Schedule 2

Leppington Major Centre

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1 Introduction

1.1 Name and application of this Schedule

This Schedule forms part of the Liverpool Growth Centre Precincts Development Control Plan (also referred to as the DCP).

This Schedule applies to all development on the land within the Leppington Major Centre Boundary on **Figure 1-11-1**. This schedule and related amendments to the DCP give effect to the provisions of the DCP for land within the Leppington Major Centre as shown on the Land Application Map.

Notes:

The Leppington Major Centre is within the Leppington North Precinct. The Leppington North Precinct, and the Leppington Major Centre, is partly within Camden Local Government Area and partly within Liverpool Local Government Area. Separate DCPs apply for each Local Government Area.

Schedule 1 – Austral and Leppington North Precincts, provides specific controls for development within those Precincts, including lands that are within Leppington Major Centre. Applicants proposing development in the Leppington Major Centre should also refer to Schedule 1 to identify any controls in that Schedule which are also relevant to the proposed development.

1.2 Structure of this Schedule

This Schedule should be read in conjunction with the main body of the DCP, and Schedule 1, and is in addition to those parts of the DCP. In the event of an inconsistency between this Schedule and the main body of this DCP, this Schedule takes precedence. **Table 1-1** summarises the structure of this Schedule.

Table 1-1: Structure of this Schedule

Part	Summary
1 – Introduction	Identifies the land to which the Schedule applies.
2 – Town Centre vision and planning principles	Establishes an overall vision and planning principles to guide the ongoing development of the Leppington Major Centre.
3 – Town Centre Structure	Includes the Indicative layout Plan which shows the proposed future layout of the Major Centre. Establishes a hierarchy of streets within the Major Centre, and the function of each street type. Identifies key access routes for vehicles (cars and delivery vehicles), pedestrians, cyclists and public transport.
4 – Public Domain Controls	Provides specific objectives and controls that apply to the public areas of the Leppington Major Centre, including streets and laneways, plazas, squares and public open space.
5 – Building Controls	Controls to achieve a built form that is consistent with the town centre vision and planning principles. Controls relate to building heights, bulk and scale, and the positioning of buildings on the site, including setbacks, façade design, and energy efficiency.

Additional notes to readers are provided throughout this document. These notes are not part of the formal provisions of the DCP, but are intended to provide additional guidance and explanation of the provisions. If further guidance is required on the interpretation of provisions in the DCP, readers should refer to the definitions or contact Council for advice.

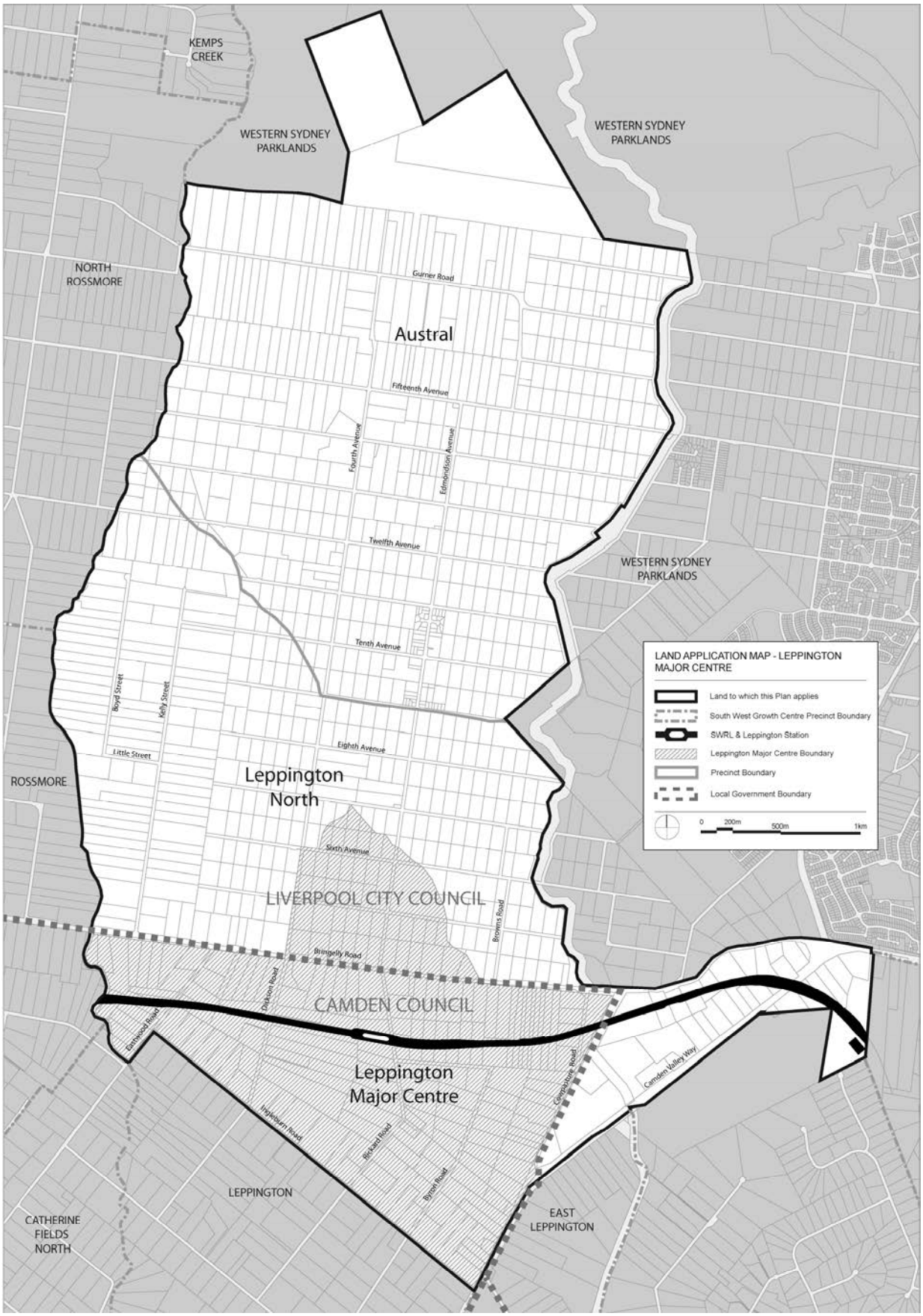


Figure 1-1: Land Application Map

2 Leppington Major Centre Vision and Planning Principles

2.1 Leppington Major Centre vision

Leppington Major Centre will be the primary focus for employment, retailing, entertainment and community services in the South West Growth Centre. It will grow progressively to become a Major Centre, consistent with the centre typology established by the Metropolitan Plan for Sydney 2036. The centre will be a destination for all residents in the South West Growth Centre, providing higher order services and facilities in addition to those found in local centres and neighbourhood centres.

Leppington Major Centre will be focused on the Leppington train station and an attractive public domain comprising a network of active streets, parks and plazas. Development will activate and enliven the public domain by encouraging the use of outdoor spaces for movement, recreation and socialisation.

The train station will provide both access to the centre, reinforcing its role as a regional employment hub, and from the South West Growth Centre to the rest of Metropolitan Sydney. An integrated road network, which builds on the existing roads and respects historic road alignments, will provide access for buses, cars, pedestrians and cyclists to the Major Centre.

Within the centre, the road network will create public spaces that are attractive to pedestrians and cyclists, while other roads will ensure good access to the centre for vehicles. Rickard Road will be the main transit boulevard: the key public transport, pedestrian and cyclist route to and from the centre and Leppington Station. The Main Street will be the focus of activity within the retail core and linking to the civic precinct north of the station. The Main Street will be activated by a high quality public domain and by development providing an active frontage to the street. The town centre streets will extend the network of active, pedestrian friendly streets throughout the centre. Perimeter roads (Eastwood Road, Dickson Road, Ingleburn Road, Byron Road, Camden Valley Way, Bringelly Road and Cowpasture Road) are the main vehicular access routes to and from the centre. Other internal roads and service lanes will provide efficient routes into the centre for cars, deliveries and service vehicles.

The layout of the centre capitalises on the natural features of the site. Public open space takes advantage of Scalabrini Creek and Bonds Creek, which form natural edges to the main commercial areas. The creek lines will serve an important role in drainage and water quality management, and also provide attractive green spaces for recreation and linkages through the centre and to surrounding residential areas. Landscaped streets will link the green spaces at the edges to the core of the centre, and water sensitive urban design measures will be integrated with street design to emphasise connections to the creeks.

A number of plazas, squares and parks will provide places for people to meet and play, and for the community to gather in the centre.

The centre will contain a mix of land uses to encourage vibrancy and to create a wide range of employment opportunities. The major land uses are clustered in sectors around Leppington Station:

- A retail core south of Leppington Station, with opportunities for mixed use development at the fringes integrating with the Scalabrini Creek parkland corridor.
- A civic precinct north of Leppington Station with education, cultural, recreation and human services for residents of the Growth Centre, in a vibrant mixed use area that connects Bringelly Road, the train station, Rickard Road and Scalabrini Creek.
- East of Rickard Road, a business park will create significant employment opportunities with commercial offices potentially associated with related uses such as warehousing or other low impact industries. The business park will be a major regional employment destination for the South West Sub-region.
- Bulky goods retailing and other related retail activities will take advantage of the high visibility of major roads including Bringelly Road and Cowpasture Road.
- Medium density residential development will be located within a number of pockets around the centre, within a 10 minute walk of Leppington Station.
- A light industrial precinct west of Dickson Road will provide significant employment opportunities and contain low impact industrial activities that meet the needs of the surrounding residential population.

The masterplan caters for long term growth, and because the major centre will develop over many years, planning controls are intentionally flexible to enable development to respond to dynamic market influences. The structural elements of the masterplan (the road network, open space network and general arrangement of land uses) are critical to creating a cohesive, functional and attractive centre. This DCP focuses on ensuring that development in the centre, at all stages of its growth, is consistent with the ultimate structure and function of the Leppington Major Centre.

