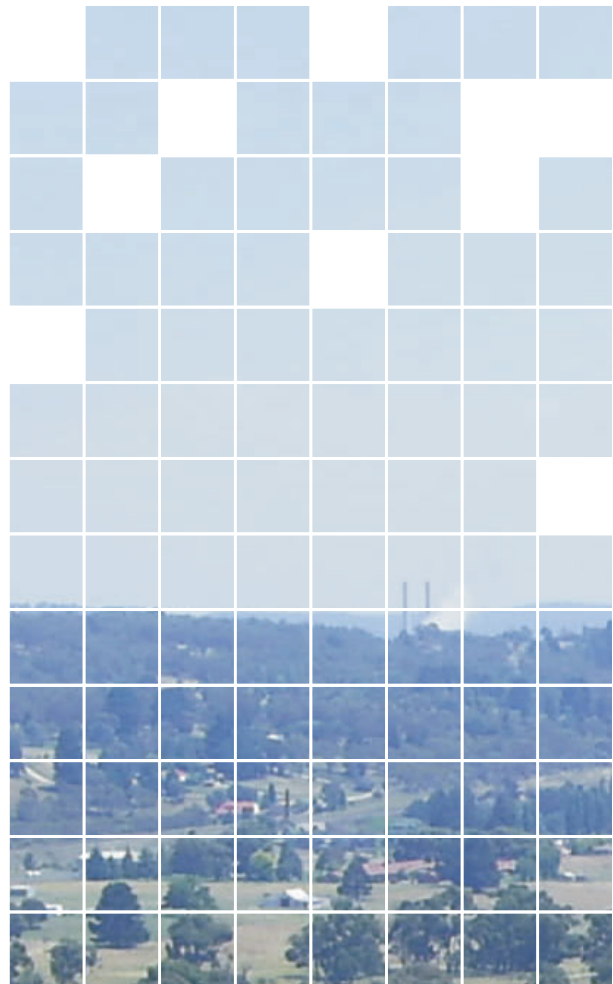
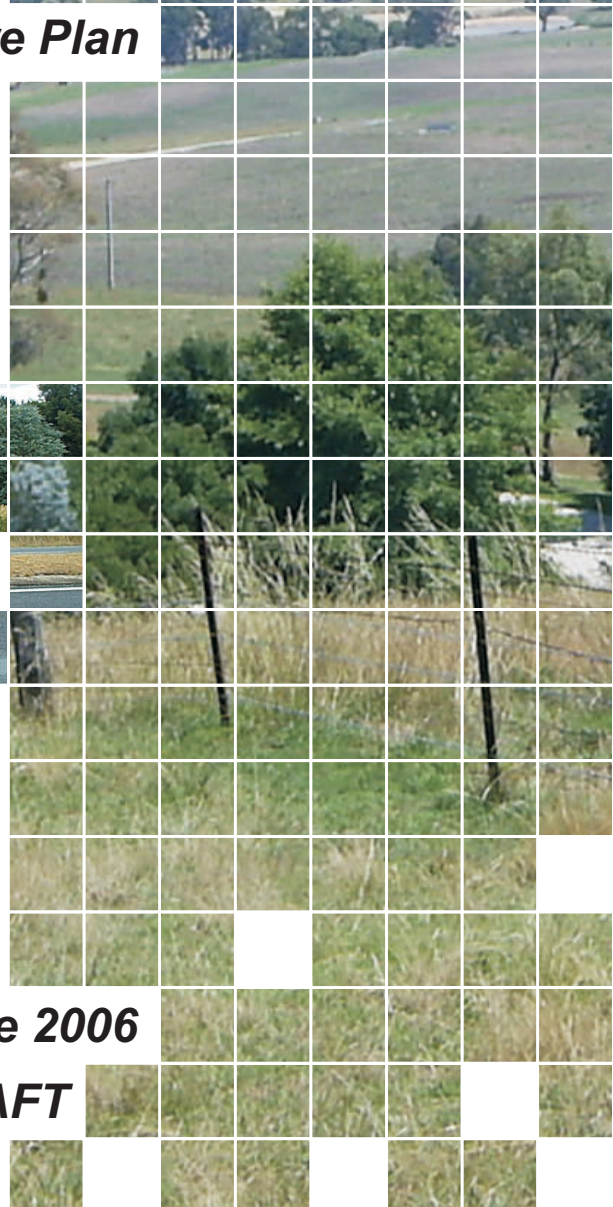




Marrangaroo Structure Plan

PREPARED FOR:



PREPARED BY:



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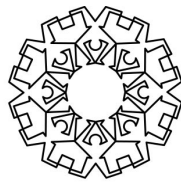
June 2006

DRAFT

MARRANGAROO
DRAFT STRUCTURE PLAN

PREPARED FOR:
LITHGOW CITY COUNCIL

JUNE 2006

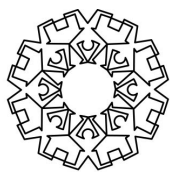


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Project:	Structure Plan
Client:	<i>Lithgow City Council</i>
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Draft/Final:	Draft

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The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

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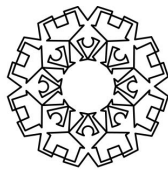
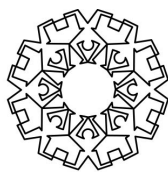


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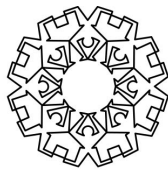
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APPENDIX A

Dictionary Extract - Standard Instrument (Local Environmental Plans) Order 2006

APPENDIX B

Application of SEPP 58



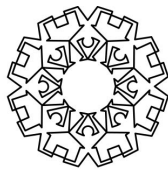
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Introduction

1.1 BACKGROUND

In 2005, Lithgow City Council, following a sharp growth in demand for residential housing, identified a need for additional urban land (residential, commercial, industrial) in close proximity to the services and facilities of Lithgow to provide for future orderly and sustained growth.

Marrangaroo was identified as a suitable site for investigation given its location, mix uses, proximity to rail and road and relative flat to undulating topography. Past studies (Kinhill 1981 and Newplan 2004) had also identified areas within Marrangaroo as suitable for a range of urban purposes.

With changes to the *Environmental Planning & Assessment Act 1979* and the requirement for Councils in NSW to put in place new LEPs reflecting a standard format Council chose to also examine the Rural 1(a) zone across much of the area. Concern had been raised that this zone because of its inherent flexibility (allowing many different types of development) was creating land use conflict and could undermine planned, efficient and attractive development.

1.2 PURPOSE

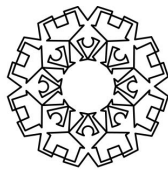
This Structure Plan has been prepared for Lithgow City Council to identify the “highest and best use” of land at Marrangaroo.

The Structure Plan should be read in conjunction with the following two reports:

- Marrangaroo Local Environmental Study, June 2006; and
- Structure Plan Guidelines, May 2006.

This Structure Plan adopts Land Use Option 3 identified in the Local Environmental Study to provide the following:-

- Preferred land uses and their location
- Areas to be conserved and protected from future development
- Key infrastructure needs and preliminary costs
- A staging plan



1.3 STRUCTURE OF PLAN

This Structure Plan has ten (10) sections.

Section One provides a background to the development of the Structure Plan and clarifies its purpose.

Section Two lists the planning principles used to provide the framework for the development of the Structure Plan and provides a brief overview of factors influencing demand for land.

Section Three outlines the proposed land uses and the types of development possible within the framework of the Standard Instrument (Local Environmental Plan) Order 2006.

Section Four describes each land use precinct and the parameters influencing development.

Section Five describes the water and sewerage infrastructure needed to service the area.

Section Six sets out the existing and indicative road network.

Section Seven is an Opinion of Cost to provide services.

Section Eight is a broad staging plan for the development of Marrangaroo.

Section Nine lists possible future actions.

Section Ten records outstanding matters which may influence this Structure Plan.

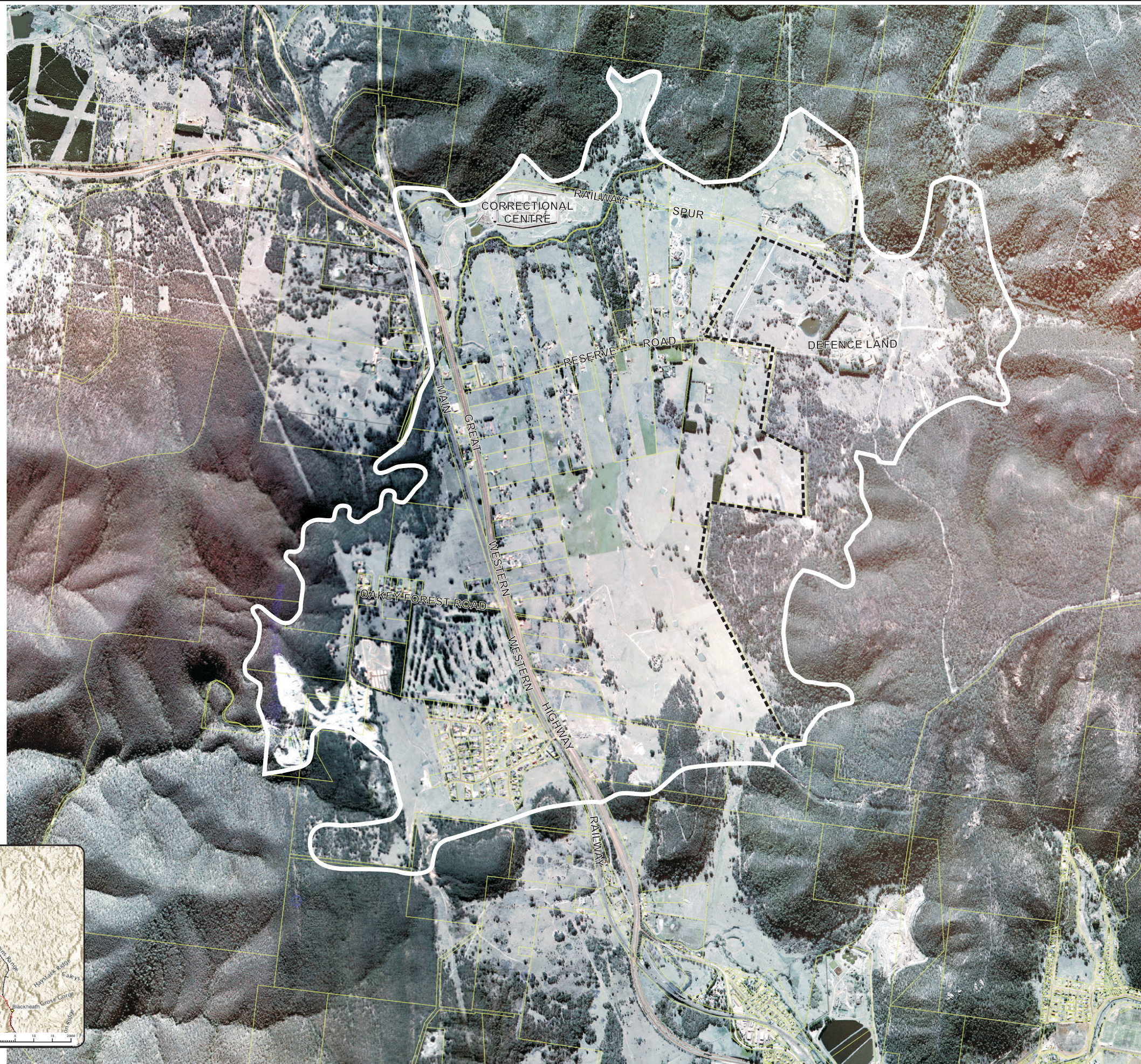
1.4 SITE LOCATION AND CONTEXT

The Marrangaroo Study Area is located between the urban centres of Lithgow and Wallerawang, approximately 145 kilometres west-north-west of Sydney.

Marrangaroo is 5 minutes north of Lithgow and is split into an eastern and western portion by the Great Western Highway and the Main Western Rail Line (see **Figure 1**). The Study Area is approximately 1100 hectares and includes land owned by the Department of Defence.

West Marrangaroo is predominantly zoned 2(a) Residential with the existing Quarry and land west of the Go Kart track being 1(a) Rural (General) under *Lithgow LEP 1994*. It is characterised by more established uses such as the Golf Course, Marrangaroo Fields Estate, the Quarry and Go Kart operation. Large rural residential lots front Oakey Forest Road and the remaining land is occasionally grazed.

On the larger eastern side the land is all zoned 1(a) Rural (General), including the sliver of land between the Highway and Railway (see **Figure 2**). This portion comprises the Correctional Centre, Defence land, rural residential sized lots along Reserve Road, grazing/farming land and a range of uses (motel, service station, industrial lots, dwellings etc) spread along the frontage to the Great Western Highway.

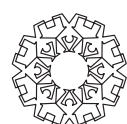


DEFENCE LAND

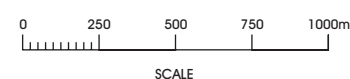
SITE

SITE BOUNDARY

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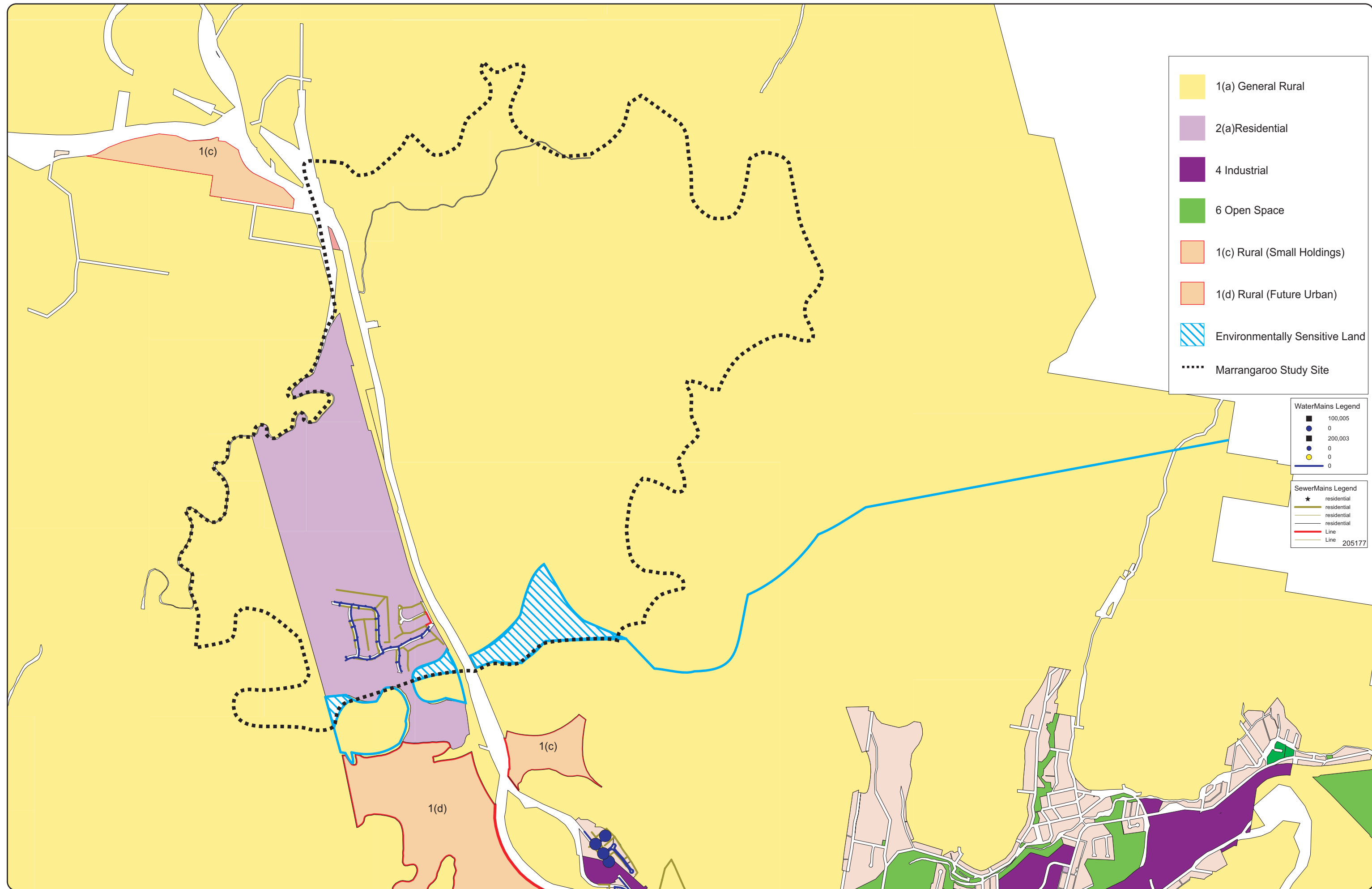


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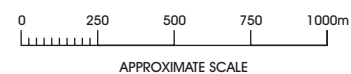
SOURCE:
 AERIAL PHOTOGRAPH & CADASTRE - © LAND AND PROPERTY INFORMATION (2005)
 REGIONAL LOCATION - © NSW LANDS (2004)

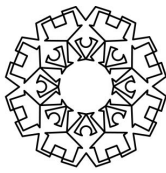
FIGURE 1:
 MARRANGAROO
 SITE BOUNDARY



	1(a) General Rural
	2(a) Residential
	4 Industrial
	6 Open Space
	1(c) Rural (Small Holdings)
	1(d) Rural (Future Urban)
	Environmentally Sensitive Land
	Marrangaroo Study Site

WaterMains Legend	
	100,005
	0
	200,003
	0
	0
	0
SewerMains Legend	
	residential
	residential
	residential
	residential
	Line
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The Study Area is enclosed by steeply vegetated slopes and has a predominately rural character despite Highway uses and scattered residential development.

1.5 RELATIONSHIP TO STRATEGIC PLAN

Lithgow City Council has embarked on a Strategic Plan with funding provided by the Planning Reform Fund Program managed by the Department of Planning.

The project is to:

To develop a strategic plan to provide the framework for the future development of the Lithgow City Council LGA and to encourage environmental, economic and social sustainability.

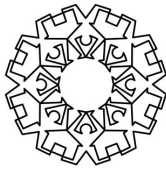
The strategic planning project has three major parts:

- A local profile documenting baseline information on where are we now?
- A series of issues papers to explore and understand the key issues with the Local Government Area and help answer where do we want to go?
- A draft and final Strategic Plan with actions and strategies on how to manage growth, development and conservation to help achieve and monitor where we want to be in next 20 years.

Community consultation and the development of a vision for the area are key parts of the project which have already commenced.

Data for the Local Profile is still being compiled however the preliminary findings suggest that:

- Lithgow has experienced a slight population decline between the census periods 1991, 1996 and 2001 from 20,253 people to 19,197 people. However, between 2000 and 2005 ABS reports that the average annual growth rate was 0.5%.
- Future population projects for Lithgow undertaken by the Department of Planning anticipate a small decline of -0.6 % to 2016 then a modest 0.1% growth for the next two census periods 2021 and 2026.
- Since 1991, there has been a decline in the average household size from 2.8 to 2.5 persons in 2001. This creates a demand for housing and is notable in areas where population levels are relatively static.
- Lithgow has a declining population of 0-5 and 5-9 year olds and 20-24, 25-29, 30-34, 35-39 year olds however it is not as high as the State average. Lithgow like many areas in NSW has an increasing portion of people in the population over 50 years of age.
- Future urban land (residential, commercial and industrial) supplies are constrained in and around Lithgow for urban development and within the village zones of Wallerawang (1,935 people) and Portland (1,817 people) both within 10 – 15 minute drive of Lithgow.



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- Lithgow has potentially over 1,234 lots zoned for residential development and are either subdivided or under consideration by Council. Some of it constrained by environmental or location factors and is in numerous private holdings. Its release onto the market is unknown and is likely to be influenced by market driven forces in Sydney and the Blue Mountains, the capacity of water and sewer within the Local Government Area and job opportunities. These lots are in both existing built areas and greenfield (new) locations.
- More specifically for Lithgow and Marrangaroo 132 combined development applications/construction certificates were lodged between 2001 and 2004. This equates to approximately 33 dwellings per year.
- There is a lack of suitable land for employment generating uses requiring large parcels of land with good access to the Highway.

The strategic assessment of Marrangaroo within the context of the local government area and its future development will be covered in more detail in the strategic planning process.

Planning Context

2.1 PLANNING PRINCIPLES

2.1.1 BUILT ENVIRONMENT

The design principles of Crime Prevention Through Environmental Design, Improving Transport Choice (2001) and the Right Place for Business and Services (2001), where relevant have been adopted in this Structure Plan and Guidelines. Both Planning for Bushfire Protection (2001) and the NSW Flood Prone Lands Policy and Floodplain Development Manual (2005) will need to be considered in detail with any future rezoning.

A wide range of issues and values for the area were identified during the preparation of the Local Environmental Study (LES) and inform this Structure Plan.

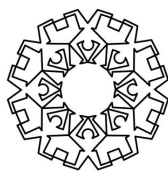
The following values for Marrangaroo were identified by the community through the LES process:

- Rural character, amenity and outlook.
- Open space, views and beauty.
- Proximity to Lithgow but with peace and quiet.
- Wildlife, bushland, natural vegetation.
- Mix of land uses and larger block sizes.
- Heritage both built and natural.
- Lifestyle, affordability and friendly people.

Table 2.1 brings together the values and principles identified by the community and those defined by various state guidelines to produce a unique set for development at Marrangaroo.

Table 2.1 - Guiding Principles for Marrangaroo

Principles adapted from Sustainable Urban Settlement Guidelines for regional NSW and Integrating Land Use and Transport.	Principles adapted from community input (Open House 16 February 2006)
1. Separate incompatible uses from one another.	1. Minimise land use conflict and protect existing resources from incompatible land uses to allow for continued economic growth.
2. Locate development near services and infrastructure reducing costs.	2. Design and implement cost effective infrastructure for the whole area to support its development.

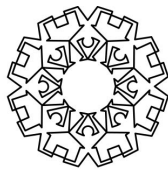


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Table 2.1 - Guiding Principles for Marrangaroo

Principles adapted from Sustainable Urban Settlement Guidelines for regional NSW and Integrating Land Use and Transport.	Principles adapted from community input (Open House 16 February 2006)
3. Design areas to provide access to natural environment, services, employment and recreational opportunities.	3. Well planned development with adequate safeguards for the environment. Improve access from Marrangaroo Fields and Oakey Forest Road onto the 100km Highway.
4. Protect environmental attributes and areas of visual amenity such as ridgelines and viewpoints.	4. Protect heritage views and rural character/setting of the area. Maintain the natural beauty of hills (forested, rock formations and vegetation) for wildlife, attractiveness and the lifestyle option it provides.
5. Incorporate wildlife corridors along gullies and waterways and avoid creating barriers for wildlife movement.	5. Protect Marrangaroo Creek, its water quality and wildlife nb: no platypus was identified during the fauna assessment however several landholders have recorded sightings and potential habitat is available.
6. Nominate buffer areas between urban development and natural areas and waterways.	6. Provide adequate separation between land uses and links to open space.
7. Avoid urban development in flood prone areas, bushfire danger, soil erosion areas etc.	7. Provide a range of recreational opportunities including access to bushland walks.
8. Provide basic services within residential neighbourhoods or villages – such as a shop or community centre. Do not plan or develop services greater than the needs of the target population.	8. Need employment generating land uses e.g. clean light industrial, business and land with good access and visibility.
9. Cluster community, service, educational, retail and commercial uses near the centre of neighbourhoods. Such uses should <u>not</u> be located on regional transport routes.	9. Maintain the visual quality of the entrance to Lithgow and ensure community and lifestyle are protected.
10. Locate compatible land uses together to reduce trip lengths, provide viable transport choice and encourage walking and cycling.	10. Road network needs to be bus friendly (wide, adequate turning circles, good & safe access). Provide walking, cycle and public transport with links back into Lithgow.
11. Encourage the type of development that will benefit the greatest number and range of people in the community with the least adverse impact.	11. Separate minimum security Correctional Centre and residential housing.
	12. Protect all reasonable access to valuable resources, such as the Quarry, that supply essential material for construction.
	13. Increase economic opportunities to live and grow in Lithgow.

