure for diversified tourism development particularly in vineyard areas (e.g. Hermitage Road and Broke Fordwich). Vineyards have a high agricultural and tourism value. There is a range of potential land use conflicts relating to agricultural use and impacts, development potential for dwellings, traffic impacts, scenic amenity and commercial activities in rural areas. Future planning should take these issues into account.

Key land use planning issues for the rural areas of Singleton were identified in the Situation Analysis as follows:

- Minimum rural subdivision size
- Protection of agricultural land and viability
- Coal mining lands and buffers
- Defence lands and buffers

- Climate change implications for land use
- Rural water quality and availability and protection of catchments and resources
- Rural servicing costs and requirements
- Branxton-Whittingham corridor development options

Each of these issues is presented below. In addition, the *Central West Rural Lands Inquiry* conducted for the Minister for Planning and concluded in August 2007 has potentially significant impacts for rural planning in NSW. The findings of the Inquiry are discussed in Section 8.9.

8.1 Minimum rural subdivision size

Singleton Council has a significant regulatory influence over future rural land use through controls over the subdivision of rural land. The Strategy and subsequent local environmental plan identify the requirements that will apply to future rural subdivision. Minimum subdivision size affects agricultural viability, enables effective provision of infrastructure servicing, and prevents land use conflicts which may arise from allowing residential uses on small lots in rural areas. Other provisions relating to maintaining and protecting agriculture within the LGA are referred to in Section 8.2.

The demand for rural subdivision is primarily affected by the dwelling entitlement on subdivided lots. Although planning provisions in the LEP could separate dwelling entitlements from lot sizes, the Strategy does not propose this. Proposed minimum rural lot sizes will generally retain existing character and entitlements, with the objective of ensuring that LEP subdivision provisions will be unlikely to change land use significantly.

A minimum area of 150 ha is proposed for the Rural North and Rural West planning areas where the predominant land use is grazing and where larger holdings are common. This is anticipated to have the effect of supporting the retention of commercial grazing activities. In parts of the LGA where the predominant land use is other than grazing and where lot sizes are less than this already, the 40 ha minimum should be retained (e.g. parts of the Rural South, Rural South East and Rural East planning areas).

The standard local environmental plan provisions include a primary production zone, within which a range of minimum lot sizes can apply. The NSW Department of Planning has developed a methodology for determining rural lot sizes which is substantially based on Department of Primary Industries methodology, but which is not readily applicable to the range of land use and existing subdivision pattern within the Singleton LGA. The Department of Primary Industries has indicated a preference for a minimum 150 ha property size to enable effective cattle grazing enterprises in the Hunter Valley which may be considered in determining minimum subdivision area where grazing is a predominant agricultural use.

LEP provisions could provide for a rural small holdings zone, permitting smaller subdivision sizes with the objective of providing for agricultural production. Holdings analysis within selected areas of Singleton LGA shows that there are enough small lots currently in existence to provide for this purpose, and no specifically identified rural small holding areas should be identified for agricultural purposes. Future

investigation may be warranted in the medium term (e.g. in vineyard areas) but water is a significant limitation and at the present time a specific provision cannot be justified. Holding the current 40 ha minimum area in areas with rural small holding potential provides adequate opportunities and prevents land values increasing due to speculation that may occur with such a zone.

Objectives – Minimum rural subdivision size

- Minimum rural subdivision sizes within Singleton LGA will be of sufficient size to accommodate and maintain a range of commercial agricultural production (predominantly grazing enterprises).
- Minimum allotment sizes will take into account land capability and agricultural suitability.

Policies – Minimum rural subdivision size

- LEP provisions for subdivision of rural land should reflect land use capability and the requirements for maintaining commercial agriculture.
- minimum lot sizes (with a dwelling entitlement) are to reflect broad scale land capability/suitability.
- Additional rural subdivision should ensure that adequate infrastructure and services are provided to new lots (including roads, electricity and telecommunications).
- The retention of 'concessional allotments' allowing subdivision of land less than the general minimum area is not supported, recognising that these have resulted in rural residential development in inappropriate locations.
- Adopt a differential minimum rural lot size within the LGA based on predominant land use and existing subdivision pattern.
- New subdivision is not to result in the creation of a right or expectation of additional water rights (e.g. by ensuring no creation of additional lots with river frontage, requiring onsite water provision, or by prior purchase of water entitlement).
- Farm or property management plans should be recognised as an LEP consideration in determining rural subdivision requirements.
- Recognise that production systems now often utilise multiple properties when setting minimum lot sizes.

Strategic Actions – Minimum rural subdivision size

- Consider the following minimum rural lot sizes (with input from DPI):
    - general minimum 40 hectares throughout rural areas of LGA (except where the predominant land use is grazing

on larger holdings and/or mining, and/or the retention of existing land use and subdivision pattern is desirable);

- broad acre grazing, 150 hectares in those parts of LGA where there is currently a predominant rural subdivision size of greater than 40 ha and/or where retention of existing land use and subdivision pattern is desirable (e.g. Rural North and Rural West planning areas).

- Consider permitting agricultural subdivision to occur without dwelling rights or without minimum lot sizes. Could be linked to consolidations, boundary adjustments, property management plans, etc.
- Consider smaller minimum subdivision areas for horticultural areas on an individual basis, where the land use is established prior to subdivision.
- Consider a farm adjustment clause (as per standard LEP).

8.2 Protection of agricultural land and viability

Significant employment in the LGA is generated by agriculture and related activities. Tourism in agricultural areas is also economically important, and needs to be taken into account and provided for. The importance of maintaining commercial agriculture is essential from both an economic and environmental point of view, and has been particularly emphasised by the NSW Department of Primary Industries.

Important ways in which the Strategy and LEP can influence agriculture are in determining suitable locations for rural residential subdivision and development; supporting the provision or improvement of infrastructure (such as roads or telecommunications); specifying minimum sizes for subdivision of rural land (dealt with in Section 8.1) and the erection of dwellings, affecting the permissibility of agriculture-related activities (e.g. rural worker dwellings, sheds and buildings, farm based industries, etc.); and restriction of uses that may be incompatible with agriculture. The most significant mechanisms relate to separation of rural subdivision entitlements from dwelling entitlements, zoning (including whether there should be more than one rural zone), permissible uses within the zone and exempt and complying development.

Certain measures proposed in the Hunter-Central Rivers Catchment Action Plan to support agricultural land use, and improved environmental management practices may be able to be linked to the Strategy and LEP.

Objectives – Protection of agricultural land and viability

- The Singleton LGA will have agricultural land that:
  - Is sufficient in size and quality to accommodate and maintain a range of commercial agricultural production in accordance with land capability and suitability.
  - Maintains a significant share of the local labour force.

- Rural production areas will be clearly identified by LEP zoning and uses in rural areas should be compatible with agricultural production.
- Other environmental values in rural areas which support agriculture should be maintained (including protection of biodiversity and natural ecosystems, rural landscapes, and water quality).

Policies – Protection of agricultural land and viability

- Recognise catchment management authority catchment action plan objectives and priorities as a matter of consideration in LEP provisions.
- Ensure water availability is considered in new development proposals and that adequate supplies are maintained for existing agriculture.
- Rural residential areas will be clearly identified and separated from rural production areas to reduce potential land use conflicts.

Strategic Actions – Protection of agricultural land and viability

- Consider using RU1 Primary Production, RU2 Rural Landscape, and E3 Environmental Management zones in the LEP (These zones are from the DoP Standard LEP provisions).
- Ensure that water supply for non-residential rural development is appropriately considered, including necessary water licences and appropriateness of ground water usage.
- Introduce LEP provisions to ensure that incompatible land uses and activities in agricultural zones are not permitted.
- In conjunction with the CMA, implement performance-based outcomes for the quality of water being discharged.
- In conjunction with the CMA & DPI, develop a framework for requiring farm and property management plans to address water quality and availability.
- Develop policies for dwellings erected in conjunction with intensive agricultural production.
- Review zoning options to enable diversified tourism and accommodation, especially in the Hermitage Road and Broke Fordwich areas.

8.3 Coal mining lands and buffers

Coal mining is probably the most significant land use and economic activity affecting the future of the LGA. In Singleton, coal production and employment is reaching its expected peak, and is likely to be stable or increase for the next 10 – 15 years and then progressively decline as easily accessible coal resources are depleted.

Within the LGA, coal mining directly employed about 4,000 persons in 2004 and produced about 52 million tonnes of coal. Mining has a range of environmental and social impacts which need to be taken into account in future land use planning.

Objectives – Coal mining lands and buffers

- Recognise that coal mining will remain a major land use within the Singleton LGA for the foreseeable future, especially in the Rural West planning area.
- Ensure that incompatible land uses are not permitted within coal mining areas, and appropriate buffers to protect environmental amenity are applied.

Policies – Coal mining lands and buffers

- Recognise that coal mining will remain a major land use within the Singleton LGA for the foreseeable future, especially in the Rural West planning area.
- Ensure that incompatible land uses are not permitted within coal mining areas, and appropriate buffers to protect the environmental amenity of adjacent uses are applied.
- Ensure that the environmental impact of new coal mining developments is to be fully assessed, including the planning context and regional scale impacts (especially relating to water, air quality and biodiversity).

Strategic Actions – Coal mining lands and buffers

- LEP to include objectives for coal mining, provide for mining as a permitted use in rural zones, and contain principles and criteria for the development of coal mining proposals.
- Support a strategic review by the NSW Government of future coal mining proposals within the Upper Hunter Region, including rehabilitation, infrastructure and land use options, and an update of the DPI (Minerals) Synoptic Plan for rehabilitation of mined landscapes.

8.4 Defence lands and buffers

The Singleton Military Area comprises an area of about 12,500 ha and is an important Army training facility. The area is a major land use and contributes substantially to the Singleton economy. Activities within the area include a live firing range, which may periodically result in noise and vibration impacts on land in the vicinity.

Objectives – Defence lands and buffers

- Recognise Defence lands as an important land use within the LGA and provide adequate buffers to surrounding land uses to maintain environmental amenity.

Policies – Defence lands and buffers

- Consult with Defence in relation to future land use change and major development proposals in the vicinity of the Singleton Military Area.

Strategic Actions – Defence lands and buffers

- Consider LEP provisions and/or overlay map to require consideration of noise and vibration impacts on land uses in the vicinity of the Singleton Military Area.
- Consider identifying principles for the use of lands around the perimeter of the Singleton Military Area, for inclusion in DCP provisions.

8.5 Climate change implications for land use

Climate change has potentially significant implications for water supply, agriculture and rural land use generally in the medium term. It also has significant implications for urban land use. There is a long term likelihood of greater frequency of extreme events (affecting natural hazards such as bush fires and flooding), increasing temperatures, evaporation, and potential changes in seasonal patterns.

Climate change is expected to have implications for agricultural viability. The three major implications of climate change for agriculture will be change to the growing season (and number of frosts), the impacts on the availability of water (including total rainfall and higher evaporation), and lower predictability of climate. A longer growing season and higher temperatures may benefit the introduction of new crops, while lower effective water availability may increase the frequency of drought conditions.

Climate change predictions indicate that there may be opportunities for new types of enterprises in the future, and that rural subdivision policy should seek to protect current water entitlements and availability.

Objectives – Climate change implications for rural land use

- Take into account the best available information on climate change scenarios for Singleton in making strategic land use decisions, especially for uses with sensitivity to climate change.

Policies – Climate change implications for rural land use

- Review impacts of climate change on water supply and security.

- Review responses to climate change periodically as further information becomes available.

Strategic Actions – Climate change implications for rural land use

- No specific land use response is identified. However there may be implications for the growth potential of areas utilising town water supplies (e.g. limited availability), and climate change may exacerbate some natural hazards with potential to require higher building construction standards. Flooding and bush fires may also become more intense, suggesting a conservative approach in critical areas.
- Promote energy efficient settlement through appropriate urban structure, transport systems and design.
- Periodic review through State of the Environment reporting.
- Rural water quality and availability and protection of catchments and resources

8.6 Rural water quality, availability and protection of catchments and resources

Many land uses are affected by the availability of adequate water of suitable quality. Water entitlements for rural subdivisions have the potential to reduce general water availability and security, although access to water is primarily the responsibility of the NSW Department of Environment and Climate Change under the provisions of the Water Management Act 2000.

In some instances, particular land uses or activities may have the potential to impact on water availability, and consideration should be given to whether these may require consent (e.g. rural industries, farm dams, plantation forests, and aquaculture) or whether special requirements may be desirable.

Protection of urban water supply catchments is a priority. Measures to identify and protect Singleton's urban water supply catchment may be implemented through the LEP and should take into account the recommendations of the Glennies Creek Total Catchment Management Study.

Objectives – Rural water quality, availability and protection of catchments and resources

- Maintain adequate water quality and availability to enable sustainable rural land use within the area.
- Ensure water availability, quality and protection of catchments and water resources is recognised in land use decision-making.

Policies – Rural water quality, availability and protection of catchments and resources

- Recognise Department of Natural Resources water sharing plan provisions for sub-catchments in land use decision-making.
- Rural rezoning or subdivision proposals shall be required to provide details of existing and proposed provision for water entitlements. Subdivisions which create additional basic water right entitlements on rivers or streams, or within catchments subject to high stress will not be supported.

Strategic Actions – Rural water quality, availability and protection of catchments and resources

- Include consideration of water implications of development as a general LEP objective.
- Include specific water quality and use objectives for rural zones (e.g. reference to Catchment Action Plan provisions and Hunter Water Sharing Plan).
- Consider including an LEP overlay identifying sub catchments and stressed streams.
- Include LEP provisions which require consideration of water entitlements and access in the determination of development applications for subdivision (except consolidation of lots).
- Prepare DCP provisions to provide guidelines on water availability and utilisation for development proposals.

8.7 Rural servicing costs and requirements

Important rural servicing requirements include roads, electricity, telecommunications, garbage services, bush fire services, and mail delivery. While these are adequately provided in most areas at present, further upgrading and ongoing maintenance are generally expensive and may be uneconomic for service providers.

Service provision is primarily an issue for Singleton Council and other agencies who are service providers, and is an important consideration in rural subdivision proposals, and other development proposals. The land use planning system provides a means of ensuring that community costs are taken into account in new rezoning proposals and development projects.

Objectives – Rural servicing costs and requirements

- Maintain adequate services and infrastructure for rural land use within the area.
- Ensure rural servicing costs and requirements are taken into account in land use decision-making.

- Generally limit extensions to current rural service areas to minimise ongoing maintenance costs.

Policies – Rural servicing costs and requirements

- Prepare clear Council policy guidelines (or DCP provisions) relating to service standards and requirements.
- Development within rural areas should not adversely affect rural infrastructure or existing service levels such as roads or electricity.
- Developers to be responsible for paying the full costs of capital upgrading for necessary services required by Council policy.
- Develop contributions plans or planning agreements to provide for necessary upgrading to rural infrastructure and services.
- Prepare a policy and requirements regarding use of non Council maintained roads for access in subdivision and development proposals, including agreement with the Department of Lands in relation to use of Crown roads for access.

Strategic Actions – Rural servicing costs and requirements

- Prepare a DCP and updated Section 94 contributions plan relating to rural servicing provision and costs. This may identify current levels of service in rural areas and areas where services will not be provided.
- Develop a policy on use of planning agreements to provide for infrastructure and services.
- Finalise agreement between Singleton Council and the Hunter Water Corporation in relation to the proposed future area of operations of the Corporation within Singleton LGA as outlined in Map 4.3.
- Seek to enter into a joint Section 94 contributions plan with Cessnock City Council to provide for road upgrading for roads that cross the LGA boundary.

8.8 Branxton-Whittingham corridor development options

Singleton Council anticipates pressure for a range of commercial, industrial, rural residential and residential development in the area generally between Branxton and Whittingham. This affects approximately 15 km of New England Highway frontage, and is primarily related to the foreshadowed extension of the F3 Freeway to Branxton and the identification in the Lower Hunter Regional Strategy of significant areas of land for investigation for potential urban development near Branxton.

The Department of Planning has held several meetings with Cessnock and Singleton Councils during 2007. One issue addressed in these meetings concerned planning and development in the Branxton area. In this respect, the Department in July 2007 advised as follows:

- *Cessnock Council has stated that it has no intention of pursuing new residential development in the vicinity of Branxton other than those already identified in the Lower Hunter Regional Strategy: Huntlee New Town (7200 dwellings), Greta Migrant Camp (up to 2000 dwellings) and Greta Wydham Street Precinct (approx 300 dwellings).*
- *Following initial consideration, there does not seem to be a need for an additional cross-LGA boundary strategic planning project. Apart from Huntlee (which has been declared State Significant and will be assessed under Part 3A) planning in the vicinity of Branxton is essentially a local scale planning exercise to be undertaken by each Council.*
- *Given the land supply provided by the above developments, there is unlikely to be a need for additional residential sites around Branxton for a considerable number of years.*
- *Via its local strategy, Singleton Council should consider opportunities for intensifying (or making minor adjustments to) existing and proposed rural residential zones close to Branxton.*

There will be ongoing consultation with Singleton and Cessnock Councils in respect of the Huntlee site, including the need for provision of local infrastructure in the Branxton/Huntlee area (this is not seen as a matter to be resolved in the current local strategy projects).

Accordingly, no additional residential land in the vicinity of Branxton will be provided for in Singleton LGA, other than south of the railway line as provided under the Lower Hunter Regional Strategy.

The demand for highway frontage land development in this location is primarily related to its location and relative accessibility by road to Newcastle and the Lower Hunter region, the advantages of sites having highway exposure, and projected growth in the Lower Hunter.

While recognising the potential demand for this type of development within the corridor in the future, determination to proceed with encouraging or allowing more intensive development in this location is premature at this time and during the Strategy timeframe. There are significant development constraints which would preclude any change to existing land use in the short to medium term, including the uneconomic provision and unavailability of necessary services (especially water), presence of listed endangered ecological communities and threatened species in the vicinity, the presence of Belford National Park in the area, and the desirability of consolidating commercial and industrial development in centres such as Singleton or Mount Thorley. In addition, ribbon urbanisation along the highway would detract from the scenic eastern entry to Singleton and detract from the identity of the town.

The land use planning priorities for this corridor should be as follows:

1. Retain the existing land use and subdivision pattern along the New England Highway frontage and in the vicinity.
2. Limit further subdivision of land fronting the New England Highway, based on current planning controls.

3. Maintain safe traffic conditions and scenic amenity by preventing development other than existing permissible dwelling houses or agricultural activities.
4. Not provide water reticulation, or other services which will support development.
5. Support consolidation of urban land uses within or adjacent to existing towns.
6. Reduce car and road dependence of development by locating commercial and industrial areas in more central locations where alternative public transport is available.
7. Review of these planning priorities for the area following the completion of construction of the F3 Freeway extension, in the context of the implementation of the Lower Hunter Regional Strategy.

The objectives, policies and strategic actions identified in this section should be read in conjunction with the Strategy proposals identified in Part 6 – Urban Settlement (especially Sections 6.1, 6.2, 6.4, 6.6, 6.7, and 6.8).

Objectives – Branxton-Whittingham corridor development options

- Maintain safe traffic conditions and scenic amenity along the New England Highway by retaining existing rural zonings and planning provisions.
- Limit further subdivision of land fronting the New England Highway.

Policies – Branxton-Whittingham corridor development options

- Adopt the priorities identified above for land between Branxton and Whittingham.
- No additional urban land to be rezoned within Singleton LGA in the Branxton-Whittingham corridor, including Belford.

Strategic Actions – Branxton-Whittingham corridor development options

- Include provision in LEP for the F3 freeway extension by inclusion of an acquisition zone, with consideration being given to identification of a noise exclusion overlay.
- Reach agreement with Hunter Water Corporation in relation to future for land use zoning and service provision in the Branxton-Whittingham corridor, taking into account the objectives and provisions of the Strategy.

8.9 Central West Rural Lands Inquiry

In February 2007, the Minister for Planning appointed an Independent Panel to investigate, report and make recommendations on land use planning in the Central West region of the State, having particular regard to balancing the protection of agricultural lands with other competing interests including, but not limited to, subdivision and rural residential development. The Panel met with a stakeholder reference group established by the Minister and consulted with a broad range of stakeholders and received submissions from interested persons.

A key recommendation contained in the Independent Panel's report release in August 2007 is the introduction of a new SEPP for Rural Lands containing provisions to guide new planning controls. The new SEPP would:

- *Set out the Government's policy direction and principles for rural planning including social, environmental and economic principles;*
- *Provide separate controls, including zones and requirements for buffers where necessary for Rural Residential, Small Farms and General Rural Zones in accordance with land capability, demand for rural lifestyle lots, potential for land use conflicts etc.*
- *Identify a comprehensive range of permissible uses in rural zones that would reflect recent trends in rural industry related tourism, restaurants, bed and breakfasts etc.*
- *Allow intensive agriculture on land zoned specifically for this purpose or in General Rural zones on merit where appropriate buffers are provided within the allotment to be developed for the intensive agricultural purposes;*
- *Remove provisions for Concessional Allotments;*
- *Rename 'minimum allotment sizes' as 'Lot Size for a Dwelling Entitlement' to make the intent of the development standard clearer;*
- *Maintain the existing 'Lot Size for a Dwelling Entitlement' development standard in General Rural zones in the LGAs unless good cause can be shown why the allotment size should be varied.*
- *Require that where a Council seeks to vary the 'Lot Size for a Dwelling Entitlement' development control in the General Rural zone, the proposed new allotment size shall be determined based on local circumstances and actual trends including the existing pattern of farming, existing pattern of holdings, current pressure for subdivision/dwellings, current pressure for change, reasons for change etc. and in consultation with the Department of Planning as the lead government agency with other government agencies inputting in an advisory capacity;*
- *Include SEPP 1 like clause that allows variation of the 'Lot Size for a Dwelling Entitlement' development control in exceptional circumstances where recommended by the Regional IHAP (refer below);*

- *Allow farm adjustment by boundary adjustment/land amalgamation etc (but with no additional dwelling entitlements);*
- *Preserve dwelling entitlements on existing allotments with separate title; and*
- *Require that new LEPs contain provisions that recognise the changing face of agriculture e.g. smaller farms, share farming, leasing, farms that are not necessarily contiguous and may be made up of a number of holdings many kilometres apart etc.*

(pp 18-19 *Review of Land Use Planning in the Central West*, Central West Rural Lands Inquiry, August 2007.)

