Murray River local profile

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Zenith
TOWN PLANNING

Contents

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Introduction

1.1 Objectives

Murray River local government area (LGA) was proclaimed in June 2016 and is an amalgamation of the former Murray Shire and Wakool Shire. It covers 11,865 square kilometres and is located along the Murray River bordering the states of New South Wales and Victoria. It is located 800 kilometres south of Sydney and 205 kilometres north of Melbourne at the closest point. The western most settlement, Tooleybuc, is 385 kilometres from Melbourne and 477 kilometres from Adelaide.. The main settlements of Murray River LGA are Barham, Koraleigh, Mathoura, Moama, Moulamien, Murray Downs, Tooleybuc and Wakool. A number of rural localities separate these settlements, some containing a cluster of houses and limited services.

Murray River adjoins the LGAs of Berrigan Shire to the east, Edward River and Hay Shire to the north, and Balranald Shire to the west. The Murray River delineates the southern boundary which adjoins the state of Victoria. The Victorian LGAs of Moira, Campaspe, Ganawarra and Swan Hill are located south of the border.

Land use planning for Murray River Council is governed by Murray Shire Strategic Land Use Plan 2010-2020, Murray Local Environmental Plan (LEP) 2011, the Wakool Shire Council Land Use Strategy Report 2009 and Wakool LEP 2013. Zenith Town Planning, supported by Southeast Engineering & Environmental, Mark Harris Ecologist and Connect Consulting, have been engaged to consolidate the strategic planning framework and to ensure consistency in zoning and development standards across the LGA. This Local Profile is the first stage in this important project which also comprises a new comprehensive Land Use Strategy and a single planning scheme for Murray River Council.

The objectives of the project are to:

- Prepare a Local Profile documenting the important characteristics of Murray River Council that are relevant to the development of the Murray River Land Use Strategy and new comprehensive draft Local Environmental Plan,
- Update and merge the Murray Shire Strategic Land Use Plan 2010-2020 and the Wakool Shire Council Land Use Strategy Report 2009 into a comprehensive Land Use Strategy to be endorsed by the Department of Planning & Environment that will serve as the integrated planning framework for Murray River Council for the next 25 years and beyond,
- Develop a Standard Instrument draft LEP to apply to the whole of Murray River Council, consistent with the final endorsed Land Use Strategy, statutory requirements and planning best practice, and
- Work with Murray River Council to incorporate effective community participation and involvement in the development of the Local Profile, Land Use Strategy and draft LEP.

The Local Profile and Land Use Strategy would need to be consistent with the vision and intent of the Murray River Council Combined Delivery Program 2013-2017 and Operational Plan 2016-2017 and future revisions of the community strategic plan. Importantly too, cross-border relationships with NSW and Victorian local government areas in terms of land use activities and service provision would need to be considered in this project. Strategic planning initiatives in neighbouring LGAs are taken into account in preparing the Local Profile and Land Use Strategy.

The NSW Department of Planning & Environment has commended Murray River Council for its commitment to undertaking this work to balance economic, social and environmental needs for the new council area. The work will identify new land use development opportunities in Murray River LGA and will assist decision-making and the preparation of a combined planning scheme.

1.2 The principles of sustainability

Local Government is obligated to ensure that natural, social and economic resources are managed in a sustainable manner. The principles of sustainability are enshrined in the Local Government Act 1993. It is part of council's charter to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development.

This project is being carried out within the context of sustainability and its recommendations are framed within Murray River Council's responsibilities to exercise caution in decision-making, retain the quality of the environment, conserve biodiversity and ecosystems, and ensure that resources are managed equitably.

The four principles of sustainability are given below.

The precautionary principle *- where there are threats of serious or irreversible damage to the community's ecological, social or economic systems, a lack of complete scientific evidence should not be used as a reason for postponing measures to prevent environmental degradation. In some circumstances this will mean actions will need to be taken to prevent damage even when it is not certain that damage will occur.*

The principle of intergenerational equity *- the present generation must ensure that the health, integrity, ecological diversity, and productivity of the environment is at least maintained or preferably enhanced for the benefit of future generations.*

The principle of conserving biological diversity and ecological integrity *- aims to protect, restore and conserve the native biological diversity and enhance or repair ecological processes and systems.*

The principle of improving the valuation and pricing of social and ecological resources *- the users of goods and services should pay prices based on the full life cycle costs (including the use of natural resources at their replacement value, the ultimate disposal of any wastes and the repair of any consequent damage).*

This project also aims to contribute to realising the Sustainable Development Goals of the UN 2030 Agenda for Sustainable Development. These goals will build an inclusive, sustainable and resilient future for people and the planet through economic growth, social inclusion and environmental protection.

1.3 Document structure

The project comprises three stages. A strategic planning approach is used to firstly identify the facts and land management issues in the Local Profile (the designative phase), secondly assess those issues and identify opportunities and constraints in the Land Use Strategy (the evaluative phase) and thirdly to implement the findings of the assessment through a Planning Proposal to generate a new LEP (the advocative phase).

This Local Profile is the first stage and essentially states the facts about land use, the community, the economy and the environment in Murray River. The report commences with on overview of the planning and policy framework that guides land use planning and management in Murray River followed by a detailed description of the LGA. Recent demographic characteristics of population, housing and employment are described and a settlement hierarchy is provided, followed by a broad summary of infrastructure services, landscape qualities (the natural environment and hazards), and heritage attributes.

Demographic, economic, environmental and servicing characteristics are then provided for each of the settlements of Barham, Koraleigh, Mathoura, Moama, Moulamein, Murray Downs, Tooleybuc and Wakool. Where available, data tables, charts and mapping are included to graphically illustrate these features. Details of any planning proposals to rezone land in these settlements that have not been completed as well as any major planned developments or infrastructure embellishments are also identified.

The report concludes with findings, noting any gaps in data as well as considerations for future land management in Murray River to be addressed in the Murray River Land Use Strategy that is the next stage of this project.

All information provided in this Local Profile is publicly-available information. Sources of data and information are generally NSW government agencies – the Department of Planning & Environment, the Office of Environment & Heritage, the Department of Primary Industry and Roads & Maritime Services. Commonwealth agencies such as the Australian Bureau of Statistics and Murray River Council also provide critical information. Previous strategic documents prepared for Council have also been used where necessary. REMPLAN Community has compiled data from the 2016 Census of Population and Housing for Council which has been used extensively throughout this report.

1.4 Community engagement

Community engagement is being carried out in accordance with Murray River Council's Community Engagement Strategy and Community Engagement Policy. Engagement needs to be effective and meaningful and tailored to the Murray River community with a program that outlines specific activities to be carried out and provides a range of opportunities for input.

Zenith Town Planning is fully committed to delivering effective community and stakeholder engagement and welcomes the opportunity to work with Murray River Council and the community in achieving an engagement process that results in genuine community and stakeholder understanding and ownership of the decisions made by Council.

An Engagement Action Plan has been prepared which includes the following components to engage the wider community during the exhibition period for each of the three stages of the project:

- fact sheets that give details about process, considerations and findings,
- media releases to local print media, radio stations and through social media informing of dates of exhibition and the dates/venues of community workshops
- information displayed on Council's website and at Council administration centres in Moama, Mathoura, Barham and Moulamein
- high quality visual documents and exhibition materials using InDesign and displays to be placed on panels in public buildings at Moama, Mathoura, Barham and Moulamein
- interactive community workshops chaired by an independent facilitator in Moama, Mathoura, Barham, Moulamein, Tooleybuc and Murray Downs

The Engagement Action Plan also includes a range of actions to involve government agencies, industry participants, community groups and other stakeholders in the process during preparation of the draft land use strategy. These actions are:

- a mail-out to all stakeholders with a disk or flash drive containing draft reports
- a mail-out to all owners of land that would be affected by proposed land rezonings identified in the draft land use strategy
- internal workshops for Councillors, staff and representatives of state agencies

The draft Local Profile was exhibited for 28 days between 8 August 2018 and 5 September 2018. In addition to the actions noted above, the draft local profile was advertised for public comment and notified in the Riverine Herald, Pastoral Times, Barham Bridge, Swan Hill Guardian and the Ganawarra Times newspapers.

The community workshops were held on 14, 15 and 16 August 2018 at Moama, Mathoura, Barham, Moulamein, Tooleybuc and Murray Downs. The workshops were attended by 82 members of the community and Council representatives. The forums were conducted as interactive information sessions and feedback about the draft Local Profile was received.

The details of submissions and the findings of stakeholder workshops are to be reported to Council along with the details of written submissions and comments made by community members and other stakeholders to assist the decision-making process.

The planning context

A range of environmental planning instruments, legislation, strategies and policies apply to land use planning and development in Murray River LGA. Documents that are relevant to land management in Murray River LGA are summarised in this chapter beginning with the current land use strategies and planning schemes for the former Murray Shire and Wakool Shire. The forthcoming comprehensive land use strategy and local environmental plan for Murray River Council are intended to consolidate and build upon the directions and actions of these documents.

The focus in this chapter is on land use strategies that provide immediate guidance to assist preparation of the comprehensive Land Use Strategy. There are many other local strategies that were adopted by the former Murray and Wakool Shire councils that have been used as valuable sources of data and information to inform the contents of this Local Profile. Examples include development servicing plans, asset management strategies, state of environment reports, and economic and community profiles. Such plans and strategies are referenced throughout this document.

Certain provisions of the environmental planning instruments, legislation, strategies and policies that are described in this chapter would need to be considered in any future planning proposal that is designed to enact the recommended actions of the forthcoming Murray River Land Use Strategy. An assessment of the compliance with those provisions of any proposal to rezone land is to be included in the Land Use Strategy to assist with the planning proposal to consolidate Murray LEP 2011 and Wakool LEP 2013 into a single planning scheme.

2.1 Murray Shire and Wakool Shire land use strategies and LEPs

2.1.1 Murray Shire Strategic Land Use Plan 2010-2030

The Murray Shire Strategic Land Use Plan 2010-2030 was prepared by Habitat Planning on behalf of the former Murray Shire Council primarily to inform the preparation of Murray LEP 2011. It sets a vision for land use planning in the former Murray Shire as 'to ensure that the Shire's natural environment is carefully managed and that its natural and built assets are protected from inappropriate rural and urban development that would prejudice the agricultural, heritage and urban attributes of the Shire'.

The plan also aims to provide certainty to the community, maintain productive agricultural land, protect the riverine environment, separate incompatible land uses, reduce speculation, consider tourism proposals and to discourage development on flood prone land.

The Murray Shire Strategic Land Use Plan 2010-2030 provides information about the population, economy and natural environment for Murray Shire as well as more detailed descriptions for the towns of Moama and Mathoura. Additional details about services, land availability, heritage and industry are provided for these two towns. Importantly, strategic land use plans are included that specify future growth opportunities and constraints.

Key planning issues and strategic responses are also contained in the plan concerning the rural hamlets of Bunnaloo, Cummeragunja and Womboota, the localities of Picnic Point and Deep Creek, rural industries (agriculture, irrigation and tourism) and elements of the natural environment.

Although the former Murray Shire Council adopted the strategic plan as a means to manage land use in the local government area, the plan has not been endorsed by the Department of Planning and Environment as a tool to be used by a relevant planning authority to determine the strategic merit of a planning proposal, or to justify an inconsistency with Local Planning Directions.

2.1.2 Wakool Shire LEP Review – Land Use Strategy Report April 2009

The Wakool Shire LEP Review – Land Use Strategy Report April 2009 was prepared by Collie Pty Ltd, Ivey ATP, Geolyse and Groupwork. The purpose of the strategy is to provide a long term strategic framework for land use and management in the former Wakool Shire and to be the basis for the new comprehensive LEP. The strategy was preceded by a Local Profile and Issues Paper.

The strategy is predicated on a thorough demographic and economic analysis of the Shire and the following vision statement:
'A prosperous, united, rural community
Healthy, safe and secure
Set in a landscape of
Rivers, Redgums and Plains'.

As a key objective of the strategy is to identify land suited to residential and commercial zoning, a series of planning principles are established relating to rural residential development, biodiversity and conservation, rural and agricultural activities, roads and access, and cultural heritage to provide guidance for future development. These principles will be used and built upon in the forthcoming comprehensive land use strategy.

Each of the major settlements of Barham, Tooleybuc, Murray Downs, Moulamein and Wakool are described in detail in terms of their role, structure and function. Opportunities for residential expansion and industrial, commercial and tourism development are explored. Guiding principles are provided for land management for each settlement.

The Wakool Shire LEP Review – Land Use Strategy Report April 2009 was adopted by the former Wakool Shire Council on 15 April 2009 and conditionally endorsed by the Department of Planning on 23 March 2011. The Department required Council to carry out further environmental assessment of certain areas proposed to be rezoned for urban release, prepare a flood study for these areas and develop a staging program to manage land release.

2.1.3 Murray Local Environmental Plan 2011

Murray LEP 2011 was prepared in accordance with the Standard Instrument (LEPs) Order 2006 to comply with state agency directives and the statutory requirements of the Environmental Planning and Assessment Act 1979. It contains a range of miscellaneous and local provisions governing such matters as flood planning, protection of biodiversity and waterways, heritage conservation, and development on riverfront land and on riverbeds and banks. It also contains provisions relating to urban land release areas to ensure that

adequate public infrastructure is planned, and requiring development control plans for these new urban areas that address the provision of services and environmental matters.

The following zones are applied to land by Murray LEP 2011:

- Zone RU1 Primary Production
- Zone RU3 Forestry
- Zone RU5 Village
- Zone R1 General Residential
- Zone R2 Low Density Residential
- Zone R5 Large Lot Residential
- Zone B2 Local Centre
- Zone B6 Enterprise Corridor
- Zone IN1 General Industrial
- Zone SP1 Special Activities
- Zone SP2 Infrastructure
- Zone SP3 Tourist
- Zone RE1 Public Recreation
- Zone RE2 Private Recreation
- Zone E1 National Parks and Nature Reserves
- Zone E3 Environmental Management
- Zone W1 Natural Waterways
- Zone W2 Recreational Waterway

Murray LEP 2011 contains development standards that apply minimum lot sizes to the subdivision of land, however, development standards restricting building heights and floor space ratios have not been adopted. A minimum lot size of 120 hectares applies to rural land in the former Murray Shire other than rural land at the eastern end of the LGA north of Murray Valley National Park which is subject to a lot size of 500 hectares. A minimum lot size of 450m^2 applies to land zoned R1 General Residential in the township of Moama near the golfcourse and north of the older and established parts of the settlement. Lot sizes of 4,000m^2 and 8,000m^2 apply to land zoned R5 Large Lot Residential west of town and a lot size of 4,000m^2 applies to land zoned R5 along the Cobb Highway north of Moama. New urban residential land to the north west of Moama is subject to lot sizes of 750m^2, 1,500m^2, ^{2},000m^2 and 3,000m^2. A lot size of ^{2},000m^2 applies to land zoned RU5 Village in Mathoura and in the hamlet of Bunnaloo. A lot size of 4,000m^2 applies to land zoned R5 in Mathoura.

2.1.4 Wakool Local Environmental Plan 2013

Wakool LEP 2013 was prepared in accordance with the Standard Instrument (LEPs) Order 2006 to comply with state agency directives and the statutory requirements of the Environmental Planning and Assessment Act 1979. It contains a range of miscellaneous and local provisions governing such matters as flood planning, protection of biodiversity and waterways, heritage conservation, and development on riverfront land and on riverbeds and banks.

The following zones are applied to land by Wakool LEP 2013:

- Zone RU1 Primary Production
- Zone RU3 Forestry
- Zone RU5 Village
- Zone R1 General Residential
- Zone R5 Large Lot Residential
- Zone B2 Local Centre
- Zone B6 Enterprise Corridor
- Zone IN1 General Industrial
- Zone SP2 Infrastructure
- Zone RE1 Public Recreation
- Zone RE2 Private Recreation
- Zone E1 National Parks and Nature Reserves
- Zone E2 Environmental Conservation
- Zone W1 Natural Waterways
- Zone W2 Recreational Waterways

Wakool LEP 2013 contains development standards that apply minimum lot sizes to the subdivision of land, however and similar to Murray LEP 2011, development standards restricting building heights and floor space ratios have not been adopted. Generally the subdivision of urban land is not restricted by a minimum lot size, however, land that is zoned R5 Large Lot Residential in the vicinity of the town of Barham has a range of applicable minimum lot sizes – 2,000m^2, 5,000m^2, 5 hectares and 10 hectares. An area of land that is still a single land holding south east of the township is zoned R1 General Residential with a minimum lot size of 600m^2. A lot size of 500 hectares applies to all rural land in the former Wakool Shire. A small area of small lot subdivision in the locality of Koraleigh has a lot size of 2,500m^2.

2.2 Commonwealth legislation and policies

2.2.1 Environment Protection & Biodiversity Conservation Act 1999

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) affords protection for seven matters of national environmental significance. These matters are world heritage properties, national heritage places, wetlands of national importance, listed threatened species and ecological communities, migratory species, commonwealth marine areas and nuclear actions including uranium mines. Actions that have, or are likely to have, a significant impact on a matter of national environmental significance require the approval of the Australian Government Minister for the Environment and Energy.

Actions include but are not limited to construction, expansion, alteration or demolition of buildings, structures, infrastructure or facilities; storage or transport of hazardous materials; waste disposal; earthworks; impoundment, extraction and diversion of water; research activities; vegetation clearance; military exercises and use of military equipment; and sale or lease of land.

It is the responsibility of the Minister to decide whether assessment and approval is required under the EPBC Act. Currently there are 6 wetlands of international importance, 5 listed threatened ecological communities, 26 listed threatened species and 10 listed migratory species protected under the EPBC Act within the study area of Murray River LGA. The provisions of the Environment Protection and Biodiversity Conservation Act 1999 may apply to development anywhere within Murray River LGA.

2.2.2 Murray Darling Basin Plan

The Murray Darling Basin Plan was developed as a requirement of the Commonwealth Water Act 2007. It aims to coordinate water management across South Australia, Victoria, New South Wales, Queensland and the Australian Capital Territory. The Basin Plan sets limits on the amount of water, known as the long-term average sustainable diversion limit, that can be extracted or taken annually from the Basin for consumptive use (urban, industrial and agricultural) without having a negative impact on the natural environments and the functions of the rivers, waterways, groundwater and wetlands of the Basin.

The sustainable diversion limits for groundwater are intended to ensure the sustainable and equitable allocation of water to communities and environments. The limits are to commence in 2019 through the preparation and implementation of water resource plans by the state governments.

2.2.3 Regional Development Australia Murray Regional Strategic Plan 2013–2016

The RDA Murray Regional Plan aims to drive regional economic development in the Murray region based on seven key priorities, clustered into four major priorities – economic (industry and smart futures, capacity for growth), environmental (maintaining balance), social (sustaining communities, health and wellbeing) and integration (linking the region, providing leadership). The plan applies to the Murray Region which incorporates 13 local government areas from the former Tumbarumba Shire in the east to Wentworth Shire in the west. At this regional level the plan contains substantial details about health and education services, the demographic and economic composition of the region, natural resource management, cross border collaboration initiatives with the Victorian government and councils, and infrastructure.

2.3 NSW legislation and policy

2.3.1 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment (EPA) Act 1979 is the principal piece of legislation governing the use and development of land in NSW. The objects of the Act are:

(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,

(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,

(c) to promote the orderly and economic use and development of land,

(d) to promote the delivery and maintenance of affordable housing,

(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,

(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),

(g) to promote good design and amenity of the built environment,

(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,

(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,

(j) to provide increased opportunity for community participation in environmental planning and assessment.

The EPA Act contains provisions governing the preparation of environmental planning instruments and development control plans that may be recommended in the Land Use Strategy that is to be prepared as the second stage of this project. The objects of the Act are intended to guide land planning and management.

2.3.2 Biodiversity conservation reforms – Biodiversity Conservation Act 2016 and Local Land Services Amendment Act 2016

The NSW government has recently reviewed biodiversity legislation. Two new laws, the Biodiversity Conservation Act 2016 and the Local Land Services Amendment Act 2016, took effect from 25 August 2017. The Biodiversity Conservation Act 2016 replaces the Threatened Species Conservation Act 2003, Nature Conservation Trust Act, and parts of the National Parks and Wildlife Act 1974 that apply to licensing and offences. The Local Land Services Amendment Act 2016 replaces the Native Vegetation Act 2003, Native Vegetation Regulation 2005 and the Environmental Outcomes Assessment Method that aims to maintain or improve biodiversity, soil, water and salinity.

Legislation is supported by a tool known as the Biodiversity Assessment Method to determine 'offsets' or 'set-asides' when the clearing of native vegetation or development that may impact on threatened species is proposed, and self-assessable rural land clearing codes. Mapping is also being prepared to identify excluded, regulated and unregulated land.

A new State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 that applies to clearing in urban and environmental zones including R5 Large Lot Residential has also been gazetted (see section 2.3.9 below). This policy caused the repeal of standard instrument LEP clauses 5.9 Preservation of trees or vegetation and 5.9AA Trees or vegetation not prescribed by development control plan that regulate the clearing of vegetation by enabling a council to make a DCP that identifies which vegetation is protected in its local government area.

2.3.3 National Parks & Wildlife Act 1974

The National Parks and Wildlife Act 1974 protects Aboriginal objects and Aboriginal places in NSW. Under the NPW Act, it is an offence to knowingly harm or desecrate an Aboriginal object. Harm includes destroy, deface or damage an Aboriginal object or Aboriginal Place, and in relation to an object, move the object from the land on which it has been situated. Aboriginal objects include sites, relics or cultural material such as scar trees, middens and ancestral remains.

The NPW Act can also protect areas of land that have no Aboriginal objects, that is, they may have no physical evidence of Aboriginal occupation or use. These areas can be declared 'Aboriginal places' if they have spiritual, natural resource usage, historical, social, educational or other type of significance.

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW provides a process whereby a reasonable determination can be made as to whether or not Aboriginal objects will be harmed by an activity, whether further investigation is warranted and whether an activity requires an application for an Aboriginal Heritage Impact Permit.

2.3.4 Rural Fires Act 1997

The Rural Fires Act 1997 seeks to protect life and property from harm or damage in the event of a bushfire. Under section 100B of the Act a Bushfire Safety Authority is required to be issued by the Commissioner of the NSW Rural Fire Service to permit the subdivision of land for the purposes of residential or rural residential development, or the development of a special fire protection purpose such as a child care centre, retirement village, hospital and the like. Future development that may result from the implementation of recommendations of the forthcoming strategy, such as to rezone land for urban development, would require a Bushfire Safety Authority to proceed.

2.3.5 Heritage Act 1977

The objectives of the Heritage Act 1977 are to promote an understanding of heritage values and to conserve the heritage of NSW. It sets out means to protect heritage that is under threat by way of interim heritage orders and specifies the process to list and

maintain items of state significance. Any items of state significance in Murray River LGA are listed on the State Heritage Register. Items of local significance are protected through listing in Schedule 5 Environmental heritage of Murray LEP 2011 and Wakool LEP 2013.

2.3.6 Protection of the Environment Operations Act 1997

The Protection of the Environment Operations Act 1997 provides an integrated system of licensing for polluting activities with the objective of protecting the environment. The provisions of this Act would need to be considered for any future subdivision and development taking place on land that is determined to be suitable for rezoning to facilitate more intensive use.

2.3.7 Water Management Act 2000

The Water Sharing Plan for the Lower Murray Groundwater Source and the Water Sharing Plan for the Lower Murray Shallow Groundwater Source are given legal effect by the Water Management Act 2000. These plans include rules for environmental protection, and managing extractions, licenses and water trading.

The Murray River is also subject to the Murray Darling Basin Plan. Under the basin plan, a Water Resource Plan has to be developed by the NSW Government by the end of June 2019 to replace the water sharing plans. The Murray River is within the surface-water water resource plan area of the NSW Murray and Lower Darling and the groundwater water resource plan area of Murray Alluvium.

2.3.8 Fisheries Management Act 1994

The Fisheries Management Act 1994 contains provisions for the identification, conservation and recovery of threatened fish species, aquatic invertebrates and marine vegetation. Threatened species, populations and ecological communities considered by the Fisheries Scientific Committee to be at risk of extinction are listed under schedules in the Act. The Act also identifies key threatening processes and establishes mechanisms by which such processes can be managed, such as recovery and threat abatement plans. The provisions of the Fisheries Management Act 1994 may apply to new development where there are potential impacts on the riverine environment.

2.3.9 State Environmental Planning Policies

SEPP No. 30 – Intensive Agriculture

The aim of SEPP No 30 is to require development consent for cattle feedlots having a capacity to accommodate 50 or more head of cattle, and piggeries having a capacity to accommodate 200 or more pigs or 20 or more breeding sows. The policy also aims to provide for public participation and sets considerations for the consent authority when assessing a DA for cattle feedlots or piggeries.

SEPP No. 44 – Koala Habitat Protection

Koala Habitat Protection aims to conserve and manage areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. Murray Shire and Wakool Shire are listed in Schedule 1 to SEPP 44 as land to which the policy applies. An assessment of the significance of land rezoned for more intensive development on which a development application is lodged will need to be carried out if the land contains any of the tree species listed in Schedule 2 of SEPP 44, any areas of land with a resident population of koalas evidenced by the presence of breeding females, recent sightings or historical records, or if the land constitutes potential koala habitat or core koala habitat as defined in the policy.

SEPP No. 52 – Farm Dams and Other Works in Land and Water Management Plan Areas

This Policy requires that development consent be obtained for the development of an artificial waterbody on land subject to a land and water management plan unless it has a storage capacity that is less than 15 megalitres or not within 40 metres of a public road, watercourse or wetland, or of any tree clearing operations. Development of an artificial waterbody in an environmentally sensitive area with a storage capacity of 100 megalitres or more, or a storage capacity of 800 megalitres or more in other areas is designated development. Murray Shire and Wakool Shire are listed in Schedule 2 as an area to which a land and water management plan applies.

SEPP No. 55 – Remediation of Land

SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any aspect of the environment. It specifies when consent is required for remediation work, considerations that are relevant when rezoning land and in determining development

applications, and that a remediation work meet certain standards and notification requirements. It applies to the whole of NSW.

If land is potentially contaminated due to a former use or is within an investigation area then a preliminary assessment must be carried out in accordance with the contaminated land planning guidelines that takes into account the extent to which it is proposed to carry out development on that land for residential, educational, recreational or child care purposes.

Any future development application lodged on land that is known or likely to be contaminated will require further assessment to determine the suitability of that land for the proposed use and the measures required to remediate that land. Potential land contamination is identified and considered as part of the assessment of suitability for rezoning for more intensive development in the forthcoming Land Use Strategy.

SEPP (Exempt and Complying Development Codes) 2008

Known as the Codes SEPP, this policy applies across NSW and specifies development that may be carried out without the need to obtain the consent of council (exempt development) and development that complies with development standards and is able to be approved by an accredited private certifier (complying development). The SEPP specifies development standards and restricts development on land that is an environmentally sensitive area, or is recognised as a heritage item or heritage conservation area.

State Environmental Planning Policy (Affordable Rental Housing) 2009

SEPP (Affordable Rental Housing) 2009 primarily aims to facilitate the effective delivery of new affordable rental housing and to facilitate the retention and mitigate the loss of existing affordable rental housing. The policy also aims to support local business centres by providing affordable rental housing for workers close to their places of work.

The policy specifies design requirements and development standards for infill development, secondary dwellings, boarding houses and group homes to qualify as affordable rental housing. Any specific need to ensure supply of affordable housing to match demographics will be identified in the Land Use Strategy.

SEPP (Housing for Seniors or People with a Disability) 2004

SEPP (Housing for Seniors or People with a Disability) 2004 aims to encourage the provision of housing (including residential care facilities) that will increase the supply and diversity of residences that meet the needs of seniors or people with a disability, make efficient use of existing infrastructure and services, and be of good design.

Design principles and development standards are established to ensure that the location, amenity and design of housing proposed under this policy meets the needs of seniors and persons with disabilities. Any specific need to ensure supply of such housing to match demographics will be identified in the Land Use Strategy.

SEPP (Infrastructure) 2007

The aims of SEPP (Infrastructure) 2007 are to ensure a consistent and flexible planning system to facilitate the delivery of services. The policy identifies environmental assessment categories for types of infrastructure, matters to consider when assessing development adjacent to infrastructure and provides for consultation with relevant public authorities. The policy applies to the whole of NSW.

SEPP (Infrastructure) contains provisions relating to approval processes and assessment requirements for infrastructure proposals according to the type or sector of infrastructure. It outlines land use zones where types of infrastructure are permissible with or without consent and identifies certain works as exempt and complying development. The effect of this policy is noted where infrastructure augmentation is recommended to service any land to be rezoned for more intensive use.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

The aims of this policy are to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, and development of mineral, petroleum and extractive material resources.

The policy identifies development that is permitted with or without consent, that is related to the mining, petroleum production, extractive industries and the co-location of such industries. Specified ancillary and minor development is specified as being either exempt or complying development.

The policy stipulates considerations for the consent authority when assessing an application for mining, petroleum production or an extractive industry, including environmental impacts, rehabilitation procedures, potential for conflict of land uses, transport and waste management.

SEPP (Rural Lands) 2008

SEPP (Rural Lands) 2008 was gazetted on 9 May 2008 and applies to all rural LGAs including Murray River. Relevantly, this policy sets out Rural Planning Principles and Rural Subdivision Principles, to implement measures that are intended to reduce land use conflicts and to identify State significant agricultural land. The Rural Planning Principles and Rural Subdivision Principles are of direct relevance to this project and in planning for the protection of agricultural land. These principles underpin the directions and actions of the Land Use Strategy. SEPP (Rural Lands) 2008 is currently under review and an Explanation of Intended Effect has been exhibited. A new Primary Production and Rural Land SEPP will replace SEPP (Rural Lands) 2008 along with SEPP No 30 (Intensive Agriculture) and SEPP No 52 (Farm Dams and Other Works in Land and Water Management Plan Areas).

SEPP (State and Regional Development) 2011

The aims of this policy are to identify state significant and regionally significant development, including state significant infrastructure and critical infrastructure. The thresholds for state and regional development are specified in schedules to the policy. State significant development is determined by the Minister for Planning or delegated to the Independent Planning Commission. Regionally significant development includes all development with a capital investment value of more than $30 million or $5 million where council or the state have an interest, private infrastructure, community facilities and ecotourist facilities valued at over $5 million, and certain designated development (extractive industries, marinas and waste management facilities). Regionally significant development in Murray River LGA is determined by the Western Regional Planning Panel.

SEPP (Vegetation in Non-Rural Areas) 2017

The aims of this Policy are:

(a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and

(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.

The policy applies to land that is zoned urban or environmental. Under this policy Council permission is required to remove vegetation that is declared in a DCP to be significant in terms of species, size, location or as part of an ecological community or habitat. The removal of native vegetation is not permitted where it exceeds the biodiversity offsets scheme threshold. The clearing of vegetation that is part of an indigenous or non-indigenous heritage item or within a heritage conservation area is only permitted where it is minor, for maintenance and where heritage significance would not be adversely affected.

2.3.10 Murray Regional Environmental Plan No 2 – Riverine Land

The Murray Regional Environmental Plan No 2 – Riverine Land came into force in 1994 and is now a deemed State Environmental Planning Policy. It applies to riverine land of the Murray River within Murray River LGA.

The objectives of this plan are:

(a) to ensure that appropriate consideration is given to development with the potential to adversely affect the riverine environment of the River Murray, and

(b) to establish a consistent and co-ordinated approach to environmental planning and assessment along the River Murray, and

(c) to conserve and promote the better management of the natural and cultural heritage values of the riverine environment of the River Murray.

It contains principles that apply when Council prepares a local environmental plan that address access to riverine land, bank disturbance, flooding, land degradation, landscape, river related uses, settlement, water quality and wetlands. Relevantly, the REP requires that the degree to which access to the river and foreshore is affected, the impacts of uncontrolled access, and disturbance to banks and riparian vegetation are to be taken into account. Any development that intensifies the use of riverside land should provide public access to the foreshore and include measures to protect and enhance vegetation.

On land that is subject to flooding, Council is to

consider such matters as hazard risks, pollution threat, redistribution of floodwaters, the availability of other suitable land that is not flood-prone, and flood-free access to essential services.

In relation to the expansion of settlements, including for new residential and rural residential development, the land should be flood-free, located close to existing services and facilities, and not compromise the potential of prime crop and pasture land to produce food or fibre. The REP is also utilised by Council as a referral document to invite comment from relevant government agencies for specified development when a development application is received.

2.3.11 Riverina Murray Regional Plan

The Riverina Murray Regional Plan 2036 was released in March 2017. It establishes a framework for growth over the next 20 years for an area extending from Snowy Valleys LGA in the east along the Murray River as far as the western extent of Murray River LGA and north to the Central West and Orana region. It includes the regional cities of Wagga Wagga, Albury and Griffith and identifies cross-border connections at Moama-Echuca, Barham-Koondrook and Murray Downs-Swan Hill.

The plan supports the protection of high-value environmental assets and aims to develop a strong and diverse economy with supportive communities. The plan contains the following four goals:

1. A growing and diverse economy
2. A healthy environment with pristine waterways
3. Efficient transport and infrastructure networks
4. Strong, connected and healthy communities

A series of directions and actions are to guide land use planning priorities and decisions. These directions and actions will be used to test the validity of any recommendations made in the comprehensive Land Use Strategy.

2.3.12 Local Strategic Plan 2016-2021

Murray River Council area is located within the region managed by Murray Local Land Services which is responsible for agricultural advisory services, biosecurity, emergency management and natural resource management across a region which includes Snowy Valleys LGA to the east and to the north beyond Jerilderie and Urana. The Murray Local Strategic Plan 2016-2021 notes the following key challenges for this region:

- Maintaining viable, vibrant and cohesive communities as the rural population declines and ages, and the availability of volunteers and services diminishes,
- Increasing recognition of Aboriginal cultural heritage, spirituality and connections to country, as well as providing economic and employment opportunities to indigenous people,
- Maintaining healthy, diverse and connected natural environments and balancing resource use,
- Maintaining productive and profitable farming systems as markets change and climatic events affect the viability of primary industry, and
- Preparing for and adapting to a changing climate with changes in rainfall and temperature patterns and increases in the frequency and intensity of extreme weather events.

The Local Strategic Plan includes nine strategies to achieve the following three goals:

- Resilient, self-reliant and prepared communities
- Biosecure, profitable, productive and sustainable primary industries
- Healthy, connect and diverse natural environments

The plan also includes information about the Aboriginal community and the various landscapes of the Murray region, noting that much of the former Murray and Wakool Shires are located in the overlapping Cadell and Murrakool landscapes.

2.3.13 Local Planning Directions

Local planning directions are environmental planning instruments made by the Minister for Planning under section 9.1 of the EP&A Act to govern the preparation of draft LEPs. These directions fall into the following categories:

- Employment and resources,
- Environment and heritage,
- Housing, infrastructure and urban development,
- Hazard and risk,
- Regional planning,
- Local plan making, and
- Metropolitan planning.

Some of these directions may be relevant to Murray River Council in relation to any future planning proposal to implement actions of the forthcoming Land Use Strategy. Any proposed rezoning of land must be consistent with relevant directions unless justified and subject to endorsement by the Department of Planning and Environment.

2.3.14 Planning for Bush Fire Protection 2006

Planning for Bush Fire Protection 2006 applies to all land that is mapped as being bushfire prone. Specific standards are applied to rural residential subdivision to ensure adequate asset protection zones, access roads, fire trails and services. The guideline calls up Australian Standard 3959 to ensure construction standards of dwellings are sufficient to withstand expected bushfire attack level.

The document also provides guidance for subdivision design in bushfire prone areas. Future development of bushfire prone land that results from implementation of the recommendations of the Land Use Strategy would need to comply with the standards of Planning for Bush Fire Protection 2006.

2.3.15 NSW State Groundwater Policy Framework

The NSW State Groundwater Policy Framework provides policy direction on the sustainable management of groundwater resources. The policy focuses on 'water below the ground surface in a geological structure or formation, and on the ecosystems from which these waters are recharged or into which they discharge', (DLWC, undated). The policy operates by managing the use of groundwaters according to the degree of stress or potential threat to an aquifer's integrity. It comprises the Quality Protection Policy, the Quantity Management Policy and the Dependent Ecosystems Policy, and is based on a set of principles centred on facilitating the co-operative and sustainable use of groundwater resources.

The policy provides for Groundwater Management Plans to be prepared across the state with an initial focus on aquifers at risk or stressed at the local level. These plans are intended to determine appropriate uses and values of groundwater resources, levels of protection required, mechanisms to protect dependent ecosystems and places of cultural significance, remediation strategies and monitoring methods.

2.3.16 Murray Lower Darling Regional Action Plan

This Regional Action Plan was released by the NSW Government in December 2012 and covers an area extending from near Albury to the South Australian border and including the western plains. The plan sets the following priorities:

- Support economic growth,
- Improve education and training opportunities for young people,
- Resolve cross-border issues and reduce red tape,
- Improve regional infrastructure, and
- Deliver integrated and coordinated human services.

The Plan specifically identifies improvements to Murray River crossings in Murray River LGA to assist freight productivity. It is noted that many existing historic timber truss bridges need either replacement or significant upgrades to meet modern freight requirements to support a number of specific industries and supply chains as well as to improve access for local residents and visitors to the region. An estimated $60 million will be directed to the Murray Region to construct a new bridge at the Moama-Echuca river crossing. The Plan also nominates $16 million to be provided to the Murray region to replace the Gee Gee timber truss bridge and the Tooleybuc timber truss bridge.

2.4 Local plans and policies

2.4.1 Murray Shire Council Community Strategic Plan 2015/16 – 2024/25

The Murray Shire Community Strategic Plan is a ten year plan to guide the delivery of services of the former Murray Shire Council over the period 2015-16 to 2024-25. It sets the vision of 'A sustainable community offering opportunity and lifestyle' to be achieved by being a leading, caring and growing community, and through an enhanced natural environment. Major issues identified in the plan are:

- The Murray Darling Basin Plan and the potential reduction in water available to sustain irrigated agriculture with the consequent social and economic impacts,
- Community sustainability through projects, programs, events and initiatives,
- Delays in providing a second bridge across the Murray River connecting Moama and Echuca,
- Access to professional health services and facilities,
- managing, maintaining and upgrading significant infrastructure assets, including roads, bridges, footpaths, stormwater drainage, plant and equipment, water, sewer and buildings, and
- local government reform (this has been resolved through the merger of Murray Shire and Wakool Shire into Murray River Council).

The plan contains an overview of socio-economic characteristics of the former LGA and a series of strategies and performance measures to support the vision and to address the issues listed above.

2.4.2 Moama North West Master Plan

The Moama North West Master Plan was prepared by MacroPlan Australia in 2009 to provide strategic direction for the use and development of 243 hectares of farmland situated to the north-west of the town of Moama. The masterplan was prepared in response to the nomination of this area for future urban development in the Murray Shire Strategic Land Use Plan 2010-2030.

The masterplan assesses demand and supply and provides projections of lot yields based on a range of minimum lot sizes and having taken into account environmental and servicing constraints. Parts of the area in closest proximity to Moama have been identified as an Urban Release Area in Murray LEP 2011.

2.4.3 Moama & District Rural Residential Strategy

The primary aim of the Moama & District Rural Residential Strategy is to identify rural residential development opportunities in the vicinity of the township of Moama. This matter was deferred at the time of gazettal of Murray Local Environmental Plan 2011. The former Murray Shire Council engaged Zenith Town Planning to address this deferred matter in response to several submissions that requested application of a rural residential zone to specific parcels of land and that focussed on the need for rural residential development generally.

The suitability of a large area of rural land to the north and west of Moama is assessed in the strategy and recommendations are made to rezone land along Perricoota Road and Thyra Road to a rural residential zone along with details of an amendment to Murray LEP 2011 and Murray DCP 2012. The strategy also identifies short, medium and long term rural residential land releases to assist Council to co-ordinate the orderly and economic use and development of land surrounding Moama.

The NSW Department of Planning and Environment has not yet endorsed the Moama & District Rural Residential Strategy as the forthcoming comprehensive land use strategy to apply to the whole of Murray River LGA will provide the broader context for development and allow for consideration of other types of housing.

2.4.4 Murray Development Control Plan 2012

Murray Development Control Plan 2012 supports Murray LEP 2011 by setting objectives and controls for land uses that are permitted within the LGA. It applies to residential, industrial and commercial development, and has separate controls for tourist accommodation, subdivision, urban release areas and to development along watercourses and riparian corridors, and on flood-prone land.

The principal purpose of a DCP is to provide guidance to proponents of development including to facilitate permissible development and to achieve the objectives of the zone. The provisions of a DCP are intended to assist the details of design, layout and function of the various aspects of development and are only applied to new development.

2.4.5 Wakool Shire Vision 2023 Community Strategic Plan

Wakool Shire Vision 2023 is a 10 year plan prepared in 2003 by the former Wakool Shire. The vision for the former Wakool Shire was to create and maintain healthy, culturally rich and inclusive communities; resilient local economies; sustainable built and natural environments; and democratic and engaged communities. The Community Strategic Plan sets out priorities and strategies to achieve this vision and allocates responsibilities and roles to Council, state agencies and NGOs, business and industry groups, and community groups. The plan contains useful background information about the characteristics of the population and the economy of the former Wakool Shire. Key Environmental Issues identified in the plan are water supply and the impact of the Murray Darling Basin Plan, water quality, relatively low rainfall levels and recurring drought, soil salinity, the protection of threatened species, noxious weeds and flood damage to Council infrastructure.

2.4.6 Wakool Economic Development Strategy 2014-17

Wakool Economic Development Strategy 2014-17 is a means to achieve the vision of Wakool Shire Vision 2023. The Strategy identifies the four sectors to continue to build competitive advantage. These sectors are agriculture (including the red gum timber industry), tourism, manufacturing and the creative industries.

The guiding principles to support economic development in the Wakool Shire are listed as:

- Where economic growth occurs in harmony with the community and the region's unique natural and riverine environments which delivers a dynamic and creative place to live, work and visit;
- That continues to build on its economic competitive

advantages and diversifying the agricultural, red gum timber and tourism industries, creating additional employment opportunities;

- Where infrastructure upgrades, such as broadband and mobile telephone capacity, enable and encourage access to services and resources for new and existing businesses and the broader community;
- Focus on the Central Business Districts of Moulamein, Tooleybuc, Wakool and Barham that are seen as the heart of their communities and which contribute to social, cultural and environmental values;
- That acts as a regional leader in innovative business practices utilising new technology and communications, and
- Where excellence in education is provided across all tiers to promote lifelong learning.

These principles are to be implemented through:

- Strength and breadth of collaboration and ability to form and maintain relationships both within the Shire and regionally;
- Ability to market, build brand awareness and maintain an economic presence of the Barham, Murray Downs and Tooleybuc areas associated with the Murray River;
- Further development of Moulamein as the principle agricultural service centre for the Shire;
- Increased investment in the key industry sectors of agriculture, red gum timber, tourism and manufacturing in the region;
- The generation of employment through expansion of the existing business base and attraction of new business;
- The preservation, enhancement and increased utilisation of Wakool's environmental and natural assets; and
- The ability to maintain the rural character of communities and the lifestyle that makes Wakool communities special.

High level strategies are identified based on the vision for the former Wakool Shire and responsibilities and roles are allocated to Council, stage agencies and NGOs, business and industry groups, and community groups.

2.4.7 Wakool Shire Tourism Strategy 2011

The Wakool Shire Tourism Strategy 2011 provides an analysis of the tourism market, and it's strengths, weaknesses, opportunities and threats. The local economy is largely based on the agricultural sector which has suffered in recent times from climatic events. Visitors to the LGA focus on the urban centres of Barham, Tooleybuc and the golf course at Murray Downs, and to a lesser extent Moulamein and Wakool. The key tourism markets comprise retirees and empty nesters, travellers passing through the area, campers to carry out fishing and hunting, and visitors to Barham and Murray Downs. Target markets are identified as those visiting friends and relatives, leisure and holiday makers, sporting and events, nature lovers and business travellers. The means to promote Wakool to these target markets is explored in the strategy and recommendations are made for ways in which visitor numbers to each of the towns can be boosted.

2.4.8 Murray River Council Combined Delivery Program 2013–17 and Operational Plan 2016–17

This document represents a consolidation of the Delivery Programs, Operational Plans and Resourcing Strategies for the former Murray Shire Council and the former Wakool Shire Council which were merged by Proclamation dated 12 May 2016. This plan includes details of proposed expenditures on infrastructure and delivery of services over coming years that are referenced in this Local Profile.

2.5 Victorian plans and strategies

2.5.1 Moira Shire

The LGA of Moira adjoins Murray River LGA to the east of Moama where the Barmah National Park meets the Murray Valley National and Regional Park. There are no corresponding settlements on either side of the Murray River. The principal planning instrument is the Moira Planning Scheme. The Shire's economic base is provided through primary industries. The region is a major fruit, dairying and beef district with growing tourism and manufacturing sectors.

Moira Shire Council has a series of strategic planning reports for the major settlements within the LGA – Cobram, Yarrawongah, Numurka and Nathalia. These reports provide an evaluation of urban land supply and needs for future residential, commercial and industrial development. The Council released the Moira Small Towns and Settlements Strategy Plan in July 2013. This strategy sets themes and guiding principles, and evaluates the capacity for growth for each small settlement. Moira Shire Council also collaborated with Greater Shepparton and Campaspe councils to prepare a regional rural land use strategy.

2.5.2 Shire of Campaspe

The Shire of Campaspe is located along the Murray River extending from Kyabram in the east to Gunbower in the west. It includes the major township of Echuca, just south of Moama. The principal planning instrument is the Campaspe Planning Scheme. The main industries include dairying, tourism, food processing, cereal cropping, tomatoes, sheep/wool, aquaculture, floriculture, vegetables, feed lotting, viticulture, beef cattle and rice.

Campaspe Shire Council has identified the need to plan for rural living opportunities, while also protecting valuable farming resources. Council adopted the Rural Living Strategy in 2015 to provide a framework to assess future rural living opportunities in the Shire. Council also has a suite of strategies in place specifically for Echuca district including strategies to support commercial, industrial, rural and rural residential development, and heritage precincts.

Campaspe Shire Council collaborated with Greater Shepparton and Moira councils to prepare a regional rural land use strategy. The key objective of this strategy is to secure and promote the future of agriculture across the region through council planning schemes. The significance of agriculture to the region is investigated and existing barriers to sustainable farming are identified. The strategy considers the availability of water, the potential for the consolidation of farms and emerging niche opportunities. The application of land use zones, overlays and policy directions are recommended.

2.5.3 Gannawarra Shire

Major centres in Gannawarra Shire are Kerang and Cohuna. Gannawarra is located south of the central part of Murray River LGA. The principal planning instrument is the Gannawarra Planning Scheme. With an economic base primarily in agriculture, activities include cropping, dairying, grazing, horticulture and viticulture. The main industries include agriculture, and dairy product manufacturing.

Faced with a declining and aging population and substantial changes to agricultural practices, the Gannawarra Urban and Rural Strategy Plan directs demand for residential and rural residential development to existing settlements, to build upon these communities and their assets such as opportunities for water frontages. The strategy also seeks to identify opportunities for tourism facilities in rural areas where there is demonstrated need and demand, and where development builds on and contributes to local attractions and the tourist economy without compromising agricultural activities and environmental values.

2.5.4 Swan Hill Rural City

Swan Hill Rural City extends from the town of Swan Hill in the east which is located south of the Murray River to the south-west of Murray Downs and as far as Robinvale in the west. The area includes both dryland farming areas in the west and irrigated areas in the east. The Swan Hill township services a wide catchment, including areas into New South Wales and is a popular tourist destination.

The principal planning instrument is the Swan Hill Planning Scheme. A range of strategies are in place, the two key plans being the 2015 Swan Hill Planning Scheme Review Report which was a period review of the planning scheme to identify updates to provisions, zones and overlays, and the Master Plan for the South West Development Precinct which identifies areas for future commercial and residential development in the town of Swan Hill.

Local government area overview

3.1 Description

3.1.1 Location and regional context

The Murray River local government area, proclaimed in 2016 from a merger between the Shires of Murray and Wakool, is located within the Riverina Murray region of New South Wales. It comprises three wards – Moama covering most of the urban centre of Moama, Greater Murray which coincides with the boundaries of the former Murray Shire and Greater Wakool which coincides with the boundaries of the former Wakool Shire.

Murray River LGA extends along the Murray River from the township of Moama in the east to Tooleybuc in the west and adjoins the Victorian border (see location map below). It adjoins Edward River Council area to the north, Berrigan Shire to the east, Balranald Shire to the west and Hay Shire at the north-western corner. Adjoining Victorian LGAs are Moira, Campaspe, Gannawarra and Swan Hill.

The LGA covers an area of 11,685 square kilometres of relatively flat and fertile land. The Murray River forms the southern boundary of the LGA and the northern extent includes a section of the Murrumbidgee River. Other main river systems are the Edward, Niemur and Wakool Rivers and Gulpa Creek. Part of the largest river red gum forest in Australia and RAMSAR wetlands of international significance are located within the LGA.

The main towns of Murray River are Moama and Barham. Other settlements are Koraleigh, Mathoura, Moulamein, Murray Downs, Tooleybuc and Wakool. Moama and Echuca are twin towns on either side of the Murray River, Murray Downs is located only a few kilometres north of Swan Hill, and Barham is located north of Koondrook and is approximately 27 kilometres from Kerang. Bendigo is about 150 kilometres south-east of Barham and 95 kilometres south-east of Moama.

The major regional centres which service Murray River are Deniliquin, Swan Hill, Echuca, Bendigo and Kerang. These centres provide higher order goods and services to Murray River LGA including retail, commercial, health and professional services. Residents in the eastern settlements of Moama and Mathoura rely on Deniliquin, Echuca and Bendigo, western settlements (Tooleybuc, Murray Downs, Moulamein) relate to and rely on Swan Hill, whilst the centrally-located settlements of Barham and Wakool access facilities and services in Bendigo and Kerang. See figure 3.1: Map of Murray River LGA.

3.1.2 History of settlement

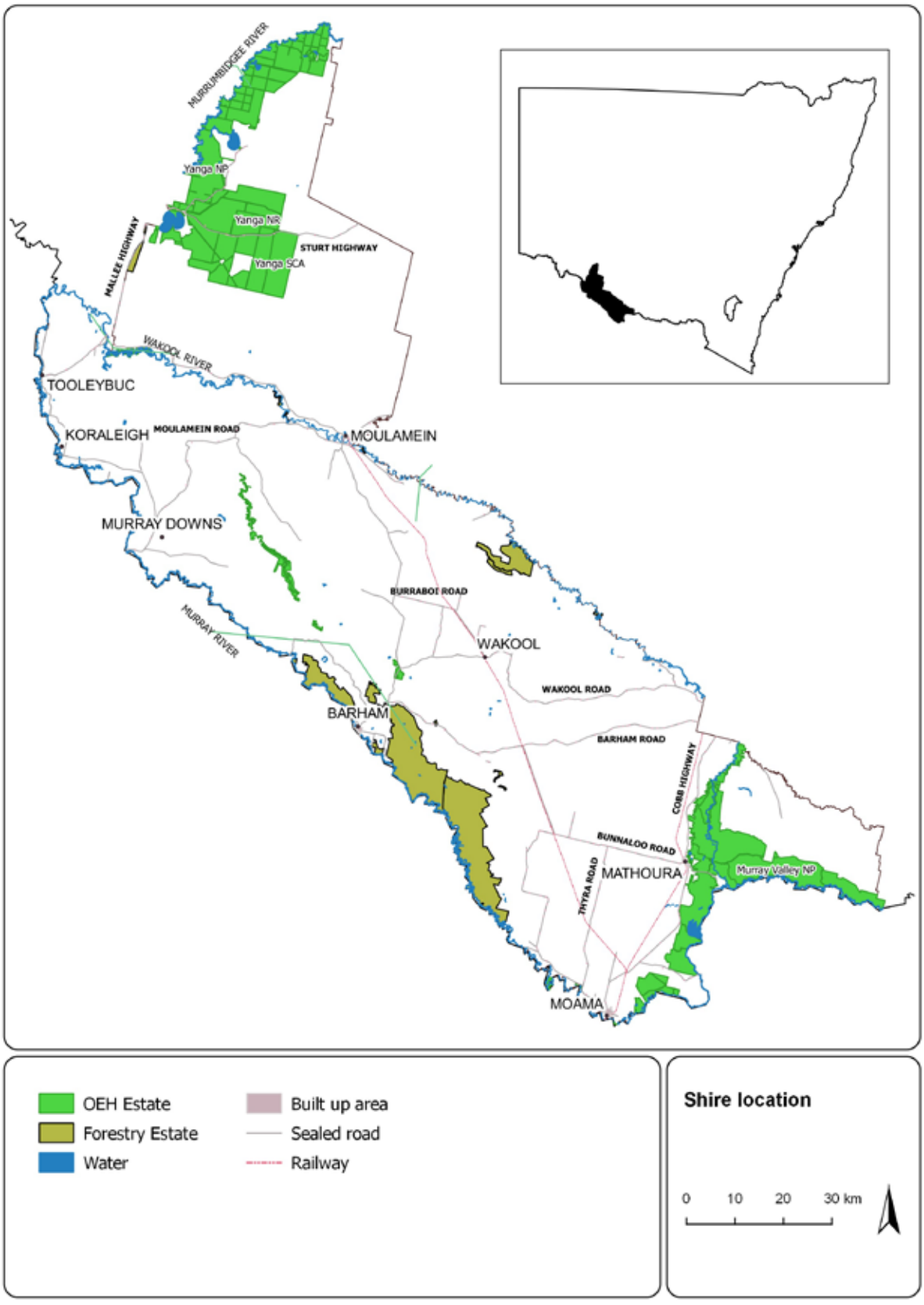
There is evidence that Aboriginal people have occupied the Murray River region since the mid-Holocene period up to 4,000 years BP (before 1950, the year in which radiocarbon dating commenced). These early inhabitants lived in many settlements along river banks and the presence of scars in remnant western grey box, black box and river red gum trees indicate that they made canoes and utensils in these areas. There are many recorded sites in the Aboriginal Heritage Information Management System that is managed by the NSW Office of Environment & Heritage which include these scarred trees, middens and burials. The Aboriginal tribes that settled along the Murray within the Murray River LGA were the Yorta Yorta, the Wadi Wadi, the Baraba Baraba and the Wemba Wemba.

The eastern area, now Greater Murray and Moama Wards of Murray River Council, was first settled by European squatters in the 1840s. An ex-convict, James Maiden, took up the Perricoota Station in the mid-1840s and established a ferry service across the Murray River and an inn on the northern bank in what is now known as Moama. This service became the first cattle crossing of the river and in 1852 the first paddle steamer commenced trading. Selectors moved into the area from the 1860's, displaced the squatters and commenced farming. The towns of Moama and Mathoura developed as service centres for local agricultural operations and the timber industry.