Source: Geolyse Pty Ltd



2.1.2 STRUCTURE PLAN GUIDELINES

IntegratedDESIGNgroup have prepared Structure Plan guidelines for Marrangaroo. These accompany this Structure Plan and flow from the environmental analysis in the Local Environmental Study.

These guidelines adopt principles for sustainable communities to be implemented in the future development of the area.

2.2 WATER QUALITY

State Environmental Planning Policy No. 58 – Protecting Sydney’s Water Supply

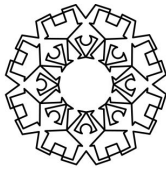
This section examines the implications of State Environmental Planning Policy (SEPP) 58 – *Protecting Sydney’s Water Supply* on the development of Marrangaroo. SEPP 58 aims to ensure that development within the hydrological catchment from which Sydney draws its drinking supply does not have a detrimental impact on water quality, and that there is a consistent approach to the assessment and control of development within the catchment that is likely to impact on water quality. It also aims to ensure that the Chief Executive of the Sydney Catchment Management Authority has a role in the approvals process for development likely to impact on water quality within the catchment.

A broad-scale study was undertaken to assess the likely impact of the proposed Marrangaroo development on receiving waters within the catchment. This study assessed the likely pollutant loads of run-off for the Marrangaroo Structure Plan, and compared these loads with those expected from the existing Marrangaroo land uses.

This study showed that it is likely that pollutant runoff loads will increase due to the proposed development. Therefore, development within the catchment will need to be supported by water cycle management strategies that are employed to address these impacts.

The water cycle management study should address the following matters (SEPP 58):

- Pre-development and post-development run-off volumes and pollutant loads from the site of the proposed development.
- An assessment of whether the development will have a neutral or beneficial effect on the water quality of rivers, streams or groundwater within the catchment, including during periods of wet weather.
- An assessment of whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term.
- An assessment of whether the development is compatible with relevant environmental objectives and water quality standards for the catchment when these objectives are established by the government.



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- The water cycle management strategies and best management practices proposed to be employed to address water quality impacts.
- The arrangements to be made for the ongoing maintenance and monitoring of the water cycle management system.
- The results of consultations concerning the proposed development with the EPA and other relevant agencies.

River Flow Objectives

The River Flow Objectives found within the *Final Report to the Independent Inquiry into the Hawkesbury Nepean River System* (1998) and provided by the Department of Conservation and Environment relevant to the study are:

- *Protect pools in dry times*
- *Protect natural low flows*
- *Protect important rises in water levels*
- *Maintain wetland and floodplain inundation*
- *Mimic natural drying in temporary waterways*
- *Maintain natural rates of change in water levels*

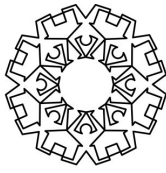
Riparian Zones

The Department of Natural Resources has developed a classification to identify minimum riparian corridor widths required along water courses which must be classified by them.

A representative from the Department of Natural Resources has inspected some of the area and recommended a minimum of 50m and a maximum of 100m for Marrangaroo Creek and a minimum of 30m and a maximum of 50m for the Category 2 watercourses pending further detailed studies. These maximum buffer widths have been adopted in this Structure Plan.

The Department has also set the following criteria to measure achievement of Category 1 objectives, in this case, applicable to Marrangaroo Creek. These are consistent with the requirements of DPI Fisheries.

- *Provide a continuous riparian corridor.*
- *Provide a suitable environmental protection zone.*
- *Restore/rehabilitate the riparian zone and ensuring the density matches those occurring naturally.*
- *Locate services such as power, water, sewerage and water quality treatment ponds outside the core riparian zone.*



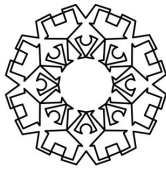
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- *Provide a suitable interface with urban development (roads, playing fields, open space) to minimise edge effects.*
- *Minimise the number of road crossings.*
- *Maintain riparian connectivity by using piered crossings in preference to pipes or culverts.*
- *Minimise the use of walkways, cycleways and general access points by using ecologically informed design principles.*
- *Locate flood compatible activities (playing fields) outside the core riparian zone.*
- *Manage urban development to avoid increasing the impact of salinity on the landscape and watercourse.*
- *Provide lateral connectivity for instream function.*
- *Ensure channel stability.*
- *Protect the natural values within the channel.*
- *Ensure all stormwater discharge is treated outside before it enters the core riparian zone.*

This Structure Plan has identified a suitable environmental protection zone continuously over the length of Marrangaroo Creek incorporating remnant vegetation within the Study Area. The remaining criteria, where relevant, has been incorporated into the design guidelines or are to be implemented in future design and development of new land uses.

Presently two, Category 2 water courses have been identified by DNR. The established criteria to ensure the objectives for these watercourses are achieved are:

- *Providing a core riparian zone of greater than 20 metres.*
- *Providing, where possible, sufficient (additional) riparian corridor width based on geomorphological and environmental considerations.*
- *Restoring/rehabilitating the riparian zone and ensuring the density matches those occurring naturally.*
- *Providing where possible, appropriate zoning that recognises the environmental significance of the riparian land.*
- *Minimising the number of road crossings and ensuring road crossings are designed to maintain riparian connectivity.*
- *Providing a suitable interface with urban development (roads, playing fields, open space) to minimise edge effects.*
- *Minimising the extent of open parkland adjacent to a stream.*



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- *Locating services such as power, water, sewerage and water quality treatment ponds outside the core riparian zone. Encroachment into the riparian area maybe possible if the impact on riparian functions is minimised.*
- *Managing urban development to avoid increasing the impact of salinity on the landscape and watercourse.*
- *Providing lateral connectivity for instream function.*
- *Ensuring channel stability.*
- *Protecting the natural values within the channel.*
- *Ensuring all stormwater discharge is treated before it enters the stream.*

At the time of writing this Structure Plan DNR had not categorised all watercourses in the Study Area. As an interim measure, Geolyse Pty Ltd has nominated a 20 metre ecological buffer.

Department of Primary Industries has also advised that impacts on water quality or water flow (including temperature and flow rate) need to be carefully considered in any study to avoid impacting on existing aquaculture facility within the catchment or any future aquaculture facility. In this case, Arch Vale Trout Farm is downstream of the Study Area on Marrangaroo Creek.

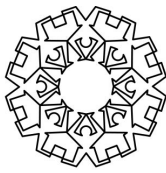
Water Sensitive Urban Design principles and methods will need to be incorporated into all development within the Study Area. In this regard the following guiding design principles should apply:

- Limit post development peak discharge to match downstream constraints.
- Remove contaminants to protect downstream aquatic systems – a treatment train approach, which utilises a series of management devices, should be adopted to control runoff quality throughout the catchments.
- Integrate stormwater treatment into the built landscape, again using the treatment train approach.
- Provide safe and efficient stormwater conveyance along major drainage lines.
- Where possible, utilise stormwater harvesting and reuse to reduce potable water demand.
- Protect downstream drainage systems against construction and long term impacts.

Groundwater

The *NSW Groundwater Quality Protection Policy* (DLWC, 1998) adopts nine principles in relation to groundwater quality protection. Those considered relevant to the Marrangaroo Study Area and addressed through this Structure Plan and Guidelines include the following:

- *All groundwater systems should be managed so that the most sensitive identified use (or environmental value) is maintained.*



- *Groundwater pollution should be prevented so that future remediation is not required.*
- *For new developments, the scale and scope of work required to demonstrate adequate groundwater protection shall be commensurate with the risk the development poses to a groundwater system and the value of the resource.*
- *Groundwater dependent ecosystems will be afforded protection.*
- *Groundwater quality protection should be integrated with the management of groundwater quantity.*
- *The cumulative impacts of developments on groundwater quality should be recognised by all those who manage, use, or impact the resource.*

2.3 ECOLOGICAL PARAMETERS

The primary ecological aim of any development within the Marrangaroo Study Area would be to maintain or improve the terrestrial and aquatic biodiversity of the area by protecting remnant vegetation, providing adequate buffers between development and sensitive habitat and enhancing native habitat. **Figure 3** maps vegetation composition and threatened species sightings for the Study Area. In this regard the following have been recommended:

- Woodland edge buffer zones of a minimum 25 metres should be established between development areas and native bushland adjoining broader woodland and forest communities.
- The Marrangaroo Creek course from an ecological perspective should be protected by a minimum buffer zone of 50 metres up to a maximum of 100 metres from either side of the channel with allowance for native vegetation associated with the riparian corridor.
- Prominent drainage depressions, unnamed creeks and feeder streams should be protected by a minimum 20 metre buffer either side of the course unless categorised by the Department of Natural Resources and a larger buffer recommended.
- Future planning should incorporate small open woodland pockets, clumps of scattered trees and 'fingers' of native vegetation into the development design. **Figure 4** provides an indicative plan for this work.
- Weed control measures would need to be undertaken as part of any future development. Different measures would be required across different sites, especially along watercourses. Regular monitoring is also required during and post development and should be included as part of routine care for buffer zones and important habitat.
- Programs need to be instigated with an understanding of feral populations and the existing native communities that serve to control all pest animals across the Study Area.
- The protection of important habitat, riparian corridors and established buffer zones should not rest on the exclusion of development from these areas. Active development should also aim to promote the rehabilitation of disturbed and degraded land, and where possible increase the extent of native communities and habitat in the area.



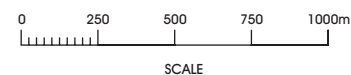
THREATENED SPECIES SIGHTINGS

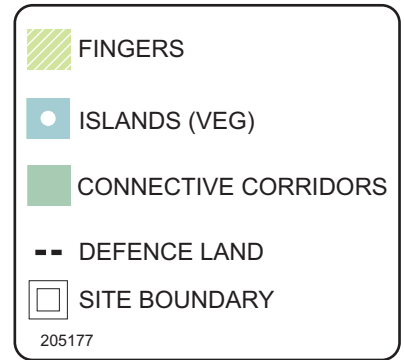
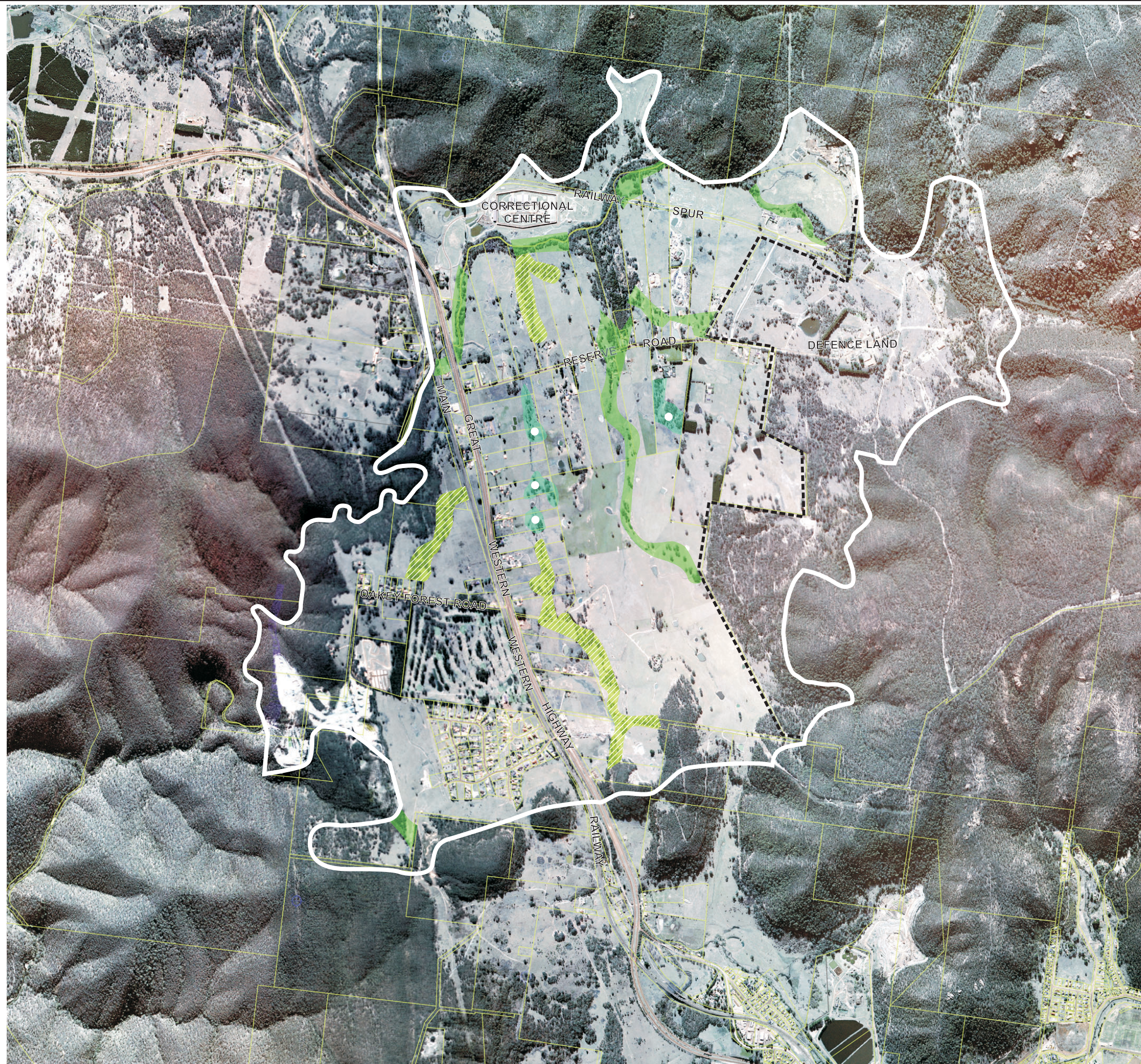
- GANG GANG COCKATOO
- COPPER BUTTERFLY
- SPOTTED TAIL QUOLL
- POWERFUL OWL
- EASTERN BENT WING BAT

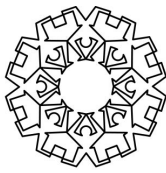
**VEGETATION COMPOSITION
STRUCTURAL CLASSIFICATION**

- WOODLAND
- RIPARIAN WOODLAND CORRIDOR
- OPEN WOODLAND
- PASTURELAND / AGRICULTURALLY MODIFIED GRASSLAND
- SITE BOUNDARY

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2.4 ECONOMY

Lithgow lies across major road and rail corridors linking the west of NSW to Sydney. Pacific National employed 42 people in 2005 (LCC). The increased interest in developing a greater transport capacity of the Bells Line of Road gives some impetus to the long term economic prospects for Lithgow.

Lithgow maintains a small light manufacturing and engineering sector. ADI employed 110 people in 2005 and a number of new and expanding enterprises, including Howards Pyrotechnics have established.

This highlights the potential for growth in this sector and the need for suitably zoned and serviced land. Ferrero Australia has established a confectionary plant at Lithgow (based on climatic conditions) employing 85 full-time staff with a floating population of 45 casuals in 2005 (LCC).

Government enterprises are an important economic base where the Lithgow Correctional Centre employed 167, Police Assistance Line 84 and State Debt Recovery Office 180 in 2005 (LCC).

The traditional basis of the Lithgow economy has been mining and power generation. This reliance will continue in the foreseeable future. However, both sectors have been impacted significantly by the removal of trade barriers, the privatisation of state utilities and efficiency goals of competition policy (Baker 2006). This is reflected in the sharp decline in the proportion of the workforce in mining and manufacturing from 1991 to 2001. The mines and Delta Electricity employed 788 and 302 respectively in 2005 (LCC).

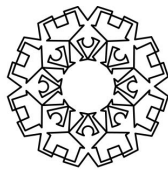
Traditional agriculture has been an important industry in the past, but the production of wool and beef may be shifting towards smaller scale enterprises such as olives, fish farming and an emerging wine-growing industry. This reflects the increasing number of lifestyle blocks in the Local Government Area many supported by off-farm incomes. Interestingly 93% of lots in the Local Government Area are less than 100 hectares with 45% less than 10 hectares lvey ATP (2006). Softwood forestry is an ongoing industry.

The retailing sector has experienced the largest proportional workforce growth between 1991 and 2001 and currently it is estimated that \$150 million is spent per year by residents in the trade area (Baker 2006). There is still substantial escape expenditure in non-food retailing. There is evidence encouraging the planning of a retail park to centralise bulky goods retailing, further boosting employment in this sector.

2.4.1 NEW EMPLOYMENT GENERATING DEVELOPMENT

Strong economic activity and investment in Lithgow LGA is occurring as evidenced by the following recent approvals or development applications under consideration:-

- Three (3) new/extended coal mines at Pinedale, Clarence and Lamberts Gully with the potential for 135 new jobs.



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- Emirates Hotels (Australia) are planning a luxury eco-tourism resort in the Wolgan Valley 35 kilometres north of Lithgow. This will have direct and flow on impacts for jobs in the region (110 full time equivalent expected in first year).
- Three (3) major project applications under consideration by the Department of Planning for Angus Place extension, Ivanhoe North rehabilitation project and Invincible open cut (240 jobs).
- Approval for a new motel, conference room and ancillary restaurant. The development comprises a two-storey motel with 18 ground floor rooms and 32 first floor rooms (including 4 penthouse rooms), with function room, bar and restaurant area for hotel patrons, courtyard and ancillary parking area.
- Approval for 74 single storey 2 and 3 bedroom units in 6 stages off Hoskins Avenue and Hayley Street, Lithgow. A Community Title tenure is proposed following approval for construction.
- New Woolworth's service station under consideration.
- Australian Defence Industries development and subdivision for 6 industrial lots, approved.
- Approved extension and redevelopment of the Westfund office to improve Main Street visibility.
- Current construction to extend the Ferrero factory building at Barton Street, Lithgow to allow new plant and potentially a 10% increase in employment.
- Residential development at Col Drewe Drive, Lithgow for 128 senior's living villas under consideration by Council.
- Child care centre for 80 children and purpose built medical centre on the corner of Bridge and Short Streets, Lithgow recently approved by Council.
- Approved extensions to aged care facilities at Tanderra in Lithgow (52 new beds) and Tabulam in Portland (26 new beds).

2.5 URBAN SUPPLY AND DEMAND

2.5.1 RESIDENTIAL

Population and household size are important factors that reflect the demand for housing and land. Demand can also be expressed in the number of dwellings approved and constructed in an area.

The Australian Bureau of Statistics has recorded an increase of 292 private dwellings between 1996 and 2001 for Lithgow. Between 2001 and 2004 Lithgow City Council's register of applications lodged recorded a total of 428 combined development applications and construction certificates (DA/CC) for dwellings.

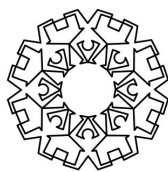


Table 2.2 breaks down the number of dwelling applications into two categories, urban and rural areas.

Table 2.2 - Number of DA/CC for Dwellings lodged with Lithgow City Council, 2001-2004

Year	Urban Centre's	Rural	Total
2001	44	51	95
2002	63	63	126
2003	52	59	109
2004	58	40	98
TOTAL	217	211	428
Average number per year	54	53	107

Source: Lithgow City Council DA Register 2001-2004

On average 107 dwelling applications were lodged per year. Of this figure approximately 49% were in the rural areas and 51% in the urban centres (recorded as Lithgow, Wallerawang, Portland & Marrangaroo). This however does not tell us how many dwellings have been actually built and issued with an occupation certificate (information not readily available).

For the Lithgow and Marrangaroo area one hundred and thirty two (132) dwelling applications were lodged between 2001 and 2004.

2.5.2 RESIDENTIAL LAND SUPPLY

The LES analysis focused on the availability of land in Lithgow itself within close proximity to Marrangaroo and found that there are approximately 1,234 potential dwellings sites in the area.

Using this figure and the number of dwellings approved between 2001 and 2004 an indication of existing supply can be given (see table below) by dividing 1,234 by the number of dwellings approved.

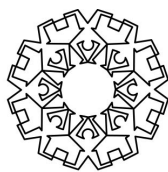
Table 2.3 – Residential Supply and Demand

Dwellings per annum 2001 - 2004	Locations	Supply (years)
54	Urban Areas	23 years
33	Lithgow & Marrangaroo only	37 years

Source: Lithgow City Council DA/CC Register 2000-2004

If we were to discount all land other than that in South Bowenfels being 900 lots, using a take up rate of 33 dwellings per year, 27 years supply of residential land would be available.

This basic analysis however, does not provide for points of difference in the market, which require a range of housing types to provide a range of lifestyle choices in Lithgow.



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In addition, approximately 300 hectares of land is zoned Future Urban 1(d) and is referred to as West Bowenfels. It lies to the north of South Bowenfels and links to land zoned 2(a) in Marrangaroo. This land has environmental constraints and is separated from the services and facilities of Lithgow by the Main Western Line (in part) and the Great Western Highway. However, subject to detailed environmental analysis, areas may be suitable for urban uses and potential housing stock in Lithgow.

Strategically however, Marrangaroo represents an opportunity to identify good land in close proximity to services and facilities of the township of Lithgow and to protect it for future uses that support the growth of the area.

2.5.3 BUSINESS AND INDUSTRIAL LAND

There is limited supply of good industrial land in Lithgow. Many enterprises and investors seek land in industrial estates or 'clusters' which are already serviced, have a high level of environmental amenity for workers and good access to arterial roads.

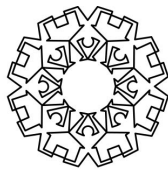
Table 2.4 provides a snapshot of available land for business and industry development in Lithgow.

Table 2.4 - Urban Land Supply: Business and Industrial in Lithgow

Location	Zoned Land Available (area or lots) ₁	Status
3 Business (Lithgow)		
Pottery Estate	52,000m ²	Proposal for a centre to include 4 cinema complex, restaurants and large retail stores.
4 Industrial (Lithgow)		
ADI Site	Redevelopment and reuse of existing buildings 1500m ² minimum lot size	Partial development of site approved and under construction.
Mort Street (old gasworks site)	2 lots Potentially more with remediation	Vacant and ready for development.
O'Connor Street (Rail Infrastructure Corp)	3.114ha over two (2) sites	Unsubdivided and adjoins the railway line.

Source: 1Lithgow City Council

Marrangaroo presents the best opportunity for this type of development and needs to be recognised and marketed under a suitable zone requiring the removal of the current Rural 1(a) from candidate areas.



Land Uses

3.1 INTRODUCTION

The Structure Plan sets out uses for land in the Study Area and is depicted in **Figure 5**. These land uses have been developed using environmental parameters, noise criteria, the road hierarchy and transport corridors, existing uses, demography, supply and demand for land and proximity to services and facilities. It has been carefully weighed against community values and concerns for its development and State level policy.

The long term sustainable development of the area will rely on well planned and co-ordinated development that takes advantage of its location and minimises land use conflict.

There is an identified need for well located land for employment generating activities which do not detract from businesses and activities in Lithgow CBD. These areas are needed to provide 'clusters' of activities to attract and retain business in the region.