Advice from the Department of Planning indicates that release of the Draft SEPP is imminent. At such time as details become available it will be necessary for the Draft Strategy's directions in respect of rural areas in Singleton to be reviewed.

9 ENVIRONMENTAL VALUES AND CONSTRAINTS

Many areas within Singleton have important environmental values and/or are subject to constraints which may limit development opportunities and need to be taken into account in planning. These areas should be identified in LEP provisions, and may require specific development control guidelines.

Key land use planning issues for Singleton relating to environmental values and constraints were identified in the Situation Analysis as follows:

- Natural hazards
- Land capability
- Catchment health
- Biodiversity and natural ecosystems
- Maintaining rural character and scale

These issues are presented below.

9.1 Natural hazards

Natural hazards are accepted as constraints to land use in order to limit damage to life and property. Within the rural areas of Singleton, these are primarily flooding and bushfires. Policy for natural hazards is primarily determined by NSW Government guidelines. A summary of available information and references is included in the Situation Analysis.

Various parts of Singleton are subject to flooding, but little information exists for areas other than for urban areas of Singleton, or the villages of Broke and Jerrys Plains.

Existing residential areas are relatively isolated from bushfire prone land, although significant areas of bushfire prone land in the LGA will impact upon the location of rural residential areas and other rural development.

Objectives – Natural hazards

- Ensure that natural hazards are considered when making development decisions, and that hazards are minimised wherever possible.
- Maintain current and accurate flooding and development data that guides land use planning decisions to limit damage to life and property.
- Identify land with potential for bush fire hazard and implement systems to minimise danger to life and property.

Policies – Natural hazards

- Adopt a consistent flood standard for Singleton, in accordance with floodplain management studies. Refer to Section 6.9.
- Recognise the need to appropriately consider bushfire, flooding and salinity as natural hazards in LEP provisions.

Strategic Actions – Natural hazards

Upgrade and maintain spatial information systems on natural hazards for planning overlay maps to be included in proposed LEP provisions:

- Include current bushfire mapping as an overlay.
- Include land with flooding limitations or requiring further investigation as an overlay.

9.2 Land capability

Regional scale rural land capability mapping exists for the whole LGA and provides information on limits to land use potential and management issues. This primarily focuses on soil erosion and slope stability.

Objectives – Land capability

- Ensure that future subdivision of land has regard to the capability of the land for future use, and that boundaries are located appropriately having regard to water catchments and capability considerations

Policies – Land capability

- Take into account land capability limitations in planning controls and development proposals (e.g. construction of roads and subdivision).

Strategic Actions – Land capability

- Upgrade and maintain spatial information systems on land capability for planning overlay maps to be included in proposed LEP provisions:
  - Identify rural land capability as an overlay.
  - Identify areas of environmental sensitivity through overlays, including attributes such as slope, vegetation, fauna, and identified 'at risk' communities and species habitat.
  - Map areas with identified salinity problems through an overlay.

9.3 Catchment health

Water supply catchments in rural areas provide essential urban water supplies and the maintaining of important agricultural activities.

Objectives – Catchment health

- To protect the quality and security of urban water supplies, by preventing incompatible land uses within water catchment areas.

Policies – Catchment health

- Development within urban water supply catchments is to maintain or improve water flow and quality.
- The priorities and provisions of the Hunter-Central Rivers Catchment Action Plan are to be taken into account in making decisions relating to future land use.

Strategic Actions – Catchment health

- Consider LEP provisions to restrict incompatible land uses, limit subdivision or impose development criteria to protect water supply.
- Map catchment boundaries in LEP and establish development criteria within catchments through LEP/DCP.
- Implement performance-based controls on environmental evaluation of all development within water supply catchments.
- Discourage further residential, industrial and/or rural residential development within water catchments.
- Ensure rural dwellings have a high standard of waste disposal.
- Link subdivision potential in rural areas to water availability and licensing under the Water Management Act 2000.

9.4 Biodiversity

Important areas for biodiversity which potentially may be impacted upon by further development and land use change are around Jerrys Plains and Branxton. Areas subject to coal mining and potentially suitable for residential expansion and rural residential development are likely to have biodiversity values which would be impacted upon by development. The strategy needs to take biodiversity values and the potential land use constraints into account.

Objectives – Biodiversity and natural ecosystems

- Maintain the ecological values of conservation reserves, and recognise their other economic benefits, including their role in supporting tourism.

- Zone conservation reserves appropriately in LEP.
- Minimise adverse impacts of development on land adjoining or affecting existing conservation reserves by establishing buffer areas and appropriate LEP provisions and development guidelines.
- Maintain or improve biodiversity values in Singleton. This includes protection and recovery of threatened species, communities and populations and their habitat, and endangered ecological communities.
- No net loss of native vegetation within the LGA.
- Consider opportunities to reverse the effect of Key Threatening Processes for threatened species, as identified under the *Threatened Species Conservation Act 1995* and the *Fisheries Management Act 1994*, when determining planning provisions and development proposals.

Policies – Biodiversity and natural ecosystems

- The value of biodiversity in Singleton will be recognised where decisions are made about land use.
- Areas of high biodiversity value will be protected in a network of reserves with buffers between them and incompatible land uses or activities.

Strategic Actions – Biodiversity and natural ecosystems

Proposed LEP provisions:

- Appropriate zoning of existing conservation reserves (E1 National Parks and Nature Reserves using Standard LEP provisions).
- Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are to be recognised in LEP provisions, including Ramsar wetlands, world heritage areas, migratory species, and Commonwealth-listed threatened species and threatened ecological communities. These matters should be identified on an LEP overlay map and be considered when determining zoning, permissible land uses in environmental protection zones, and buffer zone provisions.
- Consult with DECC as to whether any land should be reserved in the LEP for acquisition to be incorporated within existing reserves.
- Consult further with DECC in relation to suggested E2 and E3 zones. Investigate issues and management implications associated with recent mapping work and identified remnant areas of native vegetation.

- Include appropriate zoning for proposed conservation reserve at Branxton South, as provided for in the Lower Hunter Regional Strategy.

Additional actions:

- Seek updating of the *Synoptic Plan - Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley* prepared by Department of Primary Industries (Minerals) to take into account biodiversity values.
- Consider introducing or encouraging use of financial incentives to support appropriate management of areas buffering conservation reserves.
- Consider identifying important regional, sub-regional and local wildlife and habitat corridors and incorporating these within an LEP overlay map, with appropriate provisions and/or environment zonings with suitable permissible and prohibited uses.
- Where significant natural values exist on private land, the Council will encourage the voluntary adoption of conservation agreements, the establishment of Private Protected Areas under the Natural Heritage Trust National Reserve System, Nature Conservation Trust Agreements and/or management plans. Consideration may be given to zoning land E2 Environmental Conservation.
- Request Department of Planning, Department of Environment and Climate Change and the Department of Environment and Water Resources to undertake or fund regional scale surveying and mapping of high quality native vegetation areas and the distribution of endangered ecological communities, for the purpose of including this information as an overlay map forming part of the LEP.
- Ensure consideration and implementation of appropriate threatened species legislation during determination of development applications (*Threatened Species Conservation Act 1995*, *Fisheries Management Act 1994* and the *Environment Protection and Biodiversity Conservation Act 1999*). Guidelines for the application of these provisions could be included in DCP provisions.
- Consider the incorporation of provisions within Development Control Plans to address and consider impacts upon threatened species, environmental conservation zone areas, wildlife corridors and areas of high quality native vegetation when applying for development consent. DCP provisions could include provisions for minimum ecological survey standards, and define local biodiversity values and policy to determine local interpretation of *maintaining or improving* biodiversity values.

- Prepare a policy or DCP provisions to identify mechanisms to be used to protect lands of conservation value (e.g. planning agreements or land dedication).
- Prepare and implement a policy framework for council acquisition of land requiring management for conservation purposes.

9.5 Maintaining heritage, rural character and scale

The Singleton rural area contains many sites of heritage significance. There are also landscapes with scenic and cultural values, which provide important social and economic benefits. Part of the protection of rural character relates to environmental amenity, including maintaining air quality and a quiet acoustic environment. Some scenic conservation areas have been identified by the National Trust of Australia, and planning measures could be considered for protecting these.

The need to conserve Singleton rural area's built heritage is important for tourism and maintaining identity and cultural history. There is a significant number of heritage items identified in the area and these are currently identified in the local environmental plan.

Singleton Council's Heritage Advisory Committee has reviewed and updated the schedule of heritage items and heritage conservation areas listed in the existing local environmental plan.

The Aboriginal Heritage Management System is maintained by the NSW Department of Environment and Climate Change, and is subject to confidentiality policies to protect sites. It identifies 2,654 sites of Aboriginal significance in Singleton LGA, most of which are in rural areas. There is also potential for many more to be identified.

Objectives – Maintaining heritage, rural character and scale

- Singleton will be a place where the rural landscape is valued as an important vista to the open, treed character of its urban neighbourhoods.
- European heritage is identified, protected and valued.
- Agencies will be encouraged to identify and protect Aboriginal heritage.

Policies – Maintaining heritage, rural character and scale

- Heritage and landscape will be taken into account by implementing standard LEP provisions and DCP guidelines.
- Where there is lack of information on these issues, further investigation will be required prior to zoning amendments or development consent.

Strategic Actions – Maintaining heritage, rural character and scale

- Implement Standard LEP clauses.
- Identify conservation areas and heritage items with overlays. Overlay maps will provide a trigger for further investigations.
- Separately distinguish built heritage from sensitive environmental areas through overlays.
- Consider using Standard Instrument rural landscapes zone, and/or include a map of scenic areas as an LEP map overlay.

10 PLANNING ADMINISTRATION AND STRATEGY IMPLEMENTATION

10.1 Implementation

The Strategy will be implemented by the Council through its normal administrative and planning processes. The following strategic actions relate to planning administration and implementation:

- It is desirable to prepare an LEP with common provisions to implement the Land Use Strategy in a consistent and uniform manner across Singleton.
- Ensure future service demands are integrated with Council financial and infrastructure planning.
- A combined land monitor for Singleton to be developed by the Council, particularly for residential, rural residential and industrial land.
- Clarify CMA role in determination of development proposals (especially in relation to native vegetation clearing and water entitlements), consistent with Standard LEP provisions.

The Land Use Strategy provides a land use structure and policy framework for Singleton. It closely relates to a range of other formal and informal plans and documents, such as council management plans, LEPs in adjoining LGAs, catchment action plans, road and utility infrastructure planning, tourism development, state of the environment reporting programs, etc. Key plans and documents are shown in table 15.

Table 15: Strategy relationship with other plans and programs

Plan or program	Relationship to strategy	Comment
Council management plan	Identifies council visions and priorities, and administrative framework	Council management plan must complement the Land Use Strategy
Council 2030 Strategy	Sets long term administrative and social objectives for LGA	Complements the Singleton Land Use Strategy.
Local environmental plans	Key instrument for regulating land use and implementing Strategy	Development control plans may be made by the council to identify land use guidelines for matters not included in LEP provisions
Catchment action plans	CAPs identify investment priorities for catchment management authority funding, but	Relationship with LEP is not clear

Plan or program	Relationship to strategy	Comment
State of the environment report (SoE)	Enables monitoring of achievement of strategy objectives and environmental indicators	Information from the Situation Analysis may be included and updated in SoE

Implementing the Strategy requires the preparation of draft LEP provisions under the *Environmental Planning and Assessment Act 1979*. This provides the regulatory framework for land use, and where possible should not duplicate other approval processes (e.g. native vegetation clearing, water use, etc).

Strategy implementation also requires further strategic land use analysis of some issues and the preparation of land use guidelines through the preparation of development control plans (DCPs). DCPs are considered in the assessment of development proposals for which consent is required by a LEP. Table 16 shows the scope of future strategic work program priorities. It is anticipated that the program can be built upon with subsequent studies and information.

Table 16: Future strategic work program priorities

Issue	Proposed action
Preparation of development control plans	DCP provisions should be prepared for the following where required: • Infill residential subdivision, development and urban sustainability guidelines • Industrial development guidelines • Rural residential subdivision and development guidelines
Strategic biodiversity review of proposed development areas	Undertake further review of biodiversity information for the Sub-region and detailed assessment of issues relating to proposed development areas. Investigate opportunities for biodiversity certification of LEP and flora and development fauna survey requirements
Contributions plans	Update contributions plans based on the strategy and LEP provisions, and prepare guidelines for use of planning agreements within Singleton

10.2 Monitoring and Review

The Singleton Land Use Strategy outlines the key land use policies and directions for the LGA. It provides the planning context for the preparation of a Shire wide local environmental plan. The Strategy has a time frame of 25 years, to 2032, but also provides a broad planning framework for the long term future of the LGA to 50 years plus.

Singleton Council will monitor the implementation of the Strategy in its annual State of the Environment Report, prepared under the Local Government Act 1993. This monitoring and review of the Strategy will be closely undertaken with the Department of Planning and other relevant agencies. Importantly, also, the assumptions on housing demand, population growth, industrial land demand, and economic development affecting the LGA, generally, will be the subject of a major review undertaken jointly every 3 years by the Council and the Department of Planning. The major reviews will also be undertaken to update as necessary the Strategy's Objectives, Policies and Strategic Actions. The LEP and other documents, such as the DCP and Section 94 Plans, will then be appropriately amended. In this way, the Singleton Land Use Strategy will become a dynamic document, able to be refined and updated over time, but able to always maintain its fundamental strategic planning direction in guiding the future growth and change of the LGA.

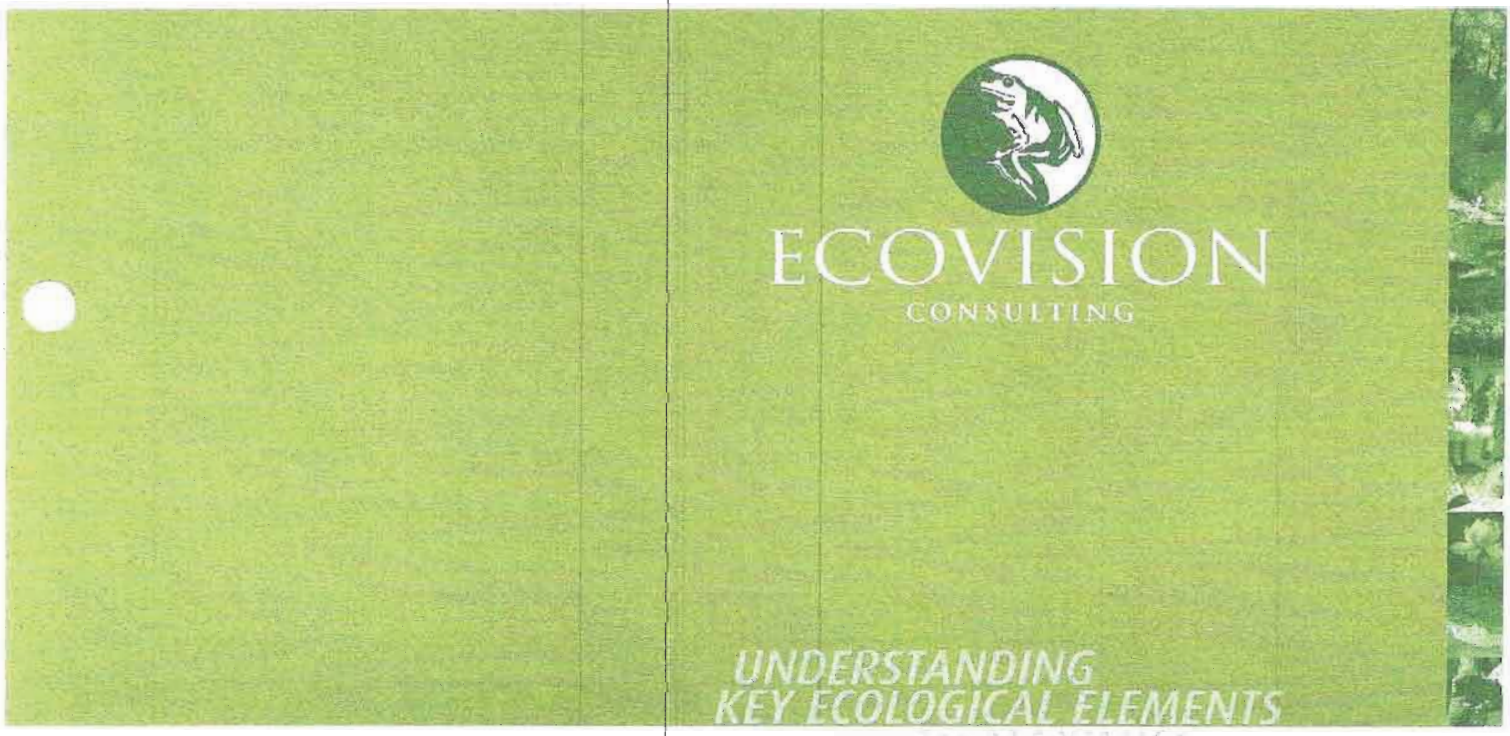
Attachment 2 – Ecological Assessment

Ecological Impact Study

Lot 12 DP 192526 Burbank Crescent, Singleton

Singleton Council Local Government Area

9 March 2007



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Ecological Impact Study

Lot 12 DP 192526 Burbank Crescent

Singleton

Singleton Council Local Government Area

9 March 2007

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DEFINITIONS

Terms used within this report are defined as follows:

DEC	Department of Environment and Conservation
Disturbed Vegetation	A mappable area containing a structurally and floristically unstable assemblage of plant species that is dominated by native and exotic flora species
EEC	An endangered ecological community within the meaning of the definitions contained within the *NSW Threatened Species Conservation Act 1995* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ES	Ecological Study
EP	An endangered population within the meaning of the definitions contained within the *NSW Threatened Species Conservation Act 1995* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
Intact	Refers to areas of native vegetation that are relatively continuous, relatively weed-free. contain natural habitat features, and which appear to function as a native ecological community. The term may be applied to areas of vegetation, which have been previously disturbed and/or cleared, but which have regenerated and recovered to the extent that natural functions have been restored, and the vegetation would be expected to progress unassisted towards a stable system.
CHVVMP	Central Hunter Valley Vegetation Mapping Project. Lands within the CHVVMP area include the local government areas of Singleton, Cessnock, Muswellbrook and Upper Hunter.
Native Vegetation	A mappable area containing a structurally and floristically stable assemblage of plant species dominated by native flora species.
Region	Sydney Basin Bioregion, which extends south from Port Stephens to Jervis Bay, with the westerly boundary approximately defined by a line from Ulan to Jervis Bay.
Study area OR Locality	Land contained within a 10 km radius of the subject site, which has been used to analyse database and vegetation mapping. Results used as a basis for comparison with the subject sites ecological values to evaluate the extent of project impacts.
Site	Land being the subject of this Ecological Impact Study, which is marked with a blue outline on each figure.
Subject species	Flora and fauna species identified in Chapter 8.2 of this report that is either known to occur within the subject site or potential habitat will be impacted by the proposed development.
Threatened species	Species listed as endangered or vulnerable within the meaning of the *NSW Threatened Species Conservation Act 1995* or the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*.

EXECUTIVE SUMMARY

A field survey designed to sample the ecological values of Lot 12 DP 192526 Burbank Crescent, Singleton (the site) was completed to examine the likely impacts of future development on the contained native flora and fauna species, specifically threatened species, endangered populations (EPs), endangered ecological communities (EECs) and their habitats (collectively referred to as *threatened biodiversity*). Threatened biodiversity listings considered include those listed on the *Threatened Species Conservation Act 1995* (TSC Act), *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and State Environment Planning Policy – Koala Habitat (SEPP 44).

Methods

This study was prepared using results from field surveys based on the Department of Environment and Conservation's (DECs) draft flora and fauna survey guidelines (DEC, 2005). Data collected during field surveys was used to quantify the sites ecological values against those within 10 km of the subject site (i.e. study area). Hence allowing for an assessment of impact for threatened biodiversity.

Surveys were conducted on 25, 30 and 31 January 2007 targeting threatened species likely to occur within the locality, a list determined by a 10 km radial search of DECs Wildlife Atlas database (DEC, 2007) and review of recent literature. Flora surveys involved systematic (i.e. quadrat) and non-systematic (targeted) techniques to sample the subject sites floristic species richness and diversity. Fauna surveys involved diurnal and nocturnal sampling regimes including targeted surveys of important habitats.

Results

The survey of the subject sites floristic values identified 72 plant species, consisting of 39 natives and 33 exotics, throughout a predominantly cleared landscape consisting mostly of cosmopolitan grasses and herbs common to the Singleton locality. This vegetation cover occurs mostly as a grassland, with a shrubby and sparsely treed over storey prominent along the sites main drainage channel and river frontage. One threatened flora species or its habitats has been identified within study area, this being the Slaty Redgum (*Eucalyptus glaucina*), which was not identified within the site during the survey period (DEC, 2006). Site surveys identified the presence of River Redgum (*Eucalyptus camaldulensis*) along the property boundary common with the Hunter River, which is part of a listed Endangered Population (EP) contained within the Hunter River catchment.