2.2 Planning Principles

Note: *Part 5 of the DCP contains principles for town centres generally, which also apply to the Leppington Major Centre. The principles that follow should be read in conjunction with the principles in Part 5.*

2.2.1 Land use

1. A wide range of commercial, retail, community services, educational, light industrial, entertainment and recreational opportunities are available in Leppington Major Centre.
2. Opportunities for residential development exist within medium density residential areas and mixed use areas within or near the centre and within walking distance of Leppington Station.
3. Related land uses take advantage of opportunities to locate near each other to maximise access to services and the efficient provision and use of ancillary functions such as car parking.
4. The mix of land uses within the centre creates high levels of activity, and a vibrant, attractive centre.
5. The scale, intensity and function of land uses reinforces Leppington's role as a Major Centre and draws people to the centre from across the South West Growth Centre.
6. Land uses take advantage of public transport provision and the major road network, both of which make Leppington a preferred location for major employment generating land uses.
7. Development responds to existing patterns of subdivision and land ownership to make efficient use of land as the centre progressively develops.
8. Development will increase in intensity and scale, and a number of major stages in growth of the centre will occur over a period of 20-30 years.
9. At each stage in the development of the major centre, land uses and the form of development will be consistent with the vision for the major centre.

2.2.2 Transport and access

1. A hierarchy of streets creates clearly legible routes for pedestrians, cyclists, public transport, cars and service vehicles to access and circulate within the centre.
2. The function of each street type is clearly defined, including the relative priority that is given to different modes of transport for each street type.
3. Streets are designed and constructed to minimum standards that will facilitate the establishment of a high quality streetscape and provide sufficient capacity for pedestrians, cyclists and vehicles to move throughout the centre.
4. Streets are safe, attractive and interesting elements of the public domain.
5. The South West Rail Link is a key transport connection to Metropolitan Sydney from the South West Growth Centre, and an important connection to Leppington Major Centre, particularly for workers in

the centre. Access to and from Leppington Station, particularly for pedestrians, cyclists and buses is a critical element of the town centre road network.

6. All streets within the centre are characterised by low traffic speeds, with an emphasis on pedestrian amenity and safety.

7. Rickard Road is the main focus of activity within the centre, and is a low speed traffic environment that gives priority to buses, pedestrians and cyclists. It is the primary access route to the transport interchange and Leppington Station.

8. The Main Street is the focus of activity in the retail core of the centre. Retail, commercial and residential development activate the street, along with pedestrians, cyclists, cars and buses.

9. Bringelly Road, Ingleburn Road, Dickson Road and Byron Road are the primary access routes to the centre for cars and service vehicles.

10. Eastwood Road and Cowpasture Road support the primary access routes providing secondary access to the peripheral areas of the town centre from surrounding areas.

11. Town Centre Streets are active and pedestrian friendly, and have capacity for buses to circulate within the centre. They provide important vehicle access routes into the retail and commercial developments. Subject to demand, Town Centre Streets may have active ground floor frontages.

12. Service Lanes provide direct vehicle access to internal car parks and loading bays. They also cater for pedestrian though site links, but do not necessarily support active frontages.

13. Pedestrian Through-Site Links are pedestrian only connections at mid-block locations, to improve pedestrian permeability within the centre, and to connect and activate squares and plazas.

2.2.3 Public domain

1. The public domain comprises a network of streets, plazas, and public open space that are accessible at all times of the day, connect places within the centre and provide a consistent, high quality character and amenity that defines the Leppington Major Centre.

2. Elements of the public domain may be constructed by Council or other parties but are designed and constructed to consistent standards to unify development across the town centre.

3. Landscaping of streets, parks and plazas enhances the quality of the public domain, provides protection from the sun, and links the natural features of the town centre with the urban areas.

4. Materials and finishes are consistent for elements such as paving, street furniture, lighting, and elements that link the public and private domains such as building facades and awnings.

5. The design of streets reinforces their role in the road hierarchy and provides a safe, attractive and legible network for cars, pedestrians, cyclists and public transport.

6. Green links along Scalabrini Creek and Bonds Creek create an interface between the urban, built up parts of the centre and the natural features which contribute positively to the identity of the centre.

7. Landscaped streets connect green spaces with the urban plazas and squares that provide a focus for activity within the built up parts of the centre.

8. The orientation of streets takes advantage of and emphasises views to local features particularly Scalabrini Creek and Bonds Creek.

9. Streets and pedestrian through site links terminate at or link public parks, plazas and squares.

10. Plazas or squares are integrated with adjoining buildings and create opportunities for people to congregate within the centre.

11. Elements of water cycle management are integrated with the street network and public spaces to capitalise on the contribution of water to the amenity and character of the centre.

12. The design of the public domain achieves energy efficiency.

2.2.4 Built form

1. The design, orientation, size and bulk of buildings compliment the public domain.

2. Building heights emphasise the natural features of the Major Centre, including ridgelines and creek corridors.

3. The location and orientation of buildings takes advantage of and emphasises views to local and more distant features, including views to Scalabrini Creek, Bonds Creek and more distant views to the Blue Mountains.

4. The built form contributes to a legible town centre by highlighting key destinations and creating landmarks.

5. Building orientation, building heights and the design of building facades enhance safety and amenity in the public domain, including streets, parks, plazas and the creek corridors.

6. Taller buildings are clustered along Rickard Road and near Leppington Station.

7. The bulk of taller buildings is minimised by a fine grained road network and by limiting the floorplate of taller building elements.

8. Mid-block pedestrian or vehicle links are encouraged to improve pedestrian circulation and to reduce the horizontal bulk of buildings.

9. Along Rickard Road, the Main Street and Town Centre Streets, and fronting public squares and plazas, buildings are built to the front property boundary to define the public domain and assist the transition between private and public areas.

10. Ancillary activities such as parking, loading and service areas are visually screened from the public domain, are orientated towards and gain access from, Town Centre Streets or Service Lanes.

11. Buildings are orientated to take advantage of solar access and provide protection from prevailing winds both for building occupants and in the public domain.

12. The design and construction of buildings maximises energy efficiency, minimises water use and maximises water re-use, and considers the embodied energy of materials used in construction.

13. Development in the vicinity of listed heritage items respects and responds to the heritage significance of those items.

3 Town Centre Structure

3.1 Indicative Layout Plan

Objectives

a. To enable development to occur within Leppington Major Centre in accordance with the Indicative Layout Plan.

Controls

1. Development within the Leppington Major Centre is to be generally in accordance with the Indicative Layout Plan at **Figure 3-13-1**.

3.2 Public Domain

Objectives

a. To establish a structure for the public domain that connects and integrates development within the Leppington Major Centre.

b. To ensure that elements of the public domain are designed and constructed to appropriate standards, and that satisfactory arrangements are in place for the ongoing management and maintenance of the public domain either by Council or land owners.

Controls

1. Elements of the public domain include:
    - Streets
    - Pedestrian through-site links
    - Public parks and drainage land
    - Plazas
2. Public domain elements are to be located as shown on the Indicative Layout Plan.
3. Elements of the public domain that are zoned RE1 Public Recreation or SP2 Infrastructure can be delivered by Council, or may be constructed in accordance with this DCP by another party and dedicated to Council, subject to the agreement of Council.
4. Elements of the public domain that are zoned for purposes other than those listed in Control 3 above are the responsibility of the applicant, and details of the proposed design, construction and operational management of public domain elements are to be included in Development Applications.

Note: *Council may accept dedication of public domain elements such as plazas and squares subject to certain conditions. However, Council may require that these elements remain in private ownership and are maintained and managed by the land owner to appropriate standards. Applicants are encouraged to*

incorporate these elements of the public domain in development proposals in the Leppington Major Centre, and these proposals should be discussed with Council prior to submission of an Application.

5. Access is to be available to the public domain at all times of the day and night.

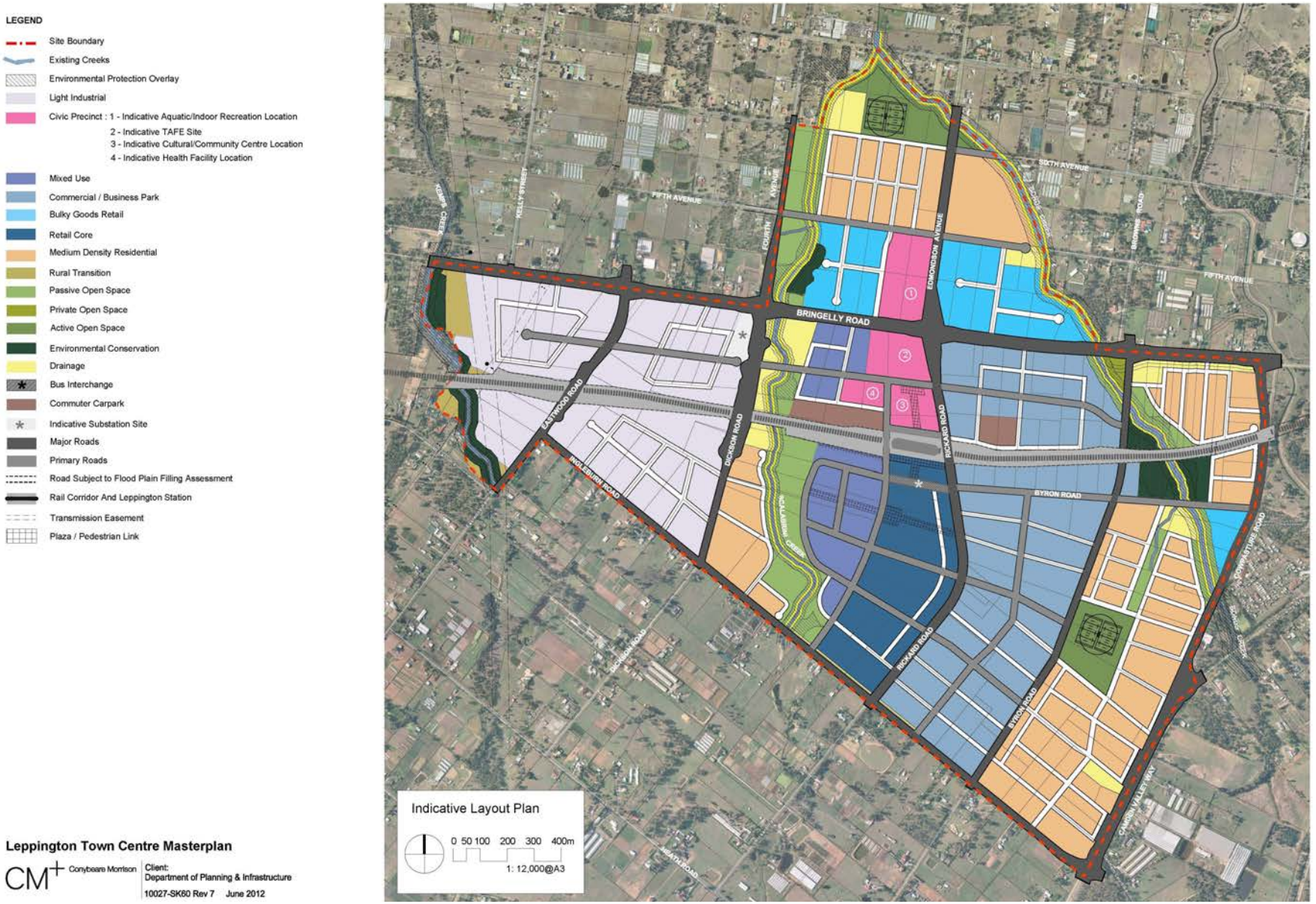


Figure 3-1: Indicative Layout Plan

3.3 Road hierarchy and circulation

Objectives

a. To ensure that the development of the Leppington Major Centre is based on a coordinated, integrated hierarchy of streets that connects places within the centre and to the road network beyond the centre;