Strong demand for residential land in the local government area and Lithgow itself is not evident. However, the recent development activity in the area and accompanying employment opportunities will promote growth. The proximity of the area to Sydney coupled with changing perceptions of the area will also assist. This growth if planned adequately will ensure the values of Marrangaroo are maintained, infrastructure is available to support it and opportunities are sustainably optimised.

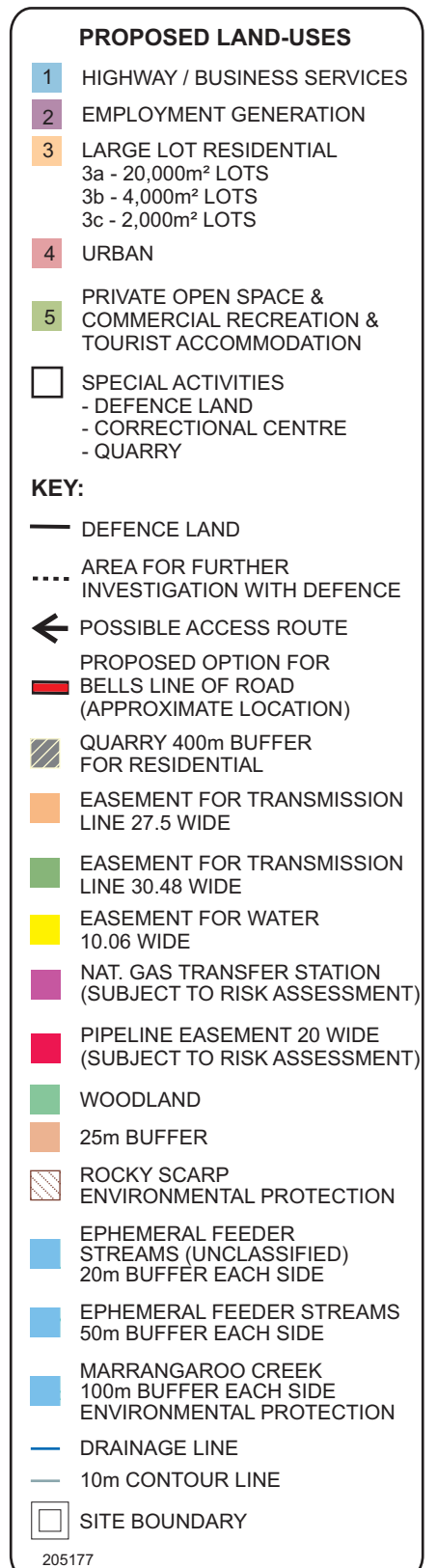
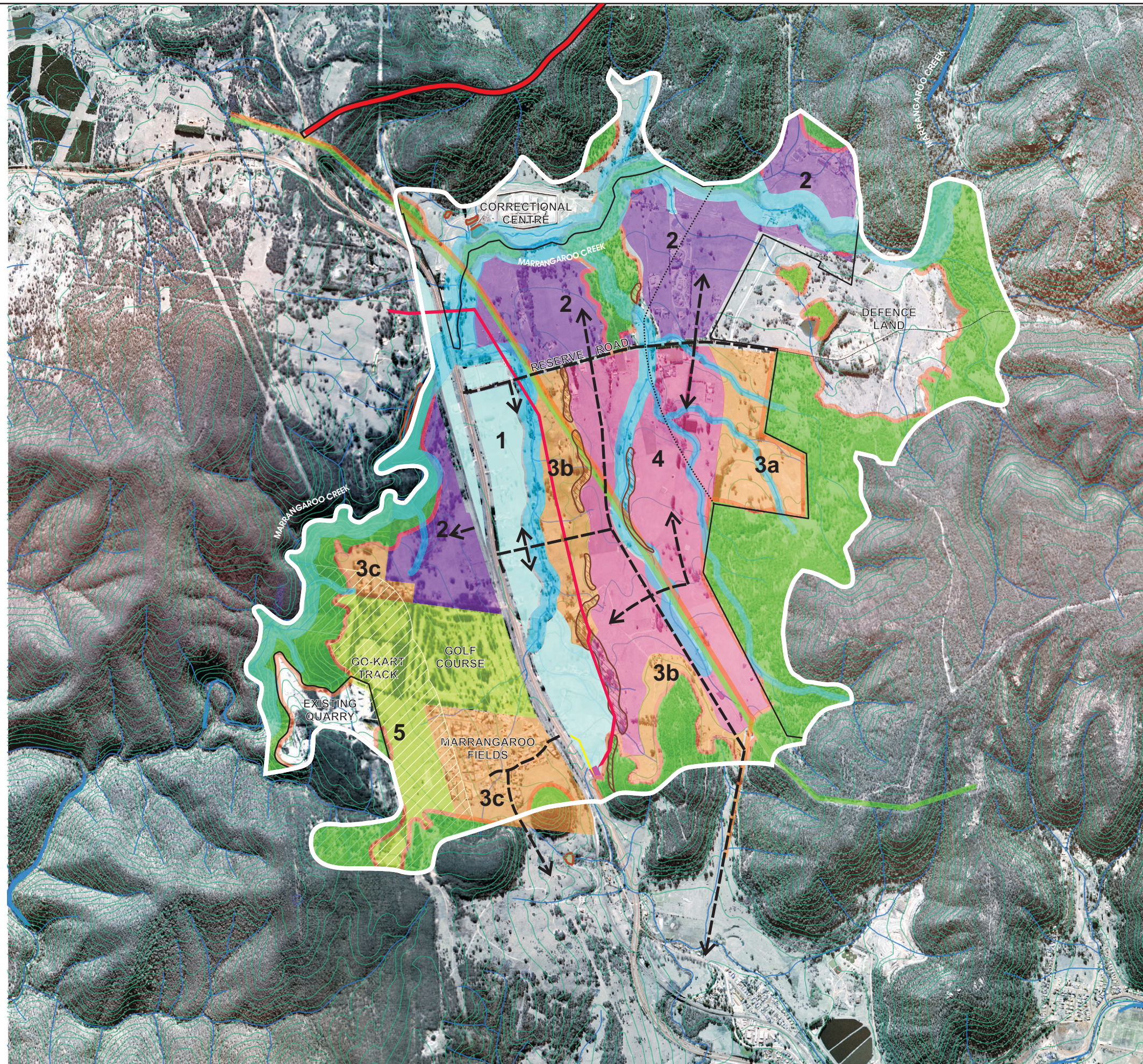
Marrangaroo is well located to services, infrastructure, major transport routes and provides large parcels of flat to undulating land within an attractive landscape. It is one of few well located areas of land available for development in a local government area constrained by its topography.

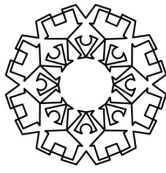
3.2 LAND USES

Five (5) land uses are proposed under this Structure Plan for Marrangaroo.

- Land Use 1 – Highway/Business Services
- Land Use 2 – Employment Generation
- Land Use 3 – Large Lot Residential (with three different densities)
- Land Use 4 – Urban (comprising open space, neighbourhood centres and housing variety)
- Land Use 5 – Private Open Space/commercial recreation

In addition, to protect and conserve Marrangaroo creek, its riparian vegetation and adjoining remnant woodland an Environmental Protection Zone is recommended limiting land uses within a 100 metre buffer either side of the creek.





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Using the descriptors provided by the Standard Instrument (Local Environmental Plans) Order 2006, a range of potential uses could occur in these areas and is described below.

3.2.1 HIGHWAY/BUSINESS SERVICES

The intention for the development of the Highway/Business land use is to promote the establishment of business along the Highway to encourage a mix of compatible uses such as business, office, retail and light industrial uses particularly associated with the use of the Highway. Such uses could include:

- Hardware and building supplies;
- Hotel accommodation;
- Landscape and garden supplies;
- Light industries;
- Passenger transport facilities;
- Warehouse or distribution centres.

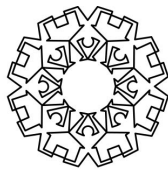
Under the Standard Instrument (Local Environmental Plans) Order 2006 this would fall within the Enterprise Corridor B6 zone which also permits multi dwelling houses. It also limits the amount of retail and clothing in the area to protect the economic strength of centres.

3.2.2 EMPLOYMENT GENERATION

The intention for the development of the Employment Generation land use is to promote the establishment of a wide range of industrial and warehouse land uses encouraging the creation of employment opportunities. Such uses could include:

- Depots;
- Passenger transport facilities; and/or
- Freight Transport facilities
- Light industries;
- Neighbourhood shops;
- Warehouse or distribution centres.

Under the Standard Instrument (Local Environmental Plans) Order 2006 this could fall within the Business Park B7 or General Industrial IN1 or Light Industrial IN2 zones. It does not include heavy, offensive or hazardous industry.



3.2.3 LARGE LOT RESIDENTIAL

The intention for the development of the Large Lot Residential land use is to provide residential housing while preserving environmentally sensitive locations and scenic quality. Development in this area should not hinder the proper and orderly development of urban areas in the future nor unreasonably increase the demand for public services and facilities. It also is to minimise land use conflict between land uses within the zone and adjoining zones.

Three areas have been identified in the Structure Plan and varying housing densities applied.

Land identified as Large Lot Residential (3a) has a proposed minimum lot size of 20,000 square metres. This is to minimise the number of residential dwellings in close proximity to Defence land and manage environmental impacts on steeper slopes and near drainage lines. Less dense development also assists in retaining a rural character for the area.

Those areas identified as Large Lot Residential (3b) are located on steep slopes, are visually prominent and, in areas, include the rocky scarp. These areas also act as a buffer between other land uses and the gas pipeline. The minimum proposed lot size is 4,000 square metres.

Marrangaroo Fields is substantially developed with lot sizes of around 2,000 square metres; however there are remaining areas to be developed which would benefit from these new objectives while recognising the values already established at Marrangaroo. The intention of further development would also be to minimise conflict between land use within the zone and adjoining uses (Quarry, scenic protection etc).

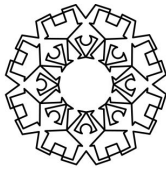
Existing clustered dwellings along Oakey Forest Road have also been included in this new land use with a minimum lot size of 2,000 square metres.

Under the Standard Instrument (Local Environmental Plans) Order 2006 these land uses could fall within the Large Lot Residential R5 zone.

3.2.4 URBAN

The intention for the development of the Urban land use is to promote the establishment of a wide range of housing types and densities providing for the housing needs of the community. Within this area a range of facilities or services would be provided to meet the day to day needs of the residents. Such uses could include:

- Dwelling houses;
- Multi dwelling houses;
- Child care centres;
- Neighbourhood shops;
- Places of public worship;



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- Residential care facilities; (for seniors(over 55)
- Seniors housing;
- Residential flat buildings;
- Community facilities;
- Educational establishments.

Under the Standard Instrument (Local Environmental Plans) Order 2006 these land uses could fall within the Neighbourhood Centre B1, General Residential R1, Village RU4 zones.

3.2.5 PRIVATE OPEN SPACE/COMMERCIAL RECREATION

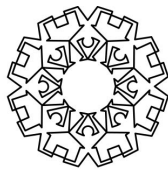
The intention for the development of the Private Recreation land use is to enable land to be used for private open space or recreation and to provide a range of recreational settings and activities within compatible land uses.

Such uses could include:

- Community facilities,
- Kiosks,
- Recreation areas,
- Indoor and outdoor recreation facilities.

Additional uses such as tourist and visitor accommodation could be added.

Under the Standard Instrument (Local Environmental Plans) Order 2006 these land uses could fall within the Private Recreation RE2 zone.



Land Use Precincts

4.1 OVERALL

Five (5) precincts have been defined in this Structure Plan, these are:

- Highway/business services
- Employment
- Large lot residential
- Urban
- Private open space with commercial recreation opportunities

Within these areas or adjoining these are environmentally sensitive elements comprising Marrangaroo Creek, remanent woodland, rocky scarps and ephemeral watercourses.

4.2 HIGHWAY BUSINESS SERVICES

This area is identified in the Structure Plan along the Great Western Highway. Lot sizes are uniform and a mix of business and dwellings exist irregularly along its length.

The opportunity exists to provide for well designed business/highway estates which do not detract from Marrangaroo and an important visual entry point to Lithgow itself.

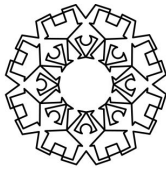
The number of licensed access points will need to be rationalised as development proceeds and the location of a new public road confirmed.

Uses in this area will be compatible with noise generated from the highway.

4.3 EMPLOYMENT GENERATING LAND

Under the Structure Plan land located north of Reserve Road and west along the Great Western Highway is nominated for employment generating uses. A wide range of potential uses could occur in these areas subject to the following parameters:

- Maintaining the ecological integrity of Marrangaroo Creek;
- Neutral and beneficial effect on the receiving waters of the Sydney Drinking Water Catchment;
- Where land adjoins the Department of Defence land, it is to be compatible with noise and vibration. Therefore noise sensitive activities such as offices or call centres would not be suitable;



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- Extent of potential flooding and location of flood sensitive activities outside the 1:100 year level;
- Noise and vibration from an operational rail corridor (western side).

The Department of Planning have produced a Dictionary of standard definitions relating to land uses for local environmental plans. To provide a better understanding of the type and range of development possible in this employment generating area reference should be made to this Dictionary reproduced in **Appendix A**.

Expected employment numbers in these areas has been identified in the servicing analysis in **Section 5.3** of this report.

4.4 RESIDENTIAL AND LIVING AREAS

The Structure Plan nominates one large area for urban living. This would include all those support services necessary to support a new population living in the area. Future development in Marrangaroo is envisaged not as a separate entity but as an important, accessible addition to the town. Alternative access back over the existing saddle to the south utilising the corridor created by the existing transmission lines and links to Cooerwull Road.

The area through the centre of the eastern portion of Marrangaroo is substantially in one ownership and is used for grazing and farming. It is located within rolling slopes giving future development its own character and definition. The majority of such development will not be viewed from the Great Western Highway.

Existing dwellings in the area are located on Reserve Road with the exception of a house and sheds on the higher knoll to the south.

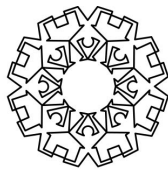
Future residential development will provide a range of housing choice by providing a mix of lot sizes and densities within walking distance of either neighbourhood shops, community facilities or open space.

The characteristics of the future community, mix of housing options and the form are guided by the Structure Plan Guidelines produced by IntegratedDESIGNgroup.

4.5 OPEN SPACE AND ENVIRONMENT PROTECTION

Open space and environment protection are found within the Urban area and within the proposed environmental protection zone. The Structure Plan Guidelines provide examples of how open space can be integrated within the environmental and landscape features of Marrangaroo.

The environmental protection areas cover Marrangaroo Creek, remnant vegetation and the rocky scarp. These are important visual, environmental and cultural features requiring protection and management.



Servicing Infrastructure

5.1 INTRODUCTION

The proposed Structure Plan determined for the Marrangaroo Study Area has identified four (4) land use zones located on the eastern side of the Great Western Highway. The four (4) land use zones comprise the following:

- Land Use 1 – Highway/Business Services
- Land Use 2 – Employment Generation
- Land Use 3 – Large Lot Residential
- Land Use 4 – Urban

The objective of this servicing infrastructure assessment is to determine an economic means of providing infrastructure to the eastern section of the Study Area to allow the future development of the land for residential, commercial and industrial purposes. Items of infrastructure such as reservoirs, sewage pump stations and rising mains will be identified to allow the development of the Study Area to occur in a structured and economical manner.

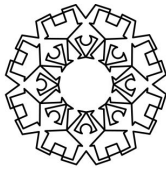
The servicing infrastructure assessment will evaluate the requirements to provide the section of the Marrangaroo Study Area limited to the eastern side of the Great Western Highway with adequate sewerage, water supply and road infrastructure to allow the development of the Study Area in accordance with the Structure Plan.

The areas of investigation covered by the servicing infrastructure assessment are:

- Trunk sewerage reticulation and associated sewage pump stations and rising mains;
- Trunk water reticulation and reservoirs; and
- Major road infrastructure items.

5.2 EXISTING INFRASTRUCTURE

Discussions with Council staff, research through Council's files and field observation has enabled the following list of Council's water supply and sewerage reticulation infrastructure to be compiled. The listing has been confined to infrastructure components that are relevant to the Marrangaroo Study Area. Relevant details including capacity of the various infrastructure components are listed in the following sections of the report.



5.2.1 WATER SUPPLY INFRASTRUCTURE

Water Treatment Plants

The source of the existing potable water supply to Lithgow is from the Oakey Park Water Treatment Plant with additional flows from the Fish River Water Supply scheme. The Marrangaroo Study Area's primary source of potable water is from the Fish River Water Supply Scheme with a backup of supply from the Oakey Plant Water Treatment Plant via Lithgow town reservoirs in time of supply interruptions.

The Oakey Park Water Treatment Plant is gravity fed raw water from Farmers Creek Dam and has a current capacity of 8 ML/d. Discussions with Council have indicated the current capacity of the plant could be increased to 11 ML/d with minor improvements to the plant. The treatment of the water includes chemical additive of soda ash, alum and polyelectrolyte, flocculation, clarification (horizontal flow), filtration (mono media) and post dosing of chlorine and soda ash. Farmers Creek Dam has its natural stream inflows supplemented by the Clarence Colliery groundwater transfer system which pumps up to 5 ML/d as required. Once treated, the water is pumped to the Cook St (low level) and Shaft St (old and new) reservoirs.

The Fish River Water Supply scheme is fed from Oberon Dam and the Duckmaloi Weir with water from the Duckmaloi Weir treated and blended with the water from Oberon Dam at the Duckmaloi Clarification Plant. Water is then gravity fed to the towns of Wallerawang, Portland, Lidsdale, Rydal, Cullen Bullen, Glen Davis, Marrangaroo and Lithgow with numerous minor users along its route. The system has a current capacity of 11 ML/d and Council has an Annual Allocation of 2019 ML/yr.

Storage Reservoirs

Water from the Oakey Park Water Treatment Plant is pumped via 450mm and 300mm diameter rising mains to the Cook St (low level) and Shaft St (old and new) reservoirs. Water is then gravity fed to the majority of the Lithgow Township along with the Marrangaroo Fields Estate in times of interrupted supply from the Fish River Water Supply.

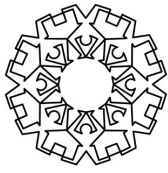
Water is pumped from the Cook St (low level) reservoir to the Cook St high level reservoir which gravity feeds higher areas of Lithgow Township together with the South Littleton reservoir which is fed from a pump station in Vickers St off the Shaft St reservoir.

Water from the Fish River Supply scheme is pumped via a 300mm diameter rising main into the Shaft St reservoir with the pipeline running along the Great Western Highway through the Marrangaroo Study Area. There is a small reservoir at Marrangaroo Fields Estate that acts as an emergency storage and is fed via a booster pump off the Fish River Water Supply pipeline.

5.2.2 SEWERAGE INFRASTRUCTURE

Sewage Treatment Plant

The Lithgow Sewage Treatment Plant consists of a Bathurst Box followed by conventional trickling filters and final tertiary treatment ponds, servicing the Lithgow Township, Marrangaroo Fields Estate



and the Lithgow Correctional Centre. The treatment plant has recently been upgraded to its current capacity of 23,000 EP and future works are planned to improve the quality of the treated effluent which is discharged to Farmer's Creek. Council's current discharge license is for up to 30,000 kL/d to be discharged from its final tertiary ponds into Farmer's Creek. Council has indicated that the current loading on the plant is 17,000 EP leaving a residual capacity of 6,000 EP for future development in the Marrangaroo Area or other areas within the Lithgow Township.

Sewage Pump Stations

Council currently operates four (4) sewage pump stations that service the Marrangaroo Study Area. The four pump stations are known as the Correctional Centre Pump Station, the Marrangaroo Pump Station, the Methven Pump Station and the No.1 Pump Station.

The Correctional Centre Pump station is located at and services the Lithgow Correctional Centre only. The pump station pumps via an independent rising main direct to the Lithgow Sewage Treatment Plant.

The Marrangaroo Pump Station services the Marrangaroo Fields Estate via gravity mains to the pump station's location at the southern end of the Study Area. The pump station pumps via a rising main into a gravity main feeding to the Methven Pump Station.

The Methven Pump Station services a small area on the north-western outskirts of Lithgow along with the pumped flows from the Marrangaroo Pump Station. The pump station pumps via a rising main into the No.1 Pump Station.

The No.1 Pump Station is Lithgow's main pump station pumping direct to the Sewerage Treatment Plant.

5.3 FUTURE POPULATION AND DESIGN LOADINGS

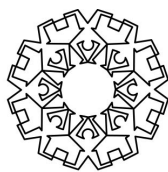
5.3.1 LAND USE ZONES

The proposed land use zones to be developed within the section of the Marrangaroo Study Area on the eastern side of the Great Western Highway include:

- Land Use 1 – Highway/Business Services
- Land Use 2 – Employment Generation
- Land Use 3 – Large Lot Residential
- Land Use 4 – Urban

A brief description of the development intent within each of these land use zones has been provided in **Section 3**.

Based on the intended development within the land use zones, estimates of sewage generation and water demand have been made as outlined in the following sections.



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5.3.2 SEWAGE DESIGN CRITERIA

The generation of sewage from the Marrangaroo Study Area will be determined in accordance with the methods outlined in the *NSW Public Works Department – Manual of Practice Sewer Design*. The following criteria will be adopted to determine the number of Equivalent Tenements (ET's) generating sewage from each land use zone. An Equivalent Tenement is a method of equating the expected sewage generation from a development that is equivalent to the sewage generated from a standard residential dwelling.

Land Use 1 – Highway/Business Services 4 ET per gross hectare

Land Use 2 – Employment Generation 2 ET per gross hectare

Land Use 3 – Large Lot Residential 1 ET per lot

Land Use 4 – Urban 1 ET per lot

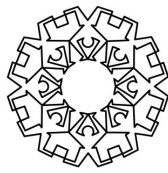
Based on the standard dwelling containing an adopted average of 2.5 persons, the equivalent population density within the land use zones can thus be calculated based upon the expected ET's generated from the proposed development.

A summary of the lot yield, sewage generation and population density is indicated in **Table 5.1**.

Table 5.1 - Lot Yield, Sewage Generation and Population Density For The Marrangaroo Study Area East of The Great Western Highway

Zone	Gross Area (ha)	No. of Lots	Equivalent Tenements (ET)	Population (EP)
Land Use 1	50	Not Applicable	200	500
Land Use 2	120	Not Applicable	240	600
Land Use 3	85	194	194	485
Land Use 4	170	1,530	1,530	3,825
TOTALS	425 ha	1,724 lots	2,164 ET	5,410 EP

The full development of the Marrangaroo Study Area on the eastern side of the Great Western Highway (5,410 EP) will use up most of the residual capacity of Council's sewage treatment plant (6,000 EP). Therefore, further development in Lithgow will be limited until detailed investigations are carried out in regards to upgrading the capacity of the sewage treatment plant. Such investigations are outside the scope of this assessment.



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Based upon the PWD sewage generation criteria, the total hydraulic loads determined for the Study Area are summarised below:

- Average Dry Weather Flow (ADWF):23.80 L/s
- Peak Dry Weather Flow (PDWF):49.55 L/s
- Peak Wet Weather Flow (PWWF):175.06 L/s

The above sewage generation rates are an estimate determined for the overall development of the Marrangaroo Study Area located on the eastern side of the Great Western Highway. It should be noted that individual assessment of discrete sewerage catchments within the Study Area may cause a variation to the total sewage generation determined in this section of the report. Individual catchment analysis within the Study Area will be further investigated in **Section 5.4** of this Report.