The fauna survey identified 53 species comprising of 33 avian, 13 mammal, 3 reptile and 4 amphibian species. There were eight threatened fauna species and/or their habitats identified within the study area (DEC, 2007), with at least three of these species potentially occurring within the subject site. Habitat of potential threatened fauna is primarily suited to mobile fauna capable of moving to and from the site as foraging population throughout the predominantly grassland vegetation cover and sparse shrubby and treed riparian corridors. Species that may occur within the site include threatened bats such as the Grey-headed Flying Fox, Eastern Bentwing Bat and Eastern Freetail Bat, with the former species observed foraging on Peppercorn fruits during the survey period. The Greater Broad-nosed Bat (*Scoteanax ruppellii*), which has not been previously recorded within the study area, was also identified within the site thereby representing a new record for the Singleton area.

Biodiversity Analysis

The sites ecological value was classified using key indicators of ecological health such as native/exotic species richness, tree hollow type and density and vegetation structural condition. In general, the subject sites ecological value was classified as follows:

> *Grassland – Low ecological condition (i.e. mostly cosmopolitan grasses and herbs consisting of natives and exotics. Contains some complex habitat features including a low abundance of tree hollows in large trees adjacent to the Hunter River. Moderate potential for foraging threatened bat species, with onsite roosting and breeding limited by low connectivity with local tracts of native vegetation).*

Nine threatened biodiversity were identified within 10km of the site (DEC, 2006). While none of the sites habitats suit any of the identified locally occurring threatened flora species, the identification of River Redgum (*Eucalyptus camaldulensis*) through site survey delineated a narrow corridor along the sites frontage with the Hunter River that contains part of this EP. Observed fauna habitat features indicate a low likelihood of threatened fauna species completing entire lifecycles within the site. However, species such as the Grey-headed Flying Fox, Eastern Bentwing Bat and Eastern Free-tailed Bat are known to occur as foraging populations within local habitats similar to the site. For the purposes of this study it is assumed that these threatened fauna species will occupy the site during various parts of their life cycles.

Impact Study

The future development of the site in accordance with an adopted rezoning strategy will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EPA Act), which requires an impact assessment under Section 5A of that Act. However, prior to the Part 4 assessment, the rezoning strategy must first be considered under Part 3 of the EP&A Act to ensure compatibility with the local environment. No formal assessment process exists under Part 3 of the EP&A Act such as Section 5A assessments. Therefore, any assessments provided for the proposed rezoning strategy are considered indicative based on the general development proposal and its likely interaction with the surrounding environment.

The future development of the site is likely to consist of a residential subdivision and ongoing agricultural activities. The establishment of residential lots and dwellings will require the consideration of numerous environmental variables such as direct impacts on biodiversity matters and any indirect impacts such as bush fire protection works. Contained within this study is an 'indicative' impact assessment based on Section 5A of the EP&A Act.

EPA Act

An indicative impact assessment was prepared in accordance with Section 5A of the EP&A Act 1979, which is otherwise referred to as the Seven Part Test of Significance. The proposed rezoning strategy was concluded to have no likely significant impact on threatened species, EPs, EECs or their habitats.

TSC Act

The future development of the site is unlikely to have a significant impact on locally occurring threatened biodiversity. Further assessment of the proposed site development in accordance with the proposed rezoning strategy is unlikely to require the preparation of a Species Impact Statement.

EPBC Act

It is considered that a referral to Environment Australia (EA) is not required, as the rezoning strategy contains sufficient safeguards that demonstrate a low impact on matters of National Environmental Significance (NES) listed under the EPBC Act.

SEPP 44 – Koala Habitat Protection

SEPP 44 applies to the Singleton Council local government area (LGA) and is therefore relevant to the subject site. Surveys identified the tree canopy to constitute 'potential' koala habitat (i.e. preferred foraging species greater than 15% total cover). No evidence of koalas or koala activity was detected within the subject site during the survey period. No further management is required for this species under SEPP 44.

Conclusions

An indicative Section 5A Assessment was prepared to analyse the likely impacts of future development within the site in accordance the proposed rezoning strategy. This indicative impact assessment considered the magnitude of future impact such as vegetation removal, hydrological alterations and revegetation works relative to the existing environment within and adjoining the site and concluded that future development will have a negligible impact.

It is considered that proposed site development represents a responsible future land use that is in keeping with the principles of ecologically sustainable development. Development at this site will

reduce the impact of developing ecologically constrained lands elsewhere within the locality, with proposed revegetation works potentially delivering a significant local improvement to sensitive landscapes such as the banks of the Hunter River and adjoining feeder creeks. No significant impacts are expected on core Koala habitat or matters of NES, as listed under the EPBC Act.

1.0 INTRODUCTION

This Ecological Impact Assessment (EIA) was prepared for Lot 12 DP 192526 Burbank Crescent, Singleton (the subject site) to assess the proposed development. The general location of the site is illustrated in **Figure 1**. An understanding of the project, subject site description and assessment tasks associated with the provision of this assessment is provided in the following sections.

1.1 Understanding of the Project

1.1.1 Background

The proposed rezoning is a Part 3 consideration under the *Environmental Planning and Assessment Act 1979* (EP&A Act 1979), which will require a demonstration of land use suitability prior to acceptance as a new land use zone. The proposed rezoning strategy is to focus on the introduction of residential land uses into an area that has been subject to land clearing events and ongoing agricultural practices. The proposed rezoning strategy aims to maximise sustainable development outcomes within this disturbed area by adjusting adjoining residential zone boundaries to increase residential development within areas suited to this activity, whilst maintaining core agriculturally productive lands within their current zone.

1.1.2 The Proposal

The proposed rezoning strategy seeks the establishment of a residential zone within Lot 12 DP 192526 for areas that currently adjoin existing residential precincts. Proposed zone boundaries have been configured to maximise the potential extent of residential development, whilst minimising the potential impact on agriculturally productive lands, which are to be retained in a suitable rural zoning. **Figure 2** shows the boundaries of the site relative to proposed zone boundaries and local land cover types.

1.2 Site Description

The subject site is located approximately 1 km from the geographical centre of Singleton in Singleton Council local government area. The developable portion of the site identified for residential use is located on an elevated plateau located between the developed North Singleton residential area and the adjoining Hunter River floodplain, which coincidently forms the remainder of the site. The site is approximately 18 ha in area, which is mostly covered by grassland vegetation.

1.3 Legislative Framework

The legislative framework considered in this ES includes Section 5A of the EP&A Act 1979, various threatened biodiversity listings under the *Threatened Species Conservation Act, 1995* (TSC Act 1995) and *Environment Protection and Biodiversity Act 1999* (EPBC Act 1999).

As the proposed rezoning strategy is not a Part 4 development under the EP&A Act 1979, Section 5A of that Act is not required to determine the degree of impact of future development on the site. However, an assessment using Section 5A of the EP&An Act 1979 is presented within this ES to provide an 'indicative' impact assessment, hence the likely suitability of proposed land use zones.

1.4 Project Tasks

The principal tasks undertaken as part of the EIA were:

- Identify the flora and fauna communities present within the subject site;
- Complete targeted surveys and habitat assessments for threatened species, endangered populations (EPs) and endangered ecological communities (EECs) of the locality;

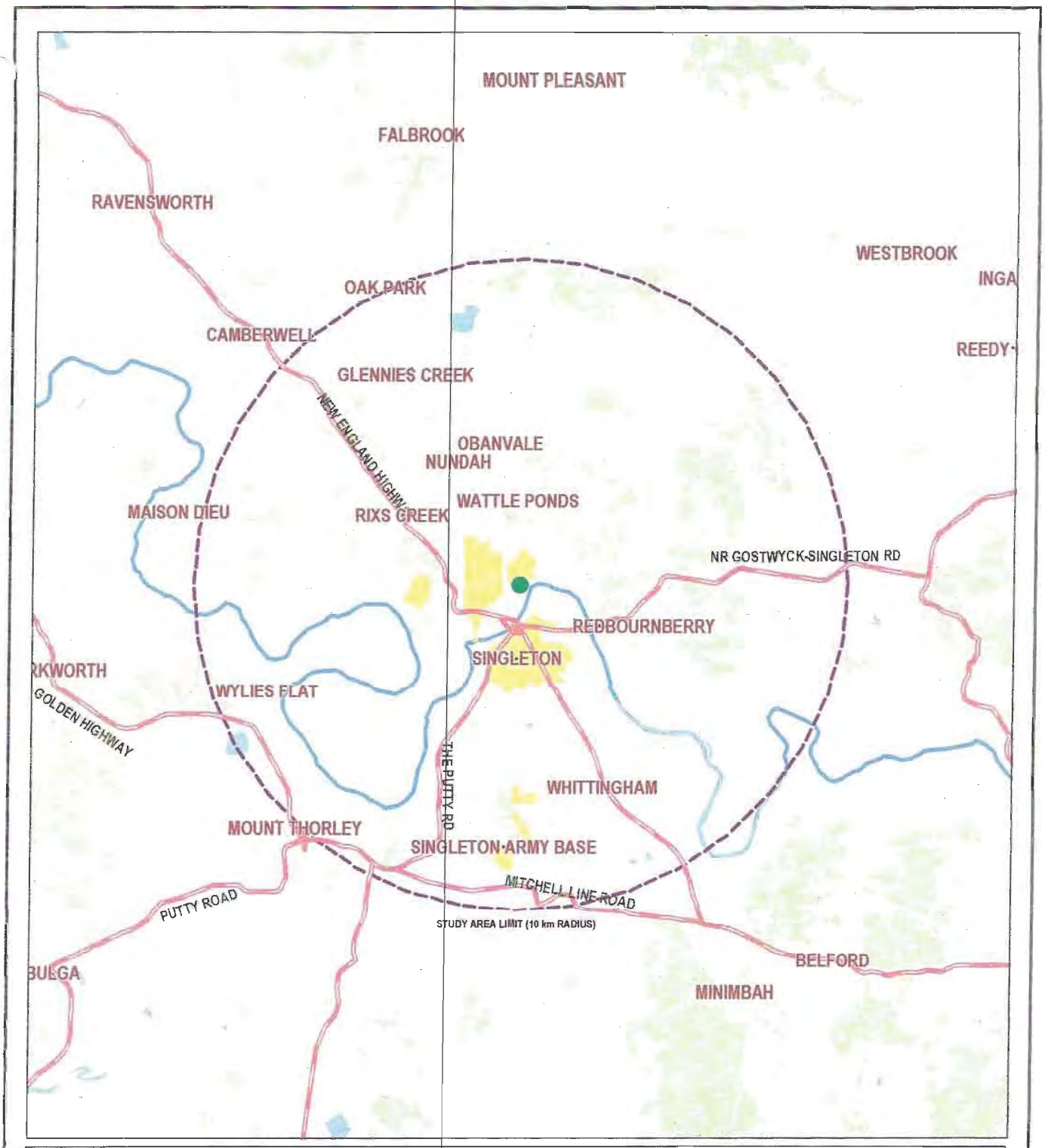

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Figure 1 Location of the Site and Study Area

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: GeoScience Australia (2006)
"Singleton 1: 250 K Topographical Map"

Scale (Approx.)
1: 150,000
Printed at A4

Map References
Date: 6/3/2007
Drafted By: Mark Aitkens
Reference: E:\Projects ... \F1116_Fig1

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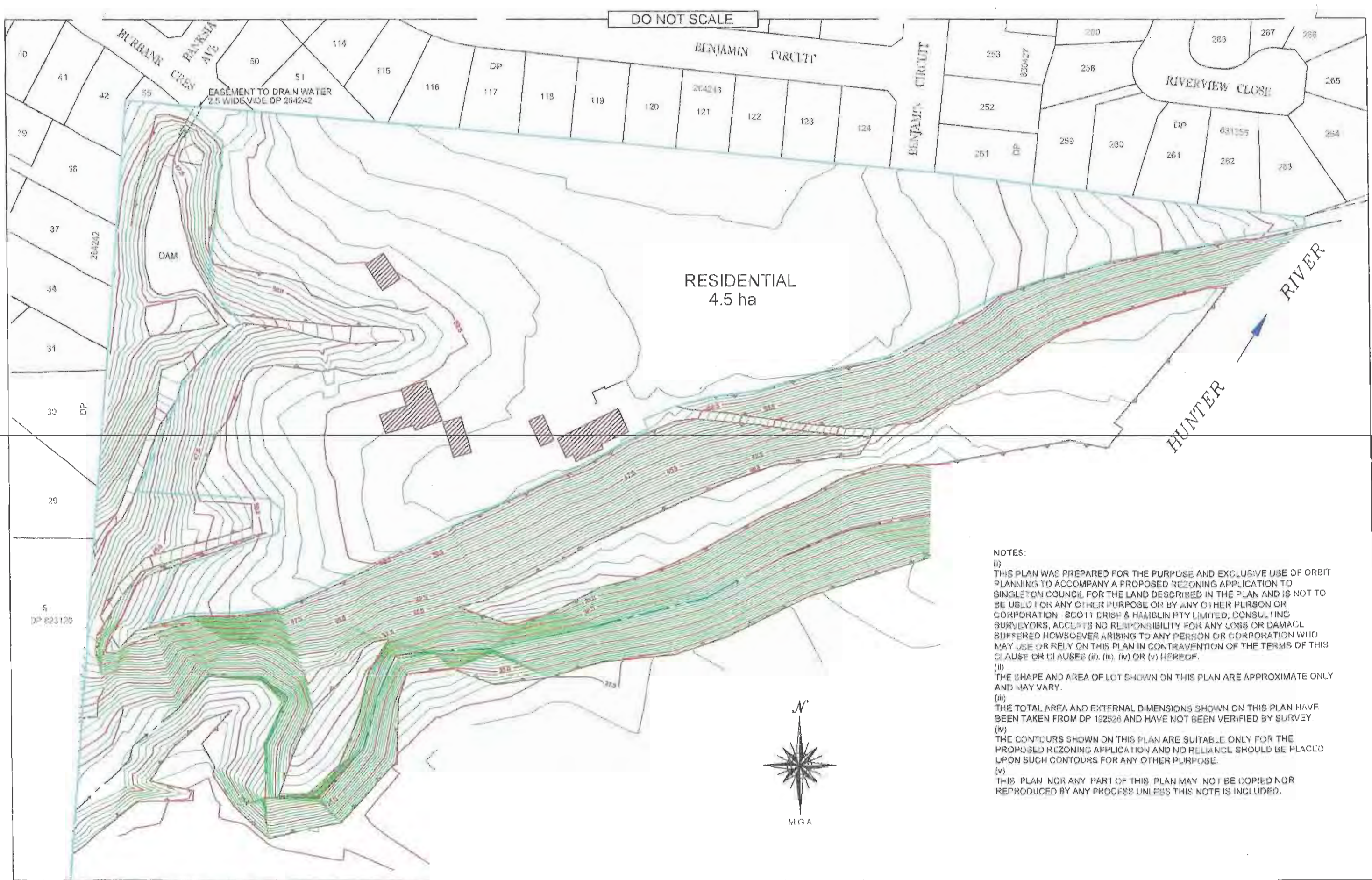

NOTES:

(i)
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(ii)
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(iii)
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(iv)
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REVISIONS	No.	DATE	APPR.

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RR: 1:1000 (AT A2 SIZE)	CLIENT: ORBIT PLANNING
HEIGHT DATUM: AHD	JOB: LOT 12 DP 192526 BURBANK CRESCENT, SINGLETON
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SURVEYED: GEH	THIS DRAWING: PROPOSED RESIDENTIAL ZONE
DRAWN: SLH	
CHECKED: GEH	

REFERENCE/DRAWING No 065459\CDS\PLOT4_009A.DWG

DATE: 28 FEB 2007

SHEET No 1 OF 1 SHEETS

- Validate the ecological values of the subject site;
- Consider the implications of proposed land use changes on the sites ecological values, including any bush fire hazard management and revegetation strategies;
- Consider and recommend improvement works, where necessary;
- Prepare an 'indicative' impact assessment in accordance with Section 5A of the EP&A Act 1979 for the proposed rezoning strategy; and
- Review the impact of the development against NES matters listed on the EPBC Act 1999.

1.5 Report Structure

The EIA has been structured in accordance with the following table:

Table 1: Report Structure

Section	Component	Content
2	Applicable Legislation	Relevant legislation
3	Survey Methodology	Details survey approach
4	Local Environment	Broad discussion of local environment and relevant threats
5	Survey Results	Detailed discussion of subject sites ecological character
6	Data Interpretation	A review of the sites biodiversity values against regional vegetation mapping and wildlife records.
7	Ecological Significance	Discussion of threatened species, EPs, EECs and subject sites significance
8	Development Impacts	A review of the development and its impacts including bush fire matters
9	Proposed Mitigation	Identifies extent of mitigation works to compensate for the developments impacts
10	Impact Assessment	Reviews the developments impact against relevant legislation and the proposed mitigation package
11	Conclusions	Summary
12	References	Resources used to prepare EIA

1.6 Limitations

This ES has classified the biological character of the site through literature reviews, database searches, field survey and data interpretation. Reliance has been placed on the accuracy contained within the regional data (i.e. DEC Wildlife Atlas database and Central Hunter vegetation mapping), with efforts to minimise the influence of erroneous data considered during data interpretation. Field surveys have been designed to maximise data capture of locally occurring threatened species and their habitats that are relevant to the project.

The field survey and assessment components of this investigation have been undertaken in a manner that reflects the overall impacts of the proposed development in the context of the locality. Modifications to field survey design have been introduced, where necessary, to reflect the nature of the development impacts on the receiving environment. For instance, nocturnal surveys may be reduced or eliminated from the survey design should specific site and local habitat features combined with the developments impacts indicate a high likelihood for a negligible impact on threatened nocturnal fauna species.

2.0 APPLICABLE LEGISLATION AND GUIDELINES

This section provides an overview of relevant State and Commonwealth legislation and guidelines concerning the assessment of flora and fauna matters.

2.1 State Legislative Framework

Development in NSW is subject to various planning instruments that regulate the use of lands containing vegetation and threatened species. The following are relevant to the development.

2.1.1 Environmental Planning and Assessment Act, 1979

Under the EP&A Act where development is on land that is, or is part of, critical habitat, or where development or an activity is likely to significantly affect threatened species, EPs or EECs and their habitats, the application for development consent or for approval to carry out the activity must be accompanied by a species impact statement (SIS). This document is to be prepared in accordance with the requirements of the *Threatened Species Conservation Act 1995* (TSC Act).

Section 5A of the EP&A Act sets out the matters that must be taken into account in deciding whether there is likely to be a significant effect on threatened species, EPs, EECs and their habitats. This assessment is often referred to as the "Seven Part Test of Significance". The Seven Part Test of Significance takes into account the biological issues in isolation of social and economic outcomes. A SIS integrates the social and economic significance of the development or activity into the assessment process.

2.1.2 Threatened Species Conservation Act, 1995

In addition to prescribing the requirements for preparation of a SIS, the TSC Act contains schedules listing endangered species, EPs and EECs, as well as vulnerable species and key threatening processes. It also provides for the keeping of a register of critical habitat, the granting of licences authorising actions leading to the harm of any threatened species, EP or EEC, the picking of any plant that is or is part of any threatened species, EP or EEC or damage to critical habitat or habitat of a threatened species, EP or EEC.

2.1.3 State Environmental Planning Policy No. 44 – Koala Habitat Protection

This State Environmental Planning Policy (SEPP) encourages the conservation and management of koala habitats in certain local government areas. This policy applies to lands located within Singleton Council LGA.

2.2 Commonwealth Legislative Framework

2.2.1 Environment Protection and Biodiversity Conservation Act, 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prohibits actions that are likely to have a significant impact on matters of national environmental significance (NES matters) without certain procedures first being followed. Matters of National Environmental Significance protected by the EPBC Act include, but are not restricted to:

- Declared World Heritage properties;
- Ramsar wetlands;
- Listed threatened species and communities;
- Listed migratory species;
- Nuclear actions; and
- Actions in a Commonwealth marine area.

It is an offence to carry out an action that will or is likely to have a significant impact on NES matters without first obtaining an approval from the Commonwealth Environment Minister except where an exemption in the EPBC Act applies. A person who is proposing to carry out an action that may have a significant impact on one of the above NES matters (and which is not the subject of an exception) is required to refer the proposed action to the Commonwealth Environment Minister. The Minister will determine as to whether the project is a "controlled action" (i.e. an action that requires the approval of, or the environmental assessment nominated by, the Environment Minister).

2.3 Survey Guidelines

Survey design was structured around industry standards for that time, this being the Working Draft Guidelines *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities*' (DEC 2004). As it is a guideline, various modifications were applied to the survey protocols to provide a satisfactory level of investigation for the site given the likely impacts.

2.4 Relevant Matters

This ES will consider the likely impact of the proposed rezoning strategy at a landscape level under Part 3 of the EP&A Act 1979. This will involve the preparation of an 'indicative' impact assessment under Section 5A of the EP&A Act 1979 where it will consider the loss of native vegetation cover and fauna habitats, changes in hydrological regimes, proposed revegetation works and the extent of the retained ecological values such as tree hollows within the site.

Field surveys will be designed to reflect the likely impact extent, with the focus of most field studies being on lands suitable for residential development. Residual lands already used for intensive agricultural production (i.e. cropping areas) have been excluded from the ES as no change in land use is proposed. However, the boundary delineating between proposed residential and rural land uses will be studied to ensure impacts within this area are well understood for assessment.

This impact study has been prepared under Part 3 of the EP&A Act 1979 using Section 5A of that Act to provide an 'indicative' impact assessment. Requirements for environment assessment under Part 4 of the EP&A Act will be further discussed but not presented in this report. Matters of NES listed on the EPBC Act 1999 are also discussed.

3.0 SURVEY METHODOLOGY

3.1 Desktop Analysis

3.1.1 Database Searches

A 10 km radial search of DECs Wildlife Atlas database from the site was completed to identify the threatened biodiversity of the study area (DEC, 2007). The results summary of this search is provided in **Appendix 1** together with a 10 km point search of the EPBC Act 1999 online 'Protected Matters Search Tool' (i.e. EPBC Act Protected Matters Report). These searches have been used to determine the 'Potential Subject Species' for this assessment.