The western area, now known as the Wakool Ward of Murray River Council, was first explored by Augustus Morris the son of a convict around 1842. He came seeking grazing land in association with Benjamin Boyd and took up pastoral runs on the Edward River. The settlement of Moulamein was gazetted in 1851 as the first town in the Riverina region. The area around Barham was settled by graziers around the same time and villages and hamlets grew along the river where crossings were available. Improvements to infrastructure such as the opening of a rail line to Echuca assisted the development of other agricultural enterprises such as cropping.

Meat production and grain crops remain the most important source of employment and income for the LGA and many historic buildings and structures associated with the early years of these industries have been retained and protected through listing in local planning schemes and on the NSW State Heritage Register.

Figure 3.1: Map of Murray River LGA



3.2 Demography

Data presented in this section and the following settlement descriptions has been sourced from the 2016 Census of Population and Housing carried out by the Australian Bureau of Statistics and the community profile of Murray River prepared by REMPLAN Community.

3.2.1 Population characteristics

Based on place of usual residence, the estimated residential population of Murray River LGA at the time of the 2016 Census was 11,682 persons - an increase of 7% from the number of residents recorded in the 2011 Census (10,919 persons) and an 8% increase since 2006 when the population was 11,020 persons. The population was almost evenly split males and females at 49.6% and 50.4% respectively. The latest estimate by REMPLAN Community for Murray River is a total of 11,887 persons.

The population of each of the key settlements in Murray River, the proportion of the total LGA population and the median age is given in Table 3.1 below. These population figures incorporate the town population and the rural areas immediately surrounding each township.

Table 3.1:Population statistics, Murray River LGA, 2016. Source: REMPLAN Community

Settlement	Number of persons	Proportion of total LGA	Median age
Barham	1,516	13.0%	57
Koraleigh	354	3.0%	44
Mathoura	940	8.1%	54
Moama	6,165	53.0%	46
Moulamein	438	3.8%	48
Murray Downs	271	2.3%	51
Tooleybuc	276	2.4%	51
Wakool	301	2.6%	53
Remainder rural localities	1,421	12.2%	
Murray River LGA	11,682		49

The neighbouring NSW LGAs of Berrigan and Edward River, and the Victorian LGAs of Gannawarra are of comparable size. Other adjoining Victorian LGAs are considerably larger in population terms.

The table below shows the populations of neighbouring NSW and Victorian LGAs for the censuses of 2006, 2011 and 2016.

Table 3.2: Adjoining LGA populations, 2006, 2011 and 2016. Source: ABS Census of Population & Housing

	NSW LGA					Victorian LGA			
	Murray River	Berrigan	Edward River	Hay	Balranald	Moira	Campaspe	Gannawarra	Swan Hill
2006	10,779	7,993	9,106	3,383	2,441	27,087	36,209	11,296	20,663
2011	10,919	8,066	8,660	2,956	2,283	28,124	36,365	10,366	20,449
2016	11,682	8,462	8,851	2,946	2,287	29,112	37,061	10,549	20,584

The table below shows the populations of neighbouring border towns in Victoria that adjoin or are in close proximity to Moama, Barham, Murray Downs and Koraleigh in 2016

Table 3.3: Border town populations, 2016. Source: ABS Census of Population & Housing

	Echuca	Koondrook	Swan Hill	Nyah
2016 population (state suburb)	14,043	991	10,905	530

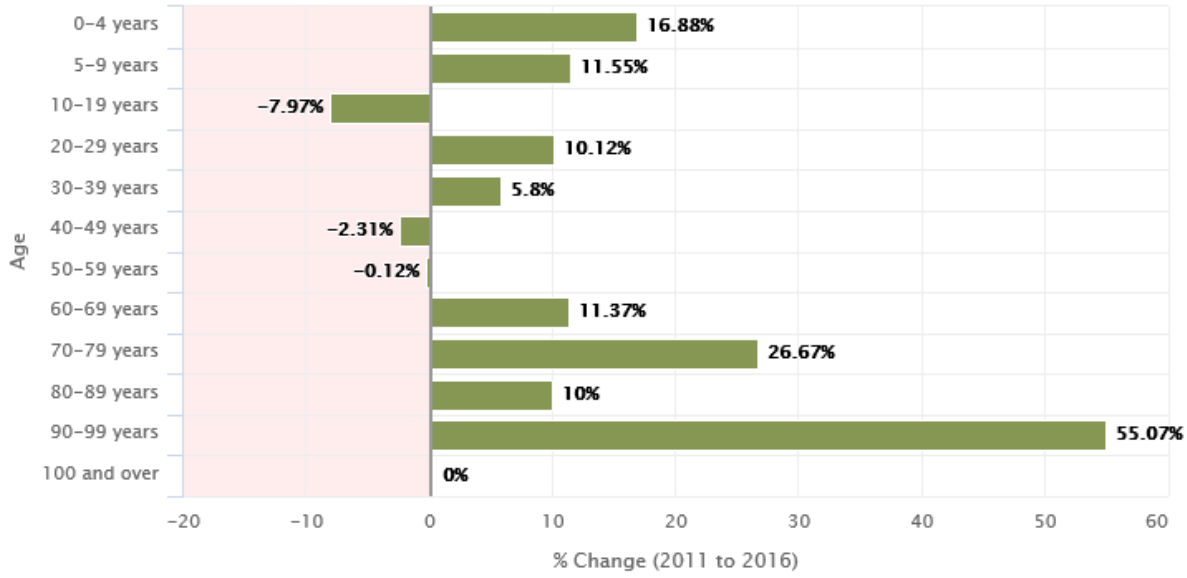
The median age of the people living in Murray River LGA was 49 years at the time of the 2016 census. This is significantly higher than the median age for persons living in NSW and Australia which is 38 years. Children aged 0 to 14 years made up 17.1% and persons aged 65 years and over made up 26.7% of the population of Murray River LGA. Persons aged from 15 to 64 years which is considered the working age group comprised over half of the population at 56.2%.

Table 3.4 Age structure, Murray River LGA, 2016. Source: REMPLAN Community

Cohorts	No. of persons	% of total population
0-4 years	637	5.45%
5-9 years	705	6.03%
10-19 years	1,258	10.77%
20-29 years	947	8.11%
30-39 years	1,077	9.22%
40-49 years	1,355	11.60%
50-59 years	1,658	14.19%
60-69 years	1,871	16.02%
70-79 years	1,458	12.48%
80-89 years	605	5.18%
90-99 years	107	0.92%
100 and over	4	0.03%
Total	**11,682**	**100%**

Chart 3.1 below shows the proportional change in age cohorts between 2011 and 2016. There has been a moderate increase in young persons aged under 10 years and a substantial increase in persons aged over 60 years.

Chart 3.1 Change in age cohorts, Murray River LGA, 2011-2016.
Source: REMPLAN Community



3.2.2 Population forecasts

The NSW Department of Planning and Environment released updated population forecasts in 2016. The forecasts indicate a growth of 850 persons and 700 households over the 20 year period. This represents growth in the numbers of persons resident in Murray River LGA of 7.4% over the period or 0.4% per annum. An increase of 13.5% in the numbers of households is expected. Growth forecasts are given in Table 3.5 below.

Table 3.5 Population forecasts. Source: NSW Department of Planning and Environment, 2016

	2016	2021	2026	2031	2036	Change 2016-2036
Population	11,550	11,900	12,100	12,300	12,400	850
Households	5,200	5,450	5,650	5,800	5,900	700

Growth projections for each of the key settlements are given below. These are based on the current proportion of the total population remaining the same over the 25 year period.

Table 3.6 Population growth forecasts for settlements in Murray River LGA

	2016	2021	2026	2031	2036	Change 2016-2036
Barham	1,502	1,547	1,573	1,599	1,612	110
Koraleigh	347	357	363	369	372	25
Mathoura	936	964	980	996	1,004	68
Moama	6,122	6,307	6,413	6,519	6,572	450
Moulamein	439	452	460	467	471	32
Murray Downs	266	274	278	283	285	19
Tooleybuc	277	286	290	295	298	21
Wakool	300	309	315	320	322	22

3.3 Settlements and development

3.3.1 Settlement hierarchy

Murray River has a distinct hierarchy of towns, villages and hamlets. Each settlement has its own character and identity, and is set within a rural landscape with natural features such as a riverine environment and remnant native forests. Settlements are generally separated by natural and farmland areas and have a defined urban footprint.

The largest settlement in Murray River is Moama which is located at the south-eastern corner of the LGA on the Murray River. Moama has a population of 6,165 persons which represents 53% of the total population of Murray River and is connected to Echuca which is a large centre on the Victorian side of the river. The second largest town is Barham with a population of 1,516 persons or 13% of the total population. Barham is also located on the Murray River at approximately the mid-point along the LGAs southern boundary and is connected to Koondrook across the river.

Smaller settlements include Mathoura with 940 persons, Moulamein with 438 persons and Wakool with a population of 301 all of which are located north and central within the LGA. Three hamlets are located along the northern banks of the Murray River. These are Koraleigh with a population of 354, Tooleybuc with 276 persons and Murray Downs, population 271.

Settlement hierarchy definitions have been adapted from the Moira Small Towns Strategy Report which in turn adapted these definitions from the Victorian Coastal Strategy (2008). It is important to be consistent with methods used in adjoining LGAs to enable sound comparisons.

District town

A population of greater than 2,000 and less than 10,000 persons with diverse population characteristics. These settlements serve a large catchment and generally have major commercial and institutional services, including several primary and secondary schools, tourist accommodation, sporting facilities, government offices, banks, health, medical and professional

services, and industrial outlets. All properties within the town boundaries are connected to reticulated water and sewer services.

Small town

a resident population of between 1,000 and 2,000 persons exhibiting some diversity. Towns generally provide some commercial and institutional services such as schools and medical facilities and often agencies for large banks and professional services. Limited industrial development is usually available.

Village

Population levels are generally between 500 and 1,000 persons. Villages have a small retail area with a hotel, general store or small supermarket and a range of speciality shops. Access to services such primary schooling and medical facilities are sometimes available. The provision of reticulated water and sewer services is limited.

Hamlet

A population of between 200 and 500 persons with a cluster of dwellings surrounded by farmland. Potentially limited access to reticulated water and sewer services. No major services other than possibly a primary school and RFS shed.

Rural locality

These areas comprise scattered farm houses occupied by the owners, managers and workers of surrounding farms. Usually no services are provided.

The settlements of Murray River are categorised in Table 3.7 below and descriptions of the services offered in each of these are provided in Chapter 4 The Settlements. Details of rural localities, including population figures, are also provided in Chapter 4.

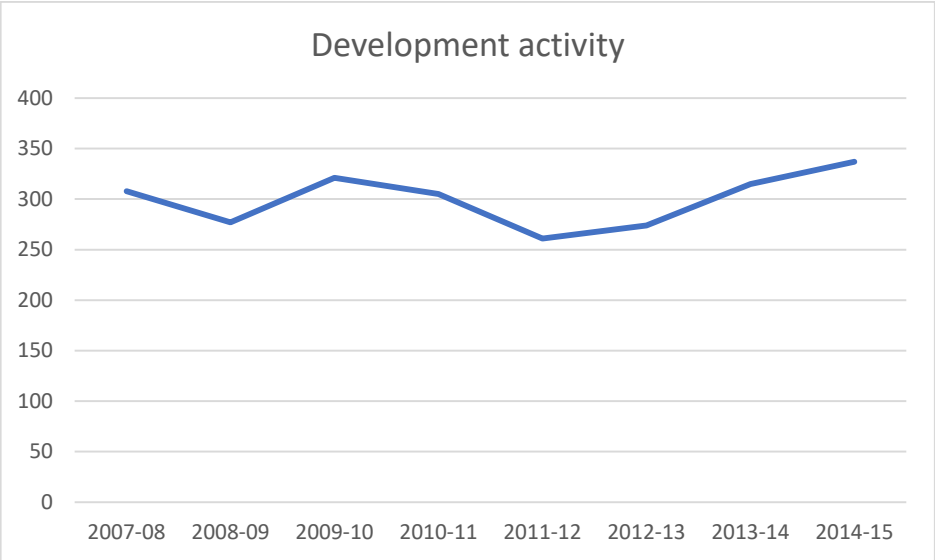
Table 3.7 Murray River's settlement hierarchy

District town (2,000 - 10,000 persons)	Small town (1,000 - 2,000 persons)	Village (500 - 1,000 persons)	Hamlet (200 – 500 persons)
Moama	Barham	Mathoura	Koraleigh
		Moulamein	Murray Downs
		Wakool	Tooleybuc

3.3.2 Development trends

Development trends have been analysed over the period 2007-08 to 2014-15 by combining the numbers of development applications determined by the former Murray and Wakool Shires. Total applications for all types of uses have fluctuated between 250 and 350 approvals per annum.

Chart 3.2 Total development activity in Murray River LGA 2007-08 to 2014-15.
Source: NSW Department of Planning & Environment



The bulk of these applications are for new residential dwellings and for alterations and additions to existing dwellings. Together these two categories make up two-thirds of all development occurring in Murray River LGA.

Table 3.8 Development applications lodged in Murray River LGA, 2007-08 to 2014-15.

Source: NSW Department of Planning & Environment

Category	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Residential - alterations & additions	145	126	115	127	78	90	105	101
Residential - new dwellings	63	37	58	52	53	67	71	93
Seniors living	0	0	1	0	0	1	0	0
Tourist	4	7	5	9	15	15	7	11
Commercial	12	15	10	19	12	12	8	18
Industrial	0	4	13	11	10	12	8	8
Mixed use	0	0	0	1	1	0	1	0
Infrastructure	1	2	2	3	1	1	5	9
Community facility	0	2	9	8	5	3	0	9
Subdivision	0	20	26	13	23	24	13	10
Residential - other	2	3	19	5	3	9	24	30
Other	81	61	63	57	60	40	73	48
Total	**308**	**277**	**321**	**305**	**261**	**274**	**315**	**337**

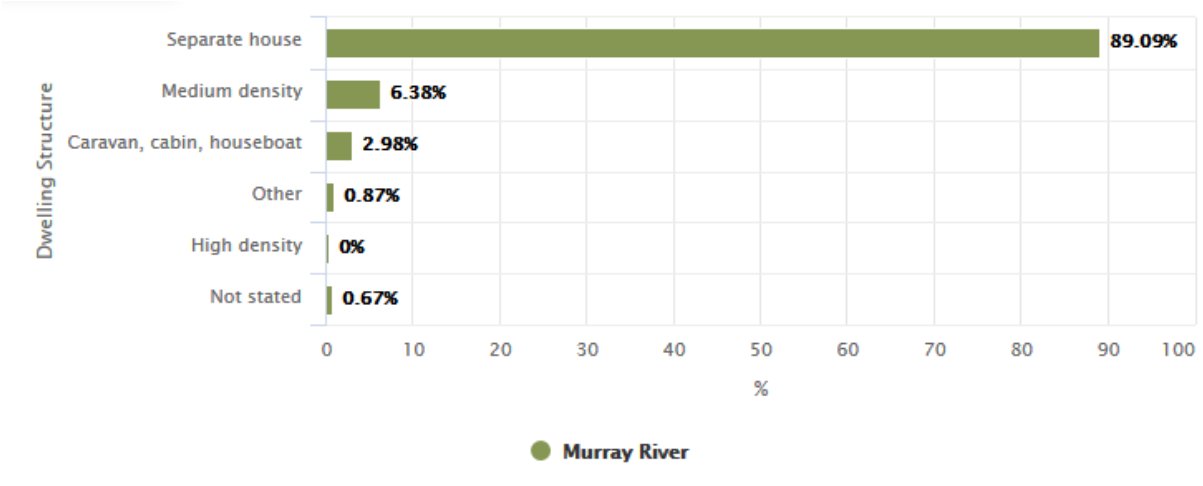
3.4 Housing

3.4.1 Dwelling types and structure

There were 5,402 private dwellings in Murray River LGA in 2016. Of these the vast majority are detached dwelling-houses which represent 89.1% of total occupied private dwellings. Medium density dwellings, comprising villas, townhouses, flats and apartments, comprise only 6.4% of total occupied private dwellings whilst flats and apartments represented 5% of the total. A total of 932, or 17%, of all private dwellings were unoccupied at the time of the census. The average occupancy rate in 2016 was 2.3 persons per dwelling. Based on Department of Planning & Environment population and household growth projections, average household size is forecast to decline to 2.03 persons per dwelling in 2036.

Chart 3.3: Dwelling structure in Murray River, 2016.

Source: REMPLAN Community



As shown in Table 3.9, over one-third of total dwellings were occupied by two persons and three-quarters of dwellings were occupied by two or more persons at the time of the 2016 Census.

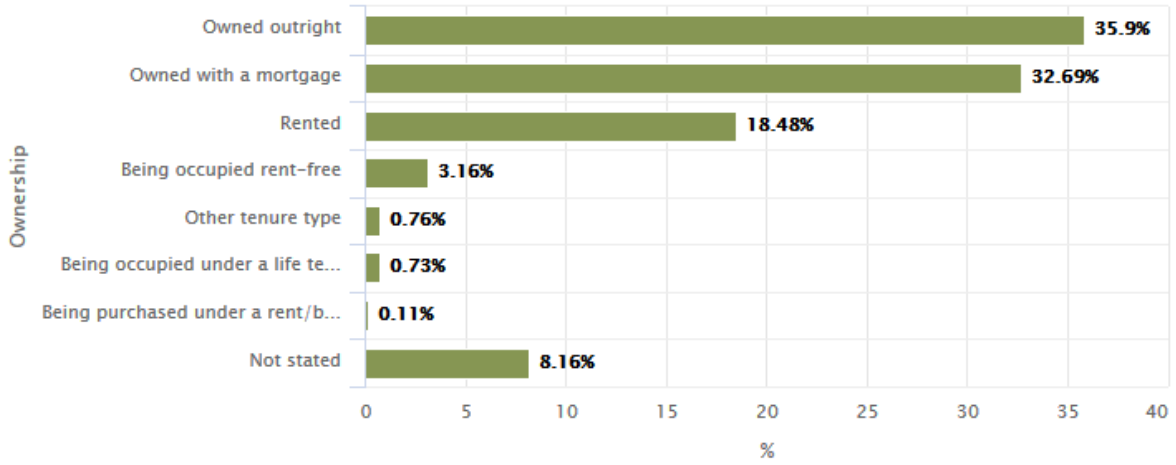
Table 3.9: Occupancy rates (persons per dwelling) in Murray River, 2016. Source: REMPLAN Community

Cohorts	No. of persons	% of total population
One person	1,428	13.82%
Two persons	3,677	35.58%
Three persons	1,476	14.28%
Four persons	1,920	18.58%
Five persons	1,255	12.14%
Six persons	414	4.01%
Seven persons	90	0.87%
Eight or more persons	75	0.73%
Total	**10,335**	**100%**

3.4.2 Ownership and finance

Two-thirds of all dwellings in Murray River are owned outright or under mortgage. Just under half of all detached dwelling-houses were owned outright and a third were subject to a mortgage. The remainder provides rental accommodation. 40% of villas, townhouses and the like were owned outright, with only 10% subject to mortgage and 30% rented. Two-thirds of flats and apartments are rental accommodation. Median weekly household income was $1,061, median monthly mortgage repayments was $1,300 and median weekly rent was $200.

Chart 3.4: Dwelling tenure in Murray River, 2016.
Source: REMPLAN Community

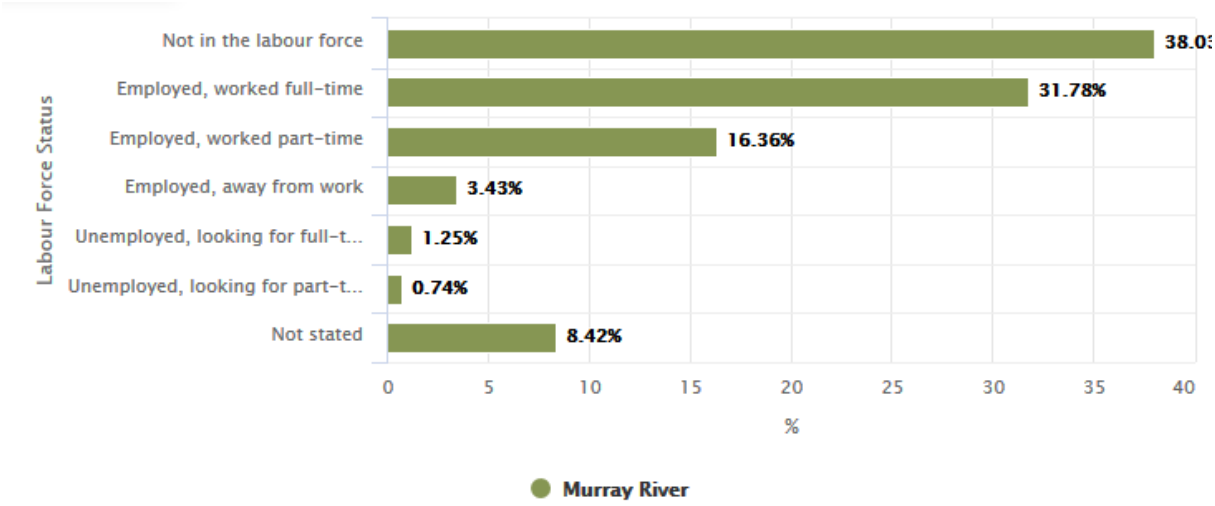


3.5 Business and industry

3.5.1 The labour force

The total labour force, comprising persons aged 15 years and over, was 4,336 persons in 2016. The labour force participation rate which comprises people employed or looking for work was 53.6%. This excludes those not in the labour force due to retirement, home duties or not stated in the Census. One third of the population was employed on a full-time basis and about 16% as part time.

Chart 3.5: Labour force status in Murray River, 2016.
Source: REMPLAN Community

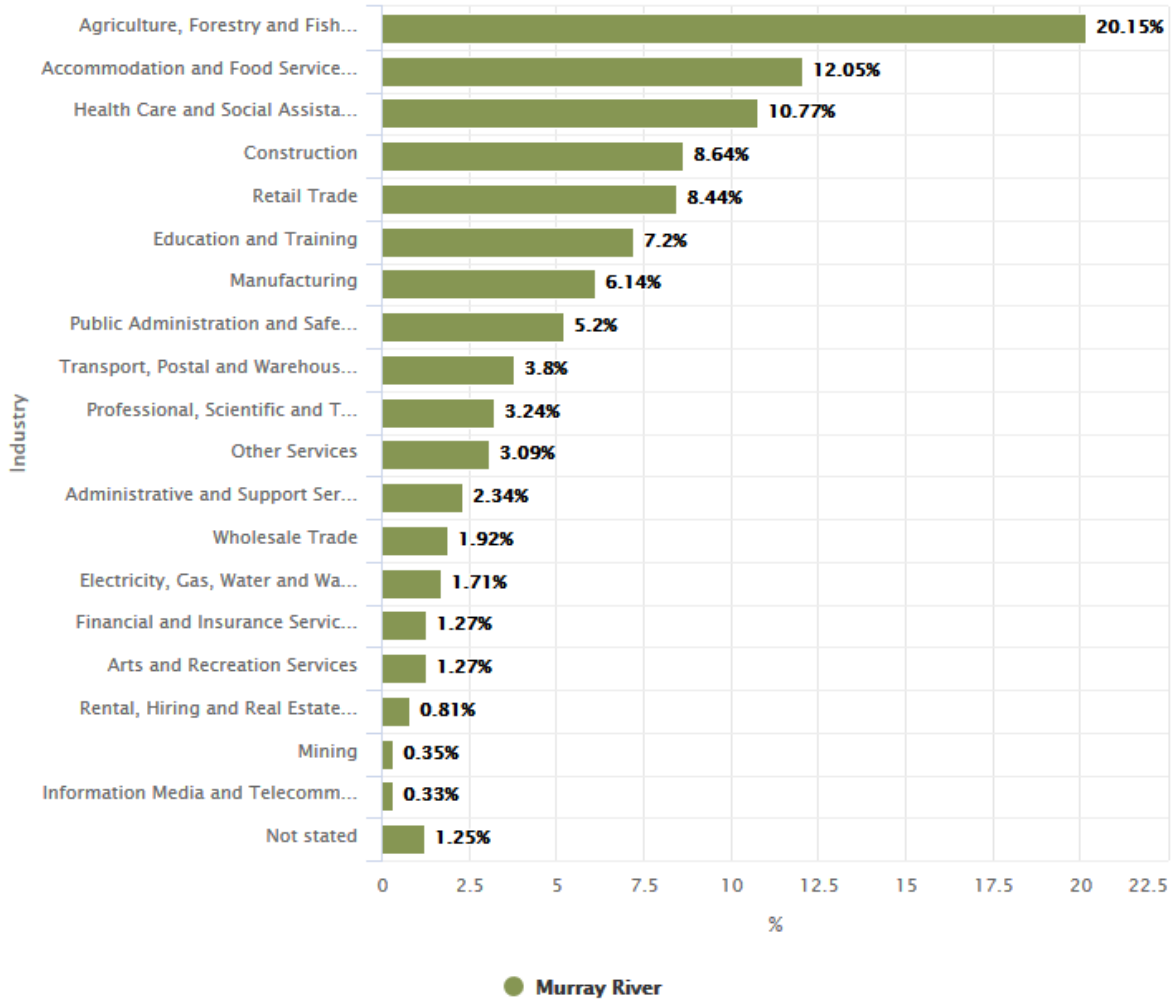


The highest proportion of the labour force in Murray River are managers at one-quarter of all employed persons. This category includes chief executive officers, farm managers, speciality managers, and hospitality, retail and service managers. The next largest employment category is professionals followed by labourers and technicians and trades workers.

3.5.2 Employment sectors

The largest employment sector in Murray River is the primary industry sector comprising agriculture, forestry and fishing. There were 1,138 jobs in that sector in 2016 representing 20% of the labour force. The next largest sectors are accommodation and food services with 840 employees, education and training with 325 employees then retail trade with 310 employees.

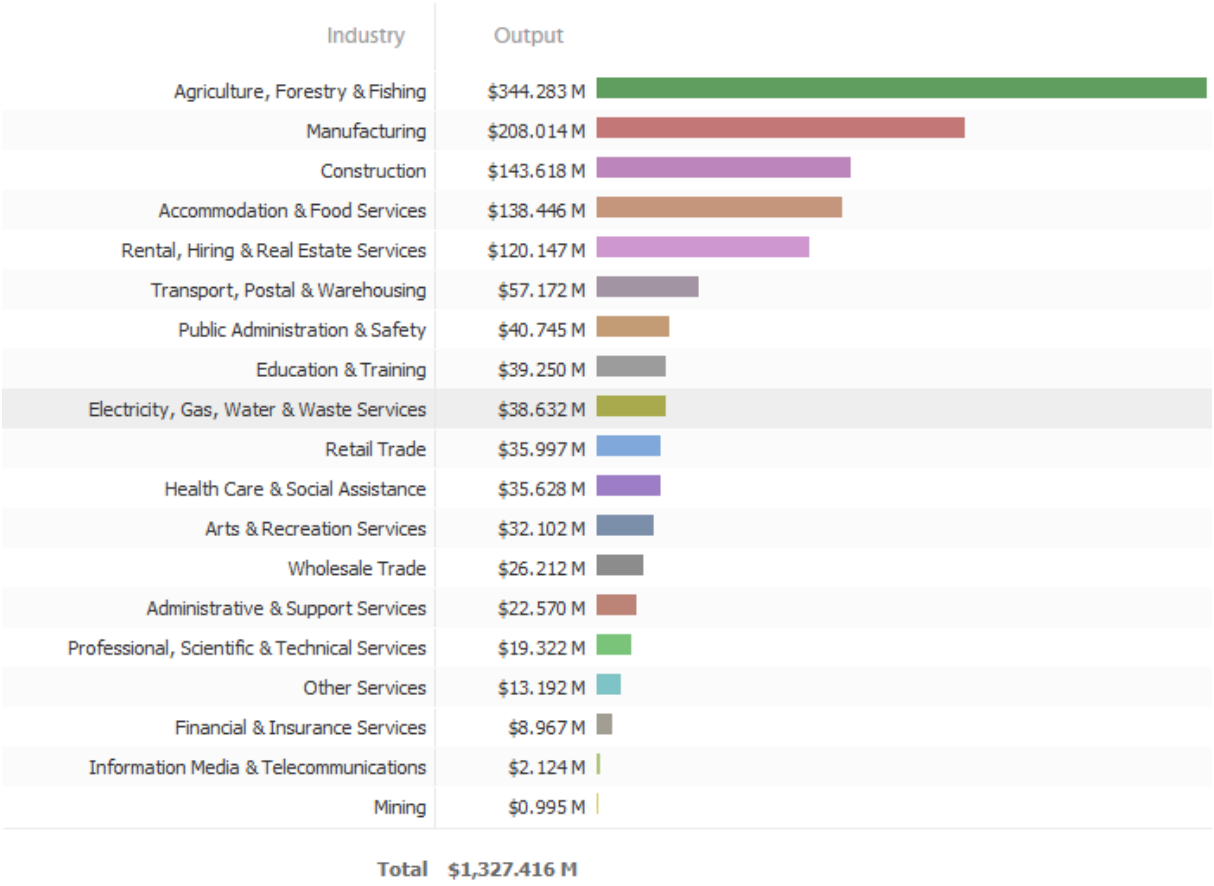
Chart 3.6 Employment sectors, Murray River 2016.
Source: REMPLAN Community



The gross revenue generated by businesses and organisations in each of the industry sectors in the Murray River economy is estimated at $1.327 billion. Agriculture, forestry and fishing are the most significant contributor to this output at $344.3 million in 2016, followed by manufacturing at $208 million.

The value of regional exports generated by the Murray River economy is estimated at $561.802 million. The value of intermediate goods and services imported into Murray River by local industry sectors is estimated at $435.258 million. The total value added by the Murray River economy is estimated at $585.027 million.

Chart 3.7 Gross revenue for each industry sector, Murray River 2016.
Source: REMPLAN Community



Murray River's gross regional product as a net measure of wealth generated by the region is estimated to be $643.532 million. Murray River represents 0.11 % of the gross state product of NSW of $576.716 billion and 0.04 % of Australia's gross regional product of $1.755 trillion.

3.5.3 Tourism

Tourism is an economic driver for Murray River and the surrounding local government areas. Visitors are attracted by the diverse recreational opportunities and experiences offered on and around the Murray River, and in the towns, villages and hamlets. Visitors come to explore and experience nature based activities such as the river, wetlands and the native fauna, fishing, walking and camping as well as other sports such as golf, and sporting and other events. Food tourism is also an attraction and a future opportunity to be explored with "eating out' noted as the most popular activity for visitors to the broader Murray Region.
(Destination NSW Travel to the Murray Year ended June 2017).

Commercial accommodation in Murray River includes hotels, camping grounds, caravan parks and overnight visitors also stay in the homes of friends and relatives. Tourism Research Australia's The Murray River Local Government Area Profile 2016 (data based on a 4-year average) reports that the Murray River attracted 157,000 domestic overnight visitors who stayed for a total of 434,000 nights during 2016. The average length of stay was 3 nights, and the average spend per night was $131, or $363 per trip. The total spend from domestic overnight visitors was estimated to be $57 million for the year. This report does not include data for international visitors and day visitors as the sample size is too small to be statistically reliable. It does however provide that the top three international markets are the United Kingdom, Switzerland and USA.

The report shows that the most popular reasons for visiting are to have a holiday, and to visit friends and relatives. Couples make up the largest travel party type, followed by family groups, and friends/ relatives travelling together. Visitors stay in commercial camping grounds and caravan parks (122,000 nights), hotels or similar (122,000 nights) and at the homes of friends or relatives (83,000 nights).

The Destination NSW Travel to the Murray Year ended June 2017 report notes that there were 136 tourism businesses in Murray River. As at the year ending June 2016, there were 11 hotels, motels and serviced apartments with 15 rooms or more in Murray River, offering approximately 350 rooms with an occupancy rate of around 50%.

A range of recreational facilities are provided in the Murray Valley National and Regional Parks which is located at the eastern end of the LGA east of the Cobb Highway and comprises precincts including the 5 Mile precinct recreational area near Moama.

In 2013 the Murray River Tourism Board published the Murray River Destination Management Plan. While it refers to a broader area than that covered by the current Murray River LGA and it is out of date, there are some findings that may still be relevant if driving increases in visitation, length of stay and the visitor experience is a desired outcome from future land use planning.

The destination plan identified product gaps and development initiatives. Those relating to land use can be briefly summarised into the riverfront, golf and food and wine. The Plan identifies various actions to create and supporting opportunities, proposals and development of tourism activity precincts along the riverfront, and across the cities and towns including improving river access, including riverside tracks and trails, boat access, parking and visitor amenities.

The Plan notes that many of the parks and reserves along the river were converted from State Forests, and some may still require investment to meet their full tourism potential. Golf courses that can accommodate higher yielding visitors, particularly international tourists were identified as an opportunity although this would require current research to assess if there is still a need in the Murray River LGA as there may be new golf product already developed nearby.

To grow food and wine tourism, the plan identifies a need for unique and/or destination dining experiences particularly restaurants that have river views, and provision of better access to the region's strong agricultural sector. The Campaspe and Murray Shire Infrastructure Gap Analysis Report prepared by the Australian Regional Tourism Research Centre makes recommendations concerning cross-border development of food and wine trails, nature-based activities, cultural heritage trails and signage, the walking and cycling network, and public recreation facilities.

3.6 Services and infrastructure

3.6.1 Water and sewerage systems

A dual reticulated water system (raw and filtered water) services the urban areas of Moama whilst Mathoura is supplied with filtered water only. The Moama water treatment plant has a capacity of 6ml per day to cater for approximately 20,000 equivalent persons. Raw water is provided to the western and north-western areas of Moama by private landowners at the time of development. The service is transfered to Council as Council takes over responsibility of the associated assets. There is no raw water service to properties west of 24 Lane other than where it is provided through private schemes. Mathoura's water treatment plant has capacity of approximately 2.3ml/d with no major upgrades until augmentation of the filtration plant in 2023. Projected capital expenditure on water supply in 2016 was $0.74 million.

The sewage system for the Greater Murray and Moama Wards includes a system in Moama with a design load of 10,000 EP and consists of an oxidation pond process, including recirculation processes. Treated effluent is stored, evaporated and irrigated at the sewer treatment plant located in Hillside Road. The system in Mathoura utilises a conventional sewerage system, consisting of gravity mains, sewage pumping stations and a sewage treatment plant. The Mathoura sewage treatment plant consists of an oxidation pond process whereby treated effluent is stored, evaporated and irrigated on a tree lot. The design load of the plant is 1,600 EP. The plant is expected to reach only 48% of capacity by 2036. Projected capital expenditure on sewage in 2016 was $0.305 million.

In Wakool Ward water is drawn from the Murray River to supply Barham and Murray Downs. Council maintains a single storage dam with a total capacity 130ml. The water supply network comprises a lagoon sedimentation treatment works, four microfiltration treatment works and one conventional treatment works, nine service reservoirs (6ml), eight pumping stations, delivery capacity into the distribution system, fourteen kilometres of transfer and trunk mains, and 152 km of reticulation. Wakool has a dual supply with 17% of the supply fully treated and the remainder being a non-potable supply for outdoor uses.

The sewerage system in Wakool Ward has five sewage treatment works providing primary, secondary, advanced secondary and tertiary treatment. The system comprises a treatment capacity for 1,860

equivalent persons utilising intermittent extended aeration (activated sludge) with biological nutrient removal and an anaerobic pond, fourteen pumping stations, twenty-one kilometres of rising mains and twenty-six kilometres of gravity trunk mains and reticulation. No effluent is recycled in Wakool Ward.

3.6.3 Waste management

Murray River Council owns and operates seven waste management facilities: transfer stations in Barham and Mathoura, a Class 1 Solid Waste Landfill licensed by the NSW Environment Protection Authority (EPA) in Moama, and landfills in Koraleigh, Goodnight, Moulamein and Wakool.

The landfill at the Moama Waste Management Facility has a compacted clay liner system to prevent groundwater contamination by capturing leachate, the toxic liquid that comes from waste in the landfill. This system has been independently designed to meet the requirement stipulated in the NSW EPA Guidelines for Solid Waste Landfills. Waste delivered to the Facility is covered daily to reduce odour, litter, dust and vermin. Council has allocated $0.111 million towards plant maintenance and $0.072million towards green waste collection in the Moama and Greater Murray Wards in the Delivery Program 2013-2017 and Operational Plan 2016-2017.

Council currently provides a kerbside waste and recycling collection service to residential and commercial properties in the towns and village centres, and also some rural areas lying on the service routes. Additional bulk waste removal services are provided to building sites, some commercial premises and several agricultural enterprises, by commercial waste contractors, under private contractual arrangements.

Council is a member of the Riverina and Murray Regional Organisation of Councils (RAMROC), which has an interest group in waste management. Council is also a founding member of the Central Murray Regional Waste Management Group, a cross border organisation whose purpose is to assist councils in reducing waste generation, and to facilitate recycling of municipal wastes. Council also receives a contribution from the Victorian based Gannawarra Shire towards operating costs for the Barham Transfer station.

3.6.4 Transport

Roads

The road network of Murray River LGA comprises a state road, and a series of regional and local roads. Major road transport routes in Murray River LGA are:

- HW21 the Cobb Highway running north-south between Moama and Deniliquin,
- HW14 the Sturt Highway running east-west between Balranald and Wagga Wagga,
- MR391 From the bridge over the Murray River at Barmah, to the Cobb Highway (HW21) approximately 15.2 km north of Moama,
- MR94 From the Cobb Highway at Deniliquin, via Wakool to the Barham - Moulamein Road near the Wakool River,
- MR341 From the intersection of the Barham - Deniliquin and Barham - Moama Roads, near Thule to the Barham - Moulamein Road north of Barham,
- MR319 From Koondrook Bridge over the Murray River at Barham, via Tullakool Beremegad Tank, Moulamein and Maude to the Hay - Oxley Road east of Maude,
- MR296 From the Cobb Highway (HW21) at Pretty Pine, via Barrata and Moulamein to the Tooleybuc – Balranald State Road (MR694) at Kyalite,
- MR552 From the Newell Highway (HW17) at Jerilderie via Coree and Conargo to the Riverina Highway (HW20) at Deniliquin,
- MR386 From the Moulamein-Barham Road (MR319) near Moulamein, via Connamit Bridge over the Wakool River to Swan Hill-Ivanhoe Road (MR467) approximately 11.2km north of Swan Hill,
- MR467 From the bridge over the Murray River at Swan Hill, generally northerly to the Tooleybuc – Balranald State Road (MR694) near Kyalite,
- MR694 Tooleybuc – Balranald State Road - From the bridge over the Murray River at Tooleybuc via Kyalite to the Sturt Highway (HW14) south of Balranald, and
- RR7605 Deniliquin - Barham Road, From the Cobb Highway (HW21) at Deniliquin to the Barham - Moama Road at Thule.

Roads & Maritime Services have completed upgrades to the Tooleybuc-Balranald road to a state road. This road connects regional Victorian towns to the Sturt Highway which is the major arterial road to the north of Murray River LGA that runs east-west as part of the network of major freight routes.

Proposed regional roads include Tulla Road, Kyalite Road and Noorong Road. All regional roads are sealed.

In addition, the Murray Valley Highway connects Echuca to Robinvale on the Victorian side of the Murray River. This highway is used by NSW travellers to access towns such as Barham and Tooleybuc from the east.

Approximately 2,500 kilometres of local roads are located in rural parts of Murray River LGA, less than one-fifth of which are sealed. There are also about 120 kilometres of sealed urban roads. Although carrying low volumes of traffic, these local roads along with regional roads provide essential connections between settlements and rural localities.

Figure 3.2: Classified roads in Murray River LGA. Source: RMS

Bridges

There are over 125 bridges on local and regional roads including a number of historic timber truss bridges and the Speewa Ferry providing a crossing of the Murray River at a point between Murray Downs and Koraleigh. These bridges are:

- The Coonamit bridge over the Wakool River which was constructed in 1929 and is located on the Moulamein/Swan Hill Road approximately 30 kilometres from Swan Hill and 39 kilometres from Moulamein,
- The Gee Gee Bridge over the Wakool River which was constructed in 1929 and is located on Noorong Road approximately 37 kilometres from Swan Hill and 48 kilometres from Barham,
- The Barham/Koondrook lift span Bridge over the Murray River which was constructed in 1904 and is located on Main Road 319 at Barham,
- The Murrabit Bridge, or Gann Crossing Bridge, over the Murray River which was constructed in 1850 and is located approximately 52 kilometres from Swan Hill and 34 kilometres from Barham,
- The Swan Hill/Murray Downs bridge which was built in 1896 is a steel lift span and timber truss bridge with steel girder spans,
- The Nyah lift span Bridge over the Murray River which was built in 1941, and
- The Tooleybuc lift span Bridge over the Murray River which was built in 1925.

Air

Registered aerodromes with the Civil Aviation Safety Authority exist in the neighbouring Victorian towns of Kerang, Echuca, Swan Hill and Yarrawonga and in the NSW towns of Albury, Deniliquin and Tocumwal. Numerous private airstrips exist across Murray River LGA to enable crop dusting services and private air transport. An airstrip located approximately 4 kilometres north of Moulamein is open for public use but does not offer airport services or a public transport connection to the town. It is maintained by Council and is available for use during daylight hours only as there is no lighting for night landings.

Rail

North-south rail links connect Murray River LGA to major logistics hubs. Separate freight rail lines connect Deniliquin through Mathoura to Moama, and from Balranald through Moulamein to Moama. These lines use a standard gauge with Victorian railways and enable links south of Echuca to either Bendigo or Shepparton. These lines assist to transport grains and cattle to the major market distribution hub of Melbourne. The Balranald-Moama rail line has recently been decommissioned.

3.6.5 Open space and recreation

Numerous parks and recreation reserves are provided in each of the settlements of Murray River LGA. A draft generic plan of management for Moama and Greater Murray Wards provides direction and continuity for the planning, resource management, maintenance, operation and programming of community land. It applies to land that is owned by Council and classified as community land and categorised as park, sportsground, natural area or general community use under the Local Government Act 1993. Natural areas are further categorised as bushland, wetland, watercourse or foreshore.

Council owns and operates two outdoor swimming pools, located in the towns of Mathoura and Moama. Other recreation facilities in the eastern part of Murray River LGA include skate parks in Barham, Mathoura and Moama. Walking tracks are provided as a heritage trail in the town of Mathoura, through red gum forest near Mathoura and Gulpa Creek, around the Dhungala Lagoon in Moama, along the river foreshore at Barham, and around the wetlands and river foreshore in and around Moama. A series of off and on road bicycles paths within Moama and Echuca connect the urban areas to the river foreshore and to the 5 Mile recreation park located on the Murray River west of Moama.

The Moama Recreation Reserve is the main sporting reserve in Murray River LGA. It is located just north of the Moama town centre and covers 45 hectares. A plan of management for the Moama Recreation Reserve was adopted by Council in July 2017. The reserve is split into five zones in this plan and key works with cost estimates are identified to establish a standard of infrastructure and natural features. Condition assessments are included for the assets in each zone. A masterplan is also in place for Barham Recreation Reserve.

3.6.6 Community facilities

Murray River Council offices and depots are located in Mathoura, Moama, Moulamein and Barham. These fragmented operations are due to the merger of the former Murray and Wakool Shires.

Various medical, community health, aged care and allied services are located in Murray River settlements such as the Barham-Koondrook Memorial Hospital located in Barham and HACC services in Mathoura, Moama, Moulamein, Tooleybuc and Wakool, however, the community relies upon primary care provided in Victorian towns such as Echuca and Swan Hill as well as those offered in Deniliquin.

Post offices are located in Barham, Mathoura, Moama, Moulamein, Wakool, Tooleybuc, Goodnight, Kyalite and Koraleigh. Library services are provided to residents in the east of Murray River LGA by two public libraries – a branch of the Central Murray Regional Library located in Mathoura and the Campaspe Regional Library (Echuca Moama). The Mathoura library is co-located with a visitor information centre. Libraries are located in Barham, Moulamein and Wakool.

The Moulamein Community Hub is a multi-purpose facility that provides meeting rooms and a business centre with access to Council, RMS Services, government services such as Local Land Services, banking and legal services. The Hub also provides a primary care centre offering community health services, Home and Community Care (HACC) and consulting rooms for doctors and allied health professionals.

Community halls are located in each of the eight settlements as well as Goodnight, Mallan, Noorong and Womboota (School of Arts).

Primary schools are located in Bunnaloo, Mathoura, Barham and Wakool, and a secondary school is located in Barham. Combined primary and secondary schools are located in Moulamein and Tooleybuc. A primary public school and a private Anglican grammar school that combines primary and secondary education are located in Moama. Tertiary vocational education is provided to the region through TAFE Riverina Institute located in Deniliquin and through TAFE Echuca.

3.7 The natural environment

3.7.1 Topography and landform

The Murray River LGA is located in the Riverine Plains in the central part of the Murray Basin, a saucer shaped depression underlain by bedrock that has resulted from the tectonic uplift that formed the Great Dividing Range to the east. The sediments that filled the basin are of fluvial (riverine) and marine in origin, from the Great Dividing Range and former marine encroachment, respectively.

Mitchell Landscapes mapping shows that about 50% of the LGA comprises the active Channels and Floodplains.

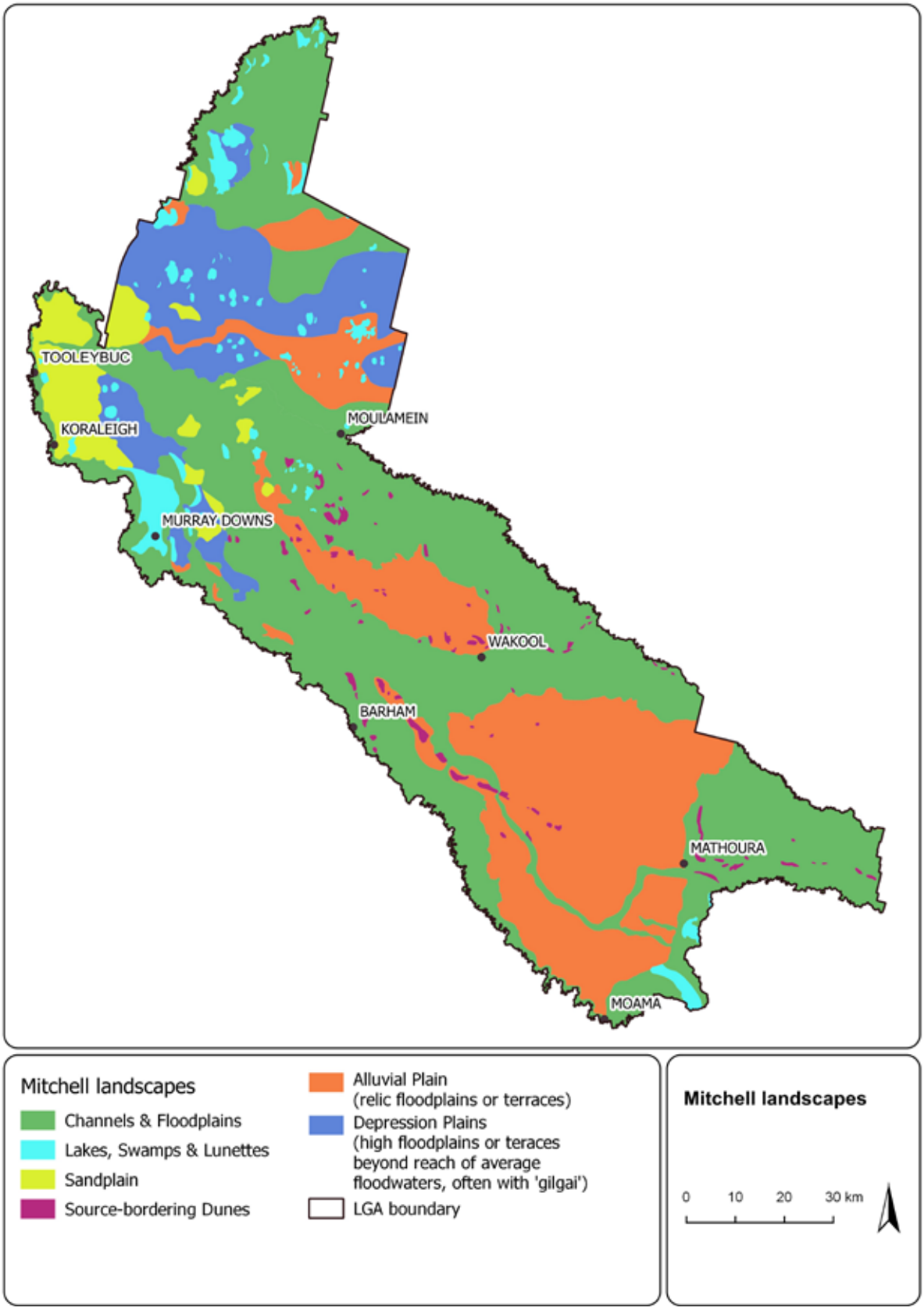
Relic Floodplains and Terraces cover about 28% of the LGA (relief generally <1m). The largest of these relic floodplains occurs on a geological feature formed by an uplift of land, known as the Cadell Tilt, which occurs between Echuca to Deniliquin. The Cadell Tilt caused the course of the Murray and several other rivers to change about 25,000 years ago. Over time and with the melting of glaciers in the Great Dividing Range about 20,000 years ago, water headed north to create the Edward River, and the Murray created a new course to the southwest (now called the Barmah Choke), to follow its current course, created by the ancient Goulburn River, to Swan Hill. Green Gully, west of Mathoura is believed to be the former course of the Murray, as are the lower reaches of the Wakool River.

Depression Plains cover about 10% of the LGA, mainly in the west, comprising alluvial plains with numerous circular depressions (also known as 'gilgai'), being high floodplains or low terraces beyond the reach of average floodwaters, relief to 10m. Depression Plains are recognisable by the presence of Myall trees and gilgai depressions. Soils are typically heavier clays, with linear patterns of sandy prior streams.

Sandplains cover about 5% of the LGA, being common west of Moulamien and scattered to the east. Sandplains comprise sand-hills and depressions of Aeolian (wind deposited) origin. These were formed during drier (recent) geological periods when vegetation cover was sparse. Relief 4 to 8m.

Lakes, Swamps and Lunettes cover about 3% of the LGA, mainly west of Moulamein. The active freshwater lakes and swamps are generally round or kidney shaped and frequently flooded. Often nested within larger relic Quaternary lake features (of Sandplains). Lunettes and sand hills often occur on the eastern margins of lakes. Relief of lakes and channels to 10m, lunettes to 20m.

Figure 3.3: Mitchell landscapes in Murray River LGA



3.7.2 Land use

Almost half of Murray River LGA is used for cropping, with dryland cropping covering 26% of the LGA and irrigated cropping covering 18%. Grazing on native pastures/vegetation covers about 28% of the LGA and grazing modified pastures covers about 10%. This largely occurs on the more marginal dryland areas along with undeveloped sections of the floodplain.

Nature conservation is another significant land use/cover, covering around 11% of the LGA, mainly on floodplains with residual forest cover, with largest of these comprising Murray Valley National and Regional Park east of Mathoura and west of Moama, and Yanga National Park/State Conservation Area, in the north-western corner of the LGA. Native hardwood forestry is a major land use in the floodplain forests around Bahram (3% of LGA).

Figure 3.4: Land use in Murray River LGA

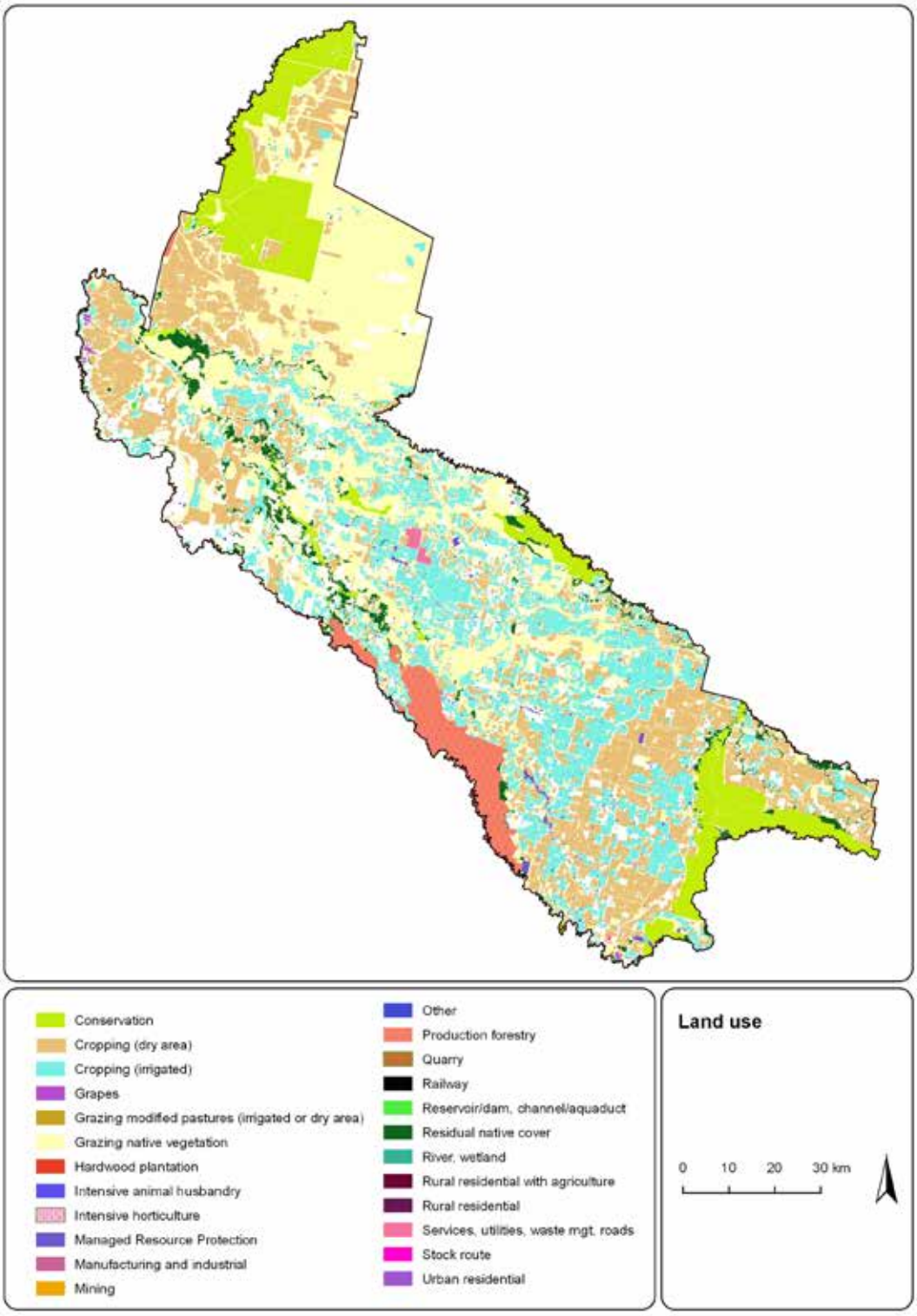


Table 3.10: Land use areas and proportion of total area of Murray River LGA

Land use	Area (km^2)	Proportion
Grazing native pastures/vegetation	333	28%
Cropping (dryland)	305	26%
Cropping (irrigated)	216	18%
Nature conservation	124	11%
Grazing modified pastures	115	10%
Production forestry	38	3%
Residual native cover	36	3%
Reservoir/dam, channel/aquaduct	1.6	0.1%
Other	16	2%

3.7.2 Land capability

Land capability mapping has been prepared using data provided by the Office of Environment & Heritage. The methodology for the classification of land is explained in The land and soil capability assessment scheme – A general rural land evaluation scheme for NSW, 2nd Approximation which is available on www.environment.nsw.gov.au. Land capability classes are described in Table 3.11.