b. To encourage walking, cycling and public transport as the dominant transport modes within the centre, while recognising the importance of private vehicles and service vehicles to the viability and functionality of the centre;

c. To ensure that the function of streets provides for all modes of transport, and that conflicts between pedestrians, cyclists, buses, cars and service vehicles are minimised;

Controls

1. The locations of streets are to be as shown on the Indicative Layout Plan.

2. The hierarchy of streets within the centre is shown on **Figure 3-23-2**. Streets are to be designed and constructed in accordance with this hierarchy and with **clause 4.1** of this Schedule.

Note: *typical cross sections for sub-arterial roads, local residential streets and residential collector roads are specified in clause 3.2.3 of the main body of this DCP. Streets of these types as shown on* ***Figure 3-23-2*** *are required to be designed in accordance with those requirements where they are within land zoned primarily for residential purposes, or are roads that are identified as sub-arterial roads.*

3. Modifications to the street network will be considered by Council only where the proposed street network:

    - Achieves the same outcomes in terms of traffic circulation;
    - Maintains the hierarchy of streets within the centre and opportunities for active street frontages to be created on the Main Street and Town Centre Streets;
    - Enables efficient and safe pedestrian and cyclist movement around the town centre;
    - Provides efficient access for cars to car parks and service vehicles to loading docks;
    - Is consistent with requirements for bus access in and around the centre and to the Leppington Transport Interchange;
    - Enables appropriate management of stormwater including connections to trunk stormwater basins shown on the Indicative Layout Plan;
    - Does not unreasonably impact on the ability of adjoining land owners to develop their land in accordance with the Indicative Layout Plan;
    - Is consistent with the Planning Principles in **clause 2.2** of this Schedule.

4. Additional mid-block streets (eg. Service Lanes) or Pedestrian Through-Site Links may be proposed where the additional street or link:

- Improves pedestrian movement or the circulation of traffic within the centre;
- Improves access to development for loading and service vehicles or for access to internal car parks;
- Integrates with the modified grid network of streets in the centre as shown on the Indicative Layout Plan;
- Meets relevant road safety requirements for intersection locations and road geometry;
- Is publicly accessible at all times;
- Does not significantly reduce the amount of pedestrian and vehicular activity on the Main Street or Town Centre Streets so as to jeopardise the creation of vibrant and active public spaces and the viability of businesses;
- Is constructed to withstand vehicular traffic for emergency and event access.

5. Traffic management measures are to be utilised within and surrounding the Major Centre to produce a low speed pedestrian friendly traffic environment, particularly on the Main Street and Town Centre Streets. Traffic management devices are to be identified at the time of DA submission.

6. Principles of CPTED (Crime Prevention through Environmental Design) are to be incorporated in the design of the street network.

7. Pedestrian and cycle links are to be provided along the streets in the major centre and in other areas of the public domain, as shown on **Figure 3-33-3**.

8. Streets and pathway networks are to be designed to ensure that walking and cycling take priority over traffic circulation.

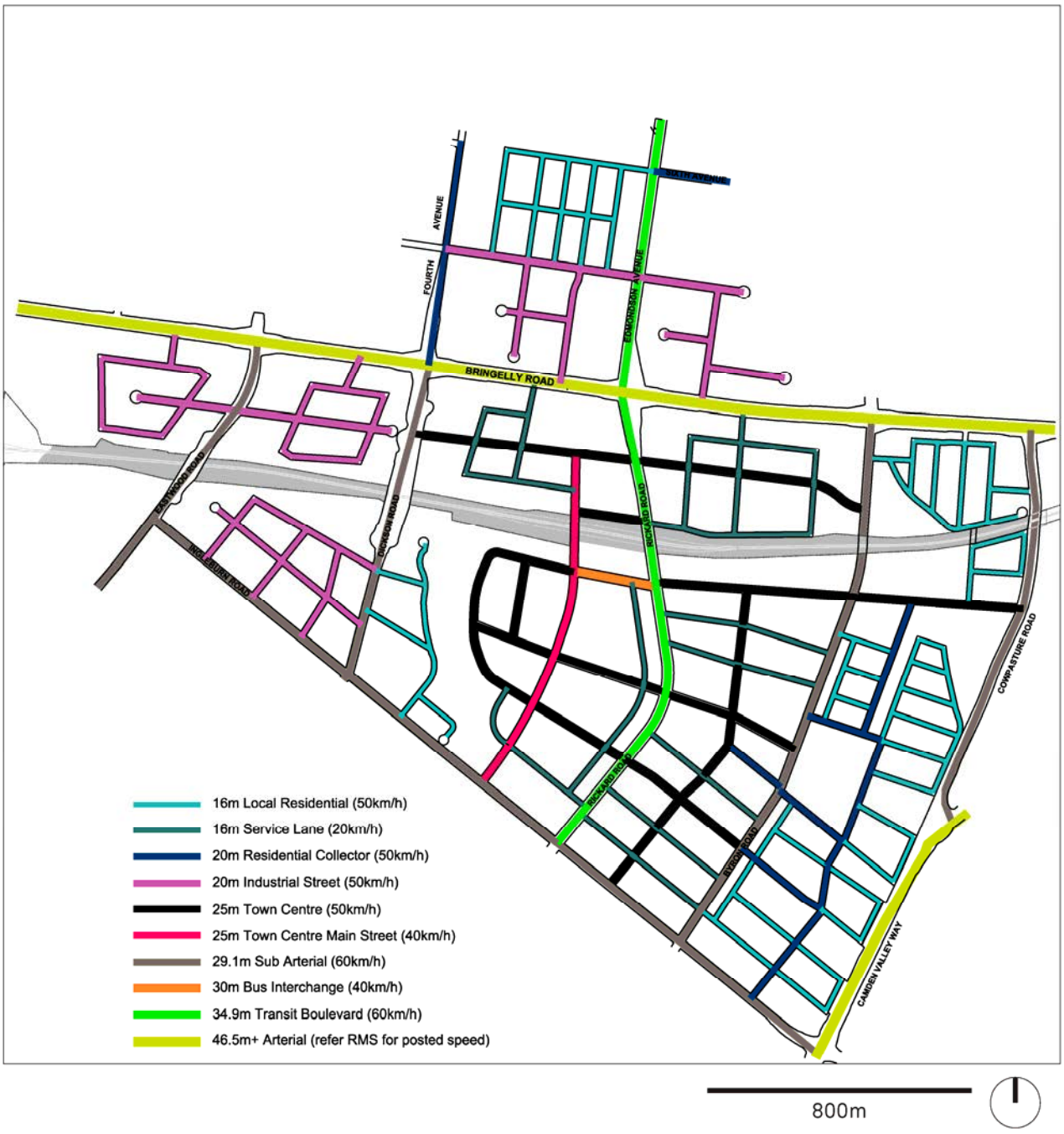


Figure 3-2: Leppington Major Centre road hierarchy

Note: *The speeds specified in the figure above are indicative design speeds. Posted speeds will not exceed these speeds and in some cases may be lower to achieve safety and amenity objectives for the Leppington Major Centre.*