5.3.3 WATER DEMAND CRITERIA

The water demand criteria used for estimating the water demand for the Marrangaroo Study Area is based upon the NSW Public Works Department guidelines, namely:

- Peak Instantaneous Demand (PID):0.15 L/s/tenement
- Peak Daily Demand (PDD):5,000 L/day/tenement

Based on the estimated 2,164 ET's to be developed within the Study Area, the additional water demand placed on Council's water supply infrastructure can be calculated as:

- Additional Peak Instantaneous Demand (PID):324.6 L/s
- Additional Peak Daily Demand (PDD):10.82 ML

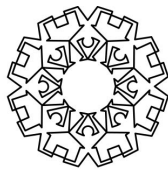
The possible development of commercial areas, schools and parkland areas within the Study Area will require the provision of additional water to cater for a range of non-residential potable water needs in the Study Area.

The water requirement for the irrigation of any parkland intended to be developed within the Study Area will be assumed to be carried out off-peak and will not be included within the calculated Peak Instantaneous Demand for the land use zones. An allowance of up to 26 L/s instantaneous demand will be made to cater for the water requirements of any potential neighbourhood shops, school or other community facility to be developed within the Study Area.

An allowance of up to 1.7 ML/day will be made for the irrigation of parklands or any potential neighbourhood shops, school or other community facility to be developed within the Study Area.

On this basis, the total water demands calculated for the proposed land use zones within the Study Area and located on the eastern side of the Great Western Highway are:

- Peak Instantaneous Demand (PID):350 L/s
- Peak Daily Demand (PDD):12.5 ML



5.4 PROPOSED SEWERAGE INFRASTRUCTURE

5.4.1 INTRODUCTION

Preliminary design investigations have been carried out to service the Marrangaroo Study Area east of the Great Western Highway with a reticulated sewerage system draining to appropriately located pump stations discharging back to Council's existing sewage treatment plant located to the south of the Study Area site. It must be noted that all preliminary sewer reticulation design has been carried out based on the available contour information only and has not been verified by field survey.

5.4.2 SEWERAGE RETICULATION

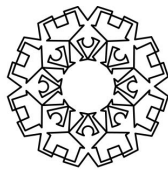
The Study Area has been divided into five (5) sewerage catchments based upon the topography of the site. Sewerage reticulation components have been determined to service approximately 2,164 ET as estimated as being generated from the ultimate development of the Study Area.

A small section of the Study Area has been determined to be capable of connecting to the existing Marrangaroo Sewage Pump Station via gravity flow. This section of the Study Area is located at the southern end of the Study Area adjacent to Great Western Highway and comprises an area of approximately 5.0ha and would contribute approximately 20 ET or 50 EP to the Marrangaroo SPS. Further detailed investigations will be required to confirm exactly the extent of the Study Area that is capable of being serviced by gravity sewer.

The Equivalent Tenement generation and catchment data for each of the 5 sewage pump station is indicated in **Table 5.2**.

Table 5.2 - Pump Station Catchment Data

Catchment Data	Pump Station				
	PS 1	PS 2	PS 3	PS 4	PS 5
Total ET's Serviced	180	536	1012	368	48
Total EP Serviced	450	1340	2530	920	120
Area Serviced (ha)	45	101	139	111	24
Average Dry Weather Flow (ADWF)	1.98 L/s	5.90 L/s	11.13 L/s	4.05 L/s	0.53 L/s
Peak Dry Weather Flow (PDWF)	5.86 L/s	14.77 L/s	25.52 L/s	10.72 L/s	1.95 L/s
Peak Wet Weather Flow (PWWF)	16.30 L/s	45.86 L/s	84.22 L/s	32.06 L/s	4.73 L/s



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Each individual pump station would be provided with two (2) submersible pumps operating in duty and standby mode and be connected to a SCADA telemetry control. The pump station sites and rising mains are indicated on **Figure 6**.

Preliminary details for each pump station are listed below:

Sewage Pump Station No. 1

Number of ET's contributing:	180 ET
Average Dry Weather Flow (ADWF):	1.98 L/s
Peak Wet Weather Flow (PWWF):	16.30 L/s
Approximate Ground Level at Pump Station:	910m
Pump Duty:	16.30 L/s at 60m
Rising Main Length:	5400m
Rising Main Diameter:	450mm

Sewage Pump Station No. 2

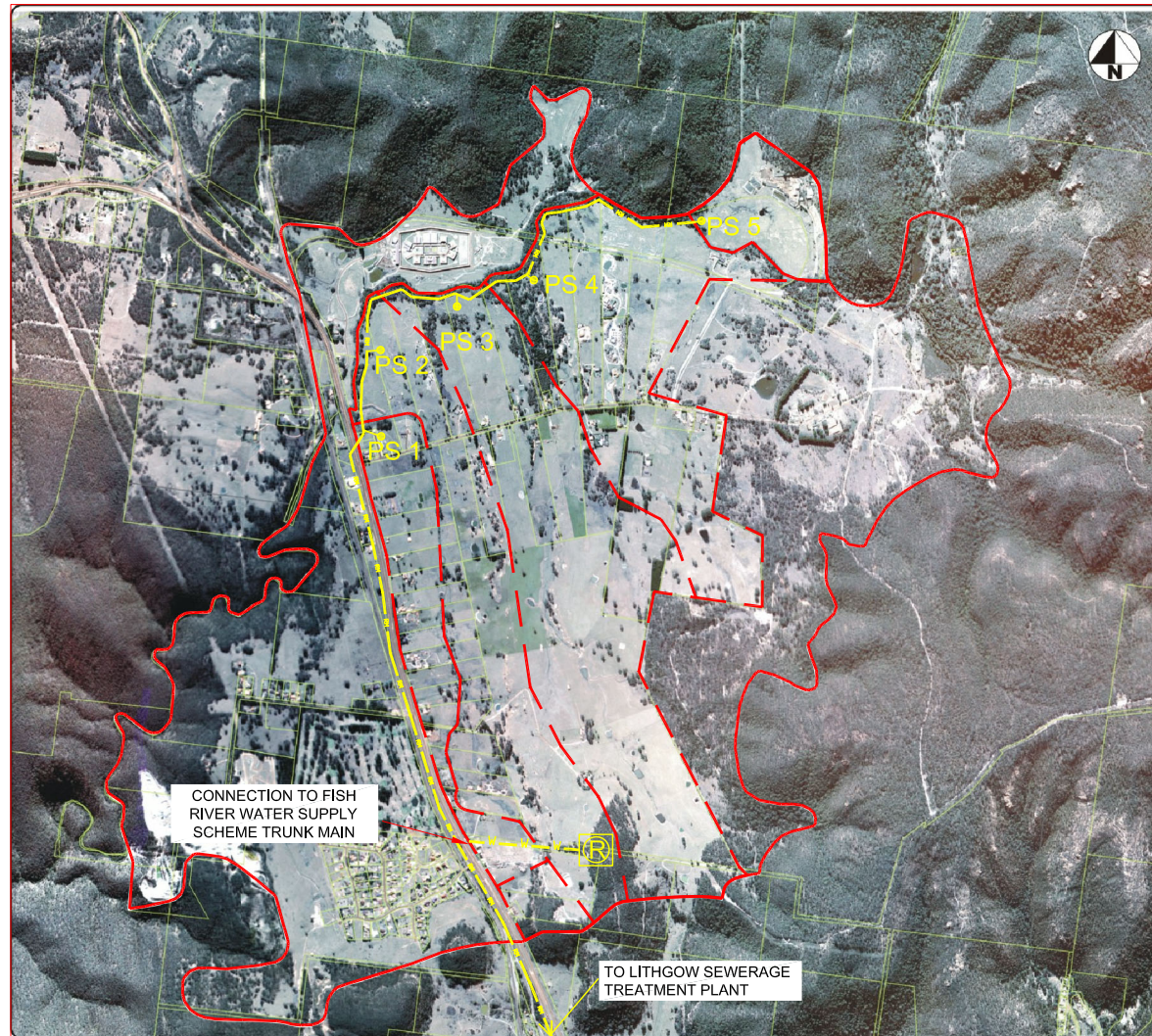
Number of ET's contributing:	536 ET
Average Dry Weather Flow (ADWF):	5.90 L/s
Peak Wet Weather Flow (PWWF):	45.86 L/s
Approximate Ground Level at Pump Station:	913m
Pump Duty:	45.86 L/s at 60m
Rising Main Length:	500m and 5400m
Rising Main Diameter:	300mm and 450mm

Sewage Pump Station No. 3

Number of ET's contributing:	1012 ET
Average Dry Weather Flow (ADWF):	11.13 L/s
Peak Wet Weather Flow (PWWF):	84.22 L/s
Approximate Ground Level at Pump Station:	917 m
Pump Duty:	84.22 L/s at 60m
Rising Main Length:	500m, 500m and 5400m
Rising Main Diameter:	300mm, 300mm and 450mm

Sewage Pump Station No. 4

Number of ET's contributing:	368 ET
Average Dry Weather Flow (ADWF):	4.05 L/s
Peak Wet Weather Flow (PWWF):	32.06 L/s
Approximate Ground Level at Pump Station:	919 m
Pump Duty:	32.06 L/s at 60m
Rising Main Length:	500m, 500m, 500m and 5400m
Rising Main Diameter:	200mm, 300mm, 300mm and 450mm

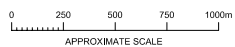


LEGEND

- SITE BOUNDARY
- - - SEWERAGE CATCHMENT BOUNDARY
- PS PROPOSED SEWER PUMP STATION
- RM — PROPOSED SEWERAGE RISING MAIN
- R PROPOSED WATER RESERVOIR
- W - W - W - PROPOSED WATER RESERVOIR TRUNK MAIN

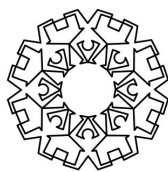


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SOURCE:
AERIAL PHOTOGRAPH
© LAND AND PROPERTY INFORMATION (2005)

FIGURE 6
MARRANGAROO
CONCEPT SEWERAGE AND
WATER SUPPLY INFRASTRUCTURE
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Sewage Pump Station No. 5

Number of ET's contributing:	48 ET
Average Dry Weather Flow (ADWF):	0.53 L/s
Peak Wet Weather Flow (PWWF):	4.73 L/s
Approximate Ground Level at Pump Station:	920 m
Pump Duty:	4.73 L/s at 70m
Rising Main Length:	1100m, 500m, 500m, 500m and 5400m
Rising Main Diameter:	100mm, 200mm, 300mm, 300mm & 450mm

The estimated extent of the trunk sewerage network servicing the individual catchments of the Study Area is summarised below. It should be noted that estimates of any of the 150mm diameter sewer main reticulation network servicing individual parcels of land is not included.

Sewerage Pump Station No. 1:	150mm diameter mains only.
Sewerage Pump Station No. 2:	225mm diameter trunk sewer main – 2000m
Sewerage Pump Station No. 3:	300mm diameter trunk sewer main – 2000m
Sewerage Pump Station No. 4:	225mm diameter trunk sewer main – 1300m
Sewerage Pump Station No. 5:	150mm diameter mains only.

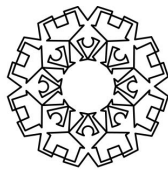
5.5 PROPOSED WATER INFRASTRUCTURE

5.5.1 WATER DEMAND

As previously determined, the total water demand required to service the Marrangaroo Study Area east of the Great Western Highway is:

- Peak Instantaneous Demand (PID): 350 L/s
- Peak Daily Demand (PDD): 12.5 ML

The Study Area has been divided into nominal water supply zones in order to determine a distribution of water supply throughout a proposed reticulation network. The water supply zones generally correspond to the catchment determined in the sewerage system assessment. The nominal water supply zones and the PID and PDD for each zone are indicated in **Table 5.3**.

**Table 5.3 - Water Supply Demand Summary**

Zone	No. of ET	Peak Instantaneous Demand (PID)	Peak Daily Demand (PDD)
1	180	27.0 L/s	0.9 ML
2	536	80.4 L/s	2.68 ML
3	1012	151.8 L/s	5.06 ML
4	368	55.2 L/s	1.84 ML
5	48	7.2 L/s	0.24 ML
6	20	3.0 L/s	0.10 ML
TOTALS	2,164	324.6 L/s	10.82 ML

5.5.2 WATER SUPPLY SOURCE

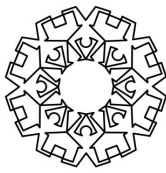
The Fish River Water Supply scheme will be used as the supply source for the Marrangaroo Study Area. The system has a current capacity of 11 ML/d and Council has an Annual Allocation of 2019 ML/yr and the system currently services a number towns along the route of the pipeline such as Wallerawang, Portland, Lidsdale, Rydal, Cullen Bullen, Glen Davis, Marrangaroo and Lithgow. A 300mm diameter rising main is located within the Great Western Highway road reserve along the frontage of the Marrangaroo Study Area.

It has been determined that the daily water demand of the Study Area east of the Great Western Highway is approximately 12.5 ML and thus exceeds the capacity of the Fish River Water Supply scheme. Further investigations will need to be carried out to determine upgrading parameters for the water supply scheme in order to supply the required water to Marrangaroo to meet the estimated demand. Such investigations are outside the scope of this analysis.

In the short term, water supply to the initial development within the Study Area may be serviced via a reticulation main connected to the Fish River rising main and possibly with the use of a pressure reducing valve (PRV). This will facilitate some initial development within the Study Area without requiring Council to commit to the construction of the main water storage reservoir serving the area.

5.5.3 STORAGE RESERVOIR

The daily water demand for the eastern section of the Marrangaroo Study Area has been estimated as approximately 12.5 ML. In accordance with the former NSW Department of Public Works design criteria for water supply infrastructure, it was usual practice to provide 1.5 days storage in water reservoirs and therefore for the Marrangaroo Study Area, a storage reservoir of approximately 19 ML would be required.



A site has been identified at the south end of the Study Area for the proposed water reservoir. The site is located on a ridgeline with a ground elevation of approximately RL 1020m. This elevation will be suitable to allow a gravity water reticulation network to be provided through the Study Area to meet pressure and water flow criteria for the development of land for residential, commercial and industrial purposes. The water reservoir site is indicated on **Figure 6**.

5.5.4 WATER TRANSFER MAIN

A water transfer main will need to be constructed from the 300mm diameter Fish River Water Supply rising main to the proposed reservoir. The transfer main will be approximately 700m in length.

In order to supply the reservoir with the daily demand over a 20 hour period, the transfer main will need to have a capacity of approximately 175 L/s. A water transfer main with a nominal diameter of approximately 300mm thus matching the diameter of the Fish River Water Supply rising main will be required. We understand that there is sufficient residual pressure in the Fish River Water Supply Main to deliver water to the Marrangaroo Water Reservoir site.

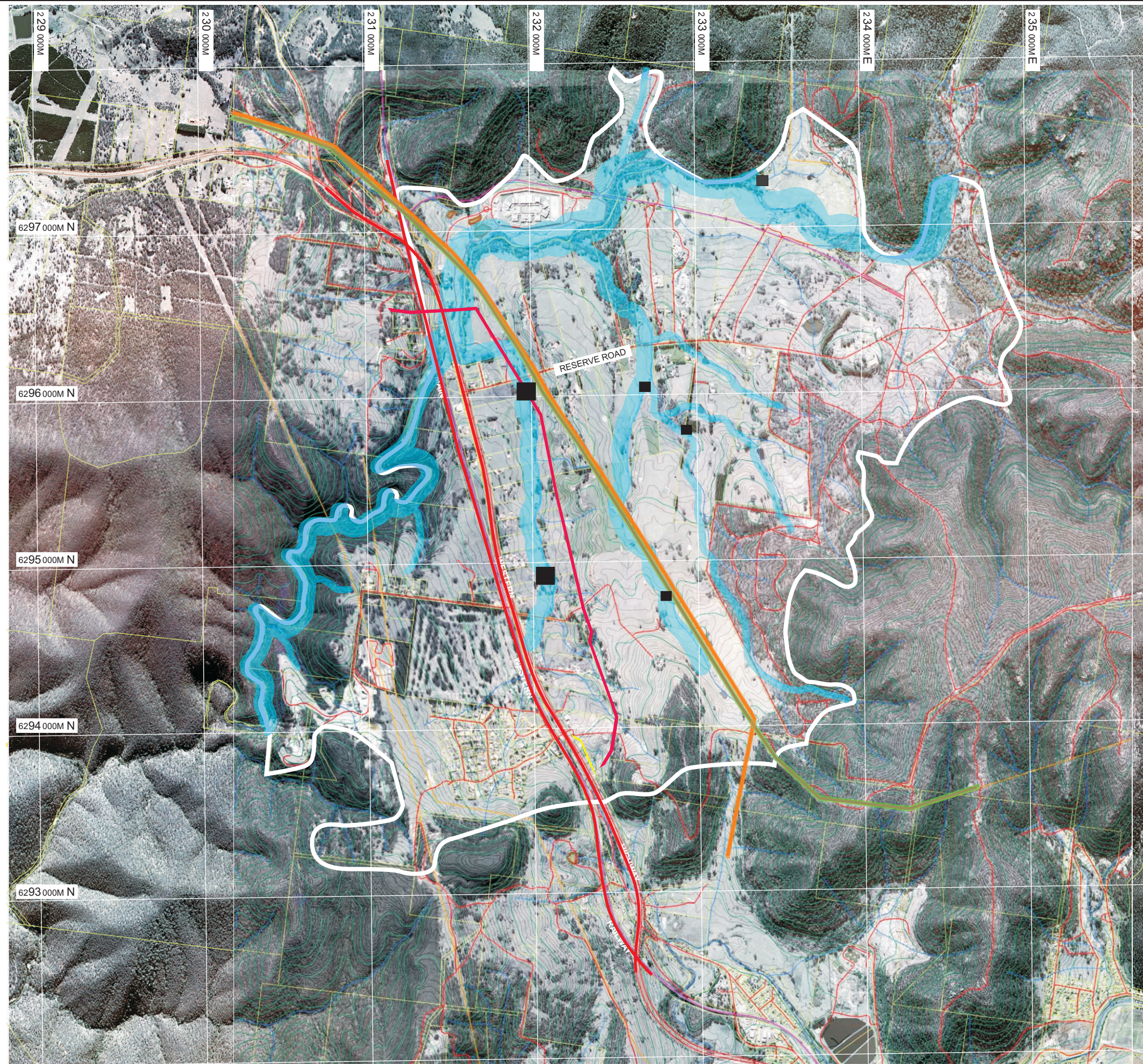
The investigation of internal water reticulation mains within the Marrangaroo Study Area is outside the scope of this assessment.

5.6 STORMWATER MANAGEMENT

An integrated stormwater management plan, incorporating the principles of urban sensitive water design, would need to be developed for the area. Conceptually this would have the following aims:

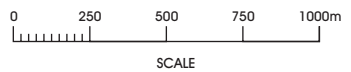
- Limit post development peak discharge to match downstream constraints.
- Remove contaminants to protect downstream aquatic systems – a treatment train approach, which utilises a series of management devices, should be adopted to control runoff quality throughout the catchments.
- Integrate stormwater treatment into the built landscape, again using the treatment train approach.
- Provide safe and efficient stormwater conveyance along major drainage lines.
- Where possible, utilise stormwater harvesting and reuse to reduce potable water demand.
- Protect downstream drainage systems against construction and long term impacts.

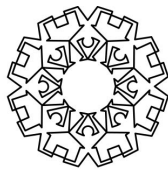
A conceptual stormwater management system is shown on **Figure 7**. This system includes the retention of riparian corridors consistent with the planning principles and integration of stormwater management ponds at strategic locations. These locations are close to the outlets of small sub catchments areas. The Study Area was divided into sub catchments according to changes in land use that are likely to result in increased runoff and pollutant loads, with one stormwater management pond used for each sub catchment. The SEPP 58 analysis is in **Appendix B**.



- INFRASTRUCTURE**
- SEALED & UNSEALED ROADS
 - STORMWATER MANAGEMENT PONDS
 - EASEMENT FOR TRANSMISSION LINE 27.5 WIDE
 - EASEMENT FOR TRANSMISSION LINE 30.48 WIDE
 - EPHEMERAL FEEDER STREAMS (UNCLASSIFIED) 20m BUFFER EACH SIDE
 - EPHEMERAL FEEDER STREAMS 50m BUFFER EACH SIDE
 - MARRANGAROO CREEK 100m BUFFER EACH SIDE ENVIRONMENTAL PROTECTION
 - NAT. GAS TRANSFER STATION (SUBJECT TO RISK ASSESSMENT)
 - PIPELINE EASEMENT 20 WIDE (SUBJECT TO RISK ASSESSMENT)
 - EASEMENT FOR WATER 10.06 WIDE
 - SITE BOUNDARY

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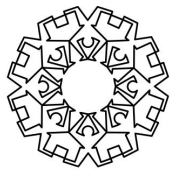
The main opportunity is the ability to integrate stormwater management throughout the development during master planning to achieve the recommended stormwater management objectives. The development should not be restricted to providing single point of control at the catchment outlet, but where possible, incorporate an integrated system that treats both stormwater quantity and quality as it moves through the system.

The conceptual stormwater management system was modelled using XP-RAFTS and it was found that a total of about 100 to 120 ML of storage would be required to limit post development peak flow to pre-development levels. This could be provided throughout the site in a series of dry retarding basins, drainage swales and lakes/wetlands to provide stormwater quantity and quality control.

Pollutant load modeling indicates there would be adequate retention volume throughout the system to reduce pollutant loads to less than existing therefore achieving a neutral or beneficial effect as required by SEPP 58.

The conceptual system assessed in this investigation provides adequate opportunity for stormwater quality control through an integrated system of basins, lakes/wetlands, grass swales, gross pollutant traps and pipes. Stormwater harvesting could be used to provide a portion of the required on-site retention volume and to reduce potable demands.

The stormwater management ponds will be designed so that post development peak stormwater discharge is limited to pre-development levels. Also, they will be designed for a detention time suitable for reducing post-development stormwater pollutant levels to pre-development levels.



Road and Rail Network

6.1 ROAD NETWORK AND ACCESS

The Great Western Highway (State Highway No. 5) is defined as a motorway and was gazetted as a Controlled Access Road on 18 December 1981. All access points onto a Controlled Access Road must be licensed by the RTA and such licensed accesses are to include public road access and private driveway access to individual properties.

Information provided by the RTA indicates that licensed accesses within the Study Area frontage of the Great Western Highway include:

- Reserve Road to the east of the Highway;
- Oakey Forest Road to the west of the Highway;
- Girraween Drive to the west of the Highway;
- An unformed public road to the east of the Highway; and
- Individual accesses to private property with frontage to the Great Western Highway.

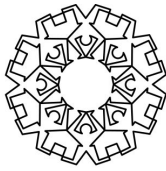
In general, the RTA will grant no further licensed access points across the motorway boundary and therefore the future development of the Study Area should rely on the consolidation of the existing licensed access points relating to the public roads on the eastern and western side of the Highway. Although confirmed in a meeting with its representatives this position has not yet been formalised by the RTA.

6.2 RAIL NETWORK

The Main Western Railway Line traverses the Study Area generally parallel to and west of the Great Western Highway. The Main Western Railway links a number of rail systems from central west NSW and provides access to the Sydney Rail network. The Main Western Railway Line is under the management of Australian Rail Track Corporation Ltd (ARTC) as far east as Bowenfels with RailCorp having responsibility for the rail system from that point eastwards and in the metropolitan area.