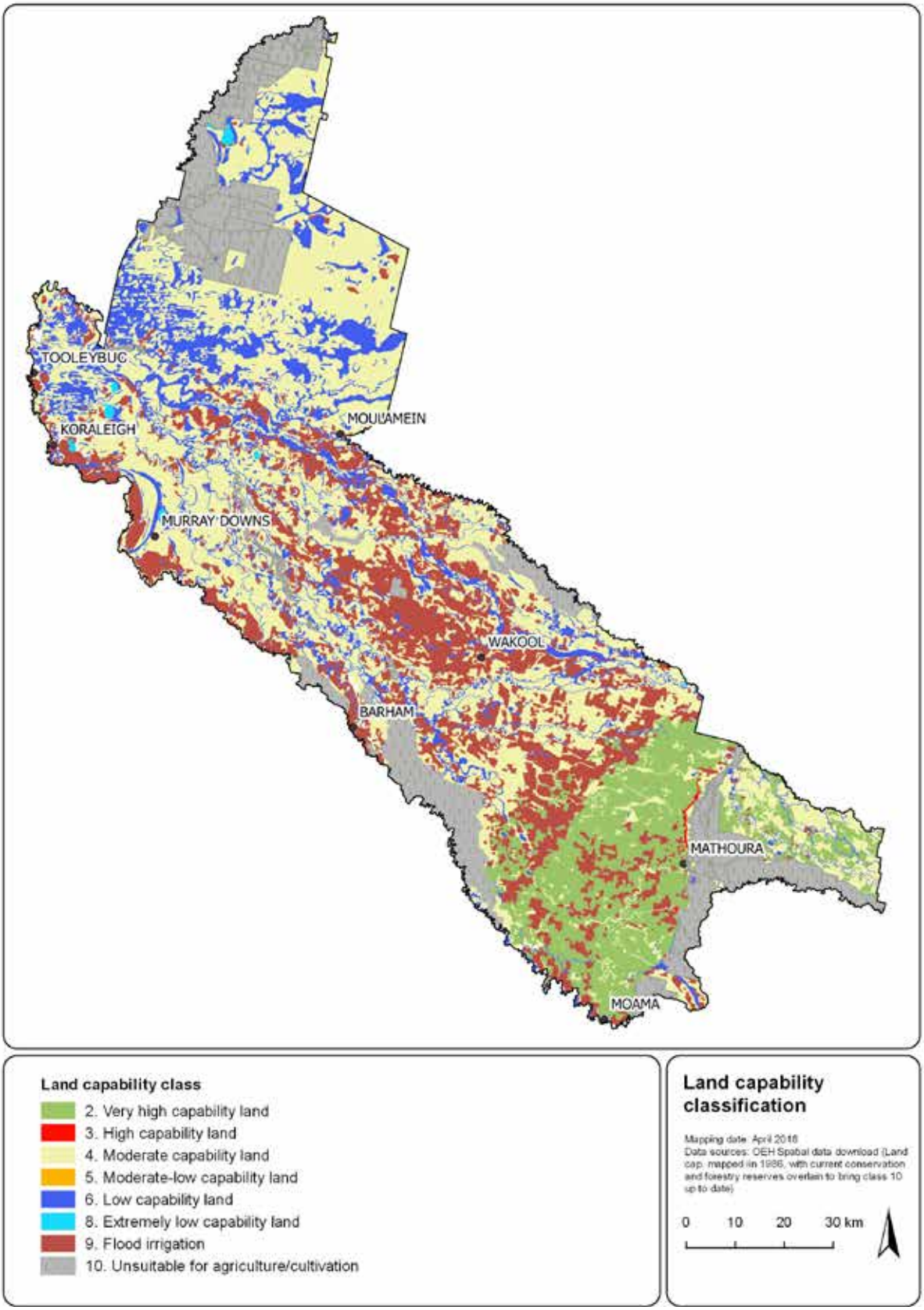
Land capability refers to the suitability of land for development based on the land's biophysical characteristics, such as slope, terrain, rockiness, drainage and erosion risk (DNR, 2006). Resultant land capability mapping comprises an eight-class classification with Class 1 being land with the greatest potential for agricultural use, with Class 8 being land entirely unsuitable for agriculture.

Almost half of the LGA (about 44%) comprises Class 4 – moderate land capability. Nineteen percent is suited to flood irrigation, while about 16% comprises Class 6 and is suitable for grazing with no cultivation. About 11% comprises Class 2 - very high capability.

Table 3.11: Land capability classes with areas of land and proportion of Murray River LGA

Class code	Land capability	Soil conservation practices	Area (km^2)	% of LGA
1	Extremely high capability land	Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices	0	0%
2	Very high capability land	Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation	1,342	11%
3	High capability land	Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation	7.5	0.1%
4	Moderate capability land	Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology	5,229	44%
5	Moderate-low capability land	Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation	1.3	0.01%
6	Low capability land	Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology	1,941	16.4%
7	Very low capability	Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.	0	0%
8	Extremely low capability land	Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation	90	0.8%
F.I.	Flood irrigation	Flood irrigation applies to specific areas of land that are irrigated with floodwaters	2,244	19.0%
M	Current non agricultural land use	e.g. mining and quarrying areas are occupied by an existing extractive industry	980	8%

Figure 3.5: Land capability in Murray River LGA



Land in Murray River is generally very fertile due to periodic inundation with floodwaters and located on the floodplains of the Murray, Edward and Wakool rivers.

The highest class of land (class 2 very high capability land) in Murray River LGA is located at the eastern end north of Moama and west of Mathoura. This coincides with dryland cropping activities although there are parcels of land scattered through this area that utilise irrigation.

Most of the irrigated croplands stretching through Wakool out to beyond Moulamein and along the Murray River are class 3 high capability land. Moderate capability land covers the majority of the western end of the LGA which is mostly used for grazing of native vegetation or modified pastures.

Land capability generally decreases heading west with patches of class 6 land that are mallee or saltbush country and predominantly used for grazing.

3.7.3 Vegetation

Around 35% of the LGA comprises native vegetation. Just over half of this occurs on the active floodplains that remain uncleared for cropping, with Riverine Forest (dominated by River Red Gum) and Black Box Woodland making up 14% and 7% of this respectively. The structure of River Red Gum stands has changed due to river regulation, timber harvesting and altered fire regimes.

The other major type remnant native vegetation comprises the Chenopod Low Shrublands (e.g. Cotton Bush, Bluebush, Dillon Bush and Saltbush). Cotton Bush is spread throughout much of the LGA, while the other Chenopod Low Shrublands are restricted to the more marginal land to the north-west. Historic overgrazing has typically shifted vegetation composition towards dominance by the most hardy plant species (mostly chenopods) at the expense of the more palatable plants such as native grasses and forbs.

Grey Box Woodland has a wide distribution, from Wakool to Moama/Mathoura, however this habitat has been extensively cleared for mostly dryland agriculture and now occurs as scattered patches, paddock trees or as in roadside remnants (1.2% of LGA). Callitris Mixed Woodland (about 1% of the LGA in total), most of which occurs on sandhills/sandplains, shares a similar distribution and clearing history to that of Grey Box Woodland.

Minor stands of Yellow Box Woodland occur in the eastern section of the LGA, on undulating plains and dunes adjacent the Murray and Edward-Wakool floodplains (McNellie eet al, 2005).

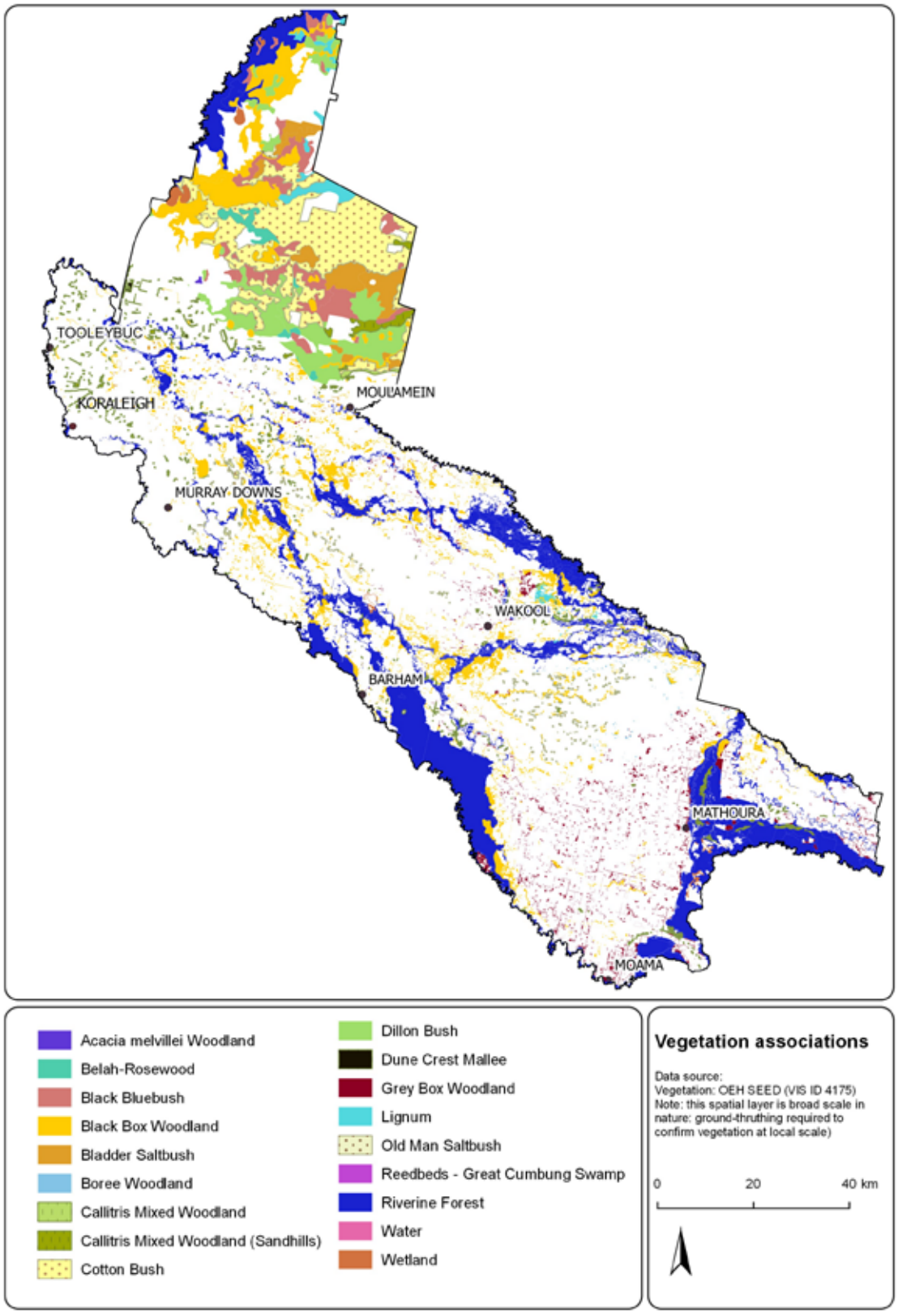
These and a number of other vegetation communities have therefore been gazetted as threatened ecological communities (TEC) under State and/or Commonwealth threatened species legislation.

Table 3.12: Threatened ecological communities under the NSW Biodiversity Conservation Act and/or the Commonwealth Environment Protection and Biodiversity Conservation Act

Vegetation association	TEC	Area (km^2)	% of LGA
Cleared land (non-native vegetation)		7,641.13	65%
Riverine Forest		1,636.22	14%
Black Box Woodland		811.98	7%
Cotton Bush		626.75	5%
Dillon Bush		331.14	2.8%
Black Bluebush		214.36	1.8%
Bladder Saltbush		160.12	1.4%
Grey Box Woodland	BC, EPBC	138.74	1.2%
Callitris Mixed Woodland (Sandhills)	BC	83.62	1%
Lignum		63.93	0.5%
Belah-Rosewood		40.13	0.34%
Wetland		33.02	0.28%
Canegrass		16.02	0.14%
Dune Crest Mallee		13.60	0.1%
Callitris Mixed Woodland		13.08	0.1%
Boree (Myall) Woodland	BC, EPBC	6	0.05%
Old Man Saltbush		3.4	0.03%
Acacia melvillei Woodland	BC	1.5	0.01%
Acacia loderi shcrublands	BC		

Note that aerial imagery of an area (e.g. NSW SIX Maps) shows that remnant native vegetation, albeit in small patches, is likely to be more extensive than what the currently available vegetation mapping indicates. The extent of vegetation shown in Figure 3.6 and in other vegetation maps for individual settlements is broad scale and indicative. Ground-truthing is required to determine the precise extent and to confirm the type of vegetation in any given area.

Figure 3.6: Vegetation associations in Murray River LGA



3.7.4 Biodiversity

Terrestrial

A total of eight (terrestrial) threatened ecological communities (TEC) are known from the LGA (OEH 2018, DoE 2018, McNellie et al 2005), as listed in Table 3.13 below. As is typically the case in rural areas, these communities correspond with broad scale land clearing on arable land. Remnants generally occur as isolated clumps, scattered 'paddock trees', as derived grasslands (i.e. cleared land with some native groundcover remaining) or as linear remnants with road reserves. As a result, the condition of TEC remnants is typically poor, with weeds and dense woody shrub regrowth often common. Remnants in better condition typically occur within Travelling Stock Reserves, other reserves, and grazing land subjected to light/intermittent grazing.

Table 3.13: Terrestrial threatened ecological communities in Murray River LGA

NSW Biodiversity Conservation Act	Commonwealth Environment Protection and Biodiversity Conservation Act	Approx area (km^2)	Approx proportion of LGA
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	160	1.2%
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	-	83	1%
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina & NSW SWS bioregions	Weeping Myall Woodlands	6	0.05%
White Box Yellow Box Blakely's Red Gum Woodland	White box – yellow box - Blakely's red gum grassy woodlands and derived native grasslands	2.3	0.02%
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	-	1.5	0.01%
Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Unknown (may have been mapped within Grey Box)	Unknown
-	Natural Grasslands of the Murray Valley Plains	Unknown**	Unknown**
-	Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Unknown**	Unknown**

Source: McNellie M, Horner G, Nott TA, Vanzella B, Scleibs M, Kordas GS, Tuner B, Hudspith TJ (2005), 'Native vegetation map series, Deniliquin 1:250,000 map sheet' NSW Department of Natural Resources, Parramatta

** Often occupies same habitat as Myall Woodland (mainly heavy-textured grey, brown and red clay), therefore not possible to distinguish from 'derived native grasslands' from that community (DoE 2018).

Aquatic

One aquatic threatened ecological community listed under the NSW Fisheries Management Act 1994, occurs within the LGA:

> The aquatic ecological community in the natural drainage system of the lower Murray River catchment.

The lower Murray River EEC includes all native fish and aquatic invertebrates within all natural creeks, rivers, and associated lagoons, billabongs and lakes of the regulated portions of the Murray River (also known as the River Murray) downstream of Hume Weir, the Murrumbidgee River downstream of Burrinjuck Dam, the Tumut River downstream of Blowering Dam and all their tributaries anabranches and effluents including

Billabong Creek, Yanco Creek, Colombo Creek, and their tributaries, the Edward River and the Wakool River and their tributaries, anabranches and effluents, Frenchmans Creek, the Rufus River and Lake Victoria (DPI 2018). Excluded from this EEC are artificial canals, water distribution and drainage works, farm dams and off-stream reservoirs.

Threatened and migratory species

Habitat within Murray River LGA supports wide ranging threatened flora and fauna species. Known records show that flora and fauna groups of threatened species under the Biodiversity Conservation Act and the Commonwealth Environment Protection and Biodiversity Conservation Act include 38 birds, 6 mammals, 2 frogs and 13 plants.

Migratory bird species are also well represented due to the extensive area of wetlands and waterways in the LGA. In addition, there are 27 migratory bird species found in Murray River that are listed under the EPBC Act and subject to one or more international agreements for their protection.

Pests and weeds, climate change and habitat loss are some of the key threatening processes facing native plants and animals. A threat may be listed as a key threatening process under the NSW Biodiversity Conservation Act 2016 if it adversely affects threatened species, populations of a species or ecological communities; could cause species, populations of a species or ecological communities to become threatened.

Currently, key threatening processes are primarily managed in NSW under the Saving our Species program, which is the NSW Government's strategy for securing threatened species and ecological communities, and for managing key threatening processes.

Koala Habitat Protection

The extensive river red gum forest stands within the LGA are important habitat for the Koala. Bionet records show known populations, with most of these in the larger reserves along the Murray River, and also on the Edward River and Tuppal Creek. An outlying western population is known to exist near Koraleigh.

River red gum Eucalyptus camaldulensis is a primary feed tree species for the Koala and occurs in the LGA. Three 'secondary food tree species' are present, but generally only in isolated and/or narrow remnants: Western grey box E. microcarpa,Yellow box E. melliodora, Black box E. largiflorens.

The following definitions from State Environmental Planning Policy (SEPP) No 44--Koala Habitat Protection are important factors to be considered during the development planning process.

"core koala habitat" means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

"potential koala habitat" means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

3.7.5 Watercourses and wetlands

Having a number of rivers flowing from the higher rainfall Great Dividing Range, watercourses are an important landscape feature of the LGA. The major river and creek systems, including the Murray, Murrumbidgee, Wakool and Edwards Rivers constitute well over 1,000 km of waterway meandering across low relief floodplains.

This combination of extensive waterways and low relief topography, along with other major geological features, such as the Barmah Choke, has produced considerable tracts of wetland habitat, totalling around 1,850 km^2 (15% of LGA). Most of these are broadly classified as floodplain wetlands, with a small proportion classified as intermittent freshwater lakes (most of which occur in the lower Murrumbidgee valley).

With most waterways being regulated for irrigation and other water supply, the ecosystem functioning of the watercourses and wetlands has been altered, e.g. a reduction in the frequency of minor flood events. Some of the freshwater lakes are now maintained as permanent water storages for irrigation, recreation and town water supply.

Wetlands of International Importance (Ramsar Convention)

A total of three wetland systems are listed under the Ramsar convention, selected for their international significance in terms of the biodiversity and uniqueness of their ecology, botany, zoology, limnology or hydrology:

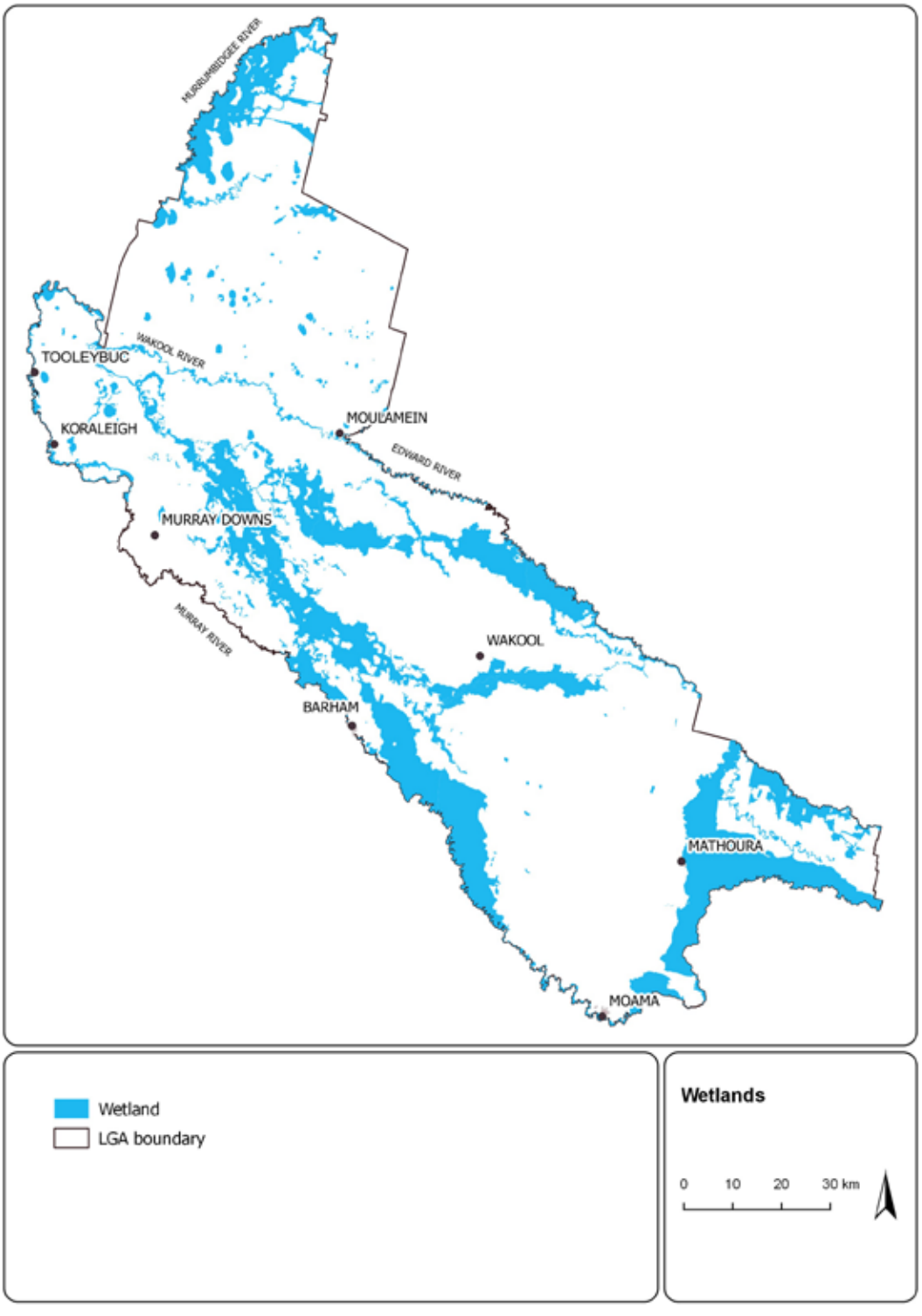
- NSW Central Murray State Forests (comprising three areas: Murray Valley National and Regional Park - formally the Millewa Forest, Werai Forests, and Koondrook -Perricoota Forests), around 84 km^2 in total.
- Barmah Forest (around 28.5 km^2).
- Gunbower Forest (around 20 km^2).

Nationally important wetlands (listed under the EPBC Act)

These wetlands are chosen based on one or more qualities relating to ecology, ecosystem representativeness and historical/cultural importance.
Within the Murray River LGA, these are:

- Koondrook and Perricoota Forests
- Lowbidgee Floodplain
- Millewa Forest
- Wakool-Tullakool Evaporation Basins
- Werai Forest

Figure 3.7: Floodplain wetlands and freshwater lakes of Murray River LGA

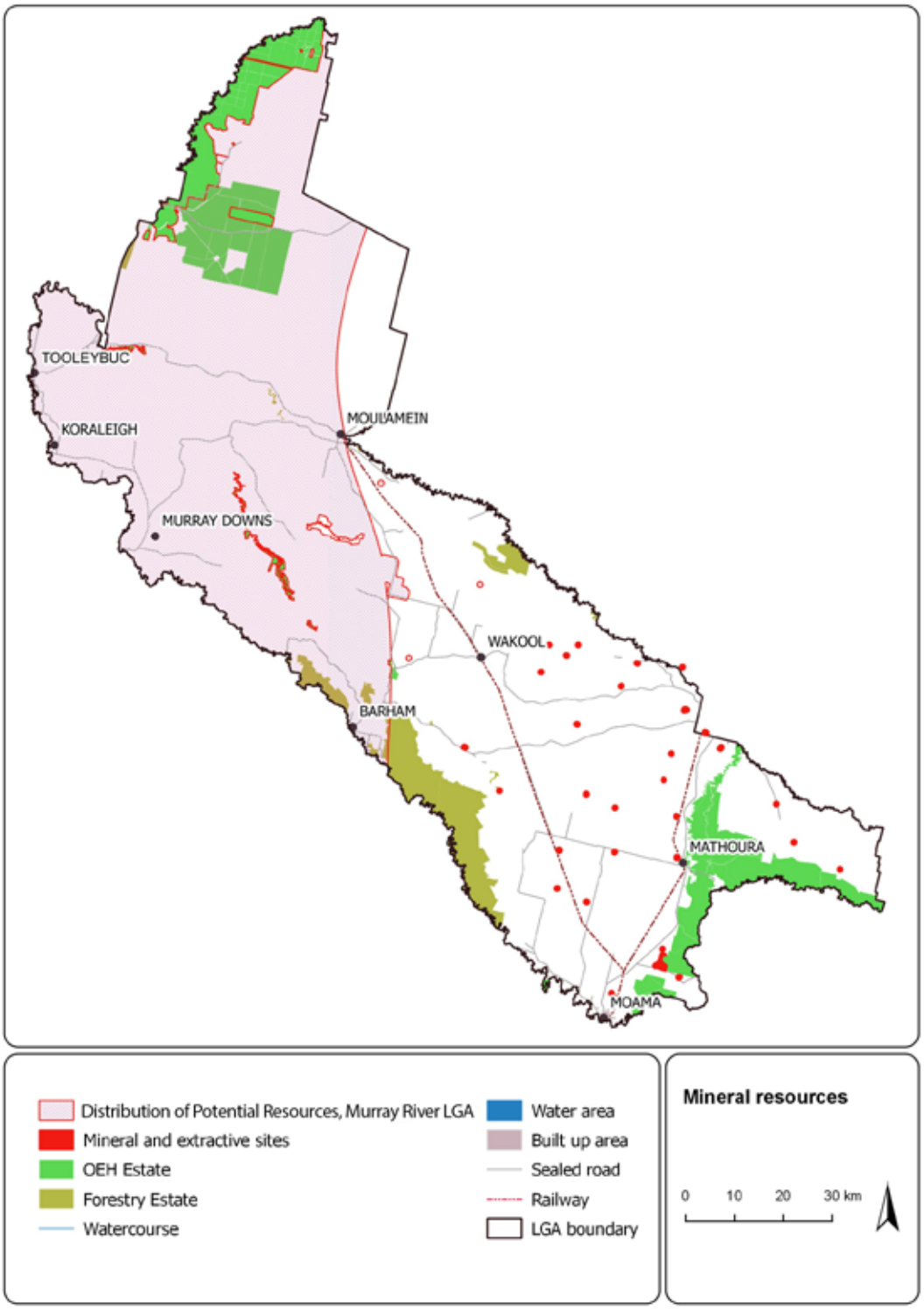


3.7.6 Mineral resources

Figure 3.8 shows the distribution of the range of potential mineral resources and ongoing exploration.

Extractive industries are not significant in Murray River LGA and generally involve surface quarrying for resources for the construction industry, roadworks or to assist farming operations.

Figure 3.8: Mineral resources, Murray River LGA



3.8 Natural hazards

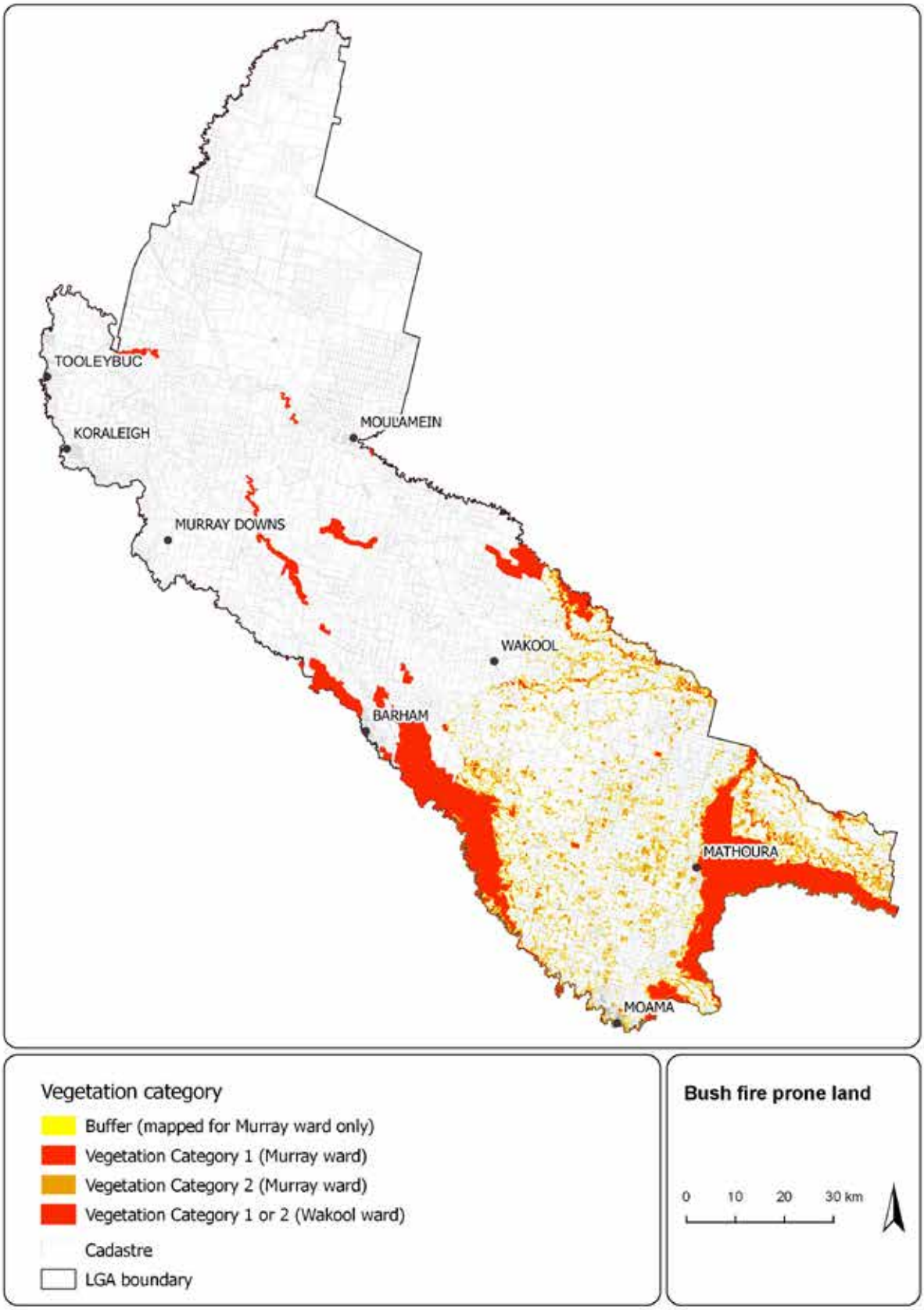
3.8.1 Bushfire

Figure 3.9 below shows land mapped as being bushfire prone land in Murray River LGA. The majority of the LGA is managed farm land. Land that is bushfire prone coincides with areas of remnant native vegetation. Only land within the settlements of Barham, Mathoura and Moama are identified on this map as either bushfire prone or as a buffer zone. Note that only bushfire prone land is identified for land within Greater Wakool Ward. The bushfire categories given in Table 3.14 below are used in the bushfire prone land map.

Table 3.14: Bushfire categories

Category	Mapping colour	Description
Bushfire Prone Vegetation - Category 1	Orange	Forests, woodlands, heaths and wetlands greater than one hectare
Bushfire Prone Vegetation - Category 2	Yellow	Forests, woodlands, heaths and wetlands less than one hectare
Nil category	uncoloured	Rainforests, shrublands, open woodlands, mallee and grasslands
Bushfire Prone Vegetation Buffer Zone	Red	Land within 100m of Category 1 and 30m of Category 2 bushfire prone vegetation

Figure 3.9: Bushfire prone land map, Murray River LGA



3.8.2 Flooding

Agricultural land use in the area is a function of floodplain fertility and water availability. Flooding of the Murray River floodplain is a normal occurrence. Flooding over the Shire is the result of floodwaters from the Murray River and other rivers extending over the Murray floodplain and surrounds. The catchments supplying these rivers and driving flooding are large, 30,000 to 50,000 square kilometres or more depending on the location within the Shire. The timing and extent of flooding is strongly influenced by both the behaviour of inflowing tributaries and the impacts of the Barmah Choke, close to Barmah, which restricts the Murray floodplain's capacity and diverts floodwaters north to the Edward River. Flood warning times for towns along the Murray and other rivers are in the order of days and weeks.

Flood studies for the urban areas of Barham, Murray Downs and Tooleybuc were completed in 2014 for the former Wakool Shire. These flood studies focus on establishing flood planning levels for these townships and outlining a range of recommendations regarding future investigations on flood protection and future development.

Previous flood studies have been completed for the townships of Mathoura and Moama, which have been used to establish flood planning extents. An updated flood study for Moama is being prepared in 2018 to better inform flood planning for Moama and surrounds.

Rural floodplain management plans have been prepared for the Edward, Wakool and Niemur Rivers as they pass through the Shire. These plans focus on the management of floodwaters over the floodplain from the perspectives of rural land management and environmental requirements.

3.8.3 Land contamination

There are one hundred and one sites listed on the contaminated lands register maintained for the Moama and Greater Murray Wards. The is only one confirmed contaminated site in listed in the register. The site was previously occupied by a service station and is located in Meninya Street in the township of Moama. This site is also listed on the NSW Environment Protection Authority register of contaminated sites but has not yet been investigated to determine the extent of contamination and appropriate remedial measures.

There are eight unconfirmed contaminated sites in the vicinity of Moama which have been the subject of preliminary assessments as part of a local environmental study or a rezoning proposal. There are a further ninety-two potentially contaminated sites primarily located in the urban areas of Moama and Mathoura and surrounding rural districts for which investigation has not yet been carried out.

The sources of contamination comprise former or current oil and fuel storage facilities, industrial activities, agricultural activities such as feedlots and horticulture on rural land, and waste storage and treatment facilities.

Details of potentially contaminated sites in Wakool ward are not available.

3.9 Heritage

3.9.1 Indigenous heritage

People of indigenous (Aboriginal and Torres Strait Islander) descent accounted for 3.2% of the population of Murray River at the time of the 2016 Census. Indigenous nations and languages are the Wadi Wadi at the western end of Murray River LGA, the Baraba Baraba and Wemba Wemba in the centre and the Yorta Yorta at the eastern end.

These people are represented by five Local Aboriginal Land Councils within the Murray River LGA. These are Balranald, Wamba Wamba, Deniliquin, Moama and Cummergunja LALCs.

Figure 3.10: Boundaries of Local Aboriginal Land Councils

There are 1915 sites of Aboriginal heritage significance that have been recorded within the LGA on the Aboriginal Heritage Information Management System that is maintained by the NSW Office of Environment and Heritage. The breakdown of these by LALC is given in Table 3.15 below.

Table 3.15: Recorded Aboriginal sites within LALCs

Local Aboriginal Land Council	No. of recorded indigenous heritage sites
Balranald	752
Wamba Wamba	253
Deniliquin	367
Moama	288
Cummergunja	255

Consultation with the relevant LALC would be required where there is a proposed change to land use zoning that may cause a change of use or a more intensive land use that may impact on an indigenous heritage item, place or value.

3.9.2 Non-indigenous heritage

There are 65 non-indigenous places listed in Schedule 5 Environmental heritage of Murray LEP 2011, the majority of which are located in Moama and Mathoura. All items are of local significance except the Echuca Wharf, the Echuca-Moama road and former rail bridge, and the Moama historic precinct based around Hunt Street which are listed in the State Heritage Register as items of state significance.

There are also two heritage conservation areas listed in Schedule 5 of Murray LEP 2011 – the historic Hunt Street precinct of Moama and the railway tower, water tank and railway precinct of Mathoura. The Hunt Street precinct is of state heritage significance and the railway precinct is of local significance.

In addition, a gateway determination has been issued by the Department of Planning and Environment for a planning proposal to proceed to amend Murray LEP 2011 that aims to include a third heritage conservation area in Schedule 5, the Chanter Street historic precinct of Moama.

There are 12 non-indigenous places listed in Schedule 5 Environmental heritage of Wakool LEP 2013. The schedule includes 6 crossings of the Murray River, five of which are also listed in the State Heritage Register as items of state significance. The Murray Downs Homestead is also listed in the State Heritage Register. There are no heritage conservation areas listed in Schedule 5 of Wakool LEP 2013.

A community Heritage Study was prepared in 2006-2007 for Wakool Shire. This is a comprehensive source of history of the former Wakool Shire area and of the towns and villages. It includes a description of the many timber truss bridges that remain as the principal river crossings in Murray River LGA.

Remnants of two historic wharves also remain – the Barham/Koondrook Wharf built in 1881 and the Moulamein Wharf constructed in 1908 were key components of the river, road and rail networks of the late 19th Century and early 20th Century. Paddle steamers plying the Murray River were the main conduit for freight movements to and from the area. Prior to the construction of the bridge river crossings, ferries conveyed goods and people across the Murray River. The last remaining ferry in operation is the Speewa Ferry, crossing the river between Murray Downs and Koraleigh.

Several properties are listed on the Australian Heritage Places Inventory that is maintained by the Commonwealth Department of the Environment. These places, sourced from the former Register of the National Estate and/or the NSW State Heritage Register, are listed below.

Table 3.16: Places listed in the Australian Heritage Places Inventory

Place	Location
Austin Bay Nature Reserve	Greenlands Rd, Pinjarra
Boodalan Island	Peel Inlet
Echuca Road and Rail Bridge	Cobb Hwy, Moama
Fairbridge Farm School (former)	Fairbridge Rd, Pinjarra
Harvey Estuary Nature Reserve	Herron Point Rd, Coolup
Indigenous Place	Barmah
Indigenous Place	Mathoura
Lakes McLarty and Mealup Area	Lake Mealup Rd, Pinjarra
Moama Courthouse	Francis St, Moama
Moonaculla Mission	Old Morago Rd, Deniliquin
Barham Bridge over Murray River	Main Road 319, Barham
Coonamit Bridge over Wakool River	Main Road 386, Swan Hill
Gee Gee Bridge over Wakool River	Main Road 94, Swan Hill (East)
Great Cumbungi Swamp Area	Oxley Rd, Balranald
Indigenous Place	Balranald
Indigenous Place	Kyalite
Indigenous Place	Balranald
Murray Downs Homestead	Moulamein Highway, Wakool
Murray River Road Bridge	McCallum St, Swan Hill
Swan Hill-Murray River Road Bridge	Main Road 67, Swan Hill (East)

The settlements

4.1 Barham

4.1.1 Description

4.1.1.1 Location, history and features

Barham is located in the centre of Murray River LGA on the northern bank of the Murray River adjacent the Victorian settlement of Koondrook. Barham is the second largest settlement in the LGA after Moama and provides social and community services to western areas and to the inhabitants of Koondrook. It has an attractive river setting with landscaped open space close to historic buildings in the town centre.

European settlement of the area commenced in the 1840s as graziers moved in from south of the Murray River. The Barham-Koondrook bridge, built in 1904, is a lift span bridge that is listed as a heritage item of state significance in the State Heritage Register and Wakool LEP 2013. The Barham War Memorial is an item of local significance listed in Wakool LEP 2013.

Figure 4.1a: Aerial image of Barham. Source: SIX Maps, 2018

4.1.1.2 Role and function

Barham is classified as a small town in the Murray River settlement hierarchy. Specific urban zones have been allocated to the urban area under Wakool LEP 2013 including R1 General Residential, B2 Local Centre and IN1 General Industrial.

Services offered in the town centre of Barham include a range of retail services, including four restaurants/cafes, a bank agency, a newsagency, pharmacy, two supermarkets (IGA and Foodworks), two hotels, two service stations, a range of property and financial services plus approximately 30 retail premises. Two small retail premises were vacant at the time of survey in November 2017.

Council maintains an office and works depot in Barham. Other social services include a community and business centre, a primary school, high school and churches.

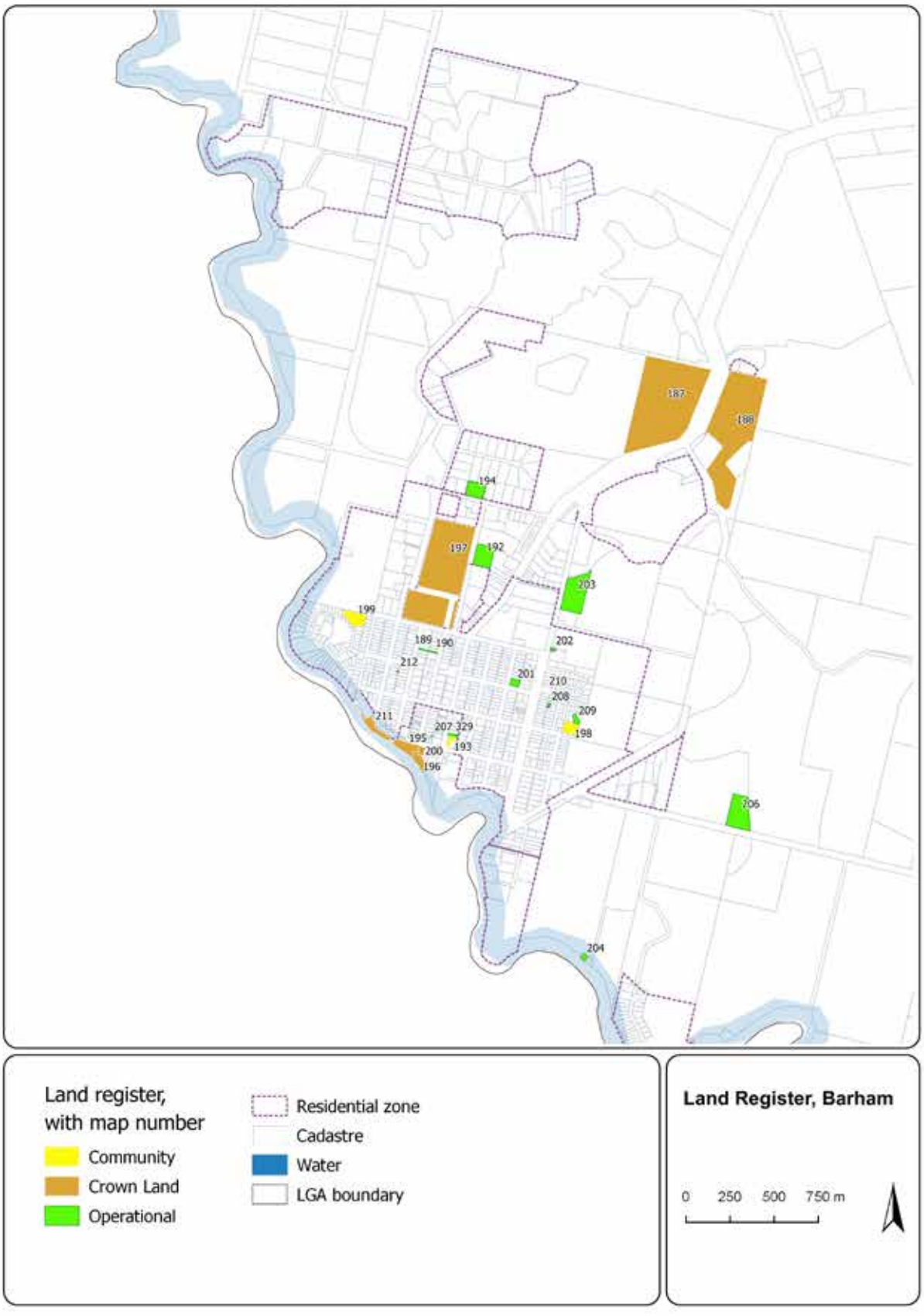
4.1.1.3 Public land

Public land in Barham is shown in Figure 4.1b as community, operational and crown land. The corresponding descriptions are given in Table 4.1a below.

Table 4.1a: Public land register, Barham. Source: Murray River Council

Map No.	Land Use	Map No.	Land Use
329	Doctors Surgery	200	Community Centre and Hall
187	Cemetery	201	Depot
188	Radio Tower	202	Water Supply Tower
189	Drainage	203	Water Filtration Plant
190	Drainage	204	Water Supply
192	Wakool Water Office	206	Sewerage
193	Rest Centre, Public Toilets, Playground	207	Sewerage
194	Pound & Lawson Street Depot	208	Sewer Pump Site-Barham
195	Recreation	209	Residential
196	Recreation	210	Road Reserve
197	Recreation	211	Bowling Club Riverside Park Reserve
198	Reserve	212	Sewerage
199	Reserve		

Figure 4.1b: Public land register, Barham. Source: Murray River Council

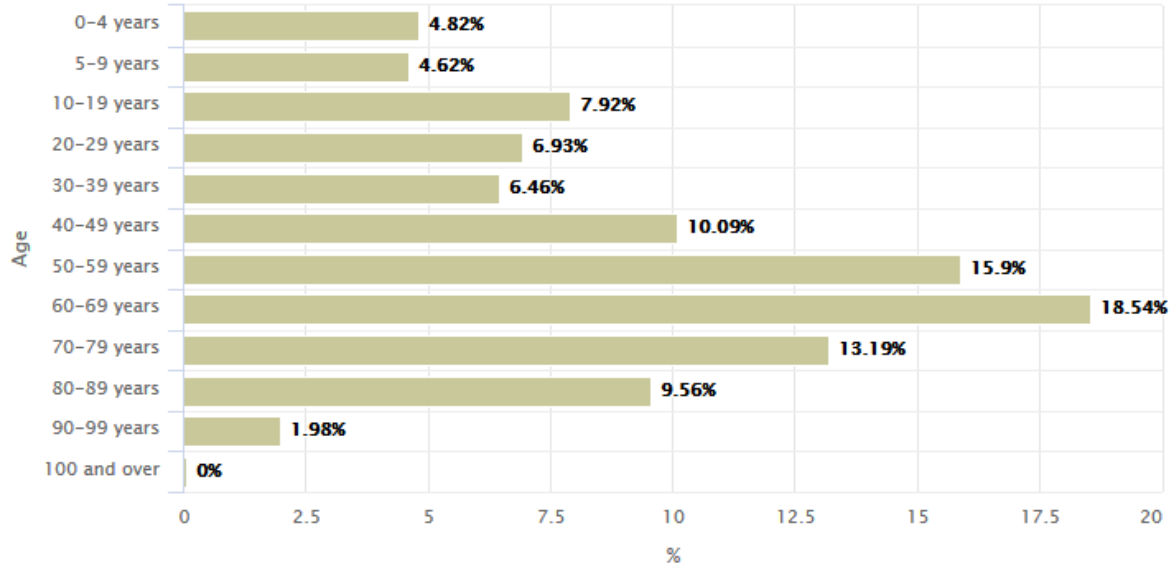


4.1.2 Demography

4.1.2.1 Population

The population of Barham as recorded in the 2016 Census is 1,516 persons. The population is weighted towards older age cohorts with almost two-thirds of the population aged over 50 years

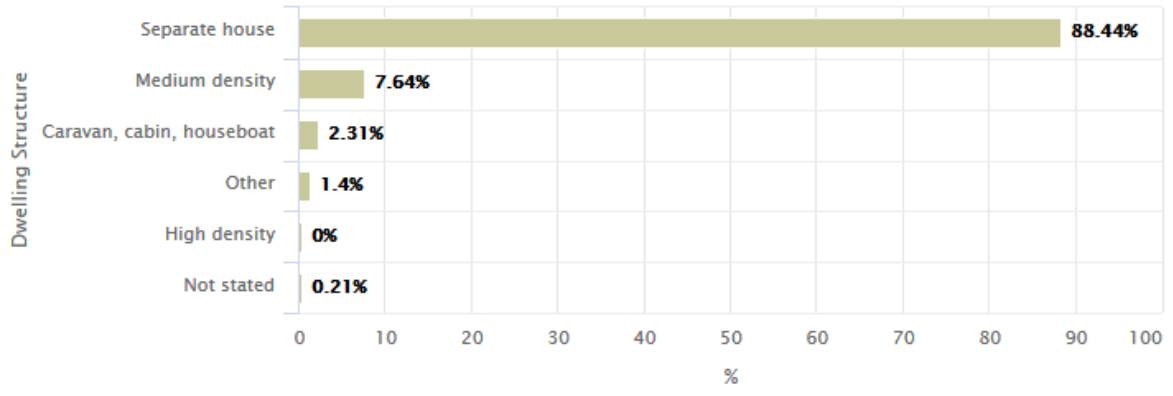
Chart 4.1a: Age distribution, Barham 2016. Source: REMPLAN Community



4.1.2.2 Housing

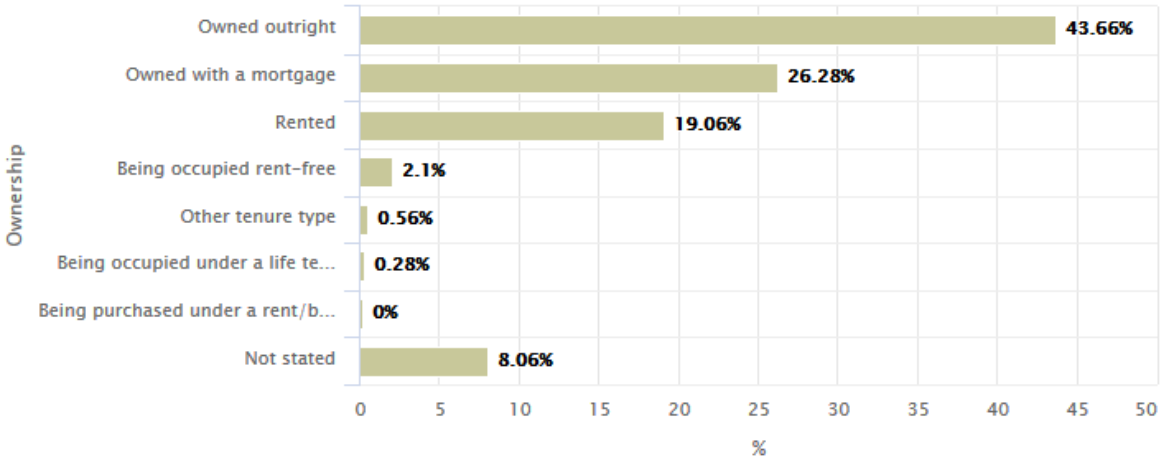
According to the 2016 Census there were 784 private dwellings in Barham in 2016, mostly classed as occupied private dwellings. Non-private dwellings accounted for nearly 8% of all dwellings. The majority of dwellings were separate houses at 88% with about 10% being medium density dwellings and alternative accommodation. The census collection district used by the ABS includes surrounding rural land as well as the township therefore the dwelling count differs from that used in the land availability analysis.

Chart 4.1b: Dwelling structure, Barham 2016. Source: REMPLAN Community



Just under three-quarters of dwellings were owned outright or under mortgage. A relatively high proportion of 19% of dwellings were being rented.

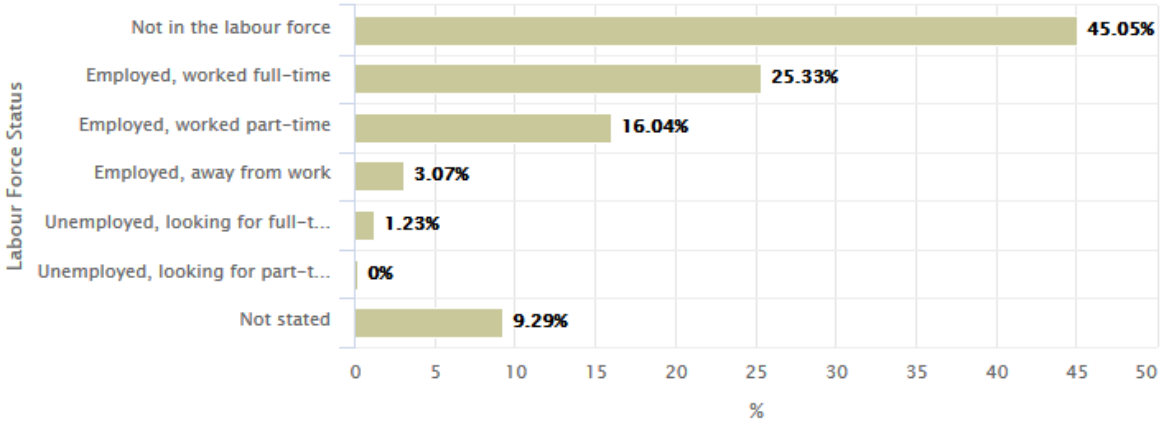
Chart 4.1c: Dwelling tenure, Barham 2016. Source: REMPLAN Community



4.1.2.3 Employment

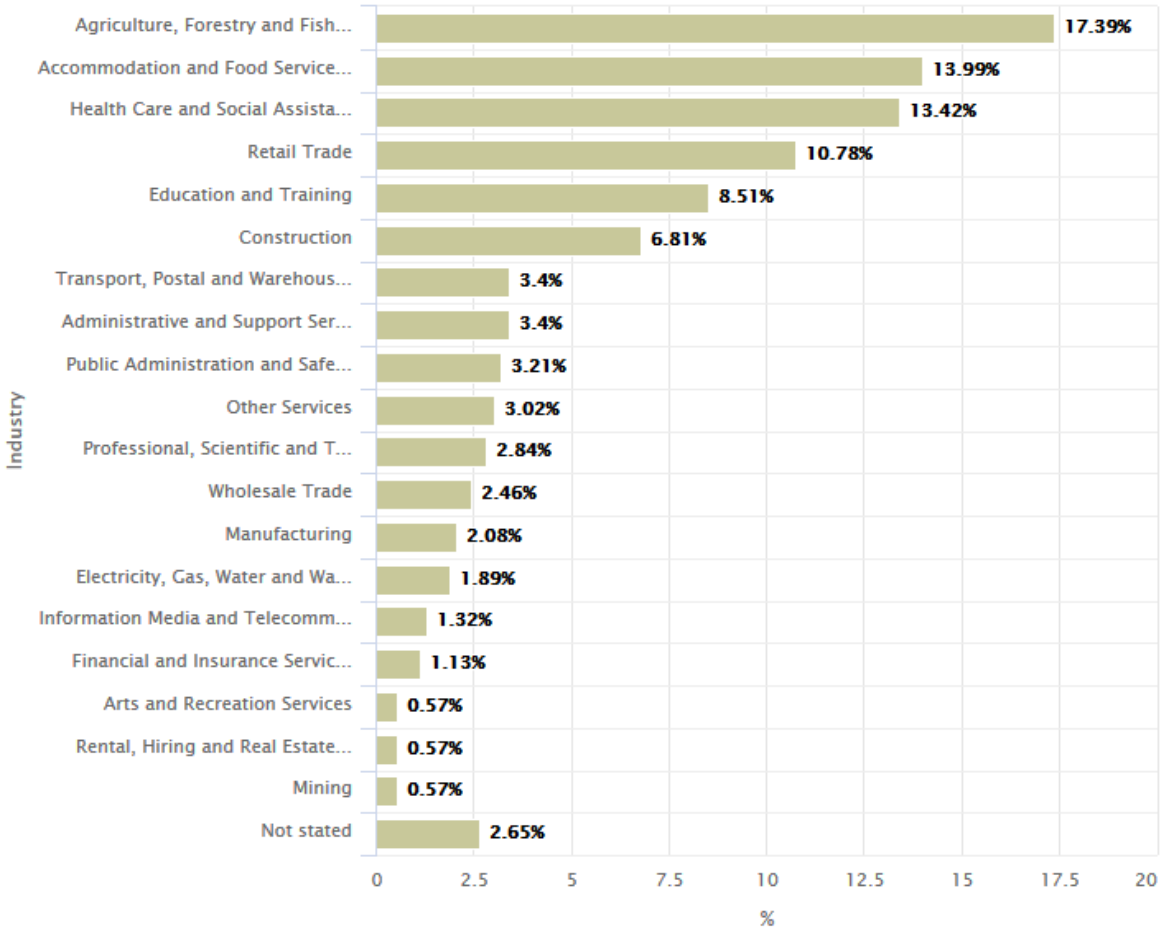
Corresponding with the weighting towards older age cohorts, in 2016 a large percentage of the working age population was not in the workforce (45.1%) and only 25% of the population was employed on a full-time basis. The labour force represents 46% of the population of Barham.