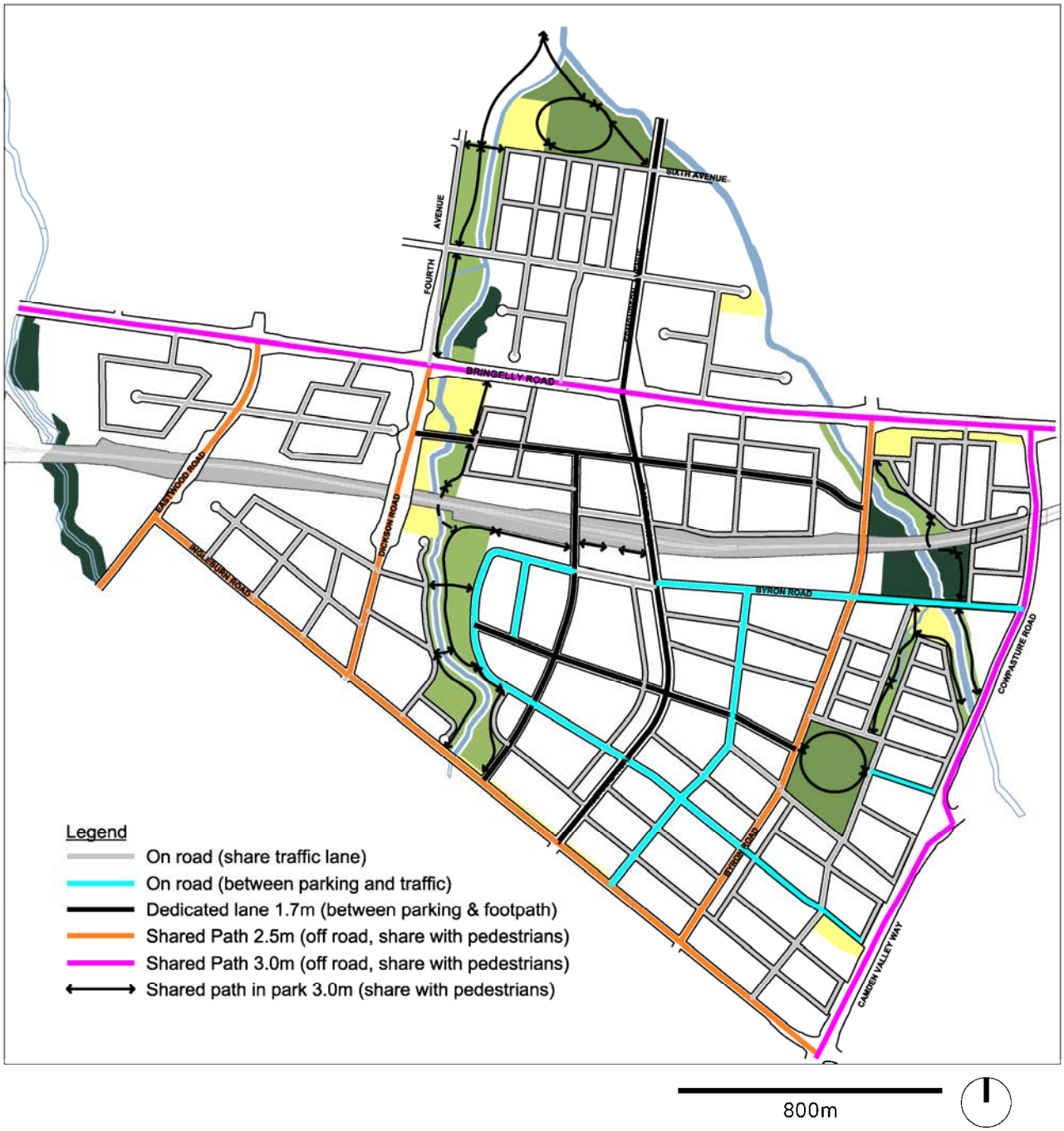


Figure 3-3: Pedestrian and cycle routes

4 Public Domain Controls

4.1 Materials

Objectives

a. To ensure that, as the Major Centre develops, consistent materials and finishes are used throughout the public domain.

b. For the public domain within the Major Centre to unify the character and amenity of the centre.

c. To ensure that materials are durable, easy to maintain and attractive.

Controls

1. Leppington Major Centre will have a unified and integrated character through consistent materials, details, finishes and treatments.

2. Materials used in the public domain are to be consistent with **Table 4-1** and demonstrate implementation of the materials selection principles below.

3. Criteria for the selection and use of materials, elements and finishes within the public domain of the Major Centre are:

    - design – items are to be functional and meet the needs of the Major Centre;
    - aesthetics – items are to relate to the scale, style and character of the Major Centre;
    - availability and ongoing supply – selection of items such as furniture and pavements e.g. should have a long term view of availability and supply for replacement parts and servicing;
    - cost – items are to be affordable and within the means of ongoing the Major Centre public domain managers;
    - maintenance – items must be easily maintained and not have onerous demanding ongoing maintenance requirements
    - life span / longevity – items selected should be looking at as long a lifespan as feasible to ensure the Major Centre public domain managers are not incurred with expensive recurrent replacement costs;
    - workability – items should be chosen for their simplicity;
    - sustainability – ESD principles of each item selected should be reviewed prior to final selection;
    - accessibility – all items must conform to the *Australian Disability Discrimination Act 1992* and relevant Australian Standards;
    - vandal resistance – all items must be implemented with view to reducing vandalism and a suitable repair programme in place;

- safety - items must conform to relevant codes and Australian Standards.
- Engineering Standards - items must comply with Council's Engineering Specifications

Table 4-1: Materials guidelines for the public domain

Item	Element	Guideline
Concrete Insitu	Joints	Expansion and control joints to align with building and alternative path edges where possible. Trip stops or equivalent to be used near trees - refer to Council's Engineering Specifications.
	Base Course	Compaction and material to be determined by consent authority - refer to Council's Engineering Specifications.
	Finish	Streets Even textured slip resistant surface to finish level Class B. Perpendicular Broom Finish with steel trowel margins
	Colour	Main path colour to be standard grey concrete. Feature concrete areas to be determined by consent authority. Dark tones can be used to create contrast with the main concrete colour, but limit area of coverage to reduce heat absorption.
	Hazard and Directional Tactile Indicators	Stainless Steel studs or product determined by consent authority. Provide 45% luminance contrast in accordance with (AS1428.4)
	Testing/Slip Resistance	Slip resistance test results required on sample installation.
	Maintenance/Cleaning	High pressure hosing / street sweeper. Maintenance program to be determined by consent authority.
Unit Pavers	Unit Size	To be determined by consent authority. Typically 400x400mm in stretcher bond pattern
	Base Course	Concrete slab support base approved by consent authority - refer to Council's Engineering Specifications. Pavers mortared onto concrete base
	Joints/Sealants	Expansion and control joints to align with building and alternative path edges where possible. To be determined by consent authority (Australian Standards) Pavers to be sealed in accordance with consent authority (AS)
	Finish	Streets/Pathways: semi-honed.
	Colour	To be determined by consent authority. Mid-tones are preferred to reduce glare and minimise heat absorption.
	Hazard and Directional Tactile Indicators	Stainless Steel studs or product determined by consent authority. Provide 45% luminance contrast in accordance with (AS1428.4)
	Testing/Slip Resistance	Slip resistant test results on loose tile samples with sealer and a sample installation.
	Maintenance/Cleaning	Sealant applied in outdoor dining areas High pressure hosing / street sweeper cleaning.

Item	Element	Guideline
		Maintenance program to be determined by consent authority.
	Tree Pit Edging	Steel edging to be installed tree pit perimeter edges to contain pavers. Steel edging to be secured to support concrete slab subbase.
Lighting	Lighting Levels	Streets/Road Reserves: P1 - P5 Pathways (Including Cycleways): P1 - P4 Public Activity Areas and Open Space (Excluding Car Parks): P6-P8 Connecting Elements (Steps, Stairways, Ramps, Footbridges, Pedestrian ways): P9-P10 Outdoor Carparks: P11 - P12
	Poles	Unpainted Proprietary Banner mounting system for Main Street Height of luminaires mounting determined by lighting engineer
	Luminaries	Luminaries to be consistent with lighting levels and Light spill requirements. To be determined by consent authority (AS)
	Light Spill	Lighting not to spill into residential areas. Lighting to focus on Street and Pedestrian pavements. To be determined by consent authority (AS)
	Catenary Lighting	Catenary lighting can be used in Town Square. To be determined by consent authority (AS)
Furniture	Bollards	Bollards to be used to control where maintenance vehicle access is required into pedestrian plaza areas Removable bollards required in emergency access and maintenance access areas. Bollards to be of consistent design.
	Barriers	Fence/Balustrade Structural Designated fencing to be provided along high level road medians and street edges to discourage pedestrian road crossing. Custom or proprietary fencing design to be determined by consent authority. Planting Designated hedge planting installed at medium level road edges and road medians to discourage pedestrian road crossing.
	Rubbish Bins	Rubbish Bins to be provided at pedestrian nodes, including crossing points. All rubbish bins to be of consistent design. Recycling Rubbish Bins to be provided in pedestrian gathering areas. Bin selection should consider bird/animal protection. Rubbish Bins and rubbish removal maintenance schedules to be determined by consent authority.
	Bench Seating/Feature Seating	Bench seating to be provided at regular intervals in the Town Centre Streets. Timber slat seating and backrest supports preferred. Custom bespoke seating can be considered in the Town Square.
	Bicycle Racks	Provide bicycle racks on hardstand areas only. Locate clear of pedestrian thoroughfares. Surface mounted, with tamper-proof fixings.
	Bicycle Rails	Locate in accordance with Austroads Part 14 – Bicycles. To be fabricated in accordance with Camden Council Standard Pathway Rails SD06.
	Drinking Fountains	Drinking fountains to be universally accessible. Locate clear of pedestrian thoroughfares.

Item	Element	Guideline
		Drinking fountain to be surface mounted.
	Shelters	Shelters and shade structures are to be: provided in open space areas and riparian corridors where sufficient immediate shade or weather protection is not available or where a sense of enclosure is considered desirable; provided over table and bench settings and table seats where weather protection is desirable; sited so that roof water is shed into garden areas; installed on hard wearing surface; surface mounted, with tamper-proof fixings; installed level, not at grade with pavement.
	Viewing Platforms	Boardwalks and Viewing Platforms maybe used to: provide access over spillways or viewing opportunities over water bodies; provide recreational or interpretational opportunities in riparian corridors or wetland areas; installed on hard wearing surface; surface mounted, with tamper-proof fixings; installed level, not at grade with adjacent surface.
	Tables	provided in association with benches in open space areas. installed on hard wearing surface. surface mounted, with anti-vandal fixings. installed level, not at grade with pavement.
	Handrails and balustrades	Handrails and balustrades to be in accordance with BCA and AS 1428.
Street Trees	Tree Guards	Tree Guards to be installed in major pedestrian gathering intersections. To be consistent design along street. To be determined by consent authority. Root guards to be installed.
	Tree Pits	Pit Covers Pit covers to be consistent along street and be flush with adjacent paving. To be determined by consent authority. Edging Steel edging required for trees in Unit Paving and Asphalt
Playgrounds	Playing Surface	High use areas (eg. District Playground) Rubber softfall to Australian Standards Low use areas (eg. Local Playground) Bark mulch to Australian Standards
	Playground Equipment	Refer Landcom Open Space Design Guidelines (2008), p25-26.
Exercise stations	Exercise Equipment	Exercise equipment to cater for a range of age groups. Provide proprietary items to Australian Standards installed to manufacturer's recommendations.
Tactile indicators	Pedestrian walkways	Provide tactile indicators on pedestrian crossing points as required by the consent authority. Consider other users impeded by tactile indicators such as wheelchairs and prams. Coordinate locations with pavement layout.

