Thurgoona Wirlinga
Precinct Structure Plan

RPS

Prepared for Albury City

March 2013

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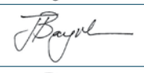
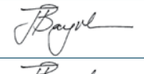
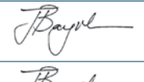
Jo-Ann Baynham		24/05/12
Jo-Ann Baynham		16/08/12
Jo-Ann Baynham		21/01/13
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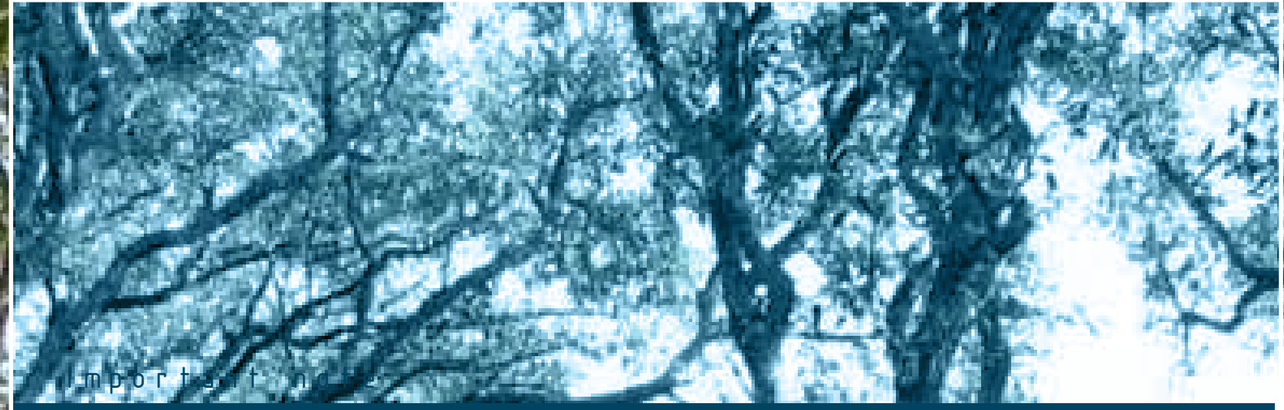

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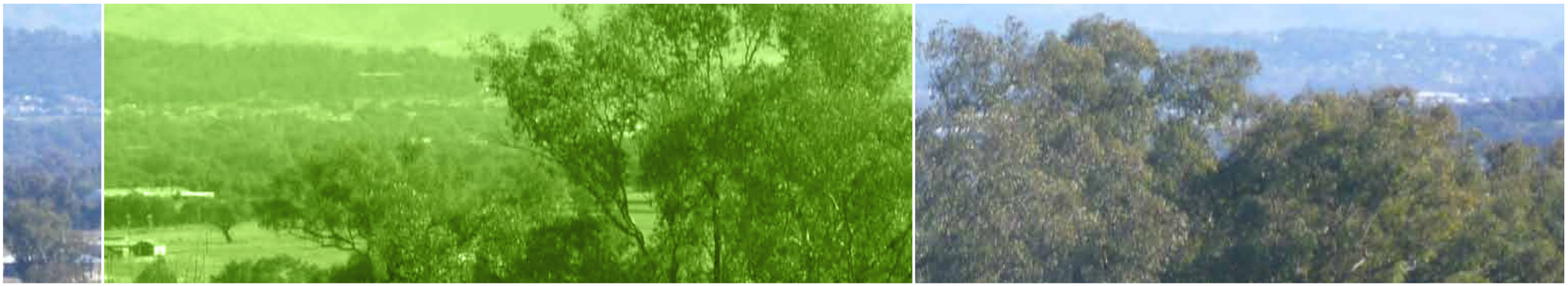


1.0 Introduction

1.0 Introduction

The primary role of the Thurgoona Wirlinga Precinct Structure Plan (TWPSP) is to deliver a framework for the future development of the entire Study Area.

Refer to Figure 6, Study Area Map.

The TWPSP has been initiated to provide an urban development structure/pattern that will facilitate a coordinated approach to land development in Thurgoona/ Wirlinga and provide a framework for statutory planning controls. It is anticipated that the TWPSP will guide statutory planning controls, including the preparation of site specific development control plans as required by the Albury LEP 2010 (Part 6, clause 6.3) to address specified matters and facilitate the logical and cost–effective development of land in the Urban Release Area (URA).

The Albury Land Use Strategy 2007 (ALUS) was prepared and adopted by Council in December 2006 to provide a strategic framework for the Albury Local Government Area that balances growth and evironmental values, guides future zoning allocations and planning decisions. The recommendations of this Strategy informed the controls and land use zonings of the Albury Local Environmental Plan 2010 (ALEP 2010) which has resulted in the release of a significant area of undeveloped residential zoned land (i.e. Urban Release Area).

AlburyCity have through ALEP 2010 effected the rezoning of significant areas of undeveloped land for residential purposes. AlburyCity consider such an approach as appropriate, insofar as that this provides a clear direction and guidance for the future development of the City, will decrease opportunities for land use conflict in rural and semi rural areas (through incompatible development) and will help provide choice and affordability of housing by avoiding the potential for land banking and the creation of an artifical housing market.

The TWPSP will also inform both local and designated state infrastructure and assist AlburyCity and State government agencies, including the NSW Department of Planning and Infrastructure (DPI), NSW Roads and Maritime Services (previously RTA) and the NSW Department of Education and Communities in determining what facilities and services will be required by this plan.

The TWPSP focuses on the entire Thurgoona Wirlinga area which is over 4500 ha, and will support an ultimate population close to 50,000 people over the next 50 years plus. The TWPSP is a long term initiative for Planning for natural incremental growth within this region. The Study Area can be appreciated as two distinct sub areas. Roughly half of the Study Area (generally to the west of Kerr Road) comprises the existing and developing Thurgoona neighbourhoods.

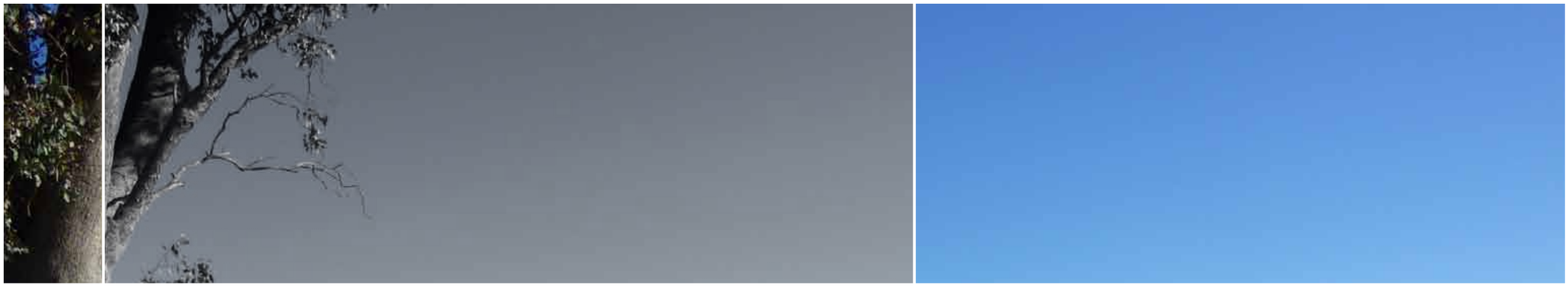
This area has been considered for the following reasons:

- The relationship it will form with the Study Area in terms of total population and needs of the entire population in the completed growth corridor.
- The services and facilities that currently exist within the area and how these facilities will contribute to supporting the future Study Area residents.
- Existing uses and whether they will support or create conflict with the Study Area.
- The existing movement corridors and access networks that exist within the area and how this will support and / or impact or be impacted upon by the Study Area.
- Public transport options.
- Existing open space and environmental corridors and the potential to extend them into and through the entire Study Area.

The main focus of the TWPSP is to deliver a framework for the future development of the URA (generally to the east of Kerr Road), as well as the broader Study Area. The URA land encompasses approximately 2000 ha of the overall Study Area. This framework will be created by the following methods:

- A study of the site and review of literature to understand the existing issues, features and constraints of the area.
- To consult broadly with the community and stakeholders to appreciate local knowledge and aspirations and create a vision for the TWPSP that is a reflection of the goals and aspirations of the community, where realistic in terms of site constraints and Council's objectives.
- To develop and set parameters and key guidelines for broad environmental, social, physical/spatial and economic objectives across the Study Area.

Any future masterplan or development to be carried out within the Study Area will need to be generally in compliance with the TWPSP. The TWPSP will need to be reviewed at least every 5 years to ensure that the objectives and guidelines are still relevant and up to date with best practice and that it is facilitating the delivery of an area which is meeting the objectives of the plan.



2.0 Strategic Context

2.1 Regional Context

The city of Albury is located in southern New South Wales (NSW) on the border of NSW and Victoria. Albury is strategically located on the Hume Highway route between Sydney and Melbourne and along with its neighbour, Wodonga (in Victoria), acts as a major Regional centre within the Riverina and North-East Victoria. The boundaries of Albury changed in 2004 when local government boundary adjustments took place between Albury and the former Hume Shire (now Greater Hume), where parts of Thurgoona/Wirlinga area were previously part of the former Hume Shire.

Refer to Figure 1.

2.2 Sub Regional Context

Albury is a regional city with a population of approximately 52,000 people. When appreciated in its context with the neighbouring city of Wodonga the district comprises over 90,000 people and represents one of the largest inland population centres in Australia. It is forecast that the Albury region will grow by over 19,000 in the next 20 years, and the majority of this growth is likely to occur in the Thurgoona / Wirlinga urban release area.

Refer to Figure 2.

2.3 Local Context

Thurgoona / Wirlinga is located to the east of the Hume Freeway between Albury and Lake Hume. Thurgoona has been developing over the last 20 – 30 years and includes features such as the Charles Sturt University, NSW Riverina Institute of TAFE, Albury/Wodonga Equestrian Centre, Thurgoona Country Golf Club Resort and Thurgoona Plaza, along with a number of residential suburbs. Thurgoona is growing at a rate of approximate 3.5 % per annum while Albury as a city is growing at over 1% per annum. Wirlinga is currently rural in nature and rises up from the less undulating Thurgoona to the escarpment that separates it from Lake Hume. The features and character of Wirlinga include primarily pasture paddocks with scattered trees, farm homesteads and rural residential housing. A large area of Defence Force land is also located within Wirlinga but is not part of the urban release area.

Refer to Figure 3.

Figure 1: Regional Location
(Source: Albury Economic Development Prospectus)

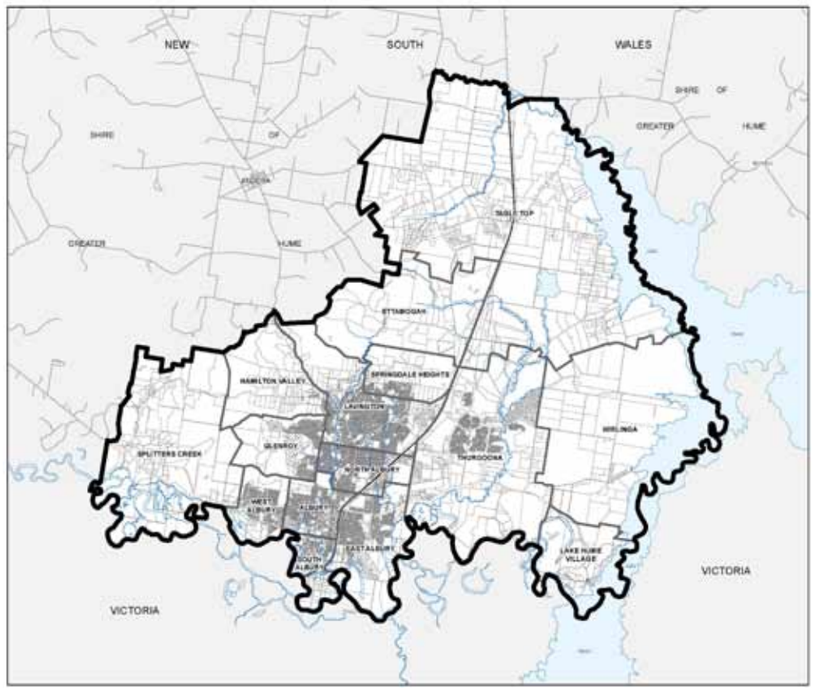


Figure 2: Albury City Boundary
(Source: Albury Local Environmental Plan, 2010)

Murray River

View to Lake Hume from Study Area

Wirlinga

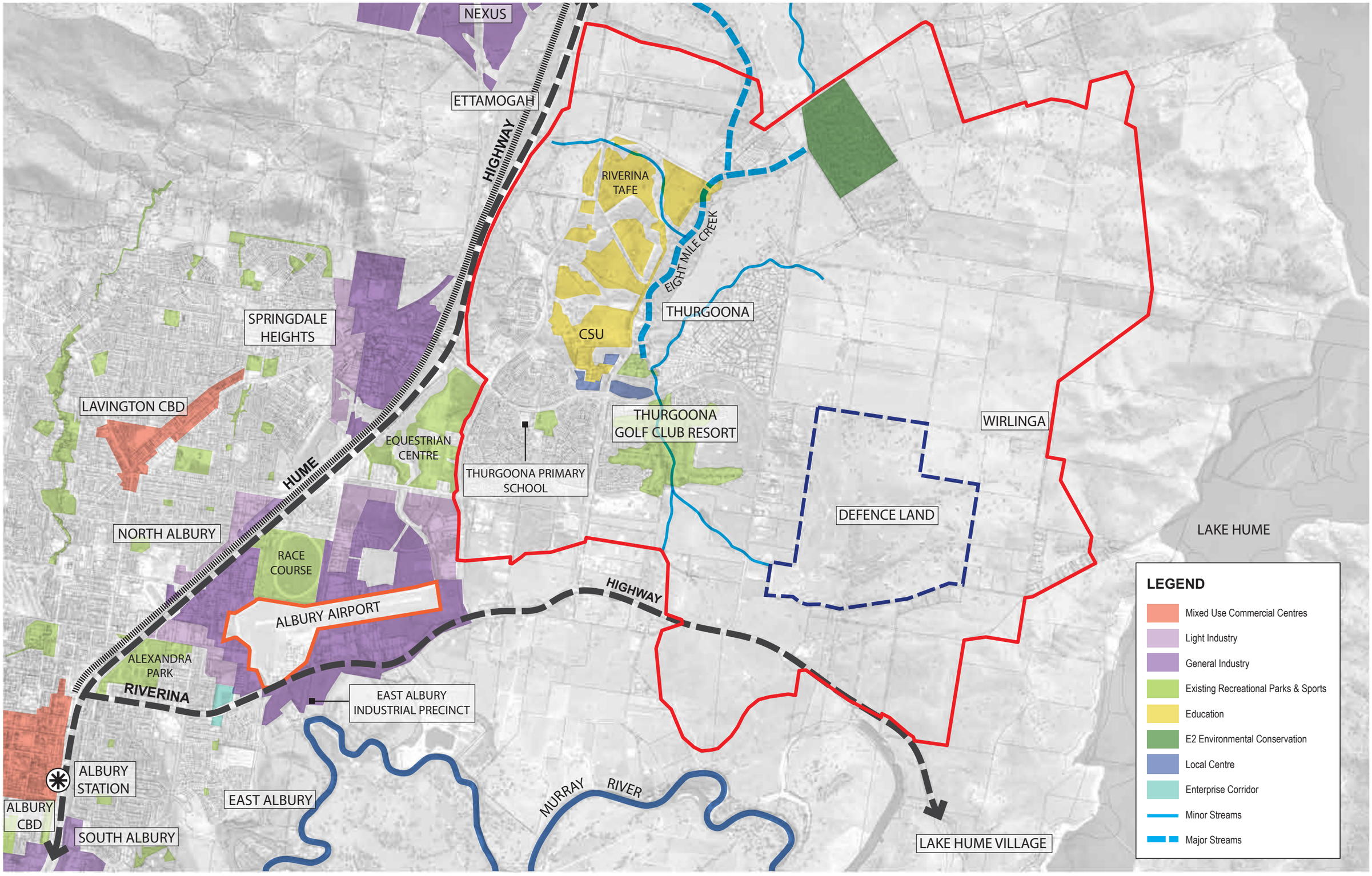


Figure 3: Locality Plan

2.4 Strategic Documents / Studies

A number of key strategic studies have been undertaken by Albury Council and other agencies. These studies have been reviewed by the consultant team and have informed many fundamental aspects of the TWPSP. The key documents that have been particularly important include the following:

- Albury 2030 (2010)
- Albury Land Use Strategy 2007 (Refer to Figure 4)
- Albury Local Environmental Study 2008
- Albury Local Environmental Plan 2010 (Refer to Figure 5)
- Albury City Wide Heritage Study
- Thurgoona Threatened Species Conservation Strategy 2004
- Biodiversity certification for Albury Local Environment Plan 2010
- Scarred Tree Survey
- Albury Bushfire Prone Land Map

The comprehensive strategic background review is located in Chapter 3 of the TWPSP Technical Report.

The strategic documents have assisted with informing the TWPSP in terms of:

- The vision for the TWPSP.
- The broader aims, objectives and desired outcomes of development in the area.
- The existing and forecasted demographic and economic profile of Albury and rate of growth of the Thurgoona area.
- The land use opportunities afforded by the existing planning / zoning framework.
- Recognised cultural and European heritage places.
- Knowledge of the threatened species likely to exist within the area and suggested management strategies to assist in the conservation of the threatened species.

For full Strategic Planning Context, refer to Chapter 3 of TWPSP Technical Report.

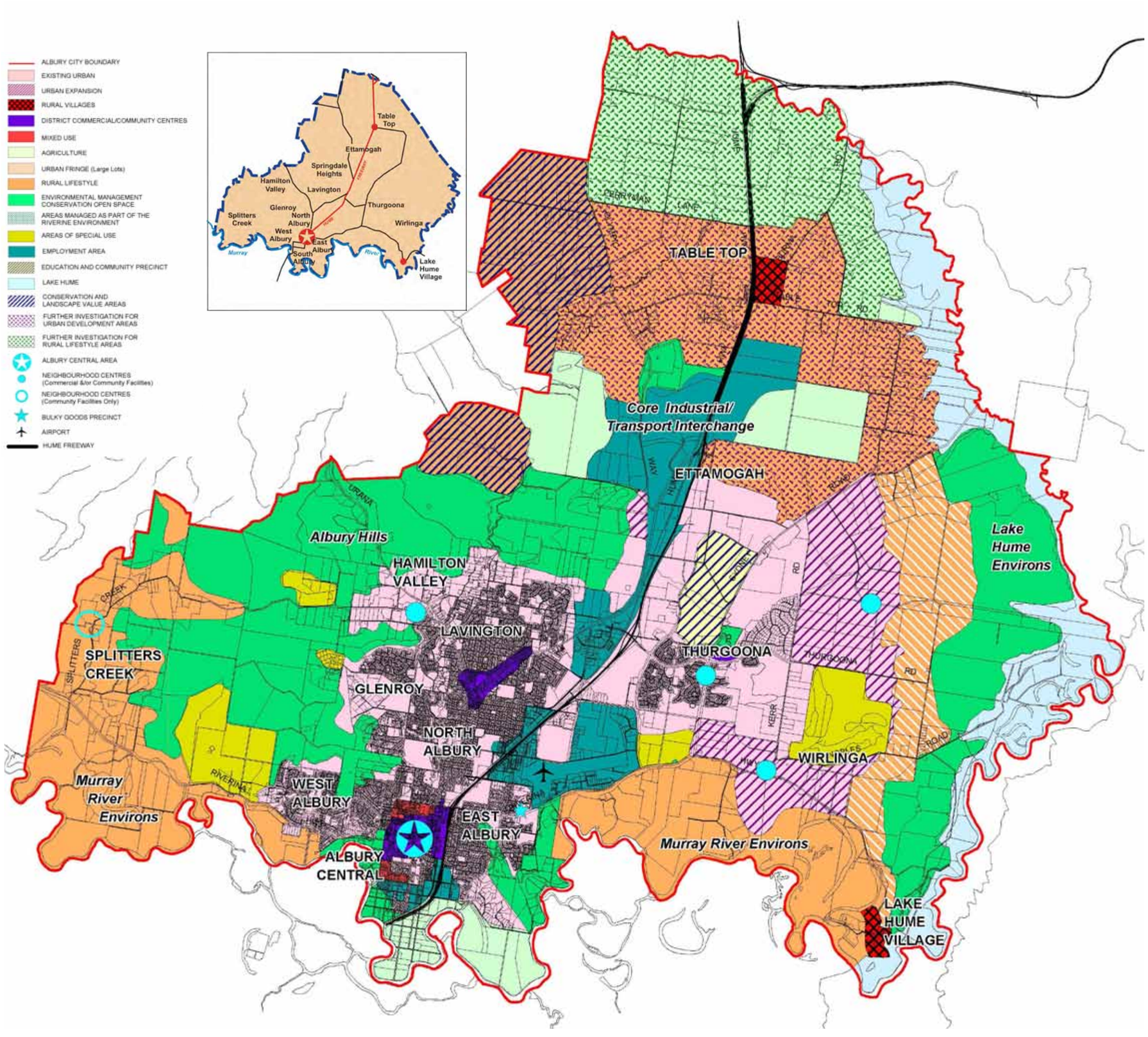


Figure 4: Albury Land Use Strategy Plan (May 2007)

Albury Local Environmental Plan 2010

Land Zoning Map - Albury LGA

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- B6 Enterprise Corridor
- B7 Business Park
- E2 Environmental Conservation
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- RU4 Rural Small Holdings
- RU5 Village
- SP1 Special Activities
- SP2 Infrastructure
- W2 Recreational Waterways
- DM Deferred Matter

Cadastre

- Cadastre 30/09/10

N W E S

Note: This map is a compilation map only, for greater detail please refer to Albury LEP 2010 Maps (as Gazetted)

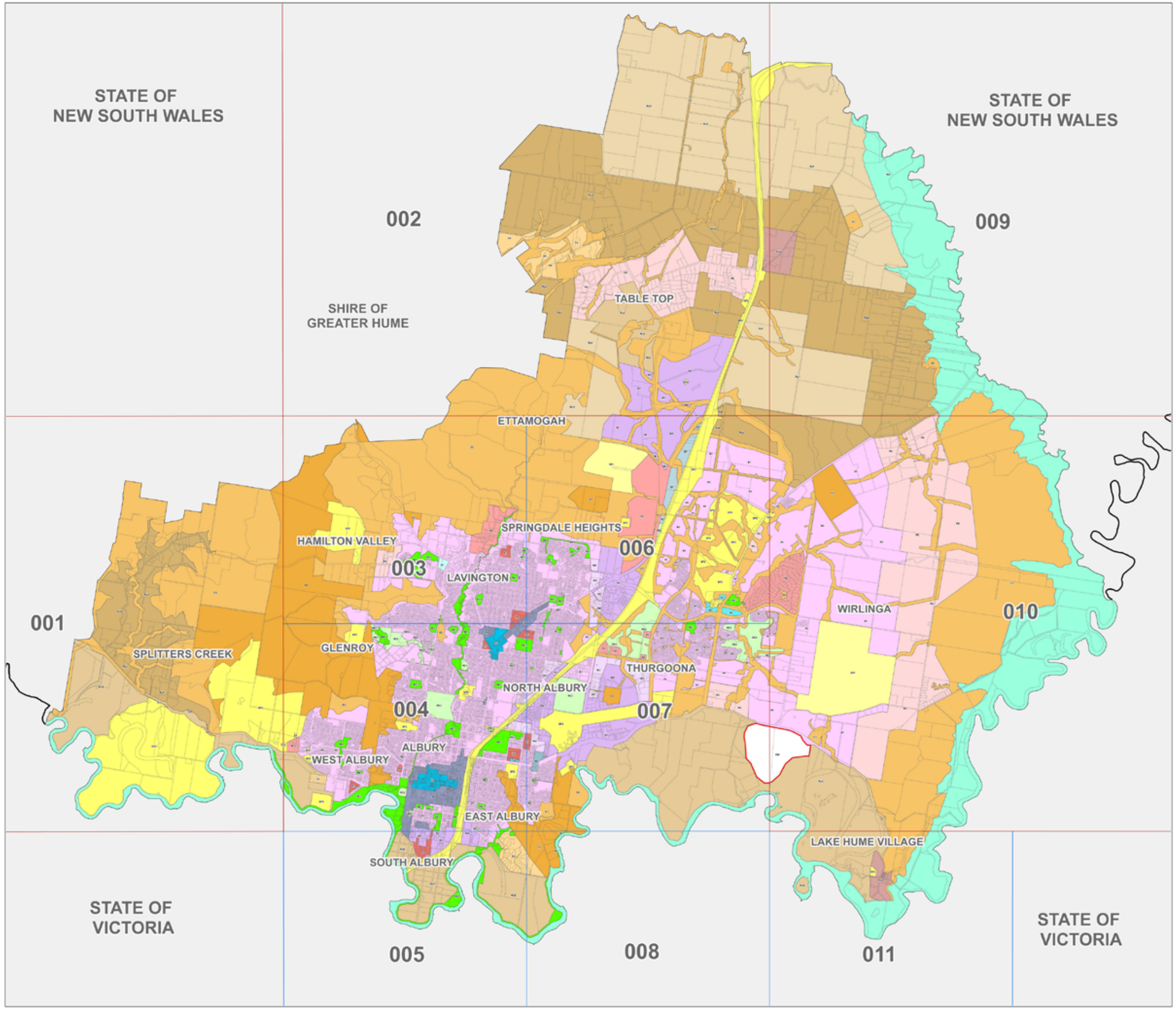


Figure 5: ALEP 2010 Land Zoning Map

3.0 Consultation Summary

3.1 Introduction to the Consultation Plan

The consultation plan for the TWPSP represents the Council and consultant's commitment to communicating early and effectively with a large community of individuals, agencies and groups with different values and concerns and taking on board feedback from these processes to the plan being developed.

The purpose of the consultation was to:

- Communicate the process and key messages.
- Ascertaining community views and opinion in order to achieve better results.
- Developing the "Vision" for the plan.
- Identifying issues and gaining input on ways to resolve them.
- Gaining input to the planning process.
- Gain public ownership of the resulting plan.

There are several advantages of consultation when undertaken effectively:

- Increase in Community / understanding of the TWPSP and the process by which it evolves.
- Improve the quality of the TWPSP as it will benefit from a broad cross section of ideas at the outset and feedback during its creation.
- Input to the planning process will be even and balanced and the plan will be created at arms length from any one stakeholder. This is a transparent process embarked from a neutral position where there are no fixed agendas.
- Integrating results from previous consultation processes.
- The TWPSP will receive "Buy- in" and ownership by community and agencies.
- Developers will have a "blue print" to work towards when preparing their own masterplans and resulting individual developments will fuse together to reflect the objectives of the overall plan.
- There will be less disputes and appeals to the plan in the long term.

3.2 Consultation Management Plan

A communication and consultation management plan sets out how consultation will take place throughout the process. The methods of communication include the following:

- Public, individual and agency Workshops.
- Establish a steering committee to monitor and inform the planning process.
- Recording events, input and keeping attendance lists / contacts to report back to attendees.
- Interactive website - Posting of events, draft plans, feedback notes on the Council's website.
- Seeking input through all methods of communication – workshops, verbal, email, letters.
- Email and letter drops to stakeholders.
- School group surveys.
- Exhibition of draft plan for public comment.
- Response to submissions and amendment of plan to reflect input where warranted.
- Liaison with state government regarding infrastructure planning commitments (MOU).
- Reporting to Council and gaining Council endorsement of plan.

3.3 Programming of Consultation

The consultation plan included the following:

Community workshops were programmed to coincide with three key project phases:

- Near the project's inception to introduce the project to the community and workshop community concerns and aspirations concerning the study and to glean importantly local knowledge that could assist the project.
- At a draft TWPSP Phase to present the draft and receive comment from the community.
- At the exhibition phase to inform the community of the final draft plan and to answer questions which may assist them in making a submission during the exhibition.

3.4 Outcomes of Consultation

The results of the first and second community consultation sessions are summarised in Chapter 3 of the TWPSP Technical Report. All other consultation sessions are summarised in relation to issues and responses in Appendix 1 of the TWPSP Technical Report.

The first community consultation sessions divided into five workshops over two days by stakeholder groups in various locations in Albury. The workshops were successful in gathering widespread information and aspirations for input into the development of the TWPSP.

The second consultation sessions were undertaken in a similar format over two days. Stakeholders provided valuable feedback on the draft TWPSP for further input into the plan prior to exhibition. These sessions were also largely utilised by stakeholders to clarify details of the draft TWPSP and how it would be implemented.

School Workshops were conducted by AlburyCity with 200 year 5 and 6 students and 50 year 9 students from both Trinity Anglican College and Thurgoona Public School. During these workshops the students were asked to complete activity sheets to ascertain their views on a number of issues relevant to the project.

Steering Committee meetings corresponded with the community sessions and additional steering committee meetings were held throughout the project to maintain momentum of the project and ensure consistent and regular connection between the key Council offficers and the consultants.

4.0 The Vision

4.1 Key Objectives of the TWPSP:

The key objectives of the TWPSP were defined by Albury City in the Provision of *TWPSP for Thurgoona/Wirlinga Urban Release Area tender document, 2011.*

There are ten key objectives, as outlined below:

- Establishes a sense of place and community.
- Creates greater housing choice and affordable places to live.
- Provides for local employment and business activity.
- Creates highly accessible, vibrant activity centres and community facilities.
- Provides an integrated, accessible, dynamic network of passive and active open space and recreation facilities.
- Provides better transport choices.
- Responds to climate change, biodiversity, heritage, natural hazards and integrated water management.
- Delivers a safe, efficient and integrated transport network.
- Identifies and resolves any potential land use conflicts.
- Delivers accessible, integrated and adaptable utilities and other necessary infrastructure services.

These key objectives, together with the outcomes from the Community Consultation process help shape the high level vision for the Study Area.

4.2 The Vision

The Vision for the TWPSP is:

To establish a living environment that promotes and is defined by a 'sense of place' and a 'sense of community' that is uniquely Australian and reflects the rural heritage of the district.

A sustainable living environment that offers all members of its community convenient and affordable access to a wide range of recreational, educational, residential and employment opportunities.

An inclusive community that has access to efficient public transport, bike paths and walkable proximity to diverse and extensive open space networks.

A community that values both its heritage and natural environment, while considering the needs of both today's residents and the residents of tomorrow.

A community that is proud of this safe and vibrant place that draws inspiration and life from its heritage and connection to the majestic Murray River.

5.0 The Precinct Features

5.1 Current Land Use

The overall Study Area encompasses over 4500 hectares and currently accommodates a population of approximately 6000 persons.

The Study Area includes a general breakdown of the major residential Land Zonings as follows:

- Approximately 1076 hectares of General Residential land.
- 1106 hectares of Urban Release Area Residential land.
- 939 hectares of Urban Release Area Rural Residential land.
- 119.3 hectares of developed Low Density Residential.

The Study Area is comprised of the following:

- 370 hectare 'Special Activities' site; Defence training site, located prominently within the Study Area, surrounded by future residential development to the north and south, rural land to the east and existing zoned residential to the west.
- 179ha 'Infrastructure' site, accommodating Charles Sturt University's Thurgoona campus to the south and Thurgoona TAFE's facilities to the north.
- An activity centre at the intersection of Thurgoona Drive and Table Top Road.
- One government primary school to the south of Thurgoona Drive.
- Thurgoona Golf Club Resort.
- Thurgoona Community Centre.
- Two sports ovals.
- Two Private P-12 Schools.
- An extensive network of open spaces, environmental areas and creeks.

Refer to Figure 6: Land Use / Study Area Map.