The Main Western Rail system through the Study Area comprises dual tracks. Information provided by the ARTC indicates that up to 22 train movements per day use the Main Western Railway Line. The train movements include an eastbound and westbound XPT passenger service each day together with up to 10 eastbound and 10 westbound freight train movements per day.

It is NSW Government policy to minimise the number of level crossings on the State's rail network. Level crossings are closed and removed at every opportunity.



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6.3 EXISTING ROAD NETWORK (EAST)

The road network through and within the Study Area comprises a number of roads in addition to the Great Western Highway. The major roads within the Study Area on the eastern side of the Highway include:

- Great Western Highway (State Highway No. 5);
- Access road to the Lithgow Correctional Centre;
- Reserve Road providing access to the Department of Defence land; and
- An unformed public road.

The Correctional Centre access road and Highway intersection has dedicated left and right turn lanes for traffic accessing the road off the Great Western Highway.

The Reserve Road and Highway intersection has dedicated left and right turn lanes for traffic accessing the road off the Great Western Highway.

The Correctional Centre access road and Reserve Road are all two way, two lane bitumen sealed roads of varying widths.

The RTA has advised that the section of the Great Western Highway through the Marrangaroo Study Area has a high recorded accident rate comprising:

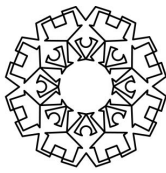
- Fatalities (pedestrian in 2000).
- Single vehicle accidents where vehicles have left the road carriageway either on curves or straight alignment.
- Dual vehicle accidents travelling in the same direction (side swipes or rear end collisions).
- Dual vehicle accidents with a head on collision.

Information provided by the RTA indicates that licensed accesses within the Study Area along the eastern frontage of the Great Western Highway include:

- Reserve Road to the east of the Highway;
- An unformed public road to the east of the Highway; and
- Individual accesses to private property with frontage to the Great Western Highway.

6.3.1 ROAD NETWORK HIERARCHY

The Roads and Traffic Authority (1984) proposes four basic road classes as the basis for the functional hierarchy of a road network.



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A functional classification takes into account the relative balance of the traffic mobility function and amenity/access functions of streets and roads and defines the purpose of a road within the context of urban and rural areas.

The four road classes are arterial, sub-arterial, collector and local roads and are defined below.

- **Arterial Roads**

Roads whose main function is to carry through traffic from one region to another forming the principal means of communication for major traffic movements.

- **Sub-Arterial Roads**

Those roads which supplement the arterial roads in providing for through traffic movement to an individually determined limit that is sensitive to both roadway characteristics and adjoining land uses.

- **Collector Roads**

Roads that distribute traffic between the arterial roads and the local street system and provide access to adjoining property.

- **Local Roads**

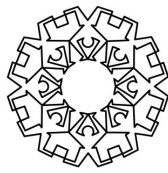
Subdivisional roads whose main traffic function is to provide access to adjoining property.

The indicative road network to be developed within the Study Area on the eastern side of the Great Western Highway will generally follow the principles of the road network hierarchy.

6.3.2 INDICATIVE ROAD NETWORK

Discussions have been held with representatives of the Roads and Traffic Authority during the preparation of the Structure Plan for the Marrangaroo Study Area particularly in relation to access onto the eastern side of the Great Western Highway. Five (5) main points were highlighted during the discussions with such points being:

1. The existing intersection of Coorwull Road and the Great Western Highway is to be closed and Coorwull Road is to be incorporated into the Marrangaroo internal road network to provide an off Highway connection road connection to and from Lithgow.
2. The existing licensed access point onto the Great Western Highway at the unformed public road near the intersection of Girraween Drive is not in a satisfactory location for the construction of a new major intersection. The RTA would support the provision of a new licensed access onto the Great Western Highway if the existing licensed access was closed. The preferred location for the relocated licensed access point to the eastern side of the Highway is several hundred metres north of the intersection of Oakey Forest Road. The RTA would prefer to have a series of T intersections onto the Highway rather than develop a four way intersection with high speed highway traffic.



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3. The RTA would prefer to see a consolidation of the existing individual licensed access points onto the Highway from private properties in order to provide a series of service roads for individual developments within the Highway Business/Services land use zone.
4. The construction of any new T intersection with the Great Western Highway will require the design and construction being carried out to the highest criteria for protected and channelised intersection works.
5. The RTA will not agree to any reduction in the current Great Western Highway speed zone (100km) through the Study Area.

Based on the specified requirements of the RTA and the evaluation of the access to be provided to the various land use zones, indicative access routes have been determined for the Marrangaroo Structure Plan.

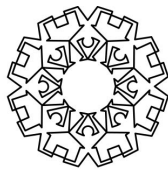
The road hierarchy through the Study Area will comprise:

Arterial Road:	Great Western Highway
Sub Arterial Roads:	Reserve Road New Access Road onto Great Western Highway Link Road between Reserve Road and new Access Road
Collector Roads:	New connection to Coorwull Road to and from Lithgow Service Roads to Highway Service/Business zones Roads off Reserve Road into Employment Generation zones
Local Roads:	Other road connections providing access from collector roads into the local road network.

The indicative road network is indicated on the attached Structure Plan.

The anticipated road standards for the construction of the road network will be:

Sub Arterial Roads:	14m sealed pavement width with concrete kerb and gutter.
Collector Roads:	12m sealed pavement width with concrete kerb and gutter.
Local Roads Urban:	10m sealed pavement width with concrete kerb and gutter.
Local Roads Rural:	8m sealed pavement with gravel shoulders.



Opinion of Cost to Provide Services

7.1 INTRODUCTION

An opinion of cost has been prepared to provide a number of trunk servicing provisions for the development of the Marrangaroo Study Area east of the Great Western Highway. The works included in the opinion of cost are:

- Sewage pump stations;
- Sewage rising mains;
- Trunk sewer mains;
- Water reservoir;
- Water transfer main;
- Major Highway intersections; and
- Sections of major roads.

It must be noted that this is an opinion of cost prepared for Structure Plan purposes only and is very preliminary in nature. Further refinement of the opinion of cost presented herein will be necessary during the feasibility investigation and concept design phase of the project.

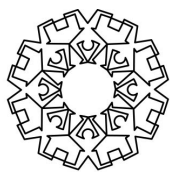
Disclaimer:

A preliminary opinion of cost for the provision of some servicing infrastructure for the Marrangaroo Study Area is outlined. It must be noted that the opinion of cost is preliminary only at this stage and has been prepared for Structure Plan purposes only and is also subject to the approval of Council, survey and detailed engineering design of the work being carried out and calling tenders for the construction of the works. Geolyse Pty Ltd provides these preliminary opinion of costs on the terms that Lithgow City Council, or any other party, will not impose any liability whatsoever on Geolyse Pty Ltd that may arise from the use of the preliminary opinion of costs.

7.2 SEWERAGE INFRASTRUCTURE

Construction of duty/standby sewage pump stations:

- | | | |
|-------------------|------------------|--------------|
| • Pump Station 1: | 16.30 L/s at 60m | \$220,000.00 |
| • Pump Station 2: | 45.86 L/s at 60m | \$330,000.00 |
| • Pump Station 3: | 84.22 L/s at 60m | \$400,000.00 |



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- Pump Station 4: 32.06 L/s at 60m \$300,000.00
- Pump Station 5: 4.73 L/s at 70m \$160,000.00

Supply and installation of sewage rising mains

- 1100m of 100mm diameter rising main \$88,000.00
- 500m of 200mm diameter rising main \$70,000.00
- 1000m of 300mm diameter rising main \$200,000.00
- 5400m of 450mm diameter rising main \$1,728,000.00

Supply and installation of trunk sewer mains

- 3300m of 225mm diameter gravity main \$528,000.00
- 2000m of 300mm diameter gravity main \$480,000.00

Total Sewerage Infrastructure **\$4,504,000.00**

7.3 WATER INFRASTRUCTURE

- Construction of 19 ML water reservoir \$2,200,000.00

Construction of transfer main

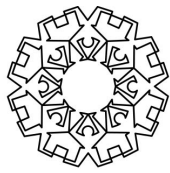
- 700m of 300mm diameter water main \$184,000.00

Total Water Infrastructure **\$2,384,000.00**

7.4 ROAD INFRASTRUCTURE

- Construction new channelised Highway intersection \$400,000.00
- Upgrade of Reserve Road to Sub Arterial Standard \$680,000.00
- New Access Road and Link Road to Reserve Road \$1,160,000.00
- New connection to Coorwull Road \$2,000,000.00

Total Road Infrastructure **\$4,240,000.00**

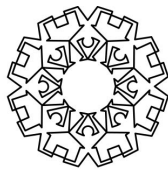


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7.5 COST SUMMARY

A summary of the preliminary opinion of cost to provide trunk servicing infrastructure to the Marrangaroo Study Area on the eastern side of the Great Western Highway is listed below:

• Sewerage Infrastructure	\$4,504,000.00
• Water Infrastructure	\$2,384,000.00
• Road Infrastructure	\$4,240,000.00
	Total \$11,128,000.00



Staging Development

8.1 STAGING DEVELOPMENT

The staging for the development of Marrangaroo would be influenced by a range of factors which are listed below.

- Existing land ownership patterns,
- The willingness of existing land owners to develop their land (either independently or in joint venture partnerships),
- Location of existing infrastructure,
- Access to new infrastructure,
- Market demands for land,
- Take up of other similarly zoned land in Lithgow and districts,
- External influences such as other employment generation projects in the region.

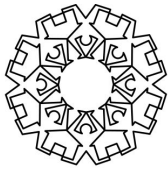
The following staging scenario is predicated on a general understanding of the above influences working in the market place, however will be subject to change as events unfold over time.

Essentially, we have assumed that the staging sequence would be primarily influenced by the availability of services and that development would therefore be more likely to commence at the lower end of each of the catchments where sewer infrastructure would be available and stormwater works kept to a minimum. Development would then be assumed to extend progressively up through each of the catchments. This assumption ignores the willingness of land owners or developers located in the upper sections of the various catchments to fund the independent extension of services to their land.

Stage 1

The most logical commencement point for Stage 1 of Marrangaroo would be the development of the Highway and Business Services zone at or near to the Reserve Road intersection. The land in the vicinity of the Reserve Road intersection would be provided with a sewer service by the installation of Pump Station 1 and the sewer rising main back to the existing sewerage treatment plant. Water supply would be provided on an interim basis via a Pressure Reducing Valve and reticulation main connected to the Fish River rising main.

Extension of the development of the Highway and Business Services zone away from the Reserve Road intersection would be influenced by market forces.



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Stage 2

The development of the Employment Generation zone and Large Lot Residential adjoining Reserve Road would also be expected to commence soon after the Highway and Business Service Zone. These areas would require the construction of Sewer Pump Station 2 and the rising main connection to Sewer Pump Station 1.

Stage 3

The development of the Urban areas adjoining Reserve Road would also be expected to commence soon after Stage 2, requiring the construction of Sewer Pump Station 3 and the rising main connection to Sewer Pump Station 2. The progression of development of the urban areas would then be dictated by market forces up the catchment (in a southerly direction) until a trigger point when the new access road from the Highway would become feasible.

Stage 4

The new access road from the Highway into the centre of the Study Area would open up further expansion of the Highway and Business Services zone, the Large Lot Residential and the Urban zones.

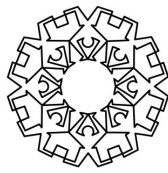
Cooerwull Road connection and Water Reservoir

It would be unlikely that the Cooerwull Road connection into the Marrangaroo Study Area would be willingly constructed without the support of a Section 94 plan or other planning agreement with developer's within Marrangaroo. Similarly, formal arrangements for the funding and construction of the Water Reservoir would need to be adopted to encourage development in the upper reaches of the Marrangaroo catchment.

Western Precinct

Servicing of the Western Precinct is assumed to have been addressed in the application approved by Council for the residential development of the land to the north of the Golf Course. The influences on staging for development of this land would therefore be independent of the land on the eastern side of the Highway.

The Servicing Infrastructure section also identifies that there is some capacity remaining in Council's existing Marrangaroo Pump Station available for expansion of Marrangaroo Fields for Large Lot Residential development. However, the expansion of Marrangaroo Fields is also subject to upgrading of the existing intersection with the Highway and we assume that the timing of such work would be market driven.



Future Options

9.1 OPTIONS FOR CONSIDERATION

Four options have been identified below to assist in determining what to do next.

9.1.1 MAINTAIN THE CURRENT ZONINGS

This option involves maintaining the status quo and continuing the current zonings under the Lithgow LEP 1994. However, this will be reassessed following the completion of the Strategic Plan and preparation of a new comprehensive Local Environmental Plan.

9.1.2 ADOPT THE MARRANGAROO STRUCTURE PLAN AS COUNCIL POLICY

The Marrangaroo Structure Plan may be adopted as Council Policy to guide the community and developers on future sustainable development in the Study Area.

9.1.3 STRATEGIC PLAN

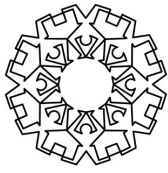
Review the Structure Plan and decide on whether to proceed or not following the finalisation of the Strategic Plan. This option will provide Council with an opportunity to consider the Marrangaroo Study Area in context of the entire Local Government Area.

9.1.4 REZONE THE LAND

Resolve to amend the Lithgow LEP 1994 and seek the agreement of the Minister for Planning. If this option is pursued it is recommended that Council manage the rezoning as a single plan covering the Study Area.

The rezoning process includes:

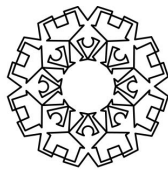
- A resolution of Council to amend Lithgow LEP 1994;
- Council advising the Minister for Planning and the Local Environmental Plan Review Panel considering that request;
- If agreed, then consultation with State agencies and others follows on the draft plan;
- A draft plan is prepared for Parliamentary Counsel to check;
- A report is prepared for the Department of Planning seeking permission to exhibit the draft plan;
- If agreed, then the draft plan and supporting information is exhibited for 28 days;



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- Submissions are considered and a report sent to DoP seeking to have the plan made;
- Plan is made and comes into force.

Rezoning land can take 12 – 24 months to finalise. In the interim, the existing planning provisions in Lithgow LEP 1994 remain. If any of the proposed landuses under this Structure Plan are permissible within the current 1(a) Rural (General) zone they can apply for development consent.



Outstanding Matters

10.1 OUTSTANDING MATTERS

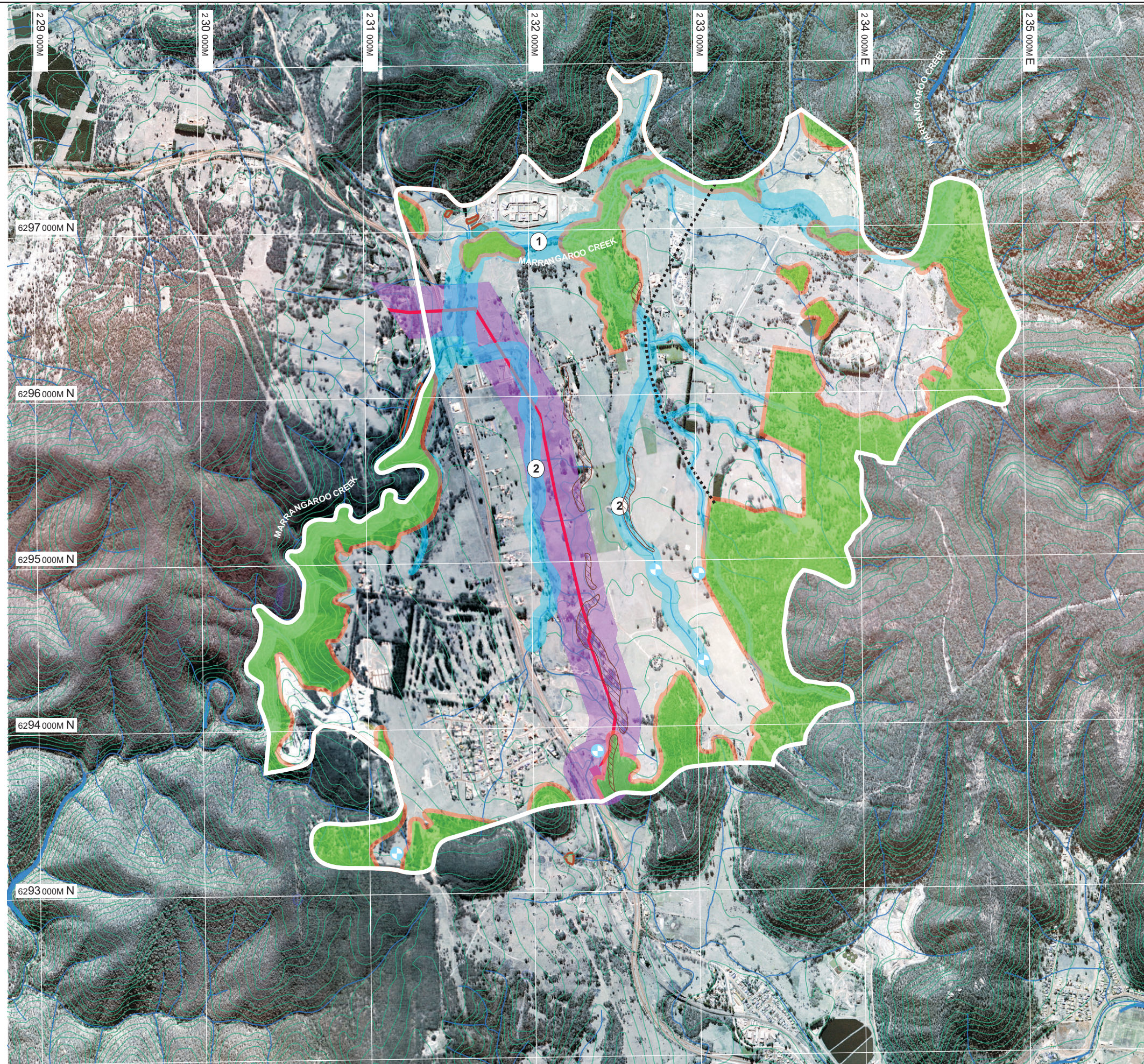
The following issues require resolution for the future development of the Study Area and may influence the final Structure Plan. **Figure 8** maps the location of the gas pipeline and Trunk Receiving Station (TRS), a 400m investigation area adjoining Defence land and those watercourses that have received a preliminary categorisation by the Department of Natural Resources.

1. Risk assessment of the high-pressure natural gas pipeline and Lithgow Trunk Receiving Station (TRS) managed by Agility. The pipeline runs behind properties fronting the Great Western Highway on the eastern side and separates two proposed land uses: a business enterprise corridor and large lot residential land (minimum lot size of 4000 sq m).

Risk is associated with the potential release and ignition of high pressure natural gas from the pipeline or the TRS. Agility have advised that any proposal to increase the current land use or population density within 157 metres (see Figure 8) of these facilities will increase the safety risk to society. A risk assessment is currently underway.

2. Suitable uses adjoining the Department of Defence land in the north east sector of the project area. Uses within a 400 metre investigation arc need to be compatible with noise and vibration generated by Defence activities. Council will seek clarification of the extent and location of noise to assist in determining best and highest land uses adjoining Defence land.
3. Categorising remaining water courses in the Study Area. Further discussions with the Department of Natural Resources and Council are required to implement appropriate objectives and planning buffers to water courses (for both categorised and uncategorised watercourses). It is understood the buffers applied to the watercourses are preliminary and can be finalised when development concepts are available and more detailed flood and ecological studies are provided.
4. Investigating an alternative safe access route for West Marrangaroo residents. The State Emergency Service have identified that in the event the bridge (off the Great Western Highway at Girraween Drive) or the level crossing at Oakey Forest Road were blocked for any length of time, residents in these areas would be 'locked' in as no alternative access is available.

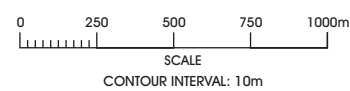
It is recommended that a future link be considered at the end of Oakey Forest Road cutting between the Quarry and the Go-Kart operation onto currently vacant land (proposed for open space) at the back of Marrangaroo Fields and Windarra Estate. This will create a link between Oakey Forest Road and Marrangaroo Fields providing alternative access should either access point onto the Highway be closed.

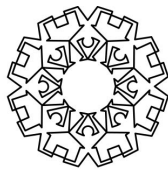


MAJOR NATURAL & APPLIED CONSTRAINTS

- NAT. GAS TRANSFER STATION
- PIPELINE EASEMENT 20 WIDE
- 157m BUFFER (SUBJECT TO RISK ASSESSMENT)
- AREA FOR FURTHER INVESTIGATION WITH DEFENCE
- WOODLAND
- 25m BUFFER
- ROCKY SCARP
- ① DNR CLASSIFICATION CATEGORY 1
- ② DNR CLASSIFICATION CATEGORY 2
- Ephemeral Feeder Streams (Unclassified) 20m Buffer Each Side
- ② Ephemeral Feeder Streams 50m Buffer Each Side
- ① Marrangaroo Creek 100m Buffer Each Side
- IDENTIFIED SPRINGS
- DRAINAGE LINE
- 10m CONTOUR LINE
- SITE BOUNDARY

205177





References

Department of Infrastructure Planning and Natural Resources & Sydney Catchment Authority (2004). *Sustaining the Catchments – The Regional Plan for the drinking water catchments and adjacent regional centres (Draft)*, NSW Government Printers.

Department of Land and Water Conservation (1997). *Warragamba Catchment Blueprint*.

Department of Land and Water Conservation (1998). *NSW Groundwater Quality Protection Policy*

Department of Urban Affairs and Planning (2001). *Integrating Land Use and Transport. Improving transport choice – Guidelines for planning and development*

Department of Urban Affairs and Planning (2001). *Integrating Land Use and Transport. The Right Place for Business and Services – Planning Policy*.

Duncan, H.P. (1999). *Urban Stormwater Quality: A Statistical Overview*, Cooperative Research Centre for Catchment Hydrology, Melbourne, Australia.

Environment Protection Authority (2000). *Industrial Noise Policy*.

Falding, M., Kelly, A.H. & Bateson, P. (2001). *Biodiversity Planning Guide for NSW Local Government*, NSW National Parkes and Wildlife Service 2001.

NSW Fisheries (1998). *Policy and Guidelines for Aquatic Habitat Management and Fish Conservation*, (Eds. A.K. Smith and D.A. Pollard) NSW Fisheries, Sydney.

NSW Fisheries (1999). *Policy and Guidelines for Bridges, Roads, Causeways, Culverts and Similar Structures*, (Eds. S. Fairfull & S. Carter) NSW Fisheries, Sydney.

Planning NSW (2000). *Sustainable Urban Settlement. Guidelines for Regional NSW*.

Roberson, John A.; Cassidy, John J.; and Chaudhry, M. Hanif (1998). *Hydraulic Engineering*, John Wiley and Sons, United States of America.

Geason, Susan and Wilson, Paul R. (1989). *Crime Prevention and Environmental Design*. Australian Institute of Criminology, Canberra.

The Institution of Engineers, Australia (2003). *Australian Runoff Quality Guidelines (Draft)*.