3.1.2 Literature Review

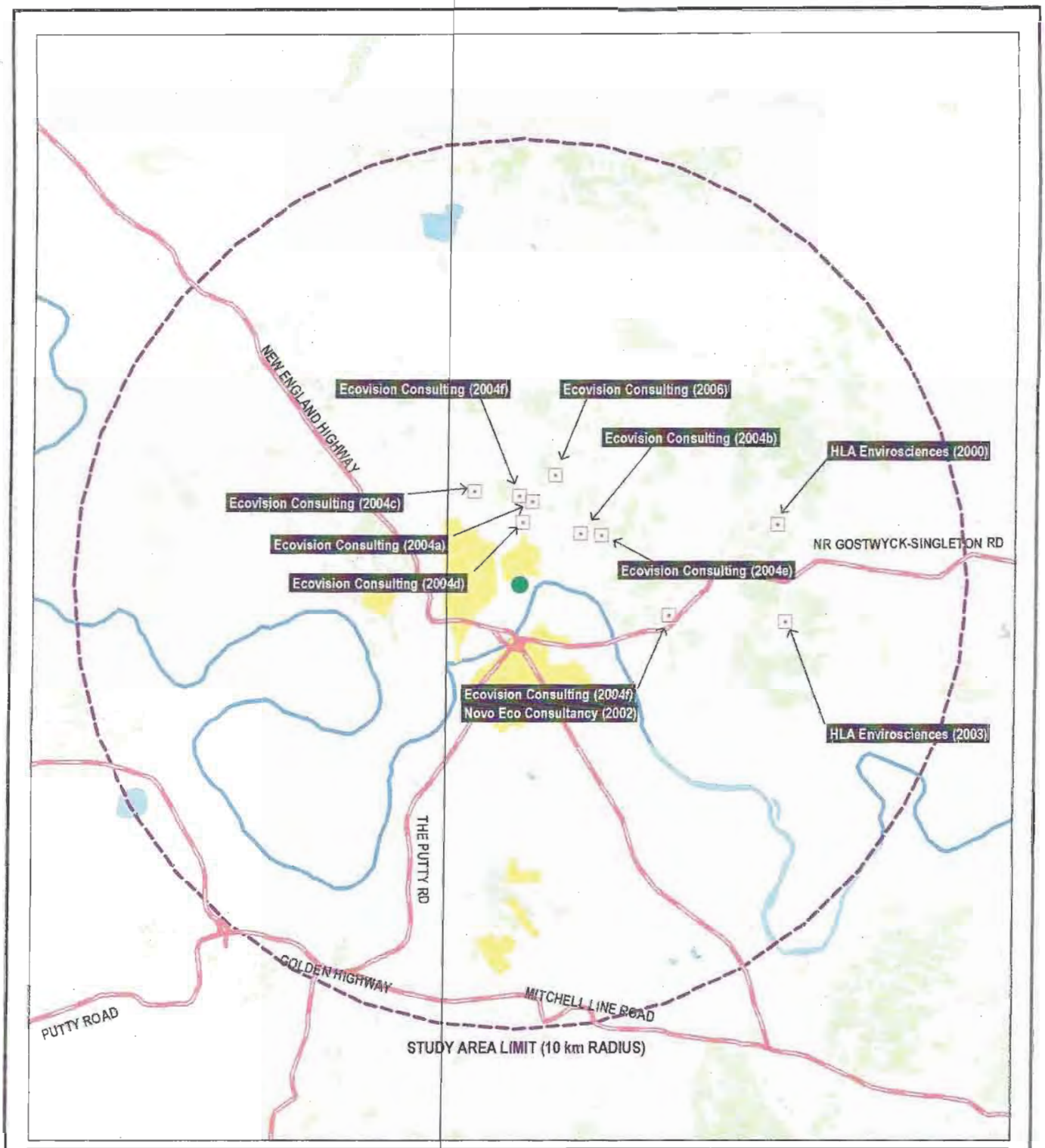
A review of recent flora and fauna reports of the locality was completed to assist the overview and description of the subject sites biological values. Sources reviewed were:

- HLA (2000). Flora and Fauna Report. Proposed Rezoning of Land at Ironbark Lane, Sedgefield;
- Novo Eco Consultancy / Banksia Environmental Consultancy (2002) Flora & Fauna Assessment – Proposed Extension to Singleton Landfill;
- HLA (2003). Ecological Investigations for Lot 209 DP 877391 and Part Lots 204 and 208, DP 839648 Big Ridge Lane, Sedgefield;
- Ecovision Consulting (2004a). Flora and Fauna Impact Assessment / Bush Fire Protection Assessment for the Proposed Retreat 10 Subdivision Wattle Ponds Road, Singleton;
- Ecovision Consulting (2004b). Flora and Fauna Impact Assessment / Bush Fire Protection Assessment for the Rezoning of Lands at Pioneer Road, Singleton;
- Ecovision Consulting (2004c). Flora and Fauna Impact Assessment / Bush Fire Protection Assessment. The Pinnacle Estate Bridgman Road, Singleton;
- Ecovision Consulting (2004d). Ecological and Bush Fire Issues for the Proposed Rezoning of Land at Bridgman Ridge, Singleton;
- Ecovision Consulting (2004e). Biodiversity Survey – Lot 122 DP 819682 Pioneer Road, Singleton;
- Ecovision Consulting (2004f). Biodiversity Survey Lot 1862 and Lot 1865 DP 850166, Lot 22 DP 739469 Gresford Road, Fern Gully;
- Ecovision Consulting (2006). Detailed Ecological Study of Lands identified north of Retreat 10 Wattle Ponds Road, Wattle Ponds; and
- Hunter-Central Rivers Catchment Management Authority (2006). *Vegetation of the Central Hunter Valley, New South Wales*.

The general location of these studies, relative to the study area, is illustrated in **Figure 3**.

3.2 Field Survey

The subject site was investigated on 25, 30 and 31 January 2007 by Mark Aitkens (NPWS Licence Number S10015) to identify the subject sites ecological values with a particular focus on the identification of threatened biodiversity and their habitats. The outer line shown in Figure 2, which represents the limits of field investigations, defines the boundaries of the subject site. The field inspection was conducted using relevant methods specified in DECs *Threatened*



Legend

- The Site
- Main Roads
- Hunter River
- Local Ecological Studies
- Native Vegetation Cover
- Cleared Lands
- Water Bodies

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Figure 3 Location of the Local Studies

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: GeoScience Australia (2006)
"Singleton 1: 250 K Topographical Map"

Scale (Approx.)
1: 150,000
Printed at A4

Map References
Date: 6/3/2007
Drafted By: Mark Aitkens
Reference: E:\Projects ... \FY1716_Fig3

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Species Survey Guidelines (DEC 2005b), as modified by the extent of developments impact on local ecological elements. The details of the survey extent are as follows.

3.2.1 Flora Survey Methods

Detailed systematic flora surveys were restricted to the lands enclosed within the subject sites boundaries. Flora surveys were completed using 4 quadrat sample sites, with each quadrat sampling 400 m^2 (20 m X 20 m). Biodiversity searches of ecotones and disturbed boundaries were also completed throughout the remaining parts of the subject site to compliment the quadrat sampling methods. Survey locations were randomly selected within representative vegetation types defined through a review of recent aerial photography of the subject site. **Figure 4** identifies the flora survey locations.

3.2.2 Fauna Survey Methods

Systematic targeted sampling techniques were employed during the diurnal survey period such as visual/audible observations (timed quadrats), scat/physical searches and habitat investigations. Spotlighting and microchiropteran bat recordings were incorporated into the survey design to satisfy nocturnal survey. Call playback and Elliott trapping methods were not undertaken for the following reasons:

- The site is currently isolated from wildlife corridors;
- Local native vegetation cover has limited areal extent and is highly fragmented;
- High edge impacts on local native vegetation cover, thereby having a high influence on the types of fauna occupation within the area; and
- The development has been designed to retain the representative tree canopy cover and contained arboreal habitats (i.e. tree hollows).

The diurnal surveys were completed simultaneously with the flora survey as shown in **Figure 5**.

Legend

- Transect
- 20 X 20 m Quadrat
- Site Boundary

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Figure 4 Flora Survey Locations

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: Dept. Lands (2003)
"Singleton Orthorectified Aerial Photography"

Scale (Approx.)
1: 4,000
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Map References
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Reference: E:\Projects ... \F1116_Fig4

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Legend

- Anabat II (Stationary Site)
- Timed Quadrat (20 minutes)
- Spotlighting Transect
- Site Boundary

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Figure 5 Fauna Survey Locations

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: Dept. Lands (2003)
"Singleton Orthorectified Aerial Photography"

Scale (Approx.)
1: 4,000
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Map References
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4.0 LOCAL ENVIRONMENT

4.1 Physical Characteristics

Table 2 describes the physical characteristics of the subject site.

Table 2: Physical Attributes of the Study Area

Attribute	Comment
Landform	Ridgetop plateau; slopes; open drainage lines; alluvial flats.
Slope	The northern third of site is characterised by a relatively flat plateau, which adjoins a steep slope (>18^0) to an open drainage line. The drainage lines forms the northern boundary to an extensive alluvial flat located throughout the central and southern parts of the site.
Aspect	Predominantly south facing slopes.
Catchment	The site drains east into the Hunter River via overland flow into an unnamed open drainage line.
General Habitat	Gravelly conglomerate derived soils characterize the sites steep slopes and ridgetop plateau. Deep alluvial solid characterize the alluvial flat and open drainage line of the site.
Vegetation Cover	Grassland characterises the vegetation cover of the site. Isolated trees and shrubs occur along the unnamed drainage line and river frontage.

4.2 Biological Characteristics

Scattered woodland remnants exist throughout the predominantly cleared rolling hills of the Singleton locality, derived principally from prior land clearing events, agricultural land uses and recent subdivision activity. The floristics of the locality varies with topography and soils, with the majority of ridgetop vegetation characterised by Grey Box (*Eucalyptus moluccana*), Narrow-leaved Ironbark (*Eucalyptus crebra*) and Spotted Gum (*Corymbia maculata*), with Broad-leaved Ironbark (*E. fibrosa*), Spotted Gum (*Corymbia maculata*) and Forest Redgum (*E. tereticornis*) atypical of sloping ground and creeklines. The structural and floristic characteristics of the understorey consist of well developed sclerophyllous shrub stratum with a diverse grass and herb groundcover layer. Riverside environments have been heavily modified by changes in land use, availability of nutrients, sedimentation and river flows.

Fauna habitats for nectivorous birds and mammals are complex due to the abundance of summer, autumn and winter flowering species. However, past agricultural activities have substantially reduced the location and abundance of trees with hollows, with the majority of hollow bearing trees restricted to steep creek banks and gullies. These woodlands, prior to pre-European disturbance, would have substantially contributed to breeding and foraging habitats for many of the now declining woodland bird species. Many of these declining species, such as the Regent Honeyeater, are now listed as threatened due to widespread clearing for agriculture. Local residential development has seen the creation of fauna habitats favouring a variety of exotic bird species together with habitats for common native species capable of occupying ecologically simplified environments.

4.2.1 Flora

Vegetation Communities

Based on regional vegetation mapping for the central Hunter Valley, it is considered that the diversity of native vegetation communities within the Singleton locality is mostly limited to open forest and floodplain vegetation types (CMA; 2006). Vegetation communities occurring within the study area are identified in **Table 3**, with none of these having mapped occurrences within the site.

Table 3: Vegetation Communities of the Study Area (CMA, 2006)

Map Unit	Vegetation Community	Area (ha)
10	Central Hunter Box - Ironbark Woodland	297.68
13	Hunter Floodplain Red Gum Woodland Complex	8.35
14	Warkworth Sands Woodland	112.60
27	Central Hunter Ironbark - Spotted Gum - Grey Box Forest	3989.55
28	Central Hunter Swamp Oak Forest	332.93
30	Hunter Valley River Oak Forest	66.70
32	Central Hunter Bulloak Forest Regeneration	93.77
36	Planted areas	0.59

The Central Hunter Ironbark - Spotted Gum - Grey Box Forest is the most prolific vegetation type within the locality and is widespread throughout the central Hunter River catchment from Singleton to Greta, where they form mostly small and medium sized remnants amidst rural and rural-residential developments and small townships. Central Hunter Box - Ironbark Woodland occurs mostly west of Singleton and is equally prolific.

The Hunter Floodplain Red Gum Woodland Complex, Central Hunter Swamp Oak Forest and Hunter Valley River Oak Forest are all riparian centric vegetation communities that occupy the flanks of drainage lines such as the Hunter River and those within the site. Warkworth Sands Woodland is located on deep sand deposits located on alluvial terraces that adjoin the Wollombi Brook located southwest of the site.

Floristic Diversity

Approximately 140 flora species of mostly native origin have been identified during studies conducted by HLA in the Sedgefield locality (HLA, 2000; HLA, 2003). One species classified as threatened (*Dillwynia tenuifolia*) was erroneously identified during these studies. This record has been deleted from the NPWS Wildlife Atlas Database (*pers. com.* Neil McElhinney, 2004).

The flora of the 'Hunter Green' rezoning area (Ecovision Consulting, 2004b) identified 156 species, consisting of 112 natives and 44 exotics, in four flora assemblages. No threatened flora species were observed in that study area. However, two locally significant species were observed during that survey period, these being Wild Sorghum (*Sarga leiocladum*) and *Cyperus vaginatus*.

A survey of lands west of the study area, in an area referred to as 'The Pinnacle Estate', identified no threatened flora species to occur within that area (Ecovision Consulting, 2004c). However, a tract of Hunter Lowland Redgum Forest EEC was identified along the main riparian corridor in the eastern parts of that study area. The subdivision design for the Pinnacle Estate proposes to exclude the majority of this EEC from the development footprint. Hunter Lowland Redgum Forest EEC was also observed during the survey of the proposed Retreat 10 subdivision area along with the locally uncommon *Bossiaea prostrata* and *Chorizema parviflorum* (Ecovision Consulting, 2004a).

Lot 122 DP 819682, which is located to the east of 'Hunter Green', provides habitat for at least 113 flora species, consisting of 97 natives and 16 exotics, in five vegetation assemblages (Ecovision Consulting, 2004e). No threatened flora species were identified within this area. However, Hunter Lowland Redgum Forest EEC and three locally uncommon species, these being Wild Sorghum (*S. leiocladum*), *B. prostrata* and *C. parviflorum* were recorded.

Two previously unsurveyed vegetation associations of the locality were identified within Lot 122 DP 819682, these being Open Dry Low Shrubland and Narrow-leaved Ironbark – White Cypress Pine Open Forest. While the former community is representative of previous land clearing disturbances, it is regarded that the Narrow-leaved Ironbark – White Cypress Pine Open Forest is a natural community that sporadically occurs throughout the Singleton district. This flora

community is similar in structure and floristics to drier inland vegetation communities such as those found on the western slopes of the Great Dividing Range and the Goulburn River catchment.

Novo Eco Consultancy / Banksia Environmental Consultancy (2002) studied lands adjacent to the Singleton waste management facility as part of the impact assessment for the Singleton landfill extension project. This study identified five flora assemblages of varying condition. No threatened species or species of regional significance were identified during the study of those lands.

An ecological survey of lands north of the proposed Retreat 10 subdivision identified 139 flora species, consisting of 112 natives and 27 exotics, in three vegetation associations these being Spotted Gum – Broad-leaved Ironbark, Grey Box – Spotted Gum – Narrow-leaved Ironbark and Forest Redgum (Ecovision Consulting, 2006). These vegetation associations occur throughout the Singleton locality in varying levels of structural and floristic condition (i.e. grasslands, shrublands, woodlands, forests). The treeless expanse that adjoins the naturally vegetated landscape is dominated mostly by common disturbance favouring native shrubs, grasses and herbs. Treed areas vary in degree of tree canopy cover, ranging from open woodland to open forest formations.

No threatened flora species or their habitats were identified within the area north of the Retreat 10 subdivision area (Ecovision Consulting, 2006). However, the Forest Redgum (*Eucalyptus tereticornis*) vegetation association consists of a species mix commensurate with the community description for Hunter Lowland Redgum Forest, which is listed as an EEC under the TSC Act. The spatial occurrence of this vegetation association is restricted to isolated patches on gently sloping lands adjacent to ephemeral creeklines. Two viable forest and shrubland remnants were mapped within the study area representing an area of 4.1 ha.

Summary

A comparison between these surveys is summarised below in **Table 4**.

Table 4: Flora diversity of the Wattle Ponds Locality

Study	Native	Exotic	Flora Assemblages	Species, Populations and Communities of Significance
HLA, 2000	84	19	5	Spotted Gum – Ironbark Forest
HLA, 2003	92	37	4	Spotted Gum – Ironbark Forest
Ecovision Consulting 2004a	77	20	4	*Chorizema parviflorum*; Spotted Gum – Ironbark Forest; Lower Hunter Redgum Forest
Ecovision Consulting 2004b	112	44	4	Wild Sorghum (*Sarga leiocladum*); *Cyperus vaginatus*
Ecovision Consulting 2004c	85	28	5	Lower Hunter Redgum Forest
Ecovision Consulting 2004d	121	39	5	Spotted Gum – Ironbark Forest; Elements of Lower Hunter Redgum Forest
Ecovision Consulting 2004e	97	16	5	Wild Sorghum (*S. leiocladum*); *Chorizema parviflorum*; *Bossiaea prostrata*; Spotted Gum – Ironbark Forest; Lower Hunter Redgum Forest
Ecovision Consulting 2005f	101	27	5	n/a
Ecovision Consulting 2006	112	27	4	Spotted Gum – Ironbark Forest; Lower Hunter Redgum Forest

The number of flora species observed to the north and northeast of the site is consistent with the variable topography, low agricultural activity and minimal land development associated with these areas, despite the extent of past land clearing throughout adjoining properties. A reduced agricultural intensity appears to increase opportunity for a range of sensitive grass and herb species to prevail as viable populations such as Wild Sorghum (*Sarga leiocladum*). The total

land area also appears to influence species richness, with the species count for study site of greater than 90 ha generally resulting in 90 or more native species observations.

The Wildlife Atlas database search (DEC, 2006) identified 279 species within 10 km of the study area. One of these species is listed as threatened, this being the vulnerable Slaty Redgum (*Eucalyptus glaucina*).

4.2.2 Fauna

Recent fauna surveys of the locality (HLA, 2000; HLA 2003; Ecovision Consulting, 2004a; Ecovision Consulting 2004b; Ecovision Consulting 2004c; Ecovision Consulting, 2004d; Ecovision Consulting, 2004e; Ecovision Consulting, 2004f; Ecovision Consulting 2006) have identified at least 137 native and exotic fauna species occupying a variety of habitats similar to those present in and adjacent to the study area. The majority of these species are common to the local area. A brief discussion of the localities fauna values is provided as follows.

Avifauna

Avifauna species that frequent the locality throughout the year include generalists such as the Magpie (*Gymnorhyna tibicen*) and Noisy Miner (*Manorina melanocephala*). Avian species of wide-open spaces also occur throughout the locality due to the abundance of open woodland environments of the disturbed ridgetops. Species such as the Pied Butcherbird (*Cracticus nigrogularis*) and Richard's Pipet (*Anthus novaeseelandiae*) are abundant throughout the grassland of the locality. Pioneer species capable of utilising the margins of regenerating lands, such as the Grey-crowned Babbler (*P. temporalis*), also utilise many of the locally occurring open woodland habitats that are currently experiencing various stages of natural regeneration.

Tree hollows are rare within the locality due to the extent of past land clearing activities and age of regrowth. Species reliant on this habitat feature include small parrots and introduced avifauna such as the Indian Myna (*Acridotheres tristis**) and Common Starling (*Sturnus vulgaris**) accordingly exhibit a patchy distribution throughout the landscape. Owls are unlikely to be found breeding within the locality due to the absence of large tree hollows. However, owls may opportunistically forage throughout the area as part of a larger home range.

The avifauna of open forest vegetation communities throughout the locality includes species such as Thornbills, Pardelottes, Silvereyes, Kookaburra, Grey Fantail and Honeyeaters. Thornbills, Pardelottes and Silvereye are often observed as a roaming cohort in the mid storey stratum of this vegetation type. Occasionally the Golden Whistler and Rufous Whistler are found with this group of birds. Speckled Warblers (*C. sagittata*) have also been observed with these species while foraging in open forest and woodlands (HLA, 2003; Ecovision Consulting, 2004a; Ecovision Consulting, 2004e; Ecovision Consulting, 2004f).

Mammals

The discontinuous sparse tree canopy that characterises the majority of the locality provides limited quantities of foraging habitat and roost study areas for arboreal species such as possums and dasyurids (carnivorous mammals). However, some larger areas of remnant vegetation provide sufficient habitat for arboreal mammal species such as the Sugar Glider (*Petaurus breviceps*), Squirrel Glider (*P. norfolcensis*) and Brush-tailed Phascogale (*Phascogale tapoatafa*). Each of these species has been trapped during recent local surveys (Novo Eco Consultancy / Banksia Environmental Consultancy (2002); Ecovision Consulting, 2004d; Ecovision Consulting, 2004e). Small tree hollows of the area also offer roosts for microchiropteran bat species such as Goulds Wattled Bat (*Chalinolobus gouldii*), Lesser Long-eared Bat (*Nyctophilus gouldii*) and Eastern Forest Bat (*Vespedulus pumilus*). However, the abundance of trees with hollows has been substantially influenced by past and present activities (i.e. agriculture and firewood collection).