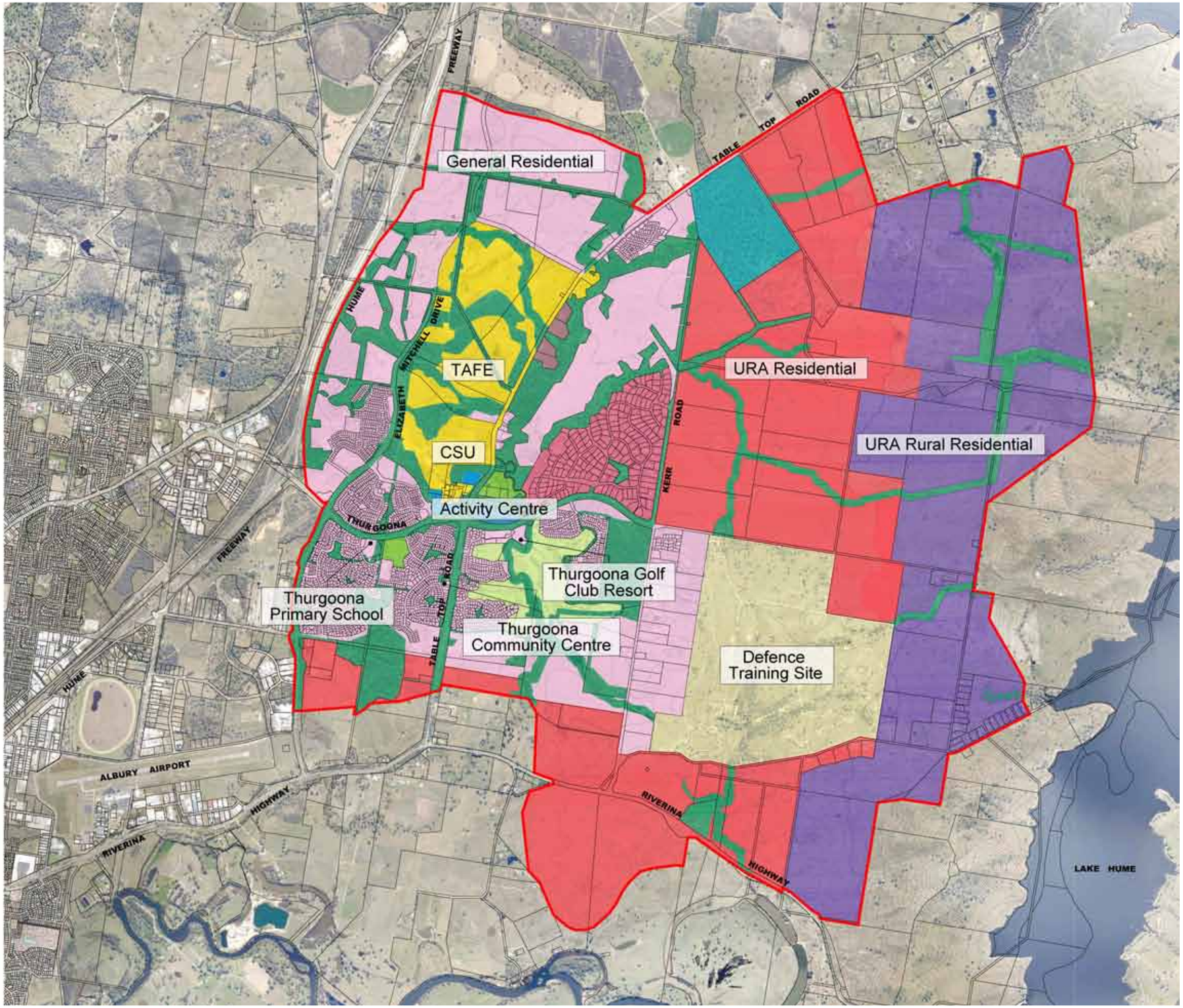


Figure 6: Land Use Plan / Study Area Map

5.2 Contours and Landform

The majority of the Study Area is relatively flat and is below the 220m contour. Woolshed Creek and related tributaries are a significant natural site feature. Surrounding hillscapes to the east and to the north west of the Study Area significantly impact on the character of the Study Area by creating a sense of enclosure. The hills on the eastern edge of the Study Area peak around the 350m contour.

Implications for the TWPSP:

- Ensure hillscape views and vistas are maintained by limiting development above the 230m contour line.
- Extend and reinforce Woolshed Creek and related tributary corridors.
- Improve linkages to escarpment and Lake Hume, particularly for pedestrians and cyclists.
- Improve visibility and access to natural features of the Study Area, through the location of esplanade roads along green corridors, orientation of residences onto open spaces and co-locating parks and sports facilities adjacent to green corridors.

Refer to Figure 7: Contours and Landform.

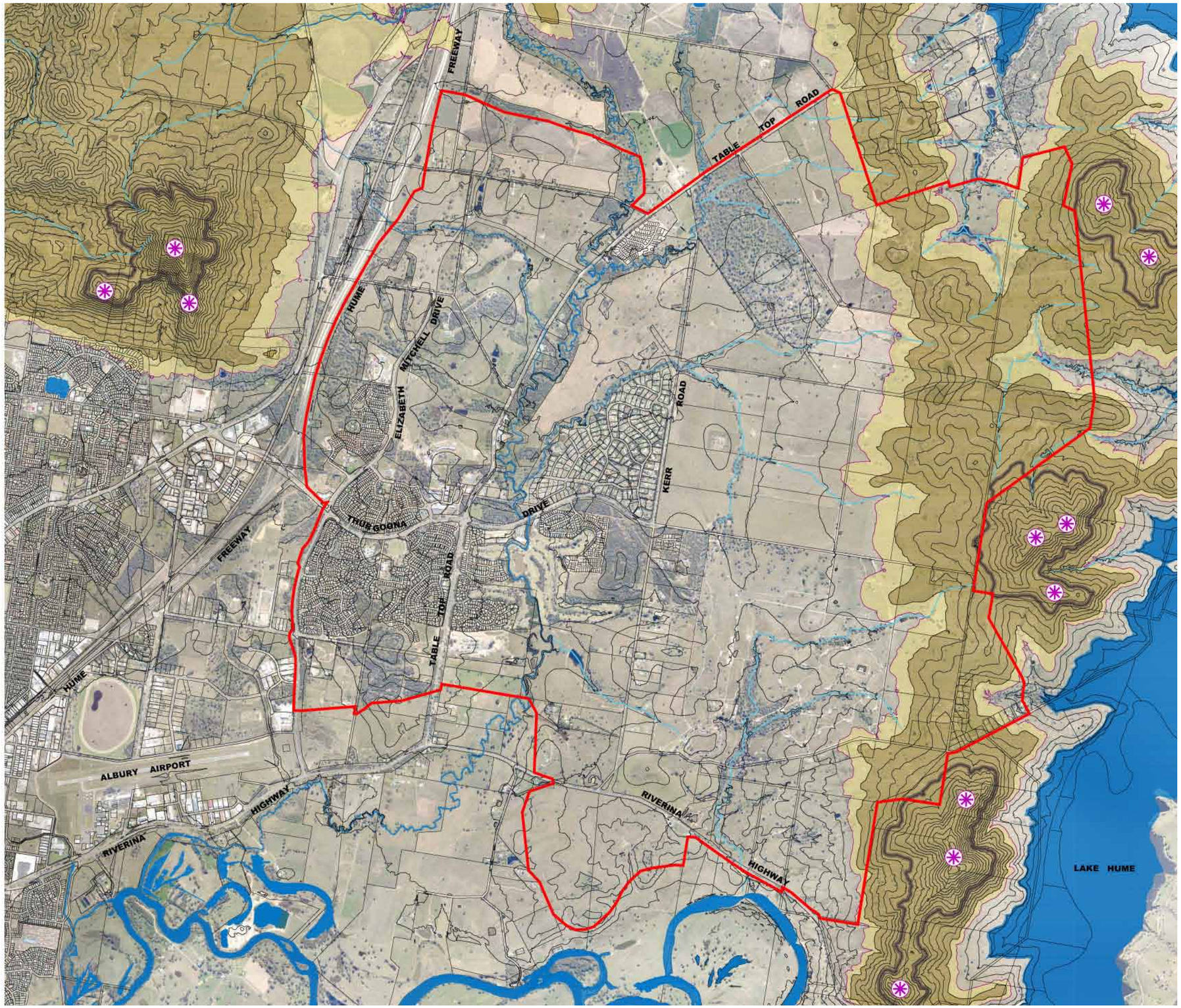


Figure 7: Contours and Landform

5.3 Bushfire Prone Land

Bush fire prone land follows the heavily vegetated creek lines, and both desired and retained habitat networks and areas that are predominantly located on the western side of the Study Area. As vegetated corridors extend towards the eastern edge of the Study Area, so too will the bush fire prone zones.

The bushfire constraint is relatively minor across the Study Area as the land classified as bushfire prone is limited. However, the TWPSP has been designed to create Asset Protection zones to protect urban development via:

- Incorporating bush fire areas into open space / environmental corridors where possible.
- Placement of perimeter roads adjacent to prone areas.
- Larger lots adjacent to bushfire prone land.
- Location of non sensitive uses adjacent to bushfire land, or adequate site area to include sufficient setbacks.

Refer to Figure 8: Bushfire Prone Land & Figure 18A Option for Residential Interface to Bushfire Prone Area.

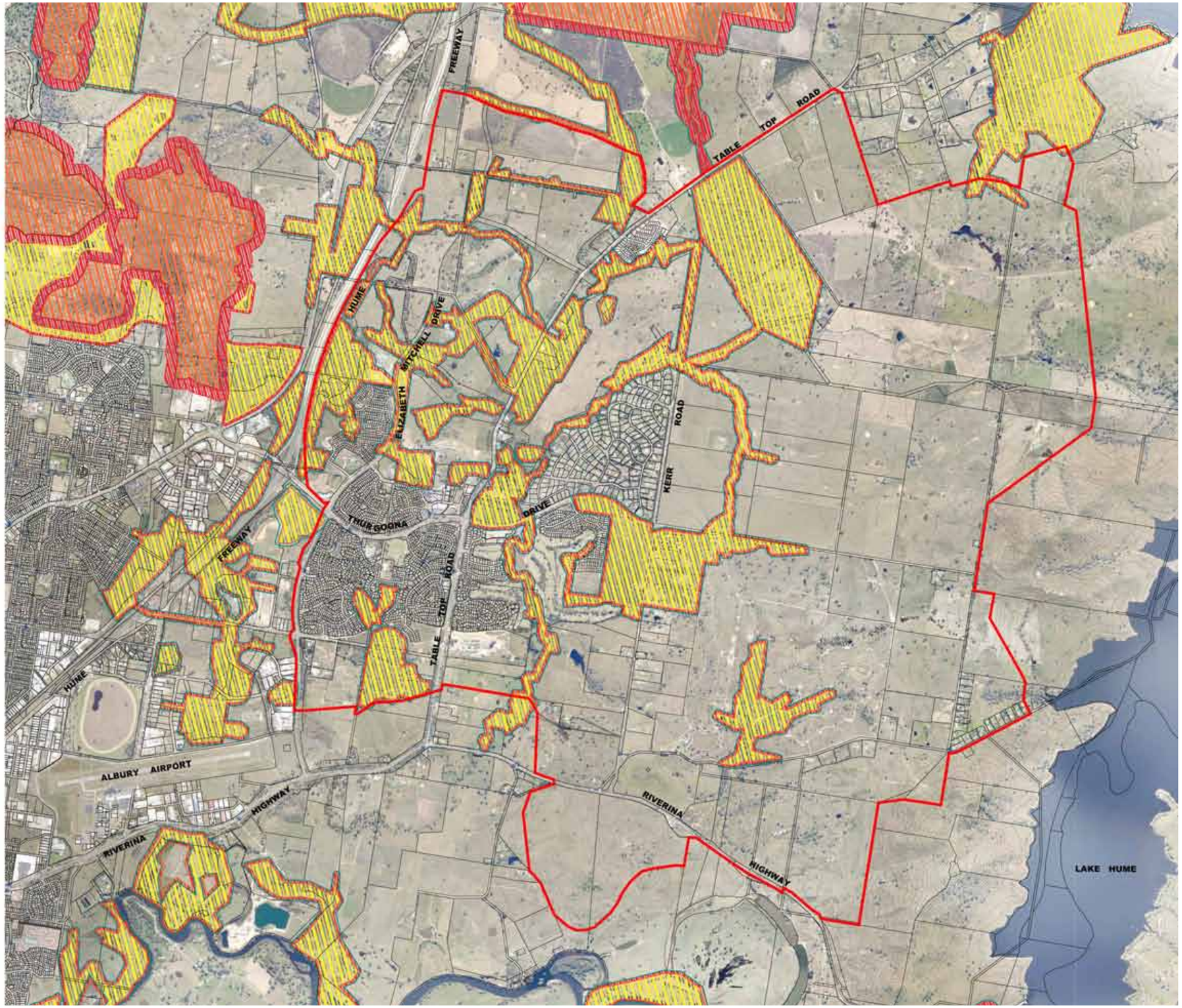


Figure 8: Bushfire Prone Land

5.4 Streams and Fish Habitat

Creeks and streams play a major environmental and 'placemaking' role within the Study Area contributing to the 'rural' character of the precinct.

Key creeks include; Woolshed Creek, running in a north south orientation, predominantly through Thurgoona and a series of creeks connecting into Woodshed Creek; Nine Mile Creek, Eight Mile Creek and Seven Mile Creek.

Implications for the TWPSP:

- Protect and enhance creek corridors.
- Reinforce amenity value and visibility though the location of open space facilities adjacent to creek corridors.
- Provide an integrated network of pedestrian and cycle paths adjacent to open space creek corridors.
- Utilise esplanade roads to key corridor interfaces to improve connections, surveillance and accessibility.
- Limit potential adverse impacts on the quality of the natural flow regime/natural flow paths, stability of the bed, shore and banks of receiving waterways and any impacts on the flows, capacity and quality of groundwater systems.
- Consider building siting and design to avoid any adverse environmental impacts or where impact cannot be avoided what design measures can be employed to minimise, manage and mitigate impacts.

Refer to Figure 9 : Streams and Fish Habitat.

Figure 9: Streams and Fish Habitat

5.5 Flooding

A large part of the area to be developed lies within the catchment area of Eight Mile Creek. This creek system has a catchment area of approximately 65 km^2, and discharges to the Murray River downstream of Lake Hume. It has a number of tributaries including 6-mile Creek, 7-mile Creek, 8-mile Creek and 9-mile Creek. The catchment area boundary is shown in Figure 10.

Low-lying parts of the catchment area are prone to flooding, and for this reason, a flood study of Eight Mile Creek and tributaries has been carried out recently by URS for Albury City Council. A report describing the results of this flood study was available from Council for review.

The report describes the hydrologic and hydraulic modelling carried out to determine the water levels and flood extents for a range of design flood events. Maps showing the extent of flooding for a number of design events are included in the report as Appendices. The design events are:

- 100 year ARI (average recurrence interval) flood event.
- Probable Maximum Flood event (largest flood that could conceivably occur at a particular location).

Interim Flood Planning Area Mapping is included in the TWPSP Technical Report. The flood planning area is the area that would be inundated by a flood event with water level 500 mm higher that the 100-year ARI event. The flood planning area (being 500mm above the 100-year ARI event), although constrained, is suitable for urban development subject to a flood planning level condition (i.e. minimum Finished Floor Level (FFL)). The interim map will need to be reviewed and adopted during the floodplain risk management plan phase.

The TWPSP has utilised the information from this flood study. The interim flood planning area mapping has been obtained from Council and included as an overlay to the TWPSP area. As indicated above, the flood planning area is suitable for urban development subject to condition relating to minimum FFL .

A submission to Albury City Council has noted that the flood study's primary objective is to estimate the flood behaviour under "existing conditions". The submission raised concerns about the impacts of future development on the creek system.

The development associated with the TWPSP (with no mitigation measures) will increase the runoff and potentially contribute to existing flooding problems. The submission suggested a vision for the future of the Woolshed Creek/ Eight Mile Creek catchment, which is a detention basin complex slowing down the excess flows resulting from development, in order to preserve the natural creek system. This would be implemented as a series of smaller detention basins to be located at new developments for the treatment of stormwater run-off, as currently happens.

This vision has been accommodated in the concept layout for the TWPSP. Areas have been reserved for stormwater treatment (both quantity and quality). Typically, a footprint area of approximately 2.5% of the catchment draining to it would be required for a stormwater detention basin and/or some stormwater quality treatment device. The typical filter area of a bio-retention basin is of the order of 1% of the contributing catchment area. The aim of the TWPSP has been to place areas designated for stormwater treatment adjacent to or within open space areas, or adjacent to sports and recreation areas.

Implications for the TWPSP:

- Flood affected areas to be maintained as open space, recreation areas and/or sports fields.
- A series of detention basins to be located at key areas throughout the TWPSP. These detention basins will not only provide stormwater storage / treatment but will also be utilised as attractive site features and place making elements.

In relation to further flood plain management, it is understood that Council have information at hand with the recent completion of the URS study which will assist with flooding considerations in future strategic planning.

Refer to Figure 10: Eight Mile Creek Catchment and Figure 11: Flood Level and 1:100 ARI.

Refer to Chapter 12, Integrated Water Management Strategy, TWPSP Technical Report.

Figure 10: Eight Mile Creek Catchment

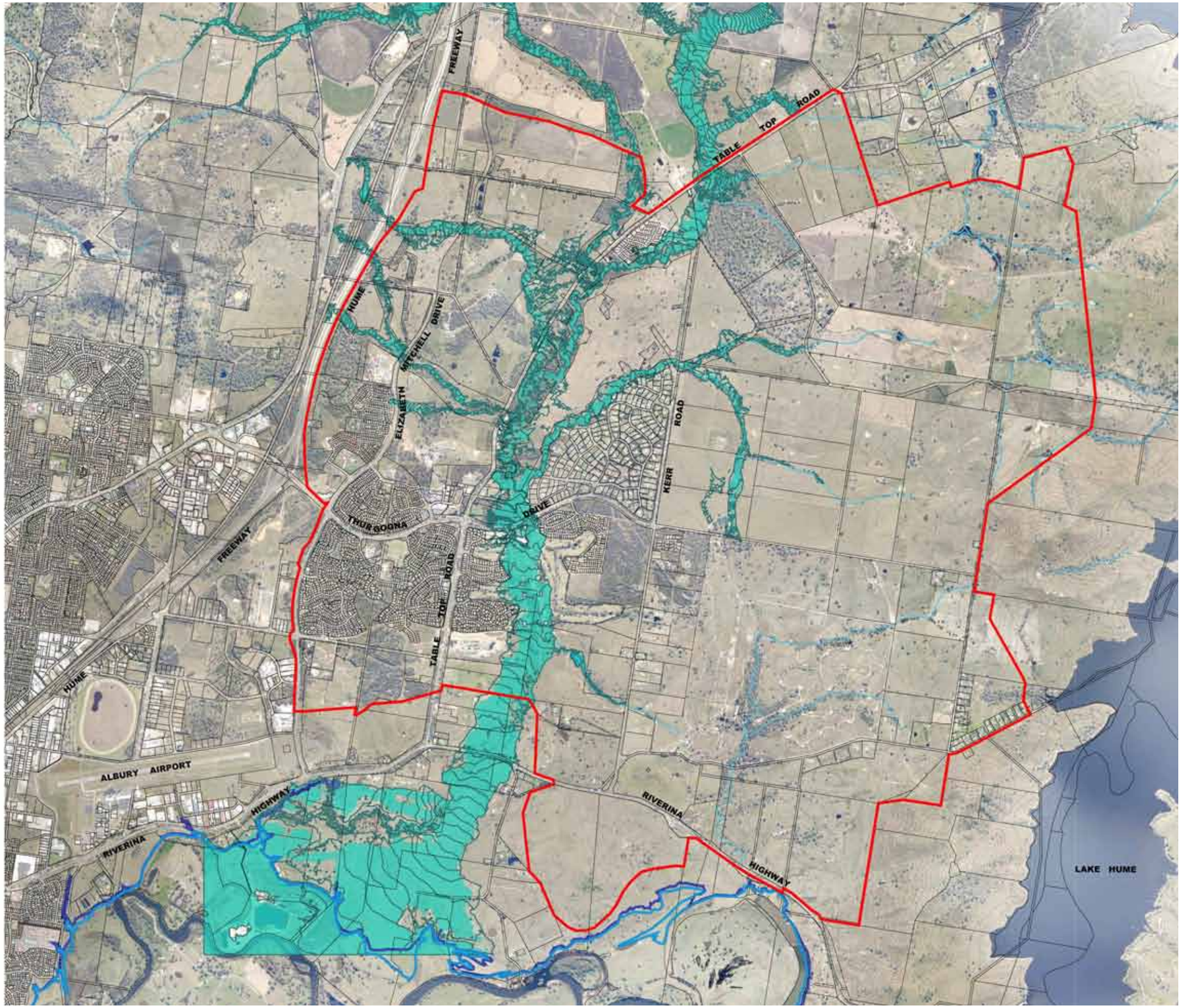


Figure 11: Flood Level and 1:100 ARI

5.6 Environment and Biodiversity

5.6.1 Introduction

Biodiversity Certification of the ALEP 2010 has been undertaken to address requirements of the Threatened Species Conservation Act 1995 (TSC Act) in relation to the Thurgoona/Wirlinga Precinct. Relevant residual issues (those not addressed by Biodiversity Certification) include the following:

- approvals under the Commonwealth Environmental Protection, Biodiversity and Conservation Act 1999 (EPBC Act) for Matters of National Environmental Significance (MNES).
- protection and management of offsets generated within the precinct as part of the Biodiversity Certification of the ALEP 2010 (e.g. trees within E2 and E3 zones) or which may be impacted in adjacent or connected areas.
- the integration of requirements under Acts such as the NSW Water Management Act 2000 into holistic landscape planning (to maximise efficiency of planning outcomes for biodiversity and other planning elements).
- the design of footprint configurations and management plans that are workable and affordable within the broader urban environment for the precinct which assist with biodiversity management.
- Funding streams and management options.

This plan addresses these issues via specified objectives and planning and design guidelines for biodiversity within the Thurgoona/Wirlinga precinct.

5.6.2 Biodiversity Context

Aside from the bio-certification process associated with the production of the ALEP 2010, the western part of the Study Area has been the subject of a conservation strategy concerning threatened species (Thurgoona Threatened Species Conservation Strategy -AWDC- 2004). This strategy measured the status of threatened species within its defined Study Area and recommended ongoing management and monitoring for the future. However, the Urban Release Area (eastern half of the TWPSP Study Area) has not been the subject of any specific threatened species survey or plan and this is a limitation in terms of the complete understanding of the context and status of biodiversity for the TWPSP.

Notwithstanding the above, the Wirlinga (eastern) precinct is largely pasture or grassland, however, in some areas native trees persist as scattered trees or in corridors.

Some remnant native ecosystems occur within the precinct, particularly the Bells Stock and Camping Reserve fronting Old Sydney Road. This includes woodland likely to qualify as White Box-Yellow Box-Blakelys Red Gum Woodland which is listed as an Endangered Ecological Community (EEC) under the TSC Act and a Critically Endangered Ecological Community listed under the EPBC Act in the north of the Precinct and some riparian ecosystem remnants across the precinct. It is unlikely that the riparian ecosystems have been mapped at fine enough scale to determine the precise communities present at any given location and a number of wetland and forested wetland communities may occur in some locations. The communities present will however have habitat value for a range of fauna including arboreal species (such as the Squirrel Glider Petaurus norfolcensis), woodland birds (a number of which are listed as endangered or vulnerable under the TSC Act or EPBC Act), the Barking Owl (Ninox connivens) and aquatic fauna.

Management for the environmental zoned networks by Council is not anticipated, ongoing management will be the responsibility of land owners. However, agreements currently exist between the Albury Wodonga Development Corporation and the Crown Lands Division for the ongoing management and improvement of environmental lands outside of the Urban Release Area and Crown Lands may be prepared to manage further areas zoned as Environmental Management. Where the land remains in private ownership, their management is reliant on local Council policy and conditions of development consent, or private developer agreements which must be monitored by Council. Other lands (those not zoned primarily for environmental purposes) may also retain biodiversity values but these may be a secondary consideration that require integration with the dominant land use.

Grants are available to private land owners of environmental land through the Albury Conservation Company to assist land management activities.

5.6.3 Biodiversity Objectives

The following objectives specify the desired biodiversity outcomes for the Thurgoona/Wirlinga precinct:

- Protect and where practicable enhance existing biodiversity values provided by significant trees (in particular corridor values; nectar resources; nest hollows and other values relating to biodiversity offsetting).
- Protect trees within E2 and E3 Environmental Zones so that Biodiversity Certification calculations relating to tree retention within these zones are upheld.
- Protect key fauna habitat values (being fauna habitat values that make the most contribution towards improved biodiversity outcomes across the Albury local government area).
- Integrate biodiversity management planning into water cycle and stormwater management planning and also bushfire and recreational planning to maximise land use efficiency and biodiversity outcomes.
- Provide guidance for urban design that reduces impacts of urbanisation on biodiversity values and reduces management costs associated with biodiversity management.

5.6.4 Planning and Design Guidelines

Chapter 10 of the TWPSP Technical Report following presents suggested guidelines for managing the following key aspects of or actions which can effect biodiversity:

A. Significant tree management.

B. Trees and understorey within E2 and E3 zones.

C. Urban design.

D. Fencing and stock exclusion

E. Precinct ecology analysis

F. Management costs and measures.

The preparation of the TWPSP has considered the above objectives in the broad allocation of land uses across the precinct. The TWPSP has been designed to:

- Extend green linkages and connect corridors throughout the Study Area and also connect with key value areas outside of the Study Area (ie river, Lake, Red Light Hill, external areas of value on the periphery).
- Manage the interface between developable lands and the corridor areas to reduce potential conflicts.
- Extend pathways through the E3 areas to allow the community the potential to use, enjoy and value the areas.

Further consideration at the master planning and development phase will be the responsibility of land owners and will be required to ensure that the key objectives of biodiversity are supported in any development. Funding is a critical issue and the analysis raised above will be a necessary technique to marry aspirations and measure expectations against costs and sources of funding.

The following Figures have been prepared to:

a) recognise the existing and zoned areas of biodiversity value (E2 Environmental Conservation and E3 Environmental Management) refer Figure 12 – Existing Biodiversity Plan

b) Identify potential areas of significance for further investigation consistent with Biodiversity Certification and recently approved developments. Refer to Figure 13 – Biodiversity Values.

c) propose extensions to corridors to link woodlands within the Study Area to the woodlands of the foreshore of the lake, river and western hillscapes. Refer Figure 14 – Proposed Biodiversity Corridor Extension plan. These areas offer the opportunity for habitat restoration and revegetation.

It should be noted that many of the areas of potential significance identified from the desk top review is predominantly located within other zoned lands (being that land not zoned primarily for environmental purposes). These lands may retain biodiversity values as a secondary consideration when integrating with the dominant land use.

Refer to Figure 12: Environment Conservation & Environmental Management Plan.

Refer to Figure 13: Biodiversity Values Plan.

Refer to Figure 14: Proposed Corridor Extension and Linkages Plan.

Refer to Chapter 10; TWPSP Technical Report.