Chart 4.1d: Labour force status in Barham, 2016. Source: REMPLAN Community



The agriculture, forestry and fishing sector was the largest industry of employment at 17.4% of the workforce which is significantly less than for other settlements in Murray River LGA. This was followed by accommodation and food service (14%) and health care and social assistance (13.4%).

Chart 4.1e: Industry of employment in Barham, 2016. Source: REMPLAN Community



4.1.3 Land availability

4.1.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential, commercial and industrial development in Barham issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any change of use to existing buildings. The data for the financial year 2017-18 is up until 19 April 2018.

Table 4.1b: Development approvals in Barham, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Residential	3	9	7	5	11	6	41
Industrial	0	0	0	1	1	0	2
Commercial	0	1	0	1	0	0	2
Total	3	10	7	7	12	6	45

4.1.3.2 Land supply

Residential land

Residential land in Barham is zoned R1 General Residential under Wakool LEP 2013. The status of land zoned R1 as occupied, vacant subdivided land or vacant unsubdivided land is given in the Table 4.1c below. This data has been provided by Council in May 2018.

Lots occupied by an infrastructure item, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

Table 4.1c: Supply of land zoned RU5 in Barham. Source: Murray River Council & SIX Maps

Status	No. of lots
Occupied subdivided lots	625
Vacant subdivided lots	156
Total subdivided lots	781
Potential yield vacant unsubdivided lots	263
Total vacant lots (subdivided and unsubdivided)	419

Subdivided lots in Barham are generally 1,000m^2 in area. An estimate of the potential yield of vacant unsubdivided lots has been made having deducted 25% of total land area for services, easements and any environmental constraints, and dividing by a lot size of 1,000m^2 as follows:

Table 4.1d: Estimated potential yield of vacant land, Barham

Land	Approximate area	Net area (total less 25%)	Potential yield @ a 1,000m^2 lot size
Lot 51 DP 1241363 Cobwell Street	9.5 hectares (95,000m^2)	71,250m^2	71 lots
Lot 69 DP 756508 Cobwell Street	3 hectares (30,000m^2)	22,500m^2	22.5 lots
Lot 127 DP 756508 Gonn Street	1.9 hectares (19,000m^2)	14,250m^2	14 lots
Part Lot 1 DP 32476 Gonn Street	1.7 hectares (17,000m^2)	12,750m^2	13 lots
Lot 122 DP 707774 Punt Road	4.7 hectares (47,000m^2)	35,250m^2	35 lots
Part Lot 22 DP 774787 Punt Road	7.4 hectares (74,000m^2)	55,500m^2	55.5 lots
Part Lot 31 DP 1202636	10.5 hectares (105,000m^2)	78,750m^2	52 lots *
Total			**263 lots**

* a lot size of 1,500m^2 was used to estimate potential future yield based on existing lot sizes.

There is estimated to be a total of 419 vacant subdivided and unsubdivided lots. At an average take-up of 7 allotments per annum there is estimated to be sufficient vacant zoned urban land for 60 years.

As there is no minimum lot size applying to land zoned R1 General Residential in Barham other than recently subdivided land at Riverview Drive where a lot size of 600m^2 applies, there is also the potential for further subdivision of existing vacant subdivided lots and occupied lots where the existing dwelling is positioned to enable subdivision.

Rural residential land

Large areas of land zoned R5 Large Lot Residential are located north of the town centre as well as south and east of the centre. Land that is zoned R5 covers approximately 204 hectares.

Lot sizes for subdivision of land zoned R5 vary from 2,000m^2 to 5,000m^2 in compartments close to the town centre. These areas are currently subdivided into 69 lots, 31 of which are occupied and 38 are vacant. These areas have the capacity to be subdivided further to create an additional 8 lots bringing the total potential vacant lots to 46 lots.

One area just north of town has a minimum lot size of 10 hectares and is occupied by a farmhouse and industrial uses and is at capacity.

Land north of the centre is separated by rural land and has a 5 hectare minimum lot size. This land is close to forestry estate along the Murray River that is mapped as bushfire prone land. This area has been subdivided into 47 lots, 19 of which are occupied and 28 are vacant. There is the capacity to create one more lot in this area bringing the total potential to 29 vacant lots.

In total, there are 75 vacant rural residential lots in Barham comprising 66 existing subdivided lots and 9 potential lots. There are also several small agricultural lots ranging in size from 2.5 hectares to 12 hectares north of Barham, however, these lots are zoned RU1 Primary Production and do not have dwelling entitlements.

Employment land

There is approximately 8.2 hectares of land zoned B2 Local Centre in Barham. Of this two lots at the corner of Moorong and Wakool Streets are vacant accounting for 3,076m^2 of land area. In addition, there is further potential for commercial expansion through the redevelopment of commercial land that remains occupied by residential dwellings.

To the north of the centre of Barham lies land zoned IN1 General Industrial. There is approximately 14.4 hectares of industrial land of which 2.8 hectares across 6 lots remains vacant. There is also 14.3 hectares of land zoned B6 Business Enterprise Corridor located between existing industrial areas. Of this 9.7 hectares across 4 properties remains vacant.

There is adequate zoned business and industrial land to cater for expected demand based on recent take-up of 2 approvals each for business and industrial development over the past 6 years.

4.1.4 Services and capacity

4.1.4.1 Water supply systems

The town of Barham is serviced with a dual water reticulation supply system of potable and raw (untreated) water sourced from the Murray River. The treated system was constructed in 1994 and includes a conventional treatment providing coagulation, flocculation, sedimentation, filtration, activated carbon and chlorination. Activated carbon dosing was implemented on a permanent basis to assist in taste and odour control.

The existing water supply system services a population of approximately 1,516 and with a capacity of 2ML/day has spare capacity. There is capacity for 3.1ML of raw supply.

Council considers a serviced population growth rate of 1.25% p.a. for the purpose of water supply service planning as almost all of the projected population growth is expected to occur in Barham, Murray Downs and Tooleybuc which are already serviced by Council. Planned plant and network upgrades to take place over coming years comprise refurbishment of the water tower, mains replacement or renewal, enlargement of raw water storage capacity and replacement of a raw water pump station and rising main.

4.1.4.2 Sewerage systems

Barham is serviced by a reticulated sewerage system comprising both gravity and rising mains including eight small pump stations and lift pumps that ultimately transfer sewage to the Barham Sewer Treatment Plant. The treatment facility includes trickling filters, effluent storage lagoons, UV treatment and evaporation for disposal. System capacity is approximately 1500 EP (peak of 2400) and current EP served is 1,516. Pressure on the treatment system can occur at different times of the year depending on tourist numbers and temporary workers visiting the area. Planned plant and network upgrades comprise replacement or renewal of sewer mains, staged upgrades to the sewer treatment plan and a pump station, and the installation of a new pump station and rising main.

4.1.4.3 Stormwater drainage

Council's stormwater system within Barham generally consists of kerb and gutter draining to a pit and pipe network or open drainage channel, ultimately directing stormwater runoff to the Murray River. A significant percentage of stormwater is directed to Eagle Creek where it is generally utilised for agricultural purposes. The flat nature of the town means that in some areas collected stormwater must be pumped to the Murray River for discharge. The pump system, along with a range of levees also provides protection against flooding. Barham has areas impacted by short term pumping capacity and Council has a program of upgrading this system to alleviate flood problems.

Currently replacement value for stormwater infrastructure is $15M across Greater Wakool Ward. Budgeting covers about 82% of renewal and there are plans to increase budgeting to 97%. Key risks include

extreme weather which can change the quality and/or performance of infrastructure. A Barham & Moulamein Stormwater Drainage Strategy outlines the future directions for stormwater planning in these townships. Planned plant and network upgrades include installation of trash gates, kerb and guttering, a new drainage outfall and pump, plus maintenance works.

4.1.4.4 Roads and bridges

Thule Street links Barham to Koondrook across the Murray over the Barham-Koondrook Bridge. Ten percent of traffic volumes across the bridge are heavy vehicles. The bridge is listed on the NSW State Heritage Register as an item of state significance and is to be retained for its heritage value. RMS, in partnership with VicRoads, is continuing restoration works on the bridge and works are expected to be completed in late 2018.

Moulamein Road is the main access to the north which links to Moulamein and Wakool to the east via Barham Road. Barham Road and then Perricoota Road is the main connection to the south on the NSW side of the Murray River. A more major connection to the south exists on the Victorian side of the Murray as the Koondrook and Pericoota River Redgum Forests and swamplands cover the eastern side of the Murray in this area.

The Barham-Koondrook Bridge Urban Design Strategy recommends ways to preserve and enhance the heritage and cultural significance of the bridge and surrounds, including separate pedestrian access. Over the past few years Council has planned for and carried out upgrades to the Barham streetscape to improve town centre accessibility, function and visual appeal. This includes implementation of a Pedestrian Accessibility and Mobility Plan to improve pedestrian access throughout urban areas.

4.1.5 Environmental attributes

4.1.5.1 Flooding

A flood study for Barham was completed for Wakool Shire Council in 2014. The Murray River catchment upstream of Barham covers approximately 43,000 km^2. Tributaries that contribute to the catchment are the Mitta Mitta River, Kiewa River, Ovens River, Goulburn River and the Campaspe River, these latter two rivers affecting the extent of flooding at Barham. Diversions of the Murray River to the Edward and Wakool River systems upstream of Barham assist to reduce flood levels at Barham.

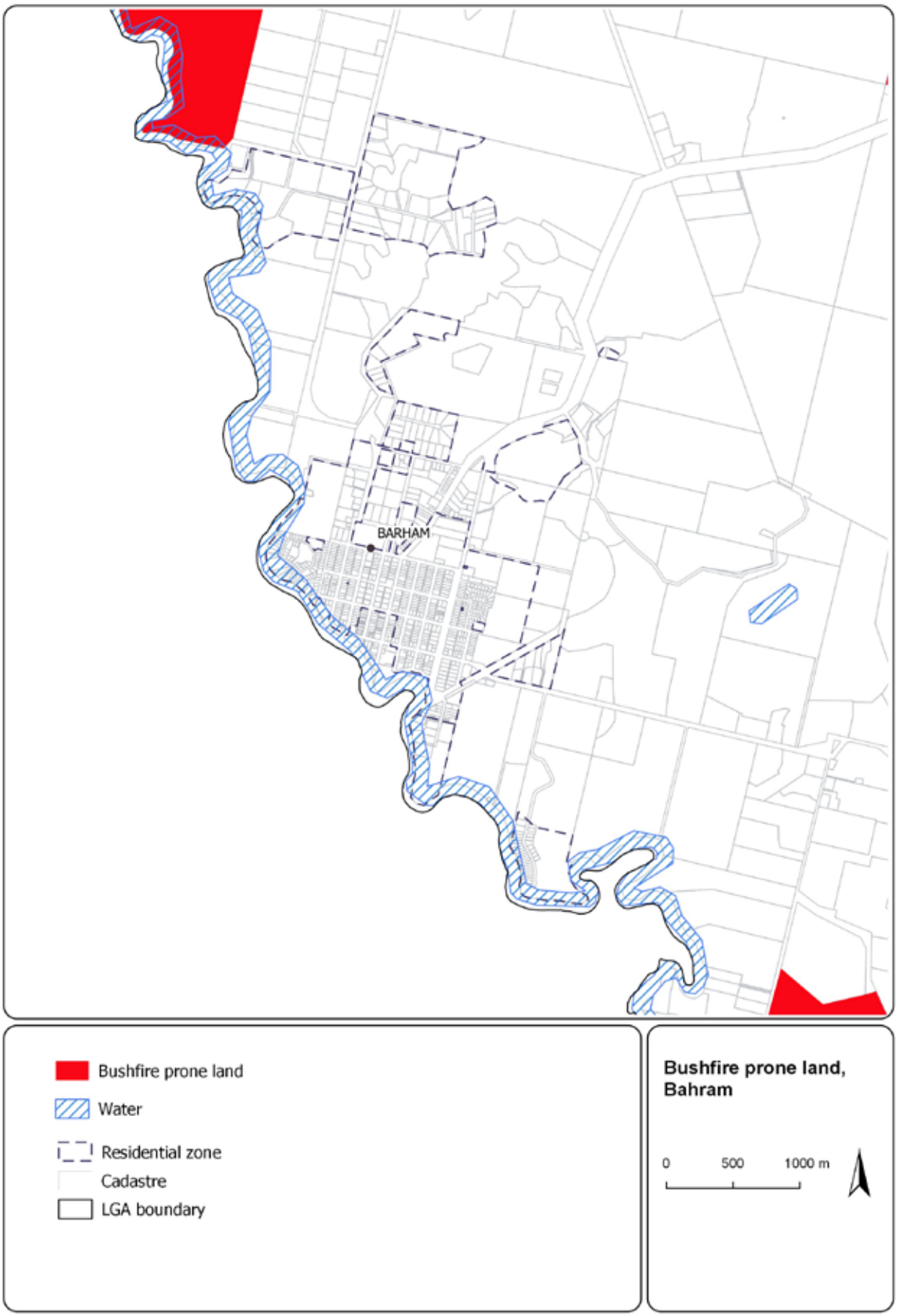
A floodplain risk management study and plan for Barham was completed in January 2017. Key recommendations from the plan are:

- Establish Flood Planning Levels (FPLs) for Barham based on the 100 year ARI and produce mapping to include in the LEP to define the affected area, and
- Undertake a levee audit including geotechnical investigations to determine the structural integrity of the existing levee system and to identify any necessary upgrades.

4.1.5.2 Bushfire

The urban area of Barham is largely unaffected by bushfire threat and is not mapped as bushfire prone. A vegetated area adjacent the Murray River and to the north of existing rural residential development is mapped as bushfire prone.

Figure 4.1c: Bushfire prone land, Barham



4.1.5.3 Biodiversity

Patches of vegetation, generally following the Murray River and tributary watercourses, are mapped on the Terrestrial Biodiversity Map that accompany Wakool LEP 2013. Corresponding areas are also mapped as environmentally sensitive on the Watercourses Map and Wetlands Map. The urban area is generally unconstrained.

Wetlands

Barham is situated close to the banks of the Murray River, however only relatively small areas of wetland habitat occur near the township. Previous development is likely to have impacted on natural wetland sytsems in the locality, e.g. Barham Lakes, now permanently filled, is likely to have comprised an intermittent floodplain wetland prior to being used as a dairy farm and then filled. More extensive wetlands associated with larger active floodplains occur near the northern perimeter of the township, while extensive wetland habitat is present about 3 km to the east in Koondrook Forest.

Vegetation, threatened ecological communities (TEC)

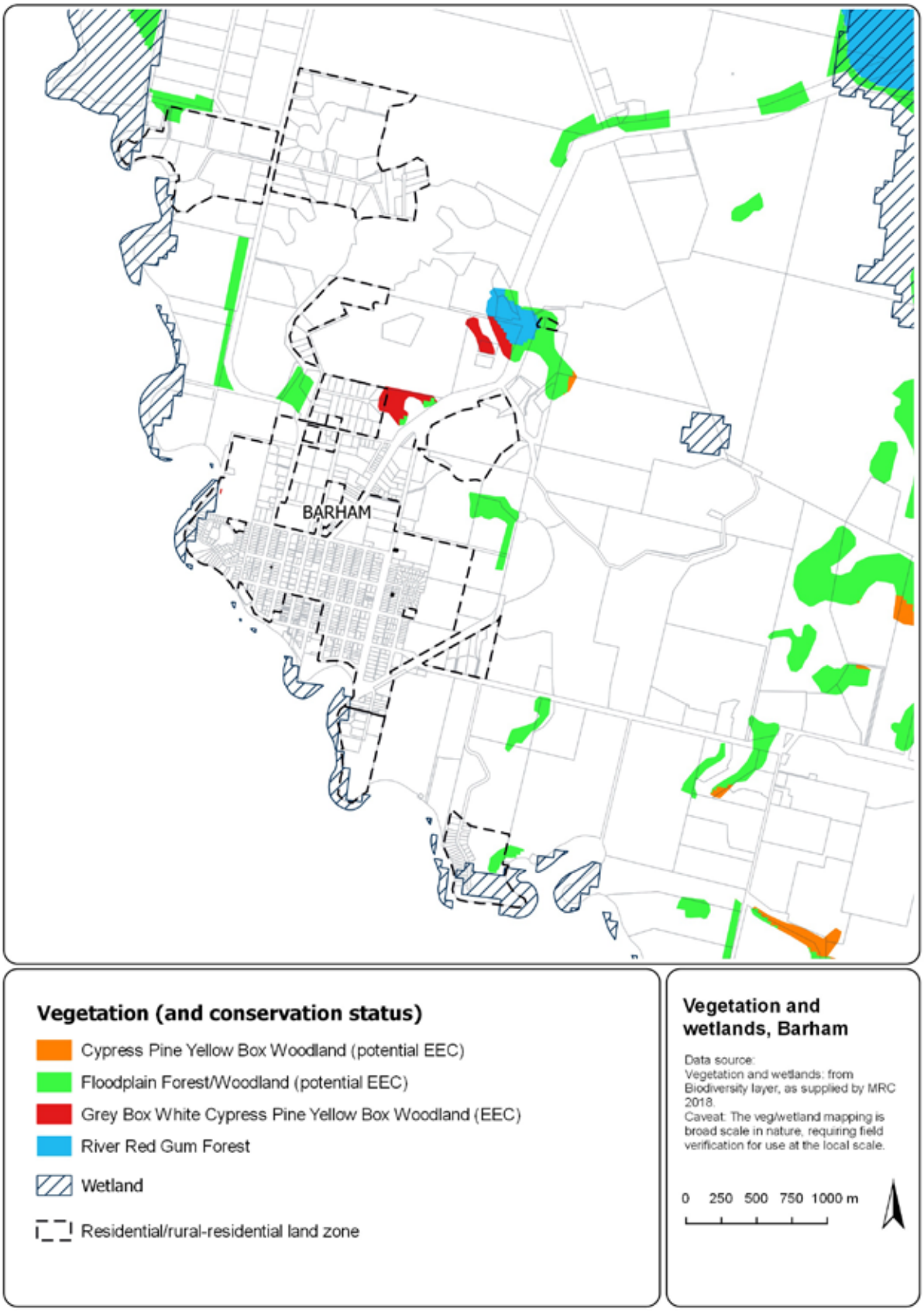
Barham is surrounded by cleared farmland, with only minor and fragmented patches of native vegetation remaining in paddocks, reserves, roadsides and fringing waterways. Some cleared land may comprise derived (native) grassland, e.g. that which has not been cropped extensively.

Other than River Red Gum forest, most of the remnant vegetation communities in the locality are likely to represent TEC. Based on current broad scale mapping and habitat characteristics in the locality, likely TEC include Inland Grey Box Woodland and Sandhill Pine Woodland. Other potential TEC include Myall (Boree) Woodland, Acacia melvillei Shrubland, Acacia loderi Shrublands and Allocasuarina luehmannii (Buloke) Woodland (Table 3.13 lists full names and legal status of these communities). There is potential for derived grassland to be classified as a TEC, where it can be shown that habitat characteristics match those of particular TEC, despite the overstorey having benn cleared. Detailed descriptions are available via: http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

The threatened plant Eucalyptus leucoxylon subsp. pruinosa is known to be scattered around the northern and eastern outskirts of Barham. A small number of threatened fauna records are known from the vicinity, however, these are mobile species and extensive areas of alternative habitat are present in the locality, e.g. along the river and in or near Koondrook Forest.

Figure 4.1d: Vegetation, threatened ecological communities and wetlands



4.2 Koraleigh

4.2.1 Description

4.2.1.1 Location, history and features

Koraleigh is a small hamlet located in the west of Murray River LGA between Murray Downs and Tooleybuc, and across the river from the Victorian settlement of Nyah. Both Koraleigh and Nyah originated as agricultural communities growing grapes and dried fruit in the early 1900s. It remains a settlement providing accommodation for the farming community and is surrounded by orchards and cropping.

Figure 4.2a: Aerial image of Koraleigh. Source: SIX Maps, 2018

4.2.1.2 Role and function

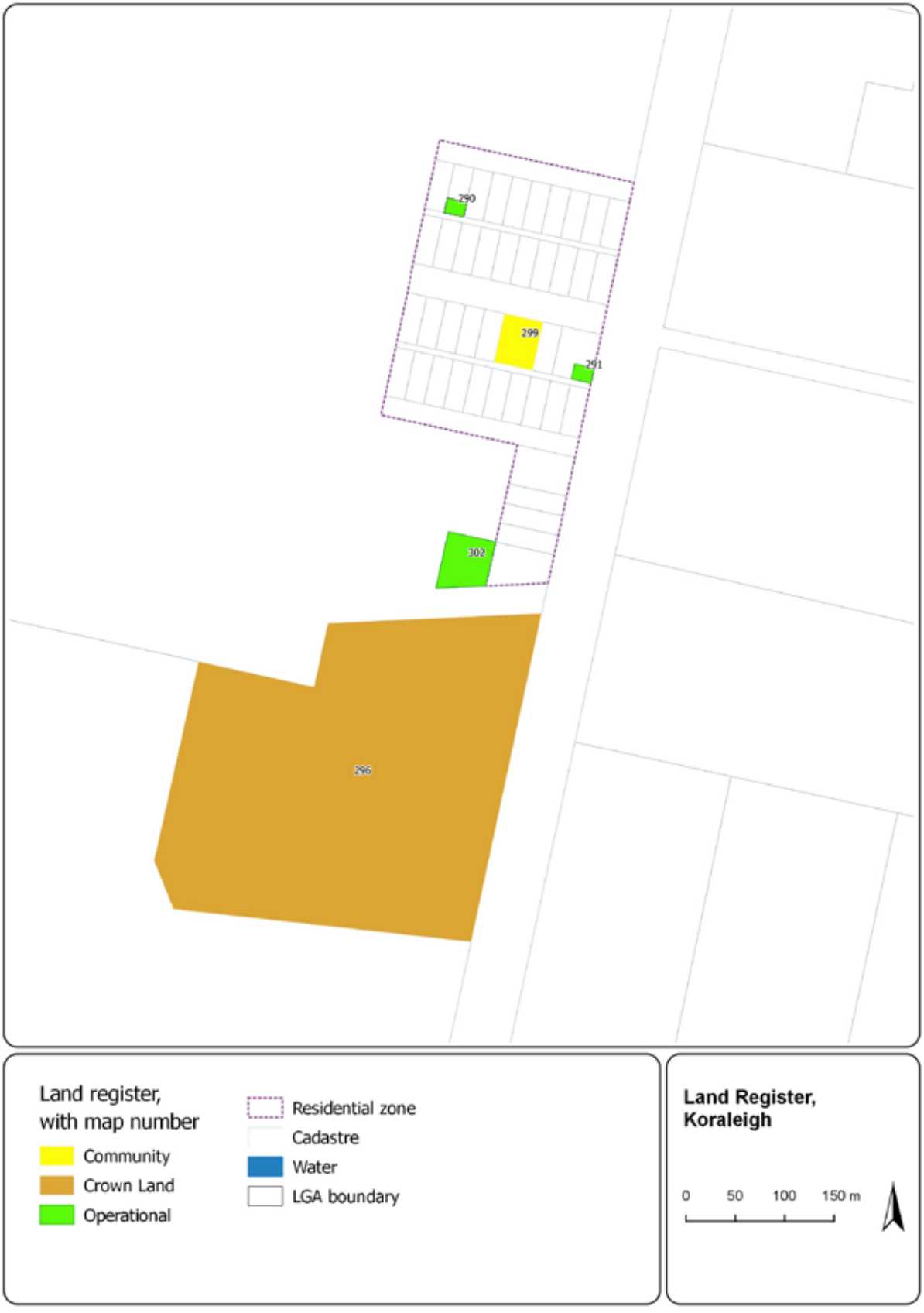
Koraleigh is classified as a hamlet in the Murray River settlement hierarchy. The settlement is zoned RU5 Village under Wakool LEP 2013. Components of the water supply system are zoned SP2 Infrastructure. Koraleigh has a Uniting Church building which is listed as a heritage item in Wakool LEP 2013 and the Koraleigh Hall which was opened in August 1959. There are no commercial or institutional services available and residents travel to Nyah for limited retail facilities.

4.2.1.3 Public land

Public land in Koraleigh is shown in Figure 4.2b as community, operational and crown land. The corresponding descriptions are given in Table 4.2a below.

Map No.	Land Use	Map No.	Land Use
290	Water	299	General
291	Fire Shed	302	Water
296	Recreation Reserve		

Figure 4.2b: Public land register, Koraleigh

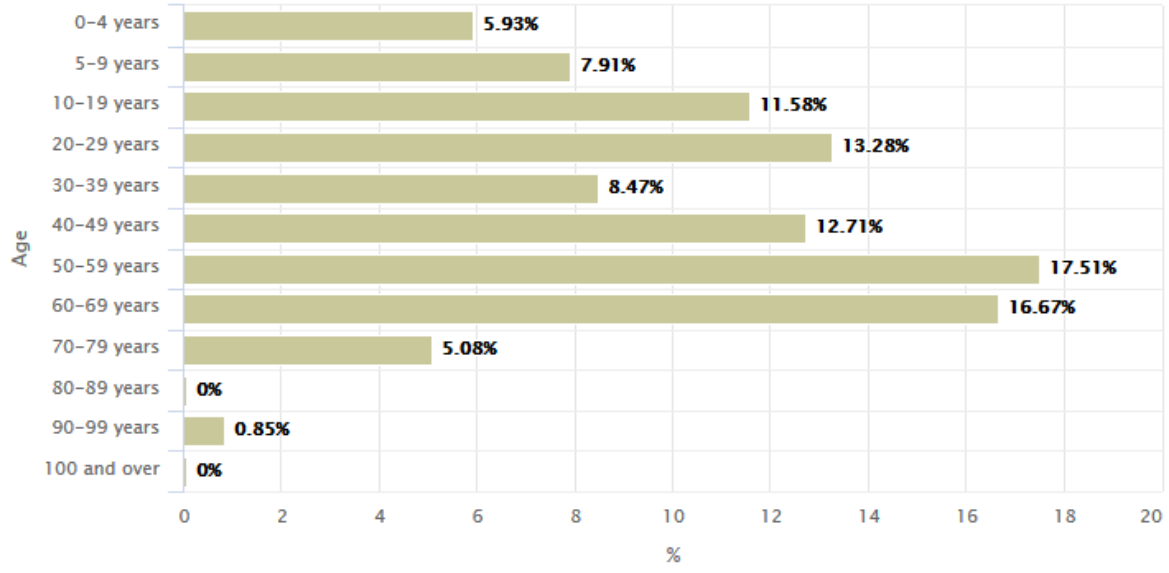


4.2.2 Demographics

4.2.2.1 Population

The population of Koraleigh recorded in the 2016 Census is 354 persons. Over half of these residents are in the working age group of 20 to 60 years. The age distribution is roughly evenly spread across age cohorts with a weighting towards the 50 to 70 years bracket.

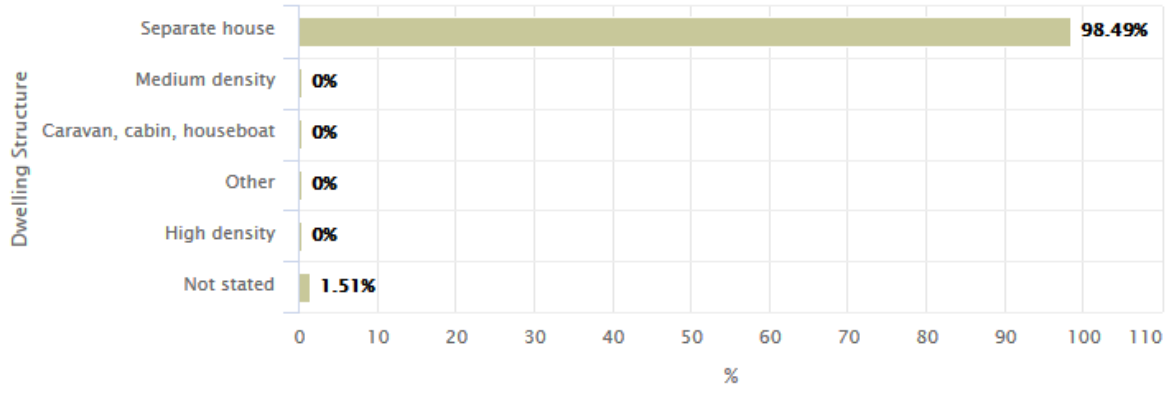
Chart 4.2a: Age distribution, Koraleigh 2016. Source: REMPLAN Community



4.2.2.2 Housing

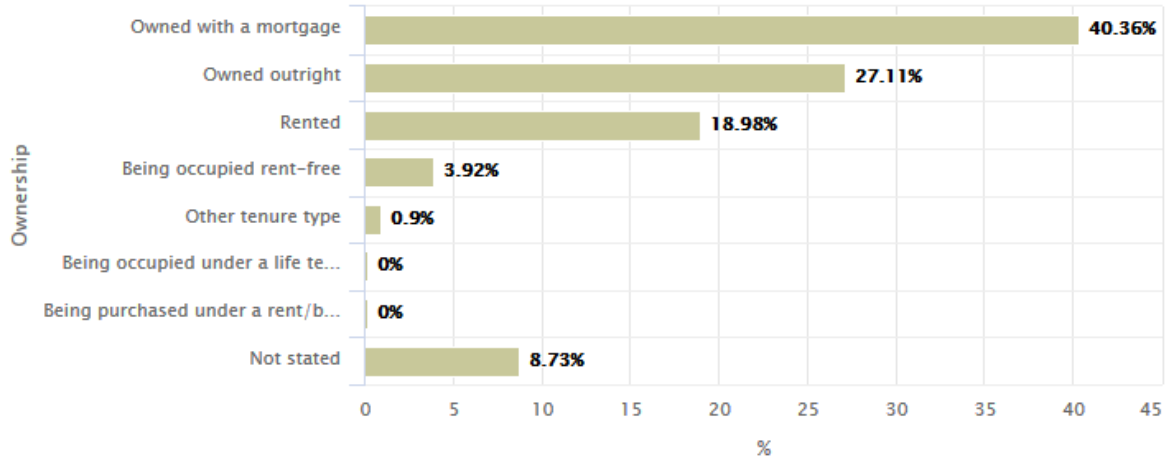
According to the 2016 Census, there are 134 private dwellings in Koraleigh noting that the ABS census collection district includes surrounding rural areas. The hamlet is a very low density environment with all dwellings being separate houses and privately occupied.

Chart 4.2b: Dwelling structure, Koraleigh 2016. Source: REMPLAN Community



The settlement exhibits a high degree of home ownership with two-thirds of these dwellings either owned outright or under mortgage. A reasonable proportion (19%) of dwellings are rented.

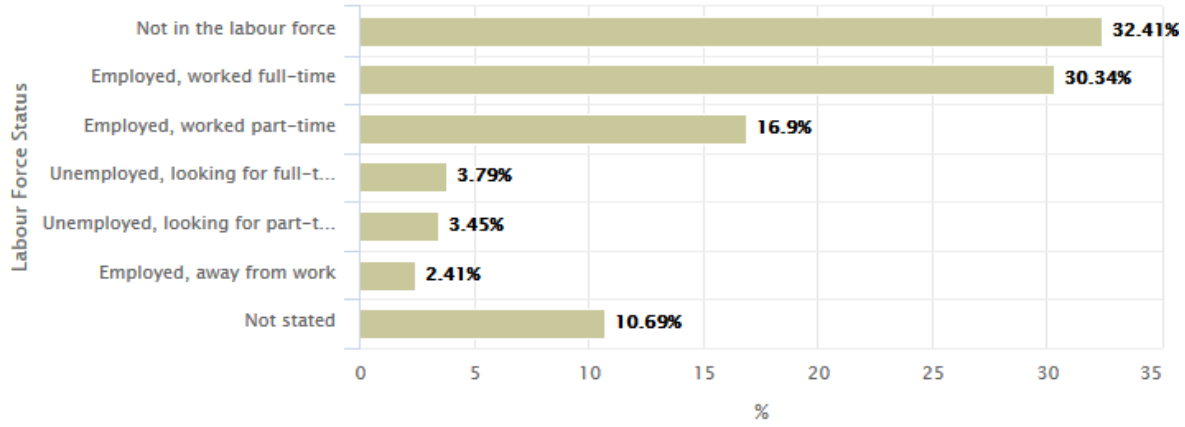
Chart 4.2c: Dwelling tenure, Koraleigh 2016. Source: REMPLAN Community



4.2.2.3 Employment

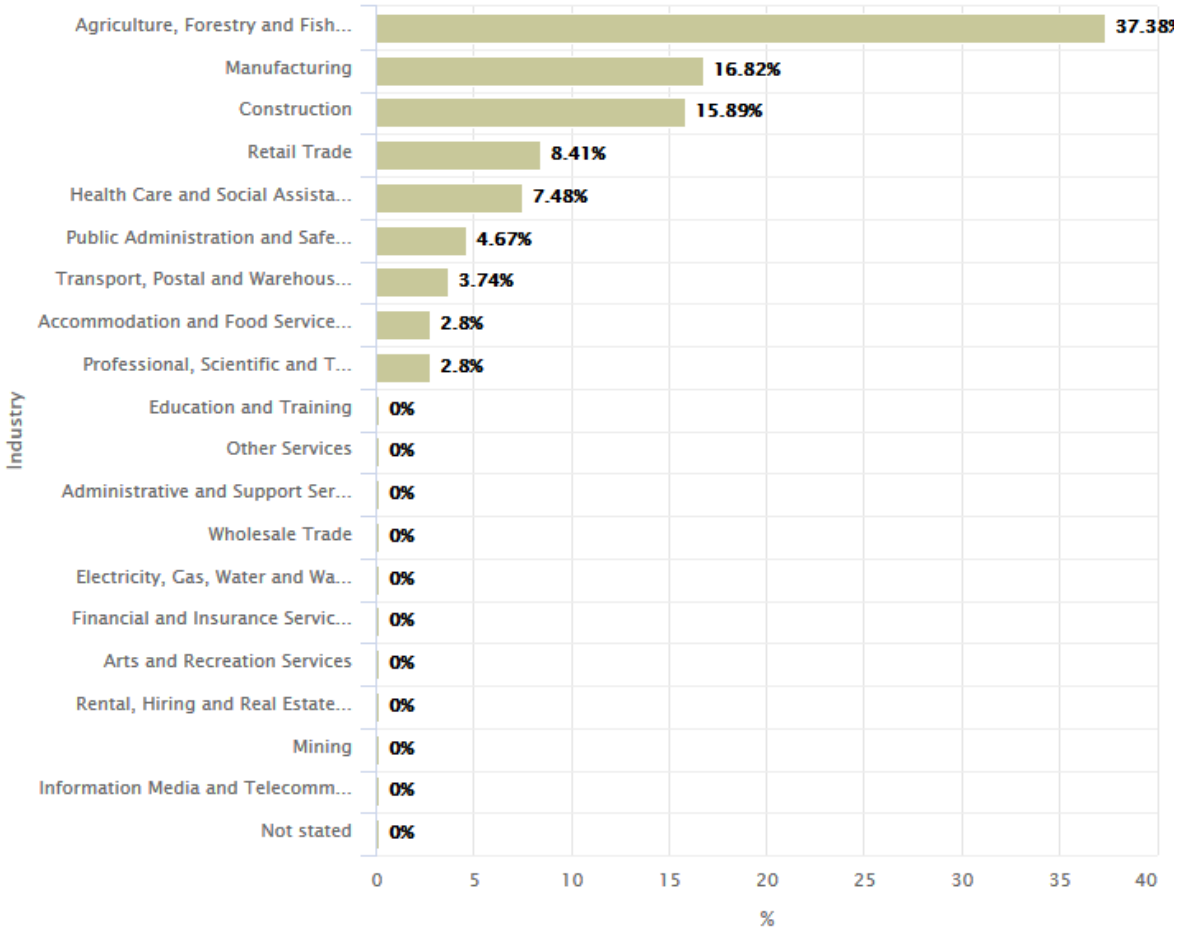
One-third of the residents of Koraleigh are not employed or actively seeking work and one-third of the population is employed full time. The labour force represents 57% of the community.

Chart 4.2d: Labour force status, Koraleigh 2016. Source: REMPLAN Community



Agriculture, forestry and fishing is the largest industry and employs 37.4% of the labour force. This is followed by manufacturing (16.8%) and construction (15.9%).

Chart 4.2e: Industry of employment, Koraleigh 2016. Source: REMPLAN Community



4.2.3 Land availability

4.2.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential, commercial and industrial development in Koraleigh issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any change of use to existing buildings. The data for the financial year 2017-18 is up until 19 April 2018.

Table 4.2b: Development approvals in Koraleigh, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Residential	0	1	1	0	0	0	2
Industrial	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0
Total	0	1	1	0	0	0	2

4.2.3.2 Land supply

Urban land in Koraleigh is zoned RU5 Village under Wakool LEP 2013. Residential, commercial and industrial development is permitted in zone RU5. The status of land zoned RU5 as occupied, vacant subdivided land or vacant unsubdivided land is given in the table below.

Lots occupied by an infrastructure item, a commercial or industrial use, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

This data has been sourced from the NSW Government's SIX Maps imagery dated 2013. All development approvals since 2012-13 have been factored into the land supply analysis as occupied lots.

Table 4.2c: Supply of land zoned RU5 in Koraleigh

Status	No. of lots
Occupied subdivided lots	31 lots
Vacant lots with approvals	2 lots
Vacant subdivided lots	10 lots
Total subdivided lots	43 lots
Potential yield vacant unsubdivided lots	0 lots
Total vacant lots (subdivided and unsubdivided)	10 lots

Lots in Koraleigh are mostly 1,000m^2 with two larger lots of about 2,500m^2 in area and a single lot of 300m^2. A minimum lot size of 2,500m^2 applies to land zoned RU5 in Koraleigh, therefore, there are no opportunities for further subdivision within the current boundaries of the settlement.

There is estimated to be a total of 10 vacant subdivided lots. At an average take-up of 1 allotment every three years and assuming that this measure of demand continues, there is estimated to be sufficient vacant zoned urban land for thirty years.

4.2.4 Services and capacity

4.2.4.1 Water supply systems

The town of Koraleigh is serviced with a water reticulation supply system of potable water sourced from the Murray River. The Koraleigh water supply system was completed in 2003 and includes a treatment plant using ultra-filtration, activated carbon and chlorination.

The existing water supply system has a capacity of 0.1ML/day. It is at capacity now and upgrades to the current water treatment plant and/or additional storage reservoirs are required. Currently, residents rely in part on rainwater capture for potable water. Council has allocated funds to replace the membrane of the storage dam in 2019.

4.2.4.2 Sewerage systems

Koraleigh has no centralised sewage system. All domestic sewage is managed on-site. Council undertakes regular inspections to assess health and environmental risk and to ensure correct operation.

4.2.4.3 Stormwater drainage

Koraleigh is a small township with limited stormwater infrastructure. The main road has some kerb and gutter with runoff in the remaining streets emptying to informal table drains adjacent to the road pavement. No works are proposed to upgrade stormwater assets, or to extend kerb and guttering.

4.2.4.4 Roads and bridges

The Koraleigh township is located on the eastern side of the Murray River, to the north of Speewa Road which crosses the Murray River to the township of Nyah. A two-lane, lift span bridge provides the connection across the River. No upgrades or maintenance are currently proposed.

4.2.5 Environmental attributes

4.2.5.1 Flooding

There is limited detailed flood information available for the township of Koraleigh. The proximity of the township to the Murry River and its low-lying nature would suggest that the township and/or surrounds are

flood affected in some way. Further investigations are required to determine flood planning levels through Koraleigh if expansion is proposed.

4.2.5.2 Bushfire

The hamlet of Koraleigh and surrounding managed farm land are not mapped as being bushfire prone.

4.2.5.3 Biodiversity

Wetlands

Koraleigh is situated about 1.5 kilometres east of the Murray River on a slight rise above the active floodplain. Floodplain wetlands extend out from the river for a few hundred metres towards the township and a minor watercourse/floodrunner is situated about 300 metres west of the township. Croping is the major land use on these floodplains.

Koraleigh is not mapped as being environmentally sensitive on either the Terrestrial Biodiversity Map, the Wetlands Map or the Watercourse Map of Wakool LEP 2013. A large wetland and corresponding watercourse and riparian vegetation located about 2.5 kilometres to the east of the settlement is mapped as environmentally sensitive.

Vegetation, threatened ecological communities (TEC)

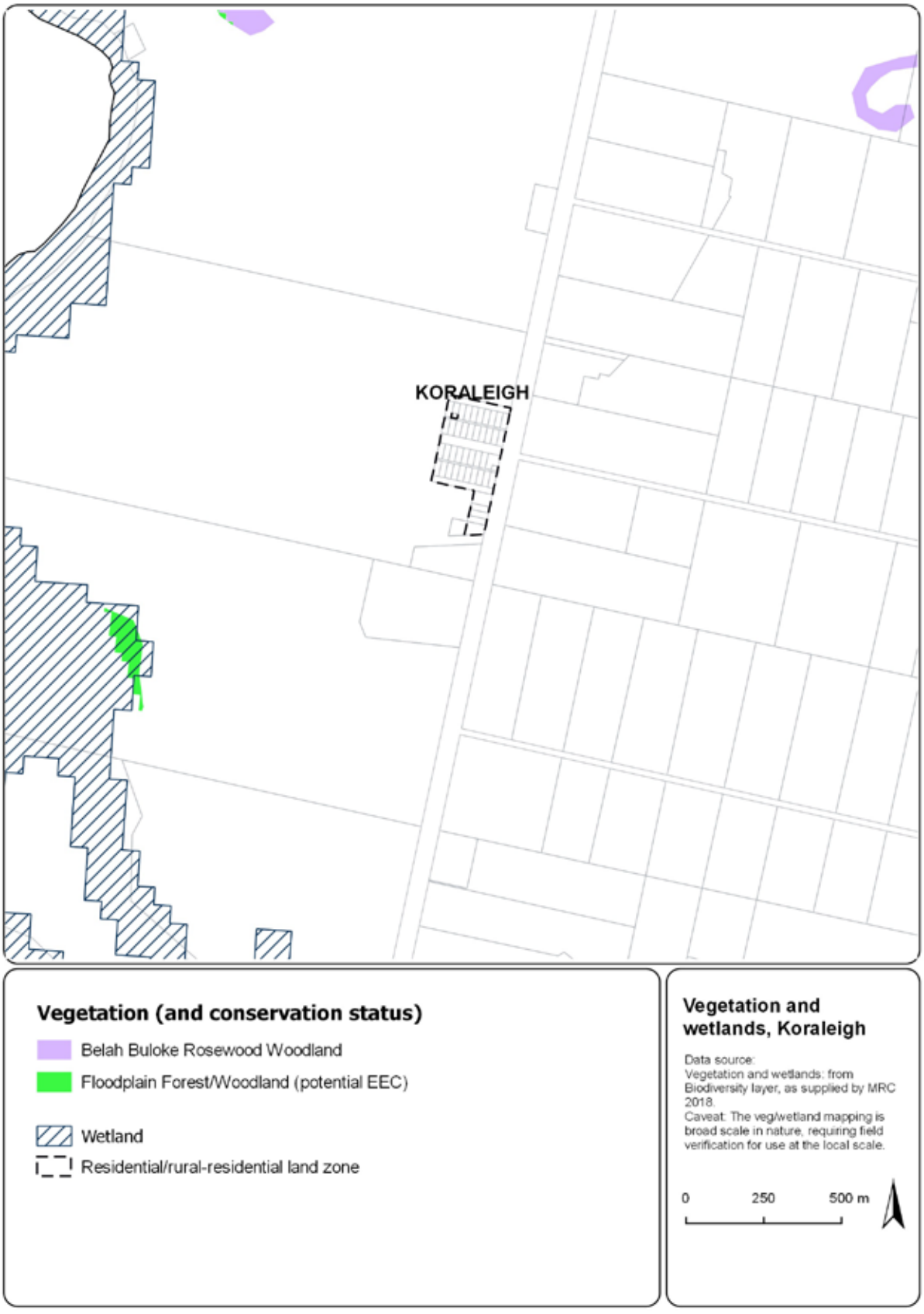
Koraleigh is surrounded by cleared farmland, with only minor and fragmented patches of native vegetation remaining in paddocks, reserves, roadsides and fringing waterways as shown in Figure 4.2c below. Only minor areas of cleared land are likely to comprise derived (native) grassland.

Other than River Red Gum forest, most remnant vegetation communities in the locality are likely to represent a TEC. Based on current broad scale mapping and habitat characteristics in the locality, TEC's may include Myall (Boree) Woodland, Sandhill Pine Woodland, Acacia melvillei Shrubland, Acacia loderi Shrublands and Allocasuarina luehmannii (Buloke) Woodland (Table 3.13 lists full names and legal status of these communities). These TEC's may be represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Detailed descriptions are available via: http://www.environment.nsw.gov.au/threatenedspeciesapp/

Threatened and migratory species

No threatened plant species are known form the vicinity (OEH 2018). A koala population was recorded in 2006, about 1 kilometre north-west of Koraleigh, which is isolated from eastern populations near Barham by over 60 kilometres. A number of migratory bird species and one threatened frog species are known from within the wetland habitat in the locality, especially the intermittent lakes to the east.

Figure 4.2c: Vegetation and wetlands, Koraleigh



4.3 Mathoura

4.3.1 Description

4.3.1.1 Location, history and features

Mathoura is located 40 kilometres north of Moama and is approximately half-way between Moama and Deniliquin on the Cobb Highway. It is located along the Cadell Fault which is a ridge running north-south formed by an upward thrust of land due to seismic activity. East of the township stands more than 70,000 hectares of continuous red gum forest which includes the Barmah-Millewa Wetlands which are of international significance. The forest is protected as the Murray Valley National and Regional Parks, and the Barmah National Park which is located on the southern Victorian side of the Murray River.

The area was first settled by Europeans in 1842 by a squatter named Peter Stuckey who claimed a run that he called Mathoura. In 1853 a shanty pub that was on the banks of Gulpa Creek was rebuilt and named the Redbank Inn. The inn was frequented by Cobb and Co and had accommodation, a store, market garden, fruit trees and vineyard.

The township was surveyed in 1858 and named Mathoura after the pastoral run in which it was located. In the 1860s timber cutters arrived and began harvesting river red gum. The construction of the Deniliquin and Moama rail line in 1876 provided access to markets and timber was freighted and distributed nationally and internationally for more than a century.

Much heritage remains in Mathoura with 19 buildings comprising residences, shops, churches and hotels listed as locally significant heritage in Murray LEP 2011.

Figure 4.3a: Aerial image of Mathoura. Source: SIX Maps, 2018

4.3.1.2 Role and function

Mathoura is classified as a village in the Murray River settlement hierarchy. Mathoura is a service centre for surrounding rural areas and a launch area for visitors exploring nearby national parks and natural areas. The settlement is zoned RU5 Village under Murray LEP 2011 with surrounding rural residential compartments that are zoned R5 Large Lot Residential. Non-urban land to the east is zoned E3 Environmental Management and the Murray Valley National and Regional Park is zoned E1 National Parks and Nature Reserves. The rail line and Cobb Highway which run parallel north-south through Mathoura are zoned SP2 Infrastructure.

A range of commercial and institutional services are offered in Mathoura. These include Council offices, a police station, a combined business centre and visitor information centre, a motel, service station, two hotels, bed & breakfast, twelve retail outlets including a general store, newsagency, real estate agents, pharmacy, butcher,

hairdresser, milk bar and a bric-a-brac store. At the time of surveying in November 2017 there were two vacant retail premises.

There is also a sports field with netball courts, child care centre, church, primary school, post office, bowling club and skatepark.

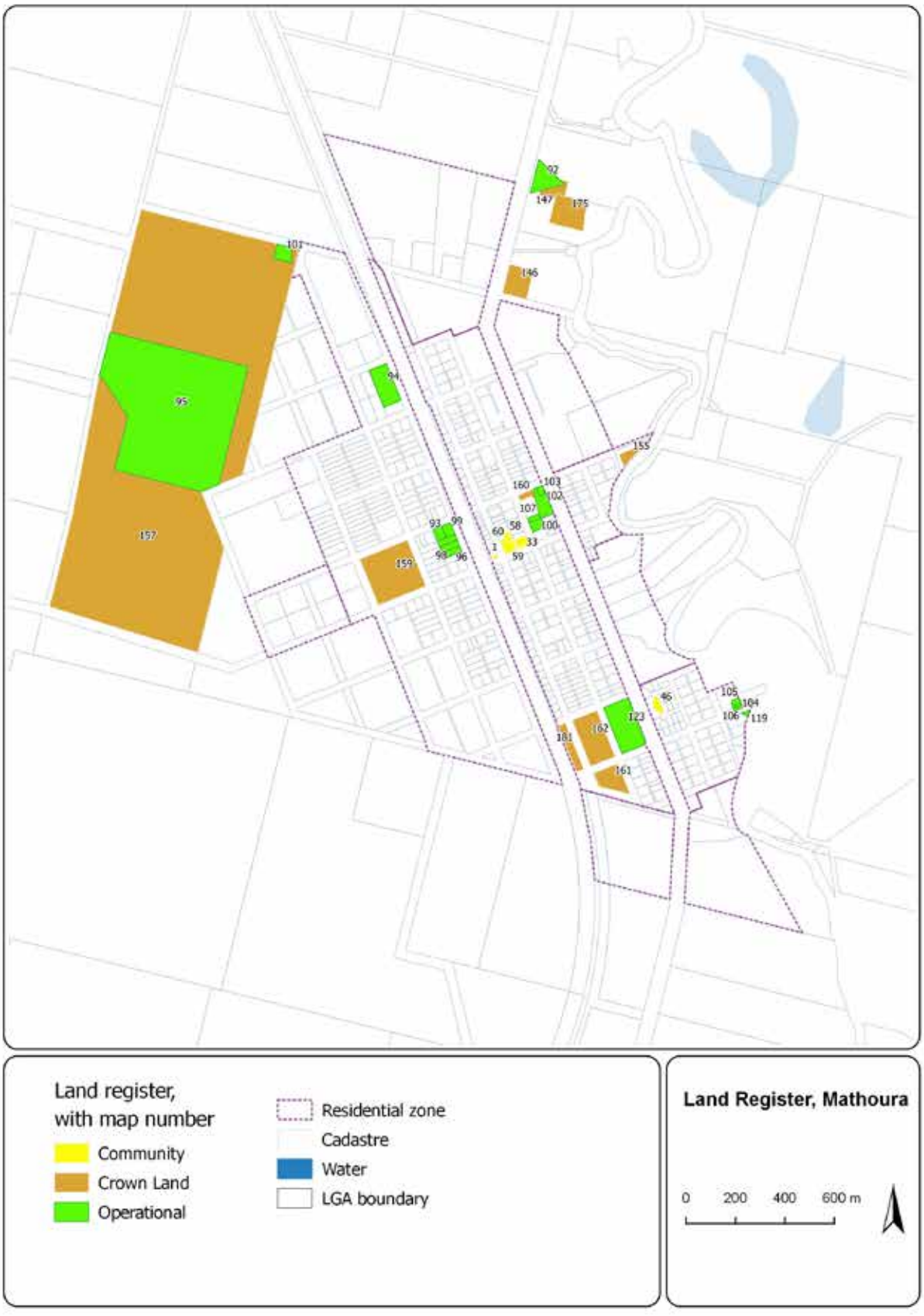
4.3.1.3 Public land

Public land in Mathoura is shown in Figure 4.3b as community, operational and crown land. The corresponding descriptions are given in Table 4.3a below.

Table 4.3a: Public land register, Mathoura

Map No.	Land Use	Map No.	Land Use
106	Water Filtration Plant	92	Communications Tower
93	RFS Shed	100	Recreation
94	RTA yard	59	Soldier's Memorial Gardens
104	Water Filtration Plant	33	Community Centre
105	Water Filtration Plant	60	Soldier's Memorial Gardens
98	Shire Depot	1	Parkland
96	Shire Depot	46	Park
99	Shire Offices & Gardens	58	Soldier's Memorial Gardens
97	Shire Depot	175	Closed Landfill Station
95	Sewerage Treatment Plant	157	Common, Cemetery, Gravel Pit
101	Transfer Station	181	Residential Subdivision
103	Mathoura Visitor and Busines Centre	159	Mathoura Recreation Reserve
102	Mathoura Visitor and Busines Centre	155	Liston Caravan Park
123	Residential Subdivision	161	Crown Reserve
119	Road Reserve	162	Crown Reserve
107	Water Tower	146	Natural Area
147	Crown	160	Skate Park

Figure 4.3b: Public land register, Mathoura

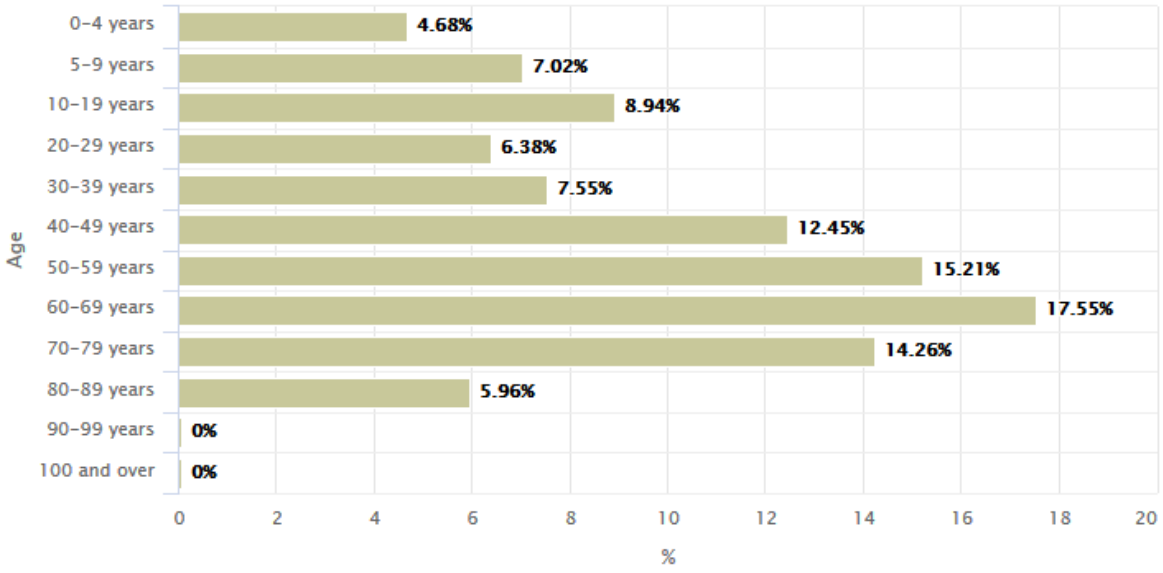


4.3.2 Demography

4.3.2.1 Population

The population of Mathoura as recorded in the 2016 Census is 940 persons. The population is roughly evenly spread across age cohorts with a weighting towards those aged 50 years and over at about half of the population.