The grassland habitats provides of the locality provide ideal foraging habitat for exotic fauna such as the European Fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus*). Small native ground fauna reliant on habitat features such as fallen timber and rocky outcrops are generally absent from the locality due to the influence of past land clearing activities, ongoing agricultural uses and lack of connectivity with larger tracts of native vegetation. However, the larger mobile species such as the Eastern Grey Kangaroo (*Macropus gigantea*) and various wallaby species are well suited to the grassy habitats offered throughout the vegetated landscape of the North Singleton locality.

Reptiles

Ground habitats of the locality are generally void of rock outcrops and loose surface rock, which are important habitat features for small shelter dependent reptiles such as the Striped Skink (*Ctenotus robustus*), Copper-tailed Skink (*Ctenotus taeniolatus*) or Yellow-faced Whip Snake (*Demansia psammophis*). Accordingly, it is rare for these species to be observed within the locality. Similarly, the accumulation of leaf litter is also limited and is restricted to areas within an established tree canopy. Thus, the potential suitability of lands within the locality for small ground dwelling species such as the common Garden Skink (*Lampropholis delicata*) is also limited.

Generally, the locality is most suited to reptilian species of large home ranges that have varied non-specific dietary requirements. Species such as the Goanna (*Varanus various*) and Bearded Dragon (*Pogona barbata*) are well adapted to the open grassy conditions of the local area. Both these species have been observed in past surveys of the locality.

Two snake species have been observed within the general locality, these being the Eastern Brown Snake (*Psuedonaja textilis*) and Red-bellied Black Snake (*Pseudechichis porphyriacus*). Both these species occupy a range of habitats, with the Brown Snake (*P. textilis*) principally found in dry environments with the Red-bellied Black Snake (*P. porphyriacus*) often associated with aquatic environments such as creek lines and farm dams. The Eastern Water Dragon (*Physignathus lesueurii*) has also been observed in riparian environments within the locality. This species frequents semi-permanent to permanent creek lines where it often perches on overhanging vegetation such as Swamp Oak (*Casuarina glauca*).

Amphibians

Small closed depressions (dams) of the locality support a variety of amphibian species these being the Eastern Froglet (*Crinia signifera*), Brown Striped Marsh Frog (*Limnodynastes peronii*), Burrowing Frog (*Limnodynastes ornatus*) and Broad-palmed Frog (*Litoria latopalmata*). Open depressions (creek lines) offer similar habitat values to the dams of the locality. However, increased salinity and in stream sedimentation has limited observed diversity to generalists such as the Eastern Froglet (*C. signifera*) and Brown Striped Marsh Frog (*L. peronii*). Small tree hollows provides potential diurnal shelters for tree frog species such as the Perons Tree Frog (*Litoria peronii*) and Green Tree Frog (*L. caerulea*), with breeding often found in dams.

Summary

The 10 km radial search of the study area identified 162 fauna species consisting of eight threatened fauna species. These are discussed further in the following sections.

4.3 Locally Significant Biodiversity

4.3.1 Flora

A database search has identified no threatened flora within the site (DEC, 2007). However, an analysis of the database records against the CMA vegetation mapping (CMA, 2006) identified the following threatened plant species occurring within the locally common Central Hunter

Ironbark Spotted Gum Grey Box Woodland, as shown in **Table 5**, with bolded species indicating a potential reliance on this vegetation community for part or all of their life cycles.

Table 5: Threatened Flora of Central Hunter Ironbark Spotted Gum Grey Box Woodlands

Common Name	Scientific Name	DEC (2006) Records in CMA Map Unit 17	Percentage relative to all Records in CMA Map Area
Slaty Redgum	***Eucalyptus glaucina***	**6**	**35.3% of all records**
Tricolor Orchid	*Diuris tricolor*	1	25.0% of all records

The locally uncommon native grass Wild Sorghum (*S. leiocladum*), which is sensitive to grazing, has been observed in scattered clumps throughout the southern parts of Hunter Green (Ecovision Consulting, 2004b), where cattle grazing have been excluded for an extended period. This species has also been observed in Lot 122 DP 819682 along with the locally uncommon *Bossiaea prostrata* and *Chorizema parviflorum* (Ecovision Consulting, 2004b). This species is sensitive to moderate – high stocking rates and is often selectively grazed out under these conditions.

A locally significant population of the sedge *Cyperus vaginatus* was observed in the main drainage corridor of the Hunter Green rezoning study area (Ecovision Consulting, 2004b). *C. vaginatus* is an inland species, with historical records indicating the most eastern limit of distribution being the Singleton locality. This species prefers wet soils to periodically inundated lands. The locally uncommon Cyperus Pine (*Callitrus glaucophylla*) forms part of a distinct dominant part of a vegetation community located along the eastern boundary of Lot 122 DP 819682 (Ecovision Consulting, 2004b). Other known occurrences of this species are within Singleton Army Range.

4.3.2 Fauna

A database search has identified eight threatened fauna species occurring within the study area (DEC, 2007) as indicated by the bolded species in **Table 6**. An analysis of the database records against the CMA vegetation mapping (CMA, 2006) identified twenty four threatened fauna species occurring within Central Hunter Ironbark Spotted Gum Grey Box Woodland, which are also shown in **Table 6**.

Table 6: Threatened Fauna contained within Central Hunter Ironbark Spotted Gum Grey Box Woodland

Common Name	Legal Status	CMA (2006) Remnant Class	Number of Records in CMA Map Unit 27	Percentage relative to all Records in CMA Map Area
Green and Golden Bell Frog	E1	4	1	100%
Speckled Warbler	**V**	**4**	**1**	**3%**
Speckled Warbler	**V**	**2**	**3**	**8%**
Speckled Warbler	**V**	**1**	**1**	**3%**
Gang Gang Cockatoo	**V**	**4**	**1**	**100%**
Glossy Black-Cockatoo	V	4	1	8%
Brown Treecreeper	V	4	13	31%
Brown Treecreeper	V	3	1	2%
Brown Treecreeper	V	2	4	10%
Diamond Firetail	V	4	5	22%
Diamond Firetail	V	2	4	17%
Black-chinned Honeyeater	V	4	1	25%
Black-chinned Honeyeater	V	3	1	25%
Black-chinned Honeyeater	V	2	1	25%
Hooded Robin	V	4	2	14%
Hooded Robin	V	2	2	14%
Grey-crowned Babbler	**V**	**4**	**4**	**7%**
Grey-crowned Babbler	**V**	**3**	**1**	**2%**
Grey-crowned Babbler	**V**	**2**	**1**	**2%**
Grey-crowned Babbler	**V**	**1**	**2**	**3%**

Common Name	Legal Status	CMA (2006) Remnant Class	Number of Records in CMA Map Unit 27	Percentage relative to all Records in CMA Map Area
Swift Parrot	E1	4	1	50%
Brush-tailed Phascogale	**V**	**4**	**5**	**83%**
Brush-tailed Phascogale	**V**	**2**	**1**	**17%**
Spotted-tailed Quoll	**V**	**4**	**4**	**33%**
Spotted-tailed Quoll	**V**	**2**	**1**	**8%**
Squirrel Glider	V	4	2	33%
Koala	V	4	2	22%
Grey-headed Flying-fox	**V**	**3**	**1**	**25%**
Eastern Bentwing-bat	**V**	**4**	**1**	**33%**

Table 6 identifies those threatened fauna species that occur within the study area (i.e. bolded species), which consistently occur within large remnants (i.e. remnant class 4 – > 100ha vegetation cover). The distribution of locally occurring threatened species is shown in **Figure 6**.

4.3.3 Endangered Populations

Two Endangered Populations (EPs) exist within Singleton Shire Council lga, these being:

Tiger Orchid (*Cymbidium canaliculatum*)
The Hunter Catchment population of *C. canaliculatum* refers to all plants of *C. canaliculatum* occurring within the Hunter Catchment, as defined by Australia's River Basins. The Hunter Catchment includes the local government areas of Cessnock, Maitland, Dungog, Singleton, Muswellbrook, Newcastle, Port Stephens, part of Mid-western Regional, and part of Upper Hunter (NSW Scientific Committee, 2006).

River Redgum (*Eucalyptus camaldulensis*).
In NSW, *E. camaldulensis* occurs along the western flowing rivers but is known from only one coastal catchment, the Hunter. The western-most individuals in the Hunter are at Bylong, south of Merriwa, and the most easterly at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. The closest known population in a western catchment is at Mudgee, some 50 km from Bylong. It has been recorded in the local government areas of Lithgow, Maitland, Mid-Western Regional, Muswellbrook, Port Stephens, Singleton and Upper Hunter (NSW Scientific Committee, 2005).

4.3.4 Ecological Communities

Three listed EECs occur within the locality, these being:

- Hunter Lowlands Redgum Forest;
- Lower Hunter Spotted Gum Ironbark Forest; and
- Freshwater Wetlands on Coastal Floodplains.

Hunter Lowland Redgum Forest, a listed EEC, has been observed as isolated remnants throughout the area. Generally, this vegetation community occurs in healthy small stands that contain most of the characteristic native tree, shrub and groundcover species listed in the final determination (NSW Scientific Committee, 2003). Local disturbances to Hunter Lowland Redgum Forest EEC remnants include recent fire, woody weeds and illegal rubbish dumping.

Less commonly observed in the local area is the Lower Hunter Spotted Gum Ironbark Forest EEC, which is more commonly found throughout the Cessnock locality. Locally, this vegetation community appears to favour protected east facing slopes in contrast to the more common Central Hunter Ironbark Spotted Gum Grey Box Woodland, which occurs on the drier upper slopes ridges and west facing slopes.

Vegetation mapping for the region indicates that these EECs rarely occur in the locality due to the extent of clearing for agriculture and urban development. The site has not been identified as currently containing any of these EECs despite there being occurrences within the locality. Historically, Hunter Lowlands Redgum Forest may once have occurred throughout the agriculturally produce alluvial flats.

4.4 Vegetation Remnants and Wildlife Corridors

Approximately 4,900 ha of native vegetation cover currently exist within 10 km of the site, representing approximately 15.5% of the vegetation cover prior to European settlement (CMA, 2006). Approximately 55% of this remnant vegetation cover occurs within remnants exceeding 40ha in area (i.e. 23 remnants comprising 2 740 ha of Central Hunter Ironbark Spotted Gum Grey Box Woodland in remnant classes 3 and 4).

Disturbances to vegetation cover within the local area include, but not restricted too, recent and established residential developments, rural-residential developments, established cleared pastures and agriculture. Past land uses of the locality were predominantly agriculturally based, which lead to a substantial diminishment of the biological character contained throughout the Hunter River flats and adjoining terraces within the Singleton local area. The majority of native vegetation once widespread throughout the locality has been displaced and fragmented by agriculture (i.e. grazing and cropping) and more recently residential and rural-residential style developments. Natural regeneration also occurs within the locality and is generally restricted to areas of poor to marginal agricultural capability.

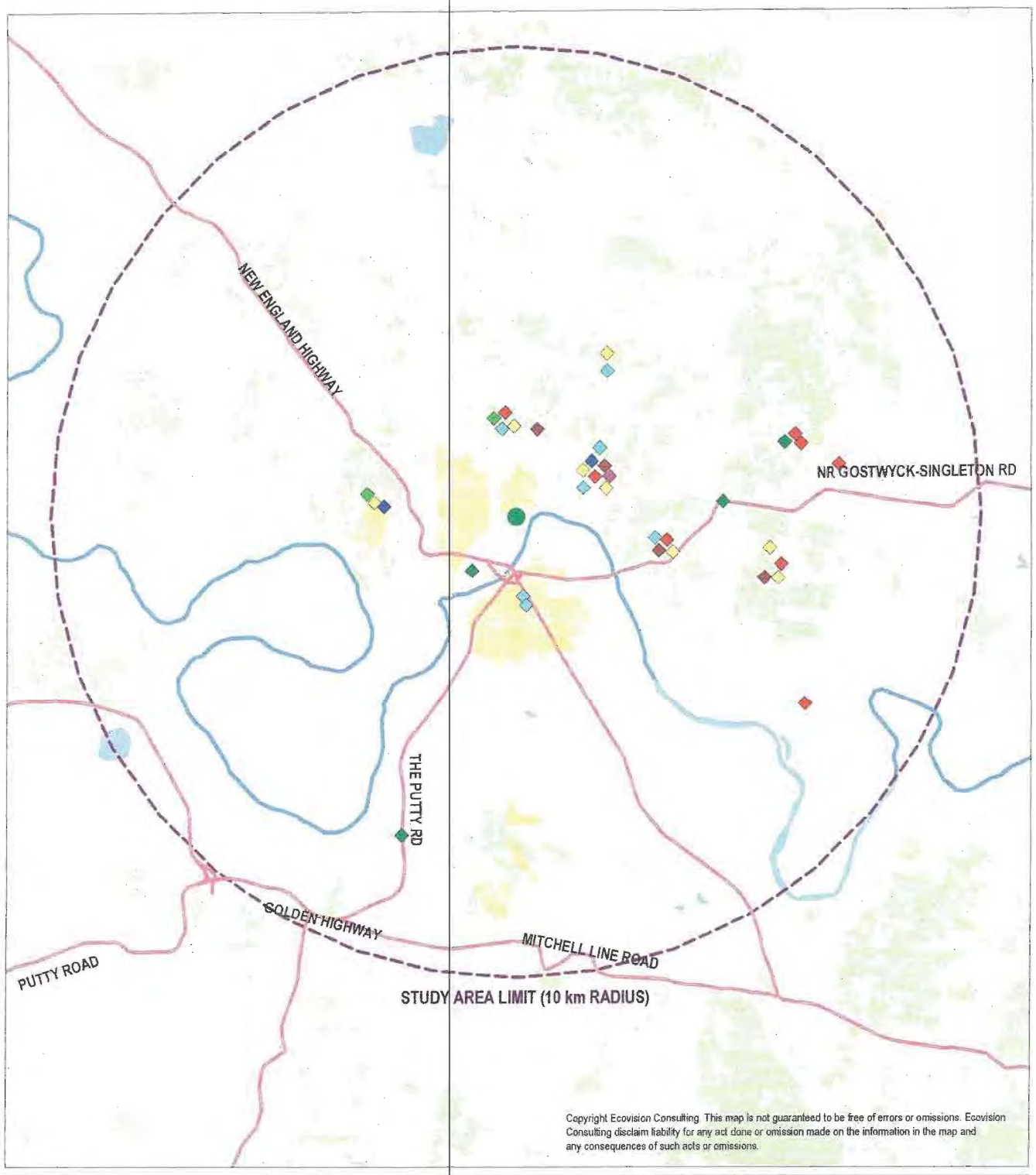
Connectivity between remnants varies with anthropogenic (human) land use intensity, with the majority of local bushland remnants being isolated and disturbed by grazing and rural-residential developments. Vegetation connectivity is fragmented throughout the locality, with extent of residential and rural-residential development within the North Singleton locality substantially reducing the wildlife passage between remnants located north and south of the Hunter River. **Figure 7** illustrates the extent of vegetation cover, hence wildlife connectivity, throughout the study area.

4.5 Existing Subject Site Impacts

The subject site has experienced impacts from human activity, with existing impacts affecting the ecological character of the subject site discussed in **Table 7**.

Table 7: Existing Site Impacts

Impact	Time since disturbance (years) +30	5-30	0-15	Percentage of the site affected by Impact (%)	Notes
Clearing	✓	-	-	90	The majority of the sites native vegetation has been cleared for the purpose of agriculture.
Fire	-	-	-	n/a	There is no evidence of fire within the site.
Rubbish	-	-	✓	1	There is scattered debris located along drainage lines of the site, particularly those arising from neighboring residential landscapes.
Agriculture	✓	✓	✓	90	There is substantial evidence supporting viable agricultural activities throughout the southern half of the site, with low intensity agriculture undertaken throughout the elevated northern half.
Exotic flora and fauna	-	-	✓	100	Elevated densities of exotic flora occur throughout the site due to the clearing and agricultural history. Exotic flora is most prevalent along drainage lines and steep lands.



Legend

- The Site
- Main Roads
- Hunter River
- Water Bodies
- Native Vegetation Cover
- Cleared Lands

Threatened Fauna*

- Gang-gang Cockatoo
- Grey-crowned Babbler (eastern subsp.)
- Speckled Warbler
- Spotted-tailed Quoll
- Brush-tailed Phascogale
- Grey-headed Flying-fox
- Eastern Bentwing-bat
- Eastern Freetail-bat

* Sources Wildlife Atlas Datase Search (DEC, 2007)
Ecovision Consulting Database (2007)

ECOVISION

Figure 6 Threatened Fauna Species of the Study Area

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: GeoScience Australia (2006)
"Singleton 1: 250 K Topographical Map"

N
Scale (Approx.)
1: 160,000
Printed at A4

Map References
Date: 6/3/2007
Drafted By: Mark Aitkens
Reference: E:\Projects ... \F1116_Fig6

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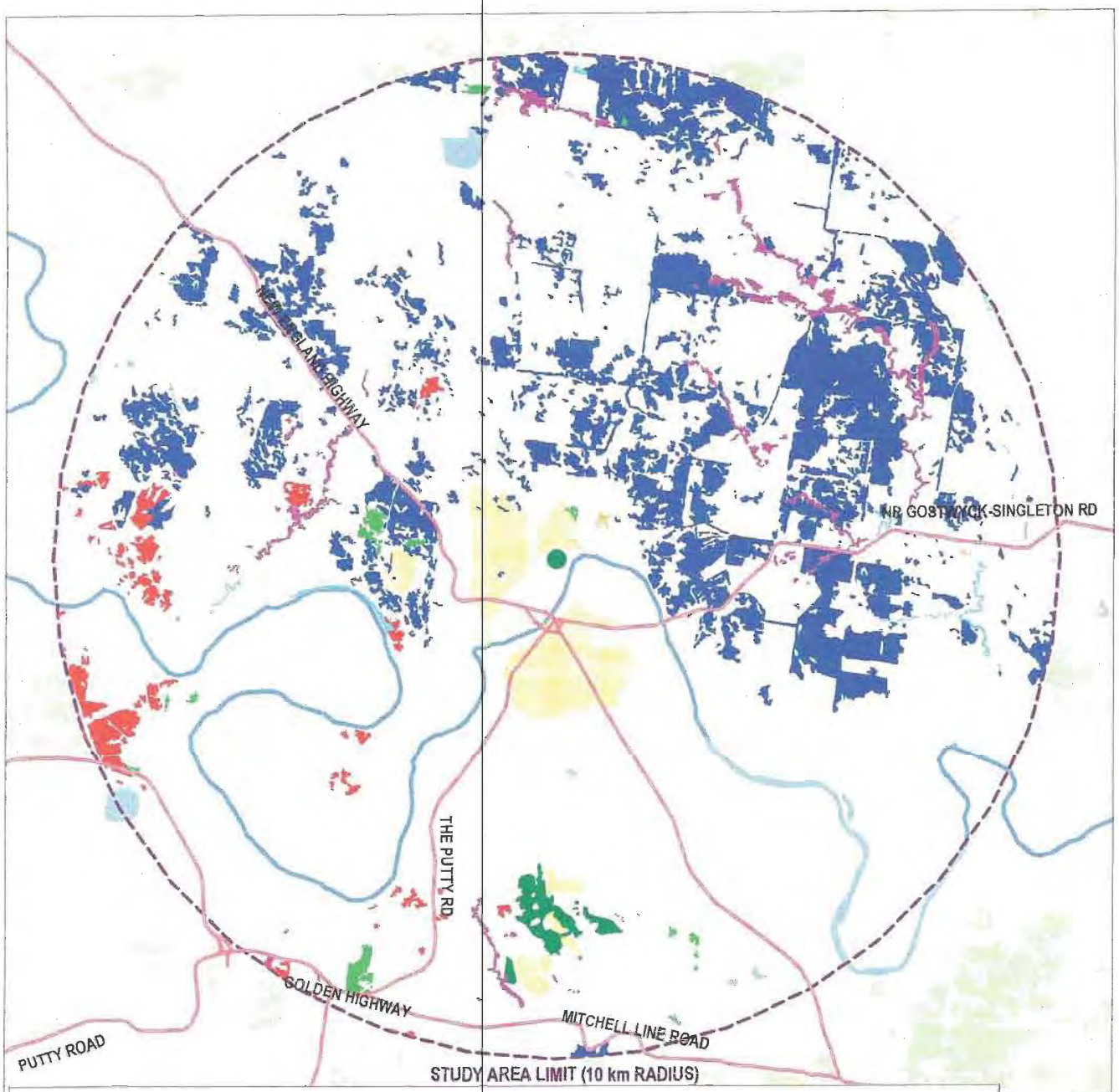

Vegetation Communities

- Central Hunter Box - Ironbark Woodland
- Central Hunter Bulloak Forest Regeneration
- Central Hunter Ironbark - Spotted Gum - Grey Box Forest
- Central Hunter Swamp Oak Forest
- Hunter Floodplain Red Gum Woodland Complex
- Hunter Valley River Oak Forest
- Planted areas
- Warkworth Sands Woodland

* Source Vegetation of the Central Hunter Valley, New South Wales (2006)

Legend

- The Site
- Main Roads
- Hunter River
- Water Bodies
- Native Vegetation Cover
- Cleared Lands
- Built up Areas

ECOVISION

Figure 7 Vegetation Cover of the Study Area (CMA, 2006)

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: GeoScience Australia (2006)
"Singleton 1: 250 K Topographical Map"

Scale (Approx.) 1: 120,000 Printed at A4

Map References
Date: 6/3/2007
Drafted By: Mark Aitkens
Reference: E:\Projects ... \F1116_Fig7

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5.0 SURVEY RESULTS

5.1 Flora

5.1.1 Vegetation Communities

The flora survey identified 72 species, consisting of 39 natives and 33 exotics, within two vegetation assemblages dominated mostly by various native and exotic grass and herb species. A summary description of the sites vegetation is provided in **Table 8**. The flora species list for the site is provided in **Appendix 2**, with **Figure 8** showing the extent of open woodland and grassland vegetation cover.