Regent Honeyeater

Squirrel Glider

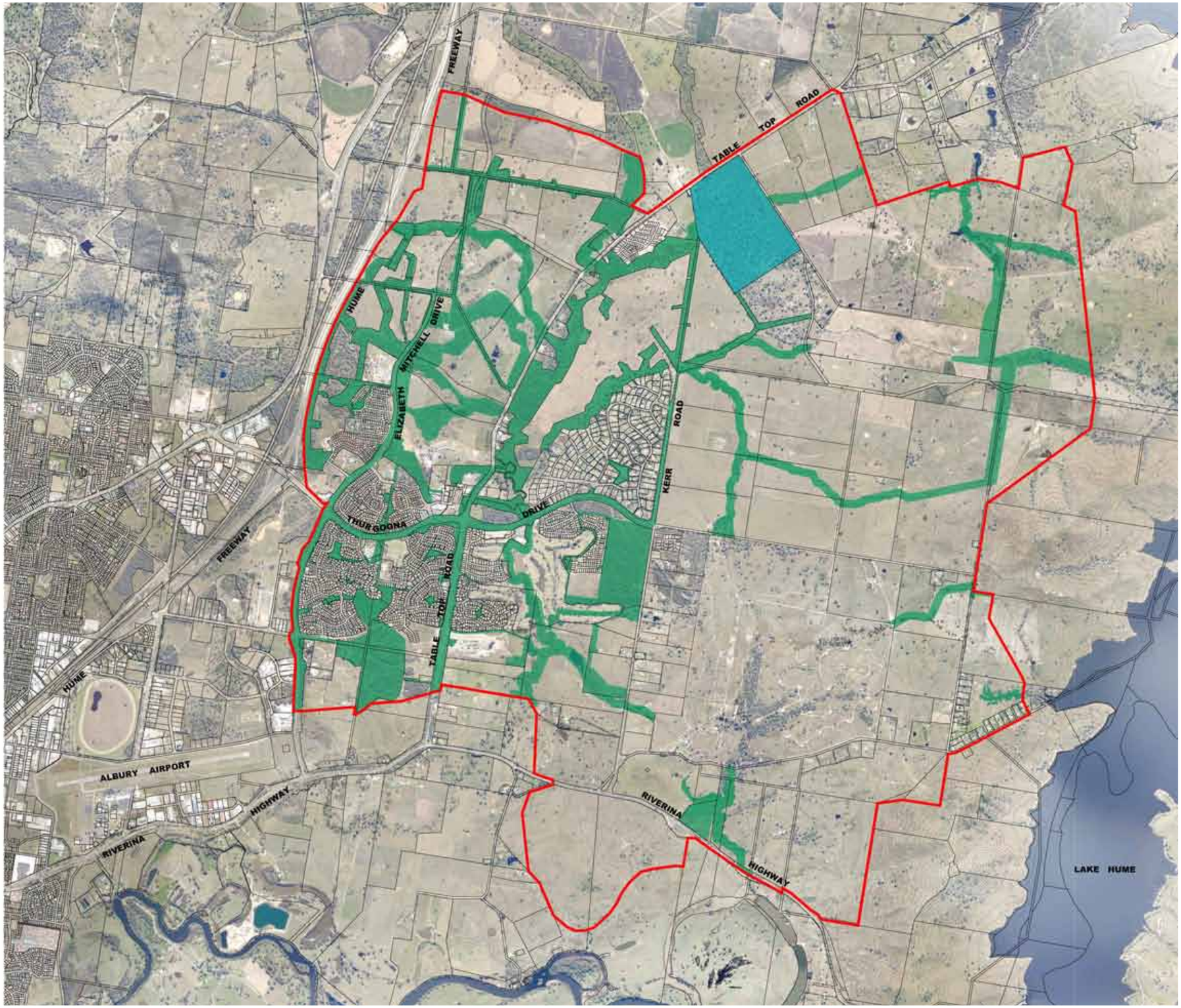


Figure 12: Environmental Conservation and Environmental Management Plan

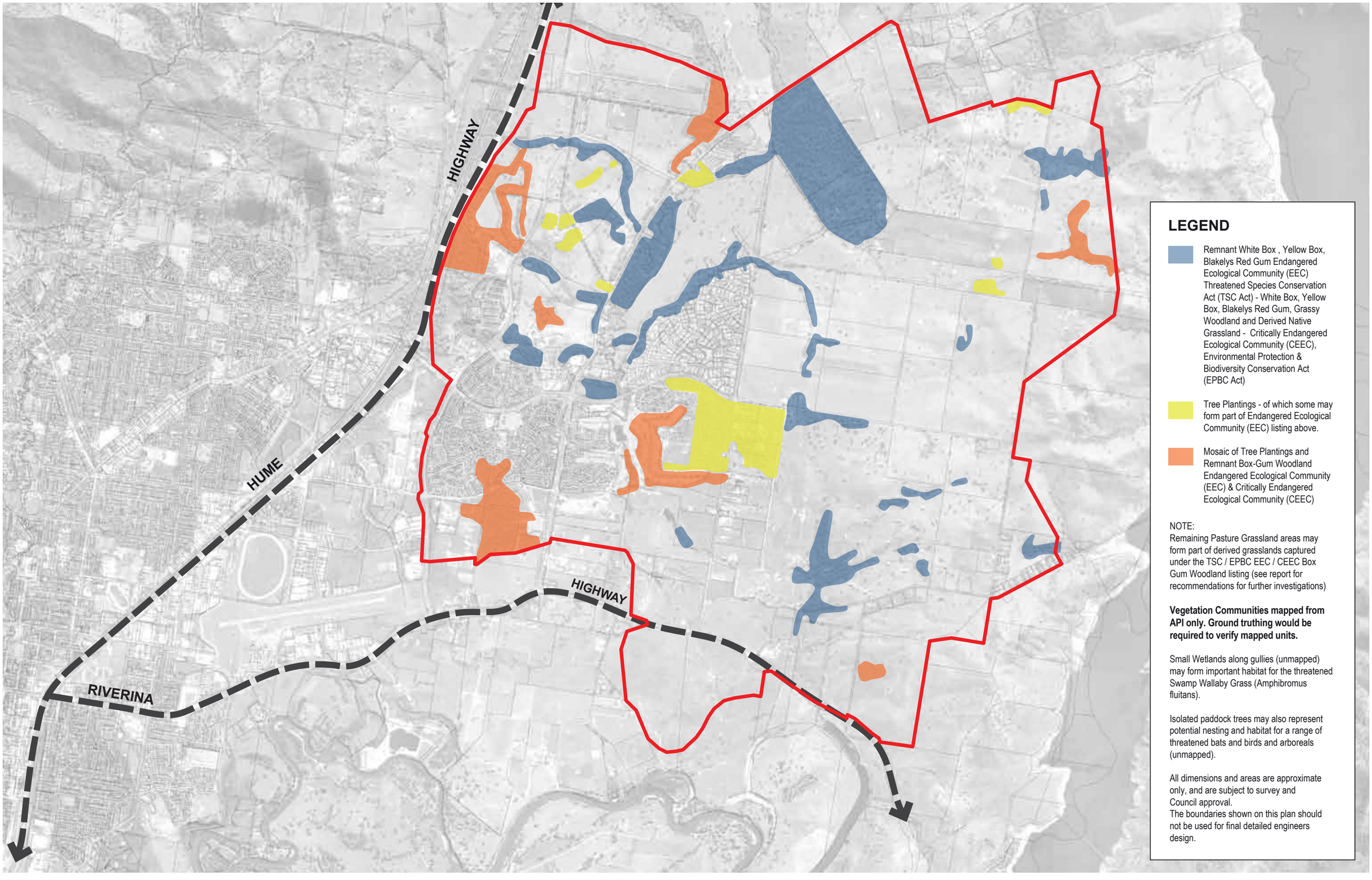


Figure 13: Biodiversity Values Plan

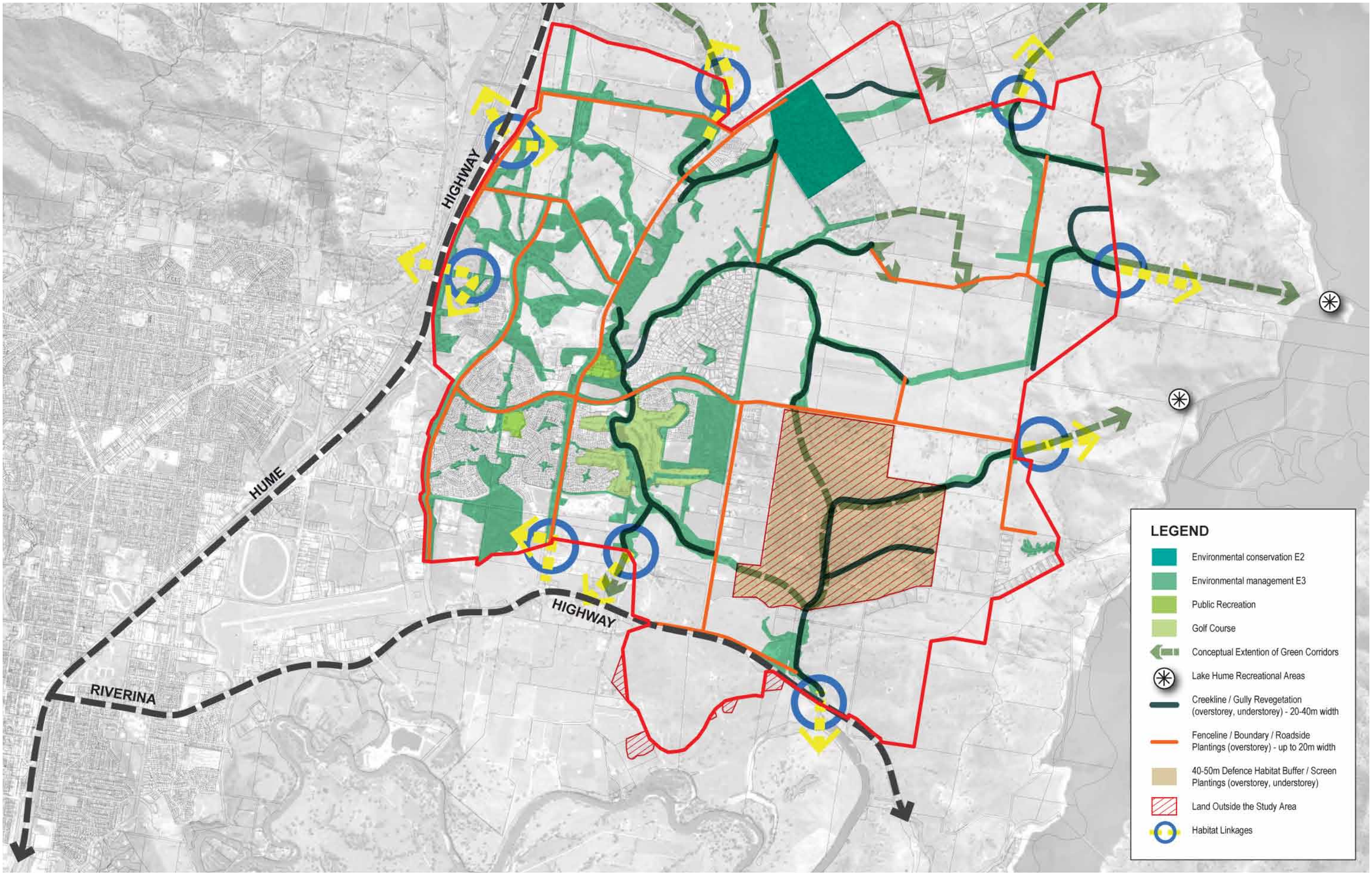


Figure 14: Proposed Corridor Extension and Linkages Plan

5.7 Heritage Elements

5.7.1 Introduction

A cultural heritage assessment has been undertaken to identify, assess and record places of significance within the project area and to develop and recommend ways of managing and conserving that significance (Albury City Council, 2011). The assessment is recorded in the Cultural Heritage Assessment prepared by RPS and provided in Appendix 2 of the TWPPSP Technical Report. The recommendations of assessment have been used to as part of the TWPSP for the Thurgoona/Wirlinga Urban Release Area. As an Aboriginal Heritage Impact Permit was not required as part of this investigation, the Aboriginal Cultural Heritage Consultation Requirements (ACHCRs) (2010) are not triggered. However, RPS initiated consultation as part of this investigation with Albury & Districts Local Aboriginal Land Council (ADLALC).

5.7.2 Heritage Context

The study of the local heritage context identified that the project area is well removed from any listed heritage items and that the proposal will have no impact on them.

5.7.3 Archaeological Context

A search of the Aboriginal Heritage Information Management System (AHIMS) database on 18 October 2011 showed a total of 60 sites within a 2.5km radius of the project area. A great percentage of these sites comprised isolated finds (70%) of quartz. Quartz appeared to be the dominant raw material used in the vicinity of the project area. This point was borne out by previous archaeological subsurface investigations carried out along the western portion of Woolshed Creek, which found 99.5% of the 131 artefacts excavated as being made from quartz.

Pursuant to the AHIMS results, historical observations and previous archaeological investigations, a predictive archaeological model was developed. It was considered that site types likely to be identified within the project area would be isolated finds, that these artefacts would be made from quartz and would likely be either small flaked pieces or debitage. A lower probability existed for the identification of larger sites and/or low density artefact scatters, and modified trees.

A pedestrian survey of the project area was undertaken by RPS archaeologist, Deborah Farina, in conjunction with Noel Stewart, representing ADLALC on 7 December 2011. Generally, ground surface visibility was poor owing to extensive ground cover by vegetation. A single site comprising a quartz flaked piece was identified during the survey. The artefact was identified on the surface of an eroded creek terrace adjacent to the north-eastern bank of Sandy Creek in Survey Unit 1. This site was entirely consistent with the predictive model.

5.7.4 Assessment

This report has considered the environmental and archaeological context of the project area, developed a predictive model and reported on the results of an archaeological survey of the project area. The following management recommendations have been prepared in accordance with the relevant legislation. Their formulation has taken into consideration the level of significance of the identified Aboriginal cultural heritage site and any potential impacts future works/developments may have on these sites. This will need to be reviewed once a development footprint is approved.

5.7.5 Recommendations

Recommendation 1

A 200m buffer either side of the relevant sections of Woolshed Creek and Sandy Creek should be included in any future Development Control Plan identifying these lands as being of moderate archeological sensitivity. All lots within this buffer should also carry advice within the s149 (2) certificate alerting owners and potential owners to this constraint. This notification should also include information regarding obligations under the National Parks & Wildlife Act 1974 (NSW) and the Heritage Act 1977 (NSW).

Note: This 200m buffer is consistent with the requirements under the Due Dilligence Code of Practice published by the Office of Environment & Heritage (formerly Department of Environment, Climate Change and Water (DECCW, 2010:12).

Recommendation 2

Proposed land uses (outside of those considered exempt by clause 80B of the National Parks & Wildlife Regulations 2009) which are intended to occur within the 200m buffer, will only be permitted after subsurface archeological testing by a qualified archaeologist is undertaken to locate or negate items of cultural significance.

The following Heritage Elements Plan has been derived from previous heritage investigations including the Albury City Wide Heritage Study 2003 and Albury Local Environmental Plan 2010 to inform future local policy plans and the elements and sensitive areas should be carefully considered as the subject sites or areas in the vicinity are developed.

Refer to Figure 15: Heritage Plan.

Refer to Chapter 11: Heritage Plan, TWPSP Technical Report.

St. Hillaire Winery remains

Guadalupe House

Bethanga Bridge

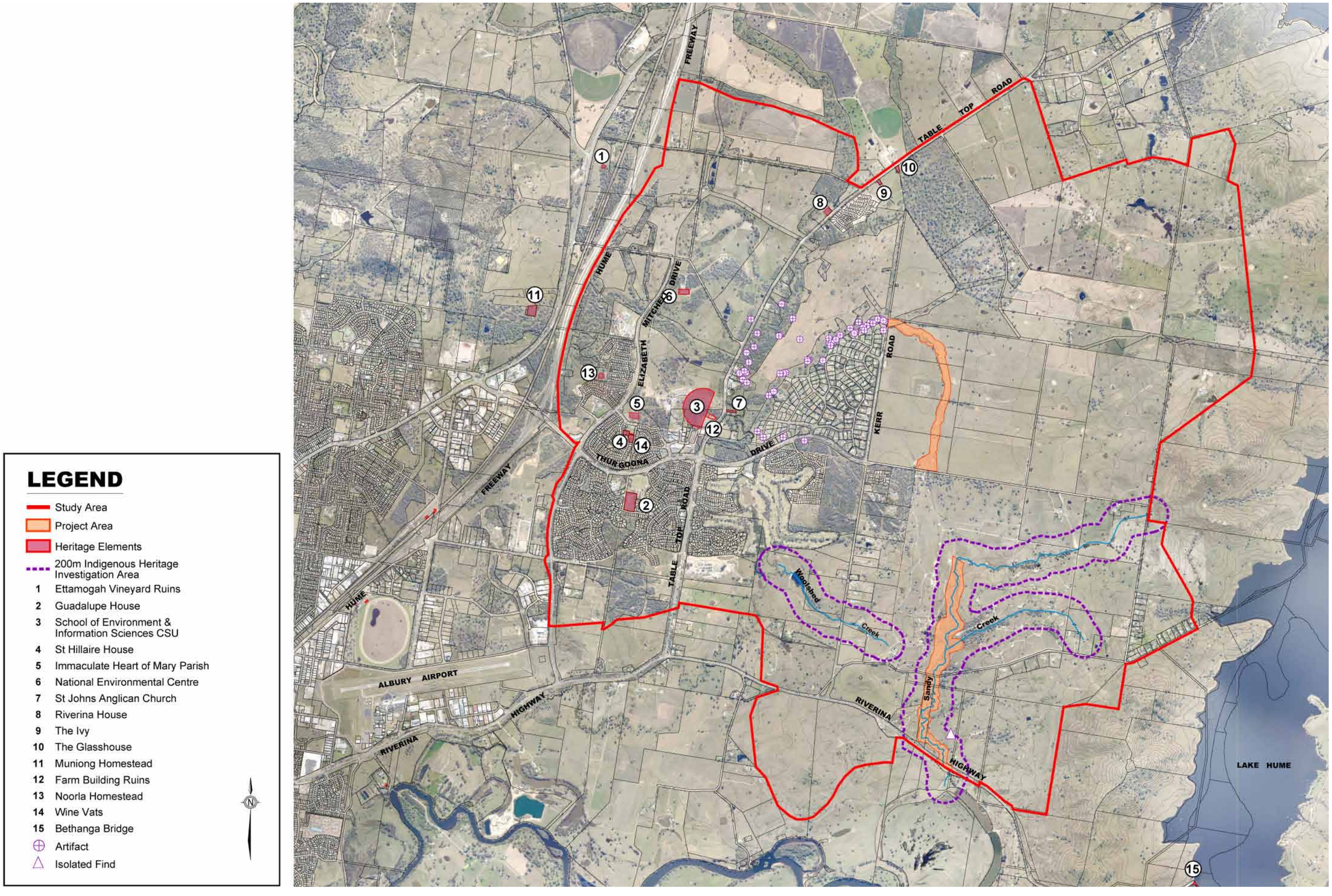


Figure 15: Heritage Elements

5.8 Utilities

The proposed development of the Study Area will require the construction of major infrastructure to reticulate essential services to the area. It is anticipated that utility services will be rolled out in conjunction with development of the area. Developers will be required to submit applications to the relevant authorities to determine actual servicing requirements for individual development sites.

Liaison with the local authorities indicates that utility services can be provided by the extension of existing infrastructure servicing the area. During our consultations with providers, no objections were raised with regard to servicing the Study Area.

Existing utilities in the area have some capacity available to service the early stages of development in the Study Area.

Determination of more detailed and specific servicing requirements for individual sites will require applications to be made to each authority at the time of the development.

Extension of existing infrastructure to service the site will be required to be undertaken by the developer in conjunction with the local servicing authorities.

The full report on Utility Investigations can be reviewed in Chapter 16 of the TWPSP Technical Report.

Refer to Figure 16: Utilities.

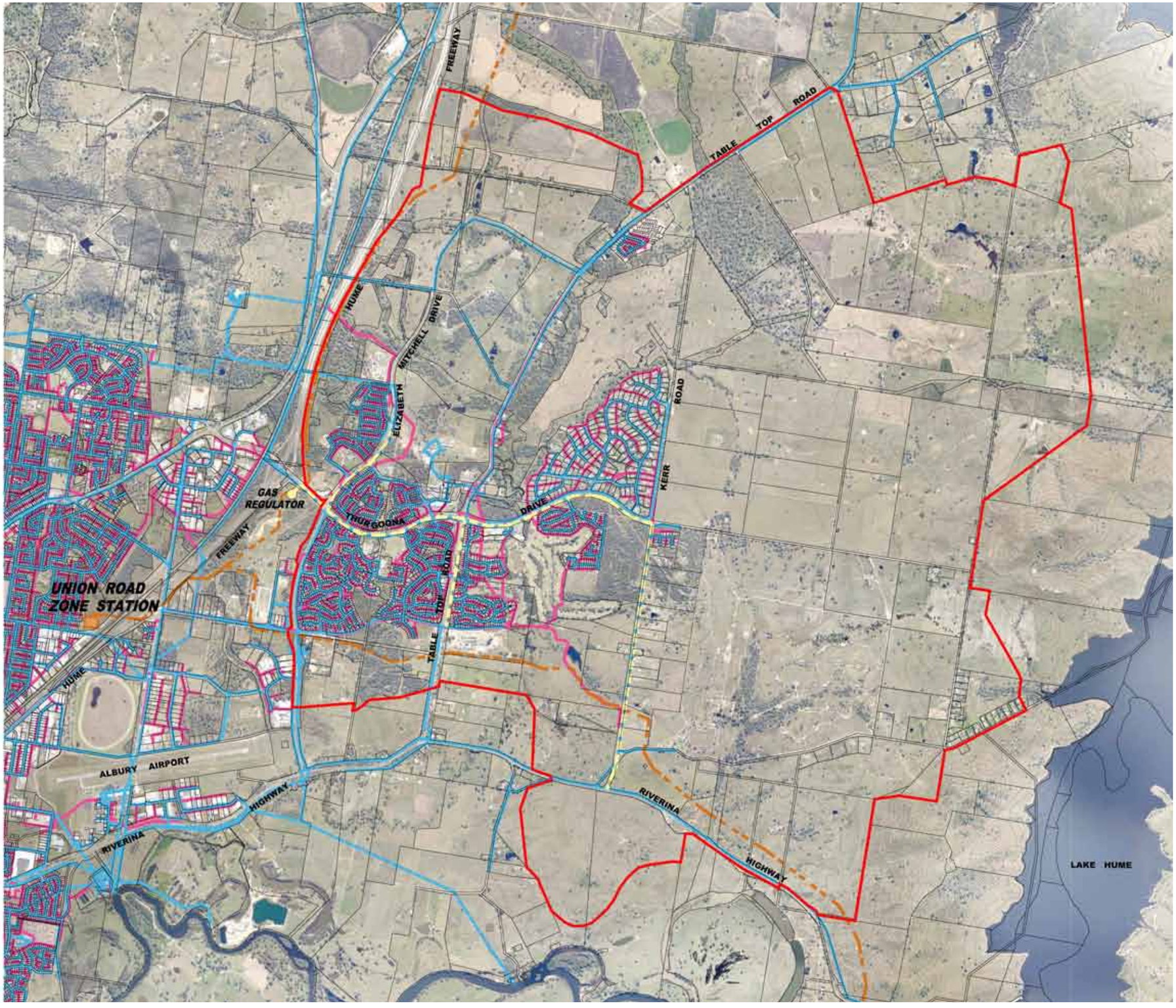


Figure 16: Utilities

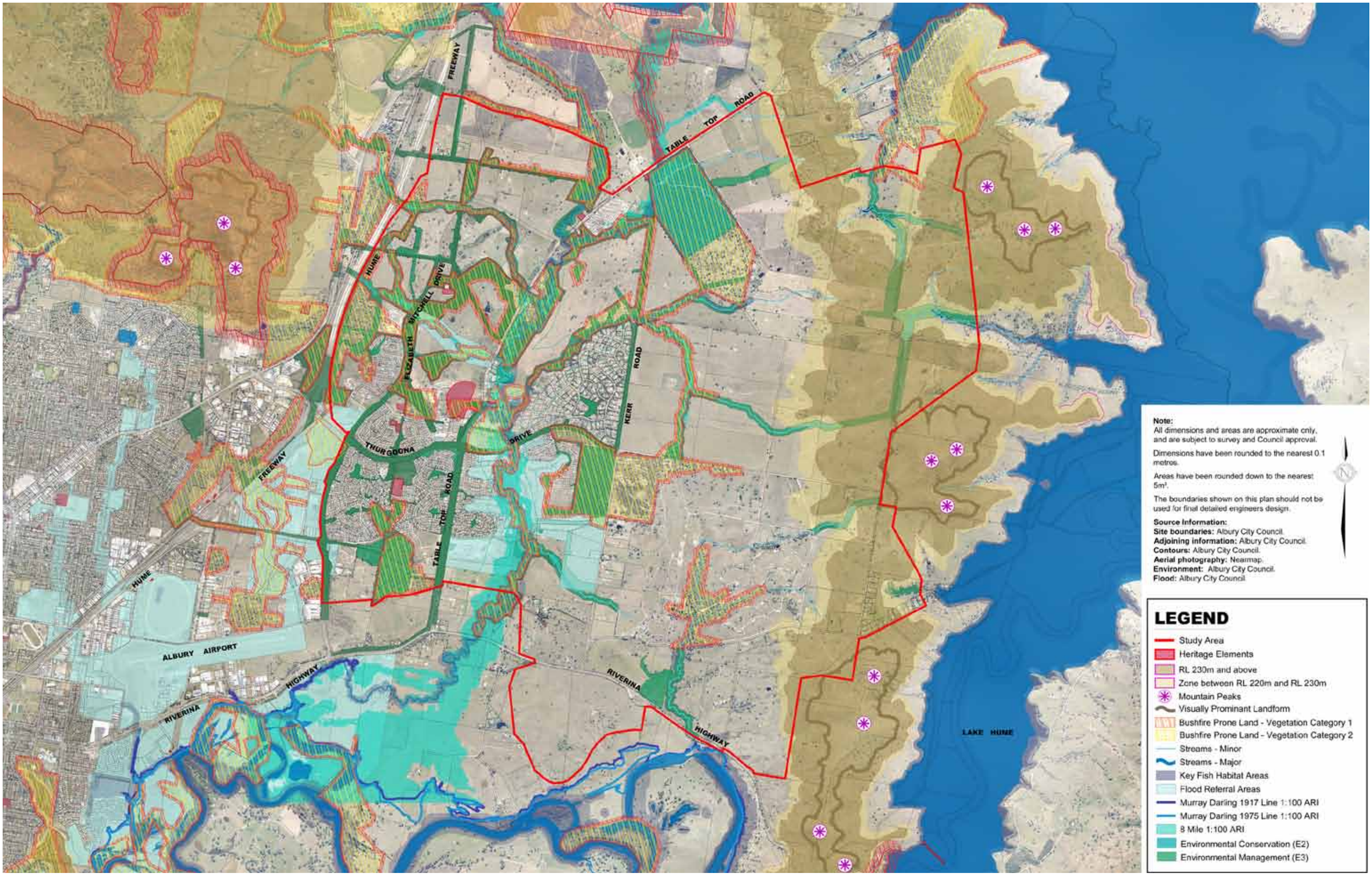


Figure 17: Site Features Plan

6.0 Potential Land Use Conflicts

6.0 Potential Land Use Conflicts

Potential land use conflicts have been a consideration in all of the investigations undertaken for the Thurgoona/Wirlinga Study Area. As the area is not completely a Greenfields site, conflicts will potentially arise from locating urban land uses around existing rural, industrial, transport and defence land uses which exist within or adjacent to the Study Area. Identified conflicts have been addressed in the TWPSP design to minimise discord whilst enabling the land uses that are required to facilitate urban growth for Albury.

This section explores current and potential land use conflicts that have been identified through:

- The review of previous studies and strategies for the area.
- Site investigations including urban design, traffic, noise, ecology, flooding.
- Consultation with stakeholders and the general community.

The issue of land use conflict was also considered at the rezoning stage for the Study Area. The Albury Local Environmental Study 2008 contains the impacts of the change of zoning from Inner Rural (Agriculture), Inner Rural (Environment), Rural (Living) and Urban Fringe zones to the General Residential (R1) zone in the Thurgoona/ Wirlinga Study Area. It states that there are no adjacent conflicting land uses relating to noise and safety. It then acknowledges that the rezoning will not prevent existing practices continuing but will restrict any potential for intensification existing land uses and practices that would conflict with and or compromise residential development outcomes.

The following Table 1 has been prepared to consider the potential conflicts and make mitigation suggestions where appropriate.

A Land Use Conflicts Plan (Figure 18) has also been created to spatially identify where potential land use conflicts may exist across the Study Area. This plan, the table and the recommendations of the acoustic study have all been considered in the preparation of the TWPSP.

Refer to TWPSP Technical Report Chapter 17 for further discussion on potential land use conflicts and their consideration within the context of the TWPSP.

Land Use Category	Potential Conflict	Comment	Response
Existing Industrial and Commercial uses			
Nexus Industrial Estate Existing and future Industry	Adjoins existing residential zoned land Noise, odour, dust	The Nexus industrial park is located to the north west of the study area and is separated from the study area by the Hume Freeway. This is considered a sufficient buffer to largely prevent amenity issues relating to the land use activities likely to occur at Nexus affecting Thurgoona Wirlinga. Due to the proximity of the Nexus estate to TW and prevailing winds and climatic conditions it is not expected that dust or odour is likely to be a concern for TW. A future link road to the Nexus estate will provide access for workers to the employment area. Due to the proximity and function of the freeway, it is not expected that industrial traffic will need to penetrate the precinct for any reason. There is provision within Appendix K of the Albury DCP 2010 for the long term expansion of the Nexus estate to the east of the highway and north of the study area. In relation to nuisance and or negative environmental impacts, the industries must achieve certain environmental and amenity standards to gain approval in the first instance and measures of achievement can be linked to the location of and number of receptors near to the facility.	No formal design response required in Thurgoona Wirlinga. If and when the industrial estate expands to the east of the freeway, it is considered that potential impacts will be largely mitigated by the separation by distance from the study area, the preservation of the existing Norske Skog self imposed buffer area and the implementation of sufficient visual buffer plantings to the edge of the estate. It is noted that as Thurgoona Wirlinga develops the number of nearby receptors to the Nexus estate is likely to increase which may create more hurdles
Norske Skog	Odour – irrigation of treated wastewater.	Norske Skog currently irrigates treated waste water on rural zoned land to the east of the Freeway directly adjacent to the Thurgoona Wirlinga site. The company intends to maintain vacant but residentially zoned land adjacent to their irrigation lands free of any development as a self imposed buffer to protect their activity from potential conflicts.	No formal design response required.
Thurgoona Plaza	Noise and traffic	The existing Thurgoona Plaza currently over caters in floor space for the population in terms of retail and supermarket space. Access and Car parking to the centre is satisfactory with both grade and level 1 car park access via two street frontages. Surrounding land uses are either complementary non residential uses or set back at a satisfactory distance not to have amenity threatened by the centre. Proximate to CSU, TAFE and other land uses which has traffic implications.	No design response required. However, further consideration needs to be given to the long term possibility of this plaza and precinct being expanded into a district centre as long as there is land owner capacity. For more details see Chapter 9 Activity Centres of the TWPSP Technical Report.
Namany Land (Adjacent Thurgoona Plaza)	Flooding, traffic, access	This site although relatively large in area has a number of land use constraints. It is restricted by vehicle access considerations, road corridor and adjacent land biodiversity values (zoned on all sides by E3 Environmental Management), as well as being partially flood prone and adjacent to a creek system. All these issues individually are challenging when planning a commercial centre on a site, collectively they will require careful strategic planning to ensure a viable centre is established that is sensitive to the constraints	With the constraints present on and surrounding this site, a concept plan has been prepared for an activity centre on this land. The principles developed through this plan can be later carried to other activity centres, but this land will benefit from some strategic consideration and advice prior to being developed.
TAFE	Traffic access and land use (organic farm)	Proximate to CSU and Thurgoona Plaza which consolidates this precinct as a high traffic generating precinct but the positive side of that is that the cumulative impact of trips will provide more support for public transport networks. The organic farm status can be potentially threatened by surrounding development.	No design response required regarding traffic as it is considered positive to have the clustering of institutions and schools together to support public transport. The TWP PSP proposes a primary and high school on the TAFE site, the catholic church is also proposing a High School nearby. These uses are not considered to be in conflict with the existing Organic farm. Consultation should take place with the TAFE concerning any conditions that may be required for landscaping in the street and frontages to dwellings to assist with conserving the organic status of the farm.

Table 1: Land Use Conflicts

Land Use Category	Potential Conflict	Comment	Response
CSU	Traffic access and land use, stormwater management	Proximate to TAFE and Thurgoona Plaza which consolidates this precinct as a high traffic generating precinct but the positive side of that is that the cumulative impact of trips will provide more support for public transport networks. CSU grounds experiencing stormwater issues since surrounding development has taken place.	Potential for public transport hub on campus. Potential for pedestrian linkages through the CSU campus and public access. Potential for outdoor amphitheatre or public meeting space on CSU land.
Future Commercial and Village Centres			
Village Centres	Traffic, noise	Need to strategically plan centres to have land uses transitioning to mitigate negative impacts of these uses adjacent to residential areas.	Major neighbourhood centres and village centre concepts have been designed (see sections 19.4 and 19.5 of TWPSP) to take into account edge planning and avoid land use conflict.
Major Neighbourhood Centres	Traffic, noise	Need to strategically plan centres to have land uses transitioning to minor impact uses adjacent to residential areas.	Major neighbourhood centres and village centre concepts have been designed (see sections 19.4 and 19.5 of TWPSP) to take into account edge planning and avoid land use conflict
Rural Residential and Residential Interface			
North East (Bowna Road – Table Top Road)	Weeds, fencing, fire hazard, domestic animal invasion, noise – tractors, motor bikes etc.	When rural residential land abuts residential the following conflicts can arise: -Exotic plant and weed species entering the rural landscape. -Urban fencing adjacent to paddocks inappropriate from an aesthetic perspective as well as unsuitable for stock -Domestic animals entering the rural landscape – stock harassment. -Noise issues from tractors / slashers or recreational use of motor bikes on rural residential land. -Fire hazard if paddocks are not slashed regularly.	Where ever possible the two zones should be separated by a road which will mitigate against many of the issues mentioned (weeds, pet invasion, fencing). The roads will then also act as a buffer for noise and a fire asset protection measure for residential houses adjacent to rural land. Where a road is not practical then the residential master plan should include a transition of larger lots adjacent to the rural residential landscape.
Hawkscote Drive	Weeds, fencing, domestic animal invasion, noise – tractors, motor bikes on land, increase in traffic.	When residential land abuts rural the following conflicts can arise: -Exotic plant and weed species entering the rural landscape. -Urban fencing adjacent to paddocks inappropriate from an aesthetic perspective as well as unsuitable for stock -Domestic animals entering the rural landscape – stock harassment -Noise issues from tractors / slashers or recreational use of motor bikes on rural residential land. -Fire hazard if paddocks are not slashed regularly. -Increased traffic	Existing rural roads not to be utilised to access the residential neighbourhoods. The residential masterplan should include a transition of larger lots adjacent to the rural landscape. Where ever possible the two zones should be separated by a road which will mitigate against many of the issues mentioned (weeds, pet invasion, fencing). The roads will then also act as a buffer for noise and a fire asset protection measure for residential houses adjacent to rural land.
Environmentally Sensitive			
Environmental Management E3	Weeds, fencing, crime and safety, fire, domestic animal invasion	Most lots will be less than 100 ha and therefore dwellings will not be permitted. Community facilities and recreation areas including indoor recreation uses are also permitted, however as the land cannot be subdivided if any of these types of uses occur they are likely to be not for profit or government run.	Where possible street frontage to these corridors is desirable. Defensible space – surveillance. Avoid back fences to these corridors where ever possible. Adjoin public recreation areas and include bikeways pedestrian ways etc on the edge of these corridors to give them additional value to the neighbourhood and ownership regarding their environmental values. Restoration of these areas can facilitate linkages through to the E2 land.
Environmental Conservation E2	Weeds, fencing, crime and safety, fire, rubbish dumping, removal of vegetation, domestic animal invasion	With very little development actually permitted within this zone, the main threat of conflict relates to the edge treatments, public interaction, removal of vegetation and rubbish dumping.	Due to the high conservation value of this area, the edge treatment is highly crucial and warrants special attention when a DCP is developed for the Urban Release Area. It is desirable to include the following: • direct public surveillance across the area • adequate setbacks from the E2 zone should be established to mitigate against weed transfer to the E2 zone • minimise backing of developments onto the E2 area (where unavoidable create a landscape buffer with appropriate species planted to protect and enhance the E2 area. Improve linkages from this area through to the river and the lake for species transfer and movement. Adjoin other open space land so that this landscape can be appreciated without negative impacts (install education signage, bird watching huts etc)
Defence Land			
Defence land use	Explosive detonation, and other sources of noise. Security Biodiversity Visual impact Dust	The Defence land is currently being utilised as a training and storage facility. Potential conflict arises from the detonation of explosives (up to a maximum of 1.5 kg explosives) or use of the site for small arms blank ammunition firing. Potential impact for dust from the facility is low due to the location of the activities central to this large site. Defence appear to be self managing a planted buffer around the majority of their perimeter. Defence concerned with impact on their own security. As development nears (fencing and security will need to increase) The Defence site has potential to offer biodiversity linkages from the E2 land, through E3 and onwards to the river.	The TWPSP has utilised land directly adjacent the Defence facility for other uses such as regional playing fields. Noise measurements have been taken during a training / blasting event at the facility. Now awaiting results and recommendation after this further acoustic assessment. An investigation should take place to determine whether the Defence site can offer biodiversity linkages through it without compromising the use of the land. Liaise with Defence to encourage the planting out of their perimeter for visual impact purposes. Future masterplanning or "Zone Planning" of the Defence facility will need to address the encroachment of urban land use and plan accordingly.
Major Roads			
Transport	Noise, traffic, safety and access	The major collector roads are designed to keep unnecessary traffic out of local streets, but the design often creates land use conflicts in terms of increased noise and edge treatments – buffers, fencing, landscaping, frontage, safety and urban design implications.	Design concept for major roads to be prepared to increase urban design values and decrease conflicts.
Flood Prone Land			
	Flooding of urban land	Have utilised flood study data to map 1 in 100 year flood levels.	1 in100 year flood area has been removed from developable area.
Bush Fire Prone Land			
Various	Threat of fire of persons and property where bushland corridors and areas are adjacent to residential and other sensitive land uses (schools, community centres etc)	Potential conflict exists between bushland areas and corridors which are or will potentially be bushfire prone and surrounding residential or sensitive uses. Management of this conflict will mainly occur through the implementation of asset protection zones to create defensible space between the threat and houses, schools etc.	Planning for bushfire prone land has been further examined in Section 14 of the TWPSP Technical Report.