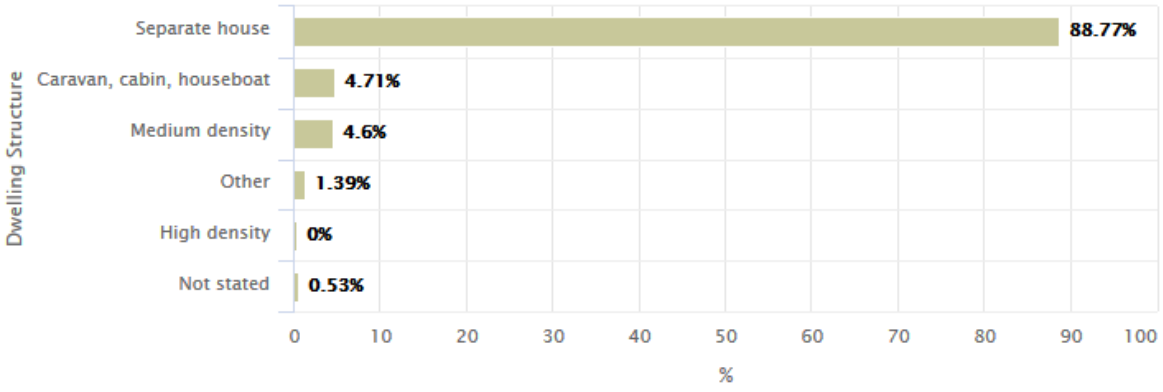
Chart 4.3a: Age distribution, Mathoura 2016. Source: REMPLAN Community



4.3.2.2 Housing

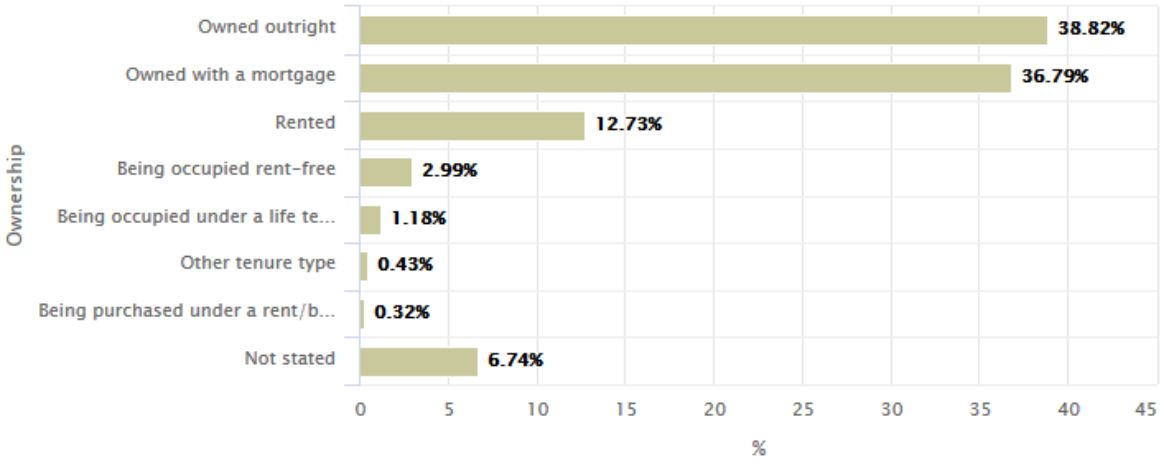
According to the 2016 Census there were 473 private dwellings in Mathoura in 2016, all classed as occupied private dwellings. The majority of these were separate houses at almost 90% with a small proportion of medium density dwellings and alternative accommodation. The census collection district used by the ABS includes surrounding rural land as well as the township therefore the dwelling count differs from that used in the land availability analysis.

*Chart 4.3b: Dwelling structure, Mathoura 2016. S*ource: REMPLAN Community



Over one-third of dwellings were owned outright and one-third were owned under a mortgage. A relatively small proportion were being rented.

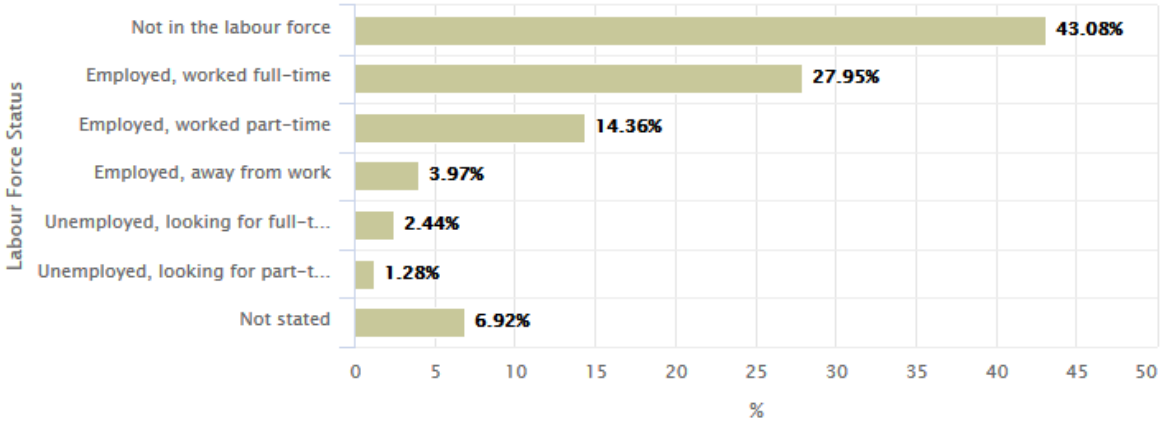
Chart 4.3c: Dwelling tenure, Mathoura 2016. Source: REMPLAN Community



4.3.2.3 Employment

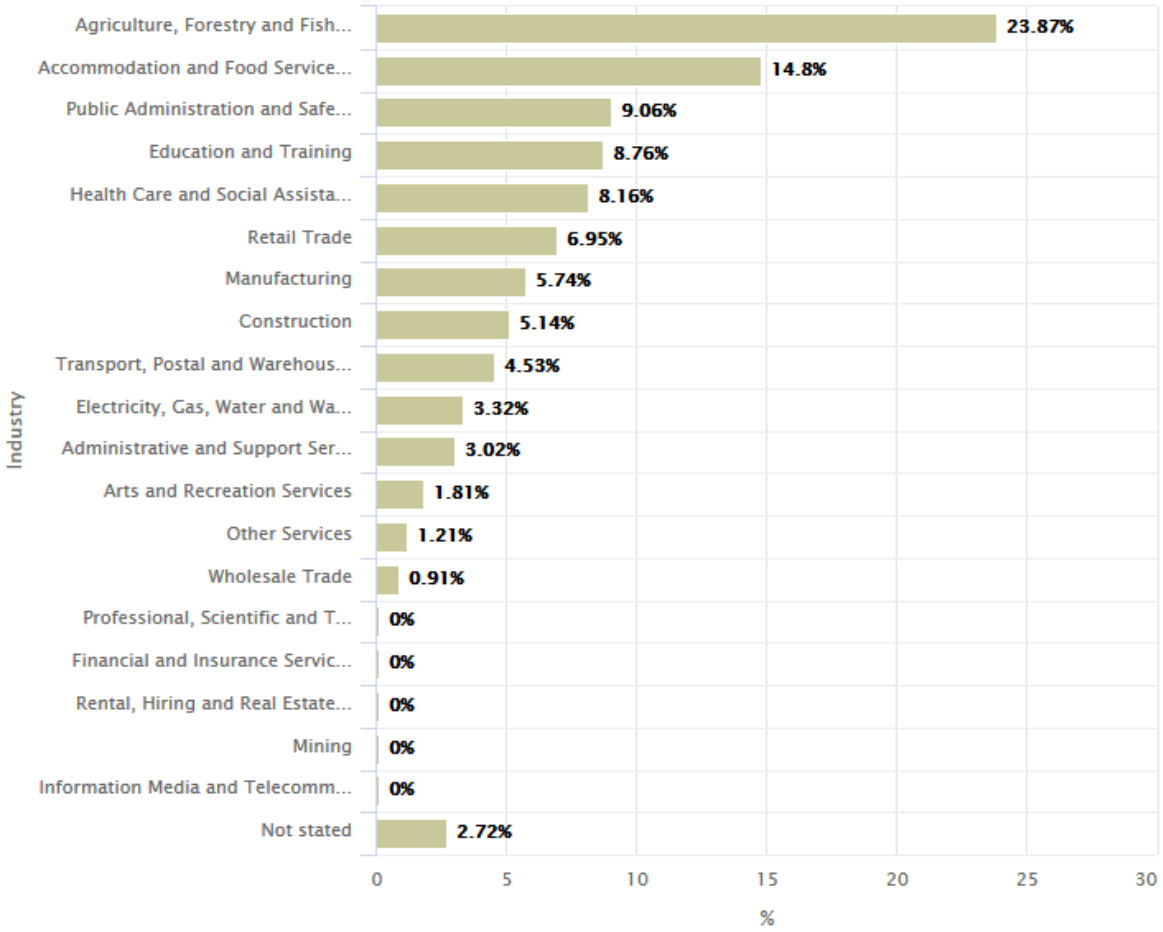
Corresponding with the weighting towards older age cohorts, in 2016 a large percentage of the working age population were not in the workforce (43.1%) and only 28% of the population was employed on a full-time basis. The labour force represents 50% of the population of Mathoura.

Chart 4.3d: Labour force status in Mathoura, 2016. Source: REMPLAN Community



The agriculture, forestry and fishing sector was the largest industry of employment at 23.9% of the workforce followed by accommodation and food service (14.8%) and public administration and safety (9.1%).

Chart 4.3e: Industry of employment in Mathoura, 2016. Source: REMPLAN Community



4.3.3 Land availability

4.3.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential development in Mathoura issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any change of use to existing buildings. The data for the financial year 2017-18 is up until 25 May 2018.

Table 4.3b: Development approvals in Mathoura, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Residential (zone RU5 Village)	1	2	3	0	2	2	10
Rural residential (zone R5 Large Lot Residential)	1	0	0	0	0	0	1
Commercial	0	0	0	0	0	0	0
Industrial	0	0	1	0	0	0	1
Total approvals	2	2	4		2	2	12

4.3.3.2 Land supply

Land zoned RU5 Village

Urban land in Mathoura is zoned RU5 Village under Murray LEP 2011. Residential, commercial and industrial development is permitted in zone RU5. The status of land zoned RU5 as occupied, vacant subdivided land or vacant unsubdivided land is given in the table below.

Lots occupied by an infrastructure item, a commercial or industrial use, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

This data has been sourced from the NSW Government's SIX Maps imagery dated 2009. All development approvals since 2012-13 have been factored into the land supply analysis as occupied lots.

Table 4.3c: Supply of land zoned RU5 in Mathoura

Status	No. of lots
Occupied subdivided lots	378
Vacant lots with approvals	10
Vacant subdivided lots	64
Total subdivided lots	452
Potential yield vacant unsubdivided lots	60
Total vacant lots (subdivided and unsubdivided)	124

Subdivided lots in Mathoura are of varying sizes. East of the Cobb Highway lots are generally either 1,000m^2 or 1,500m^2 in area. Small lots exist along the highway of 960m^2 area. West of the Cobb Highway lots tend to be 2,000m^2 in area. An estimate of the potential yield of vacant unsubdivided lots without deducted 25% of total land area for services and constraints. Large unsubdivided lots are able to be subdivided in Mathoura using the existing grid pattern and access roads. Potential lot yields of vacant unsubdivided lots are estimated by dividing by a lot size that is typical of the immediate surrounding area to retain local character as follows:

Table 4.3d: Estimated potential yield of vacant land, Mathoura

Land	Approximate area	Net area (total less 25%)	Potential yield @ a 2,000m^2 lot size
Lot 202 DP 821010 Frome Street	6,425m^2	4,819m^2	2
Lot 2 DP 610203 Forest Street	10,000m^2	7,500m^2	4
Lot 6 DP 751151 Forest Street	10,000m^2	7,500m^2	4 lots
Lot 8 DP 751151 Forest Street	10,000m^2	7,500m^2	4 lots
Lot 7300 DP 1134858 Forest Street	14ha (140,000m^2)	105,000m^2	52 lots
Total			**60 lots**

There is estimated to be a total of 124 vacant subdivided and unsubdivided lots. At an average take-up of 1.7 allotments per annum there is estimated to be sufficient vacant zoned urban land for many years.

As there is no minimum lot size applying to land zoned RU5 Village in Mathoura, there is also the potential for further subdivision of existing vacant subdivided lots and occupied lots where the existing dwelling is positioned to enable subdivision.

Land zoned R5 Large Lot Residential

There is land zoned R5 Large Lot Residential to the east and a small area to the west of Mathoura but that land is yet to be subdivided for rural living. A minimum lot size of 4,000m^2 applies to the subdivision of land

zoned R5 Large Lot Residential in Mathoura. There is approximately 94.5 hectares zoned R5 and this land was occupied by 18 dwellings including the one approval for a rural residential dwelling issued in 2012-13.

Deducting 10% of land for services and excluding lots that are less than 8,000m^2 or are constrained and not able to be subdivided gives a developable area of 83.5 hectares. The potential lot yield at a lot size of 4,000m^2 is 209 lots. Given the single approval issued for a rural residential dwelling the supply of land zoned R5 is adequate.

4.3.4 Services and capacity

4.3.4.1 Water supply systems

Mathoura is provided with a water treatment plant, located in the south of the village, adjacent to Gulpa Creek. Capacity of the treatment system is approximately 2.3ML/d.

Following treatment, water is pumped to a standpipe on Mathoura Street. Water is distributed using a small trunk pipeline network, including a 200mm rising main joining the treatment plant to the standpipe. A small raw water supply system is also provided to a limited number of customers. This consists of a pumping station and pipeline.

The existing water filtration plant was constructed in 1972, with upgrades implemented in 1989. The water filtration plant is proposed to be augmented in 2023.

4.3.4.2 Sewerage systems

Mathoura utilises a conventional sewerage system, consisting of gravity mains, sewage pumping stations and a sewage treatment plant. The Mathoura sewage treatment plant consists of an oxidation pond process. Treated effluent is stored, evaporated and irrigated on a tree lot.

The flat layout of Mathoura combined with sporadic development means that there is a high density of low capacity pumping stations. Sewage generated by newer developments passes through several sewage pumping stations, representing a higher capital and operating cost than the average for Mathoura residents. The design load of the plant is 1,600 EP. The plant is expected to reach only 48% of capacity by 2036.

No future capital works are proposed for the treatment plant, given the available capacity. Similarly, pump stations are operating under capacity, and as such no major upgrades are proposed.

4.3.4.3 Stormwater drainage

The urban township of Mathoura is located to the west of Gulpa Creek. Piped stormwater drainage collects runoff from most of the township and drains to Gulpa Creek, which then drains to the Murray River. Council is currently reviewing the drainage design capacity for Mathoura. No specific stormwater upgrade works have been identified for Mathoura. General maintenance and upgrades are planned in accordance with Councils Stormwater Management Plan.

4.3.4.4 Roads and bridges

Mathoura is located on the Cobb Highway, the main arterial route running from Moama north to Deniliquin and on towards Griffith and Wagga Wagga. A range of sealed and unsealed roads service Mathoura and surrounds. Council undertakes a range of upgrade and maintenance works to meet relevant servicing standards. No specific future road or bridge upgrade works have been identified for Mathoura.

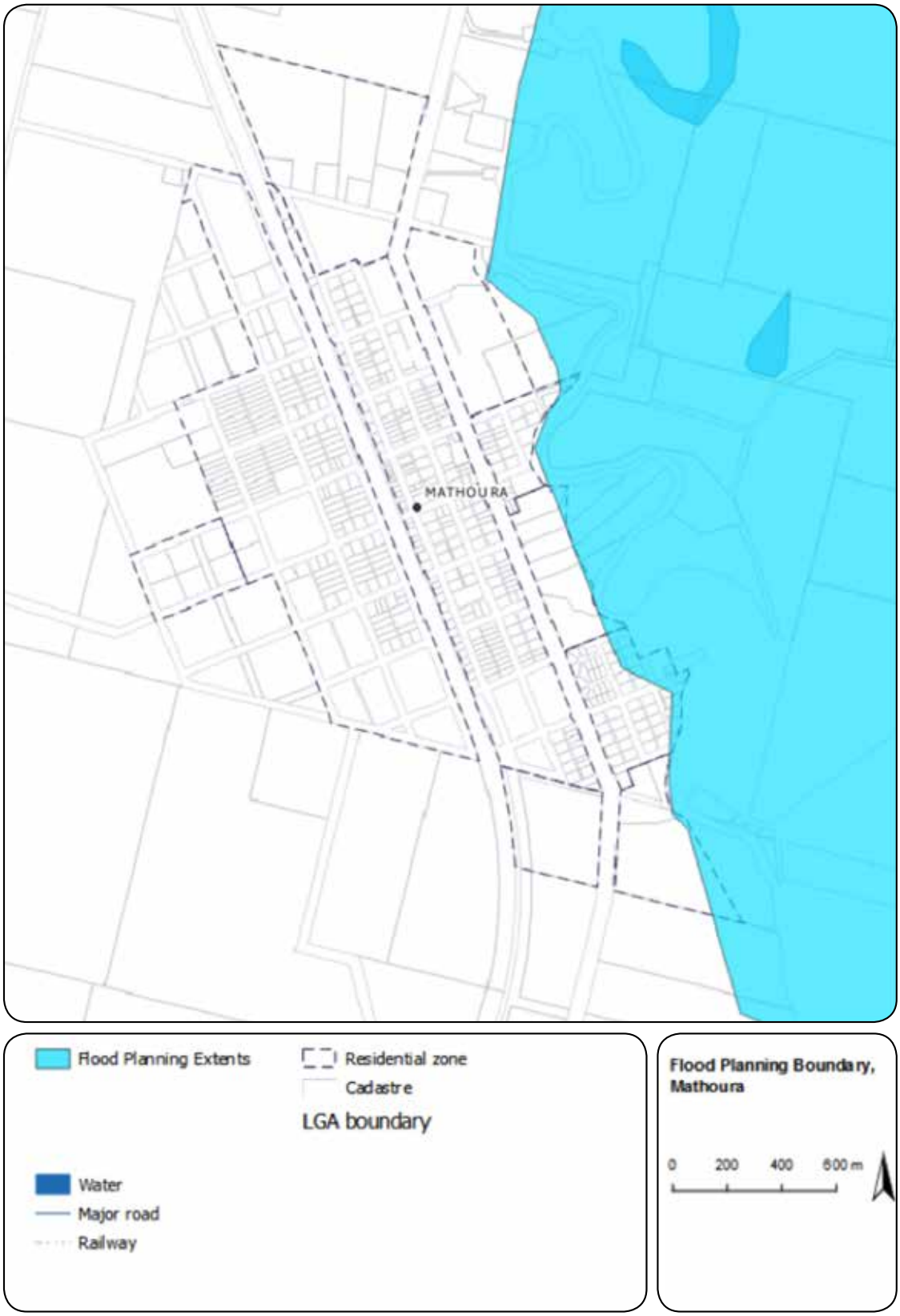
4.3.5 Environmental attributes

4.3.5.1 Flooding

Gulpa Creek, which links the Murray River and the Edward River to the north runs along the eastern edge of the Mathoura township. The eastern edge is mapped as flood affected. Flooding in this area is heavily impacted by the Barmah Choke, which diverts a significant portion of floodwaters from the Murray River to the north to the Edward River, with a portion of this heading through Gulpa Creek. Only a small portion of the township is flood affected.

The flood prone area is shown on the Flood Planning Map of Murray LEP 2011 with associated provisions in the planning scheme that seek to avoid adverse impacts of flooding on future development.

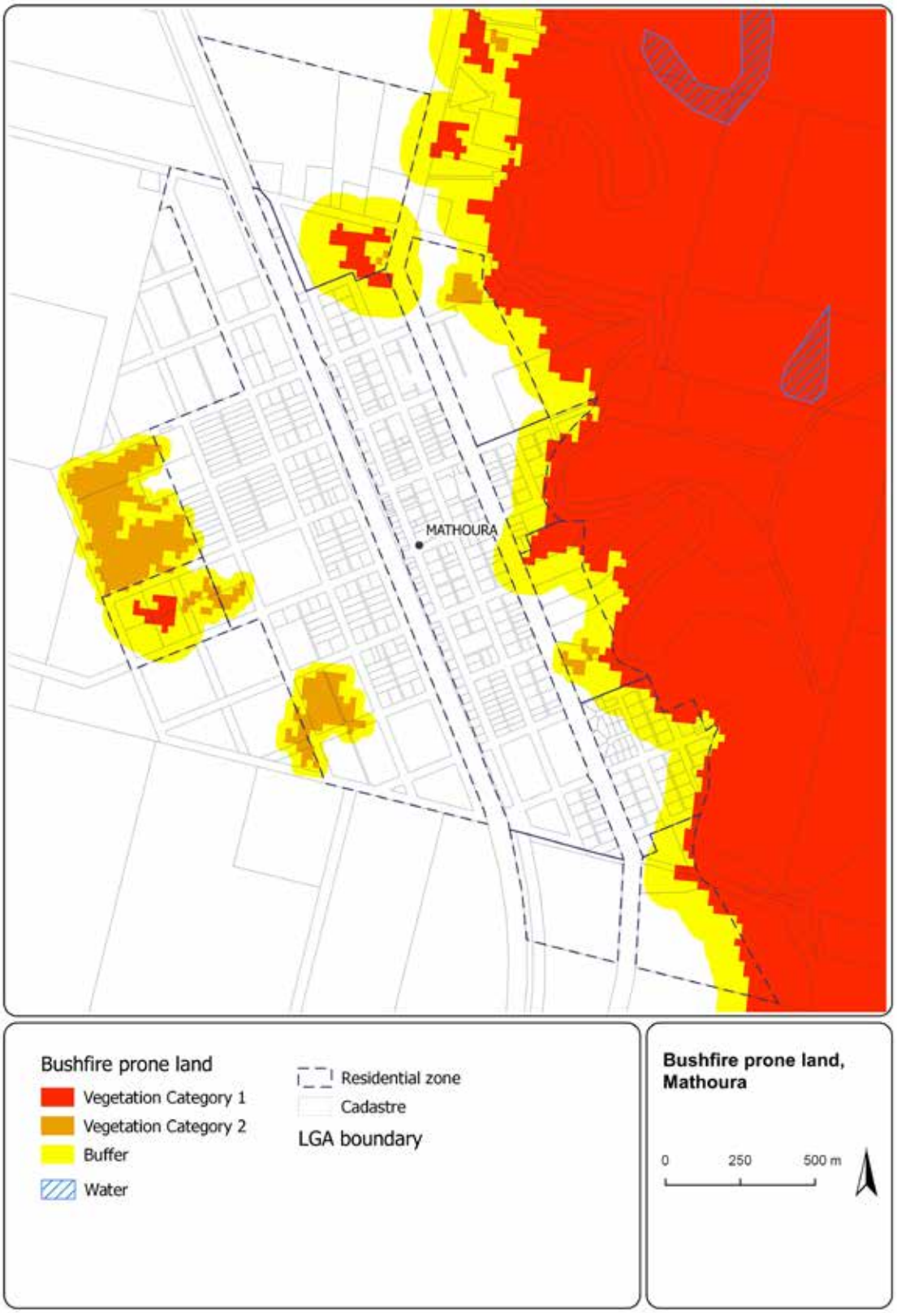
Figure 4.3c: Flood planning boundary, Mathoura



4.3.5.2 Bushfire

The majority of the urban area of Mathoura is unaffected by bushfire threat. There are three small patches at the extremities of the settlement that are bushfire prone land with buffers and the heavily forested land to the east in the direction of Gulpa Creek and the Murray Valley National and Regional Park is bushfire prone. Most subdivided village land along the eastern boundary is a buffer to the bushfire prone land.

Figure 4.3d: Bushfire prone land, Mathoura



4.3.5.3 Biodiversity

The vegetated area, wetlands and Gulpa Creek and Edward River are mapped as being environmentally sensitive on the Terrestrial Biodiversity Map, the Wetlands Map and the Watercourse Map of Murray LEP 2011. Remnant native vegetation on the outskirts of the town is also mapped on the Terrestrial Biodiversity Map.

The waterways forms part of the following aquatic threatened ecological community listed under the NSW Fisheries Management Act 1994:

The aquatic ecological community in the natural drainage system of the lower Murray River catchment.

Vegetation, threatened ecological communities (TEC)

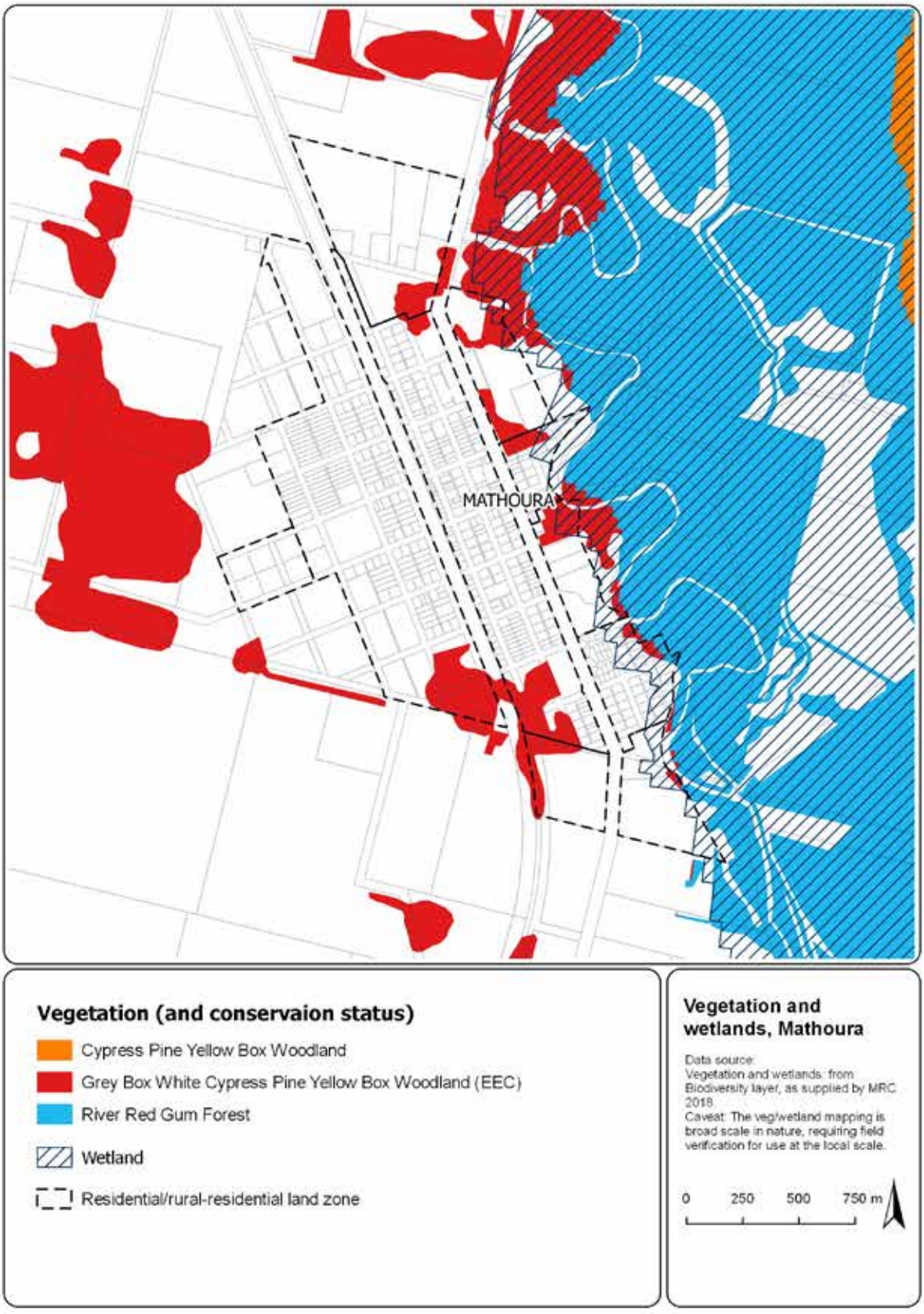
Mathoura is mainly surrounded by cleared agricultural land, however numerous paddocks contain stands of remnant and regrowth trees of sufficient density to be classified as native vegetation regardless of understorey condition. Minor areas of cleared land may comprise derived (native) grassland, e.g. where not under a continuous cropping regime.

Other than the River Red Gum forest, most remnant vegetation surrounding Mathoura is likely to represent Inland Grey Box Woodland. A potential floodplain TEC is Myall (Boree) Woodland. There is a minor chance of White Box Yellow Box Blakely's Red Gum Woodland occurring in the locality, however this TEC generally occurs further east and north. All communities may represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Table 3.13 lists full names and legal status of these communities and detailed descriptions are available at http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

One threatened plant species, Floating Swamp Wallaby-grass, is known from about 1 kilometre south of Mathoura (Bionet 2018). A range of threatened and/or migratory species are known from the extensive forest and wetland habitat to the east, including two frog species, Koala, Squirrel Glider and various microbat species.

Figure 4.3e: Vegetation and wetlands, Mathoura



4.4 Moama

4.4.1 Description

4.4.1.1 Location, history and features

Local Aborigines originally called the Moama area 'Moammay' which meant 'place of the dead'. Charles Sturt travelled through the area in 1838 and James Maiden, an ex-convict, was the first European to settle in the area in 1845. The town, originally called Maiden's Punt and reserved in 1848 after a survey of the area, was named after James Maiden who owned the punt river crossing and was the local station manager, publican and post master. The area was renamed Moama in 1851 and became a cattle market and crossing place due to its location on the main cattle route from southern NSW to the Bendigo goldfields. Boat building and the paddle steamer river trade also thrived, however, market forces coupled with floods in the late 1800s damaged much of the historic town which was gradually rebuilt on higher ground further west. The Deniliquin to Moama rail line and the iron bridge across the Murray River were constructed in the 1870s leading to steady growth and expansion. Many selectors took up the land to the north of Moama around this time and commenced growing cereal crops. Rural land surrounding Moama is still used to grow crops as well as grazing and grape vines.

Moama is located at the south-eastern corner of Murray River LGA. The larger Victorian town of Echuca is located on the southern bank of the Murray River. The two towns effectively operate as a single entity through the provision of services and in the land and housing market.

The Murray River provides a valuable visual backdrop to the town of Moama. There are walking tracks along the banks and the glimpses of the river and foreshore vegetation from public places and roads offer scenic landscape values. Several heritage buildings and places remain in Moama and are listed in Murray LEP 2011. The Hunt Street historic precinct is a conservation area and the Chanter Street precinct is in the process of being listed as a heritage conservation area.

Figure 4.4a: Aerial image of Moama. Source: SIX Maps, 2018

4.4.1.2 Role and function

Moama is the largest centre in Murray River LGA and is classified as a district town in the Murray River settlement hierarchy. It is situated adjacent the Victorian town of Echuca at the south-eastern corner of the LGA. Essential goods and services are available in Moama although higher order services such as health and medical facilities, and large floorplate retail goods are sourced in Echuca.

The range of services offered in Moama includes approximately 30 premises (including, cafes/restaurants, newsagency, pharmacy, accountancy, a hotel, service stations and motor vehicles repairs and sales, fencing). A

large floorplate supermarket (Woolworths) with specialty shops is located at the intersection of Meninya Street and Perricoota Road. Postal, medical, dental and veterinary services are also available in the town centre.

Commercial outlets are scattered along Meninya Street interspersed with dwellings from the river crossing to the intersection with Perricoota Road – a distance of about 850 metres. At the time of survey in November 2017 there were two vacant premises in the town centre and two new commercial premises were under construction.

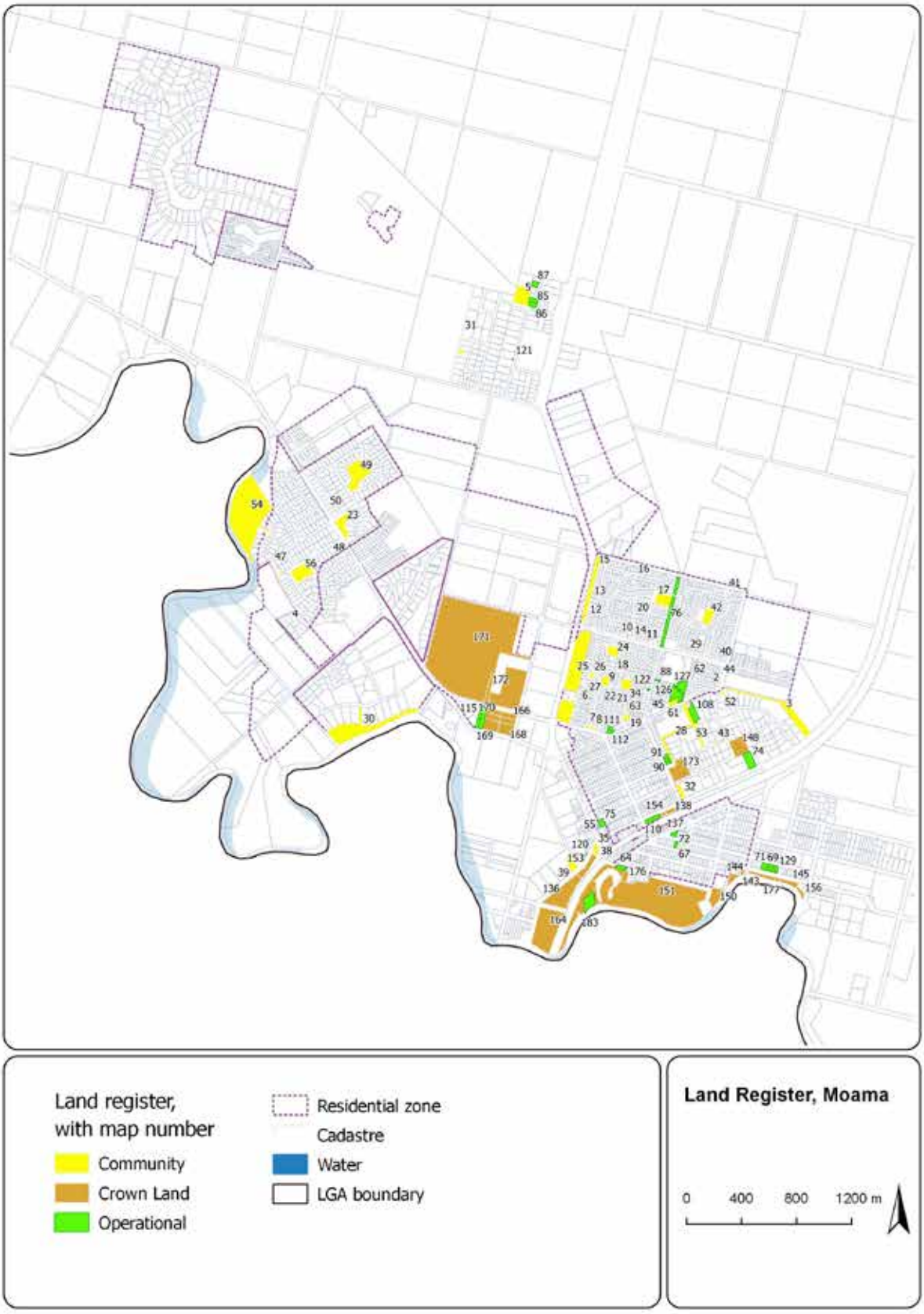
4.4.1.3 Public land

Public land in Moama is shown in Figure 4.4b as community, operational and crown land. The corresponding descriptions are given in Table 4.4a below.

Table 4.4a: Public land register, Moama

Map No.	Land Use	Map No.	Land Use	Map No.	Land Use
75	Car park behind Meninya St Shops	35	Shire Offices & Gardens	50	Buffer zone
111	Moama Pre School	36	Shire Office Carpark	43	Reserve
64	Lions Club Units	38	Shire Offices & Gardens	5	Drainage Basin
122	Sewerage pump station	37	Garden beside Shire Offices	29	Buffer zone
91	Senior citz. rooms & Dr's surgery	34	Parkland	40	Buffer zone & Walkway
89	Senior citz. rooms & Dr's surgery	19	Parkland	62	Buffer zone
72	Lions Club Units	32	Open Space	63	Walkway
108	Moama Depot	2	Buffer zone	28	Buffer Zone & Walkway
67	Lions Club Units	52	Sewer pumpsite	137	Lions Club Units
71	Floodway	61	Parkland	138	Lions Club Units
69	Floodway	3	Buffer zone	172	Moama Recreation Reserve
70	Floodway	45	Walkway	148	Drainage Basin
130	Historic Site	25	Open space	171	Moama Recreation Reserve
129	Historic Site	12	Buffer zone	167	Cemetery
88	Easement per BMac	13	Buffer zone	168	Cemetery
128	Easement	42	Parkland & walkway	169	Cemetery
126	Aged Care Hostel	54	Reserve	170	Cemetery
127	Aged Care Hostel	15	Buffer zone and Walkways	165	Cemetery
120	Sewer pumpsite	16	Walkway	183	Moama Raw Water Pump Building
121	Sewer pump station	14	Walkway	151	River Access & Bushland
90	Senior citz. rooms & Dr's surgery	56	Parkland	182	Caravan Park
87	Industrial Subdivision	17	Parkland	173	Sporting Complex
74	Drainage Basin	23	Drainage Basin	150	River Access & Bushland
85	Industrial Subdivision	49	Buffer zone	144	River Access & Bushland
86	Industrial Subdivision	20	Walkway	143	River Access & Bushland
124	Riverside Caravan Park	24	Parkland & walkway	156	River Access & Bushland
76	Buffer Zone & Walkway	53	Buffer zone	177	River Access & Bushland
110	Pool and Parkland	44	Buffer zone	145	River Access & Bushland
30	Parkland	21	Walkway	176	Old Water Tower
57	Parkland & walkway	22	Walkway	154	Lions Units
6	Walkway	11	Buffer Zone & Walkway	152	Reserve
26	Parkland	39	Skate Park	164	Moama Beach
7	Parkland	31	Buffer zone	136	Bushland
8	Parkland	48	Buffer zone	153	Recreation
9	Parkland	4	Buffer zone	166	Cemetery
27	Walkway	10	Walkway	115	Water Treatment Plant
55	Access	47	Buffer zone	114	Water Treatment Plant
18	Walkway	41	Walkway	112	Moama Pre School

Figure 4.4b: Public land register, Moama

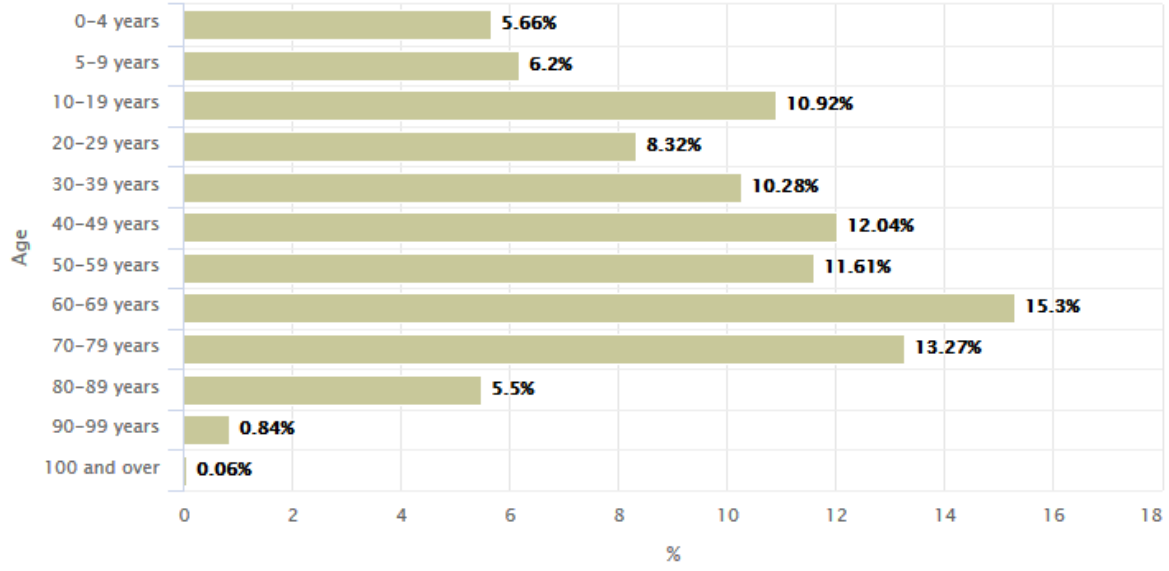


4.4.2 Demography

4.4.2.1 Population

The population of Moama as recorded in the 2016 Census is 6,165 persons. This represents a growth of 33.2% over the ten years since 2006 and an average growth rate of 3.3% per annum. Moama is home to 53% of the residents of Murray River LGA. The median age of the population of Moama in 2016 was 46 years. The population is relatively evenly-distributed across age cohorts.

Chart 4.4a: Age distribution, Moama 2016. Source: REMPLAN Community



Figures released by the Department of Planning & Environment suggest that the population of the former Murray River is ageing, with a gradually declining proportion of persons aged less than 15 years and in the working age group of 15 to 64 years, and an increase in persons aged 65 years or more over the period 2011 to 2031 reaching almost 40%. The key driver of this change is likely to be an increase in life expectancy coupled with a movement of retirees to the LGA.

4.4.2.2 Housing

More than 96% of the 2,675 dwellings in Moama are occupied private dwellings, and 86.5% of these are separate houses. Medium density dwellings account for 8.8% of total dwellings and about two-thirds of all dwellings are owned outright or under mortgage. Nearly one-quarter of dwellings are rental properties. Dwelling structure and tenure data for Moama is given in the charts below. Note that the ABS census collection districts include surrounding rural areas therefore the dwelling count will differ from that used in the land availability analysis.

Chart 4.4b: Dwelling structure, Moama 2016. Source: REMPLAN Community

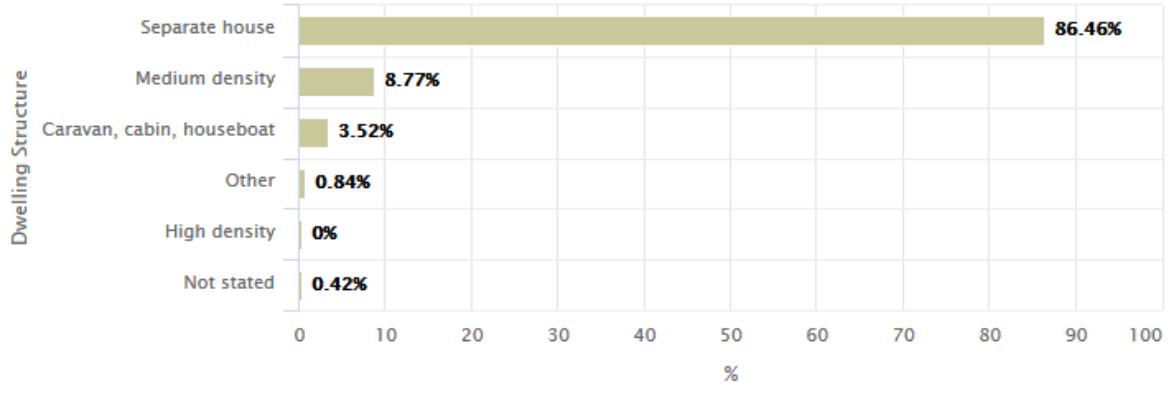
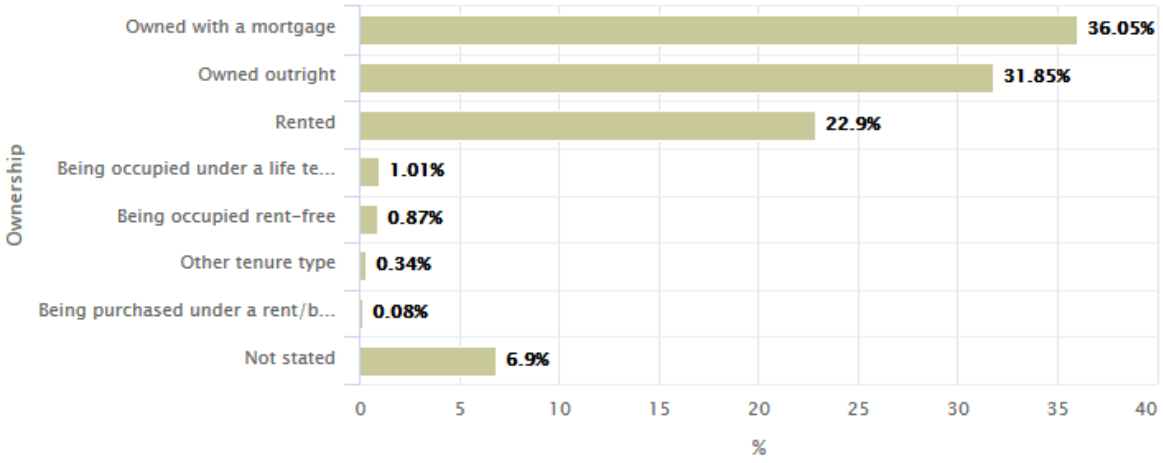


Chart 4.4c: Dwelling tenure, Moama 2016. Source: REMPLAN Community

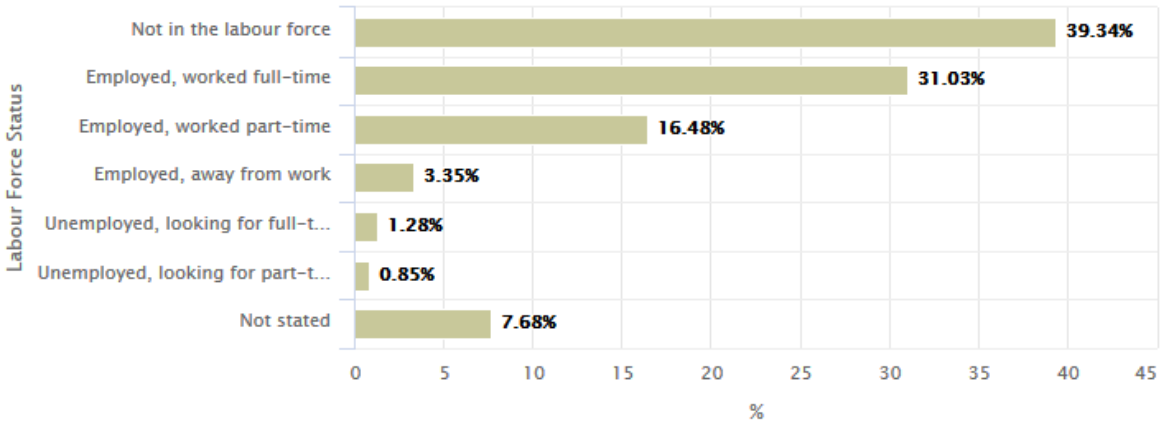


The median weekly household income in Moama was $1,157 per week. According to the 2016 Census, the median monthly mortgage repayment in Moama was $1,560. The median weekly rent in Moama was $275. The percentage of all dwellings being rented was around one-quarter in Moama.

4.4.2.3 Employment

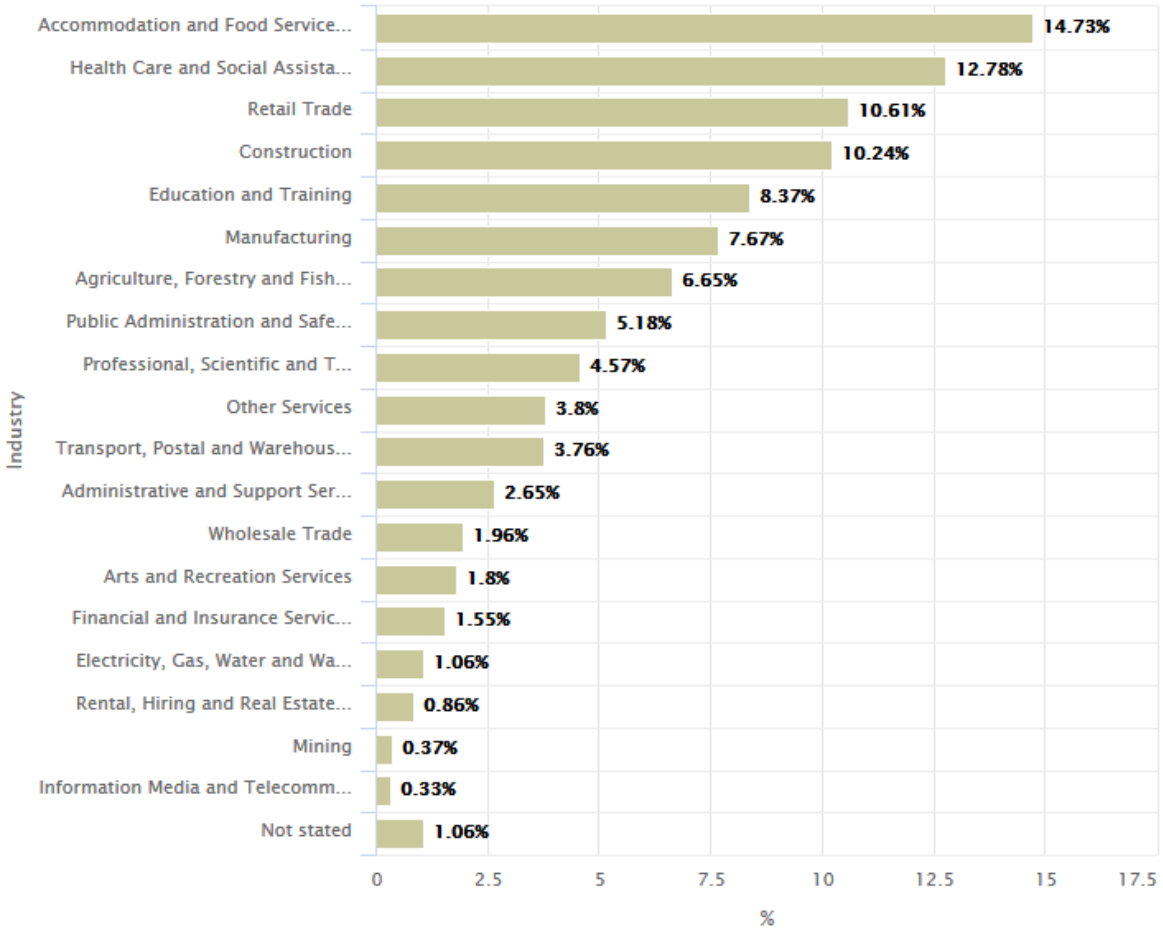
The labour force of Moama grew over the period 2001 to 2016 from 1,833 persons to 3,267 persons. The labour force comprises all persons in full time or part time employment and unemployed persons who are actively looking for work. The labour force participation rate is 53% of the population of Moama.

Chart 4.4d: Labour force status in Moama, 2016. Source: REMPLAN Community



The accommodation and food services sector was the largest industry of employment at 14.7% of the workforce. This was followed by health care and social assistance (12.8%) and retail trade (10.6%). The primary industry sector of agriculture, forestry and fishing was significantly less than for other settlements in Murray River LGA at only 6.7% of the labour force. This indicates the evolution of Moama as primarily a services and trades centre.

Chart 4.4e: Industry of employment in Moama, 2016. Source: REMPLAN Community



4.4.3 Land availability

4.4.3.1 Development trends

Residential land

Demand for residential land is measured by the take-up of allotments for new dwellings. The average annual number of approvals granted for new dwellings over the period 2012/13 to 2016/17 is 60. This includes single dwellings and multi-unit dwellings, however, it is the number of lots that have been utilised that affects the supply of land and not the total number of dwellings. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

Table 4.4b gives the volumes of Complying Development Certificates issued and development applications approved over the period 2012/13 to 2016/17. The rising number of approvals suggests strong and steady growth in the housing sector in Moama.

Table 4.4b: Dwelling approvals in zones R1 and R2, 2012/13 to 2016/17. Source: Murray River Council

Year	CDCs approved	DAs approved	Total approvals
2012/13	3	40	43
2013/14	1	47	48
2014/15	8	57	65
2015/16	11	49	60
2016/17	13	70	83
Total	**36**	**263**	**299**

Real take-up is best measured by the volume of construction certificates issued for dwelling commencements as this reflects approvals that proceed to actual construction. However, data for construction certificates and occupation certificates is only available for the whole of Murray River Council area and not separately for Moama. It is noted that DAs are accompanied by an application for a construction certificate in the majority of instances. Separate applications are made in only about 5% of cases. A CDC is a combined DA and application for a construction certificate. The volume of CDCs and DAs is therefore seen as an accurate measure of demand for residential land in Moama.

Employment lands

Table 4.4c gives the numbers of consents issued for industrial and business development during the six year period 2012-13 to 2017-18 as at 19 April 2018. These figures indicate that an average of 4 approvals are issued per annum for industrial development and 3.3 approvals for business development per annum.

Table 4.4c: Commercial development approvals in Moama, 2012-13 to 2017-18. Source: Murray River Council

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Industrial	3	5	2	2	6	6	24
Business	0	3	4	5	5	3	20
Total	**3**	**8**	**6**	**7**	**11**	**9**	**44**

4.4.3.2 Land supply

Residential land

There are currently 2,799 zoned residential subdivided lots in the urban area of Moama. Of these 2,420 are occupied. The supply of vacant residential zoned land for the current year is given in Table 4.4d below. The number of vacant subdivided lots includes approvals to subdivide land which have been approved but not yet enacted. The total number of vacant lots is estimated to be 1,508 lots as at January 2018. This includes an estimate of the potential yield of unsubdivided land having regard to the provision of services and environmental constraints.

Table 4.4d: Vacant residential lots in zones R1 and R2, January 2018. Source: SIX Maps, ground-truthing

Year	Vacant subdivided lots	Vacant unsubdivided lots	Lots subject to rezoning	Total
January 18	379	1,079	50	1,508

A planning proposal for the 50 lots that are noted as lots subject to rezoning has progressed to a Parliamentary Counsel opinion and maps are under preparation. This rezoning is expected to be gazetted in the near future.