4.2 Landscaping

Objectives

a. To ensure that, as the Major Centre develops, species selection and landscape design adopt consistent themes.

b. For the public domain within the Major Centre to unify the character and amenity of the centre.

c. To ensure that species are appropriate to the environment of the Major Centre and contribute to the amenity and comfort of people in the Major Centre.

Controls

1. Leppington Major Centre will have a unified and integrated character through a consistency of species selection and landscaping design in the public domain.

2. Plant species are to be selected predominantly from the lists in the tables that follow, noting that recommended species are suitable for different parts of the public domain, including streets, plazas and squares and open space.

3. In Riparian Protection Areas (shown on the Riparian Protection Areas Map under the Growth Centres SEPP) plant selection should be locally indigenous and typical of species that naturally occur along watercourses on the Cumberland Plan. **Table 4-5** provides guidance on appropriate species.

4. Qualified Ecologists should also assist in any planting selection for rehabilitation, revegetation or restoration works within Riparian Protection Areas.

Table 4-2: Preferred tree species for streets, plazas and squares

Species Name	Common Name	Height	Width	Native
Acer palmatum 'Senkaki'	Coral Bark Maple	4m	3m	
Acer rubrum '	October Glory' Red Maple	9m	7m	
Acmena smithii 'Red Head'	Red Head Acmena	6m	2m	yes
Agonis flexuosa	Willow Myrtle	8m	4m	yes
Angophora costata Dwarf 'Darni'	Dwarf Angophora	4m	2m	yes
Bauhinia hookeri	Mountain Ebony	10m	5m	yes
Brachychiton populneus	Kurrajong	8m	5m	yes
Brachychiton rupestris	Bottle Tree	8m	5m	yes
Cercis canadensis 'Forest Pansy'	Canadian Redbud	2m	3m	
Cercis chinensis 'Avondale'	Chinese Redbud	12m	4m	

Species Name	Common Name	Height	Width	Native
Cercis occidentalis	Californian Redbud	5m	2m	
Cercis siliquastrum	Judas Tree	15m	5m	
Cereus grandiflorus	Night Blooming Cereus	5m	2m	
Ceretopetalum gummiferum	NSW Xmas Bush	6m	3m	yes
Cupaniopsis anarcardiodes	Tuckeroo	7m	3m	yes
Elaeocarpus reticulatus	Blue Berry Ash	8m	4m	yes
Eucalyptus: Dwarf grafted varieties only	Eg -'Summer Red', 'Orange Beauty', 'Wild Fire'	3m aprx		yes
Fraxinus griffithii	Evergreen Ash	6m	4m	
Fraxinus oxycarpia	Raywood varieties	10m	5m	
Ginko biloba 'Princeton Sentry’	Tall Narrow Ginko	10m	3m	
Gordonia axillaris	Poached Egg Camellia	7m	3m	
Hymenosporum flavum	Native Frangipani	7m	3m	yes
Jacaranda mimosifolia	Blue Haze Tree	15m	10m	
Jubaea chilensis	Chilean Wine Palm	8m	4m	
Species Name	Common Name	Height	Width	Native
Juniperus chinensis 'Keteleeri'	Corkscrew conifer	4m	3m	
Juniperus chinensis 'Spartan'	Spartan conifer	4m	2.5m	
Koelreuteria paniculata	Golden Rain Tree	5m	3m	
Lagerstroemia species	Crepe Myrtle	4m	3m	
Laurus nobilis	Bay Laurel	6m	3m	
Leptosperum species	tea tree species	3m	3m	yes
Lirodendron tulipefera fastigatum	Tulip tree	12m	5m	
Lophostemon confertus	Brisbane Brush Box	9m	6m	yes
Magnolia grandifolia 'Exmouth'	Magnolia 'Exmouth'	7m	3m	
Magnolia grandiflora 'Little Gem'	Magnolia ‘Little Gem’	4m	2m	
Magnolia grandifolia 'Kay Parris'	Dwarf Perfumed Magnolia	4m	2m	
Magnolia x soulangeana	Tulip Magnolia	7m	4m	
Magnolia soulangiana	Saucer Flower	6m	6m	

Species Name	Common Name	Height	Width	Native
Melaleuca styphelioides	Prickly Paperbark	6m	4m	yes
Melaleuca decora	White Cloud Tree	5m	2m	yes
Melaleuca linariifolia	Snow In Summer	6m	4m	yes
Nyssa sylvatica 'Autumn Cascade'	Weeping Blackgum	4m	3m	
Nyssa sylvatica	Black Tupelo	15m	6m	
Parrotia persica	Persian Witch Hazel	9m	3m	
Pistacia chinensis	Pistacia Nut Tree	13m	4m	
Prunus varieties	Flowering cherry s	4m	3m	
Malus varieties	Flowering apple	4m	3m	
Pyrus varieties	Flowering pear	6m	4m	
Pyrus calleryana 'Aristocrat'	Flowering Pear	6m	3m	
Pyrus calleryana 'Chanticleer'	Flowering Pear	9m	4m	
Species Name	Common Name	Height	Width	Native
Pyrus calleryana 'Bradford'	Bradford Pear	6m	3m	
Pyrus calleryana 'Edgedell'	Edgedell Pear	5m	3m	
Pyrus calleryana 'Glens Form'	Flowering Pear	8m	4m	
Pyrus calleryana 'Capital'	Flowering Pear	8m	4m	
Pyrus betulaefolia 'Southworth Dancer'	Flowering Pear	5m	4m	
Sapium sebiferum	Chinese Tallowwood	7m	3m	
Quercus palustris 'Pringreen'	Tall Narrow Oak	10m	3m	
Syzygium australe 'Pinnicle'	Narrow Syzygium	6m	2m	yes
Syzygium paniculatum	Brush Cherry	10m	4m	yes
Tristaniopsis laurina 'Luscious'	Water Gum	7m	3m	yes
Zelkova serrata	Zelkova	10m	4m	
Zelkova serrata 'Green Vase'	Wine Glass tree	10m	4m	
Zelkova serrata 'Mushashino'	Narrow Zelkova	8m	3m	

Table 4-3: Preferred tree species for parks and larger plazas

Species Name	Common Name	Height	Width	Native
Angophora costata	Sydney Red Gum	30m	10m	yes
Angophora floribunda	Rough Barked Apple	20m	6m	yes
Angophora subvelutina	Broad Leaf Apple	18m	6m	yes
Araucaria araucana	Monkey Puzzle Tree	35m	8m	yes
Araucaria bidwilli	Bunya Bunya Pine	40m	10m	yes
Araucaria cunninghamii	Hoop Pine	45m	6m	yes
Brachychiton acerifolis	Illawarra Flame Tree	30m	6m	yes
Brachychiton discolour	Lacebark Kurragong	30m	6m	yes
Caloedendron capense	Cape Chestnut	15m	8m	
Carya illinoinensis	Pecan	30m	10m	
Cedrus atlantica	Atlas Cedar	30m	8m	
Cedrus deodara	Deodar Cedar	30m	6m	
Cupressus funebris	Funeral Cypress	20m	5m	
Eucalyptus amplifolia	Cabbage Gum	30m	5m	yes
Eucalyptus bauerana	Blue Box	25m	4m	yes
Eucalyptus benthamii	Camden White Gum	35m	8m	yes
Eucalyptus crebra	Narrow Leaf Red Iron Bark	30m	8m	yes
Eucalyptus fibrosa	Broad Leaf Red Iron Bark	30m	8m	yes
Eucalyptus tereticornis	Forest Red Gum	40m	8m	yes
Eucalyptus viminalis	Manna Ribbon Gum	50m	8m	yes
Ficus macrophylla	Moreton Bay Fig	30m	8m	yes
Ficus rubiginosa	Port Jackson Fig	18m	6m	yes
Flindersia australis	Australian Teak	25m	5m	yes
Ginkgo biloba	Maidenhair Tree	30m	8m	
Jacaranda mimosifolia	Blue Haze Tree	15m	10m	
Liriodendron tulipifera	Tulip Tree	40m	8m	
Livistona australis	Cabbage Palm	20m	2m	yes

Species Name	Common Name	Height	Width	Native
Macadamia integrifolia	Macadamia Nut Tree	15m	5m	yes
Magnolia grandifolia	Bull Bay Tree	18m	8m	
Magnolia denudata	Yulan Tree	18m	8m	
Phoenix canariensis	Canary Island Date Palm	15m	5m	
Pinus pinea	Italian Stone Pine	25m	4m	
Podocarpus elatus	Illawarra Pine	25m	8m	yes
Quercus coccinea	Scarlet Oak	15m	3m	
Quercus palustris	Pin Oak	25m	5m	
Quercus robur	English Oak	30m	6m	
Schinus areira	Peppercorn Tree	17m	5m	
Syzygium luehmannii	Small Leaf Water Gum	20m	8m	yes
Ulmus parvifolia	Chinese Elm	12m	5m	
Zelkova serrata	Zelkova	12m	4m	
Washington robusta	Mexican Fan Palm	25m	3m	

Table 4-4: Preferred mid-storey and under-storey species

SHRUBS:	CLIMBERS:	GROUND COVERS & SUB SHRUBS:
Acmena varieties	Clematis aristate	Acacia cognate 'Mini Cog'
Banksia varieties	Gelsemium sempervirens	Anigozanthos "Bush Gems - varieties,eg Bush Haze, Bush Ranger
Bauhinia galpini	Jasminum spp.	Dianella caerulea
Brunfelsia - grandifolia/ maliformis/pauciflora varieties	Hardenbergia violacea	Dichondra repens
Callistemon varieties	Kennedia rubicunda	Convolvulus mauritanicus
Cordyline fruiticosa 'Kiwi'	Mandevilla spp	Goodenia hederacea
Crinum pedunculatum	Pandorea jasminoides	Hardenbergia violacea
Dodonaea	Trachelospermum jasminoides	Kniphofia "Maid of Orleans"
Doryanthes excelsa	**NATIVE HERBS:**	Melaleuca pentagona 'Little Penta'
Eucalyptus:dwarf grafted varieties.	Dianella spp	Myoparum spp
Gordonia axillaris	Eremophila debilis (syn. Myoporum debile)	Myoporum parvifolium
Grevillea varieties	Lomandra spp (eg Tanika or Nyalla)	Myoporum montanum
Erica varieties	Plectranthus parvifolius	Plectranthus parvifolius
Eremophila varieties	Pennisetum alopecureoides	Rhodanthe anthemoides
Ixora chinensis (Prince of Orange)	Scaevola albida	Scaevola aemula
Kunzea varieties	**NATIVE GRASSES:**	Sedum sempervirens
Indigofera australis	Carex appressa	**HEDGES:**
Leptospermum species	Danthonia racemosa	Brunfelsia varieties
Loropetalum chinensis	Dianella varieties Imperata cylindrical	Buxus varieties
Magnolia grandifolia 'Little Gem'	Lomandra varieties incl 'Tanika' 'Nyalla' etc	Loropetalum chinensis varieties
Magnolia stellata (Star Magnolia)	Sorghum leiocladum	Michelia varieties
Melaleuca 'Revolution Gold'	Themeda australis	Murraya varieties
Michelia figo (Port Wine Magnolia)		Photonia x fraseri 'Little Red Robin'
Myoporum montanum		Viburnum varieties eg odoralissimum
Photonia 'Red Robin' and other smaller growth Photonia.		
Viburnum varieties, eg odoralissimum		
Syzygium varieties.		