Table 1: Land Use Conflicts

Potential Land Use Conflicts

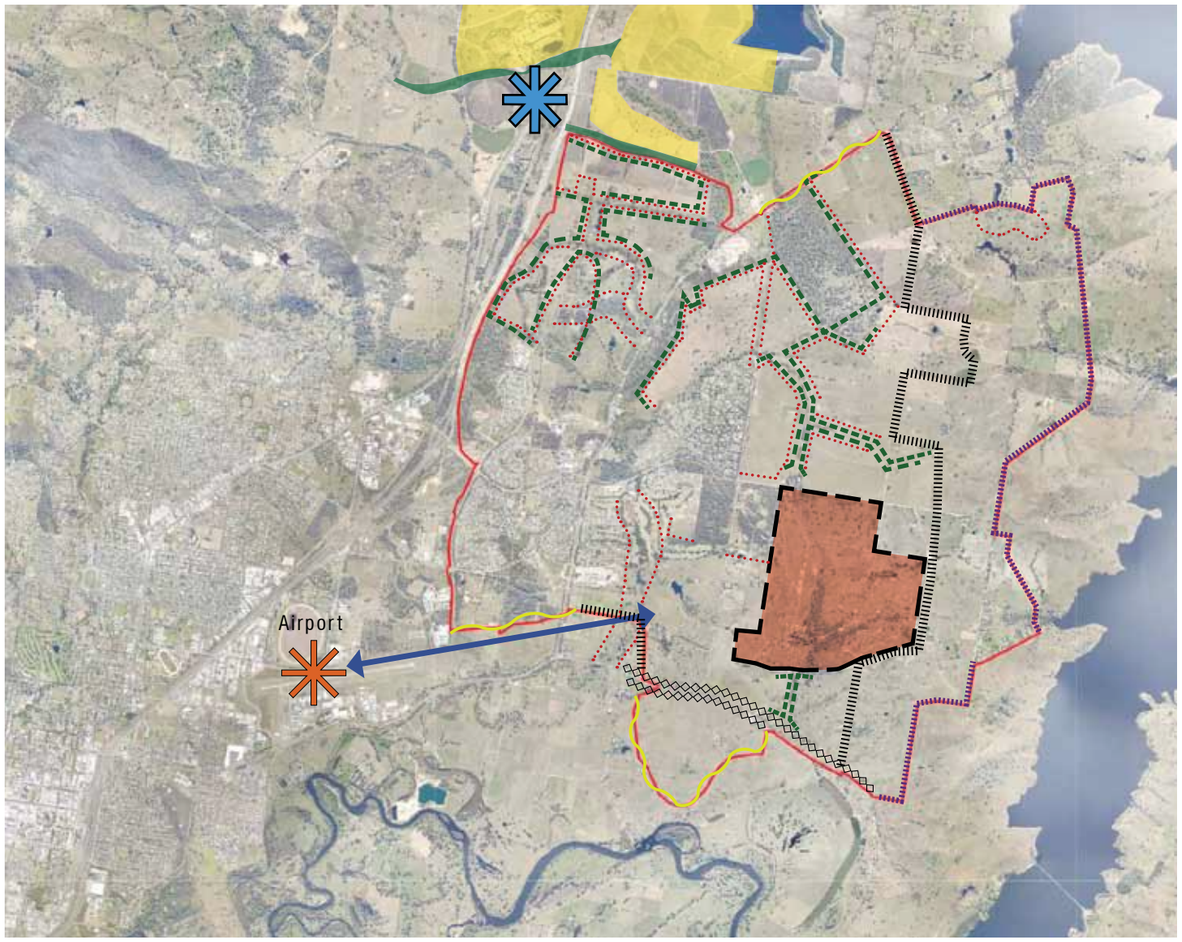


Figure 18: Noise and Land Use Conflicts

- Interface between URA Residential & URA Rural Residential
- Interface to Riverina Highway
- Noise Corridor from Airport
- Defence Land Noise Generator
- Interface between environmental corridors & residential development
- Interface between URA Residential & existing Rural
- Nexus
- Future Industrial Expansion (NEXUS)
- Vegetation Retention (Nexus Masterplan)
- URA Rural Residential / Rural Interface
- APZ

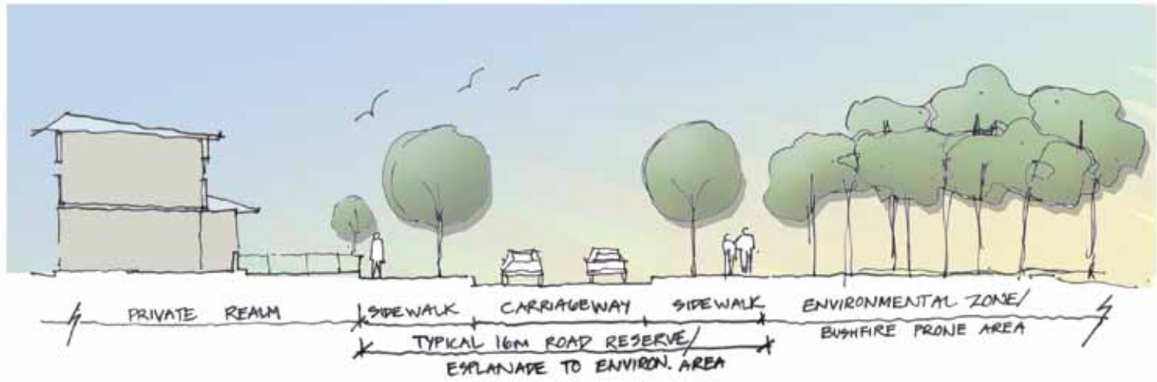


Figure 18A: Option for Residential Interface to Bushfire Prone Land

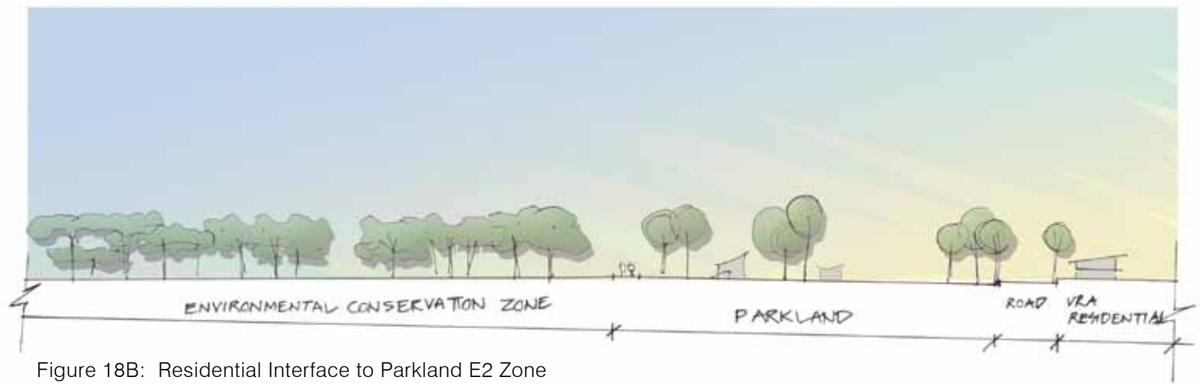


Figure 18B: Residential Interface to Parkland E2 Zone

7.0 Populations, Densities & Facilities

7.0 Populations, Densities and Facilities Requirements

In order to project the ultimate long term potential population of the overall Study Area (being the URA and surrounding undeveloped residential land), and the resulting projected quantities for facilities provision, such as schools, activity centres, sports facilities etc. the following methodology was utilised; overall unconstrained developable areas (hectares) were calculated, informing future population projections.

Refer to Figure 6: Land Use Plan for spatial location of the following land uses.

7.1 URA Residential

Areas designated as URA Residential, total approximately 1106 hectares. With local sports grounds, local recreational parks, major movement networks, interface residential, MNC's and VC's etc. removed, an overall developable area of approximately 737 hectares of land is available for residential development.

An additional 25% of this developable area will be required for local roads, and open space, further reducing the developable area down to approximately 552.7 hectares. Allowing for a mix of densities (refer to Chart 1), approximately 8,291 residences can be developed, with an estimated population of 23,772 persons.

7.2 URA Interface Residential

Three levels of 'Interface Residential' categories have been included, to provide a gradual interface between URA Residential and URA Rural Residential areas. The inclusion of these larger lot interfaces also respond to specific site conditions, contour levels and scenic back drops, to ensure that the 'rural' character and key backdrop vistas of the Study Area is maintained into the future.

- URA Interface Minimum 2500m^2; (104.89 ha's), this interface is predominantly located between the 220m (or below) and the 225m contour. This land falls predominantly within URA Residential.

- URA Interface Minimum 5000m^2; (73.01ha's), this interface is located both within URA Residential land and URA Rural Residential, and broadly encompasses areas that have few constraints and gentle slopes.

- URA Interface Minimum 1ha, (91ha's), is located within URA Rural Residential, along areas that are not located within visually sensitive 'back drop' zones.

7.3 General Residential

General Residential land is land already zoned Residential but included within the Study Area for the purpose of enabling integration and appropriate levels of facilities provision. There are approximately 1076 hectares of General Residential land within the Study Area. After the exclusion of non residential uses there is 843.9ha's of developable general residential land. Allowing for a 25% reduction in this area for local roads etc, the developable area is further reduced to 633ha's, potentially accommodating a population of 21,000 to 23,000 people.

7.4 Low Density Residential

A site of approximately 119 hectares, Thurgoona Park Estate (to the North of Thurgoona Drive) has a Low Density Residential zoning designation and is fully developed, containing 193 dwellings.

7.5 URA Rural Residential

There are approximately 939 hectares of URA Rural Residential land within the Study Area. After the exclusion of non residential uses and 'Interface Residential land' there is 738.9ha's of developable URA Rural Residential land. Allowing for a 25% reduction in this area for local roads and a 10ha minimum lot size, this area can accomodate approximately 66 dwelllings.

It should be noted that land within the URA Rural Residential zone that is located below the 220m contour line, may present some opportunity to investigate a range of 'interface' lots from 0.5 ha's to 2ha's.

Refer to Figure 28 for location of interface densities.

Residential Designation	Total Area	Estimated Developable Area	Density (Average)	No. of Residences	Approximate Percentage of Total Area
Major Neighbourhood Centre Residential	65.70ha	49ha	28du's/ha	1372	12.6%
Village Centre Residential	42.39ha	31.5ha	20du's/ha (500m^2)	630	5.8%
URA Residential	737.04ha	552.7ha	15du's/ha (615m^2)	8291	76.1%
URA Interface Minimum 2500m^2	104.90ha	84ha	4du's/ha (2500m^2)	335	3.1%
URA Interface Minimum 5000m^2	73.01ha	58ha	2du's/ha (5000m^2)	116	1.1%
URA Interface Minimum 1ha	91.00ha	77ha	1du/ha (10000m^2)	77	0.7%
URA Rural Residential	738.93ha	664ha	0.1du/ha (10ha)	66	0.6%
Total	1,852.95ha	1516.2ha		10,887	100%

Chart 1: Estimated Density spread for URA Residential, URA Interface Residential and URA Rural Residential Land

7.6 Density and Population Summary

Chart 2, below, provides a summary of the potential dwelling numbers and concomitant populations that can ultimately be accommodated within the Study Area. In summary, for 2.5 persons per household a potential supply of nearly 20,000 dwellings, long term population projections anticipate a population of approximately 50,000 people.

Refer to Chart 1 & 2.

Zones	Number of dwellings	@2.3 persons per dwelling	@ 2.5 persons per dwelling
URA Residential, URA Interface Residential and URA Rural Residential	10,887	25,040	27,217
General Residential	9,495	21,838	23,737
Low Density Residential	193	444	483
Large Lot Residential	6	14	15
Total	20,581	47,336	51,452

Chart 2: Population Summary for Study Area

7.7 Facilities Provision

Education and Community Facilities (These figures are based on council standards Australia wide and existing 'best practice'case studies and existing yields for facilities within Albury etc.)						
TYPE	STANDARD (approx. 49,000 ultimate population, approx. 26,000 within Study Area and 23,000 within existing res zoned areas within Study Area) .	NUMBER SUPPORTED	NUMBER EXISTING	ADDITIONAL PROPOSED	APPROX. SITE SIZE (m^2 per facility)	DESCRIPTION / NOTES
Day Care / Early Learning Centres	1:5000 people	10	3 • Goodstart Early Learning Thurgoona • Thurgoona Pre-school • Charles Sturt University Albury Child Care Centre	7(4 Government and 3 Private)	1000m^2 - Site 500m^2 - Building	Childcare Centre (To be co- located with primary schools)
Primary School	5,000 people (Government) 8,500 people (Private)	10 6	1 (Government), 2 (Private) • Thurgoona Public School • Border Christian College (P-12) • Trinity Anglican College (P-12)	6 Government 2 Private	30,000m^2 (3ha)	Primary Schools to be co-located where possible with High Schools. Population figures for government and private schools are mutually exclusive. While 10 Primary Schools are supported, but 6 proposed, as schools within surrounding areas can provide additional capacity.
High School	10,000 people (Government) 12,500 people (Private)	5 4	(0 Government), 2 (Private) • Border Christian College (P-12) • Trinity Anglican College (P-12)	3 Government 2 Private	60,000m^2 (6ha)	While 5 High Schools are supported, 3 are to be provided. Existing high schools in surrounding areas can provide additional capacity
TAFE	Regional / Statewide catchment	Riverina TAFE	1	-	182ha	National Environmental Centre
University	Regional / Statewide catchment	Charles Sturt University	1	-	87ha	University
District Community Centre	1: 30 000	1	0	1	5000m^2 - 1ha site (2500m^2 approximate GFA)	Possible facilities may include, Youth Centre space, performance space, library, public space, exhibition area, outdoor area , coffee shop / canteen etc.
Local Community Centre	1: 10 000 (local services)	5	2 • Thurgoona Community Centre (public) • Thurgoona Golf Club (Private)	3	2000m^2 site (800m^2 approximate GFA)	Local services, meeting hall, outdoor area etc. to be provided
RETAIL FACILITIES (tbc by economic assessment)						
District Centre (DC)	1:40 000	1	0	1 (possible extension to existing major neighbourhood centre 1 or 2)	35,000m^2 GFA; - 7000m^2 DDs - 2 x full line supermarkets - 10,000m^2 speciality stores - 10,000m^2 commercial - 5ha site	Discount Department Store (DDs), 2 supermarkets, speciality shops, commercial office space, cinemas etc.
Major Neighbourhood Centre	1:8000 to 14,000	3	1 • Thurgoona Plaza	2	6000m^2 GFA - Retail - 1000m^2 commercial - 1.5ha - 2.5ha site	Supermarket, post office, newsagent, pharmacy, food and beverage, commercial etc.
Village Centre	1:7500	6	0	6 can be supported 4 to be provided	2000m^2 GFA - 0.5ha - 1.0ha site	Convenience retail / corner store, retail services, food and beverage etc. Number of VC's determined by site specific conditions
OPEN SPACE AND SPORTS FACILITIES						
Local Recreation Parks (LRP) and Informal Parks (IP)	1:4000 for LRP's 1:2000 for IP's	12 LRP's 24 IP's	22 LRP's	22 11	Sizes may vary according to site specific conditions	The number of LRP's has been increased from 12 (1 per 4,000 persons) to 22 in order to promote pedestrian access within 500m of open space areas for the majority of residents within the TWPSP Study Area. It is further noted that an additional 11 Informal Parks have also been identified in notional locations across the TWPSP Study Area to assist pedestrian access to open space areas in those areas outside the walking catchments of the proposed network of LRP's.
Local Sports Grounds (LSG)	1:7500	6	2 • Ernest Grant Oval	5	4ha	Close proximity to schools and open space
District Sports Ground (DSG)	1: 20 000	2	0	1	7ha	Additional facilities available in Albury
Aquatic Centre	1:25 000	2	0	1 private operator	1ha	Possible location within district sports grounds

Chart 3: Facilities Provision

8.0 Elements of the Precinct Structure Plan

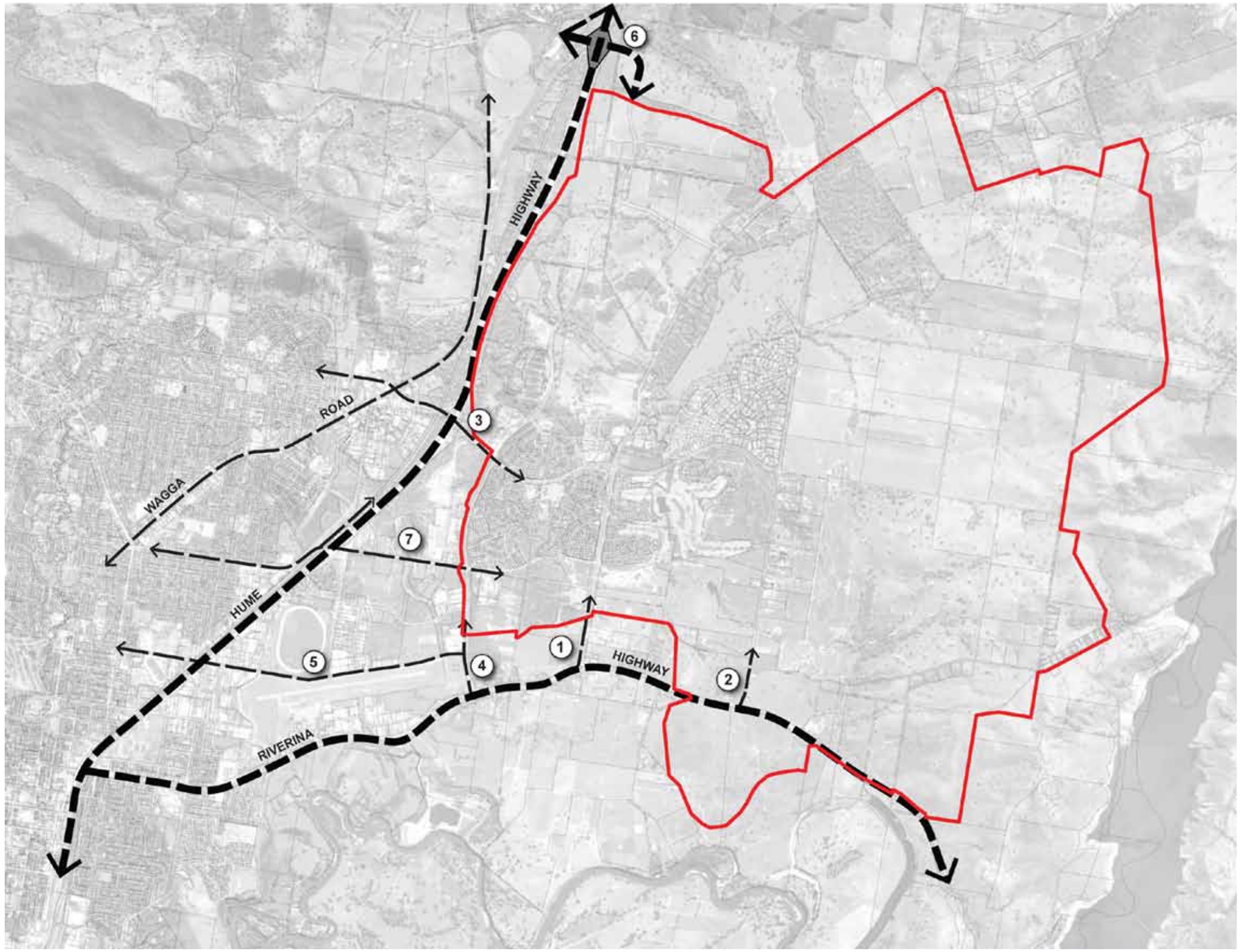
8.1 Movement Network

8.1.1 Regional Connections

The Study Area is well served by regional connector roads that provide convenient vehicular access to surrounding areas such as Albury CBD, Lavington, Wodonga etc. Riverina Highway to the south of the Study Area is connected to the Study Area through Kerr Road, Table Top Road and Elizabeth Mitchell Drive. Riverina Highway provides direct access to Lake Hume Village to the south east, Albury Airport to the south and Albury CBD to the West.

Hume Highway runs along the western boundary of the Study Area and links in a north south direction, down to Melbourne in the south and Sydney to the North.

A regional rail network with a station at Albury CBD also provides access between Melbourne and Sydney.



LEGEND

1. Tabletop Road Access
2. Kerrs Road Access
3. Thurgoona Drive Access
4. Elizabeth Mitchell Drive Access
5. Fallon Street Access
6. New Intersection (Davey Road)
7. Corrys Road Access

Figure 19: Regional Connections

8.1.2 Proposed Movement Network

The following is a list of the recommendations / objectives for the proposed movement network:

- Maximise on the use of existing road networks and road reserves to establish a flexible and robust movement grid through the Study Area.
- Encouraging active lifestyles such as walking, cycling and reducing vehicle usage by utilising public transport is important from a public health and environmental health perspective.
- Enable residents to have convenient access to public transportation.
- Improve regional connections.
- Establish integrated cycle network to cater for both commuters and recreational users, linking to Albury CBD. (refer to Sports and Open Space Plan Figure 26).
- Establish integrated pedestrian network (consider linkages to Hume Hovel track), linking schools, activity centres, sports facilities etc.

For Secondary Movement Plan refer to Figure 31

Refer to Albury City Engineering Guidelines for Subdivisions and Development Standards.

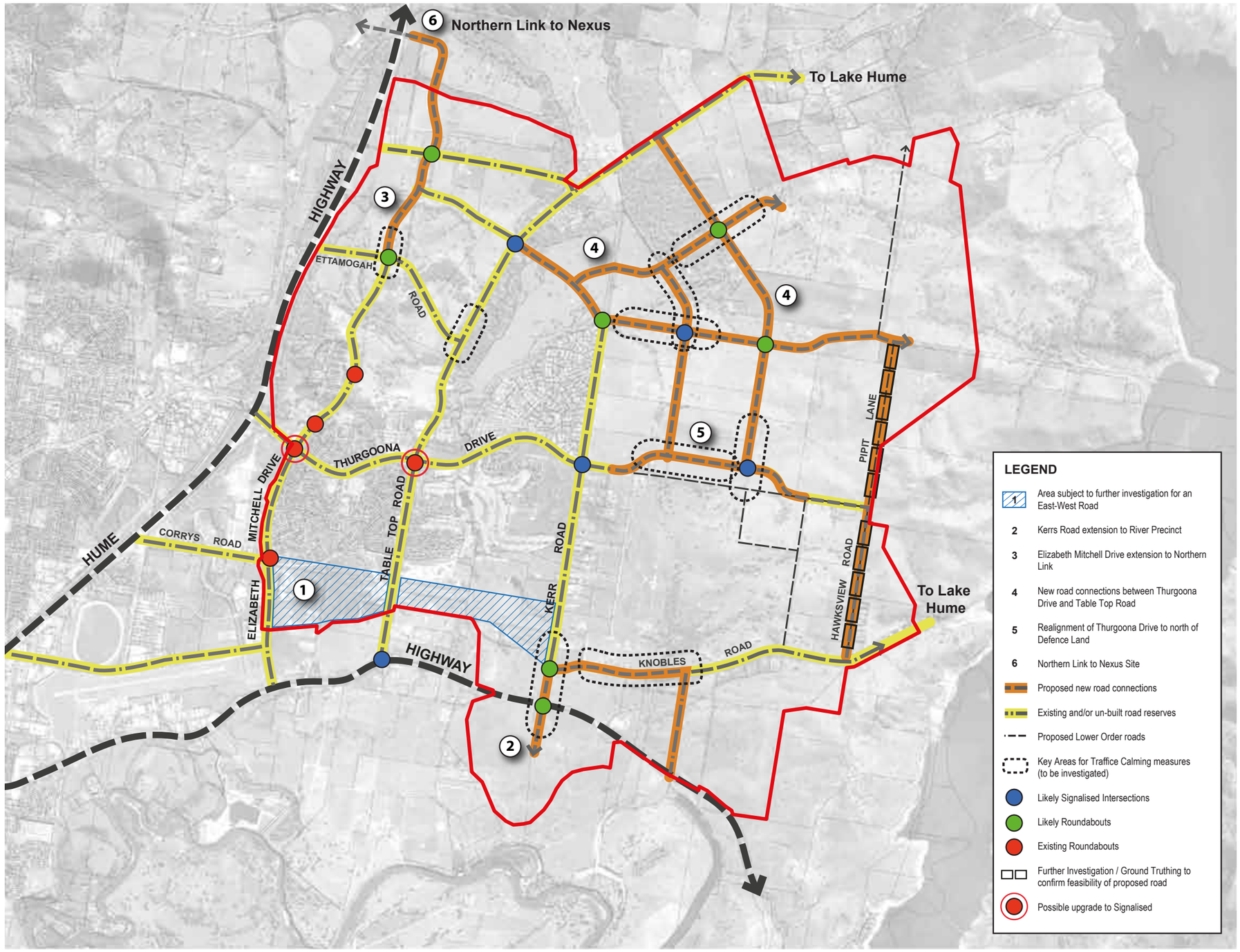


Figure 20: Major Movement Network

8.2 Activity Centres

8.2.1 Activity Centres - Existing Regional Context

The current retail hierarchy within Albury is considered to be as follows:

- The Albury CBD, located within the B3 Commercial Core and B4 Mixed Use Zones, provides for the highest order retail uses, including Regional, District and Major Neighbourhood Centres.
- The Lavington CBD, located within the B3 Commercial Core and B4 Mixed Use Zones, provides for higher order retail uses, including District and Major Neighbourhood Centres.
- Thurgoona, located within the B2 Local Centre Zone, provides for the weekly and/or fortnightly shopping needs of local residents.
- Village Centres located within the B2 Local Centre and R1 General Residential Zones, providing for the local convenience retail needs of local residents.

At capacity, the population in the Thurgoona Wirlinga Precinct will effectively double the population of the existing urban area of Albury. It will represent approximately 50% of the total Albury population. As such, Activity Centres within the Precinct will need to be developed to support and maintain the retail hierarchy with the Albury CBD at the top. RPS therefore recommends that Activity Centres within the Thurgoona Wirlinga Precinct develop in line with the second tier of the hierarchy, that is the Lavington CBD, providing for higher order retail uses, including District and Major Neighbourhood Centres.

The compact walkability will increase the need for local shopping throughout the Precinct and therefore more smaller centres in the form of Village Centres. Developing the Activity Centres in this way will maintain the Albury CBD while providing as much local employment as possible to increase the employment self containment rate in the Precinct while reducing travel times.

8.2.2 Recommendations

- 1 District Centre of 35,000m^2, comprising a 7,500m^2 DDS, 2 x 3,500m^2 full line supermarkets, 10,500m^2 of specialty stores and 10,000m^2 of commercial office space, to serve the retail needs of Thurgoona Wirlinga Precinct residents. Thi s District Centre may evolve over time from one of the three Major Neighbourhood Centres, as outline below.
- 3 Major Neighbourhood Centres, each 7,000m^2, and each comprising a 3,500m^2 full line supermarket, 2,500m^2 of specialty stores and 1,000m^2 of commercial office space, catering to the weekly and/or fortnightly needs of local residents.
- 4 Village Centres, each approximately 2,000m^2, and each comprising a 1,000m^2 small supermarket and 1,000m^2 of specialty stores, serving the local convenience retail needs of local residents.

These recommendations have been made based on the best current knowledge, and may change due to economic and market circumstances. Flexibility of delivery of these Activity Centres should be made over time, with allowances made for new market entrants. The TWPSP includes 3 Major Neighbourhood Centres, with one centre having the capacity to expand into a District Centre.

Population thresholds and facilities required				
Facility Type	Per population	Number Supported	Existing	Additional Supported
District Centre (DC)	1:40,000	1	0	1 (extension to MNC 1 or 2)
Major Neighbourhood Centre (MNC)	1:15,000	3	1	2
Village Centre (VC)	1:10,000	4	0	4

Chart 4: Activity Centres Summary

8.2.3 Major Neighbourhood Centres (MNC's)

Major Activity Centres form the core of mixed use development, recreation, employment and medium density residential development. The population calculations (outlined in Section 7) ultimately support the provision of 3 Major Activity Centres within for the Study Area, with one centre having the potential to expand into a District Centre. The Major Neighbourhood Centres are located approximately equidistant from one another, ensuring convenient and efficient access to these centres from all Study Area Residential land parcels.

For MNC's an area of land approximately within the 400m catchment of the centres, has been identified for 'Activity Centre Residential'. This includes the 25 to 30 du's/ha component of residential product as outlined in Section 7 of this report. Activity Centre Residential can include attached terraces, townhouses, 2 to 3 storey apartments, shop top housing etc.

This provides a diverse and affordable choice of housing that caters for a broad demographic and provides convenient pedestrian access to a range of facilities, employment opportunities and social activities.

MNC1 is likely to be the first of the three Major Neighbourhood Centres to attract development. MNC1 has the advantage of already being partly developed, as well as being close to existing residential communities, recreation areas and CSU. Development of the commercial and retail components of MNC2 and MNC3 will likely be developed once population catchments around these centres start to reach 10,000 to 15,000 persons, or approximately 4000 to 6000 dwellings.

The Community facilities components of the MNC's may be developed ahead of the commercial/retail components in order to facilitate the establishment of community nodes and amenity.

Refer to Section 8.7 Residential Typologies and Land Use Budget

Refer to Figure 21: Proposed Major Neighbourhood Centres.

Pedestrian areas

Multi functional public spaces

Street Trees

Outdoor covered seating

Shade Seating

Covered Walkways and Activated Interfaces

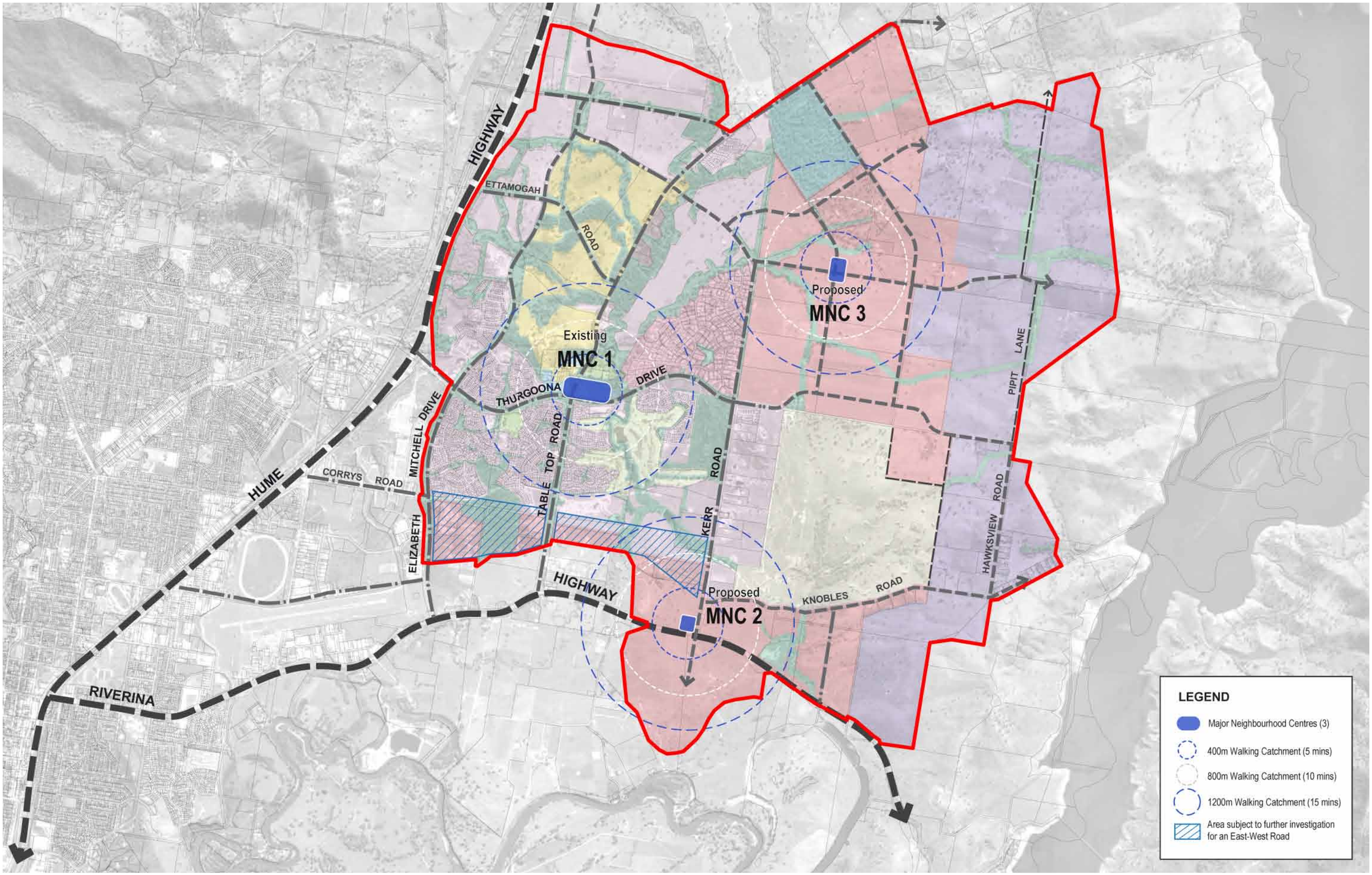


Figure 21: Major Neighbourhood Centres (MNC's)

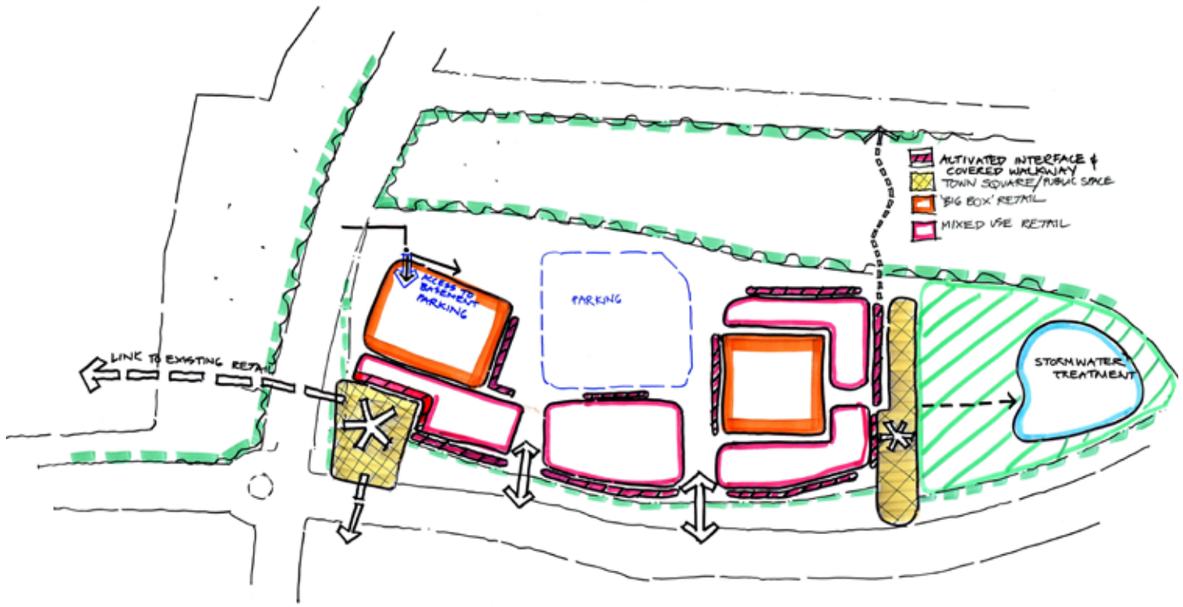
8.2.4 Major Neighbourhood Centre 1 (MNC1)

This Activity Centre has already been partially developed to the West of Table Top Road, along Thurgoona Drive, and contains a full line Woolworths and 18 speciality stores. MNC1 is well located as a western 'gateway' into the precinct and in close proximity to Charles Sturt University, Thurgoona Golf Club and proposed school sites and has the capacity to develop into a District Centre, over time, through the inclusion of additional retail facilities and a discount department store.