Table 8: Vegetation of the Site

Tree Canopy Dominants	Characteristic Shrubs	Characteristic Groundcovers	Structural Status	Area (ha)
Exotic Grassland				
None	African Box Thorn (*Lycium ferusossium**)	Threeawn Grass (*Aristida vagans*),	Grassland	9.8
Gallery Riparian Woodland				
Forest Redgum (*E. tereticornis*); Peppercorn (*Schinus areira* *); River Redgum (*E. camaldulensis*)	African Olive (*O. europeana* ssp. *africana*), Cestrium (*C. parqui*), Cooba (*A. salicina*)	Kikuyu (*P. clandestinum**), Purpletop (*Verbena* spp.), Saffron Thistle (*Cathamus lunatus*)	Open Woodland	1.9

5.1.2 General Observations

Tree Canopy

The sites tree cover is restricted mostly to the drainage lines and Hunter River frontage, where the projected tree canopy cover is generally of open woodland structure. The dominant tree species throughot the site include Forest Redgum (*Eucalyptus tereticornis*) along the drainage line and adjoining slopes, with River Redgum (*E. camaldulensis*) occurring along the banks of the Hunter River. Relevant native trees planted around the sites single dwelling include Mugga Ironbark (*E. sideroxylon*) and Silky Oak (*Grevillea robusta*), both of which are capable of supplying seasonal nectar sources. The high extent of exotic tree canopy cover, this primarily being Peppercorn (*S. areira*), is greatest throughout the drainage line and adjoining steep slopes.

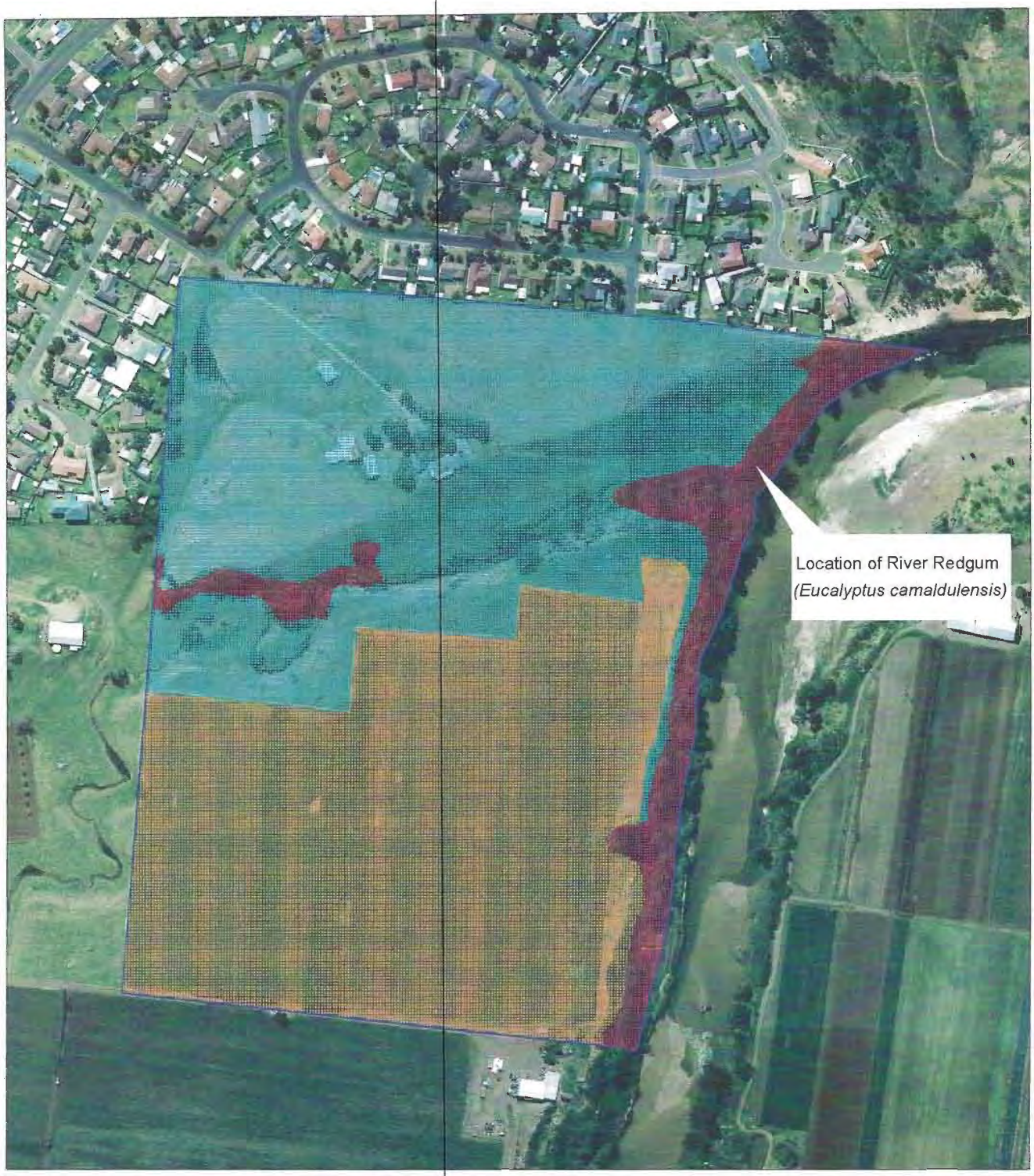
Shrub Canopy

The shrub stratum is predominantly absent throughout the entire site, with the exception of mostly exotic species scattered beneath the tree canopy cover of the steeper slopes. Historical clearing and ongoing agricultural activities have maintained this shrubless environment, with the exception of targeted shrub plantings along the sites main drainage line. Shrub species observed include Cetrium (*Cestrium parqui*) and African Olive (*Olea europea* ssp. *africana*). Scattered occurrences of Cooba (*A. salicina*) also occur along the steeper parts of the site.

Groundcover Stratum

The groundcover stratum was most dense throughout the drainage lines of the site, with groundcover density decreasing under the influence of drier soils throughout the cleared parts of the site.

Grasses and herbs dominate the majority of the sites ground strata vegetation cover. The most regularly observed native grasses were throughout the cleared northern parts of the site such as Wire Grass (*Aristida vagans*), Redleg Grass (*Bothriochloa decipiens*), Lovegrasses (*Eragrostis*



Legend

- Agricultural Cropping
- Exotic Grassland
- Gallery Riparian Woodland
- Site Boundary

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Figure 8 Vegetation of the Site

Datum and Data Sources
Map Datum: Geodetic Datum of Australia 1994
Map Projection: Map Grid of Australia 1994
Map Features: Dept. Lands (2003)
"Singleton Orthorectified Aerial Photography"

Scale (Approx.)
1: 4,000
Printed at A4

Map References
Date: 6/3/2007
Drafted By: Mark Aitkens
Reference: E:\Projects ... \F1116_Fig8

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brownii and *E. leptostachya*) occur along with the exotics Kikuyu (*Pennesitium clandestinum**) and Saffron Thistle (*Cathamus lunatus*)*. Commonly observed herbs throughout the drier parts of the site include Yellow Buttons (*Chrysocephalum semipapposum*) and Rock Fern (*C. sieberi*).

Exotic Species

Exotic species were frequently observed throughout the site, with the majority of woody weed observations restricted to such as Lantana (*Lantana camara**), African Olive (*O. europa var africana**) and Green Cestrium (*Cestrum parqui**). These species were generally found in shady positions of elevated soil moisture such as the drainage lines and adjoining steep slopes. Another weed species observed in the moister environments of the study area is Spiny Rush (*Juncus acutus**), which occurs in the main drainage channel. Other species frequently observed in the drainage lines include Paspalum (*Paspalum dilatatum**), Fleabane (*Conyza bonariensis**) and Purple Top (*Verbena* spp.*), Saffron Thistle (*C. lunatus**) and Kikuyu *Pennisetium clandestinum**).

The drier parts of the site such as the mid to upper slopes also contain populations of exotic plant species. Aside from the reglar occurrence of Tiger Pear (*Opuntia auriculata**), the most common weed species encountered within these parts of the study area include Ribwort (*Plantago lanceolata**), Fireweed (*Senecio madagascariensis**), Paddy's Lucerne (*S. rhombifolia**) and Saffron Thistle (*C. lunatus**).

5.2 Fauna

5.2.1 Fauna Observations

The fauna survey identified 33 avian species, with 13 mammal, 3 reptile and 4 amphibian species within the site, representing approximately 33% of all fauna observations (i.e. 162 species) within the study area (DEC, 2007). The species observed during the survey is provided in **Appendix 2**. Commentary on the nature of these observations is provided as follows:

Avifauna

Species observed during the survey are characteristic of both woodland and grassland environments within disturbed landscapes. Occupying the trees and shrubs around the sites single dwelling were species such as Crested Pigeon (*Geophaps lopotes*), Red Wattlebird (*Anthochaera carunculata*) and Black-faced Cuckoo-shrike (*Coracina novaehollandiae*). Smaller honeyeaters such as the White-plumed Honeyeater (*L. pencilliatus*) were also observed foraging within the tree canopy.

Species in abundant numbers within the gardens of the single dwelling include the Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*) and Red-browed Firetail Finch (*Neochmia temporalis*). These smaller species are vulnerable to predation in the adjoining open habitats where there is a limited shrub understorey and tree canopy. Habitats of importance to these species are predominantly restricted to the vegetated steeper slopes and drainage lines of the site where foraging and breeding activity may occur.

Other generalists observed occupying the predominantly cleared parts of the site (i.e. upper slopes and northern elevated plateau) include the Magpie-Lark (*Grallina cyanoleuca*), Pied Butcherbird (*Cracticus nigrogularis**) and Magpie (*Gymnorhyna tibicen**). Parrot species were observed foraging throughout this part of the site such as the Eastern Rosella (*Platycerus eximius*) and Grass Parrot (*Pseohotus haematonotus*). Birds of prey were also observed within this area, notably species being the Peregrine Falcon (*Falco peregrinus*) that forage on small prey such as insects and lizards.

Mammals

A scat search conducted throughout the study area identified the presence of the Eastern Grey Kangaroo (*M. gigantea*), which was confirmed by visual observations throughout the elevated drier ridges of the study area. This common local species will frequently utilise the study area for foraging and resting purposes, especially during the warmer months of the year, as this species will seek cooler shady areas for foraging during the heat of the day. Visual observations also confirmed the presence of the common Red-necked Wallaby (*M. rufogriseus*).

Microchiroptern bat surveys identified six tree hollow roosting species, these being the Chocolate Wattled Bat (*Chalinolobus darlingtonii*), Freetail Bat (*Mormopterus sp. 2*), Eastern Freetail Bat (*M. norfolkensis*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), White-striped Free-tail Bat (*Tadarida australis*) and Little Forest Bat (*Vespadelus vulturnus*). It is possible that these species are roosting within the study area, however the low abundance of tree hollows indicates the likelihood of low population numbers.

With the exception of the Eastern Freetail Bat (*M. norfolkensis*) and Eastern False Pipistrelle (*F. tasmaniensis*), it is considered that these species are common to the Singleton locality and are often found foraging along linear tracts of vegetation (roadside environments and creek line vegetation), open forests and woodlands. The Eastern Freetail Bat (*M. norfolkensis*) has been observed on an infrequent basis throughout the locality within habitats similar to those of the study area. However, the Eastern False Pipistrelle (*F. tasmaniensis*) observation is the first for the area and was collected from the northwestern boundary of the study area adjacent to Spotted Gum – Broad-leaved Ironbark on steep slopes.

Four introduced mammal species are known to occur within the study area, these being the European Fox (*Vulpes vulpes**) and Rabbit (*Oryctolagus cuniculus**). These species are commonly associated with agricultural landscapes of the Singleton locality.

Reptiles

Two reptilian species were observed during the survey period. The Bearded Dragon (*Pogona barbata*), a generalist species often found in a variety of habitats, was also observed sunning on a fencepost. The Wall Skink (*Cryptoblephurus virgatus*) was observed climbing tree trunks. Evidence of Goanna (*Varanus varius*) activity was also observed on tree trunks (i.e. tree markings).

Amphibian Habitat

The low abundance of tree hollows provides potential diurnal sheltering habitat for tree frog species such as the Perons Tree Frog (*Litoria peronii*) and Green Tree Frog (*Litoria caerulea*). The Perons Tree Frog (*L. peronii*) was heard calling during the survey period, with the majority of calling activity noted near and around the dam located at the northwestern corner of the site. It is possible that this species will breed within this aquatic environment together with other species observed within this area such as ground amphbians including the Brown-stripped Marsh Frog (*Limnodynastes peronii*).

5.2.2 Habitat Values

The field survey identified six categories of fauna habitat that provide potential opportunity for a range of fauna activity such as foraging and breeding. These habitat categories are as follows:

- Grasses and herbs of the open grasslands;
- A nectar producing tree canopy dominated by the autumn flowering Forest Redgum throughout the drainage line and steeper slopes;

- A scattered low abundance of small sized tree hollows along the Hunter River frontage within River Redgum; and
- Scattered fallen timber and leaf litter along the drainage lines, Hunter River frontage and steeper slopes where there is a tree canopy.

Expected and potential fauna utilisation of these habitats is discussed as follows by fauna class.

Avifauna

Common sedentary avifauna species that commonly frequent woodlands and cleared lands near residential environments are expected to occur within the site throughout the year including habitat generalists such as the Noisy Miner (*Manorina melanocephala*) and Crested Pigeon (*Geophaps lopotes*). Avian species common to wide-open spaces such as the grasslands are expected to dominate the usage of habitats within the site due to the predominantly absent tree canopy cover and shrub understorey. Species such as the Pied Butcherbird (*Cracticus nigrogularis*) and Richard's Pipet (*Anthus novaeseelandiae*) are likely to feature prominently within the cleared landscape.

Nectar supplies is restricted to the Eucalypt tree canopy, this principally being the autumn flowering Forest Redgum (*E. tereticornis*). For this reason, it is expected that the majority of avifauna activity within the site will be associated with seasonally migrating nectivores. Wide ranging honeyeaters and insectivorous species of woodland and open woodland environs are likely to be the principal foragers throughout the sites native tree cover. Due to the sites discontinuity with local native vegetation cover and the small remnant size within the site, only common species are expected to occur within the site.

The low abundance of small tree hollows substantially reduces the sites breeding potential for parrots and other small avifauna species. Species reliant on this habitat feature are likely to restrict their onsite activity primarily to foraging only, with full utilisation of the vailable tree hollows expected given the low abundance of this habitat feature within the local area. The likelihood of owls breeding onsite is considered remote given the absence of large tree hollows. Opportunistic foraging by owl species as part of a larger home range is also considered remote due to the low abundance of suitable foraging resources (e.g. small ground mammals).

Pioneer species capable of utilising the margins of regenerating woodlands such as threatened and declining woodland birds (e.g. the Grey-crowned Babbler (*P. temporalis*)), are unlikely inhabitants of the sites vegetation cover due the the lack of connectivity with larger native vegetation remnants.

Mammals

The absence of a distinct continuous tree canopy cover, restricted and fragmented distribution of ground habitats (i.e. leaf litter and fallen timber) and low abundance of tree hollows substantially inhibits site occupation by sedentary species such as possums and ground fauna. Consequently, observed foraging activity by arboreal species such as microchiropteran bats and possums was limited within the site to areas capable of supporting this activity such as the tree canopy along the drainage line (i.e. Brush-tailed Possum) and dam (i.e. highest density of microchiropteran bat foraging).

The low abundance of small tree hollows substantially reduces the viability of sedentary populations reliant on these habitat attributes for roosting purposes. Roosting activity by the Brush-tailed Possum was notably restricted to the largest of the site trees (i.e. River Redgum on the banks of the Hunter River). Given the limited supply of tree hollows within the locality, it is considered that the habitat values of the site are of moderate local significance.

The historical woodland cover of the site probably provided suitable habitat values for medium to large sized native mammal populations such as the Short-beaked Echidna (*Tachyglossus aculeatus*) and Eastern Grey Kangaroo (*Macropus gigantea*). However, given the extent of clearing throughout the locality and extent vegetation isolation, it is considered that the presence of ground fauna within the site is remote. This has been confirmed by irregular and infrequent observations of the two above mentioned species by the residents of the site.

The smaller Brush-tailed Phascogale (*P. tapoatafa*), a nocturnal species with arboreal capabilities, is generally unsuited to the open grassy habitats contained within the site. Small tree hollows located in dead trees are strongly favoured by this species as diurnal roost subject sites, which are absent. Further, remnant size is important to the Brush-tailed Phascogale (*P. tapoatafa*), which requires connected habitats often exceeding 40 ha in area. Despite the presence of local records for this species, it is considered that this species in longer capable of occuying the site given the disturbance history and lack of vegetation cover within and immediately adjoining the site.

Conversely, the disturbed habitats of the site are likely to support exotic fauna populations including the European Fox (*V. vulpes*) and Rabbit (*O. cuniculus*). Residential and rural activities predominate the sites land use, which is known to preferentially favour breeding populations of these species.

Reptiles

The vegetation of the site is mostly suited to reptilian species of large home ranges that have varied non-specific dietary requirements. Species such as the Goanna (*V. various*) and Bearded Dragon (*Pogona barbata*) are well adapted to these conditions. Similarly, arboreal reptiles such as the Barred-side Skink (*Eulamprus tenuis*), which utilise tree hollows and cracks for shelter, are likely to be present within the sites treed areas.

The field survey identified no specialised shelter sites such as rock outcrops or surface rock, thus substantially restricting the potential for small reptiles reliant on this habitat feature. Accordingly, sspecies dependant on rock shelters such as the Striped Skink (*Ctenotus robustus*), Copper-tailed Skink (*Ctenotus taeniolatus*) or Yellow-faced Whip Snake (*Demansia psammophis*) are likely to be absent from the site. Conversely, the accumulation of leaf litter beneath the largest trees of the site provides sufficient habitat values for smaller ground dwelling species such as the common Sun Skink (*L. delicata*) and Rainbow Skink (*C. triacantha*).

Amphibians

The presence of small tree hollows provides potential diurnal sheltering habitat for tree frog species such as the Perons Tree Frog (*Litoria peronii*) and Green Tree Frog (*Litoria caerulea*). These species will utilise both terrestrial and aquatic environments (i.e. dam and drainage line) for foraging and breeding purposes. These species may periodically occur within the site, in particular the locally common Perons Tree Frog (*Litoria peronii*).

6.0 DATA INTERPRETAION

6.1 Flora

The site contains limited areas of native vegetation and fauna habitats relative to the mapped occurrences throughout the study area. The ecological survey has identified few specific site characteristics that are comparable with the broader native vegetation mapping for the study area/ region (CMA, 2006) indicating the site is not an important component of the localities biodiversity values. **Table 9** summarises the similarities between sites vegetation cover and this vegetation mapping.

Table 9: Comparison between Vegetation of the Subject Site and Study Area

Vegetation of the Site	Broad Mapping Vegetation Equivalent (CMA, 2006)	Floristic Similarities	Other comments
Disturbed Grasslands	Central Hunter Ironbark – Spotted Gum – Grey Box	62 species of the site occur within Lower Hunter Spotted Gum Ironbark Forest, seven being exotic (DEC, 2006).	Of the remaining 15 species not associated with Lower Hunter Spotted Gum Ironbark Forest, 6 are exotic.

Approximately 95% of the native flora species observed within the site (i.e. 37 species) are known to occur within Central Hunter Ironbark – Spotted Gum – Grey Box Woodland, with 23% (i.e. 9 species) being positive conformative species (CMA, 2006). Based on this simplistic qualitative analysis, it is considered that the site vegetation cover is classifiable as a chronically disturbed remnant of Central Hunter Ironbark – Spotted Gum – Grey Box Woodland, with the cleared portions of the northern part of the site no longer resembling the floristic or structural characteristics of this vegetation type.

One threatened flora species occurs within the study area (i.e. Slaty Redgum), which is not known to occupy the sites disturbed habitats that are subject to future residential development. This was confirmed by interrogating the occurrence of this threatened species within the wider distribution of Central Hunter Ironbark – Spotted Gum – Grey Box community type (CMA, 2006).

6.2 Fauna

The sites flora values were compared with the fauna data contained within the Wildlife Atlas database (DEC, 2007) using the CMA broad vegetation mapping (CMA, 2006). This analysis determined those threatened species that are likely to occur within the vegetation identified within the site. The resultant threatened fauna species list is a function of local occurrence (i.e. species of the study area) and vegetation type (i.e. threatened species known to occur within Central Hunter Ironbark – Spotted Gum – Grey Box).

Table 10:Local threatened Fauna Species that may potentially occur within the Site

Common Name	Scientific Name	Legal Status
Speckled Warbler	*Pyrrholaemus sagittatus*	V
Grey-crowned Babbler	*Pomatostomus temporalis*	V
Spotted-tailed Quoll	*Dasyurus maculatus*	E
Brush-tailed Phascogale	*Phascogale tapoatafa*	V
Grey-headed Flying-fox	*Pteropus poliocephalus*	V
Eastern Bentwing Bat	*Miniopterus shreibersii*	V

Of these species, it is considered that the Speckled Warbler (*Pyrrholaemus sagittatus*), Spotted-tailed Quoll (*Dasyurus maculatus*) and Brush-tailed Phascogale (*Phascogale tapoatafa*) are unlikely users of the site given the small remnant size (i.e. < 40ha) and isolation from larger tracts of native vegetation to the northeast (i.e. where the local records occur in association with remnants exceeding 40 ha area). The Grey-crowned Babbler is common within the local area

and has been frequently recorded from disturbed environments adjacent to large tracts of native vegetation. However, for similar reasons it is considered that this species is unlikely to occupy the site for foraging or breeding purposes.