Table 4-5: Species for riparian protection areas

(a) Littoral Species (littoral means the foreshores, riverbanks and the plants of that habitat).	
Species Name	**Common Name**
Baumea articulata	
Bolboschoenus fluviatilus	
Carex appressa	Tall Sedge
Cyperus exaltatus	
Gahnia sieberiana	Red Fruited Saw Sedge
Isolepis nodosa	Knobby Club Rush
Juncus usitatus	Common Rush
Philydrum lanuginosum	
Potamogeton tricarinatus	
(b) Macrophyte Species (Macrophyte means the conspicuous plants that dominate wetlands, shallow lakes and streams)	
Species Name	**Common Name**
Baumea articulata	Jointed Twig Rush
Bolboschoenus fluviatus	Marsh Club Rush
Carex appressa	Ephemeral Marsh
Cyperus exaltatus	
Eleocharis sphacelata	Tall Spike Rush
Juncus usitatus	
Phrgmites australis	Common Reed
Potamogeton tricarinatus	
Philydrum lanuginosum	

4.3 Street design

Objectives

a. To establish design standards that correspond with the intended function and character of the different street types in Leppington Major Centre.

b. To ensure that streets provide appropriate amenity for all users, are safe and are able to be maintained.

Controls

1. Streets that are anticipated to operate as bus routes must be capable of accommodating buses with a minimum vehicle length of 14.5 metres.

2. Materials used in footpaths, landscaped areas and other elements of road verges are to be consistent with this DCP.

3. Materials and finishes, and planting, are to emphasise key elements of the streetscape, such as intersections, pedestrian crossings and major building entries.

4. Residential streets are to be designed in accordance with the controls in Part 3 of the main body of this DCP.

5. Industrial streets are to be designed in accordance with the controls in Part 5 of the main body of this DCP.

6. For local residential streets with on road cycle lane between parking and traffic lane (as shown on **Figure 3-33-3**), the road reserve is to be 18m wide. The additional land area and construction cost (above the cost of constructing a local residential street to the dimensions specified in this DCP) will be funded by Council.

Street landscaping

7. Each Development Application is to include a landscaping plan which demonstrates how the landscaping proposed for the development fits into the overall Public Domain Strategy.

8. The design of streets, including tree planting, and buildings that front them is to consider that:

    - North-south oriented and north-east to south-west oriented streets benefit from solar protection in summer to eastern side of the street.
    - East-west and north-west to south-east oriented streets benefit from solar access in the winter solstice to southern side of the street.

9. Deciduous trees are to be used only where greater solar access in winter is required (eg. on the southern side of east-west oriented streets and the southern and eastern sides of urban plazas).

10. Evergreen trees are to be used for roadside planting (especially sub-arterial and arterial roads).

11. Evergreen trees are to be used where visual-buffers are required (eg. adjacent rail and sub-arterial / arterial roads).

12. Street trees have a shorter lifespan than park trees, and their ongoing maintenance and replacement should be planned to ensure continued canopy cover.

13. Street tree planting need not be symmetrical. Different species can be planted on opposite sides of the street to perform different microclimatic functions.

14. The layout of street tree planting on town centre streets is to be formal with regular spacing and coordinate with regular light-pole locations, street parking, awnings and outdoor seating.

15. The layout of street tree planting on residential and bulky goods / industrial local streets is to be informal to maximise opportunity for planting amongst multiple driveway entrances.

16. The layout of street trees and landscape zones must coordinate required clear-zones from street corners and setbacks from street kerbs.

17. Plant selection is to utilise species listed in **Table 4-2** and take into account the following:

    - Species which complement remnant native vegetation where possible.
    - Potential impacts on road and footpath pavements.
    - Water and maintenance requirements.
    - Scale in relation to the function of the area.
    - Contribution to the character of the local centre.
    - Consistency with solar access and weather protection requirements in this DCP.
    - Impacts on utilities (Power/Gas/Water/Sewer/Cables) and street lights
    - Pruning and shaping resilience
    - Driveways, bus stops, pedestrian crossings and intersections
    - Road verge and nature strip widths
    - Building orientation, uses and setbacks
    - Lateral spreading habits
    - Waste service collections
    - Cultural and heritage amenity.
    - Minimum setbacks from concrete structures.
    - Road Authority requirements for street trees to meet road safety objectives.

18. Tree spacing should generally be:

    - 12-15m on E-W and NW-SE streets to allow greater solar access in winter.

- 10-12m on N-S and NE-SW streets to provide greater protection from summer western sun.
- Sufficient to ensure that tree pits treat stormwater runoff from the road to meet the water quality standards specified in this DCP.

Larger tree canopies may require wider spacing to match canopy width.

19. Taller trees may be appropriate on the southern side of east-west oriented streets and the eastern side of north-south oriented streets to maximise sunlight penetration in winter and shade in summer (to both the street and to building facades).

4.3.1 Rickard Road

Objectives

a. Rickard Road is to function as a transit boulevard within Leppington Major Centre, with priority to public transport, pedestrians and cyclists and a low speed traffic environment.

b. To ensure that Rickard Road has an attractive landscape character.

c. To activate the street with outdoor uses and active building frontages.

Controls

1. The design of Rickard Road is to be as shown on **Figure 4-14-1** and consistent with the controls below.

Quality of Materials	• Footpath pavement to be consistent material for the full-width. • Pedestrian pavement to be high-quality unit paver or insitu concrete.
Street Trees	• Provide street trees at regular spacing, coordinate with awnings, outdoor dining, street lights and on-street car park locations. • Large trees preferred on verges to create a tree lined boulevard. Large trees in the median preferred subject to road safety requirements. • Provide frangible street trees in median, regular spaced and offset from footpath trees. • Plant around base of street trees. • For medians less than 4m width (eg at intersections), no planting is permitted and hard surfaces are to be provided. • Provision is to be made for maintenance vehicles to enter the median.
Street Activation	• Main building entrances should be located on Rickard Road. • Outdoor dining and other activities that activate the street are encouraged adjacent to building entrances and near street corners. • Opportunity to provide outdoor dining in kerb blisters. Minimum clear pedestrian path required. Design to consider barrier treatments to provide separation from traffic lanes and a pleasant environment. • Outdoor dining to be located clear of building frontage to allow way-finding by people who are sight impaired.
Light poles and bus stop coordination	• Coordinate light pole location with street trees, bus shelters and awnings (refer to **Figure 4-24-2**).
Mid Block Crossing	• Not permitted.
Through site link	• Provide through-site link access to retail areas • Provide additional building setbacks at entrances.
Awnings and weather protection	• Continuous awnings to be provided for all development. • Supplement weather protection for outdoor dining areas with umbrellas and retractable awnings.
Water Sensitive Urban Design	• Tree pits are to collect and treat rain water from the road carriageway and downpipes from awnings to meet water quality standards specified in this DCP.