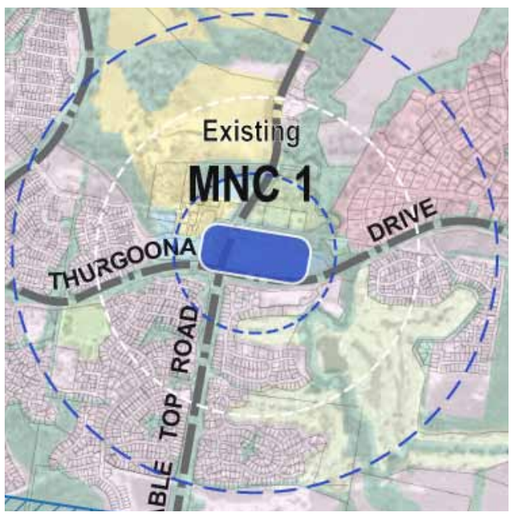
MNC1 encompasses an area of approximately 12.5ha's, of which 6.5ha's to the east of Table Top Road is undeveloped. Opportunities for Activity Centre Residential around this MNC are limited due to areas within the 400m catchment either already developed for low density residential or designated for Environmental Management, Public Recreation or Education.

Key design principles for MNC1 include:

- Create a positive activated interface to Thurgoona Drive, through the use of;
  - Covered walkways and colonnades
  - Visible and activated building elevations (frequent entries and connections through buildings, display windows, minimal blank walls etc.)
  - 'Town Square' public space at the intersection of Table Top Road and Thurgoona Drive.
  - Ensure service and loading areas are screened from public view.
- Minimise the visual impact of 'big box' tenants such as supermarkets and /or discount department stores by ensuring that a minimum of 60% of 'big box' structures are 'wrapped' by small scale retail, interfacing to public areas and major roads.
- Establish parking court to the 'centre' of the development, enclosed on 3 sides by built form, in order to minimise the negative visual impact of extensive surface parking on the public realm.
- Encourage the use of basement and half basement parking. Multi level above grade parking should be avoided.
- Integrate land parcels to the East and West of Table Top Road, through pedestrian linkages.



Site Diagram



Locality Plan

Concept Plan - Indicative only

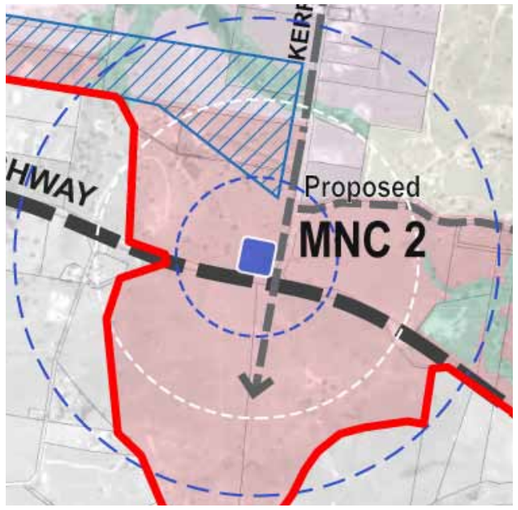
8.2.5 Major Neighbourhood Centre 2 (MNC2)

Major Neighbourhood Centre 2 has been located approximately 4km's to the south east of Major Neighbourhood Centre 1, to the north of Kerr Road and Riverina Highway intersection. This location has been selected as it is central to approximately 350 hectares of Study Area Residential land (approximately 4000 plus residences) and is a highly visible location along Riverina Highway.

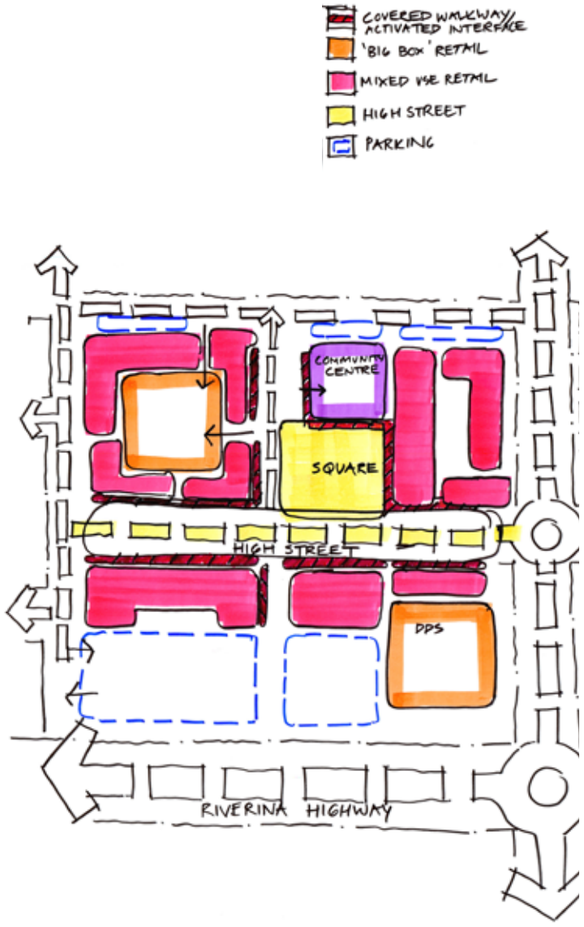
Major Neighbourhood Centre 2 encompasses an area of approximately 3.66 hectares and forms a southern 'gateway' to the precinct from Riverina Highway. MNC2 will have the capacity to expand into a District Centre, though, it is likely that expansion to MNC1 will occur first.
In addition to the retail components, MNC2 includes a local Community Centre.

Key design principles include:

- Create a 'high street' perpendicular to Kerr road by utilising zero lot lines to street edges, creating covered walkways/ colonnades to street edges, including landscaping measures such as street trees, seating areas, signage etc.
- Minimise the visual impact of 'big box' tenants such as supermarkets and /or discount department stores by ensuring that a minimum of 60% of 'big box' structures are 'wrapped' by small scale retail, interfacing to public areas and major roads.
- Establish parking courts along Riverina Highway interface.
- Create landscaped buffers to surrounding residential development to minimise the visual impact of parking and service areas.
- Encourage the use of basement and half basement parking. Multi level above grade parking should be avoided.
- Encourage built form to locate where possible on the outer edges of site , to create a strong visibility and legibility.
- Incorporate a public square into the centre's design. Preferred location central to the proposed 'High Street'.
- Locate Community Centre orientating on to public square, to establish a community hub within MNC2.
- Establish a 'gateway' entry to the 'high street' from Kerr Road.



Locality Plan



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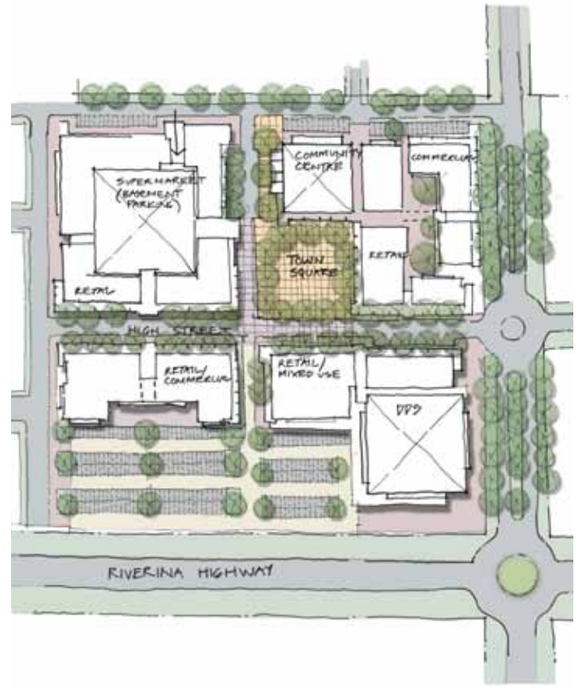


Concept Plan - Indicative only

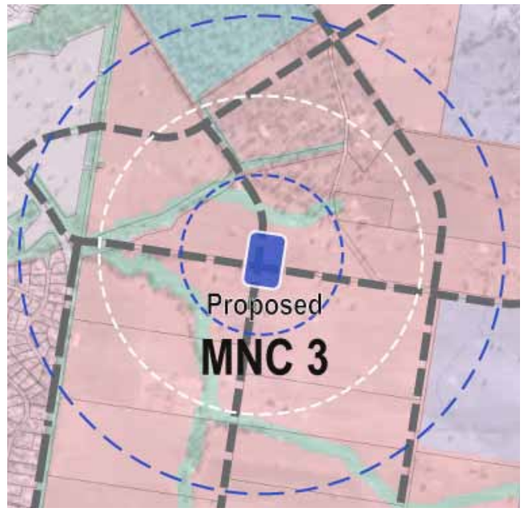
8.2.6 Major Neighbourhood Centre 3 (MNC3)

Major Neighbourhood Centre 3 (MNC3) is located in the north eastern zone of the Study Area and encompasses approximately 3.68 hectares.

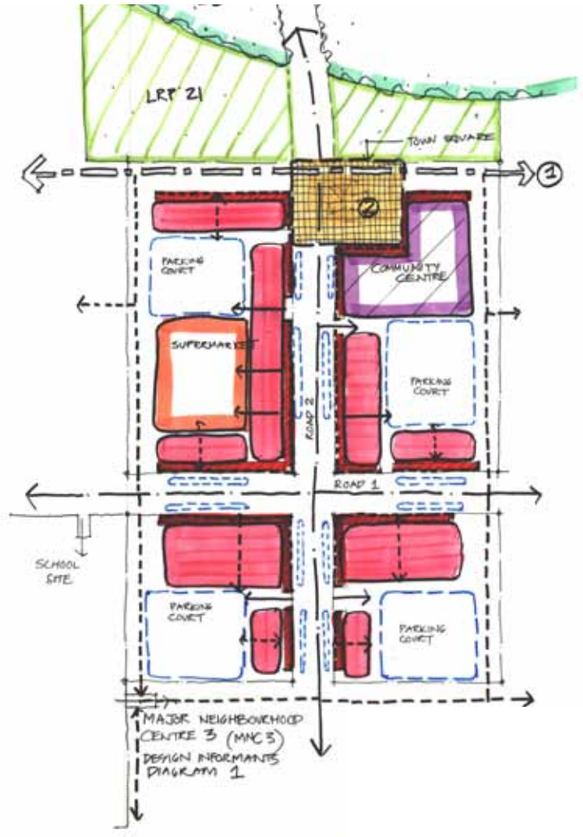
MNC3 is central to approximately 690 hectares of Study Area Residential land, with an anticipated density of 7000 residences. The broader MNC3 precinct also includes a Primary School, Local Recreational Park and Local Sports Grounds . MNC3 is not considered a preferred location for the development of a District Centre (as per MNC1 and MNC2), as it intended as the focal local community hub. Activity Centre Residential is accommodated within the 400m catchment of MNC3.

Key design principles for MNC3 include:

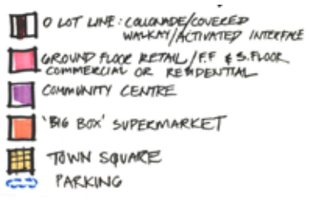
- Create a positive activated interface to the north - south and east west proposed road linkages through the centre, to create a 'high street' environment, where these roads travel through the centre. Utilise zero lot lines to street edges, creating covered walkways/ colonnades to street edges, including landscaping measures such as street trees, seating areas, signage etc.
- Visible and activated building elevations (frequent entries and connections through buildings, display windows, minimising blank walls etc.).
- Minimise the visual impact of 'big box' tenants such as supermarkets and /or discount department stores by ensuring that a minimum of 60% of 'big box' structures are 'wrapped' by small scale retail, interfacing to public areas and major roads.
- Utilise tree planting, surface paving and other speed attenuation measures to ensure safe pedestrian movement through the 'High Street'.
- Establish a series of parking courts to the 'centre' of the development, enclosed on 3 sides by built form, in order to minimise the negative visual impact of extensive surface parking on the public realm.
- Create landscaped buffers to surrounding residential development to minimise the visual impact of parking and service areas.
- Encourage the use of basement and half basement parking. Multi level above grade parking should be avoided.
- Encourage built form to locate where possible on the outer edges of site, to create a strong visibility and legibility.
- Incorporate a public square into the centre's design. Preferred location is the north eastern area of the site, offering a northerly orientation and integration with local road network between MNC3 and the local recreational park.
- Locate District Community Centre orientating on to public square, to establish a community hub within MNC3.



Locality Plan



Site Diagram



Concept Plan - Indicative only

8.3 Village Centres (VC's)

The population and density analysis as outlined in Section 7, indicates that a future population of close to 50,000 residences, can ultimately support six Village Centres. Due to site specific conditions, and proximity to Major Neighbourhood Centres and other centres external to the Study Area, the number of Village Centres to be supplied has been reduced to four.

Village Centres are small scale mixed use centres that form the hub of community life and cater for everyday retail needs and provide opportunity / venue for local social interaction. VC's are located along the proposed major movement network at accessible locations. It is intended that the majority of residents within the Study Area precinct ultimately are within an 800m catchment of either a Major Neighbourhood Centre of a Village Centre.

The provision of village centres will need to be staged in accordance with land release and increasing thresholds.

Key design principles for all Village Centres include:

- Build to boundary along major street interfaces, incorporating covered areas and colonnades.
- Provide parking areas to the rear of built form.
- Provide clear and visible building entries.

8.3.1 Village Centre 1 (VC1)

Village Centre 1 is approximately 0.734 hectares and is located at the intersection of Elizabeth Mitchell Drive and Ettamogah Road. VC1 is co-located/adjacent to a primary school (PS6) and close to a Local Sports Ground (LSG 6). It is supported by approximately 9 hectares of medium density Village Centre Residential (20 – 25 dwelling units per hectare).

8.3.2 Village Centre 2 (VC2)

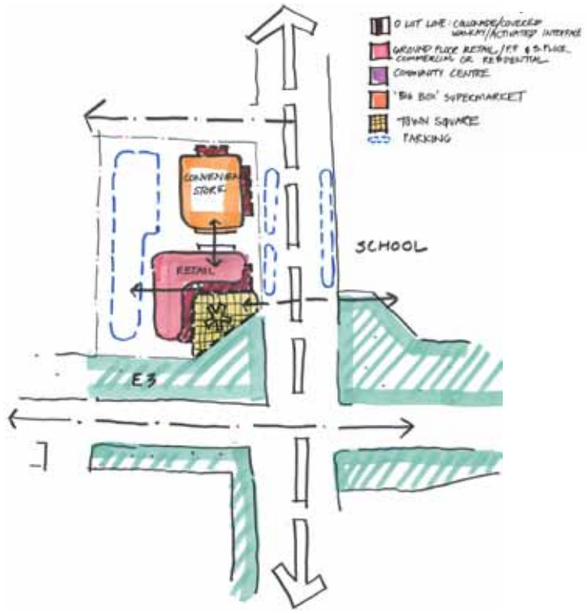
Village Centre 2 is approximately 0.96 hectares and is located in the north eastern zone of the Study Area. VC2 precinct includes an area of approximately 11 hectares of Village Centre Residential and a primary school (PS 5). It is also adjacent to a Local Sports Ground (LSG 2) and a Local Recreational Park (LRP 5).

8.3.3 Village Centre 3 (VC3)

Village Centre 3 is located to the north of Defence land, at the intersection of Thurgoona Drive and a proposed new north – south linkage to Kywanna Road. The VC3 precinct includes a primary and high school and a community centre, as well as the District Sports Grounds. Approximately 8 hectares of Village Centre Residential is located within the 200m catchment of VC3.

8.3.4 Village Centre 4 (VC4)

Village Centre 4 is approximately 0.99 hectares and is located to the south of Defence land, along Knobles Road. VC 4 includes approximately 10 hectares of Village Centre Residential land.



Generic Site Diagram

Generic Concept Plan - Indicative only

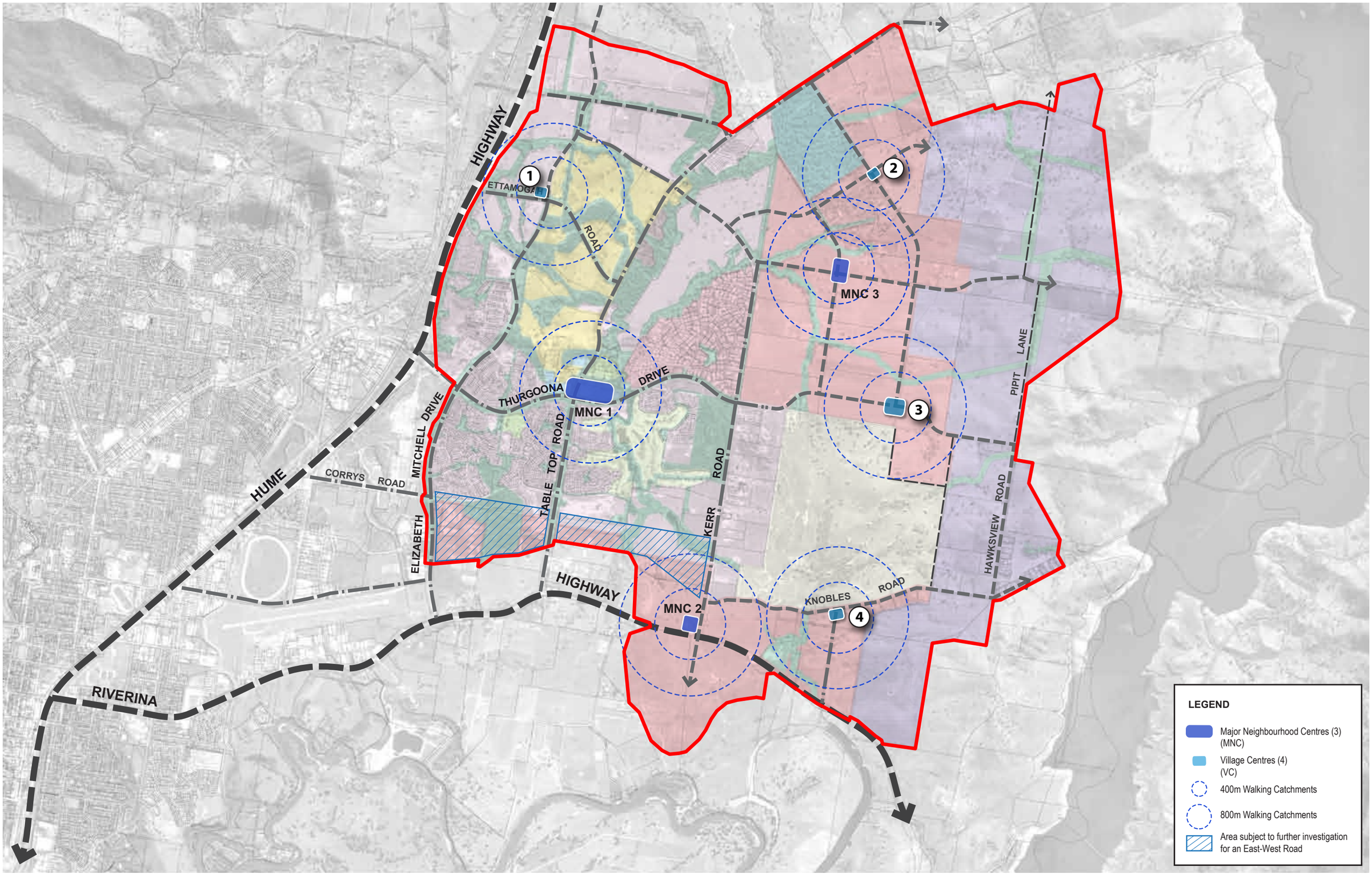


Figure 22: Village Centres

8.4 Character Elements

At the TWPSP level, key character objectives are recommended and these objectives will need to be further illustrated at the Master Plan and Site Specific Development Control Plan level as individual site designs progress.

8.4.1 Character Elements from Albury CBD

Albury CBD has a rich heritage of cultural / architectural elements that have influenced the TWPSP plan. It is not the intention of the TWPSP to rebuild the past, but rather to acknowledge these elements and utilise them in a contemporary manner to ensure that the future development of the TW Study Area can achieve a high quality of character, place making and memorability.

Elements that have been incorporated include:

- A simple grid like network of major streets, that are legible and easy to navigate.
- Built to boundary recommendations for 'main streets' in and around Major Neighbourhood Centres and Village Centres.
- A generous supply of open spaces.
- Shaded areas and covered walk ways.
- Higher densities closer to 'heart' of CBD.
- A broad range of facilities, activities and opportunities for residents.

8.4.2 General Character elements

- Utilise the natural elements throughout the Study Area, such as biodiversity corridors, remnant trees, creeks etc. as key 'green' elements and amenities within the urban environment. Extend these elements where possible. All residents will have convenient access to a range of natural and/ or green open space and amenity.
- Create a strong sense of Place and legibility, through the establishment of mixed use activity centres at different scales, e.g. three Major Neighbourhood Centres and four small scale Village Centres. These centres contribute to both the lifestyle convenience for surrounding residents as well as evolving into 'land mark' sites within the overall Study Area.
- Preserve the rural character of URA Rural residential zone and surrounding rural areas by creating 'Interface Residential' zones, preserving view corridors and surrounding hillscapes.
- Establish a network of Storm Water Management ponds as water sensitive urban design elements, within Local recreational parks. Establish three larger higher order storm water elements/ lakes, close to each of the major neighbourhood centres for both storm water attenuation and to create visual and recreational amenity elements.
- Design attractive streetscapes, with tree planting, bus shelters, lighting, as required.

Refer to Figure 23: Character Elements Plan.

Multi-functional public squares for markets, festivals etc.

Shared roadways, high street character

Contemporary public space infrastructure

Permeable architectural form

Informal areas

Pedestrian and cycle facilities

8.4.3 Residential Character

- Provide medium / higher residential densities within the 400m catchment of Major Neighbourhood Centres and Village Centres. Ensure higher density and integrated housing sites consider interfaces and orientation to streetscapes, public spaces and open spaces etc.
- Minimise large surface parking areas adjacent to streets and visible public areas. Parking areas to be accommodated to the rear of integrated housing sites (e.g. laneway access, half basement parking etc).
- Encourage a range of flexible housing typologies, avoid highly themed housing types such as 'Tuscan, Neo – Classical etc. These are not appropriate to climatic conditions and existing character of the locality.
- Promote sustainable/ environmentally responsive elements in housing design, such as water tanks, roof overhangs, solar energy etc.
- Avoid excessive use of garaging along street interfaces. Ensure legible and visible entry to buildings, with views and surveillance over streets and public spaces.

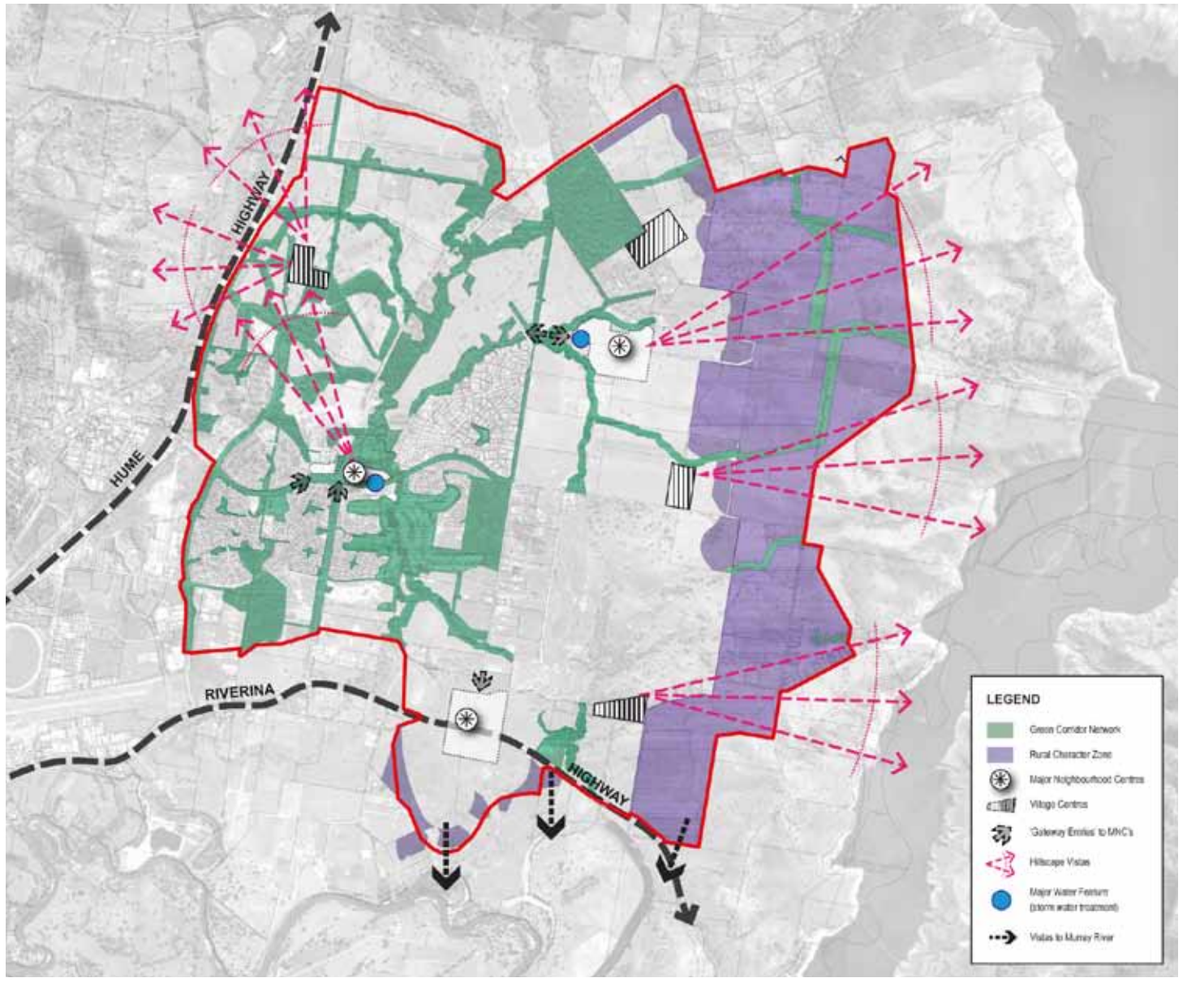


Figure 23: Character Elements Plan

Activated streets and covered walkways


Pedestrian paths


Heritage 'red brick' and landscaping features

Street furniture and lighting


Street trees and seating


Colonades, built to boundary

8.5 Schools and Community Facilities

8.5.1 Facilities Location

The following sections outline the allocation for schools. The direct population per school standard has been applied within the table stating the number of schools that could be supported. However the ultimate number suggested within the TWPSP has been rationalised and reduced after the first round consultation sessions in the draft, where the general concurrence was that schools would be potentially overcatered and a reduction in number, together with an increase in size would be more realistic.

- Daycares/Early Learning Centres have been co-located with primary schools and/or Village Centres.
- Primary Schools where possible, have been co-located with Village Centres.
- Both primary and high schools are located along major movement routes, to promote convenient access via public transport.
- Where possible, primary and high schools have been co-located.
- Where possible schools have been located close to Local Recreational Parks and Local Sports Grounds.
- The Provision of schools will be staged in line with land release and population growth.

8.5.2 Primary Schools

- PS1 is located along Table Top Road, within 'Education Precinct'.
- PS2 is located adjacent to Major Neighbourhood Centre 3, and Local Sports Ground 3.
- PS3 is located adjacent to Village Centre 3, and District Sports Grounds.
- PS4 is located adjacent to Major Neighbourhood Centre 2 and adjacent to HS2.
- PS5 is located adjacent to Village Centre 2.
- PS6 is located adjacent to Village Centre 1 and next to Local Sports Ground 6.

8.5.3 High Schools

- HS1 is located within the 'Education Precinct' across from PS1, along Ettamogah Road.
- HS2 is located close to Major Neighbourhood Centre 2 and across from PS4 and Local Sports Ground 4.
- HS3 is located on Thurgoona Drive, close to Village Centre 3, next to PS3 and close to District Sports Grounds.

Refer to Figure 24: Schools and Education.

8.5.4 Community Centres

There are two existing community centres within the Study Area; Thurgoona Community Centre and Thurgoona Country Golf Club Resort . Both of these centres are located in the south western quadrant of the Study Area, in close proximity to existing residential populations.

For a future population of close to 50,000 people, 1 District Community Centre and a total of 5 Local Community Centres are required. The proposed District Community Centre has been co-located with Major Neighbourhood Centre 3. This location is central to the large URA Residential land parcels in the north east sector of the plan. This is an accessible location, central to the majority of URA land and will further reinforce the Major Neighbourhood Centre.

The three proposed Local Community Centres have been co-located with Village Centres 2, 3 and Major Neighbourhood Centre 2. This ensures maximum accessibility for residents and reinforces the centres.

Refer to Figure 25: Community Facilities.