Appendix A

**DICTIONARY EXTRACT - STANDARD INSTRUMENT
(LOCAL ENVIRONMENTAL PLANS) ORDER 2006**



New South Wales

Standard Instrument (Local Environmental Plans) Order 2006

under the

Environmental Planning and Assessment Act 1979

MARIE BASHIR, Governor

I, Professor Marie Bashir AC, CVO, Governor of the State of New South Wales, with the advice of the Executive Council, and in pursuance of section 33A of the *Environmental Planning and Assessment Act 1979*, make the following Order.

Dated, this 30th day of March 2006.

By Her Excellency's Command,

FRANK SARTOR, M.P.,
Minister for Planning

Dictionary

(Clause 4)

Direction. The Plan must include the following definitions of those words or expressions that are used in the Plan, but not a definition of a word or expression that is not used in the Plan.

Aboriginal object means any deposit, object or other material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of an area of New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.

acid sulfate soils means naturally occurring sediments and soils containing iron sulfides (principally pyrite) or their precursors or oxidation products, whose exposure to oxygen leads to the generation of sulfuric acid (for example, by drainage or excavation).

Acid Sulfate Soils Guidelines means guidelines by that name published by the Director-General.

advertisement has the same meaning as in the Act.

Note. The term is defined as a sign, notice, device or representation in the nature of an advertisement visible from any public place or public reserve or from any navigable water.

advertising structure has the same meaning as in the Act.

Note. The term is defined as a structure used or to be used principally for the display of an advertisement.

affordable housing has the same meaning as in the Act.

Note. The term is defined as housing for very low income households, low income households or moderate income households, being such households as are prescribed by the regulations or as are provided for in an environmental planning instrument.

agricultural produce industry means a rural industry involving the handling, treating, processing or packing of produce from agriculture (including dairy products, seeds, fruit, vegetables or other plant material), and includes flour mills, cotton seed oil plants, cotton gins, feed mills, cheese and butter factories, and juicing or canning plants, but does not include a livestock processing industry.

agriculture means extensive agriculture, cotton and rice cultivation, intensive livestock agriculture, horticulture, viticulture, turf farming, animal boarding or training establishments, aquaculture or farm forestry.

airport means a place used for the landing, taking-off or parking of aeroplanes (including terminals, buildings for the parking or maintenance of aeroplanes, associated installations and movement areas), and includes heliports.

airstrip means a single runway for the landing, taking-off or parking of aeroplanes for private aviation only, but does not include an airport, heliport or helipad.

amusement centre means a building or place (not being part of a hotel or pub) used principally for playing:

- (a) billiards, pool or other like games, or

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Dictionary

-
- (b) electronic or mechanical amusement devices, such as pinball machines, computer or video games and the like.

animal boarding or training establishment means a building or place used for the breeding, boarding, training, keeping or caring of animals for commercial purposes (other than for the agistment of horses), and includes any associated riding school or ancillary veterinary clinic.

aquaculture has the same meaning as in the *Fisheries Management Act 1994*.

Note. The term is defined as follows:

aquaculture means:

- (a) cultivating fish or marine vegetation for the purposes of harvesting the fish or marine vegetation or their progeny with a view to sale, or
- (b) keeping fish or marine vegetation in a confined area for a commercial purpose (such as a fish-out pond),

but does not include:

- (c) keeping anything in a pet shop for sale or in an aquarium for exhibition (including an aquarium operated commercially), or
- (d) anything done for the purposes of maintaining a collection of fish or marine vegetation otherwise than for a commercial purpose, or
- (e) any other thing prescribed by the regulations (made under the *Fisheries Management Act 1994*).

archaeological site means the site (as shown on the Heritage Map or listed in Schedule 5) of one or more relics.

attic means any habitable space, but not a separate dwelling, contained wholly within a roof above the ceiling line of the storey immediately below, except for minor elements such as dormer windows and the like.

backpackers' accommodation means tourist and visitor accommodation:

- (a) that has shared facilities, such as a communal bathroom, kitchen or laundry, and
- (b) that will generally provide accommodation on a bed basis (rather than by room).

basement means the space of a building where the floor level of that space is predominantly below ground level (existing) and where the floor level of the storey immediately above is less than 1 metre above ground level (existing).

bed and breakfast accommodation means tourist and visitor accommodation comprising a dwelling (and any ancillary buildings and parking) where the accommodation is provided by the permanent residents of the dwelling for a maximum of [*insert maximum number of guests*] guests and:

- (a) meals are provided for guests only, and
- (b) cooking facilities for the preparation of meals are not provided within guests' rooms, and
- (c) dormitory-style accommodation is not provided.

biodiversity means biological diversity.

biological diversity has the same meaning as in the *Threatened Species Conservation Act 1995*.

Note. The term is defined as follows:

biological diversity means the diversity of life and is made up of the following 3 components:

- (a) genetic diversity—the variety of genes (or units of heredity) in any population,
- (b) species diversity—the variety of species,
- (c) ecosystem diversity—the variety of communities or ecosystems.

biosolid waste application means the application of sludge or other semi-solid products of human sewage treatment plants to land for the purpose of improving land productivity, that is undertaken in accordance with the NSW Environment Protection Authority's guidelines titled *Environmental Guidelines: Use and Disposal of Biosolids Products* dated October 1997 and *Addendum to Environmental Guidelines: Use and Disposal of Biosolids Products* (EPA 2000).

boarding house means a building:

- (a) that is wholly or partly let in lodgings, and
- (b) that provides lodgers with a principal place of residence for 3 months or more, and
- (c) that generally has shared facilities, such as a communal bathroom, kitchen or laundry, and
- (d) that has rooms that accommodate one or more lodgers,

but does not include backpackers' accommodation, a serviced apartment, seniors housing or hotel accommodation.

boat launching ramp means a structure designed primarily for the launching of trailer borne recreational vessels, and includes associated car parking facilities.

boat repair facility means any facility (including a building or other structure) used primarily for the construction, maintenance or repair of boats, whether or not including the storage, sale or hire of boats, but does not include a marina or boat shed.

boat shed means a building or other structure used for the storage and routine maintenance of a boat or boats and which is associated with a private dwelling or non-profit organisation, and includes any skid used in connection with the building or other structure.

building has the same meaning as in the Act.

Note. The term is defined to include part of a building and any structure or part of a structure, but not including a manufactured home, a moveable dwelling or associated structure (or part of a manufactured home, moveable dwelling or associated structure) or a temporary structure within the meaning of the *Local Government Act 1993*.

building height (or **height of building**) means the vertical distance between ground level (existing) at any point to highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.

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building identification sign means a sign that identifies or names a building and that may include the name of a building, the street name and number of a building, and a logo or other symbol, but that does not include general advertising of products, goods or services.

building line or **setback** means the horizontal distance between the property boundary or other stated boundary (measured at 90 degrees from the boundary) and:

- (a) a building wall, or
- (b) the outside face of any balcony, deck or the like, or
- (c) the supporting posts of a carport or verandah roof,

whichever distance is the shortest.

bulky goods premises means a building or place used primarily for the sale by retail, wholesale or auction of (or for the hire or display of) goods that are of such size or weight as to require:

- (a) a large area for handling, display or storage, or
- (b) direct vehicular access to the site of the building or place by members of the public, for the purpose of loading and unloading the items into their vehicles after purchase or hire,

but does not include a building or place used for the sale of foodstuffs or clothing unless their sale is ancillary to the sale of bulky goods.

bush fire hazard reduction work has the same meaning as in the *Rural Fires Act 1997*.

Note. The term is defined as follows:

bush fire hazard reduction work means:

- (a) the establishment or maintenance of fire breaks on land, and
- (b) the controlled application of appropriate fire regimes or other means for the reduction or modification of available fuels within a predetermined area to mitigate against the spread of a bush fire,

but does not include construction of a track, trail or road.

bush fire prone land has the same meaning as in the Act.

Note. The term is defined, in relation to an area, as land recorded for the time being as bush fire prone land on a map for the area certified as referred to in section 146 (2) of the *Environmental Planning and Assessment Act 1979*.

bush fire risk management plan means a plan prepared under Division 4 of Part 3 of the *Rural Fires Act 1997* for the purpose referred to in section 54 of that Act.

business identification sign means a sign:

- (a) that indicates:
 - (i) the name of the person or business, and
 - (ii) the nature of the business carried on by the person at the premises or place at which the sign is displayed, and

-
- (b) that may include the address of the premises or place and a logo or other symbol that identifies the business,

but that does not include any advertising relating to a person that does not carry on business at the premises or place.

business premises means a building or place at which an occupation, profession or trade (other than an industry) is carried on for the provision of services directly to members of the public on a regular basis.

canal estate development means development that incorporates wholly or in part a constructed canal, or other waterway or waterbody, that is inundated by or drains to a natural waterway or natural waterbody by surface water or groundwater movement (not being works of drainage, or for the supply or treatment of water, that are constructed by or with the authority of a person or body responsible for those functions and that are limited to the minimal reasonable size and capacity to meet a demonstrated need for the works), and that either:

- (a) includes the construction of dwellings (which may include tourist and visitor accommodation) of a kind other than, or in addition to:
 - (i) dwellings that are permitted on rural land, and
 - (ii) dwellings that are used for caretaker or staff purposes, or
- (b) requires the use of a sufficient depth of fill material to raise the level of all or part of that land on which the dwellings are (or are proposed to be) located in order to comply with requirements relating to residential development on flood prone land.

car park means a building or place primarily used for the purpose of parking motor vehicles, including any manoeuvring space and access thereto, whether operated for gain or not.

caravan park means land (including a camping ground) on which caravans (or caravans and other moveable dwellings) are, or are to be, installed or placed.

catchment action plan has the same meaning as in the *Catchment Management Authorities Act 2003*.

Note. The term is defined as a catchment action plan of an authority that has been approved by the Minister under Part 4 of the *Catchment Management Authorities Act 2003*.

cellar door premises means retail premises that sell wine by retail and that are situated on land on which there is a commercial vineyard, where all of the wine offered for sale is produced in a winery situated on that land or is produced predominantly from grapes grown in the surrounding area.

cemetery means a building or place for the interment of deceased persons or pets or their ashes, and includes a funeral chapel or crematorium.

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charter and tourism boating facility means any facility (including a building or other structure) used for charter boating or tourism boating purposes, being a facility that is used only by the operators of the facility and that has a direct structural connection between the foreshore and the waterway, but does not include a marina.

child care centre means a building or place used for the supervision and care of children that:

- (a) provides long day care, pre-school care, occasional child care or out-of-school-hours care, and
- (b) does not provide overnight accommodation for children other than those related to the owner or operator of the centre,

but does not include:

- (c) a family day care home or home-based child care home, or
- (d) an out-of-home care service provided by an agency or organisation accredited by the NSW Office of the Children's Guardian, or
- (e) a baby-sitting, playgroup or child-minding service that is organised informally by the parents of the children concerned, or
- (f) a service provided for fewer than 5 children (disregarding any children who are related to the person providing the service) at the premises at which at least one of the children resides, being a service that is not advertised, or
- (g) a regular child-minding service that is provided in connection with a recreational or commercial facility (such as a gymnasium), by or on behalf of the person conducting the facility, to care for children while the children's parents are using the facility, or
- (h) a service that is concerned primarily with the provision of:
 - (i) lessons or coaching in, or providing for participation in, a cultural, recreational, religious or sporting activity, or
 - (ii) private tutoring, or
- (i) a school, or
- (j) a service provided at exempt premises (within the meaning of section 200 of the *Children and Young Persons (Care and Protection) Act 1998*), such as hospitals, but only if the service is established, registered or licensed as part of the institution operating on those premises.

classified road has the same meaning as in the *Roads Act 1993*.

Note. The term is defined as follows:

classified road means any of the following:

- (a) a main road,
- (b) a highway,
- (c) a freeway,
- (d) a controlled access road,
- (e) a secondary road,

-
- (f) a tourist road,
 - (g) a tollway,
 - (h) a transitway,
 - (i) a State work.

(see *Roads Act 1993* for meanings of these terms).

clearing native vegetation has the same meaning as in the *Native Vegetation Act 2003*.

Note. The term is defined as follows:

clearing native vegetation means any one or more of the following:

- (a) cutting down, felling, thinning, logging or removing native vegetation,
- (b) killing, destroying, poisoning, ringbarking, uprooting or burning native vegetation.

(See Division 3 of Part 3 of the *Native Vegetation Act 2003* for the exclusion of routine agricultural management and other farming activities from constituting the clearing of native vegetation if the landholder can establish that any clearing was carried out for the purpose of those activities).

coastal foreshore means land with frontage to a beach, estuary, coastal lake, headland, cliff or rock platform.

coastal lake means a body of water specified in Schedule 1 to the *State Environmental Planning Policy 71—Coastal Protection*.

coastal waters of the State—see section 58 of the *Interpretation Act 1987*.

coastal zone has the same meaning as in the *Coastal Protection Act 1979*.

Note. The term is defined as follows:

coastal zone means:

- (a) the area within the coastal waters of the State as defined in Part 10 of the *Interpretation Act 1987* (including any land within those waters), and
- (b) the area of land and the waters that lie between the western boundary of the coastal zone (as shown on the maps outlining the coastal zone) and the landward boundary of the coastal waters of the State, and
- (c) the seabed (if any) and the subsoil beneath, and the airspace above, the areas referred to in paragraphs (a) and (b).

The coastal zone consists of the area between the western boundary of the coastal zone shown on the maps outlining the coastal zone and the outermost boundary of the coastal waters of the State. The coastal waters of the State extend, generally, to 3 nautical miles from the coastline of the State.

commercial port facility means a facility (including any building or other structure) used in connection with the carrying of goods or persons by water from one port to another for business or commercial purposes, being a facility having a direct structural connection between the foreshore and the waterway.

community facility means a building or place owned or controlled by a public authority and used for the physical, social, cultural or intellectual development or welfare of the community.

community land has the same meaning as in the *Local Government Act 1993*.

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correctional centre means a correctional centre under the *Crimes (Administration of Sentences) Act 1999* or a detention centre under the *Children (Detention Centres) Act 1987*.

Council means the [name of the Council for the relevant local government area].

crematorium means a building in which deceased persons or pets are cremated, and includes a funeral chapel.

Crown reserve means:

- (a) a reserve within the meaning of Part 5 of the *Crown Lands Act 1989*, or
- (b) a common within the meaning of the *Commons Management Act 1989*, or
- (c) land within the meaning of the *Trustees of Schools of Arts Enabling Act 1902*, but does not include land that forms any part of a reserve under Part 5 of the *Crown Lands Act 1989* provided for accommodation.

curtilage, in relation to a heritage item or conservation area, means the area of land (including land covered by water) surrounding a heritage item, a heritage conservation area, or building, work or place within a heritage conservation area, which contributes to its heritage significance.

dairy (pasture based) means a dairy where the only restriction facilities present are the milking sheds and holding yards and where cattle are constrained for no more than 10 hours in any 24 hour period (excluding during any period of drought or similar emergency relief).

demolish, in relation to a heritage item, or a building, work, relic or tree within a heritage conservation area, means wholly or partly destroy, dismantle or deface the heritage item or the building, work, relic or tree.

depot means a building or place used for the storage (but not sale or hire) of plant, machinery or other goods (which support the operations of an existing undertaking) when not required for use.

drainage means any activity which intentionally alters the hydrological regime of any locality by facilitating the removal of surface or ground water. It may include the construction, deepening, extending, opening, installation or laying of any canal, drain or pipe, either on the land or in such a manner as to encourage drainage of adjoining land.

dual occupancy means 2 dwellings (whether attached or detached) on one lot of land.

dwelling means a room or suite of rooms occupied or used or so constructed or adapted as to be capable of being occupied or used as a separate domicile.

dwelling house means a building containing only one dwelling.

earthworks means excavation or filling.

ecologically sustainable development has the same meaning as in the Act.

educational establishment means a building or place used for education (including teaching), being:

- (a) a school, or

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- (b) a tertiary institution, including a university or a TAFE college, that provides formal education and is constituted by or under an Act.

electricity generating works means a building or place used for the purpose of making or generating electricity.

entertainment facility means a theatre, cinema, music hall, concert hall, dance hall, amusement centre and the like.

environmental facility means a building or place which provides for the recreational use or scientific study of natural systems, and includes walking tracks, seating, shelters, board walks, observation decks, bird hides or the like, and associated display structures.

environmental protection works means works associated with the rehabilitation of land towards its natural state or any work to protect land from environmental degradation, and includes bush regeneration works, wetland protection works, erosion protection works, dune restoration works and the like.

estuary has the same meaning as in the *Water Management Act 2000*.

Note. The term is defined as follows:

estuary means:

- (a) any part of a river whose level is periodically or intermittently affected by coastal tides, or
- (b) any lake or other partially enclosed body of water that is periodically or intermittently open to the sea, or
- (c) anything declared by the regulations (under the *Water Management Act 2000*) to be an estuary,

but does not include anything declared by the regulations (under the *Water Management Act 2000*) not to be an estuary.

excavation means the removal of soil or rock, whether moved to another part of the same site or to another site, but does not include garden landscaping that does not significantly alter the shape, natural form or drainage of the land.

extensive agriculture means:

- (a) the production of crops or fodder (including irrigated pasture and fodder crops), or
- (b) the grazing of livestock, or
- (c) bee keeping,

for commercial purposes, but does not include any of the following

- (d) cotton and rice cultivation,
- (e) intensive livestock agriculture,
- (f) aquaculture,
- (g) turf farming,
- (h) animal boarding or training establishments,

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- (i) farm forestry,
- (j) horticulture or viticulture.

extractive industry means the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or quarrying, including the storing, stockpiling or processing of extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming.

extractive material means sand, soil, gravel, rock or similar substances that are not minerals within the meaning of the *Mining Act 1992*.

farm building means a structure the use of which is ancillary to an agricultural use of the landholding on which it is situated and includes a hay shed, stock holding yard, machinery shed, shearing shed, silo, storage tank, outbuilding or the like, but does not include a dwelling.

feedlot means a confined or restricted area used to rear and fatten cattle, sheep or other animals for the purpose of meat production, fed (wholly or substantially) on prepared and manufactured feed, but does not include a poultry farm, dairy or piggery.

fill means the depositing of soil, rock or other similar extractive material obtained from the same or another site, but does not include:

- (a) the depositing of topsoil or feature rock imported to the site that is intended for use in garden landscaping, turf or garden bed establishment or top dressing of lawns and that does significantly alter the shape, natural form or drainage of the land, or
- (b) a waste disposal landfill operation.

filming means recording images (whether on film or video tape or electronically or by other means) for exhibition or broadcast (such as by cinema, television or the internet or by other means), but does not include:

- (a) still photography, or
- (b) recording images of a wedding ceremony or other private celebration or event principally for the purpose of making a record for the participants in the ceremony, celebration or event, or
- (c) recording images as a visitor or tourist for non commercial purposes, or
- (d) recording for the immediate purposes of a television program that provides information by way of current affairs or daily news.

fish has the same meaning as in the *Fisheries Management Act 1994*.

Note. The term is defined as follows:

Definition of "fish"

- (1) **Fish** means marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history (whether alive or dead).
- (2) **Fish** includes:
oysters and other aquatic molluscs, and

crustaceans, and
 echinoderms, and
 beachworms and other aquatic polychaetes.

- (3) **Fish** also includes any part of a fish.
- (4) However, **fish** does not include whales, mammals, reptiles, birds, amphibians or other things excluded from the definition by the regulations under the *Fisheries Management Act 1994*.

flood mitigation work means work designed and constructed for the express purpose of mitigating flood impacts. It involves changing the characteristics of flood behaviour to alter the level, location, volume, speed or timing of flood waters to mitigate flood impacts. Types of works may include excavation, construction or enlargement of any fill, wall, or levee that will alter riverine flood behaviour, local overland flooding, or tidal action so as to mitigate flood impacts.

floor space ratio means the ratio of the gross floor area of all buildings on a site to the site area.

Floor Space Ratio Map means the [Name of local government area] Local Environmental Plan [Year] Floor Space Ratio Map.

food and drink premises means retail premises used for the preparation and retail sale of food or drink for immediate consumption on or off the premises, and includes restaurants, cafes, take away food shops, milk bars and pubs.

forestry has the same meaning as **forestry operations** in the *Forestry and National Park Estate Act 1998*.

Note. The term is defined as follows:

forestry operations means:

- (a) logging operations, namely, the cutting and removal of timber from land for the purpose of timber production, or
- (b) forest products operations, namely, the harvesting of products of trees, shrubs and other vegetation (other than timber) that are of economic value, or
- (c) on-going forest management operations, namely, activities relating to the management of land for timber production such as thinning, bush fire hazard reduction, bee-keeping, grazing and other silvicultural activities, or
- (d) ancillary road construction, namely, the provision of roads and fire trails, and the maintenance of existing railways, to enable or assist in the above operations.

freight transport facility means a facility used principally for the bulk handling of goods for transport by road, rail, air or sea, including any facility for the loading and unloading of vehicles, aircraft, vessels or containers used to transport those goods and for the parking, holding, servicing or repair of those vehicles, aircraft or vessels or for the engines or carriages involved.

function centre means a building or place used for the holding of events, functions, conferences and the like, and includes convention centres, exhibition centres and reception centres, but does not include an entertainment facility.

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funeral chapel means business premises used to arrange, conduct and cater for funerals and memorial services, and includes facilities for the short term storage, dressing and viewing of bodies of deceased persons, but does not include premises with mortuary facilities.

funeral home means business premises used to arrange and conduct funerals and memorial services, and includes facilities for the short term storage, dressing and viewing of bodies of deceased persons and premises with mortuary facilities.

gross floor area means the sum of the floor area of each storey of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:

- (a) the area of a mezzanine within the storey, and
- (b) habitable rooms in a basement, and
- (c) any shop, auditorium, cinema, and the like, in a basement or attic, but excludes:
 - (d) any area for common vertical circulation, such as lifts and stairs, and
 - (e) any basement:
 - (i) storage, and
 - (ii) vehicular access, loading areas, garbage and services, and
 - (f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and
 - (g) car parking to meet any requirements of the consent authority (including access to that car parking), and
 - (h) any space used for the loading or unloading of goods (including access to it), and
 - (i) terraces and balconies with outer walls less than 1.4 metres high, and
 - (j) voids above a floor at the level of a storey or storey above.

ground level (existing) means the existing level of a site at any point.

ground level (finished) means, for any point on a site, the ground surface after completion of any earthworks (excluding any excavation for a basement, footings or the like) for which consent has been granted or which is exempt development.

ground level (mean) means, for any site on which a building is situated or proposed, one half of the sum of the highest and lowest levels at ground level (finished) of the outer surface of the external walls of the building.

group home means a dwelling that is a permanent group home or a transitional group home.

hazardous industry means development for the purpose of an industry that, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would pose a significant risk in the locality:

- (a) to human health, life or property, or
- (b) to the biophysical environment.

hazardous storage establishment means any establishment where goods, materials or products are stored that, when in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the establishment from existing or likely future development on other land in the locality), would pose a significant risk in the locality:

- (a) to human health, life or property, or
- (b) to the biophysical environment.

headland includes a promontory extending from the general line of the coastline into a large body of water, such as a sea, coastal lake or bay.

health care professional means any person registered under an Act for the purpose of providing health care.

health consulting rooms means one or more rooms within (or within the curtilage of) a dwelling house used by not more than 3 health care professionals who practise in partnership (if there is more than one such professional) who provide professional health care services to members of the public.

heavy industry means an industry that requires separation from other land uses because of the nature of the processes involved, or the materials used, stored or produced. It may consist of or include a hazardous or offensive industry or involve the use of a hazardous or offensive storage establishment.