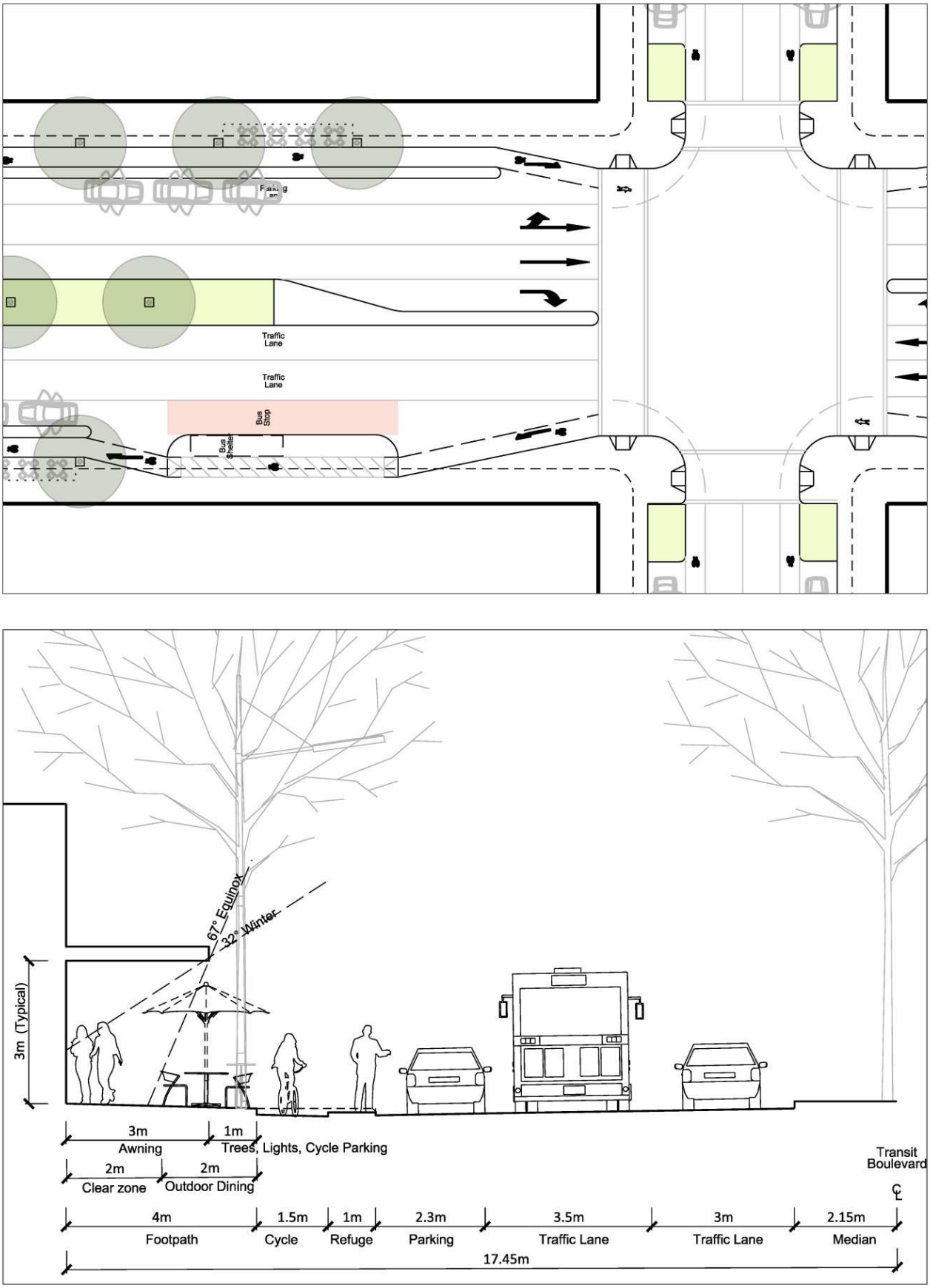


Figure 4-1: Rickard Road typical plan and cross section

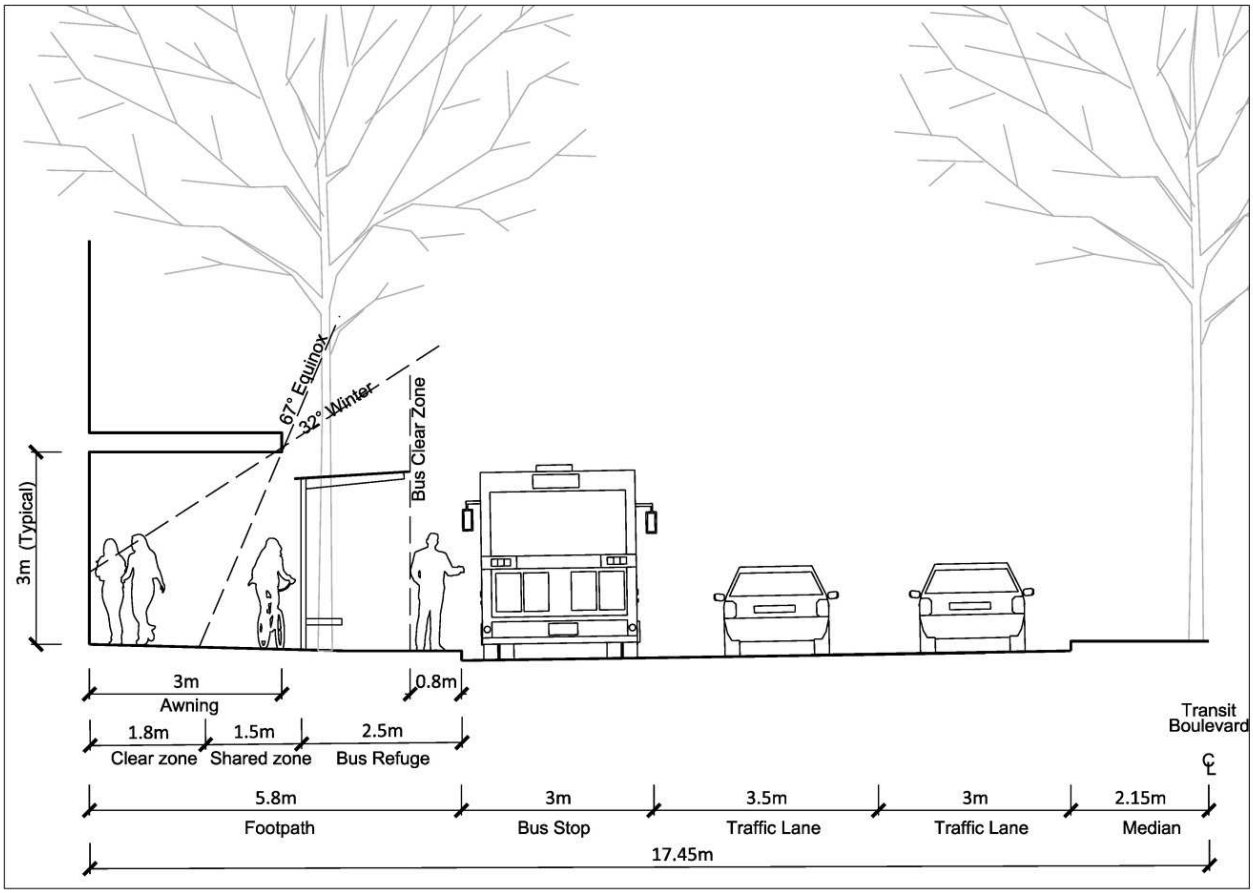


Figure 4-2: Rickard Road cross section at bus stops

4.3.2 Main Street

Objectives

a. To activate the main street by:

- fronting specialty retail and other land uses that create activity onto the Main Street.
- Maximising on street parking and access for cyclists.
- Creating at attractive pedestrian environment

b. To ensure that the main street develops as the main focus of activity in the retail core of the Major Centre.

Controls

1. The design of the Main Street is to be as shown on **Figure 4-34-3** and consistent with the controls below.

Quality of Materials	• Footpath pavement to be consistent material for the full-width. • Pedestrian pavement to be high-quality unit pavers. • Use paving patterns / variety of colours or materials to differentiate outdoor dining areas and entrances to through-site links.
Street Trees	• Provide street trees at regular spacing, coordinate with awnings, outdoor dining, street lights and street car park locations. • No street trees adjacent bus stops. • Species selection is to be from the species suitable for north-south oriented streets in Appendix A2, and species type is to be consistent for the length of the street. More than one species can be used, particularly to achieve a particular pattern or to achieve appropriate solar access / shade out comes, but the pattern of species should be replicated for the entire length of the Main Street.
Street Activation	• Development must present an active frontage to the main street. • Buildings define the street edge (zero setbacks). • Outdoor dining and other activities that activate the street are encouraged. • No outdoor dining / on-street trading adjacent bus stops. • Outdoor dining to be located clear of building frontage to allow way-finding by people who are sight impaired. • Public (unpaid) seating provided near mid-block crossings, and typically 50m spacing therefrom.
Parking and loading	• No driveway access permitted on the main street. • All off street parking and loading is to be accessed from other streets and service lanes. • The on-street parking lane provides for a range of functions (eg. loading bays, bus stops and turning lanes at intersections if required) • Provide event and emergency vehicle access to the Town Plaza via the mid block crossing using removable bollards.

Light poles and bus stop coordination	• Coordinate light pole locations with street trees, bus shelters and awnings. • Ensure light pole design can accommodate a proprietary banner mounting system. • Arrangements for bus stops, the cycle lane, footpaths and road carriageway are to be consistent with **Figure 4-44-4**.
Intersections and pedestrian crossings	• Provide a mid-block crossing centred on the Town Plaza. Consent authority is to determine if the crossing is to be raised. • The design of the crossings should accommodate either raised or flush treatments, and signals if required in the future. • Provide blisters at pedestrian crossings and the mid-block crossing consistent with **Figure 4-44-4**. • Provide corner blisters at intersections except where dedicated turning lanes are required (**Figure 4-54-5**) • Provide low-level planting to the mid-block crossing. • Use bollards if crossing is raised.
Through site link	• Provide through-site link access to retail areas at the mid-block crossing location. • Provide additional building setbacks at entrances.
Awnings and weather protection	• Supplement weather protection for outdoor dining areas with umbrellas and retractable awnings. • Continuous awnings are required for all buildings fronting the main street.
Water Sensitive Urban Design	• Tree pits are to collect and treat rain water from the road carriageway and downpipes from awnings to meet water quality standards specified in this DCP.