Schools, Education and Community Facilities				
TYPE	STANDARD	NUMBER SUPPORTED	EXISTING NUMBER	ADDITIONAL PROPOSED
Day Care /Early Learning Centres	1:5,000 people	10	3 • Goodstart Early Learning Thurgoona • Thurgoona Pre-school • Charles Sturt University Albury Child Care Centre	7 (4 Government and 3 Private)
Primary school	5,000 people (Government) 8,500 people (Private)	10 6	1 (Government), 2 (Private) • Thurgoona Public School • Border Christian College (P-12) • Trinity Anglican College (P-12)	6 Government 2 Private
High School	10,000 people (Government) 12,500 people (Private)	5 4	(0 Government), 2 (Private) • Border Christian College (P-12) • Trinity Anglican College (P-12)	3 Government 2 Private
TAFE	Regional / Statewide catchment	Riverina TAFE	1	0
University	Regional / Statewide catchment	Charles Sturt University	1	0
District Community Centre	1: 30,000	1	0	1
Local Community Centre	1: 10,000 (local services)	5	2 • Thurgoona Community Centre (public) • Thurgoona Golf Club (Private)	3

Chart 5: Education and Community Facilities

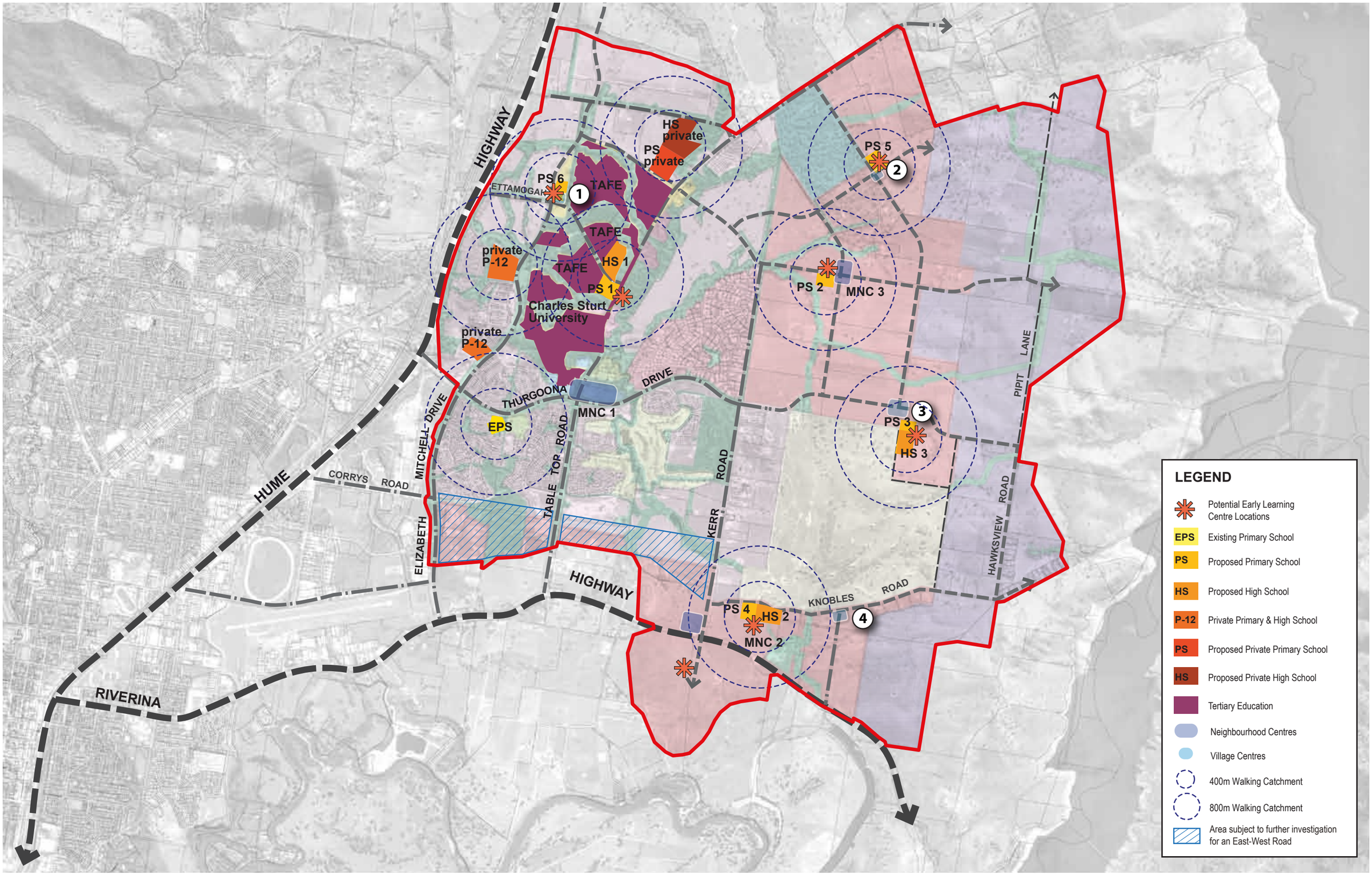


Figure 24: Schools and Education

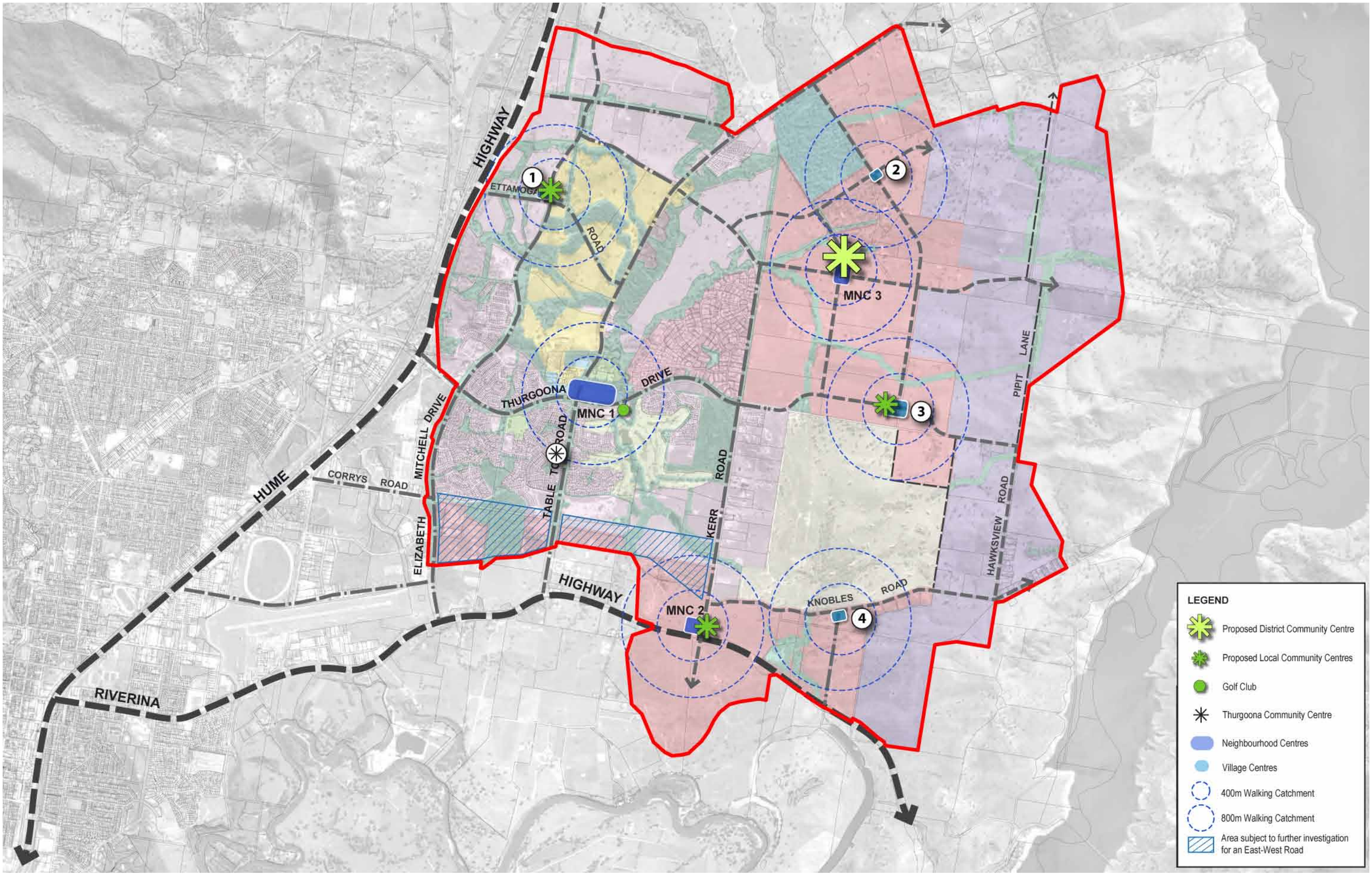


Figure 25: Community Facilities

8.6 Sports and Open Space Facilities

Chart 6 below, summarises the open space recreational and sporting facilities offered within the TWPSP. It should be noted that although the straight forward application for the standard local recreational park of 1 per 4000 people will require only 12 parks. Council's Parks Manager advised that the provision of parks needs to be doubled to ensure an increase in pedestrian access catchments. As a reponse, the TWPSP proposes 22 such parks. Parks may vary in size according to site specific conditions and may also vary infrastructure provision. An additional 11 informal parks have been included, in areas that are not within a walking catchment of a local park.

In relation to the location of these facilities, the following key objectives have been utilised:

- Sports and Park facilities have been provided throughout the Study Area to ensure these are in walking distance of the majority of residents.
- Parks and sports facilities have been located adjacent to environmental corridors so as to reinforce these corridors and extend the 'open space'.
- Parks and sports facilities have been located close to schools and public transport routes.
- The District Sports Ground has been located along the northern interface to Defence land, and adjacent to Village Centre 2. This provides a further buffer/ interface to Defence land.
- These facilities will be linked by cycle and pedestrian networks.
- Indicative locations of additional 'informal parks' are generally indicated where residential areas are not within walking catchments of Local Recreation Parks (LSG's) & should be integrated with potential storm water treatment locations.

Refer to Figures 26 & 27.

TYPE	STANDARD (approx. 50,000 ultimate population, approx. 30,000 within Study Areaand 20,000 within existing res zoned areas within study area) .	NUMBER SUPPORTED	NUMBER EXISTING	ADDITIONAL PROPOSED	APPROX. SITE SIZE (m^2 per facility)	DESCRIPTION / NOTES
OPEN SPACE AND SPORTS FACILITIES						
Local Recreation Parks (LRP) and Informal Parks (IP)	1:4000 for LRP's 1:2000 for IP's	12 LRP's 24 IP's	22 LRP's	22 11	Sizes may vary according to site specific conditions	The number of LRP's has been increased from 12 (1 per 4,000 persons) to 22 in order to promote pedestrian access within 500m of open space areas for the majority of residents within the TWPSP Study Area. It is further noted that an additional 11 Informal Parks have also been identified in notional locations across the TWPSP Study Area to assist pedestrian access to open space areas in those areas outside the walking catchments of the proposed network of LRP's.
Local Sports Grounds (LSG)	1:7500	6	2 • Ernest Grant Oval	5	4ha	Close proximity to schools and open space
District Sports Ground (DSG)	1: 20 000	2	0	1	7ha	Additional facilities available in Albury
Aquatic Centre	1:25 000	2	0	1 private operator	1ha	Possible location within district sports grounds

Chart 6: Sports and Open Space Facilities

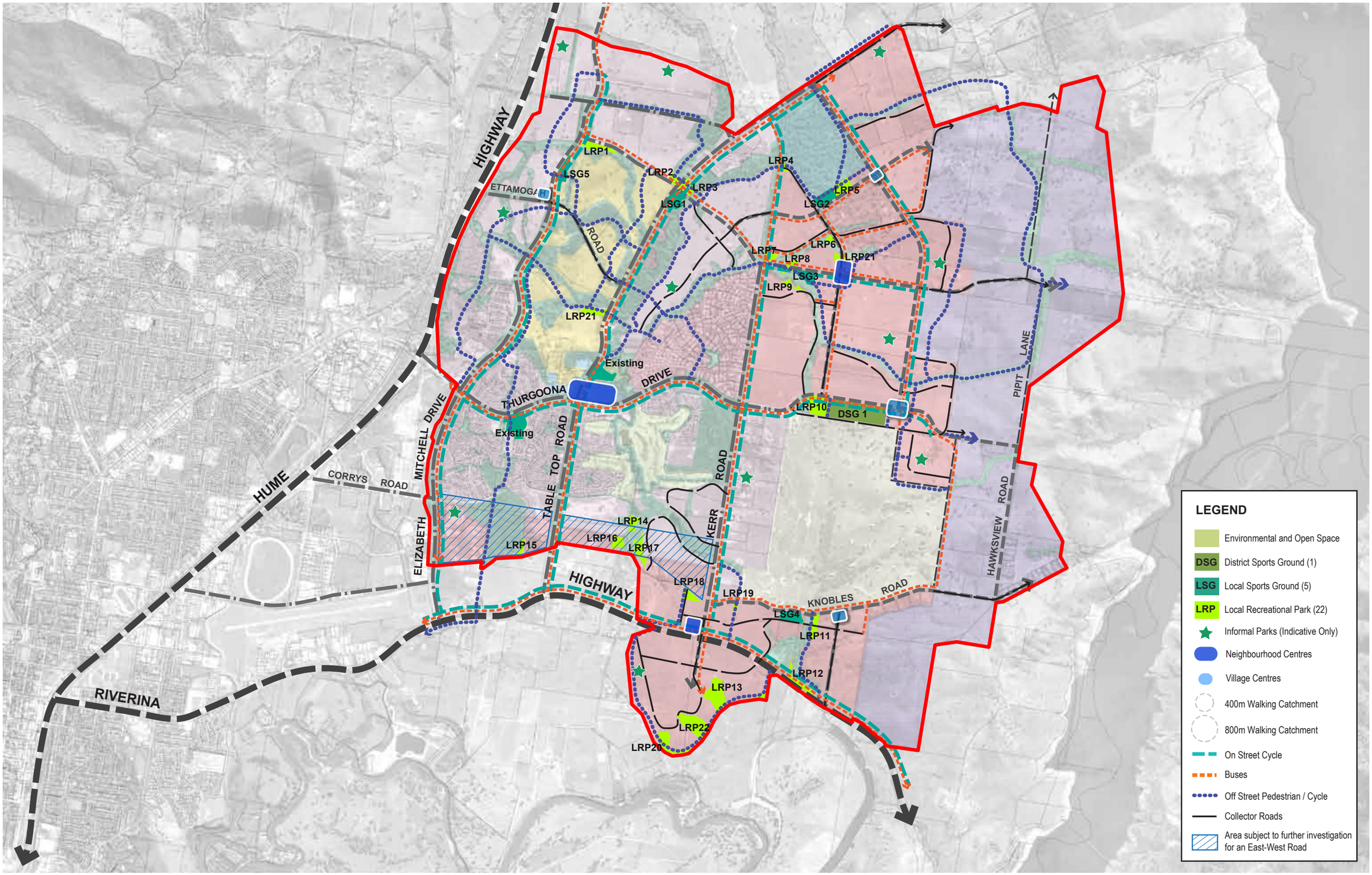


Figure 26: Sports and Open Space Plan

8.6.1 Local Sports Grounds

Local Sports Grounds are approximately 4 hectares in size and Local Recreation Parks range from 0.4 to 6 hectares, depending on specific site conditions.

Local Recreation Parks may contain play equipment, shade structures, consolidated parking areas and other facilities.

These facilities will be funded out of Section 94 contributions and need to be costed and taken into consideration for the Section 94 Contributions plan.

For indicative concept designs for Local Sports Grounds and District Sports Ground refer to pages 56-57.

Note: Informal Park (IP) locations are indicative only.

	Location	Area
Local Recreational Parks	LRP1	1.582 ha
	LRP2	0.935 ha
	LRP3	1.587 ha
	LRP4	1.114 ha
	LRP5	2.064 ha
	LRP6	1.130 ha
	LRP7	1.159 ha
	LRP8	0.844 ha
	LRP9	0.941 ha
	LRP10	4.646 ha
	LRP11	0.829 ha
	LRP12	2.154 ha
	LRP13	6.068 ha
	LRP14	1.410 ha
	LRP15	0.940 ha
	LRP16	1.605 ha
	LRP17	3.189 ha
	LRP18	1.191 ha
	LRP19	0.464 ha
	LRP20	3.902 ha
	LRP21	0.912 ha
	LRP22	5.920 ha

	Location	Area
Local & District Sports Ground	LSG1	4.000 ha
	LSG2	4.005 ha
	LSG3	4.010 ha
	LSG4	4.205 ha
	LSG5	4.149 ha
	DSG1	15.127 ha

Chart 7: Sports and Recreational Facilities/Areas

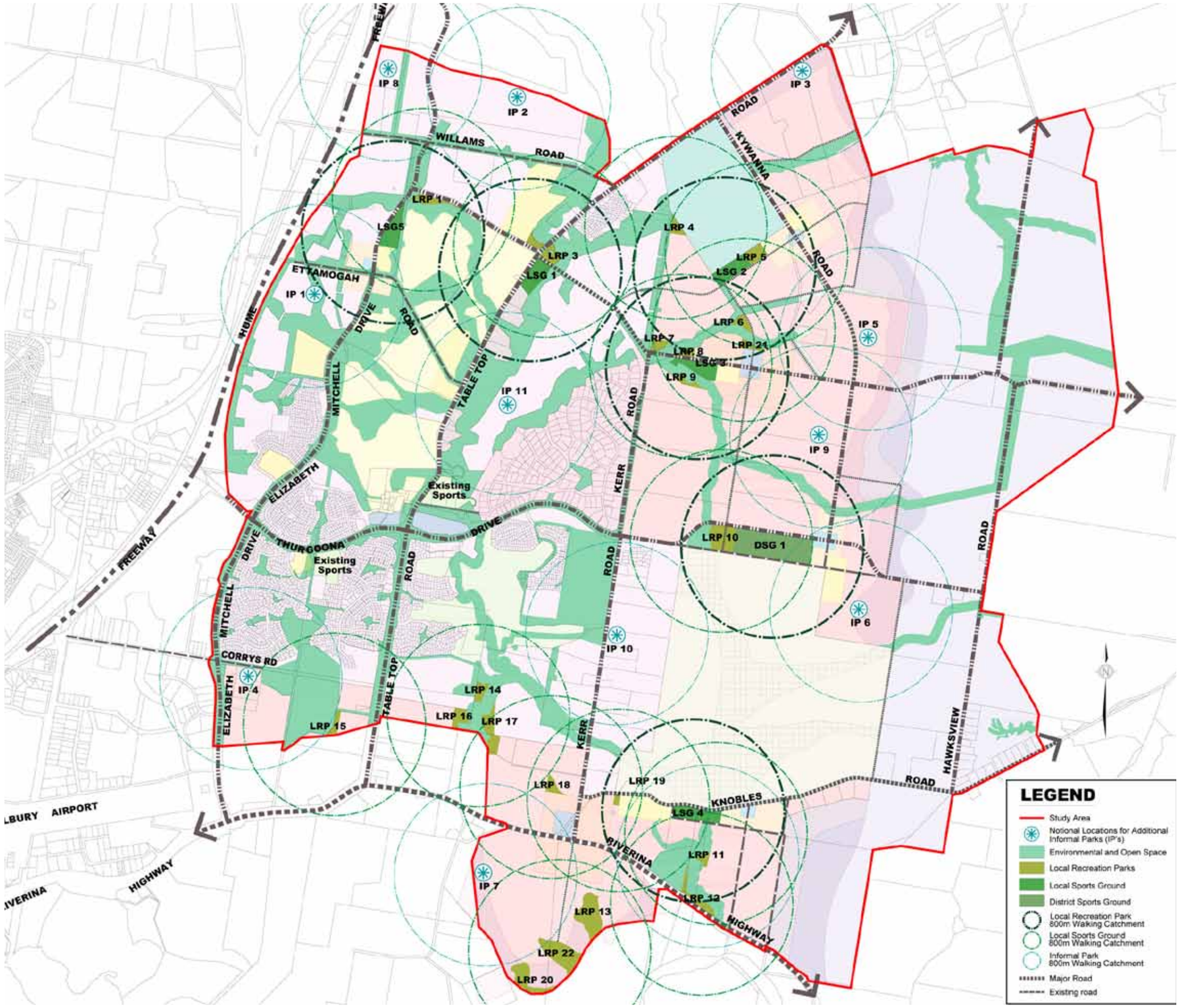


Figure 27: Local Sports Grounds and Local Recreational Parks Facilities Plan

Figure 27A: Sport Ground Concept Plans

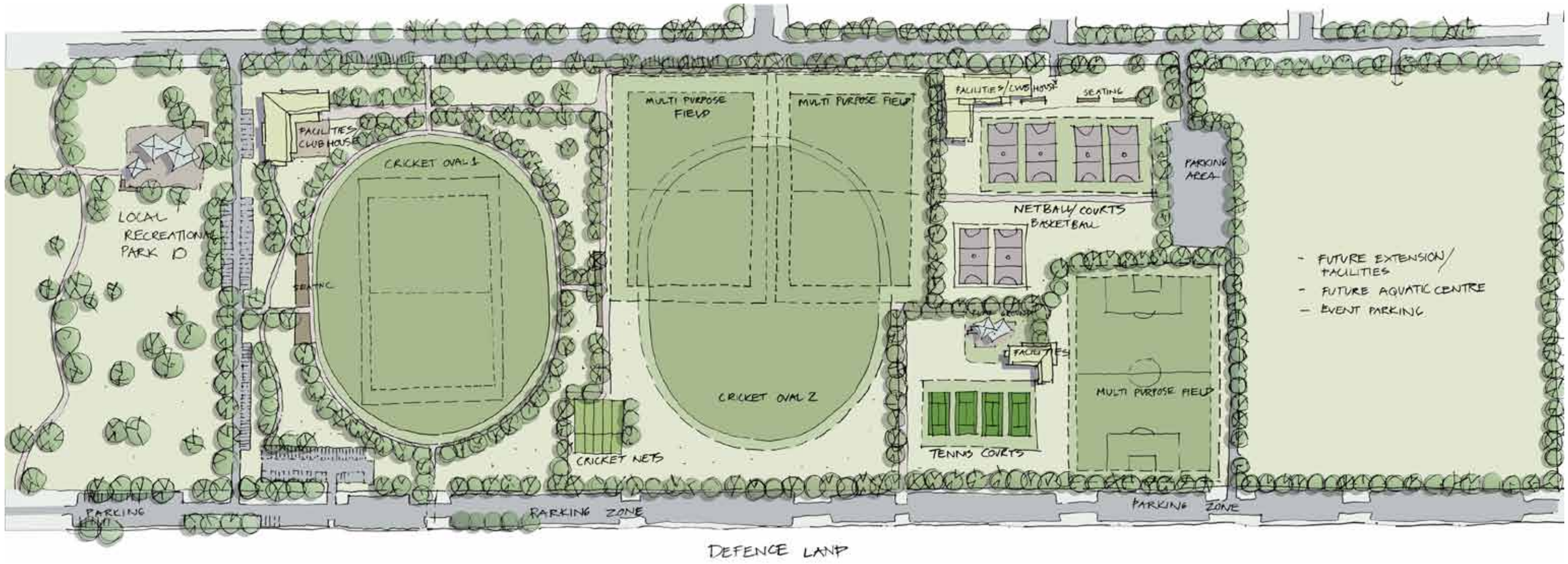
Local Sports Ground 1

Local Sports Ground 2

Local Sports Ground 5

Local Sports Ground 3

Local Sports Ground 4



District Sport Ground

8.7 Residential Typologies and Land Budget

Key issues regarding residential typologies and densities include:

- Provide a range of affordable housing options that cater for different household demographics, such as students, elderly, single parents, families etc.
- Provide efficient residential models (higher densities) along major movement routes and around activity centres and schools, to promote convenient and affordable access to these facilities and significant passing trade to patronise retail facilities.
- Ensure residential typologies contribute to positive, safe and attractive streetscapes through appropriate orientation, interfaces and parking solutions.
- Provide series of 'Interface Residential' zones to ensure a gradual lowering of residential densities out towards the Study Area Rural Residential zones.

The location of Interface Residential zones are determined by impacts on prominent view lines and slopes between the 220m, 225m and 230m contour lines.

There are six levels of residential typologies (excluding Rural Residential) accommodated within the URA;

- Level 1(Very low density): The 10,000m^2 to 2500m^2 large suburban block. This is a very low density, semi rural free standing house on a large block.
- Level 2: (Low density): The minimum 1000m^2 large low density suburban block with free standing house.
- Level 3: (Medium – low density) The minimum 615m^2 block, free standing house, average 18m wide street frontage.
- Level 4: (Medium - low density) Small lot minimum 500m^2 freestanding residential, located within 400m catchment of Village Centres.
- Level 5: (Medium Density) attached terraces and townhouses within 400m catchment of Village Centres and Major Neighbourhood Centres. These lots are approximately 400m^2.
- Level 6: (Medium Density Mixed Use) Mixed Use, Shop Top Housing, 2-3 Storey Low-rise Apartments, terraces and townhouses. Located within 400m catchment of Major Neighbourhood Centres.

Refer to Figure 28: Density Plan and Figure 28A: Residential Densities Cross Section.

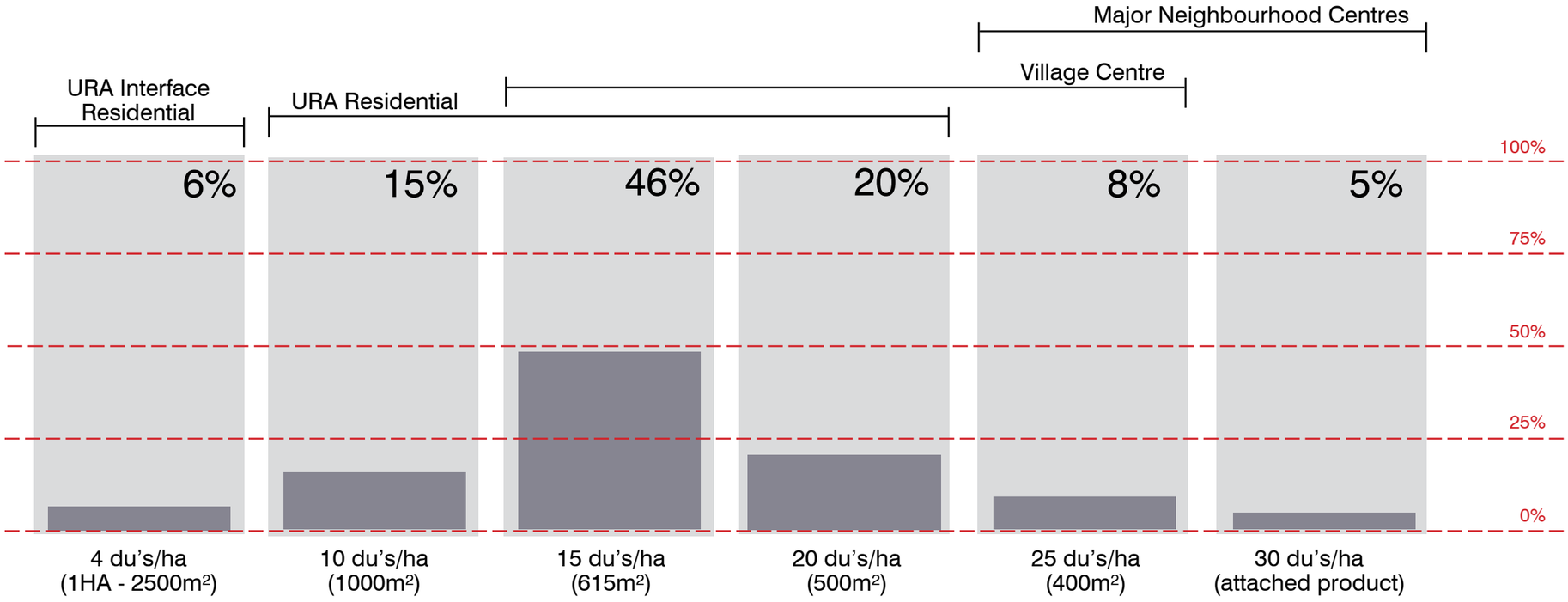


Table 2: Indicative Density Mix (Net Density)

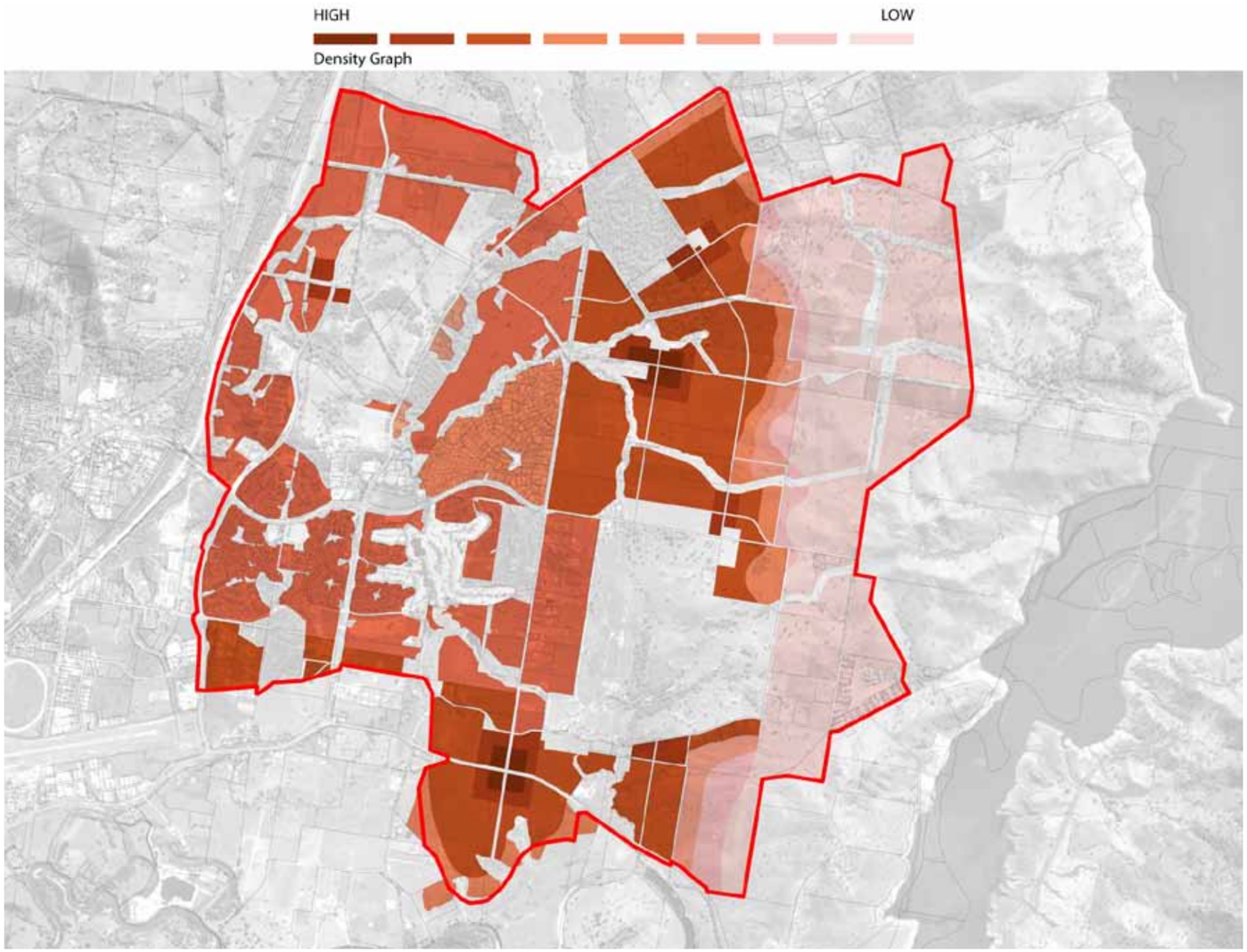


Figure 28: Density Plan

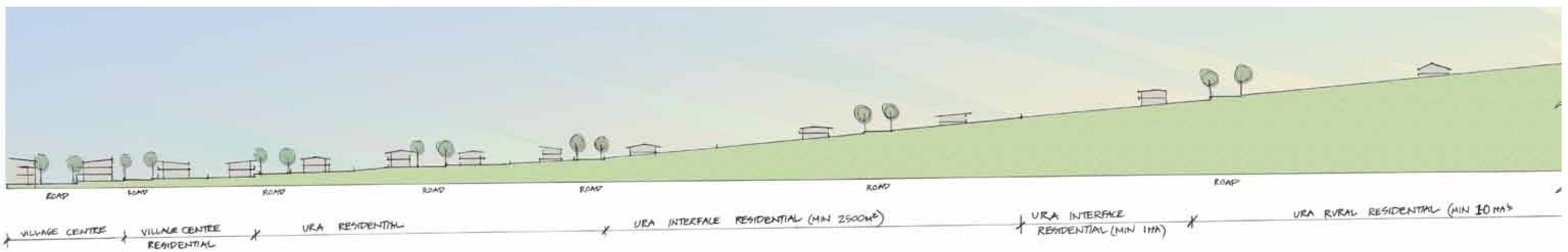


Figure 28A: Residential Densities Cross Section

8.8 The Precinct Structure Plan

Existing Land Designation	Total Hectares (ha)	Percentage of Overall Area (%)
MNC Commercial	16.96 ha	0.37%
MNC Residential	65.70 ha	1.43%
VC Commercial	4.85 ha	0.11%
VC Residential	42.39 ha	0.92%
URA Rural Residential	738.93 ha	16.10%
URA Interface Min 1ha	91.00 ha	1.98%
URA Interface Min 5000m²	73.01 ha	1.59%
URA Interface Min 2500m²	104.89 ha	2.29%
URA Residential	737.04 ha	16.06%
Large Lot Residential (R5)	12.81 ha	0.28%
Low Density Residential (R2)	121.18 ha	2.64%
General Residential (R1)	843.97 ha	18.39%
Infrastructure (SP2)	149.94 ha	3.27%
Education	71.85 ha	1.57%
Special Activities (SP1)	370.43 ha	8.07%
Public Recreation (RE1)	13.07 ha	0.28%
Private Recreation (RE2)	61.85 ha	1.35%
Environmental Conservation (E2)	83.29 ha	1.81%
Environmental Management (E3)	742.10 ha	16.17%
District Sport Ground	15.13 ha	0.33%
Recreation Park	40.60 ha	0.88%
Local Sport Ground	20.37 ha	0.44%
Proposed Environmental Management (E3)	7.78 ha	0.17%
Total Development Areas	**4425.620 ha**	**96.42%**
Existing and Proposed Roads (mathematical to suit site area)	160.96 ha	3.51%
Total Site Area	**4590.10 ha**	**100%**
Future Proposed Environmental Management (E3) (within SP1)	129.60 ha	
Proposed URA Interface Min 2500m² (outside study area)	17.54 ha	