It is estimated that the existing supply of 1,508 lots is sufficient for the next 25.2 years at an annual take-up of 60 lots.

Several planning proposals which have been granted Gateway Determinations to proceed to exhibition are under consideration by Council and/or the Department of Planning and Environment. Each of these planning proposals involve rezoning land to zone R1 or R2 in order to create new urban residential lots. Details of each of these are provided in Table 4.4e below.

In addition to these are three other planning proposals which are yet to receive a Gateway Determination and which are proposed to create several hundred new lots.

Table 4.4e: Planning proposals to rezone land in Moama to R1 or R2

PP number	Area (ha)	No of lots	Gateway Determination
PP_2016_MURRA_001_00	37.43	99	24 April 2016
PP_2016_MRIVE_003_00	0.6	6	12 August 2016
PP_2016_MRIVE_004_00	60	472	14 October 2016
Total new lots		**577**	

Rural residential land

Land made available for rural residential development is zoned R5 Large Lot Residential with minimum lot sizes ranging from 4,000m^2 to 8,000m^2. These are effectively large urban allotments that are subdivided in the same way (pattern and layout) as land within the low density residential zone. The areas currently zoned R5 in Moama are at capacity and there is no potential for any further subdivision to create additional lots.

Murray River Council has recognised that there is demand for land to be made available for rural living in the Moama district and commissioned the Moama & District Rural Residential Strategy. The strategy identified rural residential development opportunities within an area bounded by Tataila Road, Thyra Road, Perricoota Road and Twenty Four Lane to the north-west of the town centre. This area is relatively unconstrained by environmental attributes and natural hazards and can be readily provided with reticulated water and sewer services by way of augmentation of existing mains lines.

A range of lot sizes are recommended – 2 and 5 hectares – to cater for differing demand preferences and reflecting proximity to the town centre of Moama. It was estimated that rezoning this rural area for rural living would yield a total of 120 lots (87 two hectare lots and 33 five hectare lots). Using take-up of rural residential lots in neighbouring Campaspe Shire as a measure of demand, it is estimated that this supply is 20 years at the current rate of take-up of 6 lots per annum, or 12 years at an optimistic annual demand of 10 lots.

The Moama & District Rural Residential Strategy has been adopted by Murray River Council in 2017 but has yet to be endorsed by the Department of Planning & Environment. The department advised Council that the findings and recommendations of the strategy should be evaluated in the context of the comprehensive Murray River Land Use Strategy.

Employment lands

Moama is endowed with substantial zoned commercial land. There are approximately 30.8 hectares of land zoned B2 Local Centre stretching from the river crossing to north of the intersection of the Cobb Highway and Perricoota Road. Two large lots that are still used for agricultural activities totalling 76 hectares are located north of the intersection on the highway and a lot with an area of 2 hectares remains vacant beside the shopping centre on Perricoota Road. About 1.36 hectares along Meninya Street remains vacant and there is substantial potential for commercial development through the redevelopment of properties that remain occupied by residential dwellings. Several tourist accommodation facilities are located in the business centre covering large areas on both side of Meninya Street.

Given that only six properties are vacant in the old centre of town and that commercial redevelopment of residential and tourist accommodation is unlikely due to the quality and newness of those facilities, it is expected that commercial expansion will take place to the north along the large vacant properties on the Cobb Highway as demand is sufficient to generate development of that land.

There is 38.1 hectares of land zoned B6 Business Enterprise to the north of Moama along the Cobb Highway. The largest development within this zone is Byford Engineering. There remains a total of 31 subdivided lots vacant that comprise 12.8 hectares. In addition to this are two rural properties totalling 18.4 hectares in area on the eastern side of the highway that are used for rural purposes but zoned for business expansion. This area of B6 zoned land is currently under-utilised.

There are three industrial zones in Moama. An area of approximately 34 hectares that adjoins the B6 zoned land north along the Cobb Highway has been subdivided into 70 industrial lots ranging in size from

1,000m^2 to 7,000m^2 plus two lots of about 1 hectare in area one of which is occupied by a dam. Most of the lots remain vacant with only 7 lots occupied by industrial activities over 3.6 hectares, leaving 29 hectares of vacant industrial land.

An area of just over 300 hectares further north along Hillside Road is zoned IN1 General Industrial. This is primarily occupied by Council's sewer treatment plant however, about 116.3 hectares remain vacant including 10 subdivided lots facing Hillside Road.

An area of 40.4 hectares in also zoned IN1 General Industrial north east of the older part of Moama along the rail line. This area is intensively developed and only 6 lots remain vacant with an area of 2.3 hectares.

Given the extent of undeveloped industrial and business zoned land in Moama and the average take-up of 4 lots per annum of industrial land and 3.3 lots per annum for business development, it is considered that there is currently adequate supply to cater for an indefinite period.

4.4.4 Services and capacity

4.4.4.1 Water supply systems

Council provides a dual reticulated water system to the urban areas of Moama comprising raw and treated (filtered) water. The main Moama raw and filtered water supplies share a common extraction point with raw water bypassing the filtration system. The water treatment plant was constructed in 1996 an upgraded in 2001. The system is designed to treat 6 ML per day to cater for 20,000 equivalent persons. An average of 1.5 megalitres was treated per day at the time of the preparation of the Murray Shire Strategic Land Use Plan 2010-2030 which catered for 5,000 EP and a peak of about 3.5 megalitres per day for 10,000 EP during peak holiday times.

Urban areas to the west of Moama West are serviced with raw water supplies at the time of subdivision by the proponent. A raw water service is not provided beyond Twenty-Four Lane. A range of treatment and core network upgrades as well as network upgrades are planned for the future. These works are planned for the decade 2021 to 2031 and include a new clear water storage to the north of town, extensions and duplication of mains, duplication of a water treatment plant and a new pump station.

Figures 4.4c and 4.4d indicate infrastructure associated with the reticulated potable water supply and raw water supply respectively. Council funded and developer funded pumping stations, treatment works and mains are shown by DSP area. These figures are sourced from Murray Shire Development Servicing Plan No 1 – Water Supply and Sewerage Services.

Figure 4.4c: Extent of reticulated potable water supply, Moama. Source: Murray Shire DSP No 1, 2013

Figure 4.4d: Extent of raw water supply, Moama. Source: Murray Shire DSP No 1, 2013

4.4.4.2 Sewerage systems

Moama's sewerage treatment plant is located to the north of Hillside Road, just off the Cobb Highway. The plant has a design load of 10,000 EP and consists of an oxidation pond process, including recirculation processes. Treated effluent is stored, evaporated and irrigated. At the time of preparation of the Murray Shire Strategic Land Use Plan 2010-2030, the system was serving about 5,000 EP and 9,000 EP during peak holiday periods. The plant is not expected to reach capacity by 2036, however given the significant seasonal variations it is likely that by 2036 the plant may exhibit some symptoms of operating at its limits. No treatment plant upgrades are currently proposed.

A range of upgrades to rising mains and pump stations have been undertaken recently to deal with future growth in the north-western area of Moama. These have included additional storage at the transfer pumping station (PS-0) and a new rising main connection along Lignum Road. Pump stations throughout the Moama township have also undergone recent upgrades to deal with overloading issues. Figure 4.4e has been sourced from the Murray Shire Development Servicing Plan No 1 – Water Supply and Sewerage Services. Council and developer funded infrastructure is shown by DSP areas.

Figure 4.4e: Extent of reticulated sewerage system, Moama. Source: Murray Shire DSP No 1, 2013

4.4.4.3 Stormwater drainage

The urban area of Moama drains via overland flows and pit and pipe network in a generally westerly direction, with eventual discharge to the Murray River. The area is flat and a range of man-made and natural features affect flow capacities and retention. A large area to the north west of Moama has been zoned to accommodate population growth. Investigations into the impact of additional impervious surfaces associated with this development are currently being undertaken to strategically plan for potential changes to the hydrologic regime.

Council has constructed a 20ML dam within the Moama Recreation Reserve which has been designed to collect stormwater runoff from existing and new estates to the northwest. The dam provides irrigation water supply for the recreation reserve. Council operates six other stormwater reuse schemes within Moama supplying irrigation water. These are located at Layfield Downs, Perricoota Run, Moama Business Park, Echuca Street, Nicholas Drive North and Hollara Drive.

A range of stormwater projects have been identified in the Murray Shire development contributions plan. Proposed projects are mains replacement and renewal, litter management project and upgrades to stormwater treatment.

4.4.4.4 Roads and bridges

The arterial roads serving Moama are the Cobb Highway and Perricoota Road and each plays a significantly different role. The Cobb Highway is the major regional route connecting Moama to Echuca and north to Deniliquin and beyond. It carries the majority of heavy vehicle freight as well as catering to private motorists. It also provides local access to the northern parts of Moama, including industrial precincts, and surrounding rural areas. Perricoota Road is an important local distributor that performs a lower order regional function. It provides a link between Moama to settlements and recreational destinations to the west for regional transport and motoring tourists.

A new crossing is planned over the Murray River downstream of the existing Echuca-Moama crossing to service increased traffic loads and the expansion of Moama to the North West. Stage 1 of the four stage project has begun, and will be completed in 2020. There are currently around 20,000 vehicle movements per day using the existing bridge and it is anticipated that between 8,000 and 10,000 vehicle movements will transfer to the new bridge, much of that being heavy freight vehicles. This transfer is expected to impact positively on the main street of Moama, Meninya Street, by removing a significant proportion of through traffic.

Perricoota Road which runs from the western side of the Moama township from the Cobb highway to the west will provide the main connection to the new Murray River bridge, and service large parts of the urban expansion of Moama to the north and west. A range of upgrades to Perricoota road intersections were proposed in 2012 including recommendations for intersection types for new developments with access from Perricoota Road (TMM Consulting, 2012). The entry and through road on the southern side of the river is planned to be Warren Street at the western end of the old town of Echuca.

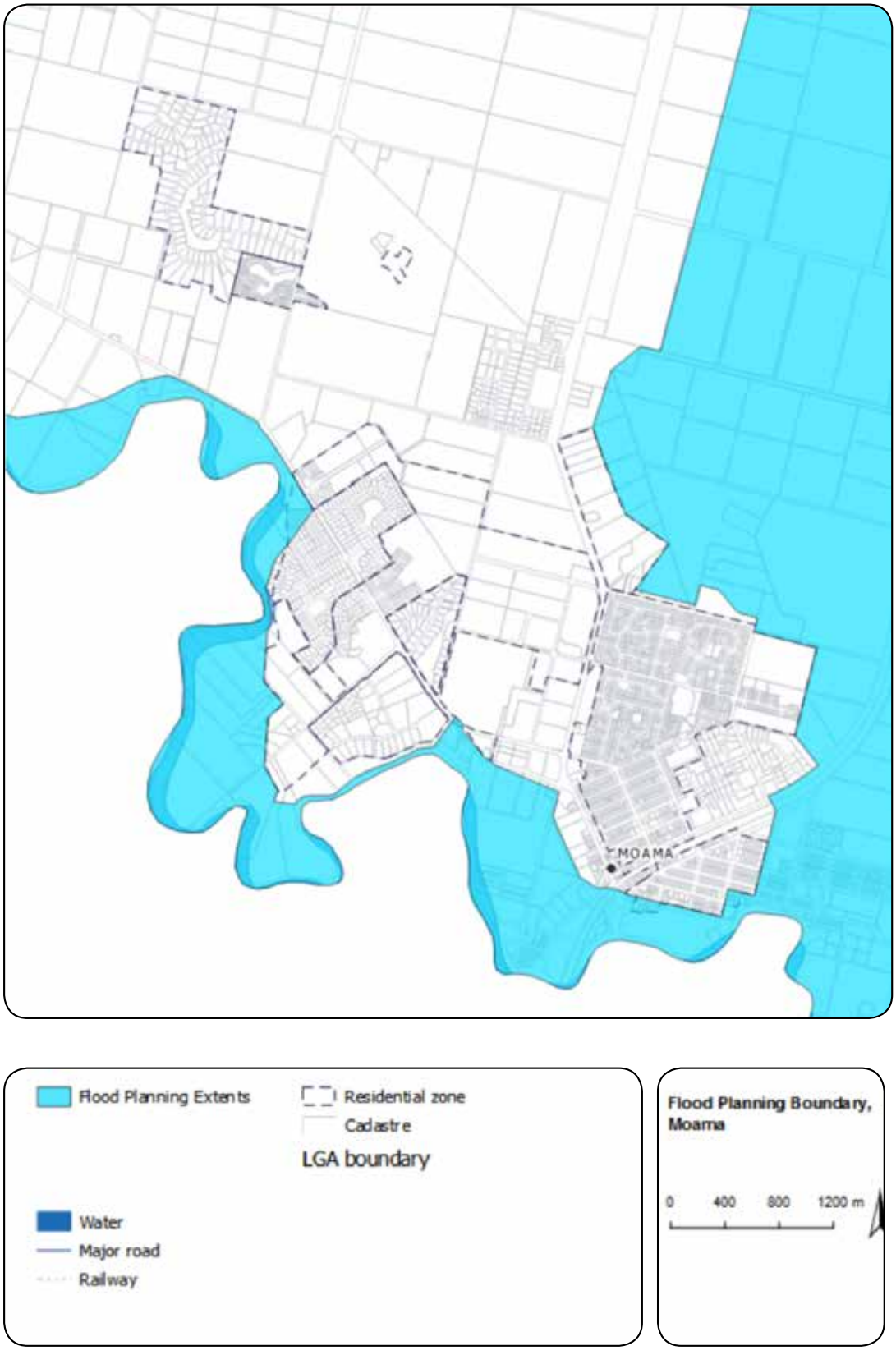
A range of road projects have been identified in the previous Murray Shire development contributions plan. Projects include general improvements to urban roads, construction of a roundabout at the Shaw Street and Francis Street intersection, improvements to Perricoota Road and preparation of a pedestrian strategy. Specific proposed upgrades to pathways include continued cycleway construction, and resealing and line-marking of public car parking.

4.4.5 Environmental attributes

4.4.5.1 Flooding

Moama is located adjacent to the Murray river on the Murray floodplain and is flood affected. Previous flood investigations carried out in the late 1990s and early 2000s established flood planning extents and depths around the township. An outcome of these investigations was the construction of a levee extending from the southeast corner of the township along the eastern and northern edges of the existing township to provide some flood protection. Floodplain mapping clearly shows the areas to the east of the township are flood affected. An updated flood study and floodplain risk management plan is being commenced in 2018 covering both Moama and Echuca. This will assist to clarify flood risks for the township and outline management and planning measures to deal with flooding into the future. A steering committee to oversee the review has been appointed by both Murray River and Campaspe Councils.

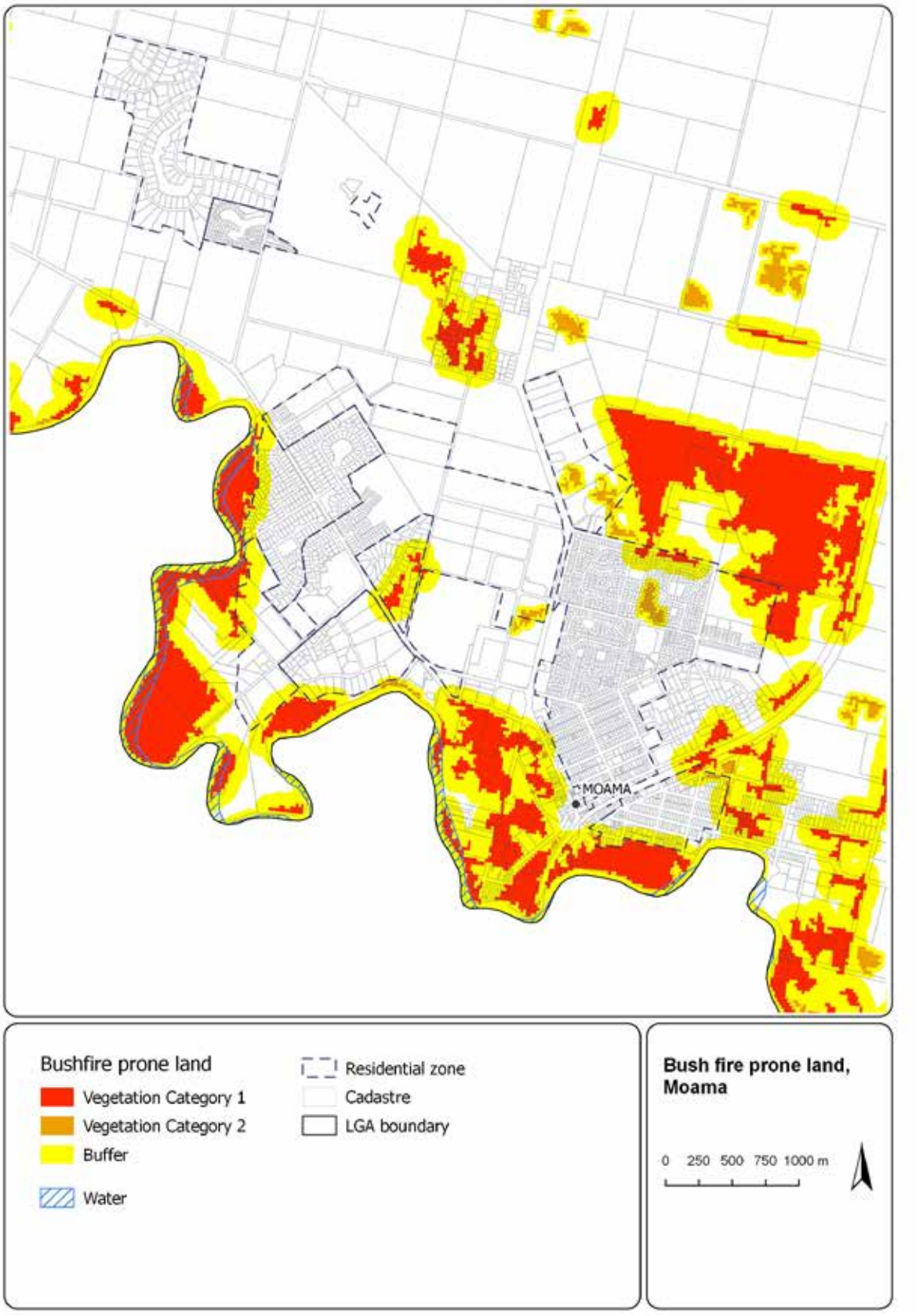
Figure 4.4f: Flood planning extent 1:100 year ARI, Moama



4.4.5.2 Bushfire

There are patches of bushfire prone land scattered within and around the township of Moama. The location of these patches coincide with remnant native vegetation close to the Murray River and north of the urban area. Figure 4.4g below shows the extent of bushfire prone land and buffers.

Figure 4.4g: Bushfire prone land, Moama



4.4.5.3 Biodiversity

Wetlands and watercourses

Environmentally sensitive areas are mapped in Murray LEP 2011. The riparian corridor along the banks of the Murray River is shown on Watercourses Map and the Wetlands Map.

The waterways forms part of the following aquatic threatened ecological community listed under the NSW Fisheries Management Act 1994:

The aquatic ecological community in the natural drainage system of the lower Murray River catchment.

Vegetation, threatened ecological communities (TEC)

Despite cleared farmland being common, substantial areas around the urban centre and encroaching into residential areas of Moama are shown on the Terrestrial Biodiversity Map that reflect the presence of remnant native vegetation around the river foreshore, along public roads, the railway corridor and along property boundaries.

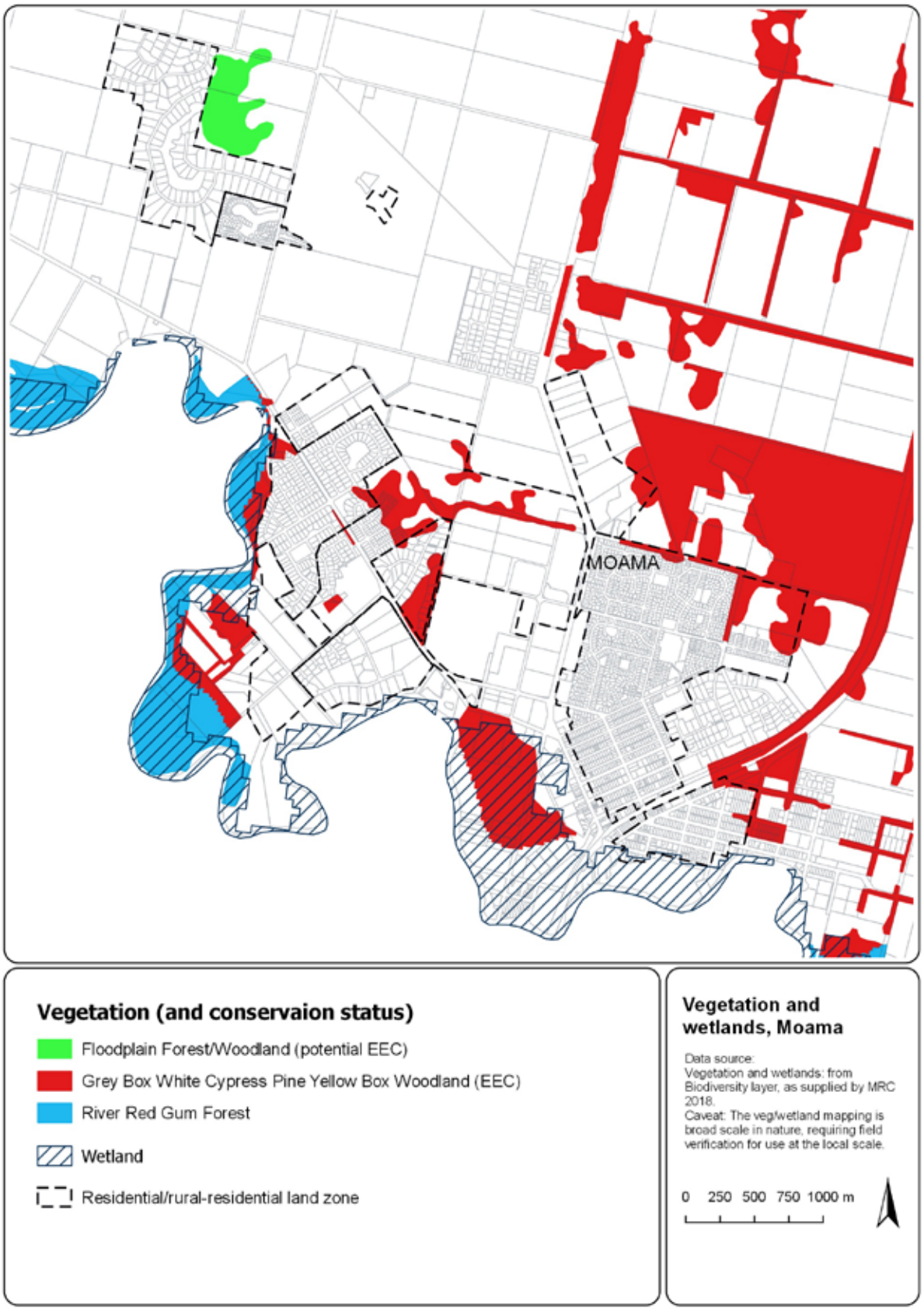
Numerous paddocks contain stands of remnant and regrowth trees of sufficient density to be classified as native vegetation (regardless of understorey condition). Areas of cleared land may comprise derived (native) grassland, e.g. where not under a continuous cropping regime.

Other than the River Red Gum forest, most remnant vegetation surrounding Moama is likely to represent a TEC, with Inland Grey Box Woodland being the most common of these in the locality. A potential floodplain TEC is Myall (Boree) Woodland. There is a minor chance of White Box Yellow Box Blakely's Red Gum Woodland occurring in the locality, however this TEC generally occurs further east and north. All communities may represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Table 3.13 lists full names and legal status of these communities and detailed descriptions are available at http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

The threatened plant species, Floating Swamp Wallaby-grass, is known from floodplain habitat about 500 metres south of Moama (Bionet 2018), while Turnip Copperbur is very common in the Travelling Stock Reserve to the north of Moama. A number of threatened woodland birds are known from the locality. The only threatened mammal record from the Bionet search is that of the Squirrel Glider. These low numbers likely reflect a small amount of survey having been taken out previously, with numerous other threatened species likely to be using the extensive woodland and forest habitat surrounding Moama.

Figure 4.4h: Vegetation and wetlands, Moama



4.5 Moulamein

4.5.1 Description

4.5.1.1 Location, history and features

The township of Moulamein, the oldest settlement in the Riverina region, is located approximately 70 kilometres north of Barham at the junction of the Edward River and Billabong Creek. The area was first settled by Augustus Morris in the early 1840s who took up pastoral runs and explored the surrounding area. The township was surveyed and gazetted in 1851 and developed quickly to become a service centre for surrounding agricultural activities which remain as cereal croplands and grazing lands. A hotel, public school, post office and stores were in existence by the 1860s. The historic courthouse and footbridge are listed as heritage items of local significance in Wakool LEP 2013.

Figure 4.5a: Aerial image of Moulamein. Source: SIX Maps, 2018

4.5.1.2 Role and function

Moulamein is classified as a village in the Murray River settlement hierarchy. The settlement is zoned RU5 Village under Wakool LEP 2013 with the water supply system, sewerage system and Council depot zoned SP2 Infrastructure. A large billabong to the north of town is zoned RE1 Public Recreation and is a playground for watersports. Sporting fields/recreation facilities at South Moulamein are zoned RE1 Public Recreation and adjoining Moulamein Bowling Club is zoned RE2 Private Recreation.

Services offered in Moulamein include a, a hotel, a small supermarket, post office, service station, café, bottle shop, bowling club, art gallery and bank. Community facilities comprise a primary school, preschool, retirement village, Council administration office and works depot, and the community hub/business centre. Two large grain storage facilities are located to the north and north-east of the urban area. Piggery operations located off Balpool Road are a large employer in the township and surrounding area.

There was one vacant retail premises at the time of the survey in November 2017.

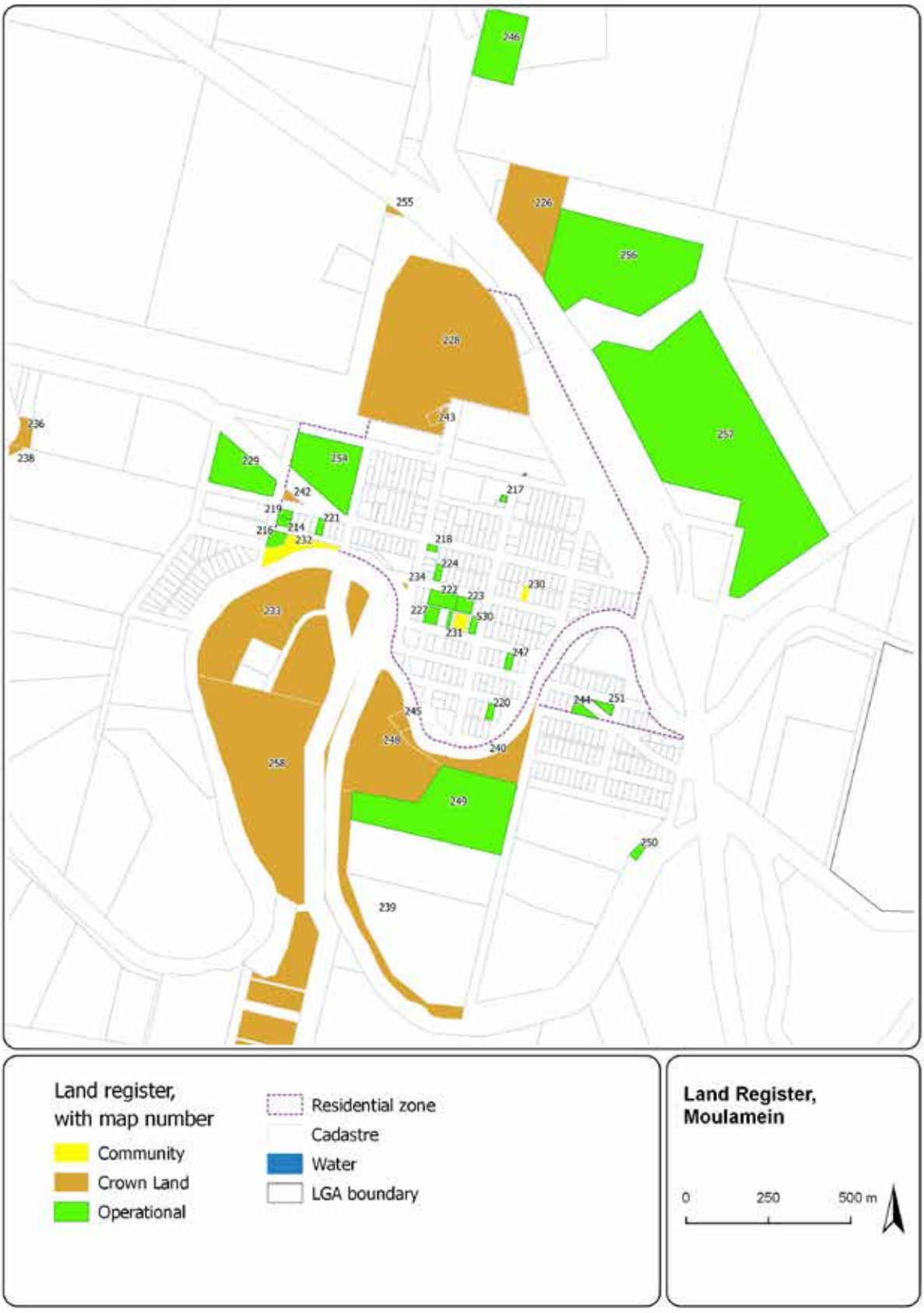
4.5.1.3 Public land

Public land in Moulamein is shown in Figure 4.5b as community, operational and crown land. The corresponding descriptions are given in Table 4.5a below.

Table 4.5a: Public land register, Moulamein

Map No.	Land Use	Map No.	Land Use
214	Carpark - Taulka Terrace	239	Future Public Requirements - Preservation of Trees
216	Office	240	Reserve
217	Depot	242	Park
218	Residential	243	Pool
219	Residential	244	Reserve
220	Residential	245	Preservation Of Historical Sites And Buildings
221	Residential	246	Sewerage
222	Residential	247	Vacant Land
223	Residential	248	Water
224	Residential	249	Water
226	Urban Services	250	Water
227	45-51 Morago ST, MOULAMEIN	251	Water
228	Reserve	530	Business
229	Depot	254	Vacant Land
230	Park	255	Urban Services
231	Park	236	Public Recreation
232	Recreation	256	Investigation Site - Tchelery Road
233	Recreation Reserve	257	Investigation Site - Tchelerey Road
234	Reserve	258	Bushland
238	Bushland/Foreshore	264	Morago Street Moulamein

Figure 4.5b: Public land register, Moulamein

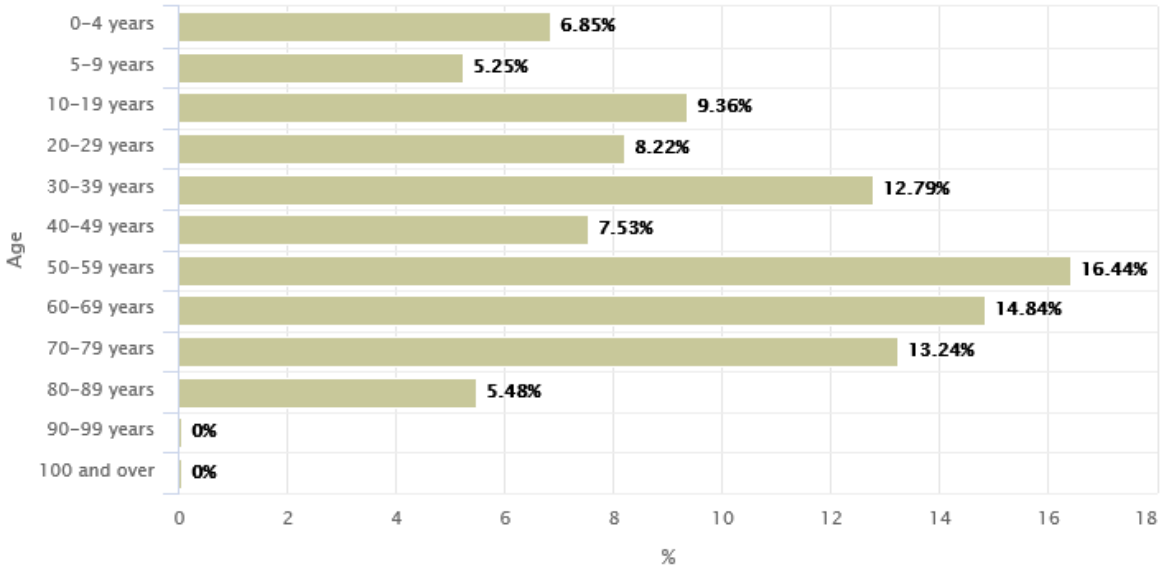


4.5.2 Demography

4.5.2.1 Population

The population of Moulamein as recorded in the 2016 Census is 438 persons. Less than a half of the population are in the working age group of 20 to 60 years, while one-third of residents are aged over 60 years.

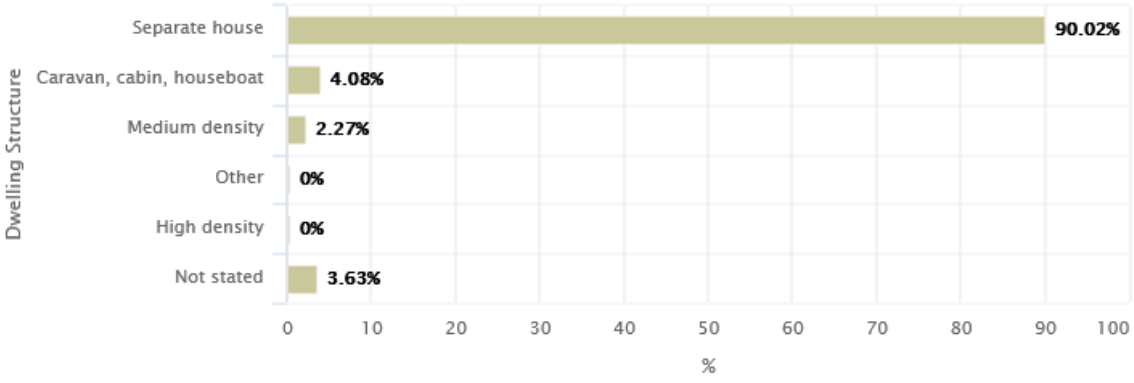
Chart 4.5a: Age distribution, Moulamein 2016. Source: REMPLAN Community



4.5.2.2 Housing

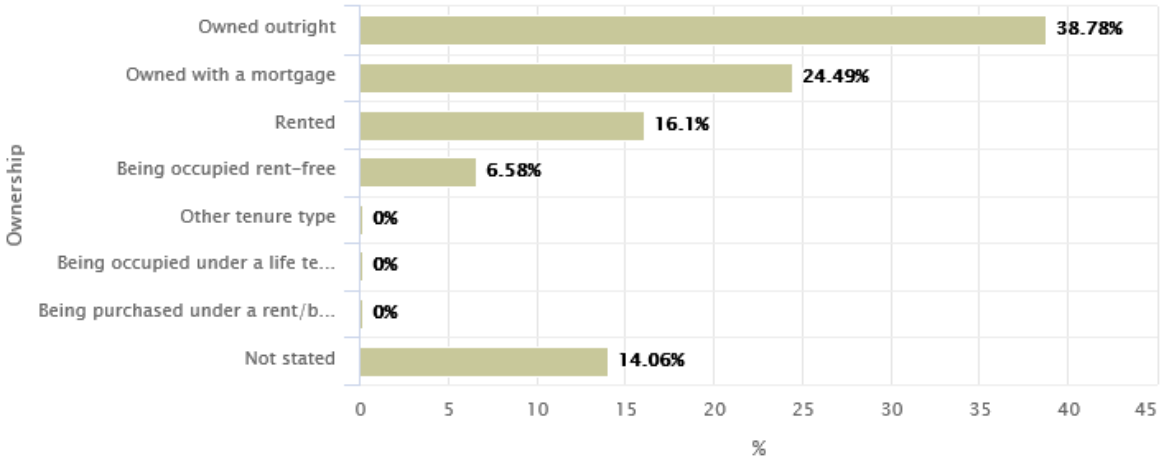
According to the 2016 Census there were 274 private dwellings in Moulamein at the time of the census. The ABS census collection districts include surrounding rural land as well as the settlement. Of all dwellings 99% were occupied private dwellings with the remainder being non-private dwellings. It is a predominantly low density housing environment with 90% being separate dwellings. Just over 2% of dwellings are medium density such as villas, townhouses, flats and apartments.

Chart 4.5b: Dwelling structure, Moulamein 2016. Source: REMPLAN Community



Two-thirds of dwellings are owned outright or under mortgage and 16% are being rented.

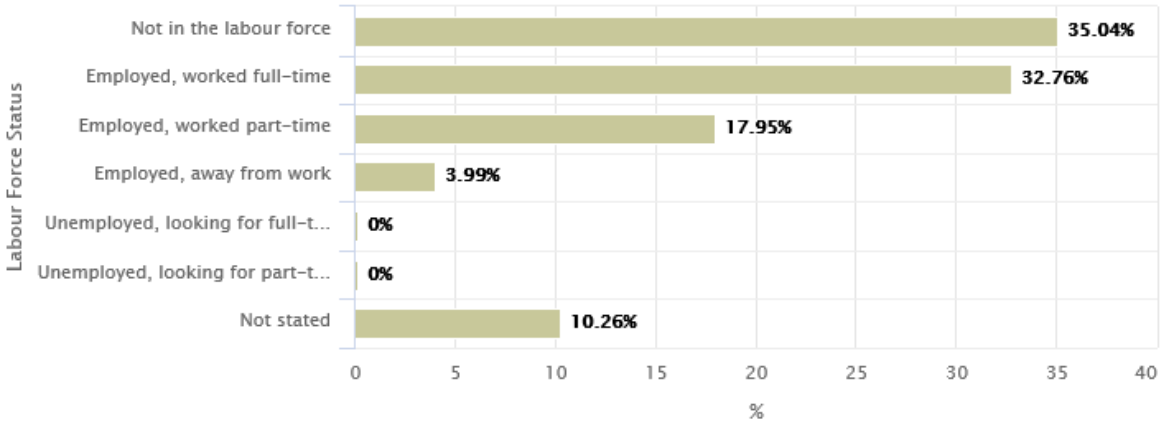
Chart 4.5c: Dwelling tenure, Moulamein 2016. Source: REMPLAN Community



4.5.2.3 Employment

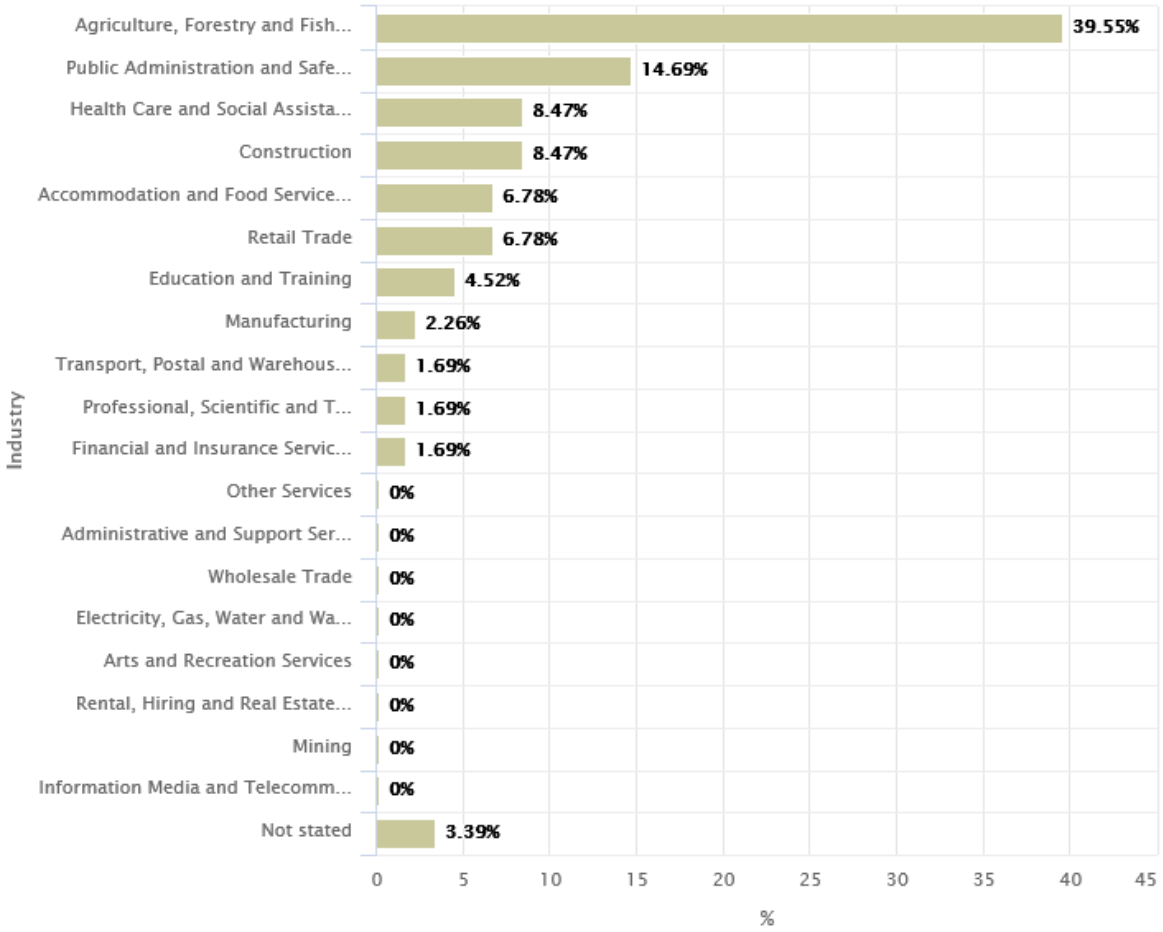
Just over one-third of the residents of Moulamein are not employed or actively seeking work and one-third of the population is employed full time. The labour force represents 55% of the population of Moulamein.

Chart 4.5d: Labour force status, Moulamein 2016. Source: REMPLAN Community



Agriculture, forestry and fishing is the largest industry and employs 40% of the labour force due to the surrounding farming activities and the presence of the grain silos. This is followed by public administration and safety (14.7%) and health care and social assistance and the construction sector (both at 8.5%).

Chart 4.5e: Industry of employment, Moulamein 2016. Source: REMPLAN Community



4.5.3 Land availability

4.5.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential, commercial and industrial development in Moulamein issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any changes of use to existing buildings. The data for the financial year 2017-18 is up until 19 April 2018.

Table 4.5b: Development approvals in Moulamein, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Residential	1	2	1	0	1	0
Industrial	1	0	0	0	0	0
Commercial	0	0	0	1	0	0
Total	**2**	**2**	**1**	**1**	**1**	**0**

4.5.3.2 Land supply

Urban land in Moulamein is zoned RU5 Village under Wakool LEP 2013. Residential, commercial and industrial development is permitted in zone RU5. The status of land zoned RU5 as occupied, vacant subdivided land or vacant unsubdivided land is given in the table below.

Lots occupied by an infrastructure item, a commercial or industrial use, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

This data has been sourced from the NSW Government's SIX Maps imagery dated 2012. All development approvals since 2012-13 have been factored into the land supply analysis as occupied lots.

Table 4.5c: Supply of land zoned RU5 in Moulamein

Status	No. of lots
Occupied subdivided lots	205
Vacant lots with approvals	7
Vacant subdivided lots	22
Total subdivided lots	234
Potential yield vacant unsubdivided lots	27
Total vacant lots (subdivided and unsubdivided)	49

Subdivided lots in Moulamein are generally either 1,000m^2 or 2,000m^2 in area. An estimate of the potential yield of vacant unsubdivided lots has been made having deducted 25% of total land area and dividing by a lot size of 1,000m^2 as follows:

Table 4.5d: Estimated potential yield of vacant land, Moulamein

Land	Approximate area	Net area (total less 25%)	Potential yield @ a 1,000m^2 lot size
Lot 7303 DP 1161591 Young Street	3.65 hectares (36,450m^2)	27,338	27 lots

There is estimated to be a total of 49 vacant subdivided and unsubdivided lots. At an average take-up of 1.2 allotments per annum there is estimated to be sufficient vacant zoned urban land for 40 years.

As there is no minimum lot size applying to land zoned RU5 Village in Moulamein, there is also the potential for further subdivision of existing vacant subdivided lots and occupied lots where the existing dwelling is positioned to enable subdivision, especially where the lot is 2,000m^2 in area and the dwelling is positioned at one end of the lot.

4.5.4 Services and capacity

4.5.4.1 Water supply systems

The town of Moulamein is serviced with a dual water reticulation supply system of potable and raw (untreated) water sourced from the Edward River. The Moulamein water supply system was completed in 2001 and includes a newer treatment plant using mirco-filtration, activated carbon and chlorination. The existing water supply system services a population of approximately 438 and with a capacity of 0.5ML/day has additional capacity to service more than twice the current population. An additional 2.5ML/d capacity for raw water supply is available. Planned plant and network upgrades comprises refurbishment of the water tower in 2019.

4.5.4.2 Sewerage systems

Moulamein is serviced by a reticulated sewerage system comprising both gravity and rising mains including 5 small pump stations and lift pumps that ultimately transfer sewage to the Moulamein Sewer Treatment Plant. The treatment facility includes sedimentation, oxidation ponds and sludge removal. Treated effluent is discharged to a evaporation and wetland system. The system has a design capacity of 1000 EP and currently serves approximately 438 EP. Planned plant and network upgrades to the sewer system comprises replacement and renewal of mains lines from 2021 onwards.

4.5.4.3 Stormwater drainage

Council's stormwater system within Moulamein generally consists of kerb and gutter draining to a pit and pipe network or open drainage channel, ultimately directing stormwater runoff to the Edward River. Council has installed several gross pollutant traps in Moulamein including one on the Brougham Street and Paterson Street discharge points to the Edward River.

The low-lying nature of Moulamein and proximity to the Edward River mean that flood levees and pumping systems are required for flood protection and to achieve stormwater discharge. A Barham and Moulamein Stormwater Drainage Strategy outlines the future directions for stormwater planning in these townships. A future flood protection levee upgrade is proposed for the township, subject to grant funding.

4.5.4.4 Roads and bridges

Moulamein is serviced by Moulamein Road from the South, Balranald Road to the west and Maude and Pretty Pine roads to the east. The road bridge at Moulamein provides the main vehicular connection from Moulmein to the south across the Edward River. The town has a small number of sealed and unsealed roads. Allocations have been made for street reseals and kerb and gutter installations by 2021.

Council have a Pedestrian Accessibility and Mobility Plan and have allocated funding over the next five years to implement this plan to improve pedestrian access throughout the urban area of Moulamein.

4.5.5 Environmental attributes

4.5.5.1 Flooding

A Floodplain Management Plan (FMP) has been prepared for the Edward and Wakool Rivers from Deniliquin to Moama-Moulamein railway, and for the Neimur Rivers between the Moama-Moulamein railway, Leiwah and Mallan.

The extent of flooding within the Moulamein floodplain depends on flow conditions within the Edward River at Deniliquin. The 1975 flood event which was a 15-20 year Average Recurrence Interval (ARI) is considered the 'design' event for flood planning and sets the flood planning level for non-urban areas. Council is required to undertake an audit of the existing town levee. The town was evacuated during a flood event in 2016 due to concerns about the structural integrity of the levee.

4.5.5.2 Bushfire

The village of Moulamein and surrounding managed farm land are not mapped as being bushfire prone.

4.5.5.3 Biodiversity

Wetlands and waterways

The Edward River and Billabong Creek and their riparian corridors are mapped as environmentally sensitive in the Watercourse, Wetlands and Terrestrial Biodiversity maps accompanying Wakool LEP 2013. In addition, the billabong recreation area to the north and much of the rural land adjoining the Edward River to the west of town are mapped as environmentally sensitive.

Vegetation, threatened ecological communities (TEC)

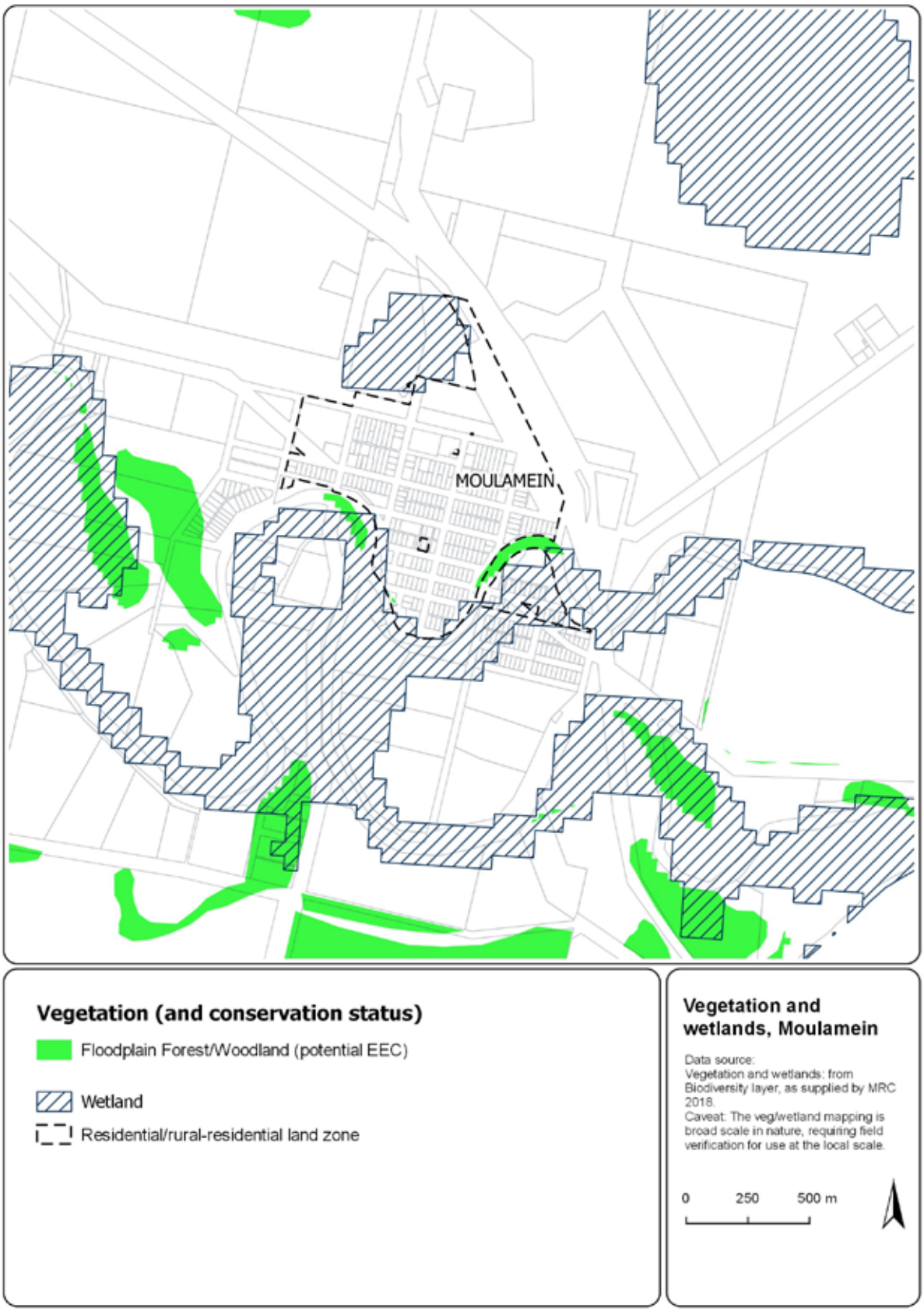
Moulamein is surrounded by a relatively large amount of native vegetation compared to most other settlements in the LGA. This is associated with the travelling stock reserve (TSR) and other floodplain areas not developed for cropping/horticulture. It is important to note that aerial imagery, e.g. NSW SIX Maps, shows significantly more remnant native vegetation on the floodplains than what the currently available vegetation mapping indicates. Minor areas of cleared land are likely to comprise derived (native) grassland or chenopod shrubland.

Other than River Red Gum forest, most remnant vegetation communities in the locality are likely to represent a TEC. Based on current broad scale mapping and habitat characteristics in the locality, the floodplain associated TEC, Myall (Boree) Woodland, is likely to be present in the locality. More elevated areas, off the active floodplain, may contain the following TEC known from the region: Sandhill Pine Woodland, Acacia melvillei Shrubland, Acacia loderi Shrublands and Allocasuarina luehmannii (Buloke) Woodland (Table 3.13 lists full names and legal status of these communities). These TEC's may be represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Detailed descriptions are available at http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

No threatened plant species are known from the vicinity (Bionet 2018). Only one threatened species record occurs in the vicinity, the Grey-crowned Babbler, about 1.5km south of Moulamein, however given the extensive amount of remnant woodland/forest in the area, numerous threatened species are likely to use the habitat, e.g. particular birds and small mammals such as microbats and native rodents.

Figure 4.5c: Vegetation and wetlands, Moulamein



4.6 Murray Downs

4.6.1 Description

4.6.1.1 Location, history and features

Murray Downs is situated on the Murray River north of the Victorian township of Swan Hill within the Greater Wakool Ward. Murray Downs is a relatively new settlement that is associated with the development of the Murray Downs Golf and Country Club and as an alternative residential area to Swan Hill.

The Murray Downs Homestead, located on the Swan Hill-Kyalite Road, is listed as a heritage item of state significance on the NSW State Heritage Register and in Wakool LEP 2013.

Figure 4.6a: Aerial image of Murray Downs. Source: SIX Maps, 2018

4.6.1.2 Role and function

Murray Downs is classified as a hamlet in the Murray River settlement hierarchy. The majority of the settlement is zoned R1 General Residential under Wakool LEP 2013 with the golf course and other recreational areas zoned RE2 Private Recreation. An industrial area north of Swan Hill Road is zoned IN1 General Industrial. Zone SP2 Infrastructure has been applied to elements of the sewerage system and to the Wamba Wamba Aboriginal Settlement located on the river frontage north of the river crossing.

Limited services are available to residents locally although daily and higher order goods and essential services are provided in the regional centre of Swan Hill. Murray Downs has strong connections with Swan Hill in terms of services and as a source of employment.

The main attraction of Murray Downs is the Murray Downs Golf and Country Club. This facility provides tourist accommodation as well as a restaurant and sporting facilities. Other developments in the area are a dorper stud, grain silos and a transport business and marine activities close to the river frontage.