In relation the Grey-headed Flying Fox, it is considered that this species is likely to occur within the site for foraging purposes only. A known roost camp within the locality almost certainly means individuals will frequent the site, particularly given the wide ranging dispersal capabilities of this species. Similarly, the Eastern Bentwing Bat and other microchiropteran bat species may also occupy the site for foraging purposes, with potential roostingoccurring within the tree hollows that flank the Hunter River.

7.0 MATTERS OF ECOLOGICAL SIGNIFICANCE

7.1 Potential Subject Species

7.1.1 Threatened Species

A search of the Wildlife Atlas Database (DEC, 2007) identified a number of threatened fauna species (i.e. Potential Subject Species) within the study area. Species identified from this search have been assessed in terms of their potential to occur within the subject site, with those considered relevant to this report listed in **Table 11** together with their legal status under the TSC and EPBC Acts. **Appendix 3** contains habitat information for these species.

Table 11: Threatened Fauna Species Relevant to this Assessment

Common Name	Scientific Name	Legislative Status		Site Habitat Values	Potential Sensitive Species Yes/No
		TSC Act	EPBC Ac		
Threatened Aquatic Fauna					
Green and Golden Bell Frog	*Litoria aurea*	E	V	Absent	No
Southern Barred Frog	*Mixophyes iteratus*	E	E	Absent	No
Painted Snipe	*Rostratula australis*	E1	V	Absent	No
Threatened Woodland Birds					
Swift Parrot	*Lathamus discolor*	E	E	Low	No
Speckled Warbler	*Pyrrholaemus sagittatus*	V	-	Absent	No
Regent Honeyeater	*Xanthomyza phrygia*	E	E	Low	No
Brown Treecreeper	*Climacteris picumnus*	V	-	Absent	No
Grey-crowned Babbler	*Pomatostomus temporalis*	V	-	Absent	No
Threatened Mammals					
Spotted-tailed Quoll	*Dasyurus maculata*	V	V	Absent	No
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	-	Absent	No
Squirrel Glider	*Petaurus norfolcensis*	V	-	Absent	No
Grey-headed Flying Fox	*Pteropus poliocephalus*	V	V	Moderate	Yes
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	Absent	No
Eastern Bent-wing Bat	*Miniopterus schreibersii*	V	-	Moderate	Yes
Eastern Free-tail Bat	*Mormopterus norfolkensis*	V	-	Moderate	Yes

E = Endangered V = Vulnerable

Threatened Aquatic Fauna

Aquatic environments are largely absent from the site, thus excluding the potential presence of threatened fish species, amphibians or wader birds. Thus, these species will not be further considered in this report.

Threatened Woodland Birds

Habitat values for nectar seeking species such as the Swift Parrot (*L. discolor*) and Regent Honeyeater (*X. phrygia*) occurs within the site as a spatially restricted band of autumn flowering Forest Red Gum (*E. tereticornis*), which is of low value to these species given the isolation of the site from larger connected tracts of native vegetation. Breeding habitat is not considered to occur within the site, with foraging habitat values considered low. Thus, these species will not be further considered in this report.

Threatened owls, such as the Masked Owl (*N. novaehollandiae*) are unlikely to use the site for either foraging or breeding purposes, due to the absence of large intact connected remnants, large tree hollows and foraging resources (i.e. small ground mammals).

The site contains no habitat values for the Speckled Warbler (*P. sagittatus*) and Grey-crowned Babbler (*P. temporalis*), with the absence of connective vegetation and proximity of residential development substantially diminishing any potential life cycle activity for these species. Both these species will not be further considered in this report.

Threatened Mammals

The subject site contains low quality potential foraging habitat for the threatened mammal species listed in the above table. Species requiring caves for roosts are likely to be absent from the site (i.e. Large-eared Pied Bat (*C. dwyeri*)). Similarly, species requiring large areas of undisturbed vegetation as part of their natural home ranges will be absent form the subject site (i.e. Spotted-tailed Quoll (*D. maculatus*) and Brush-tailed Phascogale (*P. tapoatafa*)) given the isolation of the site from large vegetation remnants and proximity of human disturbances. Both these species are reliant on trees with hollows generally within large connected vegetation remnants, with viable populations generally associated with connected vegetation cover exceeding 100 ha. Therefore, it is considered that neither of these species is unlikely to occur within the site and hence will not be further considered in this report.

Similarly sedentary species such as the Squirrel Glider (*P. norfolcensis*), which is reliant on year round nectar and sap resources, will not occur within the site given the limited availability of seasonal foraging resources and absence of connected vegetation. Accordingly, it is considered that the global habitat values of the site for this species are poor. No further discussion of this species in this report is therefore warranted.

The Eastern Free-tail Bat (*M. norfolcensis*) and Eastern False Pipistrelle (*F. tasmaniensis*) may be potential occupants within the site due to the presence of suitable foraging grounds and trees with hollows. Thus, these species will be further considered in this report.

Threatened Reptiles

No threatened reptiles or their habitats occur within the site. No further consideration of this matter is required.

7.1.2 EPs and Critical Habitat

Two EPs occur within the study area, these being Hunter Catchment populations of the Tiger Orhid (C. canalicultum) and River Redgum (E. camaldulensis). A portion of the River Redgum (E. camaldulensis) population occurs within the site immediately adjacent to the banks of the Hunter River. This matter will be further considered within this report.

No areas of critical habitat were identified within the study area (DEC, 2007). Targeted biodiversity surveys confirmed the absence of Critical habitat from the site, thereby warranting no further analysis of this matter in this report.

7.1.3 EECs

Within a 10 km radius of the subject site there are known occurrences of Lower Hunter Spotted Gum Ironbark Forest, Hunter Lowlands Redgum Forest and Freshwater Wetlands of the Floodplain. None of these EECs occurs within the site, thereby warranting no further analysis of this matter in this report.

7.1.4 Matters of NES (EPBC Act 1999)

The subject site is not located in a:

- Declared world heritage property;
- Ramsar wetland;
- Commonwealth marine area; or
- Represent a nuclear action.

Threatened Species

Ten threatened species and/or their habitats have been reported as occurring within the study area (DEH, 2007). Only one of these listed species are considered potential occupants of the site, this being the Grey-headed Flying Fox (*P. poliocephalus*). This species was observed foraging within the site during the survey period where it was noted in the canopy of the exotic Peppercron Tree (*S. aireana**).

Migratory Species

Migratory species listed within the schedules of the EPBC Act are unlikely to occur in the subject site. None of these species were observed within the site during the survey period, nor is there any habitat values of importance for these species. Development of the cleared grassland environments is unlikely to adversely impact the local or regional habitat values for migratory species.

7.1.5 Summary

The list of potential subject species identified in the above sections has been reviewed against the sites ecological values in **Section 5.0** and **Section 6.0** for assessment against the development impacts in **Section 8.0** to determine the list of 'Subject Species' relevant to this indicative impact assessment. **Appendix 3** documents the habitat preferences of the potential subject species and those species that have selected as subject species.

7.2 SEPP 44 – Koala Habitat Protection

Surveys for Koala trees and activity was undertaken to determine the likelihood of potential or core Koala habitat occurring within the subject site. Preferred foraging tree species promoting Koala activity occur within the subject site, this being Forest Redgum (*Eucalyptus tereticornis)*, in densities greater than 15% of the total projected tree canopy cover. This constitutes 'Potential Koala Habitat' and therefore may potentially be considered 'Core Koala Habitat'. A site only contains 'Core Koala Habitat' if there are activite populations within the locality that are known to use the site.

8.0 DEVELOPMENT IMPACTS

The future development of the site in accordance with the proposed rezoning strategy will permit at a future date the establishment of residential dwellings in accordance with the residential zone, thereby resulting in an impact on the vegetation cover for that area. Revegetation works are likely to occur within the less agriculturally capable lands that immediately adjoin the proposed residential precinct, with the balance of rural zoned lands to be retained and managed in their current manner. The extent of these future impacts is identified as follows.

8.1 Future Development

8.1.1 Residential Precinct

Development within the proposed residential area will coincide with a predominatly cleared landscape containing no habitat values for threatened biodiversity. None of the listed ecological values identified within this report are likely to be adversely impacted by development within this area.

8.1.2 Rural Zone

The remaining rural zoning will comprise of two significantly differing landscapes, these being:

- Flat alluvial lands throughout the southern half of the site; and
- Steep slopes and drainage lines through the centre of the site.

The southern agriculturally viable lands will be retained and managed in their current manner (i.e. cropping). No additional or differing land uses are expected and as such no adverse impact on threatened biodiversity is expected.

The steep slopes and drainage lines of the central parts of the site will not be utilised for agriculture. Rather, it is envisaged that this area will be partially revegetated together with some exotic plant removal to improve and maintain the current ecological values. The proposed works are expected to be undertaken using low impact procedures, with the net impact being positive for the site and local area. The potential establishment of River Redgum (*E. camaldulensis*) juveniles throughout selected parts of this area is a regarded as a proactive activity potentially improving the long term viability of this EP.

8.1.3 Tree Retention

The future development of the site has considered the extent of tree cover, particularly those with hollows, with intense development areas not overlapping with any significant quantities of tree canopy cover. All native trees located within the steep lands and drainage line are likely to be retained if not embellished with revegetation works. However, for bush fire purposes, the extent of revegetation works will be limited to minimise the establishment of bush fire prone lands in close proximity to the residential precinct.

8.1.4 Summary

The existing tree canopy cover and hollows will be maintained within the site, together with the bulk of other native plant species, thereby retaining the extent of existing fauna habitats within the site. Given the limited extent of vegetation clearing and modification, relative to the residual vegetation cover within the site and study area, it is considered that a detailed analysis of the key threatening process 'Land Clearing' is not required in this assessment.

8.2 Subject Species

An indicative impact assessment will be prepared in accordance with Section 5A of the EPA Act to consider each of the subject species listed in **Table 12**, hence identify whether the proposed rezoning strategy is likely to have a significant impact on threatened biodiversity. This assessment will consider the intensity of residential development within the residential precinct, the limited amount of native vegetation loss, likely revegetation works and any other recommended mitigation measures specified in **Section 9.0** of this report.

Table 12: Subject Species Impacts, Mitigation and Local Significance

Potential Subject Species	Development Impacts	Mitigation	Subject Species
Eucalyptus glaucina	No loss of known habitat	N/A	No
Diuris tricolor	No loss of known habitat	N/A	No
Green and Golden Bell Frog (*Litoria aurea*)	No loss of known habitat	N/A	No
Painted Snipe (*Rostratula australis*)	No loss of known habitat	N/A	No
Swift Parrot (*Lathamus discolor*)	No loss of known habitat	N/A	No
Speckled Warbler (*Pyrrholaemus sagittatus*)	No loss of known habitat	N/A	No
Regent Honeyeater (*Xanthomyza phrygia*)	No loss of known habitat	N/A	No
Grey-crowned Babbler (*Pomatostomus temporalis*)	No loss of known habitat	N/A	No
Spotted-tailed Quoll (*Dayurus maculates*)	No loss of known habitat	N/A	No
Brush-tailed Phascogale (*Phascogale tapoatafa*)	No loss of known habitat	N/A	No
Grey-headed Flying-fox (*Pteropus poliocephalus*)	Part loss of foraging habitat	Revegetation Works	Yes
Eastern Freetail-bat (*Mormopterus norfolkensis*)	Part loss of foraging habitat	Revegetation Works	Yes
Large-eared Pied Bat (*Chalinolobus dwyeri*)	No loss of known habitat	N/A	No
Eastern Bentwing-bat (*Miniopterus schreibersii*)	Part loss of foraging habitat	Revegetation Works	Yes
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	Part loss of foraging habitat	Revegetation Works	Yes

No EECs are known to occur within the site, therefore none will be considered in this assessment. However, the Hunter Catchment River Redgum EP does occur within the site and is accordingly considered in this indicative assessment as a subject species.

9.0 PROPOSED MITIGATION

It is recommended that the future development of the site consider the following 'best practice' management strategies, which have been developed in accordance with the principles of ecologically sustainable development, to minimise the impact on locally important ecological elements:

- Retain mature trees throughout the steep slopes and drainage lines of the site;
- Retain live and dead trees that contain hollows;
- Undertake revegetation works throughout the sites steep slopes and drainage lines to improve local tree canopy cover, including provisions for the replanting of River Redgum in suitable areas;
- Remove exotic trees and manage other troublesome exotic plant species by undertaking a targeted exotic species removal program; and
- Placement of roost structures suiting microchiropteran bat species to facilitate the improvement of available local roost sites.

These recommendations will serve to protect and enhance local biodiversity values, particularly for threatened biodiversity that occur within the site and the adjoining landscape.

10.0 IMPACT ASSESSMENT

The future development of the site in accordance with the proposed rezoning strategy may potentially have an impact on threatened biodiversity and their habitats. An indicative impact assessment (i.e. 'Seven Part Test of Significance') was prepared in accordance with Section 5A of the EPA Act 1979 to determine the significance of this impact, hence any requirements for further assessment. The following indicative impact assessment has been completed to identify the likely level of impact significance to determine whether a SIS is likely to be required.

10.1 EP&A Act 1979

The indicaitive Seven-part Test of Significance was prepared for Subject Species identified in this report as potentially being impacted by the future development arising from the proposed rezoning strategy. This assessment is presented in **Table 13** and has considered the likely impact areas, tree canopy retention, plantings and retention of tree hollows.

Table 13: Seven Part Test of Significance – Threatened Biodiversity

Seven Part Test Criterion		Assessment
a)	In the case of a threatened species ..... is likely to be placed at risk of extinction.	No breeding habitat for a threatened species to be modified. Foraging habitat located within cleared grasslands for local threatened species will experience an isolated negligible permanent loss. No significant impact expected, particularly given the retention of foraging habitat and roost hollows within the steeper lands and drainage lines of the site.
b)	In the case of an endangered population, .. is likely to be placed at risk of extinction.	No. The portion of the Hunter Catchment River Redgum EP that occurs within the site is located on the banks of the Hunter River and will consequently not be cleared from the site. Impacts are localised and are not likely to significantly contribute to a cumulative impact on this EP.
c)	In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed	
(i)	is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	N/A
(ii)	Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	N/A

Seven Part Test Criterion		Assessment
(d)	In relation to the habitat of a threatened species, population or ecological community:	
(i)	The extent to which habitat is likely to be removed or modified as a result of the action proposed.	No known or potential natural habitats for locally occurring threatened biodiversity are to be removed or modified by development arising from the proposed rezoning strategy.
(ii)	Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action.	Future development within the site will not contribute to any further wildlife corridor loss.
(iii)	The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The habitats contained within the site are of limited local importance as the local area is already predominantly cleared. Further clearing within the locality will not significantly impact the longterm survival of species, population or ecological community in the locality.
(e)	Whether critical habitat will be directly or indirectly affected.	No critical habitat declared within or adjacent to the subject site. No further consideration warranted.
(f)	Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	No recovery plans or threat abatement plans are relevant to the threatened biodiversity that occur within the proposed development area. No further consideration warranted.
(g)	Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	No. The future development of the site in accordance with th eproposed rezoning strategy is not considered a KTP nor will it result in the operation of or increase the impact of a KTP.

The indicaitive impact assessment for the proposed rezoning strategy clearly identifies there will no significant impact on threatened biodiversity located within the site and/or the adjoining local area. A SIS is unlikely to be required to further assess any future development applications for the site that are aligned with the proposed rezoning strategy.

10.2 EPBC Act

10.2.1 Listed Threatened Biodiversity

Habitat analysis identified the site to contain low value potential foraging habitat for the Regent Honeyeater (*X. phrygia*) and Swift Parrot (*L. discolor*). Neither of these species has been regularly observed within the district with the majority of records being old, indicating a low potential for future occurrences. The low value potential foraging values present within the site are further diminished by the absence of connectivity with local native vegetation cover and small remnant size.

The Grey-headed Flying Fox (*P. poliocephalus*) was observed within the site foraging principally on the exotic Peppercorn (*S. areira**). This threatened species has a large campsite located in the centre of Singleton. Large groups are often seen flying overhead during dusk, with few diverting to the site for foraging purposes. Impacts associated with exotic weed removal will have a negative impact on local foraging resources, which will be mitigated by plantings of native species capable of providing nectar resources.

No recent records of the Spotted-tailed Quoll (*D. maculatus*) are within the immediate area proposed for development. Local records occur to the east within a predominantly undeveloped area consisting of large vegetation remnants greater than 100 ha. Roads, cleared lands, residential and rural-residential developments that surround the site substantially limit the occurrence of this species.

10.2.2 Listed Migratory Species

Nine migratory species (terrestrial and wetland) and eight listed marine species were identified in the EPBC Act Protected Matters Report as potentially occurring in the locality. None of the listed marine species or their habitats occurs is relavent to the site, as the site is not classified as Commonwealth land. However, of the listed migratory species (terrestrial and wetland), two are known to occur within the site (i.e. Rainbow Bee-eater and Dollar Bird).

The future development of the site will involve the construction and occupation of a residential precinct throughout the northern elevated parts of the site, leaving a balance of partially treed lands along the sites steeper slopes and drainage lines including the banks of the Hunter River. Site habitat values will be retained, with proposed plantings likely to have a net beneficial affect. Therefore, it is concluded that there will be no significant impact on this NES matter.

10.2.3 Significance Assessment

In determining the nature and magnitude of the development's impact, it is important to consider matters such as:

- All on-subject site and off-subject site impacts including direct and indirect impacts;
- The frequency and duration of the action;
- The total impact, which can be attributed to that action over the entire geographic area affected, and over time;
- The sensitivity of the receiving environment; and
- The degree of confidence with which the impacts of the action are known and understood.
- A review of matters of National Environmental Significance is provided in **Table 14** to determine whether a referral to the Department of Environment and Heritage is required.

Table 14: NES Matters

All on subject site and off subject site impacts	Permanent removal of cleared and disturbed agricultural lands resulting in a permanent biodiversity loss consisting mostly of common native and exotic species. There will be no direct impact on any NES matters. Sufficient habitat contained within the locality and site to offset the minor local impact on the receiving environment.
All direct and indirect impacts	Direct impacts will be restricted to cleared and disturbed agricultural lands, with the impact being a permanent loss of these environments. The existing tree canopy cover and associated shrub and groundcover understorey is to be retained together with important local habitat features such as trees with hollows.
The frequency and duration of the action	The proposed redevelopment of the site in accordance with the rezoning strategy is planned to be a single event and will be permanent.
The total impact which can be attributed to that action over the entire geographic area affected	Low.
The sensitivity of the receiving environment	The sensitivity of the receiving environment is low given the extent of clearing throughout the locality, the low ecological values of the disturbance area, the lack of connected native vegetation corridors and proximity of the proposed development area to established residential lands.
The degree of confidence with which the impacts of the action are known and understood	A high degree of confidence is placed on this assessment.

In summary, it is concluded that there will be a low insignificant impact on matters of National Environmental Significance assuming the development includes the recommended mitigation measures. Accordingly, it is recommended that a referral to Environment Australia not be required to determine whether the proposed development is a controlled action under the EPBC Act.

10.3 SEPP 44 – Koala Habitat Protection

The subject site was assessed for Koala activity using the following methods:

- A search of the NPWS *Wildlife Atlas* Database (DEC,2007);
- A survey on foot, with koala food trees being inspected for signs of koala use. Trees were inspected and identified for the presence of koalas, characteristic scratch and claw marks on the trunk and scats around the base of each tree. The proportion of trees showing signs of koala use was calculated. Additionally the location and density of droppings, if found, were documented; and
- Identification and an assessment of tree density (stems/ha) for preferred feed trees listed in SEPP No. 44 - Koala Habitat Protection, including an estimate of the tree density for each tree species across the subject site, determined by averaging the percentage of stems counted.

Preferred Koala feed tree species listed on Schedule 2 of SEPP 44 were found during the survey of the subject site, this being Forest Redgum (*E. tereticornis*). The percentage cover of this species does exceed 15% of the total canopy cover thereby constituting potential Koala habitat. However, no Koalas or evidence of recent Koala activity was observed during the survey period. Further, there are no local recent records the presence of a local Koala population. Wildlife linkages are poor to absent, indicating a low likelihood of transient Koala activity. Accordingly it is considered that the site does not represent core habitat. Given the absence of Koala activity, it is considered that no management plan is required to protect potential Koala habitat within the site.

11.0 CONCLUSIONS

The results of the field survey, impact review and assessment support the following conclusions.

- Survey identified no threatened flora species within the site;
- Survey identified two threatened fauna species listed as vulnerable (TSC Act) within the site (i.e. Greater Broad-nosed Bat and Grey-headed Flying Fox);
- A portion of the Hunter Catchment River Redgum EP was identified within the site alongside the Hunter River;
- No listed EECs have been found within the site;
- No loss of threatened fauna habitat or the Hunter Catchment River Redgum EP and its habitat is expected as a consequence of future development in accordance with the proposed rezoning strategy;
- The impact on local and/or regional wildlife corridors will be low as the site does not constitute a critical part of a local or regional corridor;
- A SIS is unlikely to be required for the assessment of the sites future development as the indicative Section 5A Assessment shows a low insignificant impact on threatened biodiversity; and
- The submission of a referral to Department of Environment and Heritage under the EPBC Act is **not** required to further assessment the proposed rezoning and future redevelopment of the site.

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Attachment 3 – Geotechnical Assessment

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PRELIMINARY CONTAMINATION AND URBAN CAPABILITY ASSESSMENT

PROPOSED REZONING
LOT 12 DP 192526,
14 BURBANK CRESCENT, SINGLETON

Prepared for

ORBIT PLANNING

PROJECT 39661

MARCH 2007

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PRELIMINARY CONTAMINATION AND URBAN CAPABILITY ASSESSMENT
LOT 12 DP 192526
14 BURBANK CRESCENT, SINGLETON

1. INTRODUCTION

This report presents the findings of a Preliminary Contamination and Urban Capability Assessment for Lot 12 DP 192526, 14 Burbank Crescent, Singleton, New South Wales. The assessment was carried out at the request of Sally Flannery of Orbit Planning.