Table 3: Land Budget Table

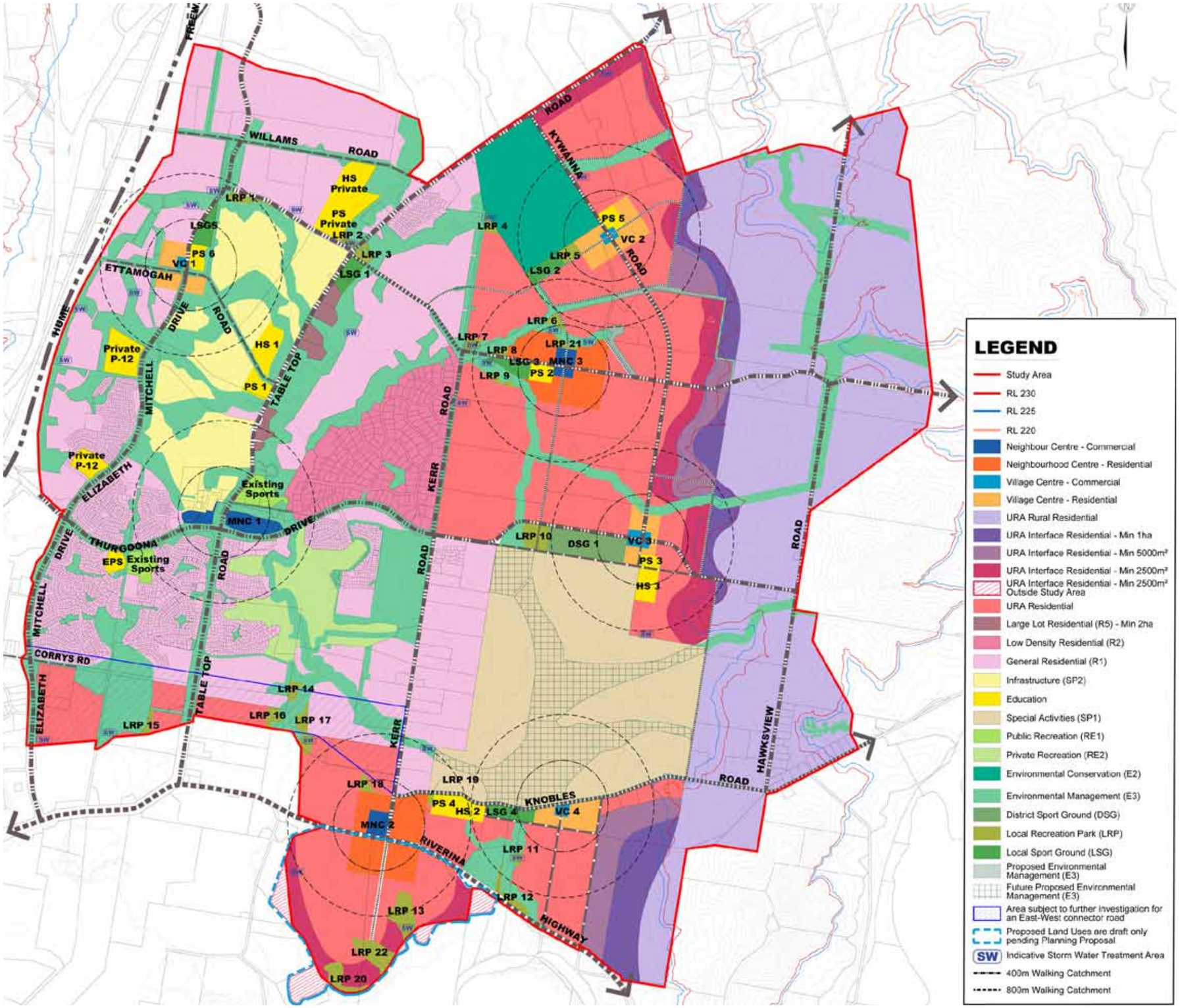


Figure 29: Precinct Structure Plan

9.0 Employment Plan and Travel to Work

9.0 Employment Plan and Travel to Work

The major employment areas in Albury include Nexus, Thurgoona, East Albury, Lavington, South Albury and Albury CBD. Wodonga also plays a role in the employment of Albury residents.

RPS defines employment self containment as the measure of the number of residents who are employed within the same defined community divided by the number of jobs demanded by residents within a defined community. The employment self containment rate in Albury is 62% and Albury Wodonga 60%.

The Thurgoona Wirlinga Precinct is anticipated to have a total population at capacity of close to 50,000 people. Based on this population, combined with the existing supply of facilities within Albury, RPS recommends that at capacity, the Thurgoona Wirlinga Precinct comprise an additional:

- 7 child care centres.
- 6 government primary schools.
- 2 private schools (P-12).
- 3 government secondary schools.
- 1 district community centre.
- 3 local community centres.
- 1 district centre (future expansion of existing major neighbourhood centre).
- 2 major neighbourhood centres.
- 4 village centres.

Refer to Chart 5: Education and Community Facilities.

RPS recommends that the existing Thurgoona Plaza is expanded to develop as a district centre once the population threshold of 50,000 people is realised. This centre may be developed in stages as the population increases.

These community and retail facilities, combined with home based businesses, are anticipated to provide approximately 6,670 jobs. RPS therefore recommends that the Thurgoona Wirlinga Precinct have a 27% self containment rate local to the site, with an additional 63% (15,750) jobs local to the Albury Wodonga region and the remaining 10% of jobs (2,500 jobs) to occur in areas outside of the region such as farming or mining.

The additional employment uses are to develop as clusters around the district and major neighbourhood centres, as well as around the university to service the local student and workforce population. The remaining employment uses such as village centres should be located across the precinct to service the local population catchments.

In addition to the associated employment benefits derived through having a number of jobs hosted within the Precinct, the creation of these jobs provides the opportunity to encourage residents of the Precinct to take shorter trips and walk to local centres, reducing people's journey to work times as well as the proportion of residents travelling to work by car and increasing those travelling by bicycle and/or public transport. Reducing journey to work times have a number of tangible benefits including less traffic congestion, lowering wear and tear on roads (thus reducing maintenance costs) and reducing household transport expenditure. Reducing household transport expenditure can create a positive economic affect for the local community through additional expenditure on other uses and a positive social benefit of reduced commuting time with increased time with family and for recreation.

In order to increase the self containment rates and number of jobs close by, RPS recommends that the Albury Economic Development Strategy outline measures to support local jobs and for Council to support the growth of Charles Sturt University and maximise the existing major employment areas. The creation of 6,670 jobs in the Thurgoona Wirlinga Precinct will provide the opportunity to decrease residents' journey to work, increase employment diversity, and provide employment opportunities for the long term unemployed, people returning to work and people looking to up skill. The development of the Thurgoona Wirlinga Precinct will need to provide a mix and diversity of housing types as well as affordable housing in order to attract a diverse demographic population to the community in order to achieve required housing densities.

In addition to future employment opportunity within the Study Area, Albury's 450ha industrial growth area, Nexus, is located directly to the North and North West of the Study Area, along Hume Highway. Nexus will contribute to employment opportunity within this region.

Refer to Table 11: Thurgoona Wirlinga Precinct Employment Detail, TWPSP Technical Report.

10.0 Integrated Water Management

10.0 Integrated Water Management Plan

The pride that Albury has in its parks and gardens suggests that water management should focus on optimizing the use of non-potable water for irrigation and in doing so, extend the availability of water during drought and/or water restriction periods.

The availability of sufficient stormwater and wastewater to service a dual reticulation scheme in Thurgoona-Wirlinga is limited by capacity and reliability. Stormwater availability is restricted by climate, and substantial diversion of stormwater would also remove environmental flows from the waterways. To be reliable, the scheme would need a major storage system, and only a large aquifer (groundwater) would have the capacity.

Wastewater availability is limited by the current demand for reclaimed water but in the future, as Thurgoona-Wirlinga develops, it would be possible to invest in local wastewater treatment and service a dual reticulation system. The desirability of this approach is a matter for Council, because there are already plans to increase total capacity in the existing WWTPs to the west of the city.

The following Integrated Water Management Strategies are recommended from the analysis:

Objectives and targets: adopt the proposed objectives and targets set out in Chapter 10 of the TWPSP technical report as a basis for integrated water management in the Study Area. Post development targets outlined below:

Landcom (2009): Water Sensitive Urban Design, Parramatta, NSW.

Notes:
1. target relative to Albury City residential average
2. targets relative to untreated urban

IWM Element	Target	Source of Target
Potable water demand[1]	40% Reduction in new homes	BASIX
Flooding	No increase in afflux	LEP 2010
Stormwater flow	No change to pre-urban flow regime	LEP 2010
Stormwater quality[2]	85% reduction in Suspended Solids	Landcom 2009
	45% reduction in Total Nitrogen	Landcom 2009
	65% reduction in total Phosphorus	Landcom 2009

Chart 8: Integrated Water Management

1. Natural Waterways: Protect all of the waterway corridors shown as sensitive areas in LEP 2010 through appropriate zoning and development setbacks; undertake site surveys to identify and prioritise waterway rehabilitation; revegetate waterway corridors to establish improved corridor linkages wherever it does not cause flood afflux or interfere with other open space uses.
2. Stormwater flows: Establish detention basins throughout the catchment to maintain current flow regimes – in particular, ensure that urban development does not increase flooding or peak flow velocities and that low flows are maintained to support aquatic ecosystems.
3. Stormwater Quality Incorporate bio-retention basins and wetlands within or adjacent to detention basins. Design structures to achieve stormwater quality targets as per Section 10.1; and enhance natural waterway values – including landscape and ecology. Potential bio retention areas are nominated in Figure 30.
4. Reclaimed Water (treated wastewater): subject to Council's current investigations, use return water from the Norske Skog Paper Mill for open space irrigation within the Study Area; Consider a future dual reticulation scheme, subject to Council 's city-wide planning for future wastewater treatment.
5. Alternative water supplies on lots: Encourage future residents and commercial/industrial/institutional users to recycle greywater and install optimally sized rainwater tanks.

Further analysis will be required to identify specific management actions, including:

- Waterway management plan to prioritise and cost management measures to stabilize and revegetate all sensitive waterways within the Study Area.
- Stormwater quality modeling: MUSIC or equivalent modeling to optimize locations and guide the sizing and design of bioretention basins or wetlands. (Note: This analysis should be integrated with hydraulic and hydrological analysis of the Study Area to optimize the detention basin design).

10.1 Stormwater Treatment

Some possible locations of stormwater treatment devices are indicated on the IWM concept plan. The actual locations of these devices which include stormwater quality treatment devices and stormwater detention basins will depend on a number of factors including:

- Drainage characteristics of the areas to be developed.
- The scale of the stormwater quality treatment devices. Treatment devices can be distributed through an urban development and integrated into the streetscape. For example, bio-retention pods, infiltration strips, rain gardens and swales can be incorporated in streets and treat runoff from areas as little as a single block. Regional scale devices can also be constructed to treat a whole subdivision in lieu of distributed devices. Regional devices could include wetlands, swales and bio-retention basins. Concept guidelines are available (SEQ 2009) for water sensitive design of stormwater treatment measures.
- The sequence of development. The locations of treatment devices will be influenced by the sequencing of the areas to be developed.

Detention Basins shall be designed to reduce post development flows to pre-development flows for all storms up to and including the 1: 100 year rainfall event.

All basins need to include in their design a dam break analysis and cascade failure (if applicable) to ensure that all people and propertiesdown stream are not put at risk.

For the above reasons, conceptual locations of the devices can only be specified at this planning stage.

Bio-retention basins are the preferred method of stormwater quality treatment although wetlands may offer environmental advantages. It is desirable to allow for a footprint of approximately 2.5% of the contributing catchment of the urban area draining to the device. The typical filter area of a bio-retention basin is of the order of 1% of the contributing catchment area.

Approximate construction costs of bio-retention systems greater than 100 square metres in area have been reported as $125 – 150 per square metre including vegetation (Taylor 2005).

Further information on the approximate construction and maintenance costs of bio-retention basins and other treatment devices such as constructed wetlands are available from Taylor 2005.

Taylor, A. C. (2005). Structural Stormwater Quality BMP Cost – Size Relationship Information From the Literature, Technical paper (version 3). Cooperative Research Centre for Catchment Hydrology, Melbourne, Victoria.

SEQ (2009). Concept Guidelines for Water Sensitive Urban Design Version 1 2009, SEQ Healthy Waterways Partnership.

Infrastructure Category	Project Title	Project Description
SW1	Bio-retention/ detention	Catchment area 16ha Approximate structure footprint 3,300m^2
SW2	Bio-retention/ detention	Catchment area 109ha Approximate structure footprint 21,900m^2
SW3	Bio-retention/ detention	Catchment area 13ha Approximate structure footprint 2,500m^2
SW4	Bio-retention/ detention	Catchment area 38ha Approximate structure footprint 7,700m^2
SW5	Bio-retention/ detention	Catchment area 25ha Approximate structure footprint 4,900m^2
SW6	Bio-retention/ detention	Catchment area 26ha Approximate structure footprint 5,200m^2
SW7	Bio-retention/ detention	Catchment area 28ha Approximate structure footprint 5,500m^2
SW8	Bio-retention/ detention	Catchment area 78ha Approximate structure footprint 15,500m^2
SW9	Bio-retention	Catchment area 60ha Approximate structure footprint 12,000m^2
SW10	Bio-retention/ detention	Catchment area 39ha Approximate structure footprint 7,900m^2
SW11	Bio-retention/ detention	Catchment area 131ha Approximate structure footprint 26,200m^2
SW12	Bio-retention/ detention	Catchment area 67ha Approximate structure footprint 13,300m^2
SW13	Bio-retention/ detention	Catchment area 32ha Approximate structure footprint 6,300m^2
SW14	Bio-retention/ detention	Catchment area 11ha Approximate structure footprint 2,200m^2
SW15	Bio-retention	Catchment area 52ha Approximate structure footprint 10,500m^2
SW16	Bio-retention	Catchment area 110ha Approximate structure footprint 22,000m^2
SW17	Bio-retention	Catchment area 285ha Approximate structure footprint 57,000m^2
SW18	Bio-retention/ detention	Catchment area 65ha Approximate structure footprint 12,900m^2
SW19	Bio-retention/ detention	Catchment area 37ha Approximate structure footprint 7,400m^2
SW20	Bio-retention/ detention	Catchment area 29ha Approximate structure footprint 5,900m^2
SW21	Bio-retention/ detention	Catchment area 18ha Approximate structure footprint 3,700m^2
SW22	Bio-retention/ detention	Catchment area 14ha Approximate structure footprint 2,800m^2
SW23	Bio-retention	Catchment area 37ha Approximate structure footprint 7,400m^2
SW24	Bio-retention/ detention	Catchment area 77ha Approximate structure footprint 15,400m^2

Extract from Chart 9: Infrastructure Plan

10.2 Integrated Water Management Plan

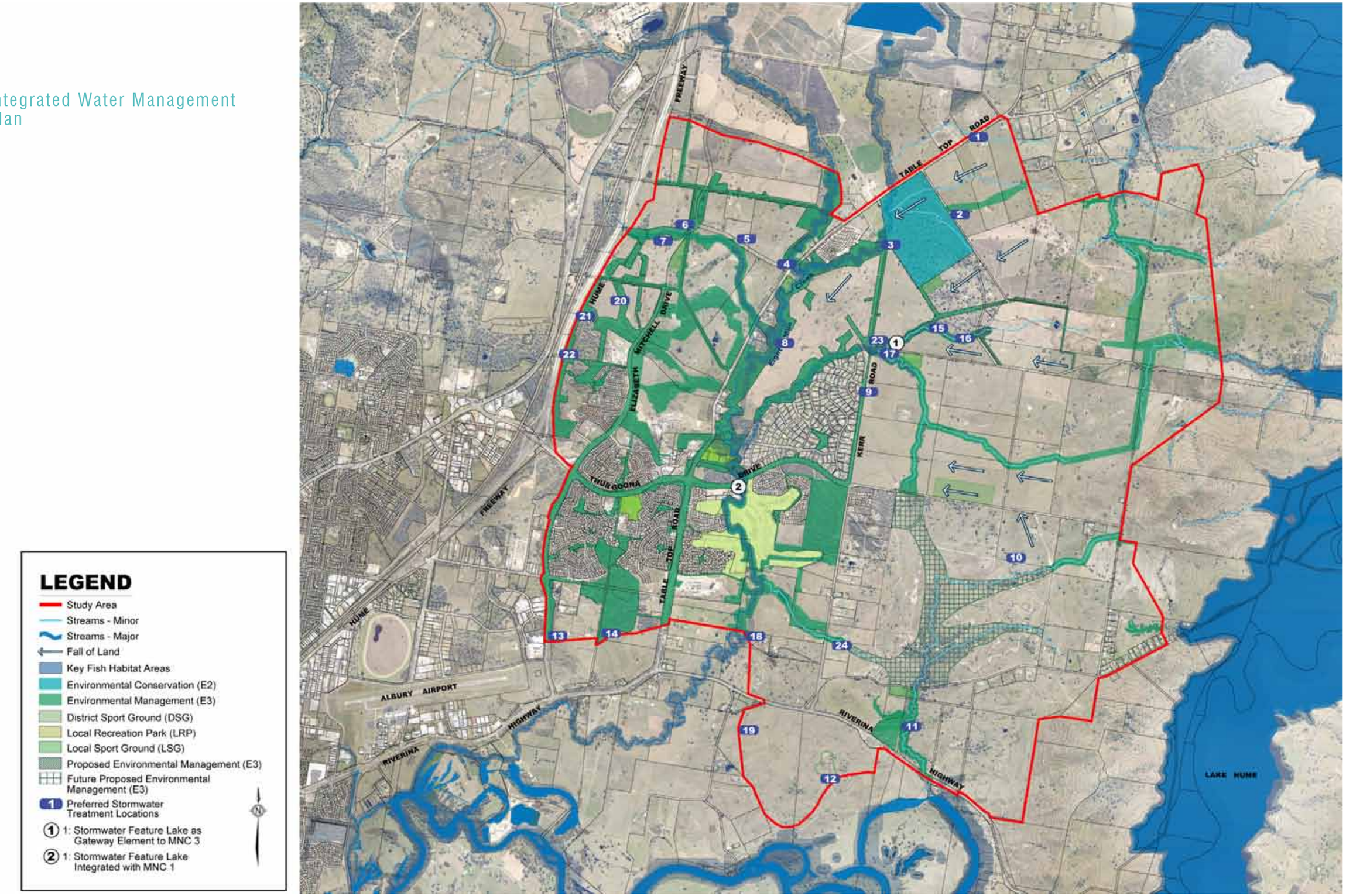


Figure 30: Integrated Water Management Plan

11.0 Transportation Plan Summary

11.0 Transportation Plan Summary

The transport networks through the Study Area, particularly the eastern portions, will require significant development to provide adequate capacity, safety and amenity for an urban environment. Additionally, the future transport demands need to be considered across the wider Albury network to ensure that future requirements on existing infrastructure are also considered. As described in the following sections.

It is generally proposed that the existing travel networks are expanded. While there is a focus on promoting non car trips, it is understood that in the proposed low density context, demand for private vehicles usage will be high. As such, there is community expectation that roads with sufficient capacity are provided as the primary transport network.

11.1 Proposed Road Network

The current distributor road network through the western portions of the Study Area is generally configured in a grid pattern of east-west primary routes and north-south secondary routes. It is proposed to extend this network with further distributor routes continuing to form this general grid pattern. This will provide the greatest flexibility with respect to route choice and provides logical access for most users. It also allows the future road network to maximise the use of existing road reserves.

Roads at the collector level and below are to be developed within the scope of individual lot development or via more detailed TWPSPning as development demand progresses. However, as a guide, it has been identified that the orientation of collector roads in particular should be such, the “rat-running” opportunities are generally avoided. Furthermore, these roads would ideally be located adjacent to open space or conservation areas. This will provide buffers and also limit the number of access points on these roads.

11.2 Connecting to the Existing Road Network

Several intersections between the Study Area and central Albury have already been identified as problematic with respect to future capacity. These generally centre around the Hume Highway interchanges and approaching intersections.

To address future capacity requirements at this point, it is proposed to provide traffic routes which bypass these congestion points. This will allow direct movement between future residential areas and the existing Albury urban area.

Several intersection upgrades have also been identified around the existing network to provide additional capacity. These range from simple reconfigurations with respect to lane assignment and phasing, to provision of signals at major intersections and the reconfiguration of freeway interchange configurations.

A new connection is also proposed to the north, by extending Elizabeth Mitchell Drive to the proposed Davey Road interchange. This will provide the primary road corridor between the site and the Nexus development, as well as the highway to the north.

11.3 Cyclist Paths

Given the current work travel modes in the Thurgoona area, cyclist trips are considered the most likely as an alternative to private vehicles. This is in addition to the health and social benefits of high levels of cycling. As such, the development of the cyclist network is considered a very high priority.

Two levels of cyclist path are considered. Thurgoona already contains shared paths in road reserves to cater for commuter cyclists. These connect to the Albury-Thurgoona trail, which runs parallel to the Hume Highway. This route is the most heavily utilised in the Albury region. It is therefore proposed that this network is expanded along proposed major road corridors. This will include full north-south connections between Thurgoona Drive and Borella Road, connecting the existing points on the network.

Recreational cyclists are also to be catered for on a separate, but connected, network of paths. The recreational paths will be focussed in open space areas and corridors. As many of these areas will have ecological requirements which will exclude the provision of cyclist facilities, paths may be located immediately adjacent to these corridors. The recreational paths will also provide connectivity to community facilities, such as schools, to provide children with safe and direct paths to ride to school.

Part of the cyclist network is also to considered end of trip facilities. It is proposed that all non residential developments provide suitable end of trip facilities, including parking, lockers and shower facilities. This provision is to be considered across the Albury urban areas, as well as the Study Area.

11.4 Pedestrian Network

Pedestrian movements are considered critical within 800m of the major activity centres and community facilities such as schools. Within these catchments it is recommended that direct, high quality pedestrian facilities are provided. While these may be provided within verges of roads, direct links which cut through residential areas are preferred. This will ensure that pedestrian facilities are more direct than vehicle routes, further promoting the walkable catchment to local neighbourhoods.

Beyond these 800m catchments, the requirement for dedicated pedestrian facilities becomes less critical. Generally in these locations paths would only be provided along roads of collector standard and above to separate occasional pedestrian movements from vehicle traffic and to provide access to potential bus stops.

11.4.1 Hume Hovell Track

Where Hume Hovell Track is traversed for distributor road purposes, pedestrian crossing options are to be considered, designed and implemented to assist pedestrian and cycle movements.

11.5 Public Transport Facilities

The provision of low density housing away from the major activity centres is not compatible with the provision of high amenity public transport. The location of the Study Area relative to employment opportunities also limits public transport opportunities as bus travel times and costs will not be competitive with private vehicles.

However, it is considered appropriate to make provision for bus routes should demand be generated in the future. In particular, the high potential student and aged population in the Study Area may demand public transport is provided in the future. As such, all roads of collector standard and above are to be designed to cater for bus movements.

The best opportunities for public transport, based on existing usage, appear to be with the operation of private group transport. Uses such as schools and aged care facilities currently operate buses for access to their sites. Again to be effective, these services need access to all roads of collector standard and above.

The provision of these facilities can be promoted through town planning measures, including the requirements of bus facilities on-site and through the relaxation of parking requirements where suitable provisions are made.

11.6 Heavy Vehicle Movement

The uses through the site are not expected to generate significant heavy vehicle movements. In particular, there will be no industrial or extractive industries which will require haulage corridors. Truck traffic will generally be limited to domestic deliveries and refuse collection, as well as servicing retail and commercial uses in the various centres. These limited uses will generally be catered for on the proposed public road network.

11.7 Rail Network

While the site is bordered by a rail line, it provides regional and interstate movement for goods and passengers, with little to no opportunity to provide for local movements. Current passenger services operate infrequently and do not coincide with traffic peaks.

Community consultation has also raised the issue of the proposed very fast train (VFT) project between Sydney and Melbourne. This project will be planned at the national level. The planning that determines if and when this infrastructure is developed, will also determine the most appropriate route and stop locations. This may or may not include a station in the vicinity of the development area. This may provide opportunities to commute from the Study Area to capital cities, however is generally beyond the scope of this planning exercise.

Refer to Chapter 15 of Technical Report and Appendix 4.

Refer to Figures: 19 and 20.

Refer to Figure 31: Secondary Movement Plan.

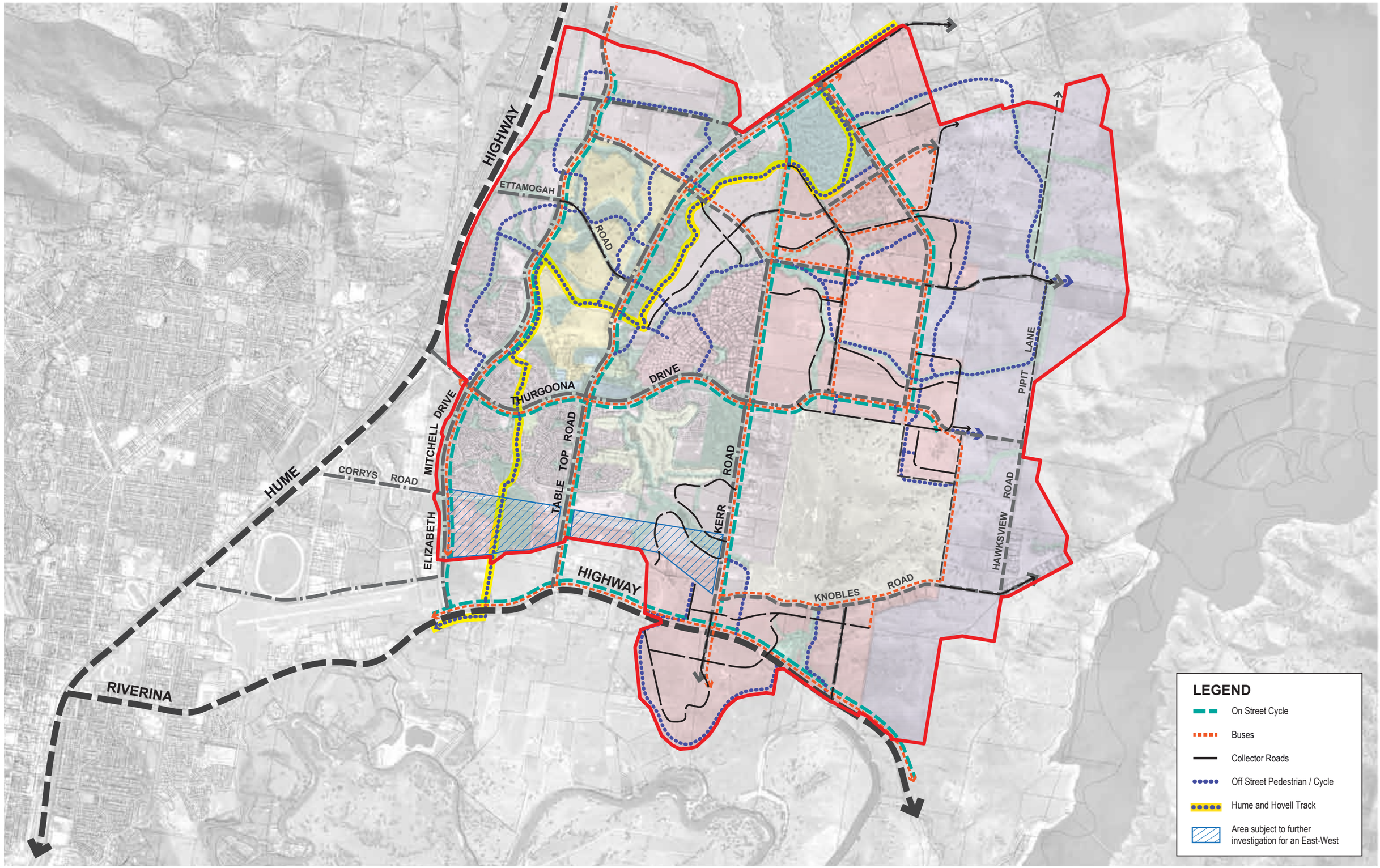


Figure 31: Secondary Movement Plan

12.0 Utilities and Infrastructure Plan

12.0 Utilities and Infrastructure

The construction of major infrastructure to reticulate essential services to the area is required. It is anticipated that utility services will be rolled out in conjunction with development of the area. The existing utilities of the area have been assessed considering their ability to extend to service the Study Area. Key utility considerations include the following.

12.1 Water

Reticulated water can be provided to the proposed Study Area by extension of mains from the existing Albury City water network in the area.

It has been indicated that the existing water network servicing the Thurgoona-Wirlinga area has capacity to provide adequate service to the Study Area. It is anticipated that duplication and augmentation of the existing network would be required as development proceeds. A plan indicating the existing water infrastructure and proposed trunk water mains is shown in Figure 32.

12.2 Sewer

Existing development in the Thurgoona – Wirlinga area is serviced by a network of gravity sewer mains draining to local sewer pump stations (SPS). Capacity within the existing sewer network is limited. Augmentation and upgrade of the existing system would be undertaken progressively in conjunction with development of the Study Area.

A plan showing existing sewer infrastructure in the vicinity of the Study Area and the general direction of flows is shown in Figure 32.

12.3 Electricity

There are two (2) existing zone substations in the Albury electrical network. These stations are located at Union Rd and Jelbart Rd. Short to medium term planning indicates the need for the construction of an additional zone substation at Ettamogah. Once approximately 4,000 homes are occupied in the area the construction of a dedicated zone substation for the area will be required. The zone substation should be located centrally within the development area, if possible. Construction of the zone substation will require and land parcel of approximately 200m x 200m on relatively flat land.

A plan showing existing transmission lines traversing the Study Area and a potential zone substation site is provided in Figure 32.

12.4 Telecommunications

The telecommunication network will be capable of all services including high quality voice, high speed broadband, video conferencing etc. The actual quality of the services provided to the end user will depend on the service provider and the plans selected by the user.

It is not anticipated that major infrastructure requiring significant parcels of land will be constructed as part of the telecommunication network.

12.5 Gas

Envestra (APA Group) has advised that Thurgoona-Wirlinga is well serviced by the existing gas infrastructure in the area. It is anticipated that supply of gas to the Study Area would be provided by extension of mains from the existing system in the area.

Refer to Figure 32: Utilities Plan.