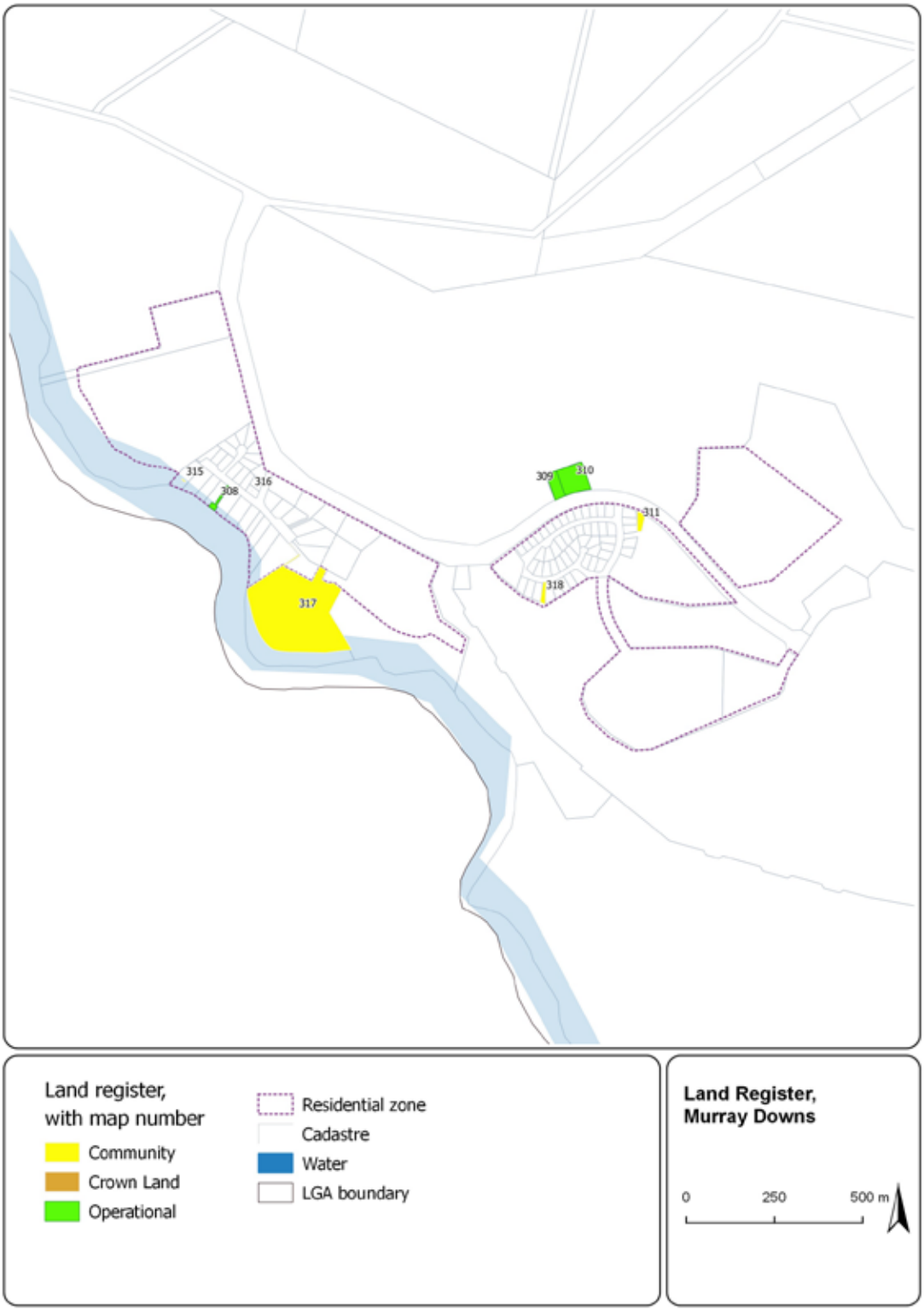
4.6.1.3 Public land

Public land in Murray Downs is shown in Figure 4.6b as community, operational and crown land. The corresponding descriptions are given in Table 4.6a below.

Table 4.6a: Public land register, Murray Downs

Map No.	Land Use	Map No.	Land Use
308	Sewerage	315	Public Reserve - Kidman Reid Dr - Murray Downs
309	Fire Shed	316	Reserve
310	Fire Brigade	317	Reserve
311	Park	318	Public Reserve

Figure 4.6b: Public land register, Murray Downs

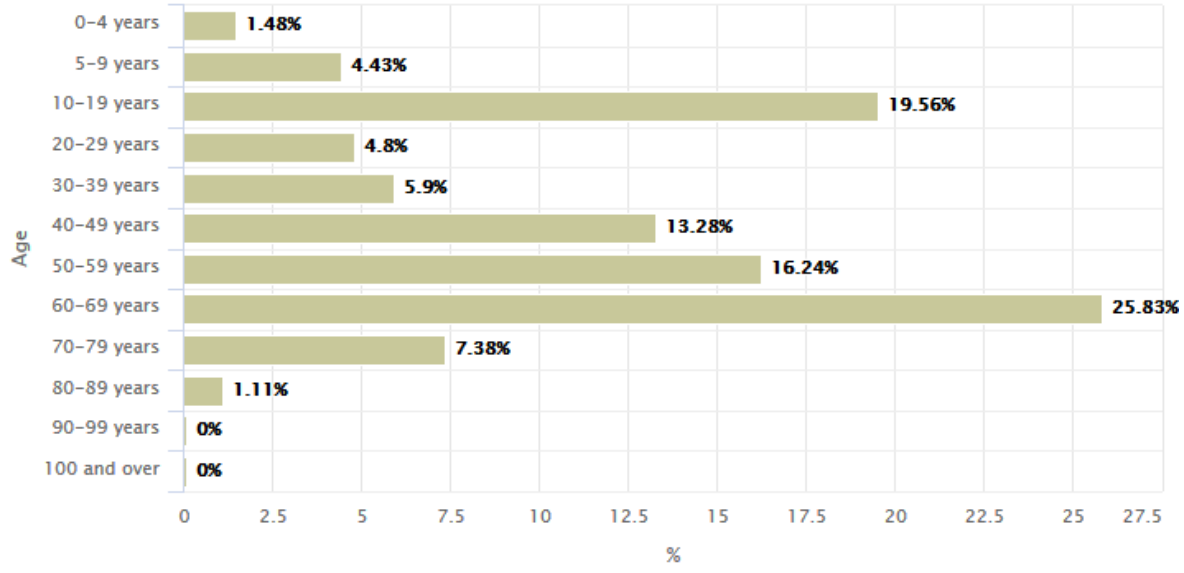


4.6.2 Demographics

4.6.2.1 Population

The population of Murray Downs as recorded in the 2016 Census is 271 persons. 40% are in the working age group of 20 to 60 years and one-third of residents are aged over 60 years. A high proportion of the population is within the 10 to 19 years age bracket (20%) suggesting the presence of young families living in Murray Downs.

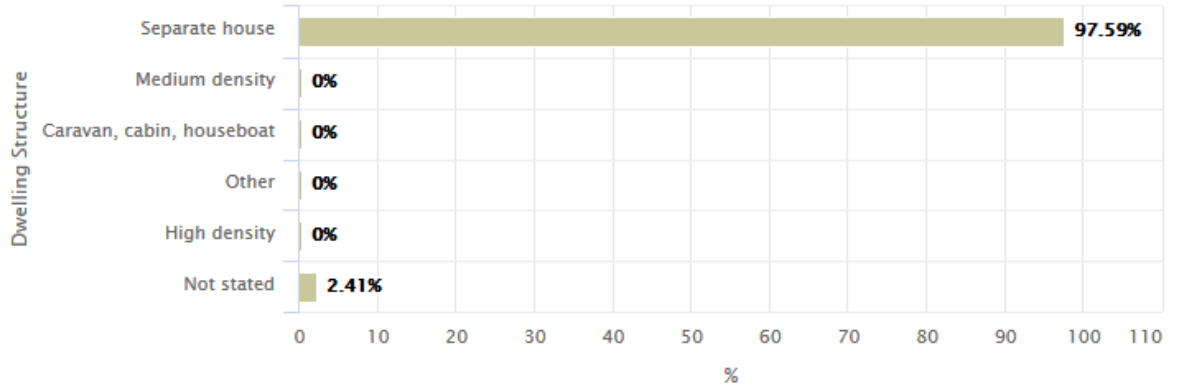
Chart 4.6a: Age distribution, Murray Downs 2016. Source: REMPLAN Community



4.6.2.2 Housing

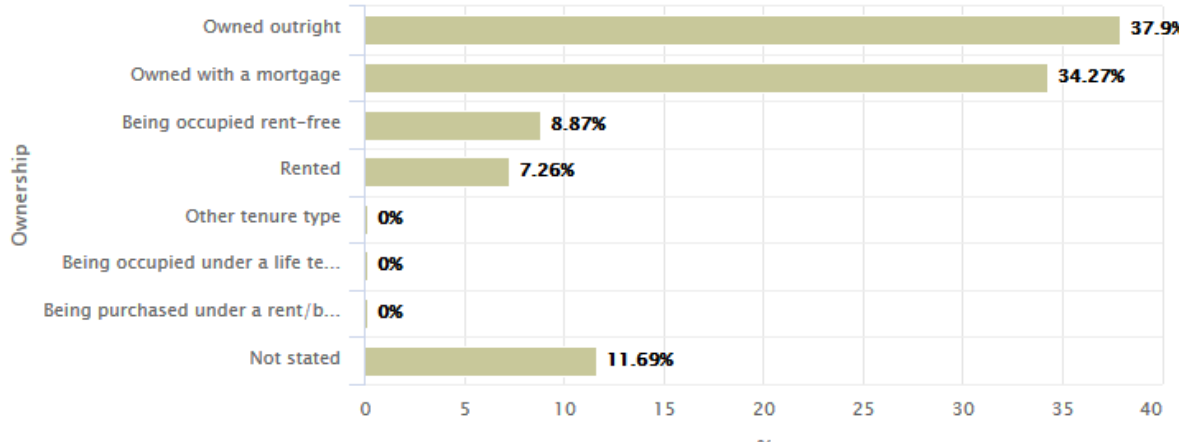
According to the 2016 Census, there were a total of 105 private dwellings in Murray Downs at the time of the census, noting that the census collection district includes surrounding farm land. It is a predominantly low density housing environment with 98% being noted as separate dwellings in the Census. There are no medium density dwellings in Murray Downs.

Chart 4.6b: Dwelling structure, Murray Downs 2016. Source: REMPLAN Community



Nearly three-quarter of dwellings in Murray Downs are owned outright or under mortgage and 18% are rentals.

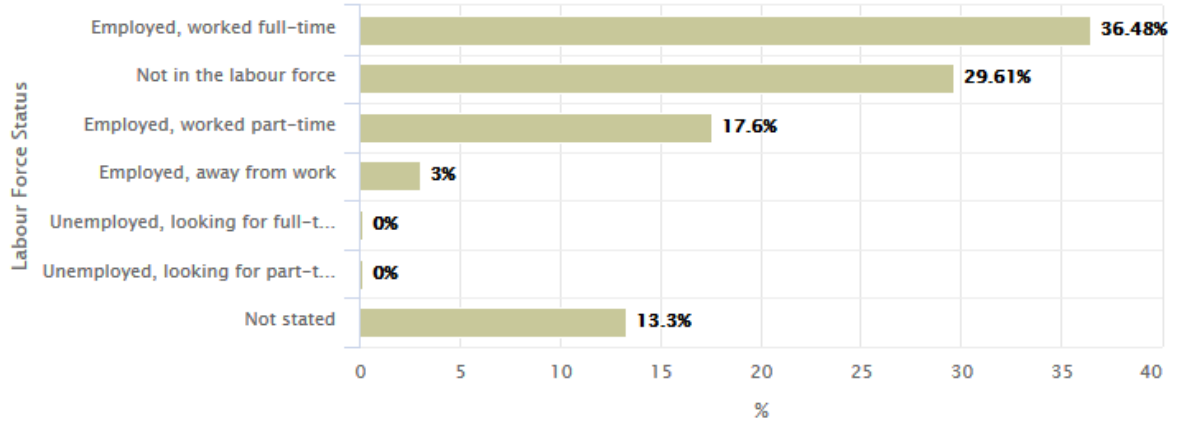
Chart 4.6c: Dwelling tenure, Murray Downs 2016. Source: REMPLAN Community



4.6.2.3 Employment

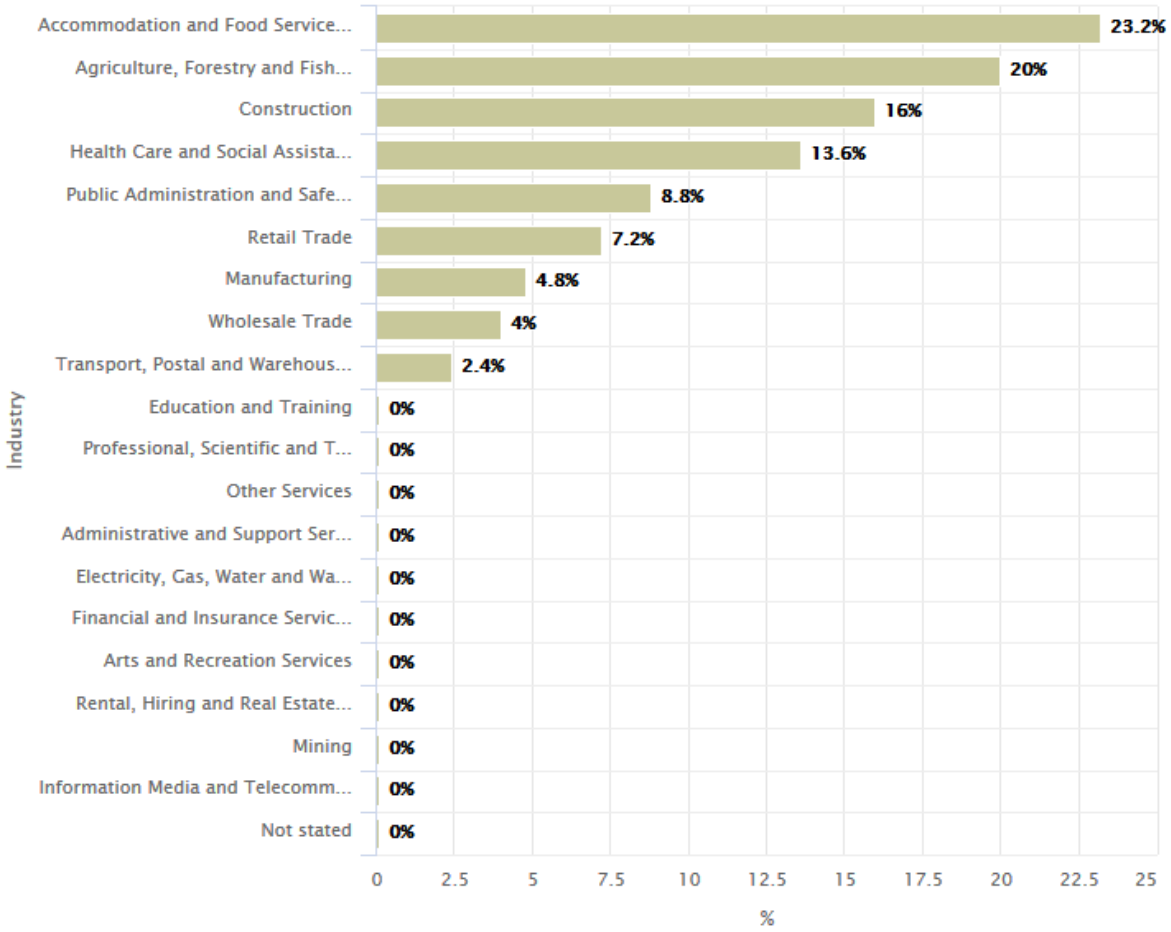
More than one-third of the residents of Murray Downs are not employed or actively seeking work and under one-third of the population is employed full time. A high proportion (18%) are employed part time. The labour force represents 50% of the population.

Chart 4.6d: Labour force status, Murray Downs 2016. Source: REMPLAN Community



Accommodation and food services is the largest industry and employs 23.2% of the labour force. This reflects the presence of the Murray Downs Golf and Country Club. This is followed by agriculture, forestry and fishing (20%) and construction (16%).

Chart 4.6e: Industry of employment, Murray Downs 2016. Source: REMPLAN Community



4.6.3 Land availability

4.6.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential, commercial and industrial development in Murray Downs issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any change of use to existing buildings. The data for the financial year 2017-18 is up until 19 April 2018.

Table 4.6b: Development approvals in Murray Downs, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Residential	0	1	4	4	5	0	14
Industrial	0	1	0	0	0	0	1
Commercial	0	0	0	0	0	0	0
Total	**0**	**2**	**4**	**4**	**5**	**0**	**15**

4.6.3.2 Land supply

Urban land in Murray Downs is zoned R1 General Residential under Wakool LEP 2013. Residential, tourist accommodation, infrastructure and limited commercial development is permitted in zone R1. The status of land zoned R1 as occupied, vacant subdivided land or vacant unsubdivided land is given in the Table 4.6c below.

Lots occupied by an infrastructure item, a commercial or industrial use, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

This data has been sourced from the NSW Government's SIX Maps imagery dated 2012. All development approvals since 2012-13 have been factored into the land supply analysis as occupied lots.

Table 4.6c: Supply of land zoned RU5 in Murray Downs

Status	No. of lots
Occupied subdivided lots	93
Vacant subdivided lots with approvals	15
Vacant subdivided lots without approvals	4
Total subdivided lots	112
Potential yield vacant unsubdivided lots	190
Total vacant lots (subdivided and unsubdivided)	194

Subdivided lots in Murray Downs are generally between 750m^2 and 1,000m^2 in area in the original subdivision adjoining the golf course. Newer subdivisions to the west comprise lots upwards from 2,000m^2. An estimate of the potential yield of vacant unsubdivided lots has been made having deducted 25% of total land for services and easements area and dividing by an average lot size of 2,000m^2 as follows:

Table 4.6d: Estimated potential yield of vacant land, Murray Downs

Land	Approximate area	Net developable area (total area less 25% for services and easements)	Potential yield @ a 2,000m^2 lot size
Lot 1 DP 1144152 Murray Downs Drive	3.41ha – 7,520m^2 access handle to river = 26,580m^2	19,935m^2	10 lots
Lot 2 DP 1144152 Murray Downs Drive	16.34ha (163,400m^2)	122,550m^2	61 lots
Lot 24 DP 1186290 Kidman Reid Drive	5.62ha (56,200m^2)	42,150m^2	21 lots
Lot 51 DP 813520 Currowong Court	6,360m^2	4,770m^2	2 lots
Lot 2 DP 1002063 Murray Downs Drive	4.46ha – 675m^2 access handle = 43,925m^2	32,944m^2	16 lots
Lot 4 DP 785831 Murray Downs Drive	2.49ha (24,900m^2)	18,675m^2	9 lots
Lot 58 DP 813520 Murray Downs Drive	9.83ha – 6,660m^2 access handle = 91,640m^2	68,730m^2	34 lots
Lot 2 DP 785831 Murray Downs Drive	10ha (100,000m^2)	75,000m^2	37 lots
Total			**190 lots**

There is estimated to be a total of 194 vacant subdivided and unsubdivided lots. At an average take-up of 2.5 allotments per annum and assuming this take-up rate continues indefinitely, there is estimated to be sufficient vacant zoned urban land for over 70 years.

There is no minimum lot size applying to land zoned R1 General Residential in Murray Downs, however, the potential for further subdivision of existing vacant subdivided lots and occupied lots is limited due to the size of dwellings and the small areas of land remaining for further subdivision.

4.6.4 Services and capacity

4.6.4.1 Water supply systems

The town of Murray Downs is serviced with a water reticulation supply system of potable water sourced from the Murray River (Lower Murray Water, Swan Hill). The Murray Downs water supply system was commissioned in 1992 and includes a conventional treatment system providing coagulation, flocculation, sedimentation, filtration and chlorination.

The existing water supply system services a population of 271 with no spare capacity to cater for growth. Upgrades to the current water treatment plant and/or additional storage reservoirs are required. However, no specific upgrades are planned at this stage.

4.6.4.2 Sewerage systems

Murray Downs is serviced by a reticulated sewerage system comprising both gravity and rising mains including four small pump stations and lift pumps that ultimately transfer sewage to the Murray Downs Sewerage Treatment Plant.

The treatment facility includes a clarifier, membrane bioreactor and evaporation ponds with design capacity for 1000 EP, and currently servicing 550 EP. Pressure on the existing treatment system can occur at different times of the year during periods of high visitation by tourists and workers. Planned plant and network upgrades include the renewal of mains lines in 2020 and membrane replacement in 2023.

4.6.4.3 Stormwater drainage

Council's stormwater system within Murray Downs generally consists of layback kerb and gutter draining to a pit and pipe network or open drainage channel, ultimately directing stormwater runoff to the Murray River. In many areas stormwater runoff is directed to open drainage channels or road side swales. Planned plant and network upgrades include the installation of new kerb and guttering and drainage infrastructure in local streets.

4.6.4.4 Roads and bridges

Murray Downs is connected to Swan Hill, via the Swan Hill-Kyalite Road (Main Road 467), which crosses the Murray River. Swan Hill Road also provides access to the north to Moulamein. Noorong Road provides access to Wakool to the east, and Murrabit Road, which is currently predominantly unsealed, provides access to Barham to the south. Council has budgeted to undertake ugrades and sealing of Murrabit Road over the next 5 to 10 years.

The Swan Hill Bridge is a major connection across the Murray River and provides access to Swan Hill from Murray Downs. The existing bridge has considerable heritage value as it is one of only two surviving Murray River bridges with Allan truss spans. The bridge is currently undergoing maintenance to improve structural strength and to increase width. A replacement bridge is planned and investigations carried out on behalf of Roads and Maritime Services in 2011 have determined a preferred option upstream of the existing bridge. A new crossing is expected to be built in the next 5 to 10 years if agreement can be reached on a suitable location.

4.6.5 Environmental attributes

4.6.5.1 Flooding

The Murray River catchment upstream of Murray Downs covers approximately 50,000 km^2 and incorporates the Mitta Mitta River, Kiewa River, Ovens River, Goulburn River, Campaspe River, Loddon River and the Avoca River. Upstream diversions assist to force floodwaters away from the Murray Downs area.

Private levees provide protection to development on either side of the Moulamein Road between the river bridge crossing and Murray Downs Drive. Residences along Murray Downs Drive are unprotected, however, impacts in a 100 year ARI flood are limited to grounds flooding only of a small number of properties.

A floodplain risk management study and plan for Murray Downs was completed in January 2017. Key recommendations that relate to land use planning are:

- Establish Flood Planning Levels (FPLs) for Murray Downs based on the 100 year ARI plus 0.5m freeboard and include mapping in the local environmental plan to define the affected area,
- Improve flood data collection, and
- As part of the new crossing works for the proposed replacement bridge two culvert structures should be constructed on Moulamein Road to improve the distribution of local and Murray River floodwaters to the north.

4.6.5.2 Bushfire

The hamlet of Murray Downs and surrounding managed farm land are not mapped as being bushfire prone.

4.6.5.3 Biodiversity

Wetlands and waterways

The Murray River that forms the south-western boundary to Murray Downs is mapped as being environmentally sensitive on the Terrestrial Biodiversity Map, the Wetlands Map and the Watercourse Map of Wakool LEP 2013, as it forms part of the aquatic threatened ecological community listed under the NSW Fisheries Management Act 1994: The aquatic ecological community in the natural drainage system of the lower Murray River catchment.

A tributary to the Murray that runs north of the town parallel to the river and beside the industrial area is also mapped as a wetland and watercourse. Riparian vegetation associated with the river, wetlands and watercourses and a large patch of remnant vegetation to the north of the golf course are also mapped as terrestrial biodiversity.

Vegetation, threatened ecological communities (TEC)

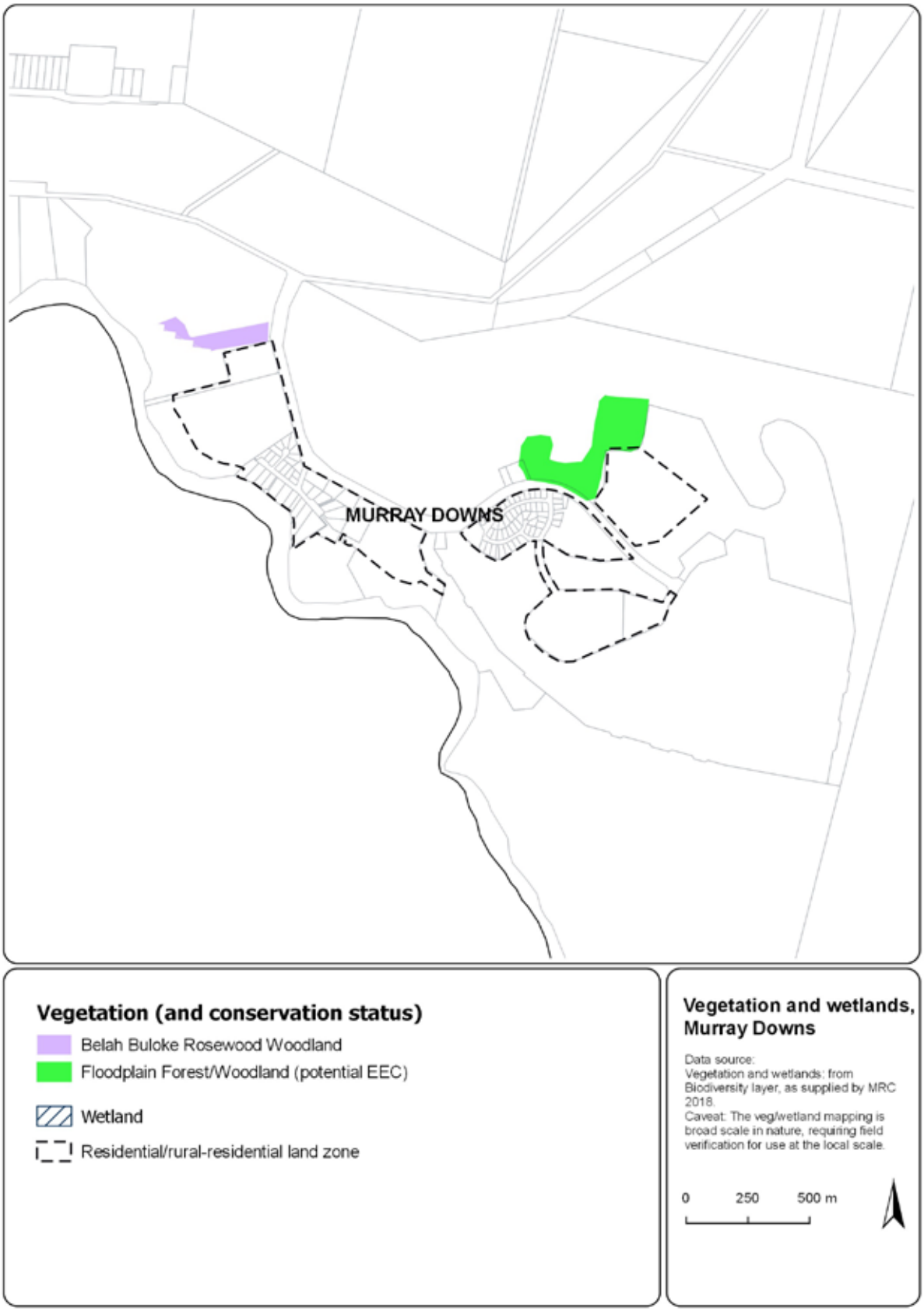
Murray Downs is mainly surrounded by cleared agricultural land. Patches of native vegetation are present between the residential area and the golf course/country club, with the northern patch appearing to contain both remnant vegetation and planted trees, based on aerial imagery (NSW SIX MAPS). Minor areas of cleared land may comprise derived (native) grassland.

Other than the River Red Gum forest, remnant vegetation in the locality is likely to represent a TEC. Based on current broad scale mapping and habitat characteristics in the locality, the floodplain associated TEC, Myall (Boree) Woodland, may be present in the locality. More elevated areas, off the active floodplain, may contain: Sandhill Pine Woodland, Acacia melvillei Shrubland, Acacia loderi Shrublands and Allocasuarina luehmannii (Buloke) Woodland (Table 3.13 lists full names and legal status of these communities). These TEC's may be represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Detailed descriptions are available at http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

No threatened plant species are known from the vicinity (Bionet 2018). The migratory species, Caspian Tern, is known from Swan Hill, this and other bird species are likely to use the wetlands/lakes in the golf course/country club.

Figure 4.6c: Vegetation and wetlands, Murray Downs



4.7 Tooleybuc

4.7.1 Description

4.7.1.1 Location, history and features

The township of Tooleybuc is located at the western end of Murray River LGA on the eastern banks of the Murray River. It was originally part of a pastoral run taken up by Augustus Morris in the 1840s and became a significant sheep grazing area from the 1860s. The land is generally semi-arid or arid and characterised by saltbush plain. Subdivision prior to World War 1 lead to the development of intensive agricultural pursuits with fruit-growing on fertile parts of the floodplain being the main industry.

The Tooleybuc Bridge over the Murray River was built in 1925 to provide alternative access to the ferry to the fruit-growers of the area. The bridge is a timber truss and steel lift span design which is of state heritage significance. It is listed as a heritage item in the NSW State Heritage Register and in Wakool LEP 2013.

*Figure 4.7a: Aerial image of Tooleybuc. S*ource: SIX Maps, 2018

4.7.1.2 Role and function

Tooleybuc is classified as a hamlet in the Murray River settlement hierarchy. The settlement is zoned RU5 Village under Wakool LEP 2013 with the water supply system and the sewerage system zoned SP2 Infrastructure. Foreshore parks and sporting fields are zoned RE1 Public Recreation, and Tooleybuc Sporting Club and golf course are zoned RE2 Private Recreation.

Services offered in Tooleybuc include three motels, a hotel, a general store, newsagency and service station. The settlement has a combined primary and secondary school and a branch of Health and Community Care.

Large almond plantations are being developed in the vicinity of the settlement of Tooleybuc and the hamlet of Goodnight with approximately 320 hectares of plantings committed to occur over the next 10 years with potentially more following that. The almond industry is likely to bring positive impacts through employment and increased expenditure in the community. The suitability of the land to grow pistachio nuts is also under investigation.

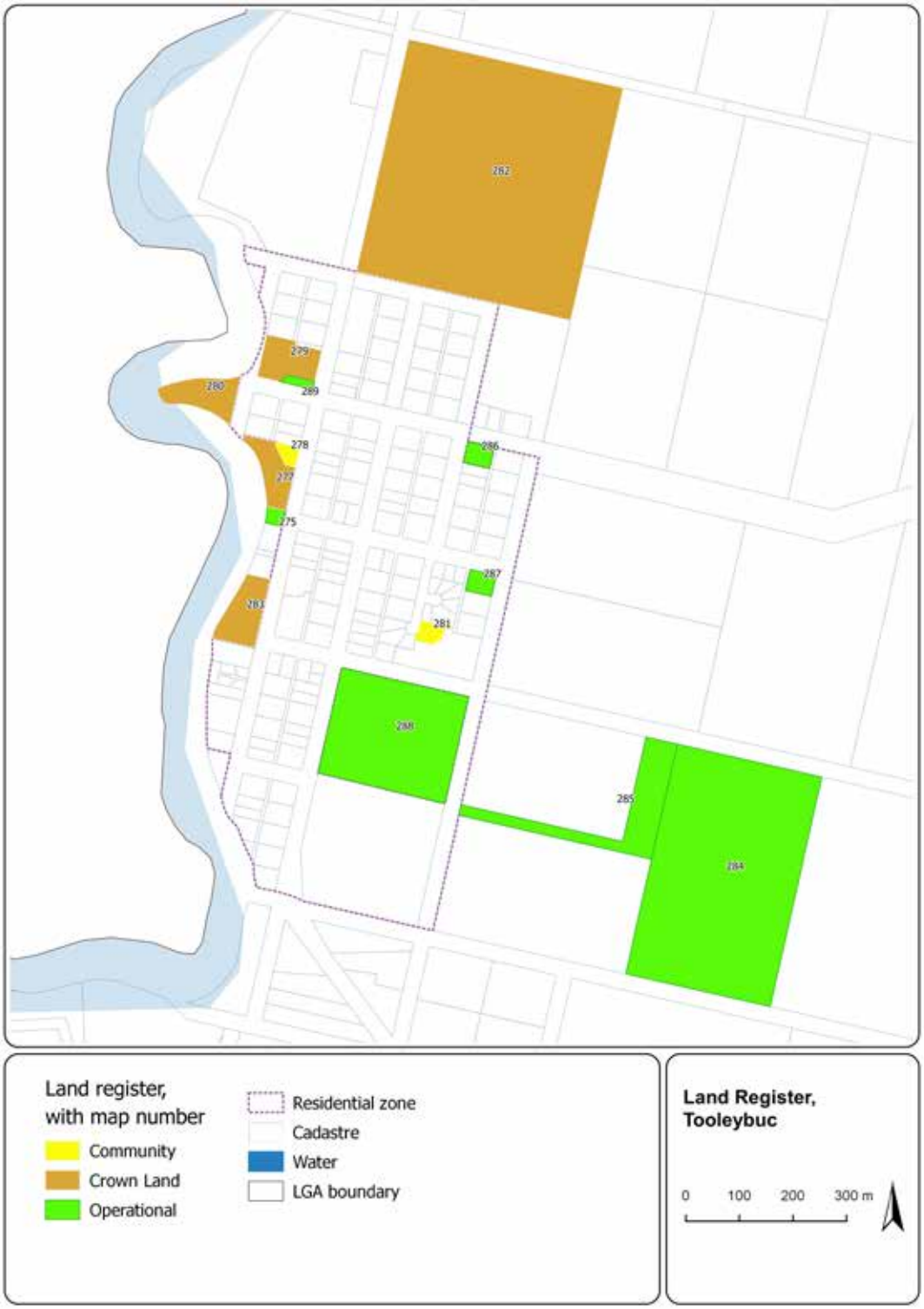
4.7.1.3 Public land

Public land in Tooleybuc is shown in Figure 4.7b as community, operational and crown land. The corresponding descriptions are given in Table 4.7a below.

Table 4.7a: Public land register, Tooleybuc

Map No.	Land Use	Map No.	Land Use
283	Public Recreation	282	Reserve
275	Tooleybuc Caretakers Cottage	284	Sewerage
277	Playground	285	Sewerage
278	Playground	286	Water
279	Reserve	287	Depot
280	Reserve	288	Water
281	Reserve	289	Fire Shed

Figure 4.7b: Public land register, Tooleybuc

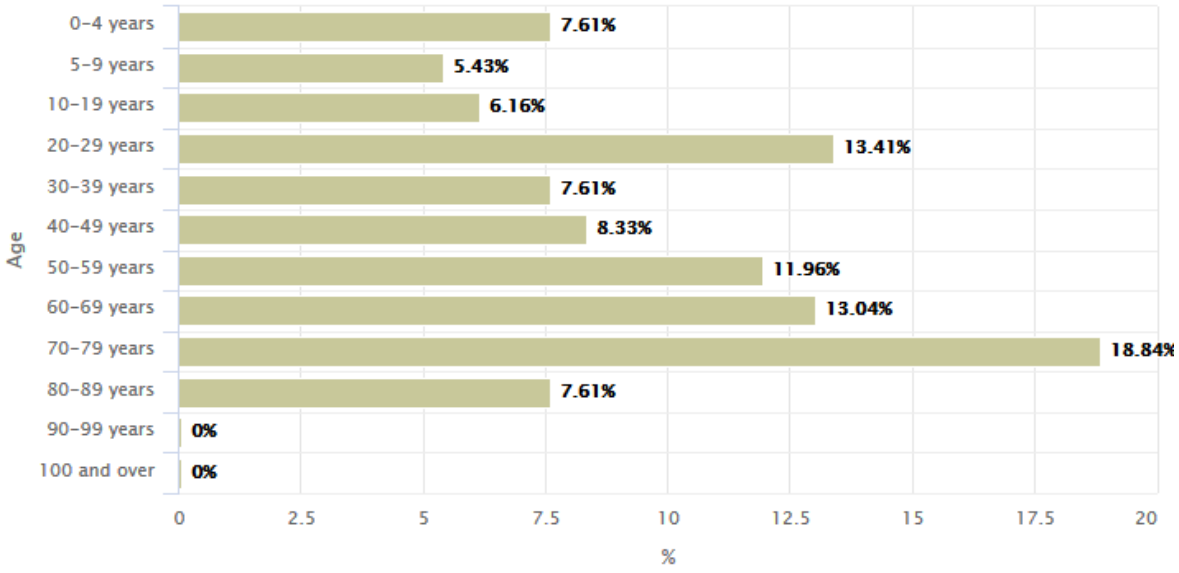


4.7.2 Demographics

4.7.2.1 Population

The population of Tooleybuc as recorded in the 2016 Census is 276 persons. Over 40% are in the working age group of 20 to 60 years and a similar proportion of residents are aged over 60 years.

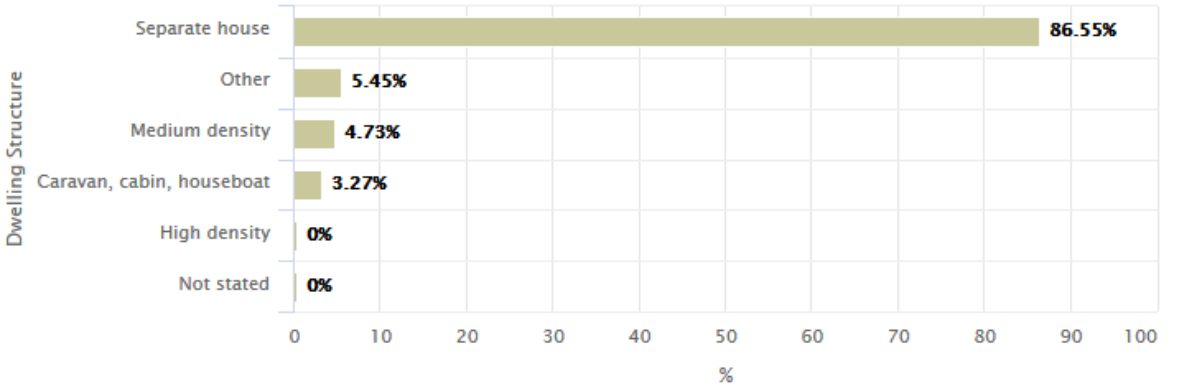
Chart 4.7a: Age distribution, Tooleybuc 2016. Source: REMPLAN Community



4.7.2.2 Housing

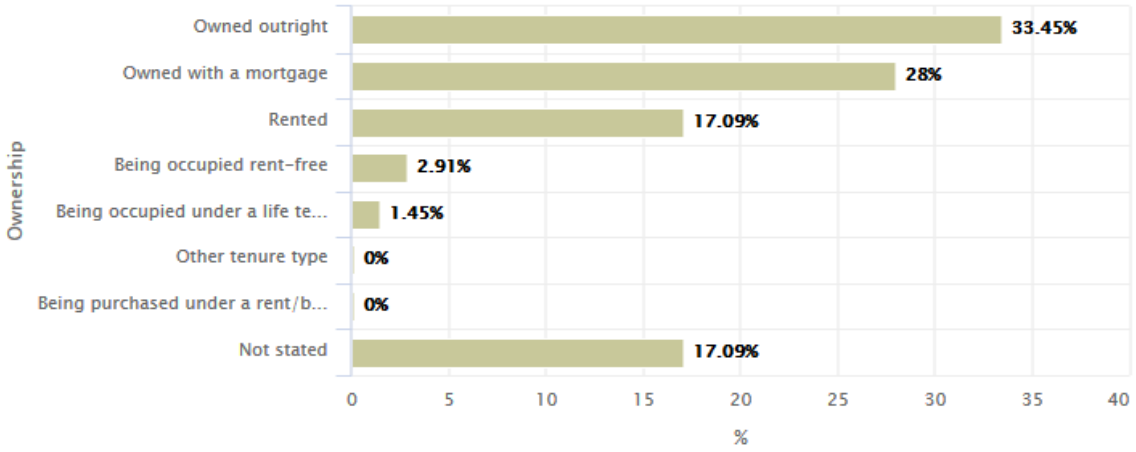
According to the 2016 Census, there were 120 private dwellings in Tooleybuc at the time of the census. Note that the ABS census collection district includes surrounding rural land as well as the township. Of total dwellings 90% were occupied private dwellings with the remainder being non-private dwellings. It is a predominantly low density housing environment with over 86% being separate dwellings on large allotments. Less than 5% of dwellings are medium density such as villas, townhouses, flats and apartments.

Chart 4.7b: Dwelling structure, Tooleybuc 2016. Source: REMPLAN Community



Over 60% of dwellings are owned outright or under mortgage and 17% are rentals.

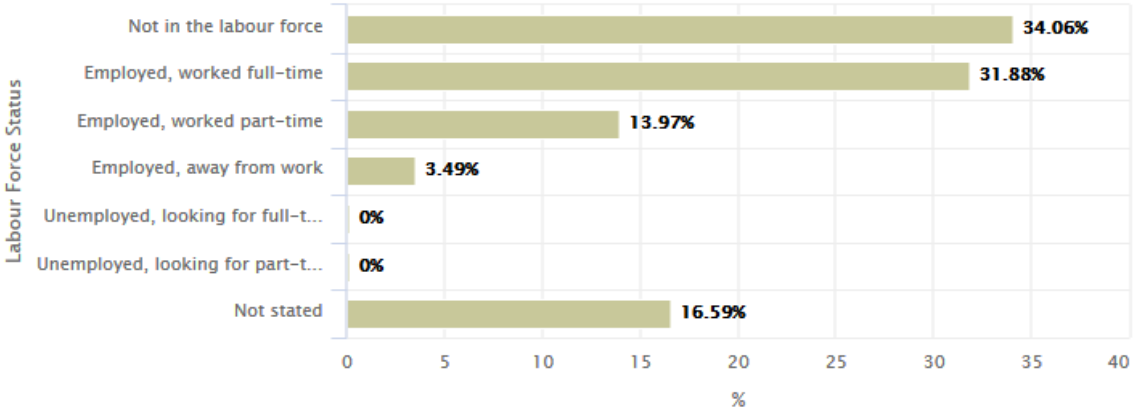
Chart 4.7c: Dwelling tenure, Tooleybuc 2016. Source: REMPLAN Community



4.7.2.3 Employment

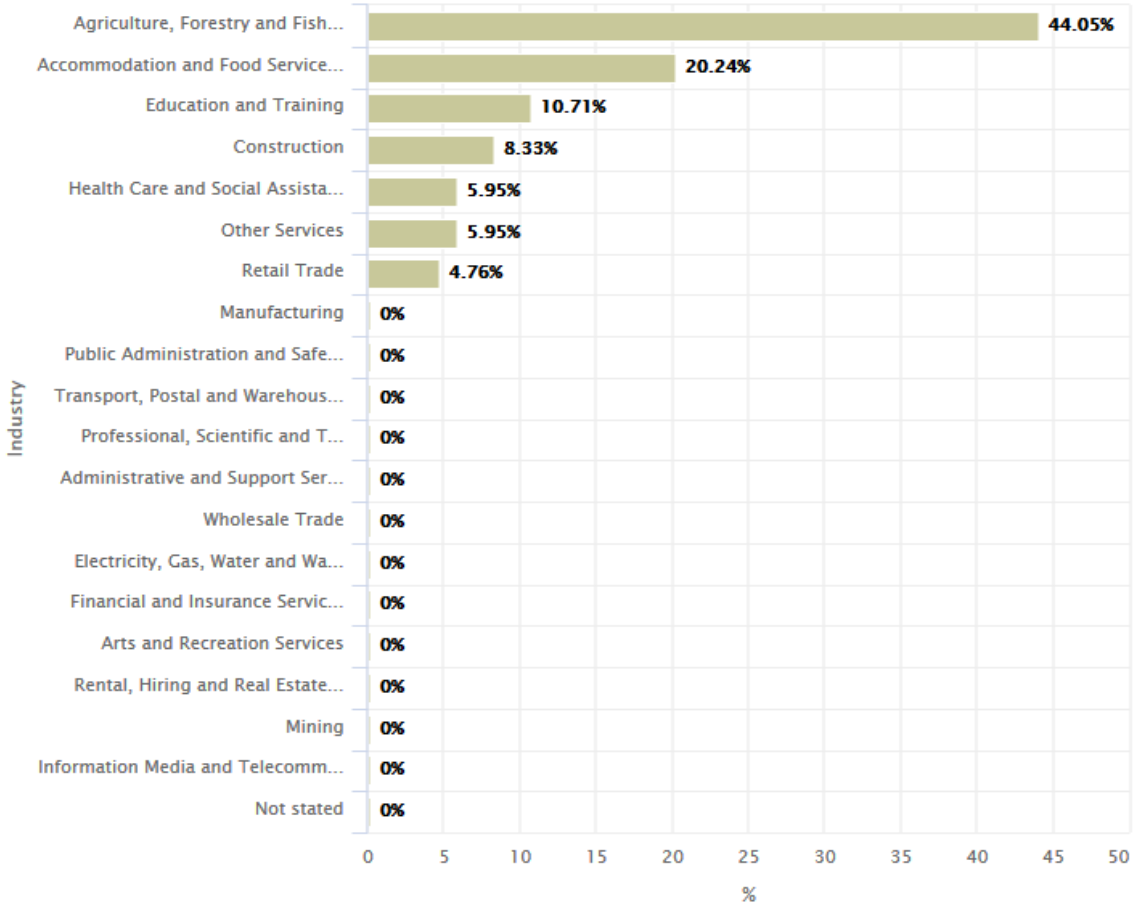
Just over one-third of the residents of Tooleybuc are not employed or actively seeking work and one-third of the population is employed full time. The labour force represents 49% of the population.

Chart 4.7d: Labour force status, Tooleybuc 2016. Source: REMPLAN Community



Agriculture, forestry and fishing is the largest industry and employs 44% of the labour force. This is followed by accommodation and food services (20.2%) and education and training (10.7%) reflecting the presence of the sports club and the k-12 public school.

Chart 4.7e: Industry of employment, Tooleybuc 2016. Source: REMPLAN Community



4.7.3 Land availability

4.7.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential, commercial and industrial development in Tooleybuc issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any change of use to existing buildings.

The data for the financial year 2017-18 is up until 19 April 2018. There have been a total of 7 approvals in the period, comprising 5 dwelling approvals and two approvals for industrial development. This shows an average take-up of vacant land of 1 allotment per annum.

Table 4.7b: Development approvals in Tooleybuc, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Residential	1	0	1	0	2	1	5
Industrial	0	0	1	0	1	0	2
Commercial	0	0	0	0	0	0	0
Total	**0**	**0**	**2**	**0**	**3**	**1**	**7**

4.7.3.2 Land supply

Urban land in Tooleybuc is zoned RU5 Village under Wakool LEP 2013. Residential, commercial and industrial development is permitted in zone RU5. The status of land zoned RU5 as occupied, vacant subdivided land or vacant unsubdivided land is given in the Table 4.7c below.

Lots occupied by an infrastructure item, a commercial or industrial use, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

This data has been sourced from the NSW Government's SIX Maps imagery dated 2013. All development approvals since 2012-13 have been factored into the land supply analysis as occupied lots.

Table 4.7c: Supply of land zoned RU5 in Tooleybuc

Status	No. of lots
Occupied subdivided lots	104
Vacant subdivided lots with approvals	7
Vacant subdivided lots without approvals	30
Total subdivided lots	141
Potential yield vacant unsubdivided lots	49
Total vacant lots (subdivided and unsubdivided)	79

Subdivided lots in Tooleybuc are generally either 1,000m^2 or 2,000m^2 in area. However, a recent subdivision designed around a cul-de-sac incorporates a range of lot sizes between 600m^2 and 1,000m^2. An estimate of the potential yield of vacant unsubdivided lots has been made having deducted 25% of total land area and dividing by a lot size of 1,000m^2 as follows:

Table 4.7d: Estimated potential yield of vacant land, Tooleybuc

Land	Approximate area	Net area (total less 25%)	Potential yield @ a 1,000m^2 lot size
Lot 63 DP 756584 Cadell Street	5.62 hectares (56,200m^2)	42,150m^2	42 lots
Lot 2 DP 1077629 Grant Street	9,295m^2	6,971m^2	7 lots
Total			**49 lots**

There is estimated to be a total of 79 vacant subdivided and unsubdivided lots. At an average take-up of 1 allotment per annum there is estimated to be sufficient vacant zoned urban land for almost 80 years.

As there is no minimum lot size applying to land zoned RU5 Village in Tooleybuc, there is also the potential for further subdivision of existing vacant subdivided lots and occupied lots where the existing dwelling is positioned to enable subdivision.

4.7.4 Services and capacity

4.7.4.1 Water supply systems

The town of Tooleybuc is serviced with a dual water reticulation supply system of potable and raw (untreated) water sourced from the Murray River. The Tooleybuc water supply system was completed in 2001 and includes a newer treatment plant using micro-filtration, activated carbon and chlorination.

The existing water supply system services a population of approximately 276 and is at capacity. Upgrades to the current water treatment plant and/or additional storage reservoirs are required. Planned plant and network upgrades include refurbishment of the water tower in 2020 and membrane replacement in 2022.

4.7.4.2 Sewerage systems

Tooleybuc is generally serviced by a series of lift grinder pumps and rising mains ultimately transferring sewage to the Tooleybuc Sewer Treatment Plant. The treatment facility includes septic tanks, oxidation ponds, evaporation and reuse for irrigation. The system is designed to service 500EP and currently serves about 210EP.

Pressure on the existing treatment system can occur at different times of the year depending on the numbers of tourists and travelling workers visiting the area. No upgrades are currently proposed to the Tooleybuc sewerage system.

4.7.4.3 Stormwater drainage

Council's stormwater system within Tooleybuc generally consists of kerb and gutter draining to a pit and pipe network or open drainage channel, ultimately directing stormwater runoff to the Murray River. To manage stormwater pollutants, Council has installed several gross pollutant traps in Tooleybuc including one on the Murray Street and Lea Street discharge points to the Murray River. No upgrades are currently proposed to the Tooleybuc stormwater drainage system.

4.7.4.4 Roads and bridges

Tooleybuc Road provides a connection across the Murray River from Tooleybuc to the township of Piangil. Roads & Maritime Services in partnership with VicRoads has funding to plan for a new bridge on the Mallee Highway at Tooleybuc as part of the Bridges for the Bush initiative, with a focus on improved freight productivity in regional areas. The preferred option includes a new high-level bridge approximately 250 metres downstream of the existing historic bridge.

Yanga Way provides the main connection to the north and east to Balranald and Moulamein. Koraleigh Road connects to Koraleigh to the south.

4.7.5 Environmental attributes

4.7.5.1 Flooding

A flood study for Tooleybuc was completed for Wakool Shire Council in 2014. The study found that most of the existing town area at Tooleybuc is located on a sand hill that is elevated above the areas affected by flooding and there is therefore little or no risk of flooding occurring in the settlement area.

Similar to Barham, the Murray River catchment upstream of Tooleybuc covers more than 50,000 km^2 and incorporates the tributaries of the Mitta Mitta River, Kiewa River, Ovens River, Goulburn River, Campaspe River, Loddon River and the Avoca River. However, upstream diversions cause most floodwaters to bypass Tooleybuc.

A floodplain risk management study and plan for Tooleybuc was completed in January 2017 which includes the following key recommendations:

- Establish Flood Planning Levels (FPLs) for Tooleybuc based on the 100 year ARI plus 0.5m freeboard and include mapping in the planning scheme to define the affected area, and
- Improve flood data collection.

4.7.5.2 Bushfire

The hamlet of Tooleybuc and surrounding managed farm land are not mapped as being bushfire prone.

4.7.5.3 Biodiversity

Wetlands and watercourses

The Murray River that forms the western boundary to the urban area of Tooleybuc is mapped as being environmentally sensitive on the Terrestrial Biodiversity Map, the Wetlands Map and the Watercourse Map of Wakool LEP 2013, as it is included under the following aquatic threatened ecological community listed under the NSW Fisheries Management Act 1994:

The aquatic ecological community in the natural drainage system of the lower Murray River catchment.

A large wetland (Lake Coomaroop) and corresponding watercourse and riparian vegetation located about 1 kilometre to the east of the settlement is mapped as environmentally sensitive.

Vegetation, threatened ecological communities (TEC)

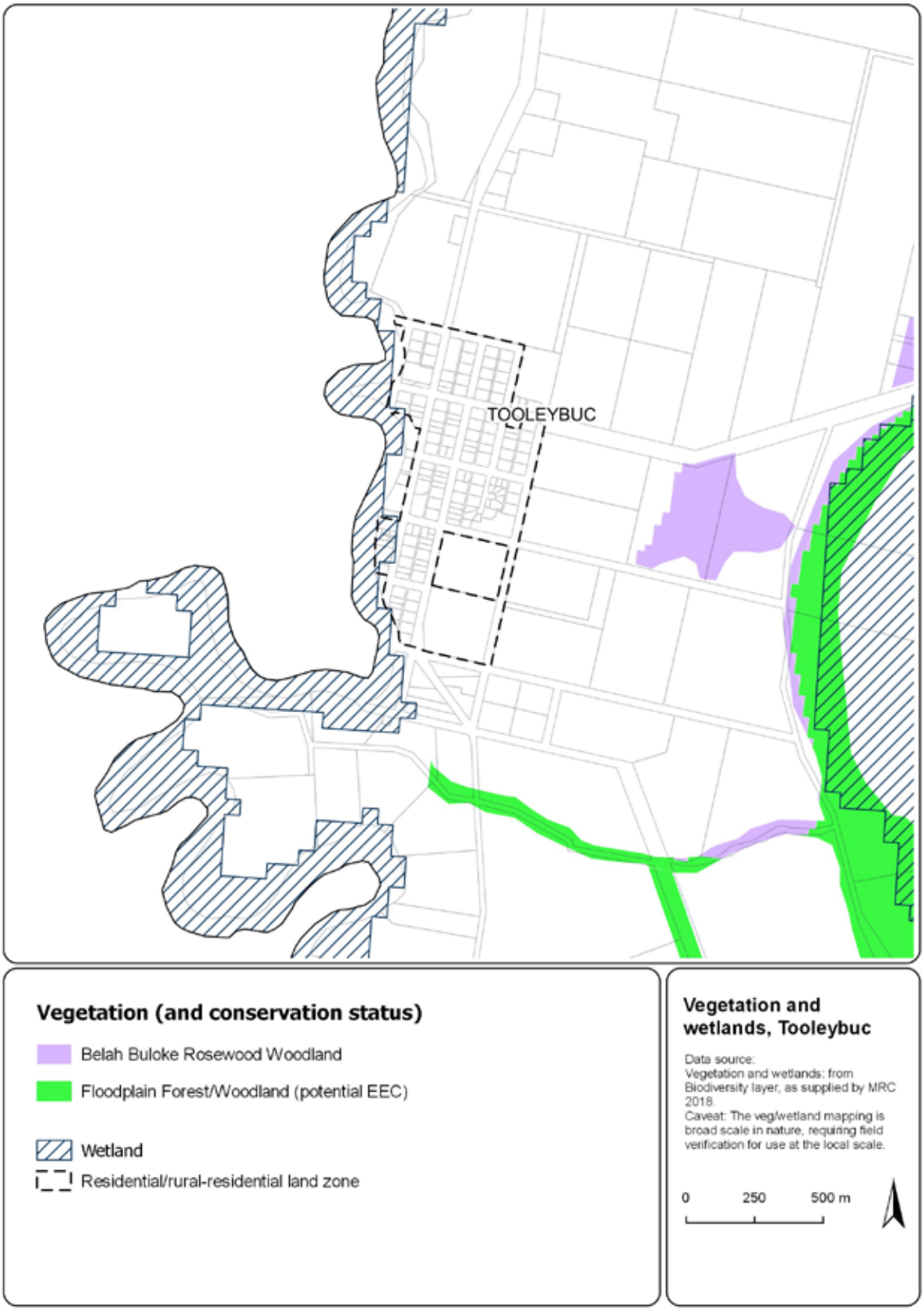
Tooleybuc is surrounded primarily by cleared land used for intensive horticulture/cropping, with only occasional native trees remaining. Narrow remnants of River Red Gum occur along the riverbank, with one more significant stand at the northern end of the township, near the Tooleybuc Sporting Club. More significant stands occur to the east surrounding Lake Coomaroop, with patches of derived (native) grassland potentially being present in this area if land exists that has not been used intensively for agriculture.