It is understood that:

- The site is to be rezoned to accommodate future residential development;
- The residential development will occur only in the northern portion of the site;
- The southern portion of the site is to remain rural.

The objective of the investigation was to provide a preliminary assessment of the suitability of the site for future development with respect to potential site contamination and geotechnical conditions, for proposed rezoning.

The assessment comprised the following tasks:

- Desktop study, including brief review of site history, aerial photographs, topographic, orthophoto, geological and soil landscape maps;
- Searches with NSW Department of Environment & Conservation (DEC), NSW Department of Natural Resources (DNR), and Singleton Council (SC);
- Site inspection on 11 January 2007, which included in-situ measurement of pH and Electrical Conductivity (EC) of surface waters;
- Brief discussions with site personnel familiar with former and current site activities;
- Preparation of this report, which discusses the findings of the combined assessment.

2. SITE IDENTIFICATION

The site has a total area of approximately 18.62 ha and comprises one agricultural lot as shown on Drawing 1 in Appendix B. The site is identified as Lot 12 DP 192526, 14 Burbank Crescent, Singleton, New South Wales.

The main site area is bound by the agricultural land to the south and south-west, residential to the north north-west and the Hunter River to the east.

3. DESKTOP REVIEW

Topography

Reference to the 1:25,000 topographical map for Singleton indicates that the site is dominated by a large tree-lined gully, which traverses the site west to east. The gully drains to the east, into the Hunter River, which forms the eastern boundary of the site. Site slopes generally fall towards the gully, from the north and south. The eastern portion of the site appears to drain to the east, towards the Hunter River.

The site generally falls towards the gullies at slopes in the order of 30-40°. However localised regions of the gully exhibited slopes of up to 70°. The topographical map indicates surface levels of around 50 m AHD within the site.

Drainage

The predominant surface water drainage paths within the site comprise the gully draining towards the east. A small farm dam is located in the north-western corner of the site, and was observed to contain water at the time of the walkover (refer to Section 4).

Soils generally appeared to be well drained on the upper slopes. Damp surface conditions and ponded water were however observed within the main gully lines during the site inspection, as discussed in Section 4.

Geology/Hydrogeology

Reference to the 1:100 000 Newcastle Regional Coalfields geological map indicates the site lies on the border of the Permian Aged Maitland Group (specifically Mulbring Sandstone) and Quaternary alluvium. Mulbring Siltstone is predominantly siltstone, however may also contain claystone and minor fine grained sandstone. Quaternary Alluvium comprises silt, sand and gravel.

The regional groundwater flow regime is believed to be towards the Hunter River, which is located, adjacent to the eastern site boundary.

Soil Landscape

Reference to the 1:100,000 Soil Landscape Series Sheet for Singleton (Sheet SI 56-1) prepared by the Department of Land & Water Conservation of NSW (DLWC, now DNR), indicates that the northern portion of the site is underlain by the Sedgefield soil landscape, while the southern portion is underlain by the Hunter soil landscape.

The Sedgefield Landscape is generally defined as having the following properties:

- Low undulating hills and rises with many small creek flats;
- The main soil types are Yellow Soloths on the upper to midslopes with Yellow Sodolic Soils on lower slopes and drainage lines;
- Black Soloths may also occur in areas of seepage on the slopes.
- Salinity is evident in the Sedgefield Landscape in some drainage lines. There is also a general high propensity for structural degradation/erosion.

The Hunter Landscape is generally defined as having the following properties:

- Alluvial plains and terraces of the Hunter River and its tributaries;
- Black clays and Black earths on prior stream channels and on tributary flats;
- Alluvial soils on levees and flats adjacent to the present river bed;
- Non-calcic Brown soils on terraces with Yellow Sodolic soils in drainage lines.

Acid Sulphate Soils

Acid sulphate soils are not expected to be encountered within the site, based on the elevation of the site. Acid Sulphate Soil Risk Maps have not been published for the Singleton area.

Salinity

Searches with DNR indicates that no areas within the site have been identified as having mapped salinity occurrences or salinity hazard.

4. PRELIMINARY CONTAMINATION ASSESSMENT

4.1 Scope of Work

The preliminary contamination assessment was conducted with reference to NSW EPA Guidelines (Ref 1), and comprised the following:

- Brief discussions with Mr Bob and Mrs Jocelyn Graham, the owners of Lot 12 DP 192526;
- Searches with Singleton Council (SC);
- Searches with NSW Department of Environment & Conservation (DEC);
- Review of historical aerial photos;
- Search of nearby registered groundwater bores through DNR;
- Site inspection on 11 January 2007 to assess site conditions.

4.2 Discussions with Current Owner

The following information was obtained from discussions with Mrs Jocelyn Graham, the current owner of Lot 12, DP 192526, and her husband:

- Mrs Graham has owned the site for approximately 35 years;
- Mrs Graham indicated that pig farming on the site had ceased at least 45 years ago;
- Mrs Graham conducted cattle grazing on the northern section of the site, which ceased in November 2006;
- There was a maximum of 20 cattle on site at any time during Mrs Graham's tenure;
- Cattle were only sprayed with pesticides and no cattle dipping was conducted on the site;
- A piggery was located next to the site in the past, where residential housing is now located;
- The southern section of the site is used for vegetable crops and has been leased for that purpose by Mrs Graham for the past 20 years;
- Some filled areas are located on the site;
- A former silage pit has been retained as a fill pit for timber and green waste, however opportunistic dumping had resulted in some building materials being dumped in the pit;
- Mrs Graham had the building waste removed from the pit the day before the walk over;
- A former fill pit for glass bottles used by former owners of the site is located in the western section of the site;
- A 10 x 10 m area of soil located at the southern end of the dam was sourced from the excavation of swimming pools in the area;
- No chemicals were stored at the site;

- Prior to residential development, a spring fed the dam in the north western portion of the site;
- No known landslides had occurred on the site during Mrs Graham's tenure of the site;
- Mrs Graham indicated that during heavy rainfall, large volumes of stormwater run-off course through the gully system and river water backs up, causing a ponding effect;
- There have been no major issues relating to salinity or erosion on the site, however minor erosion is present within gullies;
- No chemicals were used to control plant growth;
- Effluent is generally stored in an onsite tank;
- Excess effluent is disposed in an area immediately west of the site dwelling;
- A large water tank next to the former dairy shed collects storm water run-off;
- Dairy ceased in 1968, however cattle were still kept on site;
- An above ground fuel storage tank was located next to the dairy, along with a 44 gallon drum.

4.3 Council Records Search

Discussions with SC indicated that no Development Applications (DA) or Building Applications (BA) have been submitted for the site based on the records that the council have held for the last 10 years.

Review of the Section 149 Planning Certificate for the site provided by SC indicated the following:

- The site is currently zoned Rural 1 (a);
- The site is not proclaimed to be within a mine subsidence district;
- Development within the site is not restricted because of the likelihood of acid sulphate soils;
- The site has no matters arising under the Contaminated Land Management Act 1997.

4.4 NSW Department of Environment & Conservation

An information search with the NSW DEC (formerly the EPA) indicated that the site has no statutory notices issued under the provision of the Contaminated Land Management Act.

4.5 Review of Historical Aerial Photos

The following historical aerial photos were reviewed:

Table 1 – Aerial Photo Review

Year	Approximate Scale	Black and White/Colour
1963	1:40 000	Black and White
1974	1:40,000	Black and White
1984	1:40 000	Black and White
2000	1:25 000	Colour
2001 Approx	Digital[1]	Colour
2004	1:25 000	Colour

Notes to Table 1:
1 – Source *iplan.australis.com.au*

1963 Aerial Photograph

- A gully is present, bisecting the site in an east/west alignment;
- The gully appears to contain water;
- Minor areas of sparse vegetation are observed, mainly in the western portion of the site, where another minor gully is observed;
- Site area south of the gully appears to be agricultural landuse;
- Site area north of the gully contains up to three buildings and cleared/grassed land;
- Adjacent site uses appear to also be agricultural, with Hunter River running parallel to the eastern boundary of the site;
- The majority of the site appears to be clear of trees with some small pockets located centrally (i.e. along the gully) and in the northern portion of the site;
- An access road is visible from the north-western corner of the site to the buildings in the centre of the site.

1974 Aerial Photograph

- Similar to the 1963 photograph;
- A second access road appears to have been constructed in the western portion of the site towards the buildings;
- Another building appears to have been constructed in the central portion of the site;
- Some erosion scarring/disturbed ground is present along the bank of the Hunter river along the eastern boundary of the site;
- Adjacent landuse appears unchanged.

1984 Aerial Photograph

- The site is similar to the 1974 photograph with slightly increased vegetation growth, predominantly along the gully;
- Residential development is in the process of being constructed immediately north and west of the site, otherwise surrounding landuse appears similar to 1974 photograph.

2000 Aerial Photograph

- The site appears similar to its current condition (see Section 5 for details);
- A small area of disturbed ground is present in the west of the site;
- A small area of disturbed ground is visible in the north of the site (possible agricultural/grazing area).

2001 Aerial Photograph

- The site appears similar to its current condition.

2004 Aerial Photograph

- The site appears similar to its current condition.
- A few small areas of disturbed ground are visible in the north-eastern corner of the site.

It is noted that the review of aerial photos was difficult due to the relatively small scale and poor resolutions.

4.6 Groundwater Bore Search - DNR

A groundwater bore search by DNR indicated that the nearest groundwater well (GW016059) is located approximately 1 km to the north of the site. Review of the details of the bore licence indicates that the bore is authorised for irrigation purposes. There are no groundwater bores between the site and the Hunter River.

5. FIELD WORK

5.1 Methods

A site walk-over was undertaken on 11 January 2007 to assess dominant geomorphologies, site slopes, and site features such as eroded areas, gullies, wet ground, existing dams and potential contamination. Field measurement of surface waters for pH and electrical conductivity (EC) was also undertaken using calibrated portable meters.

The approximate photo locations and general site features are indicated on Drawing 1, Appendix A.

5.2 Results

The results of the walk-over survey including slope measurement and site observations are presented on Drawing 1 in Appendix A, and are discussed in Section 4.

The results of in-situ pH and EC testing of surface waters are summarised in Table 2 below.

Table 2 – Surface Water pH and EC Testing in Dam

Location	pH	EC (µS/cm)
Dam	6.6	260

Notes to Table 2:
EC – Electrical Conductivity
Refer to Drawing 1 attached for dam location

The results of surface water testing generally indicate that surface waters are close to neutral pH and generally fresh.

6. SITE CONDITION

The dominant topographical feature of the site is the gully system, which traverses the site. Towards the east of the site the gully system was up to approximately 10 m deep, with bank slopes observed to range from 30° to 40° with localised slopes of 60° to 70° observed in possible erosion scarps (Photos 1 to 4). The floor of the gully appeared to be relatively flat.

Photo 1 – Typical section of the gully, looking south-east

Photo 2 – Typical section of the gully, looking west. Some erosion scarring is visible along the southern side of the gully.

Photo 3 – View along the gully looking east

Photo 4 – View along the gully looking east

The upper reaches of the gully system within the site originate from suburban run-off onto the site, specifically a stormwater culvert draining into a farm dam located in the north-eastern corner of the site (photos 5, 6 and 8). The dam was observed to be turbid and contained some reeds and surface vegetation at the time of investigation.

Photo 5 – Stormwater culvert draining onto site looking north-west

Photo 6 – Farm dam located in the north-western portion of the site, looking south-west.

The southern end of the dam within the gully contained some fill at the time of investigation (photos 7 and 8) comprising clayey sand and gravel (generally 100mm diameter or less) at the surface.

Photo 7 – Fill located at the southern end of the fill batter, looking west.

Photo 8 – Upper reaches of the gully system showing open unlined drainage channel, dam and fill area, looking north-west.

A series of minor drainage channels were observed in the north-western corner of the site in the vicinity of the dam. Site slopes of 10° to 15° were observed in the vicinity of the drainage channels. Localised erosion scarring was observed along the gully banks (photos 2, 9 and 10). Some of these erosion scars were the cause of the steeper slopes observed on site. Erosion scarring appeared to be in areas of decreased surface vegetation. Slopes within the eroded gullies were typically above 30° and less than 3 m in height. At the time of inspection, the gully lines were generally vegetated with some tree cover, grasses and small shrubs.

Photo 9 – Erosion scarring along the gully banks

Photo 10 – Erosion scarring along the gully banks

The remainder of the site sloped generally toward the main gully, with the exception of the eastern portion of the site, which sloped to the Hunter River.

Vegetation at the site generally comprised medium dense pockets of shrubs and semi mature trees, predominantly along the gully line (photos 1 to 4 and 11), to grassed former pasture land (photo 12) in the northern portion of the site, and current crop land observed over the southern section of the site (photo 13).

Photo 11 – Semi mature trees and along the major gully line

Photo 12 – Open former pasture land at the northern end of the site, looking east.

Photo 13 – Crop land in the southern section of the site looking north-east

A number of small fill stockpiles were observed on site, the largest of which was located adjacent to the dam (approximately 10 x 10 m in area) in the north-western corner of the site (photos 7 and 8). The surface of the fill stockpile generally comprised clayey sand and gravel materials.

A fill stockpile containing timber and green waste, (previously containing building demolition materials) was located south-east of the dam in the western section of the site (photo 14). A further fill stockpile to the south of the dam contained clayey sand and gravel, glass, timber, plastic, PVC, brick and concrete up to 500 mm in diameter (photos 16 and 17). A small area of disturbed ground (possible rubbish burial area) was located in the western section of the site near the timber and green waste stockpile (photo 15).

Photo 14 – Timber and green waste fill stockpile in the western section of the site, looking south.

Photo 15 – Small buried fill area in the western section of the site looking east.

Photo 16 – Fill stockpile in the western section of the site containing various materials, looking south-east.

Photo 17 – Fill stockpile in the western section of the site containing various materials, looking north.

At the time of investigation, three sheds were located on-site as well as the site dwelling. The northernmost shed comprised timber, sheet metal and masonry construction on a concrete slab (photo 18). It is understood that this shed housed a dairy.

Two further sheds were located in the central-western portion of the site, adjacent to the residence, as shown in photos 19 and 20.

The southernmost shed was of timber and sheetmetal construction on a concrete slab, and at the time of investigation was used for vehicle storage. The third shed, also of timber and sheetmetal construction, was on bare ground and was used for storage of hay bales, empty 44 gallon drums, a caravan, timber and building materials.

Photo 18 – Former dairy shed, looking south-east.

Photo 19 – vehicle storage shed, looking south.

Photo 20 – inside the southernmost storage shed

A water tank located adjacent to the dairy shed appears to collect stormwater from the roof of the shed and has not been used since 1971 (photo 21). No surface staining was observed in the vicinity of the shed at the time of investigation.

Photo 21 – Stormwater collection tank next to the dairy shed. Looking east toward the storage shed.

The southern section of the site contained large ploughed fields for cropping purposes (photo 22). Above ground fuel storage tanks were observed on the southern boundary of the site (photo 23). Some localised staining was observed at the base of the tanks.

Photo 22 – Ploughed fields for cropping purposes.

Photo 23 – Above ground fuel storage tanks located on the southern boundary of the site.

6.1 Potential Contaminants

Based on the results of the preliminary assessment, the potential for gross contamination to be present within the site is considered to be low due to on site activities or current site condition. The following observations were made with respect to potential contamination:

- Localised surface areas near the dwelling was observed to contain lush grass growth, which is likely to be a result of elevated nutrients from effluent disposal;
- The fill pad found next to the dam contained brown clayey sand and gravel at the surface and was sourced from the excavation of nearby swimming pools, however the chance of opportunistic dumping in this area cannot be discounted;
- A fill pad located in the western section of the site near the dam contained glass, timber, plastic, PVC, bricks and concrete up to 500 mm in diameter at the surface and could contain a range of potential contaminants including TRH, PAH, BTEX, PCB, OCP/OPP, Asbestos and Heavy metals;
- A former silage pit in the western section of the site contains predominantly green waste and timber, however, building materials which were removed from this area may have contained a range of contaminants including asbestos and the possibility of remnant contamination cannot be discounted;
- A large shed currently used for storage has an unsealed base and may have come into contact with a range of potential contaminants including TRH, PAH, BTEX, PCB, OCP/OPP and Heavy Metals from past landuse;
- Soils in the vicinity of the former above ground storage tank and 44 gallon drum near the former dairy have the potential to contain a variety of contaminants including TRH, PAH and Heavy Metals;
- Soils in the vicinity of the above ground fuel storage tanks on the southern boundary have the potential to contain a variety of contaminants including TRH, PAH and Heavy Metals;
- Contamination due to the former piggery landuse cannot be discounted, however, contamination is considered unlikely due to the period of time that has passed since the piggery was discontinued;
- Possible pesticide use in the southern section of the site may have caused contamination, however given that this area of the site is proposed to remain agricultural, further assessment is not required at this stage;

- The presence of rubbish burial areas on the site. The extent of these burial areas has not been assessed.

7. URBAN CAPABILITY

Slope Stability

Slopes in the vicinity of the major gully are generally in the order of 30° to 40°, with some localised steeper slopes associated with erosion within the gullies. Further assessment of slope stability (including set back requirements for the proposed residential development) by an experienced geotechnical engineer or engineering geologist is recommended.

Further assessment of the long term stability will be required for the on site dam (if retained), prior to re-development. Some remedial works, such as compaction of embankment material and erosion protection may be required if dam is retained.

The main gully system comprises relatively wide gullies with a meandering stream at the base. The gully is incised with steep slopes, both in proximity of the stream and remote from the stream.

Slopes within the northern banks of the gully system were observed to range from 20° to 60° although slopes of up to 70° were observed in the north-eastern corner of the site. The batters were up to around 10 m in height but in places are around 5 m in height (near western boundary). It is possible that on-going erosion in these areas may in future cause localised slumping or instability in the banks and the adjacent areas, which is part of the natural geomorphological processes in such areas.

It is suggested that the following constraints should be applied to development on the flanks of the gully:

- No development on slopes between 15° and 25° or within 10 m of the crest of these slopes without specific geotechnical assessment;
- No development on slopes exceeding 25° and within 25 m of the crest of these slopes without specific geotechnical assessment and suitable remedial works where necessary.

The approximate extent of the area affected by these restrictions is shown on Drawing 1, Appendix B.

The site is considered to be generally suitable for development with respect to slope stability providing that the above constraints are addressed during the design and/or construction phase.

Soils in the immediate vicinity of the farm dam were observed to contain some wet to saturated surface soils and some ponded water. The presence of soft / wet or poorly drained soils would not necessarily preclude development but would require some form of ground treatment, depending on the nature of the development. Further investigation is required in this area to determine the most appropriate treatment for future foundation and pavement design.

Acid Sulphate Soils

Acid sulphate soils are not anticipated within the site as described previously.

Erosion Potential

Near surface soils within the site were observed to be erodable where vegetation was sparse predominantly in the vicinity of the gully system. Further assessment including laboratory testing of soils is required to assess erosion potential of soils on site.

Provision of an adequate vegetation cover would aid in preventing large scale erosion at the site. It should also be noted that erosive soils are readily amenable to standard mitigation measures during and following construction.

Salinity Potential

During the site inspection, there were no obvious indicators of gross salinity (i.e. impacted vegetation or salt scalds). In addition, preliminary water testing in major creeks and dams on site indicated that generally fresh surface water was present (i.e. no indication of saline surface waters).

Based on the soil landscape mapping, there may be a potential for salinity issues associated with drainage lines within the site. It is noted, however, that salinity occurrences or hazards have not been identified on the site by DNR.

Additional soil sampling and testing is recommended as part of the detailed design to further assess the distribution salinity of the soils, and confirm appropriate measures to manage such soils.

Mine Subsidence

The site Section 149 certificate indicates that the site is not within a proclaimed Mine Subsidence District and is unlikely to be undermined.

8. COMMENTS

The results of the preliminary geotechnical and contamination assessment have identified issues that should be considered for site development:

- Localised constraints imposed by steep gully slopes requiring specific geotechnical assessment in relation to slope stability;
- The potential for salinity issues within drainage lines;
- The presence of erodable soils where not protected by vegetation cover;
- Uncontrolled fill, fill stockpiles and rubbish burial areas which will require further assessment and possible removal;

- The potential for hydrocarbon contamination in the vicinity of former aboveground fuel storage and in unsealed areas in the vicinity of sheds.

The above issues are considered to be minor and readily addressed through detailed investigation and design. The potential for contamination at the site is considered to be low. The presence of elevated nutrients in surface soils near the effluent disposal area can be readily addressed during earthworks construction. Further investigation is recommended to confirm the absence of contamination associated with the fill stockpiles, and other areas such as the unsealed shed base, in the vicinity of the dairy shed and above ground tanks located in the southern section of the site.

Overall the northern portion of the site is considered to be suitable for future rezoning, subject to the above issues being addressed, with further subsurface investigation recommended.

9. LIMITATIONS OF THIS REPORT

DP have performed investigation and consulting services for this project in general accordance with current professional and industry standards for land contamination investigation.

DP, or any other reputable consultant, cannot provide unqualified warranties nor does DP assume any liability for site conditions not observed or accessible during the time of the investigations.

No site investigations can be thorough enough to provide absolute confirmation of the presence or absence of substances, which may be considered contaminating, hazardous or polluting.

This report and associated documentation and the information herein have been prepared solely for the use of Orbit Planning and any reliance assumed by other parties on this report shall be at such parties own risk. Any ensuing liability resulting from use of the report by other parties cannot be transferred to DP.

DOUGLAS PARTNERS PTY LTD

Reviewed by:

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2. Department of Land and Water Conservation, "Site Investigations for Urban Salinity", 2002.