Height of Buildings Map means the [*Name of local government area*] Local Environmental Plan [*Year*] Height of Buildings Map.

helipad means a place not open to the public used for the taking off and landing of helicopters.

heliport means a place open to the public used for the taking off and landing of helicopters whether or not it includes:

- (a) a terminal building, or
- (b) facilities for the parking, storage or repair of helicopters.

heritage conservation area means:

- (a) an area of land that is shown as a heritage conservation area on the Heritage Map (including any heritage items situated on or within that conservation area), or
- (b) a place of Aboriginal heritage significance shown on the Heritage Map.

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heritage conservation management plan means a document prepared in accordance with guidelines prepared by the Department of Planning that documents the heritage significance of an item, place or heritage conservation area and identifies conservation policies and management mechanisms that are appropriate to enable that significance to be retained.

heritage impact statement means a document consisting of:

- (a) a statement demonstrating the heritage significance of a heritage item, archaeological site, place of Aboriginal heritage significance or other heritage conservation area, and
- (b) an assessment of the impact that proposed development will have on that significance, and
- (c) proposals for measures to minimise that impact.

heritage item means a building, work, archaeological site, tree, place or Aboriginal object specified in an inventory of heritage items that is available at the office of the Council and the site and nature of which is described in Schedule 5.

Heritage Map means the [Name of local government area] Local Environmental Plan [Year] Heritage Map.

heritage significance means historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value.

home-based child care or family day care home means a dwelling used by a resident of the dwelling for the supervision and care of one or more children and which satisfies the following conditions:

- (a) the service is appropriately licensed within the meaning of the *Children and Young Persons (Care and Protection) Act 1998*,
- (b) the number of children (including children related to the carer or licensee) does not at any one time exceed 7 children under the age of 12 years, including no more than 5 who do not ordinarily attend school.

home business means a business carried on in a dwelling, or in a building ancillary to a dwelling, by one or more permanent residents of the dwelling that does not involve:

- (a) the employment of more than 2 persons other than those residents, or
- (b) interference with the amenity of the neighbourhood by reason of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil, traffic generation or otherwise, or
- (c) involve the exposure to view, from any adjacent premises or from any public place, of any unsightly matter, or
- (d) the exhibition of any notice, advertisement or sign (other than a notice, advertisement or sign exhibited on that dwelling to indicate the name of the resident and the business carried on in the dwelling), or
- (e) the sale of items (whether goods or materials), or the exposure or offer for sale of items, by retail, except for goods produced at the dwelling or building, or

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- (f) the use of more than [*insert number*] square metres of floor area to carry on the business,

but does not include bed and breakfast accommodation, home occupation (sex services) or sex services premises.

home industry means a light industry carried on in a dwelling, or in a building ancillary to a dwelling, by one or more permanent residents of the dwelling that does not involve:

- (a) the employment of more than 2 persons other than those residents, or
- (b) interference with the amenity of the neighbourhood by reason of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil, traffic generation or otherwise, or
- (c) the exposure to view, from any adjacent premises or from any public place, of any unsightly matter, or
- (d) the exhibition of any notice, advertisement or sign (other than a notice, advertisement or sign exhibited on that dwelling to indicate the name of the resident and the light industry carried on in the dwelling), or
- (e) the sale of items (whether goods or materials), or the exposure or offer for sale of items, by retail, except for goods produced at the dwelling or building, or
- (f) the use of more than [*insert number*] square metres of floor area to carry on the light industry,

but does not include bed and breakfast accommodation or sex services premises.

home occupation means an occupation carried on in a dwelling, or in a building ancillary to a dwelling, by one or more permanent residents of the dwelling that does not involve:

- (a) the employment of persons other than those residents, or
- (b) interference with the amenity of the neighbourhood by reason of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil, traffic generation or otherwise, or
- (c) the display of goods, whether in a window or otherwise, or
- (d) the exhibition of any notice, advertisement or sign (other than a notice, advertisement or sign exhibited on that dwelling to indicate the name of the resident and the occupation carried on in the dwelling), or
- (e) the sale of items (whether goods or materials), or the exposure or offer for sale of items, by retail,

but does not include bed and breakfast accommodation or home occupation (sex services).

home occupation (sex services) means the provision of sex services in a dwelling, or in a building ancillary to a dwelling, by no more than 2 permanent residents of the dwelling and that does not involve:

- (a) the employment of persons other than those residents, or

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- (b) interference with the amenity of the neighbourhood by reason of the emission of noise, traffic generation or otherwise, or
 - (c) the exhibition of any notice, advertisement or sign, or
 - (d) the sale of items (whether goods or materials), or the exposure or offer for sale of items, by retail,

but does not include a home business or sex services premises.

horticulture means the cultivation of fruits, vegetables, mushrooms, nuts, cut flowers and foliage and nursery products for commercial purposes, but does not include retail sales or viticulture.

hospital means a building or place used for the purpose of providing professional health care services (such as preventative or convalescent care, diagnosis, medical or surgical treatment, psychiatric care or care for people with disabilities, or counselling services provided by health care professionals) to people admitted as in-patients (whether or not out-patients are also cared for or treated there), and includes ancillary facilities for (or that consist of) any of the following:

- (a) day surgery, day procedures or health consulting rooms,
- (b) accommodation for nurses or other health care workers,
- (c) accommodation for persons receiving health care or for their visitors,
- (d) shops or refreshment rooms,
- (e) transport of patients, including helipads, ambulance facilities and car parking,
- (f) educational purposes or any other health-related use,
- (g) research purposes (whether or not it is carried out by hospital staff or health care workers or for commercial purposes),
- (h) chapels,
- (i) hospices,
- (j) mortuaries.

hostel means premises that are generally staffed by social workers or support providers and at which:

- (a) residential accommodation is provided in dormitories, or on a single or shared basis, or by a combination of them, and
- (b) cooking, dining, laundering, cleaning and other facilities are provided on a shared basis.

hotel accommodation means a building (whether or not a hotel within the meaning of the *Liquor Act 1982*) that provides tourist and visitor accommodation consisting of rooms or self-contained suites, but does not include backpackers' accommodation, a boarding house or bed and breakfast accommodation.

industry means the manufacturing, production, assembling, altering, formulating, repairing, renovating, ornamenting, finishing, cleaning, washing, dismantling, transforming, processing or adapting, or the research and development of any goods, chemical substances, food, agricultural or beverage products, or articles for commercial purposes, but does not include extractive industry or a mine.

information and education facility means a building or place used for providing information or education to visitors, and the exhibition or display of items, and includes an art gallery, museum, library, visitor information centre and the like.

intensive livestock agriculture means the keeping or breeding of cattle, poultry, goats, horses or other livestock, that are fed wholly or substantially on externally-sourced feed, and includes operation of feed lots, piggeries, poultry farms or restricted dairies, but does not include the operation of facilities for drought or similar emergency relief or extensive agriculture or aquaculture.

jetty means a horizontal decked walkway providing access from the shore to the waterway and is generally constructed on a piered or piled foundation.

kiosk means retail premises with a gross floor area not exceeding [insert number] square metres and that provides food, light refreshments and other small convenience items such as newspapers, films and the like.

Land Application Map means the [Name of local government area] Local Environmental Plan [Year] Land Application Map.

Land Reservation Acquisition Map means the [Name of local government area] Local Environmental Plan [Year] Land Reservation Acquisition Map.

Land Zoning Map means the [Name of local government area] Local Environmental Plan [Year] Land Zoning Map.

landscape and garden supplies means a building or place where trees, shrubs, plants, bulbs, seeds and propagating material are offered for sale (whether by retail or wholesale), and may include the sale of landscape supplies (including earth products or other landscape and horticulture products) and the carrying out of horticulture.

landscaped area means a part of a residential site used for growing plants, grasses and trees, but does not include any building, structure or hard paved area.

liquid fuel depot means a depot or place used for the bulk storage for wholesale distribution of petrol, oil, petroleum or other inflammable liquid and at which no retail trade is conducted.

light industry means an industry, not being a hazardous or offensive industry or involving use of a hazardous or offensive storage establishment, in which the processes carried on, the transportation involved or the machinery or materials used do not interfere with the amenity of the neighbourhood by reason of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil, or otherwise.

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livestock processing industry means a rural industry that involves the commercial production of products derived from the slaughter of animals (including poultry) or the processing of skins or wool of animals, derived principally from surrounding districts, and includes such activities as abattoirs, knackeries, tanneries, woolscours and rendering plants.

local heritage significance, in relation to a place, building, work, historical archaeological site, tree or precinct, means its heritage significance to an area.

Lot Size Map means the [Name of local government area] Local Environmental Plan [Year] Lot Size Map.

maintenance in relation to a heritage item or a building, work, historical archaeological site, tree or place within a heritage conservation area, means ongoing protective care. It does not include the removal or disturbance of existing fabric, alterations, such as carrying out extensions or additions, or the introduction of new materials or technology.

marina means a permanent boat storage facility (whether located wholly on land, wholly on the waterway or partly on land and partly on the waterway) together with any associated facilities, including:

- (a) any facility for the construction, repair, maintenance, storage, sale or hire of boats, and
- (b) any facility for providing fuelling, sewage pump-out or other services for boats, and
- (c) any facility for launching or landing boats, such as slipways or hoists, and
- (d) any associated car parking, commercial, tourist or recreational or club facility that is ancillary to a boat storage facility, and
- (e) any associated single mooring.

market means retail premises comprising an open-air area or an existing building used for the purpose of selling, exposing or offering goods, merchandise or materials for sale by independent stall holders, and includes temporary structures and existing permanent structures used for that purpose on an intermittent or occasional basis.

materials recycling or recovery centre means a building or place used for the recycling or recovery of resource materials (excluding sludge-like material) from waste materials, and that involves separating and sorting, processing (such as baling, crushing, shredding and composting), transferring and the sale of recycled or recovered material, but that does not involve the re-manufacture, chemical manufacture or incineration of the material.

mean high water mark means the position where the plane of the mean high water level of all ordinary local high tides intersects the foreshore, being 1.44m above the zero of Fort Denison Tide Gauge and 0.515m Australian Height Datum.

medical centre means business premises used for the purpose of providing health services (including preventative care, diagnosis, medical or surgical treatment, counselling or alternative therapies) to out-patients only, where such services are principally provided by health care professionals, and may include the ancillary provision of other health services.

mezzanine means an intermediate floor within a room.

mine means any place (including any excavation) where an operation is carried on for mining of any mineral by any method and any place on which any mining related work is carried out, but does not include a place used only for extractive industry.

mine subsidence district means a mine subsidence district proclaimed under section 15 of the *Mine Subsidence Compensation Act 1961*.

mining means mining carried out under the *Mining Act 1992* or the recovery of minerals under the *Offshore Minerals Act 1999*, and includes:

- (a) the construction, operation and decommissioning of associated works, and
- (b) the rehabilitation of land affected by mining.

mixed use development means a building or place comprising 2 or more different land uses.

mooring means a detached or freestanding apparatus located on or in a waterway and that is capable of securing a vessel.

mortuary means premises that are used, or intended to be used, for the receiving, preparation, embalming and storage of bodies of deceased persons pending their interment or cremation.

moveable dwelling has the same meaning as in the *Local Government Act 1993*.

Note. The term is defined as follows:

moveable dwelling means:

- (a) any tent, or any caravan or other van or other portable device (whether on wheels or not), used for human habitation, or
- (b) a manufactured home, or
- (c) any conveyance, structure or thing of a class or description prescribed by the regulations (under the *Local Government Act 1993*) for the purposes of this definition.

multi dwelling housing means 3 or more dwellings (whether attached or detached) on one lot of land.

native fauna means any animal-life that is indigenous to New South Wales or is known to periodically or occasionally migrate to New South Wales, whether vertebrate (including fish) or invertebrate and in any stage of biological development, but does not include humans.

native flora means any plant-life that is indigenous to New South Wales, whether vascular or non-vascular and in any stage of biological development, and includes fungi and lichens, and marine vegetation within the meaning of Part 7A of the *Fisheries Management Act 1994*.

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native vegetation has the same meaning as in the *Native Vegetation Act 2003*.

Note. The term is defined as follows:

Meaning of “native vegetation”

Native vegetation means any of the following types of indigenous vegetation:

- (a) trees (including any sapling or shrub, or any scrub),
- (b) understorey plants,
- (c) groundcover (being any type of herbaceous vegetation),
- (d) plants occurring in a wetland.

Vegetation is indigenous if it is of a species of vegetation, or if it comprises species of vegetation, that existed in the State before European settlement.

Native vegetation does not include any mangroves, seagrasses or any other type of marine vegetation to which section 205 of the *Fisheries Management Act 1994* applies.

natural water-based aquaculture means aquaculture undertaken in natural waterbodies (including any part of the aquaculture undertaken in tanks, ponds or other facilities such as during hatchery or depuration phases).

Note. Typical natural water-based aquaculture is fin fish culture in cages and oyster, mussel or scallop culture on or in racks, strings or cages.

navigable waterway means any waterway that is from time to time capable of navigation and is open to or used by the public for navigation, but does not include flood waters that have temporarily flowed over the established bank of a watercourse.

neighbourhood shop means retail premises used for the purpose of selling foodstuffs, personal care products, and other small daily convenience goods for the day-to-day needs of people who live or work in the local area, and may include ancillary services such as a post office, bank, newsagency or dry cleaning.

non-potable water means water that does not meet the health and aesthetic values set out in the Australian Drinking Water Guidelines issued from time to time by the National Health and Medical Research Council.

offensive industry means any development for the purpose of an industry that would, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), emit a polluting discharge (including, for example, noise) in a manner that would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality.

offensive storage establishment means any establishment where goods, materials or products are stored and that would, when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the establishment from existing or likely future development on other land in the locality), emit a polluting discharge (including, for example, noise) in a manner that would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality.

office premises means a building or place used for the purpose of administrative, clerical, technical, professional or similar activities that do not include dealing with members of the public at the building or place on a direct and regular basis, except where such dealing is a minor activity (by appointment) that is ancillary to the main purpose for which the building or place is used.

operational land has the same meaning as in the *Local Government Act 1993*.

parking space means a space dedicated for the parking of a motor vehicle, including any manoeuvring space and access to it, but does not include a car park.

passenger transport facility means a building or place used for the assembly or dispersal of passengers by any form of transport, including facilities required for parking, manoeuvring, storage or routine servicing of any vehicle that uses the building or place.

permanent group home means a dwelling:

- (a) used to provide a household environment for disabled persons or socially disadvantaged persons, whether those persons are related or not, and
- (b) occupied by the persons referred to in paragraph (a) as a single household, with or without paid or unpaid supervision or care and either with or without payment for board and lodging being required,

but does not include a building to which *State Environmental Planning Policy (Seniors Living) 2004* applies or a transitional group home.

place of Aboriginal heritage significance means an area of land shown on the Heritage Map that is:

- (a) the site of one or more Aboriginal objects or a place that has the physical remains of pre-European occupation by, or is of contemporary significance to, the Aboriginal people. It can (but need not) include items and remnants of the occupation of the land by Aboriginal people, such as burial places, engraving sites, rock art, midden deposits, scarred and sacred trees and sharpening grooves, or
- (b) a natural Aboriginal sacred site or other sacred feature. It includes natural features such as creeks or mountains of long-standing cultural significance, as well as initiation, ceremonial or story places or areas of more contemporary cultural significance.

place of public worship means a building or place used for the purpose of religious worship by a congregation or religious group, whether or not the building or place is also used for counselling, social events, instruction or religious training.

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pond based aquaculture means aquaculture undertaken in structures that are constructed by excavating and reshaping earth, which may be earthen or lined, and includes any part of the aquaculture undertaken in tanks, such as during the hatchery or pre-market conditioning phases, but does not include aquaculture in a natural waterbody.

Note. Typical pond based aquaculture is the pond culture of prawns, yabbies or silver perch.

potable water means water that meets the health and aesthetic values set out in the Australian Drinking Water Guidelines issued from time to time by the National Health and Medical Research Council.

private open space means an area external to a building (including an area of land, terrace, balcony or deck) that is used for private outdoor purposes ancillary to the use of the building.

property vegetation plan has the same meaning as in the *Native Vegetation Act 2003*.

Note. The term is defined as follows:

property vegetation plan means a property vegetation plan that has been approved under Part 4 of the *Native Vegetation Act 2003*.

pub means licensed premises under the *Liquor Act 1982* the principal purpose of which is the sale of liquor for consumption on the premises, whether or not the premises include hotel accommodation and whether or not food is sold on the premises.

public administration building means a building used as offices or for administrative or other like purposes by the Crown, a statutory body, a council or an organisation established for public purposes.

public authority has the same meaning as in the Act.

public entertainment has the same meaning as in the *Local Government Act 1993*.

Note. The term is defined as follows:

public entertainment:

- (a) means entertainment to which admission may ordinarily be gained by members of the public on payment of money, or other consideration, as the price or condition of admission and an entertainment does not cease to be a public entertainment merely because:
 - (i) some (but not all) persons may be admitted to the entertainment otherwise than on payment of money, or other consideration, as the price or condition of admission, or
 - (ii) such payment, or other consideration, is demanded as the charge for a meal or other refreshment, or for any other service or thing, before admission to the entertainment is granted or as the charge for the entertainment after admission to the entertainment has been granted, and
- (b) includes a public meeting.

public hall has the same meaning as in the *Local Government Act 1993*.

Note. The term is defined as follows:

public hall means a public hall that is used or intended to be used for the purpose of conducting public meetings or providing public entertainment.

public land has the same meaning as in the *Local Government Act 1993*.

Note. The term is defined as follows:

public land means any land (including a public reserve) vested in or under the control of the council, but does not include:

- (a) a public road, or
- (b) land to which the *Crown Lands Act 1989* applies, or
- (c) a common, or
- (d) land subject to the *Trustees of Schools of Arts Enabling Act 1902*, or
- (e) a regional park under the *National Parks and Wildlife Act 1974*.

public meeting has the same meaning as in the *Local Government Act 1993*.

Note. The term is defined as follows:

public meeting means an assembly held for a public purpose to which admission may ordinarily be gained by members of the public (whether or not on payment of money, or other consideration, as the price or condition of admission), but does not include an assembly held for the purpose of religious worship only.

public reserve has the same meaning as in the *Local Government Act 1993*.

public utility undertaking means any of the following undertakings carried on or permitted to be carried on by or by authority of any Government Department or under the authority of or in pursuance of any Commonwealth or State Act:

- (a) railway, road transport, water transport, air transport, wharf or river undertakings,
- (b) undertakings for the supply of water, hydraulic power, electricity or gas or the provision of sewerage or drainage services,

and a reference to a person carrying on a public utility undertaking includes a reference to a council, electricity supply authority, Government Department, corporation, firm or authority carrying on the undertaking.

rainwater tank means a tank designed for the storage of rainwater gathered on the land on which the tank is situated.

recreation area means a place used for outdoor recreation that is normally open to the public, and includes:

- (a) a children's playground, or
- (b) an area used for community sporting activities, or
- (c) a public park, reserve or garden or the like,

and any ancillary buildings, but does not include a recreation facility (indoor), recreation facility (major) or recreation facility (outdoor).

recreation facility (indoor) means a building or place used predominantly for indoor recreation, whether or not operated for the purposes of gain, including a squash court, indoor swimming pool, gymnasium, table tennis centre, health studio, bowling alley, ice rink or any other building or place of a like character used for indoor recreation, but does not include an entertainment facility, a recreation facility (major) or a registered club.

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recreation facility (major) means a building or place used for large-scale sporting or recreation activities that are attended by large numbers of people whether regularly or periodically, and include sports stadiums, showgrounds, racecourses and motor racing tracks.

recreation facility (outdoor) means a building or place (other than a recreation area) used predominantly for outdoor recreation, whether or not operated for the purposes of gain, including a golf course, golf driving range, mini-golf centre, tennis court, paint-ball centre, lawn bowling green, outdoor swimming pool, equestrian centre, skate board ramp, go-kart track, rifle range, water-ski centre or any other building or place of a like character used for outdoor recreation (including any ancillary buildings), but does not include an entertainment facility or a recreation facility (major).

Reduced Level (RL) means height above the Australian Height Datum, being the datum surface approximating mean sea level that was adopted by the National Mapping Council of Australia in May 1971.

registered club means a club in respect of which a certificate of registration under the *Registered Clubs Act 1976* is in force.

relic means any deposit, object or other material evidence of human habitation:

- (a) that relates to the settlement of the area of [insert name local government area], not being Aboriginal settlement, and
- (b) that is more than 50 years old, and
- (c) that is a fixture or is wholly or partly within the ground.

residential accommodation means a building or place used predominantly as a place of residence, but does not include tourist and visitor accommodation.

residential care facility means accommodation for seniors (people aged 55 years or more) or people with a disability that includes:

- (a) meals and cleaning services, and
- (b) personal care or nursing care, or both, and
- (c) appropriate staffing, furniture, furnishings and equipment for the provision of that accommodation and care,

not being a dwelling, hospital or psychiatric facility.

residential flat building means a building containing 3 or more dwellings.

restaurant means a building or place the principal purpose of which is the provision of food or beverages to people for consumption on the premises and that may also provide takeaway meals and beverages.

restricted dairy means a dairy (other than a dairy (pasture-based)) where restriction facilities are present in addition to milking sheds and holding yards, and where cattle have access to grazing for less than 10 hours in any 24 hour period (excluding during periods of drought or similar emergency relief). A restricted dairy may comprise the whole or part of a restriction facility.

restricted premises means business premises or retail premises that, due to their nature, restrict access to patrons or customers over 18 years of age, and includes sex shops and similar premises but does not include hotel accommodation, a pub, home occupation (sex services) or sex services premises.

restriction facilities means facilities where animals are constrained for management purposes, including milking sheds, pads, feed stalls, holding yards and paddocks where the number of livestock exceeds the ability of vegetation to recover from the effects of grazing in a normal growing season, but does not include facilities for drought or similar emergency relief.

retail premises means a building or place used for the purpose of selling items by retail, or for hiring or displaying items for the purpose of selling them by retail or hiring them out, whether the items are goods or materials or whether also sold by wholesale).

roadside stall means a place or temporary structure with a gross floor area not exceeding [insert number] square metres used for retail selling of agricultural produce or hand crafted goods (or both) produced from the property on which the stall is situated or from an adjacent property.

rural industry means an industry that involves the handling, treating, production, processing or packing of animal or plant agricultural products, and includes:

- (a) agricultural produce industry, or
- (b) livestock processing industry, or
- (c) use of composting facilities and works (including to produce mushroom substrate), or
- (d) use of sawmill or log processing works, or
- (e) use of stock and sale yards, or
- (f) the regular servicing or repairing of plant or equipment used for the purposes of a rural enterprise,

undertaken for commercial purposes.

rural worker's dwelling means a dwelling, ancillary to a dwelling house on the same landholding, used as the principal place of residence by persons employed for the purpose of agriculture or a rural industry on that land.

sawmill or log processing works means a building or place used for handling, cutting, chipping, pulping or otherwise processing logs, baulks, branches or stumps, principally derived from surrounding districts, into timber or other products derived from wood.

school means a government school or non-government school within the meaning of the *Education Act 1990*.

seniors housing means residential accommodation that consists of:

- (a) a residential care facility, or
- (b) a hostel, or

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(c) a group of self-contained dwellings, or

(d) a combination of these,

and that is, or is intended to be, used permanently for:

(e) seniors or people who have a disability, or

(f) people who live in the same household with seniors or people who have a disability, or

(g) staff employed to assist in the administration of the residential accommodation or in the provision of services to persons living in the accommodation,

but does not include a hospital.

sensitive coastal location means land in the coastal zone that is any of the following:

(a) land within 100 metres above mean high water mark of the sea, a bay, an estuary or a coastal lake,

(b) a declared Ramsar wetland within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* of the Commonwealth,

(c) a declared World Heritage property within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* of the Commonwealth,

(d) land declared as an aquatic reserve under the *Fisheries Management Act 1994*,

(e) land declared as a marine park under the *Marine Parks Act 1997*,

(f) land within 100 metres of any of the following:

(i) the water's edge of a coastal lake,

(ii) land to which paragraph (b), (c), (d) or (e) applies,

(iii) land reserved under the *National Parks and Wildlife Act 1974*,

(iv) land to which *State Environmental Planning Policy No 14—Coastal Wetlands* applies,

(g) residential land (within the meaning of *State Environmental Planning Policy No 26—Littoral Rainforests*) that is within a distance of 100 metres from the outer edge of the heavy black line on the series of maps held in the Department of Planning and marked "*State Environmental Planning Policy No 26—Littoral Rainforests (Amendment No 2)*".

service station means a building or place used for the sale by retail of fuels and lubricants for motor vehicles, whether or not the building or place is also used for any one or more of the following:

(a) the ancillary sale by retail of spare parts and accessories for motor vehicles,

(b) the cleaning of motor vehicles,

(c) installation of accessories,

(d) inspecting, repairing and servicing of motor vehicles (other than body building, panel beating, spray painting, or chassis restoration),

(e) the ancillary retail selling or hiring of general merchandise or services or both.

serviced apartment means a building or part of a building providing self-contained tourist and visitor accommodation that is regularly serviced or cleaned by the owner or manager of the building or part of the building or the owner's or manager's agents.

sewage treatment works means works or land used for the collection, treatment and disposal of sewage by or for a public authority.

sex services means sexual acts or sexual services in exchange for payment.

sex services premises means premises used primarily for the provision of sex services, but does not include home occupation (sex services).

shop top housing means mixed use development comprising one or more dwellings located above (or otherwise attached to) ground floor retail premises or business premises.

signage means any sign, notice, device, representation or advertisement that advertises or promotes any goods, services or events and any structure or vessel that is principally designed for, or that is used for, the display of signage, and includes:

- (a) building identification signs, and
- (b) business identification signs, and
- (c) advertisements,

but does not include traffic signs or traffic control facilities.

site area means the area of any land on which development is carried out, or is proposed. The land may include the whole or part of one lot, or more than one lot, if they are contiguous to each other.

site coverage means the proportion of a site area covered by buildings. However, the following are not included for the purpose of calculating site coverage:

- (a) any basement,
- (b) any part of an awning that is outside the outer walls of a building and that adjoins the street frontage or other site boundary,
- (c) any eaves,
- (d) unenclosed decks, pergolas and the like.

spa pool has the same meaning as in the *Swimming Pools Act 1992*.