Other than River Red Gum forest, most remnant vegetation communities in the locality are likely to represent a TEC. Based on current broad scale mapping and habitat characteristics in the locality, TEC's may include Myall (Boree) Woodland, Sandhill Pine Woodland, Acacia melvillei Shrubland, Acacia loderi Shrublands and Allocasuarina luehmannii (Buloke) Woodland (Table 3.13 lists full names and legal status of these communities). These TEC's may be represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Detailed descriptions are available at http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

No threatened plant species are known form the vicinity (OEH 2018). A number of migratory bird species records are associated with the Lake Coomaroop wetland and, to a lesser extent, the riverine habitat (OEH 2018).

Figure 4.7c: Vegetation and wetlands, Tooleybuc



4.8 Wakool

4.8.1 Description

4.8.1.1 Location, History and features

Wakool is located north-east of Barham and is a small community surrounded by cereal croplands and grazing lands. Although not located on a river, it is in close proximity to the Edward, Niemur and Wakool Rivers. The settlement was surveyed in 1867 but not established until the 1890s when construction of the Echuca to Balranald rail line supported the expansion of the wheat industry.

Figure 4.8a: Aerial image of Wakool. Source: SIX Maps, 2018

4.8.1.2 Role and function

Wakool is classified as a village in the Murray River settlement hierarchy. The settlement is zoned RU5 Village under Wakool LEP 2013 with the water supply system, sewerage system and waste management facility zoned SP2 Infrastructure. Wakool Park, a large reserve containing a sports field, tennis courts and a bowling club located on Crown Land north of the village, is zoned RE2 Private Recreation.

Services offered in Wakool include a general store/post office, community hall, primary school, a branch of Health and Community Care, and the offices of Murray Irrigation Limited. There were are a number of vacant retail premises including the supermarket, two shops and the National Australia Bank building at the time a survey was undertaken in November 2017. A winery is located just off Burraboi Road at the northern entrance to the village.

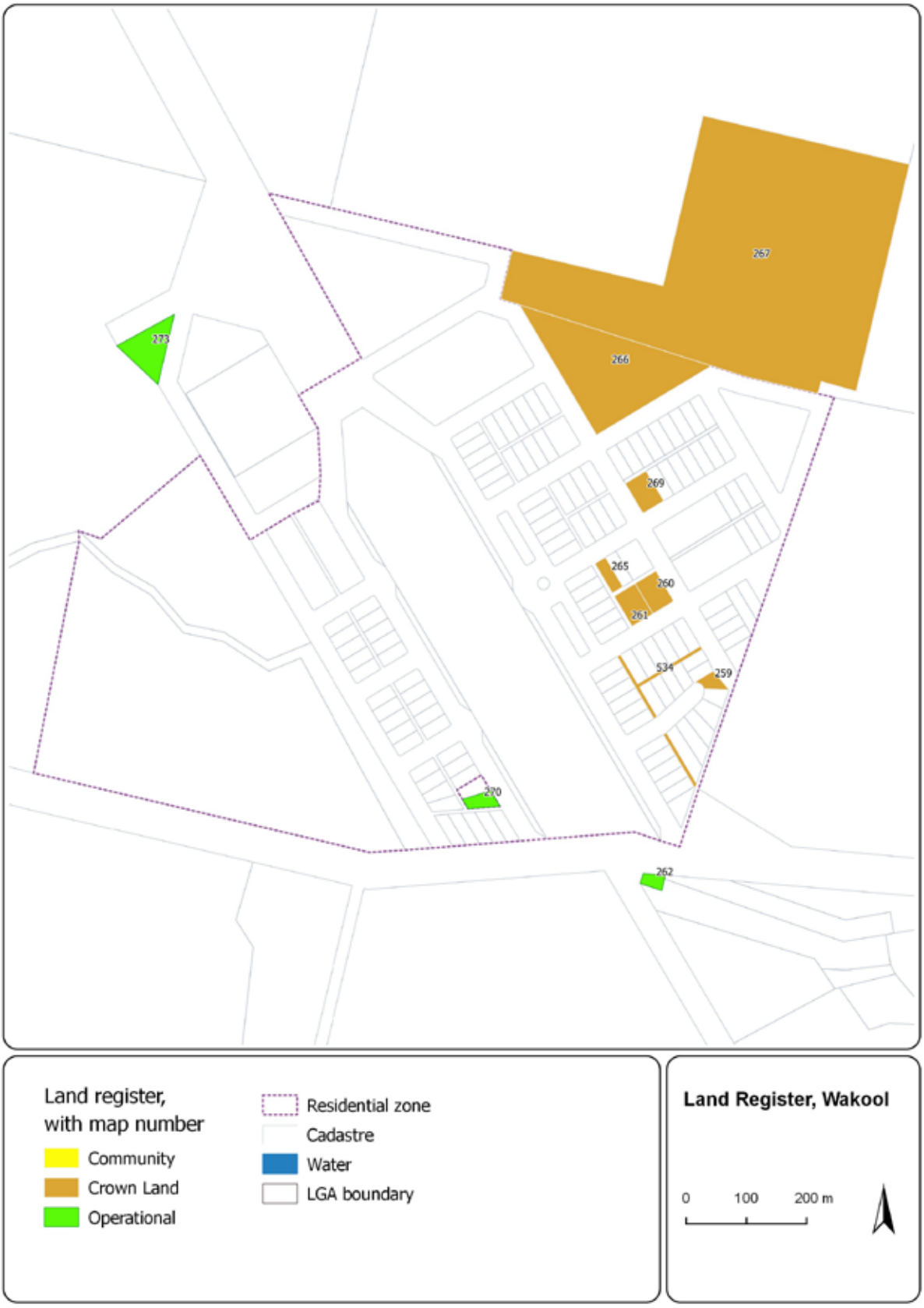
4.8.1.3 Public land

Public land in Wakool is shown in Figure 4.8b as community, operational and crown land. The corresponding descriptions are given in Table 4.8a below.

Table 4.8a: Public land register, Wakool

Map No.	Land Use	Map No.	Land Use
534	Drainage - Water Supply	266	Reserve
259	Bass Street Reserve (De Quiros Street Playground)	267	Recreation
260	Park	269	Water
261	Hall	270	Depot
262	Pump Station	273	Sewerage
265	Fire Services		

Figure 4.8b: Public land register, Wakool

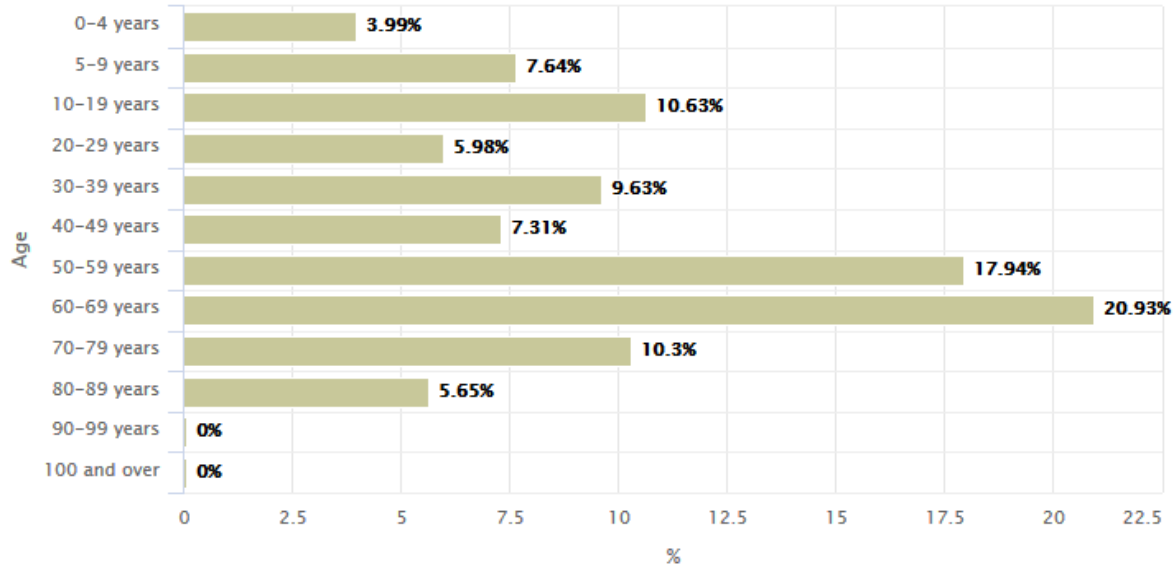


4.8.2 Demography

4.8.2.1 Population

The population of Wakool as recorded in the 2016 Census is 301 persons. Less than one-quarter of the population are in the working age group of 20 to 60 years, while more than a third of residents are aged over 60 years.

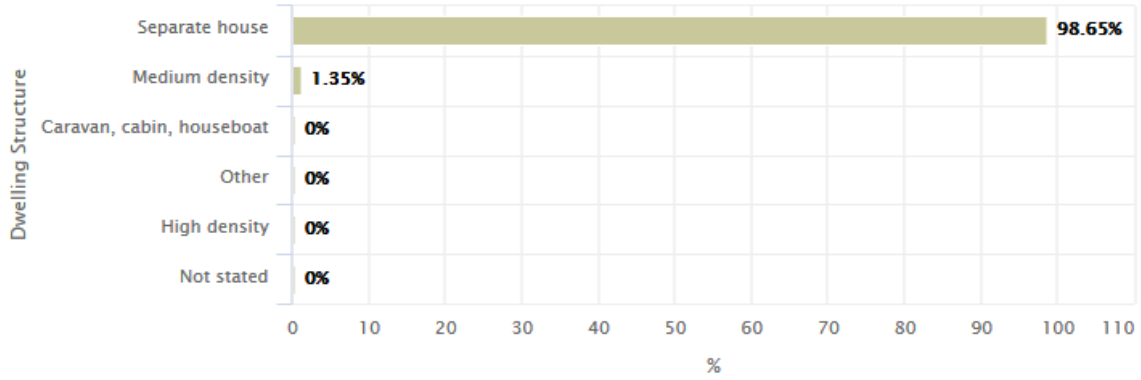
Chart 4.8a: Age distribution, Wakool 2016. Source: REMPLAN Community



4.8.2.2 Housing

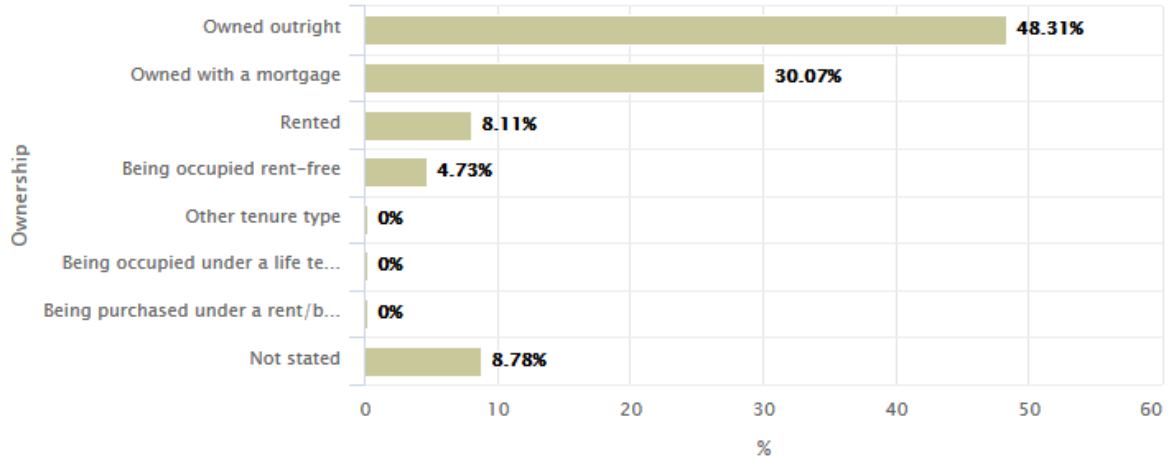
According to the 2016 Census there were 170 private dwellings in Wakool at the time of the census, noting that the census collection district includes surrounding farm land. Of total dwellings 99% were occupied. It is a predominantly low density housing environment with over 98.7% being separate dwellings and only 4 medium density dwellings, such as villas, townhouses, flats and apartments.

Chart 4.8b: Dwelling structure, Wakool 2016. Source: REMPLAN Community



Almost 80% of dwellings are owned outright or under mortgage and only 8% are rental properties.

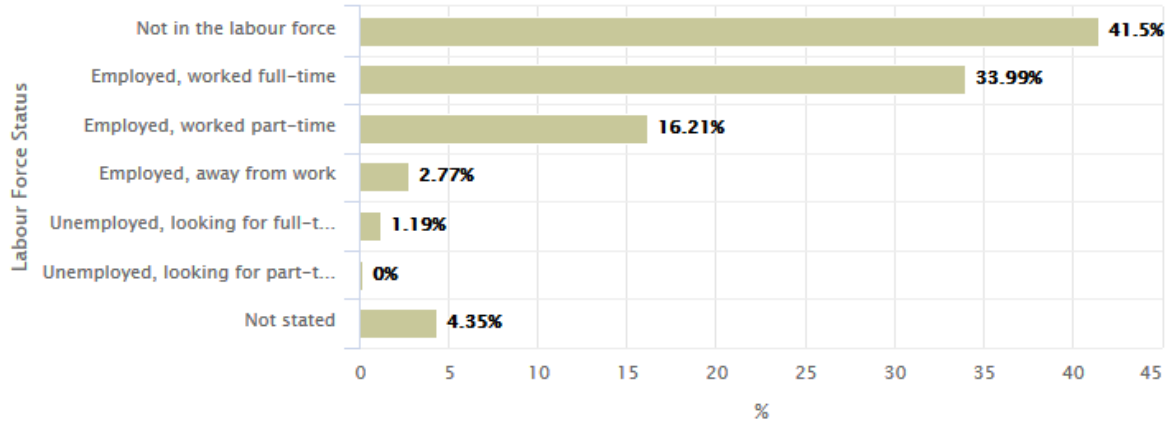
Chart 4.8c: Dwelling tenure, Wakool 2016. Source: REMPLAN Community



4.8.2.3 Employment

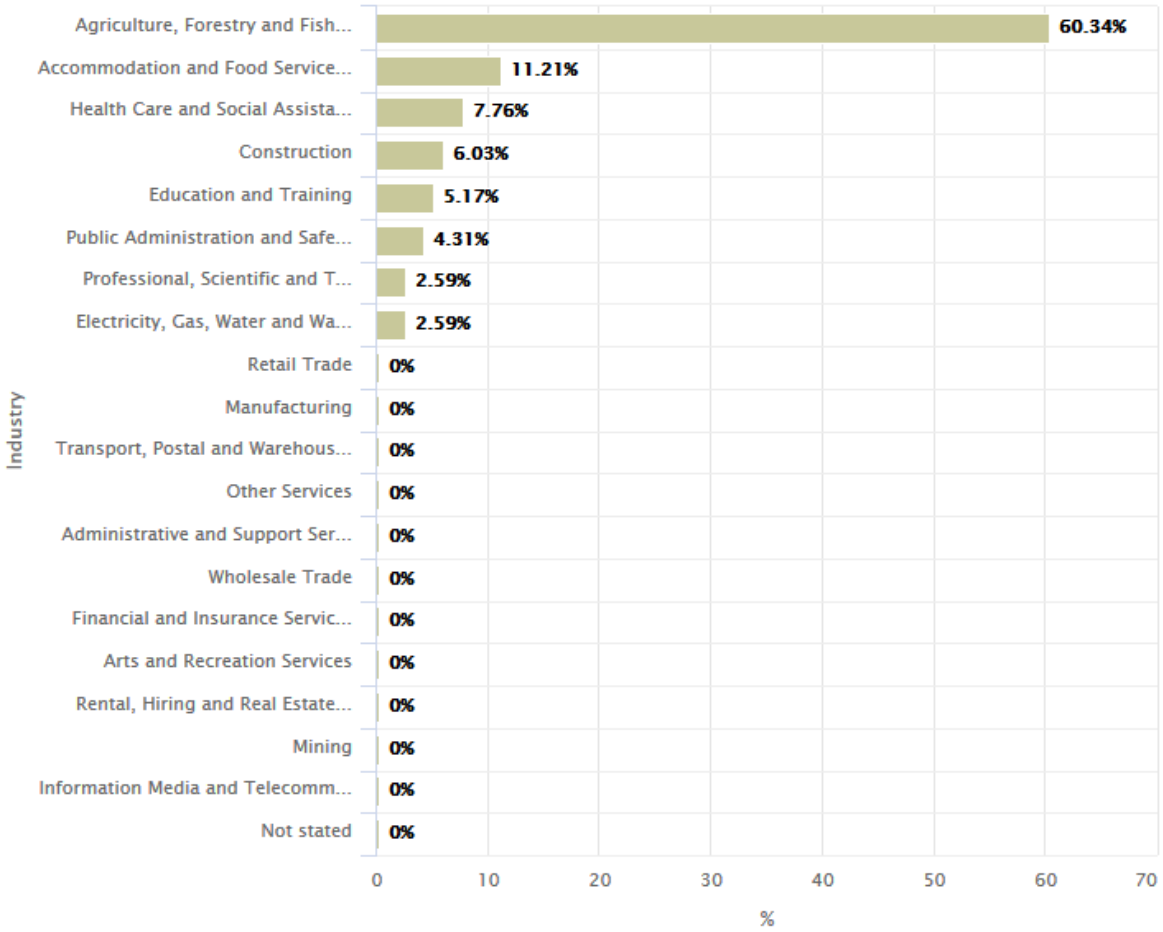
Just over 40% of the residents of Wakool are not employed or actively seeking work. One-third of the population is employed full time. The labour force represents 54% of the population.

Chart 4.8d: Labour force status, Wakool 2016. Source: REMPLAN Community



Agriculture, forestry and fishing is the largest industry and employs 60% of the labour force, due to the feedlot situated north of the village which is a significant employment hub for Wakool. This is followed by accommodation and food services (11.2%) and education and health care and social assistance (7.8%).

Chart 4.8e: Industry of employment, Wakool 2016. Source: REMPLAN Community



4.8.3 Land availability

4.8.3.1 Development trends

The volume of approvals (development consents and complying development certificates) for new residential, commercial and industrial development in Wakool issued during the period 2012-13 to 2017-18 are summarized in the table below. These are for the construction of new buildings and do not include alterations and additions, or any change of use to existing buildings. The data for the financial year 2017-18 is up until 19 April 2018.

Table 4.8b: Development approvals in Wakool, 2012-13 to 2017-18

Use	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Residential	0	1	0	0	0	0	1
Industrial	0	0	0	0	0	0	0
Commercial	0	1	0	0	0	0	1
Total	**0**	**2**	**0**	**0**	**0**	**0**	**2**

4.8.3.2 Land supply

Urban land in Wakool is zoned RU5 Village under Wakool LEP 2013. Residential, commercial and industrial development is permitted in zone RU5. The status of land zoned RU5 as occupied, vacant subdivided land or vacant unsubdivided land is given in the table below.

Lots occupied by an infrastructure item, a commercial or industrial use, or that are Crown land or other public land are excluded from the count. Where a building straddles a boundary it is considered to occupy both lots and this land has been considered occupied. Where multiple dwellings have been constructed on a lot it is still considered a single occupied subdivided lot for the purposes of this analysis.

This data has been sourced from the NSW Government's SIX Maps imagery dated 2011. All development approvals since 2012-13 have been factored into the land supply analysis as occupied lots.

Table 4.8c: Supply of land zoned RU5 in Wakool

Status	No. of lots
Occupied subdivided lots	112 lots
Vacant subdivided lots with approvals	3 lots
Vacant subdivided lots without approvals	23 lots
Total subdivided lots	138 lots
Potential yield vacant unsubdivided lots	237 lots
Total vacant lots (subdivided and unsubdivided)	309 lots

Subdivided lots in Wakool are generally 1,000m^2 in area with a few lots ranging from 1,300m^2 to 2,300m^2. An estimate of the potential yield of vacant unsubdivided lots has been made having deducted 25% of total land area and dividing by a lot size of 1,000m^2 as follows:

Table 4.8d: Estimated potential yield of vacant land, Wakool

Land	Approximate area	Net area (total less 25%)	Potential yield @ a 1,000m^2 lot size
Lot 63 DP 756584 Cadell Street	5.62 hectares (56,200m^2)	42,150m^2	42 lots
Lot 2 DP 1077629 Grant Street	9,295m^2	6,971m^2	7 lots
Total			**49 lots**

There is estimated to be a total of 260 vacant subdivided and unsubdivided lots. At an average take-up of 1 allotment every three years there is estimated to be sufficient vacant zoned urban land for many years.

As there is no minimum lot size applying to land zoned RU5 Village in Wakool, there is also the potential for further subdivision of existing vacant subdivided lots and occupied lots where the existing dwelling is positioned to enable subdivision.

4.8.4 Services and capacity

4.8.4.1 Water supply systems

The town of Wakool is serviced with a water reticulation supply system of potable water sourced from the Edward River and the Murray Irrigation Limited channels. The Wakool water supply system was commissioned in 2004 and includes a treatment process of ultra-filtration, activated carbon and chlorination.

The existing water supply system services a population of approximately 300 and with a capacity of 1.2ML/day has additional capacity to service more than twice the current population. Planned plant and network upgrades include refurbishment of the water tower in 2023, membrane replacement in 2024 and mains renewal asset plans in 2025.

4.8.4.2 Sewerage systems

A low pressure reticulation network has been installed at Wakool comprising small pump units installed on each property that will collect and pump sewage to low pressure system and ultimately a new sewer treatment plant. Sewerage treatment options are currently being evaluated. This system will largely replace on-site sewage management systems in Wakool.

4.8.4.3 Stormwater drainage

Due to the flat nature of Wakool stormwater runoff is generally directed to open drainage channel or road side swales. Excess runoff would generally drain to the adjacent irrigation channel. Some kerb and gutter upgrades are proposed during 2018 and 2021.

4.8.4.4 Roads and bridges

Wakool is connected to Barham to the west and Deniliquin to the east via Wakool Road which crosses the Wakool River in both directions. Burraboi Road and Moulamein Road provide access to the north to Moulamein across the Neimur River.

The town has a small number of sealed and unsealed roads. Approximately $160,000 is budgeted for street reseals by 2025.

4.8.5 Environmental attributes

4.8.5.1 Flooding

A Floodplain Management Plan (FMP) has been prepared for the Edward and Wakool Rivers from Deniliquin to Moama-Moulamein railway (known as the Stage 1 floodplain), and for the Neimur Rivers between the Moama-Moulamein railway, Leiwah and Mallan. The severity of flooding within the Stage 1 floodplain depends almost entirely on inflows from the Edward River at Deniliquin which in turn depends on water levels in the Murray River downstream of the Barmah Choke. The Murray River floodplain has an upper limiting flood flow discharge capacity of 30,000 to 35,000 ML/day at the Barmah Choke.

The 1975 Flood event, a 15-20 year Average Recurrence Interval (ARI) event, is considered the 'design' event for flood planning in Stage 1 floodplain and is the flood planning level for non-urban areas.

4.8.5.2 Bushfire

The village of Wakool and surrounding managed farm land are not mapped as being bushfire prone.

4.8.5.3 Biodiversity

Wakool is not mapped as being environmentally sensitive on either the Terrestrial Biodiversity Map, the Wetlands Map or the Watercourse Map of Wakool LEP 2013.

Wetlands

There are no wetlands or natural watercourses in the vicinity of Wakool. The nearest wetland systems begin about 2km to the south, associated with the Wakool River floodplain.

Vegetation, threatened ecological communities (TEC)

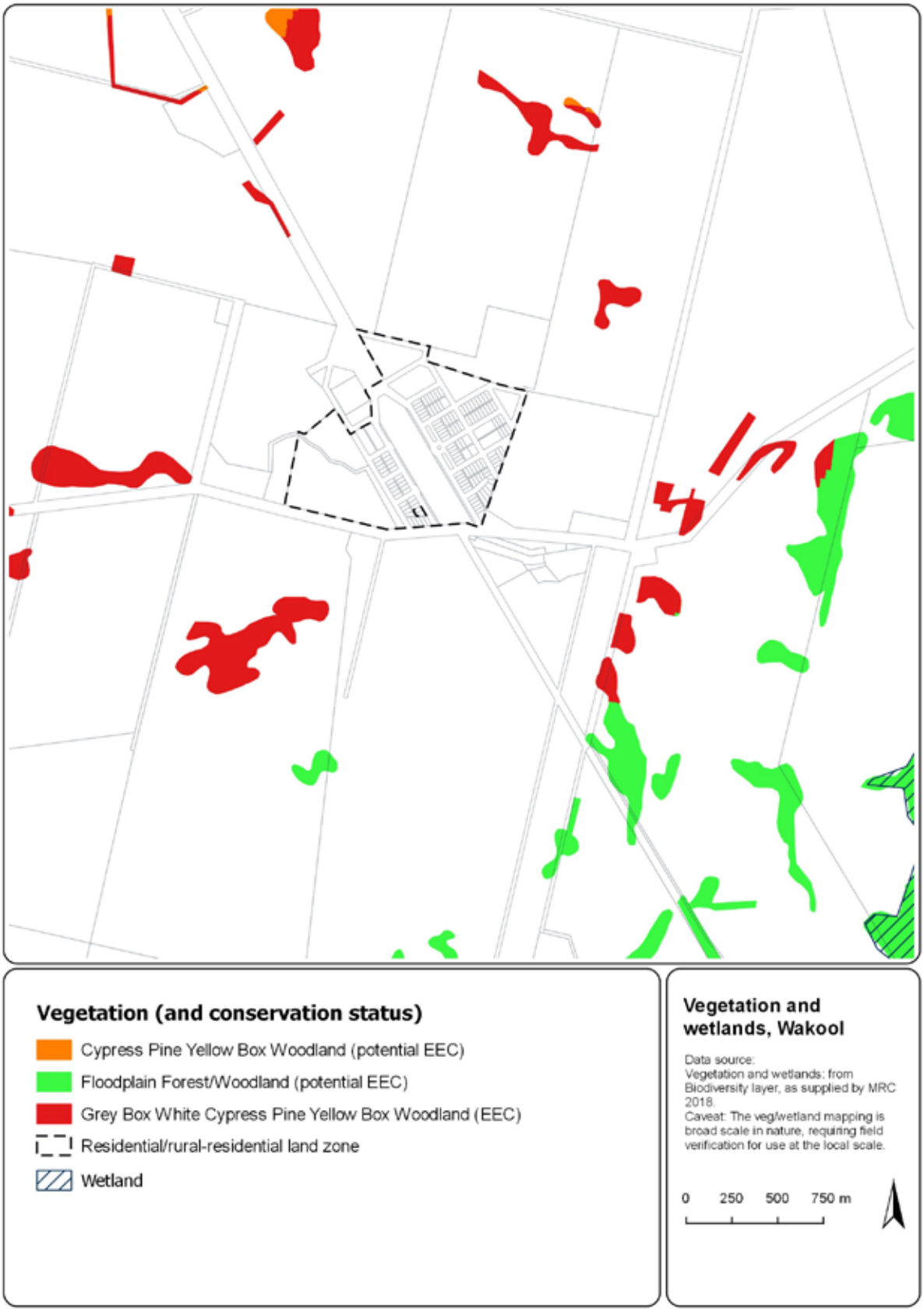
Wakool primarily surrounded by irrigated cropland. Remnant patches of native woodland, primarily Grey Box woodland, are scattered throughout farmland. Only minor areas of cleared land are likely to comprise derived (native) grassland, e.g. those not cropped or pasture improved.

Most remnant vegetation patches in the locality are likely to represent a TEC. Based on current broad scale mapping and habitat characteristics in the locality, TEC's are likely to comprise Grey Box Woodland and possibly Myall (Boree) Woodland. Sandplain/ sandhill communities are likely to occur further afield on elevated land, e.g. Sandhill Pine Woodland, Acacia melvillei Shrubland, Acacia loderi Shrublands and Allocasuarina luehmannii (Buloke) Woodland (Table 3.13 lists full names and legal status of these communities). These TEC's may be represented by derived grassland, where it can be shown that habitat characteristics match those of particular TEC. Detailed descriptions are available at http://www.environment.nsw.gov.au/threatenedspeciesapp/.

Threatened and migratory species

No threatened plant species are known form the vicinity (OEH 2018). While no wetlands occur in the vicinity, there is potential for threatened and/or migratory birds to use the irrigated areas when flooded.

Figure 4.8c: Vegetation and wetlands, Wakool



4.9 Rural localities

4.9.1 Description

Rural localities in Murray River LGA are characterised by scattered rural dwellings that provide accommodation for farm owners and workers on large parcels of agricultural land.

REMPLAN provides population data for thirty-one rural localities. These localities and their population at the time of the 2016 Census of Population and Housing are listed in Table 4.9a below.

Table 4.9a: Rural localities of Murray River LGA and populations, 2016. Source: REMPLAN Community

Rural locality	2016 population	Rural locality	2016 population	Rural locality	2016 population
Deniliquin West	207	Gonn	43	Dilpurra	22
Womboota	107	Bullatale	39	Noorong	14
Bunnaloo	102	Thule	35	Stoney Crossing	14
Goodnight	97	Cunninyeuk	33	Waugorah	11
Speewa	96	Niemur	33	Aratula	9
Tullakool	72	Caldwell	31	Moolpa	9
Calimo	70	Yanga	31	Thyra	9
Burraboi	65	Cobramunga	30	Keri Keri	7
Kyalite East	63	Dhuragoon	25	Tooranie	7
Mallan	52	Tantonan	25	Wetuppa	3
Mellool	46				

There are limited commercial and community services provided in these rural localities. The exceptions being Bunnaloo and Womboota.

Both areas were established in the early 1870s and comprise a small cluster of dwellings that house the owners, managers and workers of surrounding farms. Bunnaloo is located on a rail line and has a Rural Fire Service shed, sportsfield, primary school and church. There are no commercial services in Bunnaloo with the exception of a fuel depot, and grain silos and bunkers are the dominant visual feature. Womboota is located on the Barham Road to the northwest of Moama and has a school of arts, a Catholic church, a Uniting church, an RFS shed and a winery.

In addition to Bunnaloo and Womboota, the small settlement of Cummeragunja was originally established in 1881 on 720 hectares of land at Cumeroogunga Reserve on the Murray River to accommodate Aboriginal people. It has been variously a lease-hold co-operative, a registered company and an Aboriginal reserve farming area. In 1983 the NSW Government dedicated a large portion of the reserve to the Yorta Yorta Local Aboriginal Land Council. There are now approximately 40 dwellings on unsubdivided land at Cummeragunja with a population of around 70.

4.9.2 Land uses

Rural areas of Murray River support a wide range of agricultural activities. All private freehold rural land is zoned RU1 Primary Production under Murray LEP 2011 and Wakool LEP 2013.

Much of the LGA is irrigated using waters from the Murray, Edward and Wakool rivers for the growing of cereal crops such as wheat and barley. Dryland cropping occurs predominantly in the east and western extremities of the LGA. Lucerne, hay, rice, citrus fruits, stone fruits, vines, olives and rice are also grown and the area is a large producer of livestock for meat markets. Almond production is an emerging industry in the western part of the Shire.

Hardwood timber plantations extend along the lower central section of the LGA above the Murray River and a large are of the more marginal country in the north-west is used for grazing.

Two significant areas set aside for conservation include:

- Murray Valley National and Regional Parks – the bulk of this estate is located east of Moama along the Murray River and extends north to the east of Mathoura along Gulpa Creek and along the Edward River as far as Deniliquin. Smaller reserves are

scattered west along the Murray River – such as at Five Mile west of Moama and Benarca. This park was established to protect the river red gum forests of the Ramsar-listed wetlands. With Barmah National Park on the Victorian side of the Murray River, the park provides a continuous protected area on either side of the river, hosts a unique ecosystem with over 60 threatened native animal species and 40 threatened plant species, and is an important place for Aboriginal people.

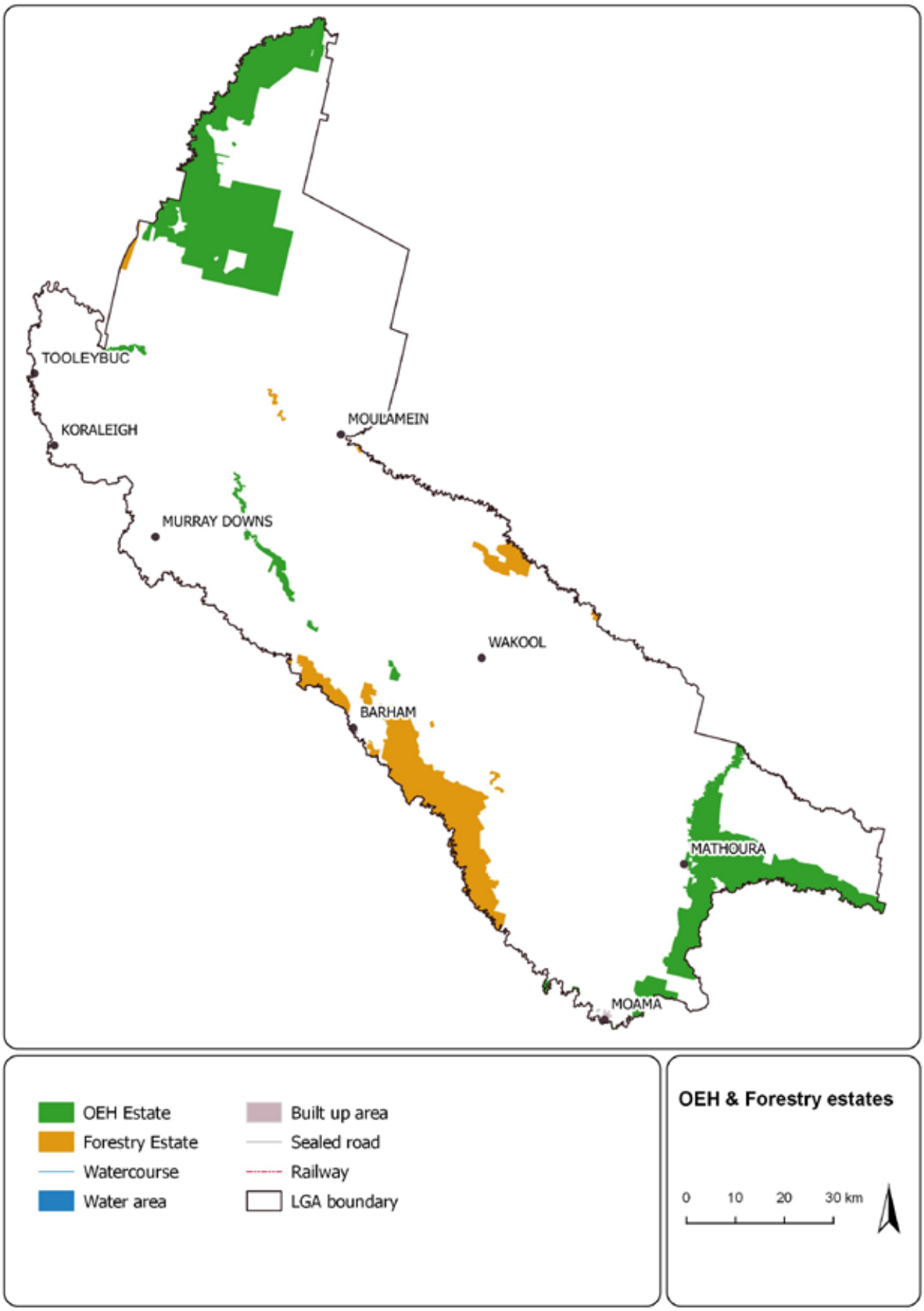
- Yanga National Park straddles the Murrumbidgee River at the north-western corner of the LGA north of Moulamein and extending towards Balranald. This park incorporates historic places such as the old Yanga Woolshed and Homestead.

Most of the riparian areas on either side of the Wakool River are also set aside as national park. National park estate is zoned E1 National Parks and Nature Reserves under Murray LEP 2011 and Wakool LEP 2013.

There are six publicly owned forestry reserves within the LGA. These are Bama, Moira, Millewa, Gulpa Island, Perricoota and Werai state forests. All relate to significant riverine environments and all but the Bama State Forest are registered as NSW Central Murray State Forests Ramsar wetlands sites. The Werai State Forest is a red gum forest of about 5,000 hectares on the southern side of the Edward River west of Deniliquin. The Perricoota State Forest is a large red gum forest of almost 16,000 hectares alongside the Murray River, downstream of Moama.

The Barmah-Millewa Forest is the collective name given to the Moira, Gulpa Island and Millewa forestry reserves. It is located on the floodplain of the Murray and Edward Rivers between Moama, Deniliquin and Tocumwal.

Figure 4.9a: National park and forestry estate, Murray River LGA



4.9.3 Rural production

The total value of agricultural production in Murray River LGA as recorded in the 2010-11 Agriculture Census was $267.6 million – an increase of $18.2 million since 2005-06. This represented 2.3% of total NSW production in 2010-11, down from 2.9% in 2005-06.

Table 4.9b below gives the value of agricultural commodities and the proportion of total production in Murray River.

Table 4.9b: Value of production and contribution to agricultural production, Murray River.

Source: 2010-11 Agriculture Census, ABS

Commodity	Value	% of Murray River production
Cereal crops	$137,766,085	51.5%
Other broadacre crops	$8,036,074	3.0%
Nurseries, cut flowers and cultivated turf	$2,892,582	1.1%
Crops for hay	$14,260,250	5.3%
Vegetables	$3,591,881	1.3%
Citrus Fruit	$5,509,102	2.1%
Grapes (wine and table)	$3,258,578	1.2%
Pome Fruit	-	
Stone Fruit	$4,657,557	1.7%
Other Fruit	$992,102	0.4%
Berry Fruit	-	
Plantation Fruit	-	
Nuts	$3,037,009	1.1%
Wool	$20,079,441	7.5%
Milk	$22,313,375	8.3%
Eggs	$4,520	0.0%
Honey	-	
Meat	$41,243,057	15.4%
Sheep and lambs	$11,160,310	4.2%
Cattle and calves	$16,786,127	6.3%
Goats	$64,133	0.0%
Pigs	$13,228,879	4.9%
Poultry	$3,608	0.0%
Total agricultural commodities	**$267,641,612**	**51.5%**

By far the largest contributor to the value of output of agricultural activities in Murray River is cereal crops, generating $137.8 million and 51.5% of total agricultural production in the year 2010-2011. The value of cereal crops increased by $27.6 million since 2006. Sheep and lambs meat production was the next largest activity generating $41.2 million in value of product and 15.4% of total LGA production.

The number of broadacre farms decreased over the ten year period to 2011, however, there is evidence that there is increasing demand for farms greater than 1,000 hectares in area and a reduction in small size farms. This indicates that there has been some consolidation of farms and an intensification of output through economies of scale resulting in a higher value of production. The primary industry sector (agriculture, forestry and fishing) accounted for 25.5% of total employment in 2016.

The table below gives an indication of the size of farming operations in the former Wakool Shire as at the 2010-11 Agriculture Census. This data is not available for the former Murray Shire and therefore cannot be aggregated to provide a snapshot for Murray River LGA.

Access to water for irrigation and the need for adequate river crossings is of importance to primary industry.

Table 4.9c: Size of agricultural industries, Wakool Shire. Source: 2010-11 Agriculture Census, ABS

Agricultural industry	Number of stock or hectares	Number of farms
Beef Cattle (no.)	22,265	129
Dairy Cattle (no.)	7,428	29
Chickens for eggs (no.)	169	3
Chickens for meat (no.)	0	0
Horses Non Stud (no.)	257	57
Horses Stud (no.)	74	14
Pigs (no.)	35,480	4
Sheep Lambs (no.)	266,549	157
Total Number Livestock for these industries	332,222	393
Cereal crops (ha.)	109,561	182
Non cereal crops (ha.)	5,137	51
Fruit (excluding grapes) (ha.)	1,130	29
Grapes (ha.)	417	41
Cut Flowers (Ha undercover)	0	2
Cultivated Turf (number of farms only, hectare info n/a)	0	0
Nurseries (Ha undercover.)	0	9
Vegetables (ha.)	259	12
Total Hectares for these industries	**116,504**	**326**

4.9.4 Minimum lot sizes for rural dwellings

A minimum lot size of 120 hectares to subdivide land zoned RU1 Primary Production for the purposes of a dwelling applies to rural land under Murray LEP 2011 in the Greater Murray Ward other than rural land at the eastern end of the LGA north of Murray Valley National Park which is subject to a lot size of 500 hectares. A lot size of 500 hectares applies to all rural land under the Wakool LEP 2013 in the Greater Wakool Ward.

As a comparison the table below gives the minimum lot sizes that apply in neighbouring NSW and Victorian LGAs.

Table 4.9d: Minimum lots sizes in adjoining NSW and Victorian LGAs

LGA	Instrument	Minimum lot size for subdivision for a rural dwelling
Murray River	Murray LEP 2011 Wakool LEP 2013	120 hectares, 500 hectares
Berrigan	Berrigan LEP 2013	40 hectares
Balranald	Balranald LEP 2010	40 hectares
Hay	Hay LEP 2011	600 hectares
Edward	Deniliquin LEP 2013 Conargo LEP 2013	40 hectares, 40 hectares/200 hectares
Jerilderie	Jerilderie LEP 2012	213 hectares
Murrumbidgee	Murrumbidgee LEP 2013	200 hectares
Campaspe (Victoria)		Farming Zone 1: 80 hectares, Farming Zone 2: 40 hectares
Swan Hill (Victoria)		Dry land: 100 hectares, Irrigated land: 20 hectares

The minimum lot size development standard is wide-ranging across the Riverina Murray region. This variation may be due to the capability of farmland – the size of a farm holding that is required to successfully sustain the current agricultural activity. If this is the case then farms on land that is of higher productive capability tend to require less land to remain viable in contrast to more marginal land which requires larger areas to sustain activity. Future minimum lots sizes to enable subdivision for a rural dwelling need to take into account the capability of the land and viable farm sizes.

Considerations

5.1 Considerations for the land use strategy

Matters have been identified during the preparation of this Local Profile that should be considered either in the Murray River Land Use Strategy, or to assist with planning for services across the LGA through the Community Strategic Planning Process. These matters relate to:

- Data gaps - the availability of data to assist land use decision-making, and
- Strategic matters - strategic planning and management to ensure land is managed efficiently and appropriately through the combined local environmental plan for Murray River Council.

Details of each of these matters are described below.

5.1.1 Data gaps

Data gaps were identified during research and preparation of the Local Profile. It is recommended that Murray River Council standardise registers, maps, databases and the like to enable a consistent approach to planning for the new LGA. These are:

- Mapping of bushfire prone land – mapping for the former Wakool Shire shows only land that is bushfire prone. Mapping for the former Murray Shire shows buffer categories in addition to land that is bushfire prone. This requires standardisation across the new Murray River LGA
- Details of potentially contaminated land in Wakool Ward. Sites have been listed on a register for Greater Murray and Moama wards
- Asset registers – details of infrastructure assets, including community and recreational facilities, differ between wards. Needs assessments should be carried out to identify any additional requirements of the current and future populations
- Infrastructure capacities – updated details of existing systems, current and target levels of service, and any augmentation required to cater to population growth

5.1.2 Strategic matters

A workshop was held on 3 May 2018 attended by Murray River councillors and the Department of Planning & Environment. Ten strategic matters identified at that workshop and during the preparation of this Local Profile are listed below. The description of these matters can be used as discussion points during the consultation phase. It is expected that additional issues will be identified and raised during the public consultation phase and the final version of this Local Profile will contain further information about matters to consider during the preparation of the Land Use Strategy.

1. Establishment of consistent planning policy

There is a need to establish consistency in planning to protect and manage the best outcomes for the community. There is a need to include development and planning controls that address river frontage lifestyle lots, rural / farm subdivisions and small rural lots, new industrial land for development and tourism for the development of the towns.

The establishment of consistent planning policy will also be required to place a high level of importance of the Murray River and other associated waterways. The Murray River is significant at a local, regional, state and national level. All our waterways underpin the areas agriculture related manufacturing, natural environment, lifestyle, tourism and amenity. The communities highly value access to the waterways, as well as other natural assets.

2. Changing demographics and changes in the local economy

The changing demographics and local economy create both opportunities and challenges for the future of the Murray River Council area. Some of these – population growth in Moama, population decline in smaller towns, and the ageing of the population have already been identified in the development of the local profile.

Tourism is continuing to grow along the Murray River, this not only has positive implications for the economy, it also has the potential to create long term impacts on the existing infrastructure and services provided by the Council. A significant portion of the tourism development is focused on the Murray River and/or associated waterways and the promotion and implementation of tourism related development must be planned so as to reduce the potential impact on our natural resources.

The increasing trend towards retirement along the Murray River and along other river systems not only has a positive implication for the economy but will also place a strain on the ongoing essential service provide by Council and other government agencies. The ageing population will place added pressures on the health system but also the need to plan for and appropriately locate retirement living.

With 66% of the population living in two main

communities being Moama (53%) and Barham (13%) Council will be faced with the challenge of maintaining the road infrastructure and developing town infrastructure , which is critical infrastructure for the community. The maintaining and development of same is required to suit population needs, whilst also being accessible and attractive to visitors to the region. Based on the vast area that the Council encompasses, the number of small and remote communities of which some are in decline the ability to meet the expectation of these communities the ongoing maintenance on its own will continue to be a major expense.

3. Reconciling minimum lot sizes for rural subdivision and dwellings

A minimum lot size for the subdivision of rural land in the former Murray Shire is 120 hectares and for the former Wakool Shire is 500 hectares. These lot sizes need to be reconciled based on a report prepared by an agricultural economist to determine the optimum area of land that is required to support farming enterprises.

The analysis should consider the pattern of existing land holdings and the potential for additional rural dwellings using current minimum lot sizes, the characteristics of the primary production sector, (i.e. types of operations, value of production and occupied land areas), an understanding of the viability of rural operations, and an estimate of the demand for rural dwellings based on approvals and anecdotal evidence. The minimum lot sizes that apply in neighbouring LGAs also warrants consideration.

First and foremost is the need to protect the productive capacity of agricultural land. Enabling subdivision for rural dwellings needs to be predicated upon ensuring that existing and potential farms remain sustainable. Importantly, the application of a minimum lot size does not necessarily mean that all rural landowners would seek to subdivide their properties and develop rural dwellings. Market forces, access to capital to fund development and the size of a holding necessary to sustain farm production would be taken into account in decision-making.

4. Containing urban areas within defined boundaries

Containing urban areas within defined boundaries brings benefits such as the ability to plan for and efficiently provide infrastructure and services. The uncontrolled outward spread of urban settlements can cause the loss of productive farm land or natural ecosystems as they are replaced with housing along with costly service provision.

The spread of urban residential land to the south-east of Barham has occurred and undeveloped land is separated by rural land and land zoned for recreation. This intervening land needs to be considered in terms of future zoning and the future boundary to the urban area needs to be identified. In particular, the future highest and best use of land owned by Club Barham east of the town centre needs to be determined. It contains a series of ponds and was formerly a recreation area maintained by the club but is now disused. A planning proposal to rezone this land to urban residential has been considered by the Department of Planning & Environment.

5. Assess suitability of land for rural residential development near Moama and Barham and explore opportunities for rural residential development near Koraleigh, Moulamein and Tooleybuc

There is existing land zoned and vacant for future rural residential development near Barham. The Moama and District Rural Residential Strategy identified land suitable for rural residential development near Moama.

The allocation of lot sizes to rural residential compartments should be assessed to determine how to facilitate subdivision layouts that are conducive to future urban residential subdivision. For example, lot sizes of 2 hectares and 5 hectares have been recommended for land to the west of Moama along Perricoota Road. However, lot sizes of 2 hectares and 4 hectares may enable the gradual subdivision in response to future demand.

6. The allocation of dwelling entitlements to existing small agricultural lots

The allocation of dwelling entitlements to existing small agricultural lots in close proximity to Moama, Barham and Moulamein centres should be considered, having regard to avoiding land use conflict with agricultural operations. Similarly, intervening land between the urban residential areas of Moama and Barham and existing R5 zones should be reviewed to determine the appropriate zoning of this land.

Large almond plantations are being developed located in the vicinity of the settlement of Tooleybuc and the hamlet of Goodnight. The suitability of the land to grow pistachio nuts is also under investigation. It is necessary to ensure that sufficient accommodation is available to support these plantations and to cater for incoming farm workers, noting that some farming processes may be automated and require less manual labour.

7. Optimal location for growth of Moama town centre

Given the large areas of vacant land that are zoned B2 Local Centre north of the town centre of Moama along the Cobb Highway and the fact that little vacant commercial land remains along Meninya Street, it is expected that the growth and expansion of business will be to the north of the existing shopping centre development at the corner of Perricoota Road. This area is closer to the residential growth area on flood-free land to the north-west.

It is important to reinforce the role of the existing town centre by maintaining a consolidated commercial precinct. This serves to retain settlement character and provide certainty to the business community. Commercial and civic functions may be co-located on greenfields sites to facilitate multi-purpose trips and to achieve economies of scale in services.

Decisions need to be made as to the location and layout of development of this land to ensure adequate access to institutional services such as Council and government offices, and health and educational facilities.

8. Protect the economic base by retaining zoned business and industrial land

There are adequate areas of land zoned for business and industrial use in both Barham and Moama as well as other villages (noting that commercial uses may be developed on land zoned RU5 Village). It is important to retain these zones and avoid development that could jeopardise ongoing and future commercial operations. The permissibility of extractive industries in business and industrial zones should be addressed. However, the location of industrial areas and the suitability of these areas for the types of industries looking to establish in Murray River LGA needs to be examined. The location, supply, layout and access arrangements should facilitate business development and the co-location of linked industries. The implementation of buffers to industrial uses and to land zoned for industry may be appropriate to provide ongoing protection for these uses and to avoid land use conflict.

9. Identify areas within urban areas for redevelopment for medium density housing

Moama is the largest town in Murray River LGA and is experiencing strong growth. Most new residential development is tending towards large separate houses on relatively large allotments. There is currently limited medium density housing available in the urban area of Moama, i.e. only 8.8% of all dwellings are either townhouses, villas, apartments or similar.

Encouraging and facilitating the development of a greater proportion of medium density housing should be considered to ensure a range of housing styles and types is available to cater to differing age groups, lifestyles and choice. The appropriate locations for such housing should be assessed.

10. Rationalise public land holdings

There is a substantial amount of public land that has been dedicated or acquired by Council over time. Council is required to care, control and manage this land and in doing so incurs significant expense. The extent of these public land holdings is shown on Land Register maps given for each settlement in this Local Profile.

It is recommended that a review be commenced to ascertain the highest and best use of each parcel of land, and to recommend whether each parcel should be retained or offered for sale having regard to current uses, public interest, development potential and physical attributes. The review would consider relevant strategic policy and community interest, and include details of any necessary rezoning and/or reclassification from community land to operational land.

The review should also identify where public land may be used to add to the supply of land within existing urban boundaries and where funds realised from the disposal of surplus lands may be used to develop or improve infrastructure assets including recreational and community facilities.

11. Protect scenic values of the rural landscape and riverine environments

The scenic landscapes of the foreshores of major river systems in Murray River LGA and rural areas are of value to the community in terms of amenity, and to travellers as backdrops to the visitor experience. An assessment of scenic resources should be carried out to identify and map significant landscapes, features and viewsheds. Planning for the protection of scenic views may intersect with other priorities such as environmental protection or economic development. However, additional protection may be achieved through overlays to ensure that development does not compromise the scenic values that attract residents and tourists to Murray River.

12. Prepare urban land release sequencing plans

The sequencing of land release enables the efficient provision of infrastructure to new residential development. It also ensures that the supply of vacant

subdivided and serviced land is kept at an optimum level to cater for expected demand.

Stages of land release should be based on distance from the town centre, the complexity of planning and environmental considerations, and the need to ensure adequate supply to cater for the next 15 to 20 years. Current land release sequencing should be reviewed to ensure that a continuous supply of residential land is available to the market based on expected take-up and specified supply thresholds. The review would consider available land that has been zoned and nominated for early stage release but which remains unsubdivided and have regard to land that is the subject of planning proposals with the likelihood that the owners of such land will bring land onto the market in the short term. The review would involve liaison with Council's engineering division to discuss the provision of services to any revised staging and the likely cost implications to alter planned infrastructure provision.

13. Consider requirements of emerging agricultural industries

The current growth of the almond industry in western parts of Murray River LGA and the potential for the establishment of the pistachio industry needs attention to ensure that there is adequate land to cater for farm workers and adequate water supplies for industrial use as well as for human consumption. Potential impacts may be offset through the contribution of agricultural expansion and diversity to the local economy through employment generation and local spending.

14. Investigate mooring restrictions on the Murray River near Barham, an appropriate waterways zoning and development guidance

15. Investigate the potential to reduce setbacks to waterways

16. Address the zoning of intervening land between Murray Downs and Swan Hill to enhance connectivity between the settlements and facilitate development

17. Investigate the potential to zone additional land for residential development near Tooleybuc

18. Investigate the potential to zone additional land for industrial development near Tooleybuc

19. Examine the impacts of shared interests of Victorian and NSW towns along the Murray River

5.2 Next steps

Following endorsement of the Local Profile by Murray River Council and the Department of Planning & Environment, a draft Land Use Strategy will be prepared using the data and information contained in this document to address the considerations listed above.

The strategy will include:

- A set of assessment criteria to guide the allocation of land use zones and development standards to include in the new local environmental plan,
- An assessment of the opportunities and constraints of land proposed to be rezoned. This would include an analysis of environmental attributes and natural hazards such as flooding potential and bushfire threat, and the capacity to provide services to the land, and
- An assessment against the directions of the Riverina Murray Regional Plan and other statutory considerations such as Local Planning Directions to include in Stage 3 of the project – the planning proposal for a new local environmental plan.

The draft Land Use Strategy will be placed on exhibition for public comment and feedback will be sought from relevant government agencies and stakeholders. Community engagement will inform the final version of the strategy prior to endorsement by Council and the NSW Government.