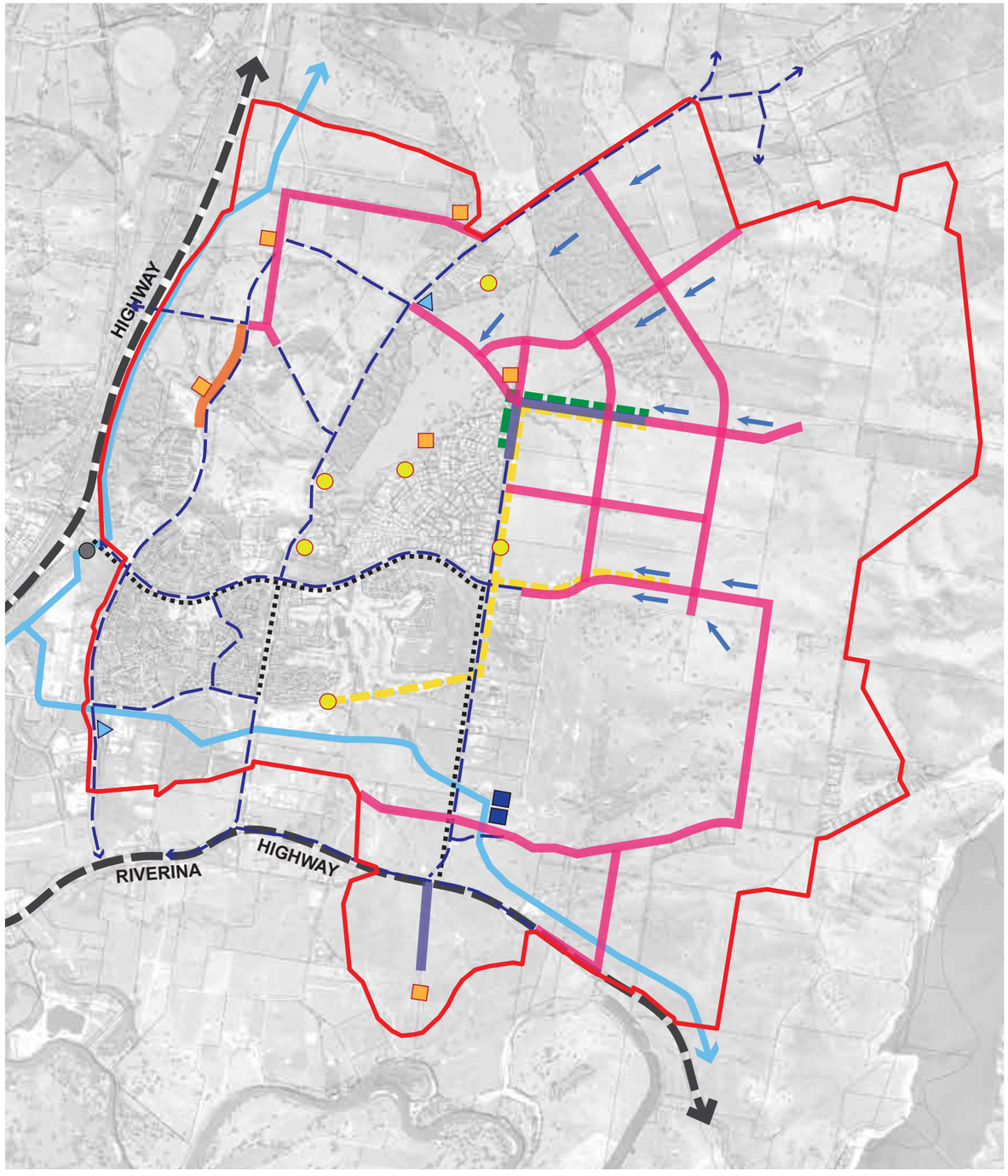


Figure 32: Utilities Plan

Chart 9: Infrastructure Plan

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating agency	Timing Short: 0- 10 years Medium: 10-20 years Long: 20+ years	Indicative Cost Cost ($2012)
1 - Roads						
1.1	Arterial Road	Riverina Highway Upgrading	Upgrade the highway to 4 lanes between East Street and Kerr Road (6.6km). This will include signalisation at Table Top Road, Elizabeth Mitchell Drive and Kerr Road intersection	RMS	Medium to Long	$100M
1.2	Arterial Road	Thurgoona Drive	Upgrade from 2 lanes to 4 lanes for the 3.2km between the Hume Hwy and Kerr Road. This will include signalisation at the Kerr Road intersection	ACC	Long	$45M
1.3	Arterial Road	Thurgoona Drive Intersections	Intersection Upgrades – signalise the Thurgoona Drive intersections with Elizabeth Mitchell Drive and Table Top Road	ACC	Short	$7M
1.4	Sub-arterial	Thurgoona Drive Extension	Provide 3.2km long two-lane, single carriageway from Kerr Road to Hawkesview Road, including signalised intersection near VC3 and significant road reserve widening	ACC	Long	$20M
1.5	Sub-arterial	Elizabeth Mitchell Drive	Carriageway improvements, including sealed shoulders, intersection upgrades, lighting and stormwater. 5.2km from Borella Road to Ettamogah Road	ACC	Short	$26M
1.6	Sub-arterial	Elizabeth Mitchell Drive Extension	Two-lane, single carriageway north of Ettamogah Road to Davey Road interchange (2.5km)	ACC	Medium	$15M
1.7	Sub-arterial	Table Top Road	Carriageway improvements, including sealed shoulders, intersection upgrades, lighting and stormwater. 5.2km from Borella Road to Williams Road	ACC	Medium	$15M
1.8	Sub-arterial	Kerr Road	Carriageway improvements, including sealed shoulders, intersection upgrades, lighting and stormwater. 5.5km from Riverina Highway to Table Top Road	ACC	Long	$18M
1.9	Sub-arterial	Kerr Road Extension	Provide 1.3km long 2-lane carriageway south of Table Top Road	ACC	Long	$8M
1.10	Sub-arterial	East West Connector Road	Provide 3.2km long 2-lane carriageway from Elizabeth Mitchell Drive and Kerr Road, including signalised intersections with Table Top Road, Elizabeth Mitchell Drive and Kerr Road and road reserve resumptions	ACC	Long	$25M
1.11	Sub-arterial	New Ring Road	Upgrade 12.1km of existing roads, including Knobles Road, Hawkscote Road, Kywanna Road and Williams Road to provide a ring road around the study area. This will include new pavements, intersection upgrades, lighting and stormwater	ACC	Long	$70M
1.12	Arterial Road	Thurgoona Drive Interchange	Upgrade Roundabouts to signals, including earthworks and lighting.	RMS	Medium	$20M
1.13	Arterial Road	Borella Road Interchange	Amend line markings and kerb alignments and change signal sequence/phasing to provide optimum operation	RMS	Short	$0.4M

*Note that cost are for full development of the road carriageway, including pavement, drainage, relocate services, minor waterway crossings, pedestrian, cyclist and public transport facilities, as appropriate.

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating agency	Timing Short: 0- 10 years Medium: 10-20 years Long: 20+ years	Indicative Cost Cost ($2012)
2 - Public Transport						
2.1	Public Transport	Bus Stop Facilities	Provision of bus stops along routes including bus shelters, pavements and lighting	ACC	As required bus route development	$3M
2.2	Public Transport	Bus Route Expansion	Expand bus service coverage (to satisfy minimum service standards, complementing private bus operations)	Transport NSW	Staged with development	TBA
3 - Trails						
3.1	Off Street Trail	Off St 1	7km trail in the north eastern section of the development area from VC1 to Kywanna Road	ACC	Long	$1.75M
3.2	Off Street Trail	Off St 2	5.3km trail in the north western section of the development area from Kerr Rd to Elizabeth Mitchell Drive	ACC	Short	$1.33M
3.3	Off Street Trail	Off St 3	1.7km trail in the eastern development area near VC3	ACC	Long	$0.4M
3.4	Off Street Trail	Off St 4	5km trail from MNC1 to VC3	ACC	Short	$1.25M
4 - Open Space						
4.1 *Note 1: Per hectare rates as per current Albury City Section 94 costings, for regional parks, averaging $72,358.00 per hectare.*	Local Recreational Park (LRP) 1	Elizabeth Mitchell Drive North Parklands	Development of parkland, approx. 1.5ha's, located to the south of new east – west connector road at intersection with Elizabeth Mitchell Drive northern extension. Parkland is within Education Precinct (Infrastructure SP2)	ACC	Short	Land acquisition cost: $525,000 Construction: $108,537 Total: **$633,537**
4.2 *Note 2: Land Acquisition costs calculated at a rate of $350,000 per hectare*	LRP 2	Table Top Road West Parklands	Acquisition of land and development of parkland, approx. 0.9ha's located at the intersection of new east – west connector and Table Top Road North.	ACC	Short	Land acquisition cost: $315,000.00 Construction: $65,122.20 Total:**$380,122.20**
4.3 *Note 3: All costings are preliminary and subject to further investigation and detail design.*	LRP 3	Table Top Road East Parklands	Acquisition of land and development of parkland, approx. 1.6ha's, to the east of LRP2, along Table Top Road.	ACC	Short	Land acquisition cost: $560,000.00 Construction: $115,772.80 Total:**$675,772.80**
4.4	LRP 4	Kerr Road North Parklands	Acquisition of land and development of parklands, approx. 1.1ha's, along Kerr Road, adjacent to Environmental Conservation zone (E2)	ACC	Short	Land acquisition cost: $385,000.00 Construction: $79,593.80 Total:**$464,593.80**
4.5	LRP 5	Village Centre Two Parklands	Acquisition of land and development of parklands, approx. 2 ha's, to the south of E2 zone, adjacent to Village Centre 2	ACC	Medium/ long	Land acquisition cost: $700,000.00 Const*ruction:* $144,716.00 Total:**$844,716.00**
4.6	LRP 6	Village Centre Two, South Parklands	Acquisition of land and development of parkland, approx. 1.1ha to the South of Village Centre Two.	ACC	Short	Land acquisition cost: $385,000.00 Construction: $79,593.80 Total:**$464,593.80**

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating agency	Timing Short: 0- 10 years Medium: 10-20 years Long: 20+ years	Indicative Cost Cost ($2012)
4.7	LRP 7	Kerr Road Central Parklands	Acquisition of land and development of parklands, approx. 1.16ha's, at intersection of Kerr Road and new east – west connector road.	ACC	Short	Land acquisition cost: $406,000.00 Construction: $79,593.80 Total:**$485,593.80**
4.8	LRP 8	Central Parklands	Acquisition of land and development of parklands, approx. 0.8ha's to the north of Local Sports Ground 3.	ACC	Short	Land acquisition cost: $280,000.00 Construction: $57,886.40 Total:**$337,886.40**
4.9	LRP 9	Lakefront Parkland	Acquisition of land and development of parkland, approx. 0.941ha's, to the west of Local Sports Ground 3.	ACC	Short	Land acquisition cost: $329,350.00 Construction: $72,358.00 Total:**$401,708.00**
4.10	LRP 10	Thurgoona Drive extension Parkland	Acquisition of land and development of parkland, approx. 4.6ha's, to the west of District Sports Ground.	ACC	Medium	Land acquisition cost: $1,610,000.00 Construction: $332,846.80 Total: **$1,942,846.80**
4.11	LRP 11	Knobles Road East Parklands	Acquisition of land and development of parkland, approx. 0.8ha's, to the south of Knobles Road, adjacent to Local Sports Ground 4.	ACC	Long	Land acquisition cost: $280,000.00 Construction: $57,886.40 Total:**$337,886.40**
4.12	LRP 12	Riverina Highway East Parkland	Acquisition of land and development of parkland, approx. 2.1ha's between Riverina Highway and Environmental Management E3 Zones to the north of the highway.	ACC	Long	Land acquisition cost: $735,000.00 Construction: $151,951.80 Total:**$886,951.80**
4.13	LRP 13	Riverina South Parkland	Acquisition of land and development of parkland, approx. 6ha's, south of Riverina Highway.	ACC	Medium	Land acquisition cost: tbc Construction: $434,148.00 Total:**tbc**
4.14	LRP 14	Golf Club Precinct South Parklands	Acquisition of land and development of parklands, approx. 1.4ha's, to the south of Thurgoona Golf Club Resort	ACC	Medium	Land acquisition cost: $490,000.00 Construction: $101,301.20 Total:**$591,301.20**
4.15	LRP 15	Fallon Street West Parklands	Acquisition of land and development of parkland, approx. 0.9ha's in south west Thurgoona, to the north of Fallon Street extension.	ACC	Medium	Land acquisition cost: $315,000.00 Construction: $65,122.20 Total:**$380,122.20**
4.16	LRP 16	Fallon Street Central Parklands	Acquisition of land and development of parkland, approx. 1.6ha's to the North of Fallon Street extension, East of Table Top Road.	ACC	Medium	Land acquisition cost: $560,000.00 Construction: $115,772.80 Total:**$675,772.80**
4.17	LRP 17	Fallon Street Parklands East	Acquisition of land and development of parkland, approx. 3.1ha's along Fallon Street extension, to the east of LRP 16.	ACC	Medium	Land acquisition cost: $1,085,000.00 Construction: $224,309.80 Total: **$1,309,309.80**
4.18	LRP 18	Kerr Road South Parklands	Acquisition of land and development of parkland, approx. 1.1ha's at intersection between Fallon Street extension and Kerr Road.	ACC	Medium	Land acquisition cost: $385,000.00 Construction: $79,593.80 Total:**$464,593.80**
4.19	LRP 19	Knobles Road South Parklands	Acquisition of land and development of parkland, approx. 0.46ha's, south of Knobels Road, and east of Kerr Road	ACC	Medium	Land acquisition cost: $161,000.00 Construction: $33,284.64 Total**:$194,284.68**
4.20	LRP 20	Thurgoona South Parkland	Acquisition of land and development of southern most parkland within study area, approx. 3.9ha's	ACC	Long	Land acquisition cost: $1,365,00.00 Construction: $282,196.20 Total: **$1,647,196.20**
4.21	LRP 21	Table Top Road Central Parkland	Acquisition of land and development of parkland, approx. 0.9ha's located within Education Precinct (Infrastructure SP2)	ACC	Short /medium	Land acquisition cost: nil Construction: $65,122.20 Total:**$65,122.20**
4.22	LRP 22	Thurgoona South East Parkland	Acquisition of land and development of parkland, approx. 5ha's, to the north of LRP 20	ACC	Medium /long	Land acquisition cost: 1,750000.00 Construction: $361,790 Total: **$2,111 790.00**
4.23 *Note 4: Multipurpose sports grounds calculated at a rate of $760,000.00 per ha, all inclusive. Each sports ground to accommodate 2.55ha's fields and 1.45ha's basic landscaping ($72,358.00 per ha).*	Local Sports Ground (LSG) 1	Table Top Road North Sports Ground	Acquisition of land and construction of multipurpose sports grounds and sports pavilion, (site area approx. 4ha's) to the south of LRP 3, along Table Top Road.	ACC	Short	Land acquisition cost: $1,400,000.00 Construction: $1,938,000.00 +$104,919.10 Total: **$2,042,919.10**
4.24	LSG 2	Northern Sports Precinct	Acquisition of land and construction of multipurpose sports grounds and sports pavilion, (site area approx. 4ha's) to the west of Village Centre 2.	ACC	Medium	Land acquisition cost: $1,400,000.00 Construction: $1,938,000.00 +$104,919.10 Total: **$2,042,919.10**

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating agency	Timing Short: 0- 10 years Medium: 10-20 years Long: 20+ years	Indicative Cost Cost ($2012)
4.25	LSG 3	Major Neighbourhood Centre 3 Sports Grounds	Acquisition of land and construction of multipurpose sports grounds and sports pavilion, (site area approx. 4ha's) to the west of MNC 3.	ACC	Medium	Land acquisition cost: $1,400,000.00 Construction: $1,938,000.00 +$104,919.10 Total: **$2,042,919.10**
4.26	LSG 4	Knobles Road Sports Ground	Acquisition of land and construction of multipurpose sports grounds and sports pavilion, (site area approx. 4ha's) located to the South of Knobles Road.	ACC	Medium /long	Land acquisition cost: $1,400,000.00 Construction: $1,938,000.00 +$104,919.10 Total: **$2,042,919.10**
4.27	LSG 5	Elizabeth Mitchell Drive Sports Grounds	Acquisition of land and construction of multipurpose sports grounds and sports pavilion, (site area approx. 4ha's) located along Elizabeth Mitchell Drive	ACC	Short /medium	Land acquisition cost: $1,400,000.00 Construction: $1,938,000.00 + $104,919.10 Total: **$2,042,919.10**
4.28	District Sports Ground (DSG)	Thurgoona Drive District Sports Grounds	Acquisition of land and construction of multipurpose District Sports Grounds and sports pavilion, (site area approx. 15ha's) along northern boundary of Defence land. (5ha's sports facilities, 10 ha's basic landscaping. Potential for private sector investment opportunities, e.g. Aquatic Centre.	ACC	Medium / long	Land acquisition costs: $5,250 000.00 Construction: $3,800,000 + $720,358.00 Total: **$9,770 538.00**
4.29 (Note; 0.5 ha sites have been allowed for. Sizes may vary, subject to site specific conditions).	Informal Park (IP) IP1	Ettamogah Road South Informal Park	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Short	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.30	IP 2	Williams Road north precinct	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium/Long	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.31	IP 3	Table Top Road North	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium/long	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.32	IP 4	Corry's Road south	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Short/Medium	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.33	IP 5	Kywanna Road East	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium/long	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.34	IP 6	Kywanna Road South	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Long	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.35	IP 7	Riverina South	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.36	IP 8	Williams Road North West	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium/long	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 **Total: $211,179.00**
4.37	IP 9	Kywanna Road West	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.38	IP 10	Kerr Road East	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
4.39	IP 11	Table Top Road East	Acquisition of land and construction of informal park of approx. 0.5 hectares. Basic infrastructure only	ACC	Medium	Land acquisition costs: $ 175,000.00 + Construction : $36,175.00 Total: **$211,179.00**
5 - Community						
5.1 *Note 5: An overall construction cost of $2,500/m2 has been utilised for buildings and $300/m2 for landscaping.*	District Community Centre	Central District Community Centre	Acquisition of land and construction of multipurpose community centre, located within Major Neighbourhood Centre 3 precinct, (to be integrated with MNC 3 development).	ACC	Medium / long	Land acquisition costs: $175,000.00 Construction: $6,250,000.00 + $750,000.00 Total: **$7,175,000.00**

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating agency	Timing Short: 0- 10 years Medium: 10-20 years Long: 20+ years	Indicative Cost Cost ($2012)
5.2	Local Community Centre	Community Centre East	Acquisition of land and construction of multipurpose community centre, located within Village Centre 3 precinct.	ACC	Long	Land acquisition costs: $70,000.00 Construction: $2,000.000.00 + $360,000.00 Total: **$2,430,000.00**
5.3	Local Community Centre	Community Centre South	Acquisition of land and construction of multipurpose community centre, located within Major Neighbourhood Centre 2 precinct.	ACC	Medium	Land acquisition costs:$70,000.00 Construction: $2,000.000.00 + $360,000.00 Total: **$2,430,000.00**
5.4	Local Community Centre	Community Centre West	Acquisition of land and construction of multipurpose community centre, located within Village Centre 1 precinct.	ACC	Short	Land acquisition costs:$70,000.00 Construction: $2,000.000.00 + $360,000.00 Total: **$2,430,000.00**
6 - Education						
6.1 *Note 6: Provisional site areas of x1000m2 and land acquisition cost: $35.00/m2*	Early Learning Centres (ELC)					
6.2 *Note 7: An overall construction cost of $2,500/m2 has been utilised for buildings and $300/m2 for landscaping. Provisional GFA: 500m2*	ELC 1	Table Top Road ELC	Acquisition of land and construction of ELC co-located with Primary School 1.	ACC	Short	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
6.3	ELC 2	Central ELC	Acquisition of land and construction of ELC co-located with Primary School 2, within MNC3 precinct	ACC	Shot / medium	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
6.4	ELC 3	Thurgoona Drive ELC	Acquisition of land and construction of ELC co-located with Primary School 3, within Village Centre 3	ACC	Medium	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
6.5	ELC 4	Knobles Road ELC	Acquisition of land and construction of ELC co-located with Primary School 4.	ACC	Short / Medium	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
6.6	ELC 5	Kywanna Road ELC	Acquisition of land and construction of ELC co-located with Primary School 5 within Village Centre 2.	Private	Long	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
6.7	ELC 6	Ettamogah Road ELC	Acquisition of land and construction of ELC co-located with Primary School 6 within Village Centre 1.	Private	Medium	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
6.8	ELC 7	Southern ELC	Acquisition of land and construction of ELC south of MNC2.	Private	Medium	Land acquisition costs: $35,000.00 Construction: $1,250,000.00 + $150,000.00 Total: **$1,435,000.00**
7 - Primary Schools (PS)						
7.1 *Note 8: Primary school sites: 3Ha's. Costings are indicative only.*	PS1	Table Top Road Primary School	Development of primary school along Table Top Road, within Education Precinct.	Dept. Education	Short	Estimated total cost $10,000,000.00
7.2	PS2	Thurgoona North Primary School	Acquisition of land and development of a primary school	Dept. Education	Short / medium	Estimated total cost $12,000,000.00
7.3	PS3	Wirlinga Primary School	Acquisition of land and development of a primary school	Dept. Education	Medium/ long	Estimated total cost $12,000,000.00
7.4	PS4	Knobles Road Primary School	Acquisition of land and development of a primary school	Dept. Education	Medium	Estimated total cost $12,000,000.00
7.5	PS5	Kywanna Road Primary School	Acquisition of land and development of a primary school	Dept. Education	Medium / long	Estimated total cost $12,000,000.00
7.6	PS6	Ettamogah Road Primary School	Development of a primary school within Education Precinct.	Dept. Education	Short	Estimated total cost $10,000,000.00
8 - High Schools (HS)						
8.1 *Note 9: High School sites: 6ha's, costings are indicative only.*	HS1	Table Top Road High School	Development of a high school within Education Precinct	Dept. Education	Short	Estimated total cost $14,000,000.00
8.2	HS2	Knobles Road High School	Acquisition of land and development of a high school along Knobles Road, south of Defence land.	Dept. Education	Medium	Estimated total cost $15,000,000.00
8.3	HS3	Village Centre 3 (VC3) High School	Acquisition of land and development of a high school adjacent to VC3.	Dept. Education	Long	Estimated total cost $15,000,000. 00

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating agency	Timing Short: 0- 10 years Medium: 10-20 years Long: 20+ years	Indicative Cost Cost ($2012)
9 - Utility Infrastructure						
9.1 *Note: The devices have been located to treat run-off from proposed urban areas – Costs estimated assuming filter area is 1% of the urban catchment to be treated, with costs according to Taylor (2005)*	1 – MNC 3	Bio-retention/ detention	Catchment area 808ha Approximate structure footprint 48,000m^2	Council (s 94)	L	$1, 966,000 – costed as wetland
9.2	2 – MNC 1	Bio-retention/ detention	Catchment area 5600ha	Council (s 94)	S	Preliminary cost estimate would need to be assessed after the form of the feature is defined and a feasibility study carried out
9.3	SW1	Bio-retention/ detention	Catchment area 16ha Approximate structure footprint 3,300m^2	Private	M	$114,000
9.4	SW2	Bio-retention/ detention	Catchment area 109ha Approximate structure footprint 21,900m^2	Private	M	$487,000
9.5	SW3	Bio-retention/ detention	Catchment area 13ha Approximate structure footprint 2,500m^2	Private	S	$92,000
9.6	SW4	Bio-retention/ detention	Catchment area 38ha Approximate structure footprint 7,700m^2	Private	S	$218,000
9.7	SW5	Bio-retention/ detention	Catchment area 25ha Approximate structure footprint 4,900m^2	Private	S	$155,000
9.8	SW6	Bio-retention/ detention	Catchment area 26ha Approximate structure footprint 5,200m^2	Private	S	$161,000
9.9	SW7	Bio-retention/ detention	Catchment area 28ha Approximate structure footprint 5,500m^2	Private	S	$169,000
9.10	SW8	Bio-retention/ detention	Catchment area 78ha Approximate structure footprint 15,500m^2	Private	S	$374,000
9.11	SW9	Bio-retention	Catchment area 60ha Approximate structure footprint 12,000m^2	Private	S	$307,000
9.12	SW10	Bio-retention/ detention	Catchment area 39ha Approximate structure footprint 7,900m^2	Private	L	$222,000
9.13	SW11	Bio-retention/ detention	Catchment area 131ha Approximate structure footprint 26,200m^2	Private	L	$560,000
9.14	SW12	Bio-retention/ detention	Catchment area 67ha Approximate structure footprint 13,300m^2	Private	M	$333,000
9.15	SW13	Bio-retention/ detention	Catchment area 32ha Approximate structure footprint 6,300m^2	Private	S	$187,000
9.16	SW14	Bio-retention/ detention	Catchment area 11ha Approximate structure footprint 2,200m^2	Private	S	$83,000
9.17	SW15	Bio-retention	Catchment area 52ha Approximate structure footprint 10,500m^2	Private	M	$276,000
9.18	SW16	Bio-retention	Catchment area 110ha Approximate structure footprint 22,000m^2	Private	L	$488,000
9.19	SW17	Bio-retention	Catchment area 285ha Approximate structure footprint 57,000m^2	Private	M	$1,015,000
9.20	SW18	Bio-retention/ detention	Catchment area 65ha Approximate structure footprint 12,900m^2	Private	M	$325,000
9.21	SW19	Bio-retention/ detention	Catchment area 37ha Approximate structure footprint 7,400m^2	Private	M	$212,000
9.22	SW20	Bio-retention/ detention	Catchment area 29ha Approximate structure footprint 5,900m^2	Private	S	$178,000
9.23	SW21	Bio-retention/ detention	Catchment area 18ha Approximate structure footprint 3,700m^2	Private	S	$123,000
9.24	SW22	Bio-retention/ detention	Catchment area 14ha Approximate structure footprint 2,800m^2	Private	S	$101,000
9.25	SW23	Bio-retention	Catchment area 37ha Approximate structure footprint 7,400m^2	Private	S	$212,000
9.26	SW24	Bio-retention/ detention	Catchment area 77ha Approximate structure footprint 15,400m^2	Private	M	$374,000
9.27 Regional Sewer Pump Station	Sewer	Off Kerr Rd	Regional SPS to serve land East of Kerr Rd	AlburyCity	2011- 2015	Included in existing DSP (costs are comparable to RPS independent assessment)
9.28 375mm Sewer Carrier Main	Sewer	Kerr Rd	Sewer carrier main connecting to Kerr Rd SPS and providing a point of connection to the land East of Kerr Rd.	AlburyCity	2011- 2015	$2,800,000
9.29 300mm Water Trunk Main	Water	Kerr Rd	Water trunk main delivering bulk water to development East of Kerr Rd.	AlburyCity	2020 - 2025	$610,000
9.30 300mm Water Trunk Main	Water	South of Riverina Hwy	Water trunk main delivering bulk water to development South of the Riverina Highway	AlburyCity	2015 - 2020	$260,000
10 - Biodiversity						
10.1		Ecology Study	Inventory native and exotic flora, identify vegetation communities and EECs, targeted Threatened woodland bird surveys, inspection of future corridors and linkages for possible revegetation works	Biodiversity Strategy	Spring (Oct) 2013	$15-25, 000.00
10.2		Revegetation/ Rehabilitation Plan	Detail corridors and linkages to be revegetated, including detailed revegetation methodologies (eg. direct seeding, tubestock propagation and out-planting, brush mulching); weed control, feral animal control, fencing and access.	Biodiversity Strategy	To be prepared following Ecology Study 2013	$ 25, 000.00

12.6 Staging

The suggested stages nominated on Figure 33 have been generated from the staging plan prepared by Albury City Council for the establishing residential areas

The development of the Study Area will also occur in stages with the sequential arrangement nominated in Figure 33 based on the following factors:

- Proximity to existing development.
- Availability and sequential delivery of infrastructure.
- Current activity of ownership to mobilise development.
- Staggering of centres and schools to develop once populations reach thresholds to support the centres.

Figure 33 indicates likely commencement dates for development (and not completion dates).

E3 corridors have not been allocated into any stages at present as it would be ideal if these were dedicated to either Council or Crown lands earlier to get them planted out and gain momentum on achieving biodiversity goals.

The population projections reveal that at current development growth rates it is likely that Thurgoona Wirlinga will not reach capacity for approximately 50 years. In rough terms this means population growth of approximately 1000 persons per year and 400 dwellings.

STAGE	RELEASE / COMMENCEMENT
A	2011 - 2015
B	2015 - 2020
C	2020 - 2025
D	2025 - 2030
E	2030 - 2035
F	2035 - 2040
G	2040 - 2045
H	Unspecified - Not Infrastructure Dependant

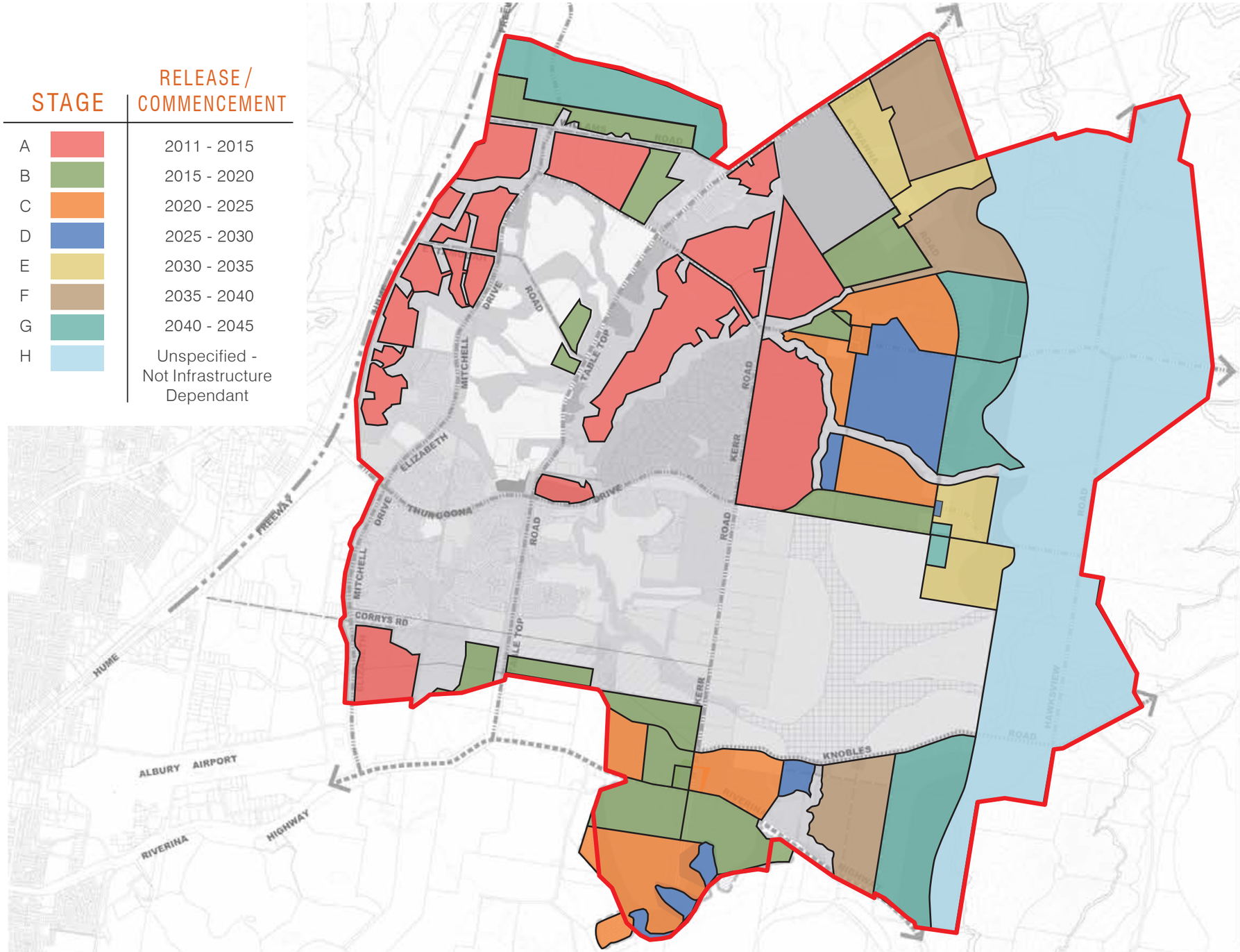


Figure 33: Staging Plan (Indicative Only)

Conclusion

The Thurgoona Wirlinga Precinct Structure Plan (TWPSP) gives direction to the future development of the large 2000 plus hectares of Study Area land as well as integrating this future development with the additional developed and non developed areas within the overall Study Area.

The TWPSP considers future population growth within this area and ensures that appropriate infrastructure utilities, public amenities, retail opportunities etc. are all accommodated in a staged approach, that ensures high quality urban performance and liveability.

A wide range of residential typologies have been accommodated, from the medium density terraces, townhouses and units within Major Neighbourhood Centres and Village Centres, to the large lot Interface Residential, that includes lots from 2500m2 to minimum 1hectare. This diversity in residential product ensures both efficient land use close to public transport, retail and work opportunities etc. and also protects the unique hillscape and character of this area, as it interfaces with Rural Residential lots and Rural land.

The TWPSP, is intended to be minimalist and flexible, to allow for change over time and changing conditions, while protecting the natural assets and character of the region. At its core is the focus on guiding the delivery of and integrated framework of key public infrastructure in a manner that promotes optimal ‘place making’ opportunities and ultimately facilitates the development of a contemporary regional Australian city that respects its past, while ensuring opportunities for tomorrow’s communities.

RPS

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