Note. The term is defined to include any excavation, structure or vessel in the nature of a spa pool, flotation tank, tub or the like.

standard industry means an industry not being a heavy, light, offensive, hazardous or extractive industry or a mine.

stock and sale yard means a building or place used on a commercial basis for the purpose of offering livestock or poultry for sale and may be used for the short-term storage and watering of stock.

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storey means a space within a building that is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but does not include:

- (a) a space that contains only a lift shaft, stairway or meter room, or
- (b) a mezzanine, or
- (c) an attic.

swimming pool has the same meaning as in the *Swimming Pools Act 1992*.

Note. The term is defined as follows:

swimming pool means an excavation, structure or vessel:

- (a) that is capable of being filled with water to a depth of 300 millimetres or more, and
- (b) that is solely or principally used, or that is designed, manufactured or adapted to be solely or principally used, for the purpose of swimming, wading, paddling or any other human aquatic activity,

and includes a spa pool, but does not include a spa bath, anything that is situated within a bathroom or anything declared by the regulations made under the *Swimming Pools Act 1992* not to be a swimming pool for the purposes of this Act.

take away food or drink premises means food or drink premises that are predominantly used for the preparation and sale of food or drink for immediate consumption away from the premises.

tank-based aquaculture means aquaculture utilising structures that are constructed from materials such as fibreglass, plastics, concrete, glass or metals, are usually situated either wholly or partly above ground, and may be contained within a purpose built farm or industrial style sheds or plastic covered hothouse to assist in controlling environmental factors.

telecommunications facility means:

- (a) any part of the infrastructure of a telecommunications network, or
- (b) any line, equipment, apparatus, tower, mast, antenna, tunnel, duct, hole, pit, pole or other structure or thing used, or to be used, in or in connection with a telecommunications network.

telecommunications network means a system, or series of systems, that carries, or is capable of carrying, communications by means of guided or unguided electromagnetic energy, or both.

temporary structure has the same meaning as in the *Local Government Act 1993*.

Note. The term is defined as follows:

temporary structure includes a booth, tent or other temporary enclosure (whether or not part of the booth, tent or enclosure is permanent), and also includes a mobile structure.

the Act means the *Environmental Planning and Assessment Act 1979*.

timber and building supplies means a building or place used for the display and sale (whether by retail or wholesale, or both) of goods or materials used in the construction and maintenance of buildings, where those goods or materials are of such size or weight as to require customers to have direct vehicular access to the building or place in order to load or unload those goods or materials.

tourist and visitor accommodation means a building or place that provides temporary or short-term accommodation on a commercial basis, and includes hotel accommodation, serviced apartments, bed and breakfast accommodation and backpackers' accommodation.

transitional group home means a dwelling:

- (a) used to provide temporary accommodation, for the purposes of relief or rehabilitation, for disabled persons or socially disadvantaged persons, whether those persons are related or not, and
- (b) occupied by the persons referred to in paragraph (a) as a single household, either with or without paid or unpaid supervision or care and either with or without payment for board and lodging being required,

but does not include a building to which *State Environmental Planning Policy (Seniors Living) 2004* applies.

transport depot means a building or place used for the parking or servicing of motor powered or motor drawn vehicles used in connection with a passenger transport undertaking, business, industry or shop.

truck depot means a building or place used for the servicing and parking of trucks, earthmoving machinery and the like.

turf farming means the commercial cultivation of turf for sale and the removal of turf for that purpose.

utility installation means a building, work or place used by a public utility undertaking, but does not include a building designed wholly or principally as administrative or business premises or as a showroom.

vehicle body repair workshop means a building or place used for the repair of vehicles or agricultural machinery, involving body building, panel building, panel beating, spray painting or chassis restoration.

vehicle repair station means a building or place used for the purpose of carrying out repairs or the selling of, and fitting of accessories to, vehicles or agricultural machinery, but does not include a vehicle body repair workshop.

vehicle showroom means a building or place used for the display or sale of motor vehicles, caravans, boats, trailers, agricultural machinery and the like, whether or not accessories are sold or displayed there.

veterinary hospital means a building or place used for diagnosing or surgically or medically treating animals, whether or not animals are kept on the premises for the purpose of treatment.

warehouse or distribution centre means a building or place used mainly or exclusively for storing or handling items (whether goods or materials) pending their sale, but from which no retail sales are made.

waste disposal land fill operation means use of land for the purpose of disposing of industrial, trade or domestic waste on that land.

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waste management facility means a facility used for the storage, treatment, purifying or disposal of waste, whether or not it is also used for the sorting, processing, recycling, recovering, use or reuse of material from that waste, and whether or not any such operations are carried out on a commercial basis. It may include but is not limited to:

- (a) an extractive industry ancillary to, required for or associated with the preparation or remediation of the site for such storage, treatment, purifying or disposal, and
- (b) eco-generating works ancillary to or associated with such storage, treatment, purifying or disposal.

water recreation structure means a structure used primarily for recreational purposes that has a direct structural connection between the shore and the waterway, and may include a pier, wharf, jetty or boat launching ramp.

waterbody means a waterbody (artificial) or waterbody (natural).

waterbody (artificial) means an artificial body of water, including any constructed waterway, canal, inlet, bay, channel, dam, pond, lake or artificial wetland, but does not include a dry detention basin or other stormwater management construction that is only intended to hold water intermittently.

waterbody (natural) means a natural body of water, whether perennial or intermittent, fresh, brackish or saline, the course of which may have been artificially modified or diverted onto a new course, and includes a river, creek, stream, lake, lagoon, natural wetland, estuary, bay, inlet or tidal waters (including the sea).

watercourse means any river, creek, stream or chain of ponds, whether artificially modified or not, in which water usually flows, either continuously or intermittently, in a defined bed or channel, but does not include a waterbody (artificial).

waterway means the whole or any part of a watercourse, wetland, waterbody (artificial) or waterbody (natural).

wetland means:

- (a) natural wetland, including marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands that form a shallow waterbody (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with fresh, brackish or salt water, and where the inundation determines the type and productivity of the soils and the plant and animal communities, or
- (b) artificial wetland, including marshes, swamps, wet meadows, sedgelands or wet heathlands that form a shallow water body (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with water, and are constructed and vegetated with wetland plant communities.

BY AUTHORITY

Appendix B

APPLICATION OF SEPP 58

MARRANGAROO STRUCTURE PLAN

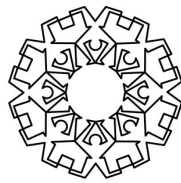
APPLICATION OF SEPP 58

PROTECTING SYDNEY'S WATER SUPPLY

PREPARED FOR:

LITHGOW CITY COUNCIL

JUNE 2006

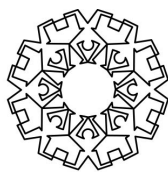


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Report Title:	<i>Application of SEPP 58</i>
Project:	Marrangaroo Structure Plan
Client:	<i>Lithgow City Council</i>
Report No.:	<i>205177_Marrangaroo Structure Plan_AppB.doc</i>
Draft/Final:	Final

Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

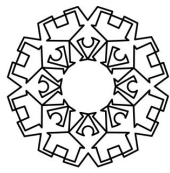
The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All maps and plans contained within this report are prepared for the exclusive use of Lithgow City Council to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

Reviewed By:	<i>Colette Goodwin</i>
Position:	<i>Project Manager</i>
Signed:	
Date:	

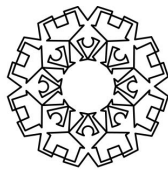
Prepared By:	<i>Kris Longmore</i>
Position:	<i>Environmental Engineer</i>
Signed:	
Date:	



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1.1 INTRODUCTION

This section examines the implications of State Environmental Planning Policy (SEPP) 58 – *Protecting Sydney's Water Supply* on the Marrangaroo development. SEPP 58 aims to ensure that development within the hydrological catchment from which Sydney draws its drinking supply does not have a detrimental impact on water quality, and that there is a consistent approach to the assessment and control of development within the catchment that is likely to impact on water quality. It also aims to ensure that the Chief Executive of the Sydney Catchment Management Authority has a role in the approvals process for development likely to impact on water quality within the catchment.

SEPP 58 applies to development in the Warragamba, Upper Nepean, Woronora, Blue Mountains and Shoalhaven catchments. The Marrangaroo development lies within the Upper Nepean catchment, and therefore SEPP 58 must be applied.

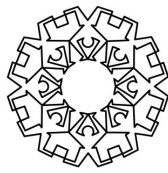
1.2 DESCRIPTION OF SEPP 58

SEPP 58 states that the consenting authority, in granting approval for designated development within the catchment area, must consider the following:

- Whether the development will have a neutral or beneficial effect on the water quality of rivers, streams or groundwater within the catchment, including during periods of wet weather,
- Whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term, and
- Whether the development is compatible with relevant environmental objectives and water quality standards for the catchment when these objectives are established by the government.

SEPP 58 also states that the consent authority can not grant consent to specified development within the catchment without the concurrence of the Chief Executive of the Sydney Catchment Authority, who will consider a water cycle management study relating to the proposed development in his decision to grant concurrence or otherwise. The water cycle management study should address the following matters:

- Pre-development and post-development run-off volumes and pollutant loads from the site of the proposed development.
- An assessment of whether the development will have a neutral or beneficial effect on the water quality of rivers, streams or groundwater within the catchment, including during periods of wet weather.
- An assessment of whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term.



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- An assessment of whether the development is compatible with relevant environmental objectives and water quality standards for the catchment when these objectives are established by the government.
- The water cycle management strategies and best management practices proposed to be employed to address water quality impacts.
- The arrangements to be made for the ongoing maintenance and monitoring of the water cycle management system.
- The results of consultations concerning the proposed development with the EPA and other relevant agencies.

1.3 APPLICATION OF SEPP 58 TO THE MARRANGAROO DEVELOPMENT

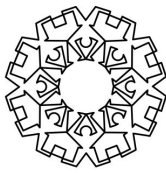
1.3.1 INTRODUCTION

A broad-scale study was undertaken to assess the likely impact of the proposed Marrangaroo development on receiving waters within the catchment. This study assessed the likely pollutant loads of run-off from the proposed Land Use Plan Option 3 in the Marrangaroo Local Environmental Study and compared these loads with those expected from the existing Marrangaroo land uses.

This study showed that it is likely that pollutant runoff loads will increase due to the proposed development. Therefore, it is likely that developments within the catchment will need to be supported by water cycle management strategies that are employed to address these impacts.

The study was undertaken at a broad scale, with the only details of the proposed development used in the study being land use type. Individual developments will be required to assess in greater detail their water quality impacts and meet the requirements of SEPP 58 as part of the normal approvals process. This study should not be used to accurately predict the pollutant loads from the Marrangaroo development area, but rather should be used to give an indication of the likely limits of pollution leaving the study area as runoff, as well as an indication in the likely changes of these limits with the proposed landuse changes.

A limitation of this study is that SEPP 58 is generally applied to individual developments, rather than to a broad study area (with the possible exception of developments with a negotiated pollution offset). However, this study gives an indication of the likely impact of the overall development of the study area on receiving water quality, and hence will also give an indication of the likely water cycle management practices that will need to be considered for individual developments within the study area.



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1.3.2 STUDY METHODOLOGY

Duncan (1999) measured pollutant loads in runoff from different sites, and reported the results as runoff from different land use categories as a mean bounded by plus and minus one standard deviation. The categories used were:

- All urban
- Residential
- Industrial
- Commercial
- Other urban
- All rural
- Agricultural
- Forest
- Other rural

The runoff loads in the study exhibited wide variation, with the range of one standard deviation either side of the mean regularly covering one or two orders of magnitude. The Marrangaroo study assessed the likely change in the mean pollutant loads from the study area, as well as the likely changes in the plus/minus one standard deviation from the mean limits.

Roberson *et. al.* (1998) recommend runoff coefficients for different land use types.

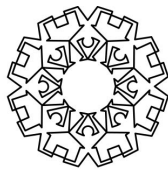
Duncan's results and Roberson's recommendations were applied to the Marrangaroo study. The Marrangaroo existing and proposed land uses were grouped into categories based on their similarity to Duncan's categories and their applicability to Roberson's runoff coefficients. For example, machine storage, service station, quarry and conveyor belt manufacturing were given the land use category of industrial (and the relevant pollutant loadings for this category), and a runoff coefficient corresponding to light industry.

The Marrangaroo existing land uses were then mapped using MapInfo GIS software, and from this map the areas of each land use was determined. The same was done for the proposed land uses in Land Use Plan Option Three of the Marrangaroo Local Environmental Study.

Rainfall data for the area was then obtained by taking the average monthly values across the four collection sites in or near Lithgow.

Monthly pollutant loads for the existing and proposed land uses were then calculated according to the following formula:

$$L = \sum C_L \times RF \times A_L$$



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Where L = the total load of the pollutant leaving the study area in runoff

RF = the level of rainfall on the study area for the month

C_L = the concentration of the pollutant in the runoff from each landuse

A_L = the area of each landuse in the study area

Turbidity was calculated in a different manner, as turbidity can not effectively be expressed as a discrete load, but rather is a property of the water itself. Turbidity was assessed as the turbidity of the runoff water leaving the study area. This was found by combining the turbidity of the runoff from each land use type in proportion to the relative amount runoff from each land use type. The following formula was used:

$$T = \sum T_L \times RU_L / RU_T$$

Where T = the turbidity of the runoff leaving the study area

T_L = the turbidity of runoff from each land use type

RU_L = the runoff from each land use type

RU_T = the total runoff from the study area

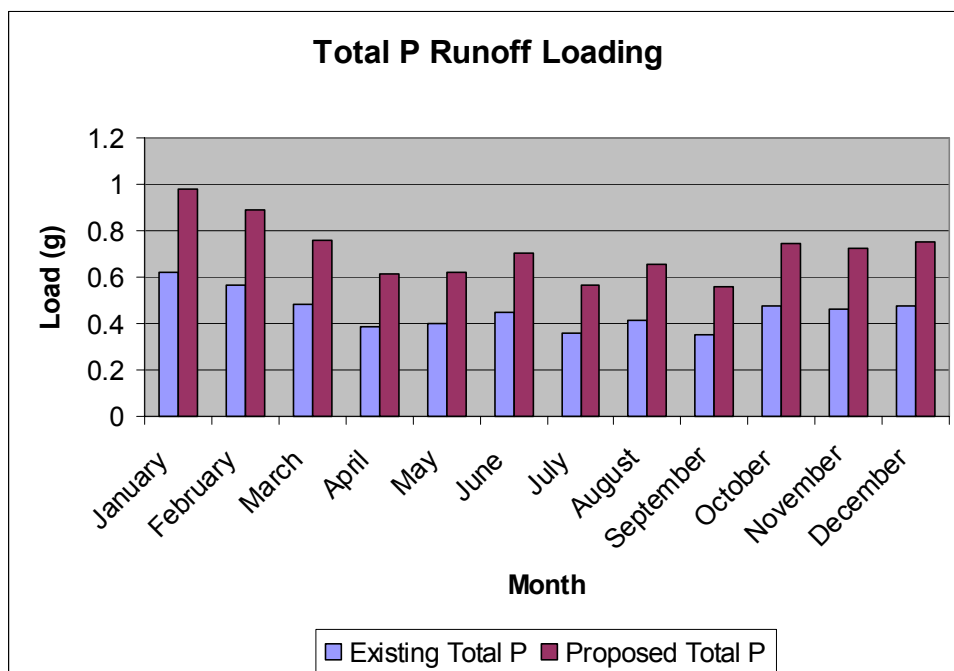
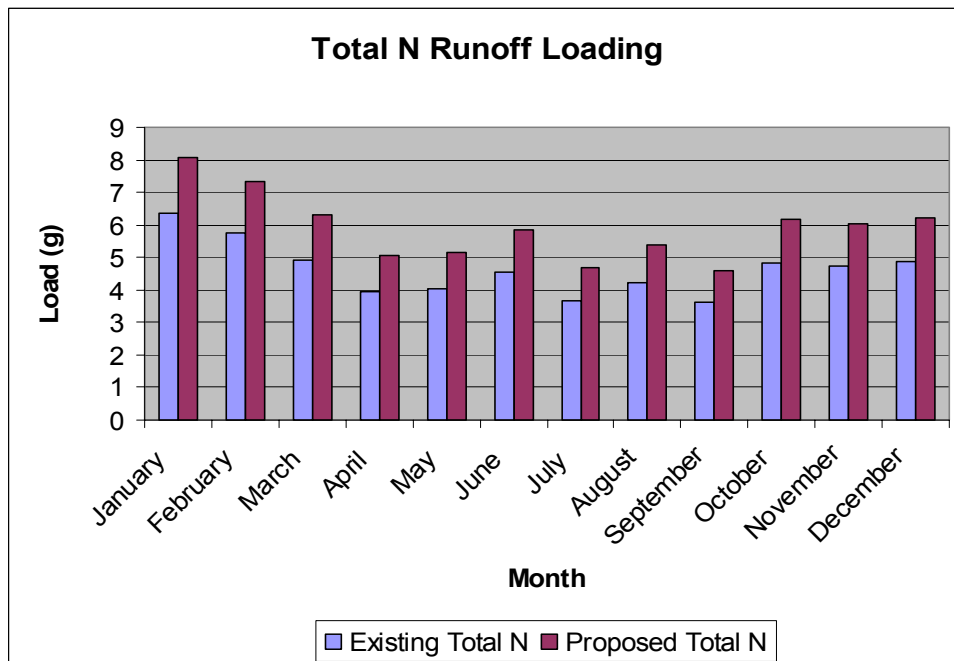
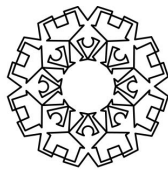
The study was applied to the following pollutants: suspended solids, total phosphorous, total nitrogen, chemical oxygen demand, biological oxygen demand, oil and grease, total organic carbon, turbidity, total lead, total zinc, total copper, total cadmium, total chromium and fecal coliforms.

1.3.3 RESULTS

The study indicated that the pollutant loads in runoff from the Marrangaroo study area will increase as a result of the development proposed in Land Use Plan Option 3.

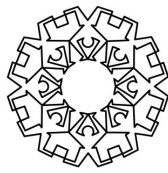
Although difficult to quantify due to the broad nature of the study, it is likely that the mean load for all pollutants will increase by around 50-60%.

Actual loads could increase by much more or much less depending on the exact nature of the development undertaken in the study area. The figures below show the likely increases in the mean runoff loads for total nitrogen (N) and total phosphorous (P). The percentage increases are typical for all pollutants assessed.



1.3.4 DISCUSSION

As the study demonstrates that pollutant loading in runoff is likely to increase as a result of the proposed development, it is unlikely that development in the Marrangaroo area will result in neutral or beneficial impacts on receiving waters without implementing some form of water cycle management practice. These water cycle management cycle practices could include:



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- On-site storage and treatment that would return water leaving a site to such a condition that it demonstrated neutral or beneficial impact on receiving waters (for example detention ponds or constructed wetlands).
- Water quality issues managed by downstream treatment and disposal methods that do not negatively impact on the quality of receiving waters (for example a constructed wetland strategically placed at the point of water discharge from the study area designed to capture and treat the majority of the runoff from the study area).
- Offsetting the impact of a proposed development with the impacts of development on a larger scale, so as to demonstrate no overall negative impact on receiving water quality. This is achieved through negotiation with the Sydney Catchment Authority.

It is recommended that stormwater management ponds be constructed in strategic locations in the Marrangaroo development area, in order to control increases in runoff flows and pollutant levels. The stormwater management ponds would be sized so as to ensure that the quantity and quality of stormwater leaving the developed site is at least equivalent to the quantity and quality of stormwater leaving the undeveloped site.

1.3.5 CONCLUSION

This study demonstrates that pollutant runoff loads are likely to increase as a result of the development proposed for Marrangaroo in the Proposed Land Use Plan Option 3, and that this development is unlikely to demonstrate a neutral or beneficial impact on water quality according to SEPP 58. However, these impacts can be managed through on or off site treatment methods, or through negotiated pollution offsets with Sydney Catchment Authority. A conceptual scheme has been developed including the location of possible stormwater management ponds and is found within the Structure Plan.

Due to the requirements of SEPP 58 and the likely impacts of the proposed development, a water cycle assessment will need to be undertaken for individual developments within the Study Area, and impact management practices will need to be designed and submitted with development applications.

1.4 REFERENCES

Duncan, H.P. (1999). *Urban Stormwater Quality: A Statistical Overview*, Cooperative Research Centre for Catchment Hydrology, Melbourne, Australia.

Roberson, John A.; Cassidy, John J.; and Chaudhry, M. Hanif (1998). *Hydraulic Engineering*, John Wiley and Sons, United States of America.

The Institution of Engineers, Australia. 2003, *Australian Runoff Quality Guidelines (Draft)*.