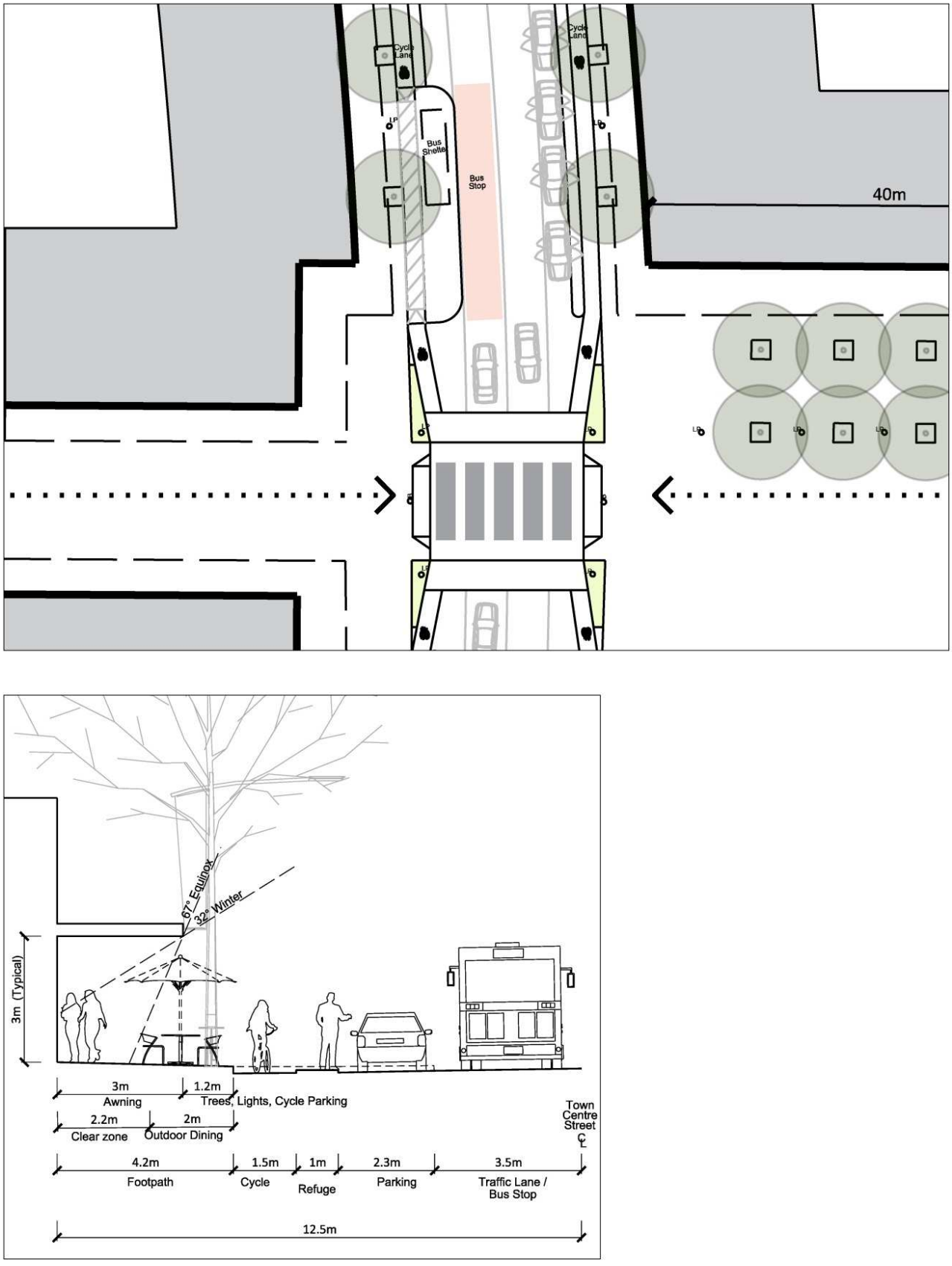


Figure 4-3: Main Street typical plan and cross section

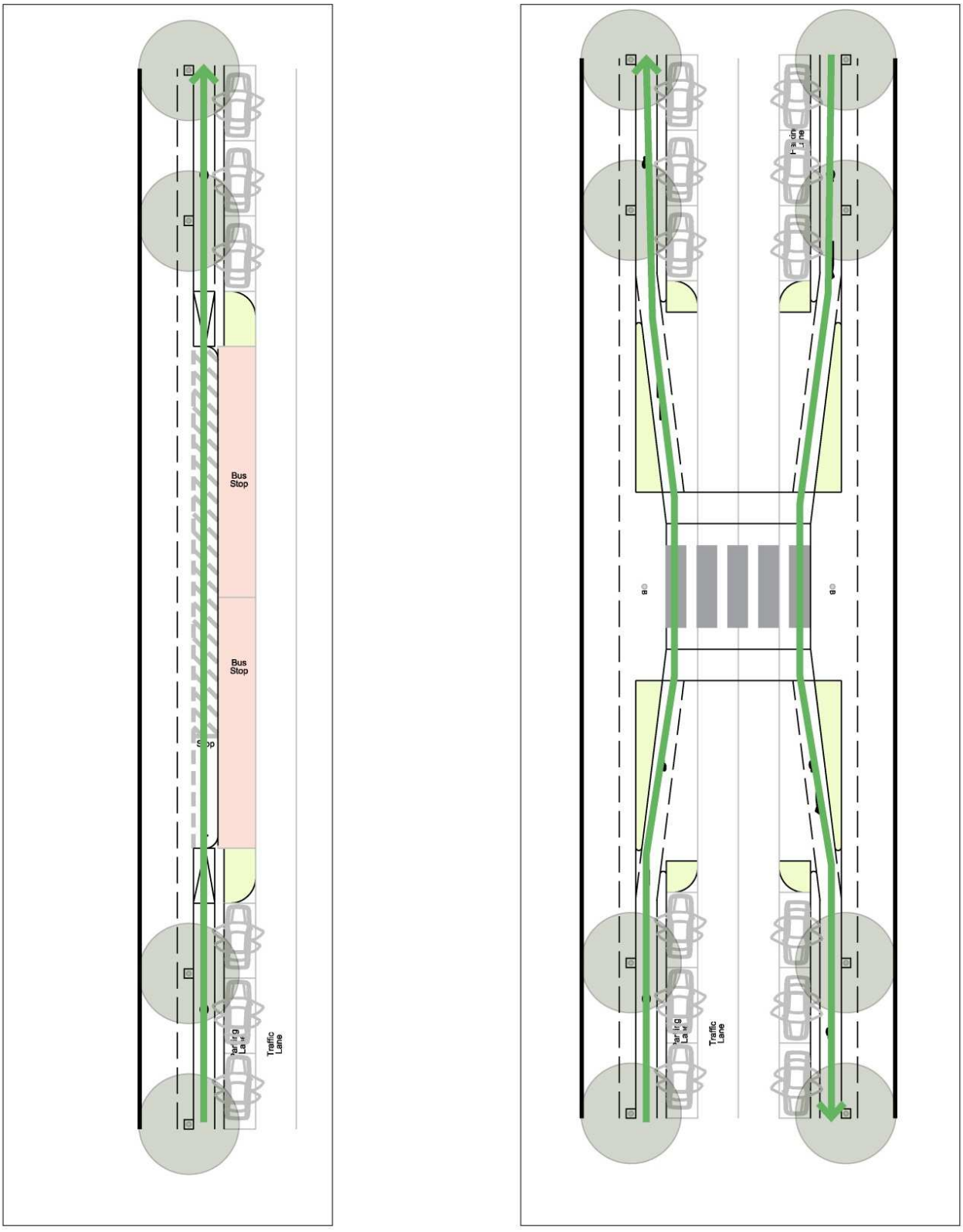


Figure 4-4: Main Street design at mid-block bus stops and mid-block pedestrian crossings

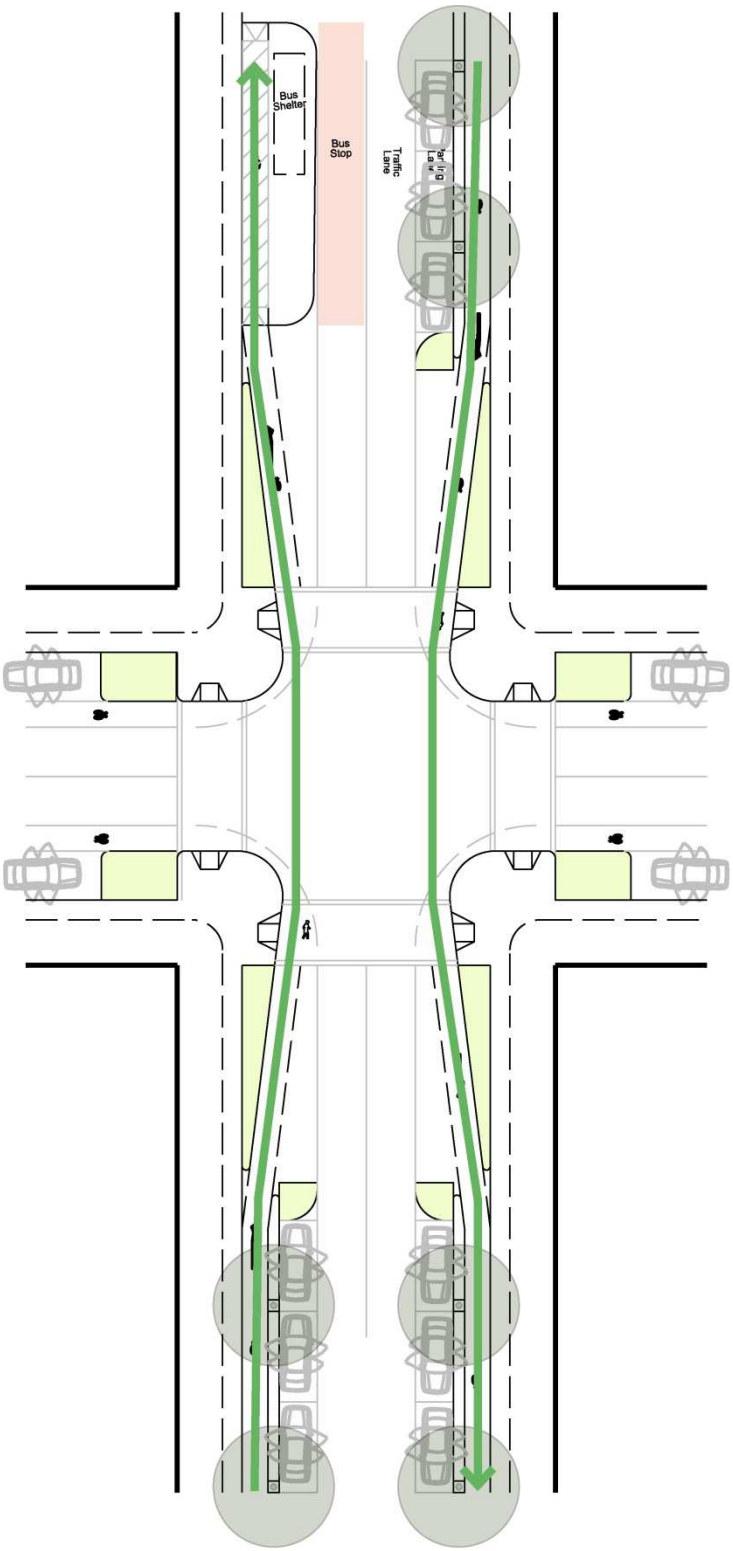


Figure 4-5: Main Street intersection design

4.3.3 Town Centre Streets

Objectives

a. To ensure that Town Centre Streets are able to accommodate growth in vehicular, pedestrian and cyclist traffic as the town centre develops.

b. To ensure that development in the town centre has appropriate vehicle access for parking, loading and services.

c. To ensure that Town Centre Streets are attractive and contribute positively to the character of the Major Centre.

d. To activate Town Centre Streets, where possible, by:

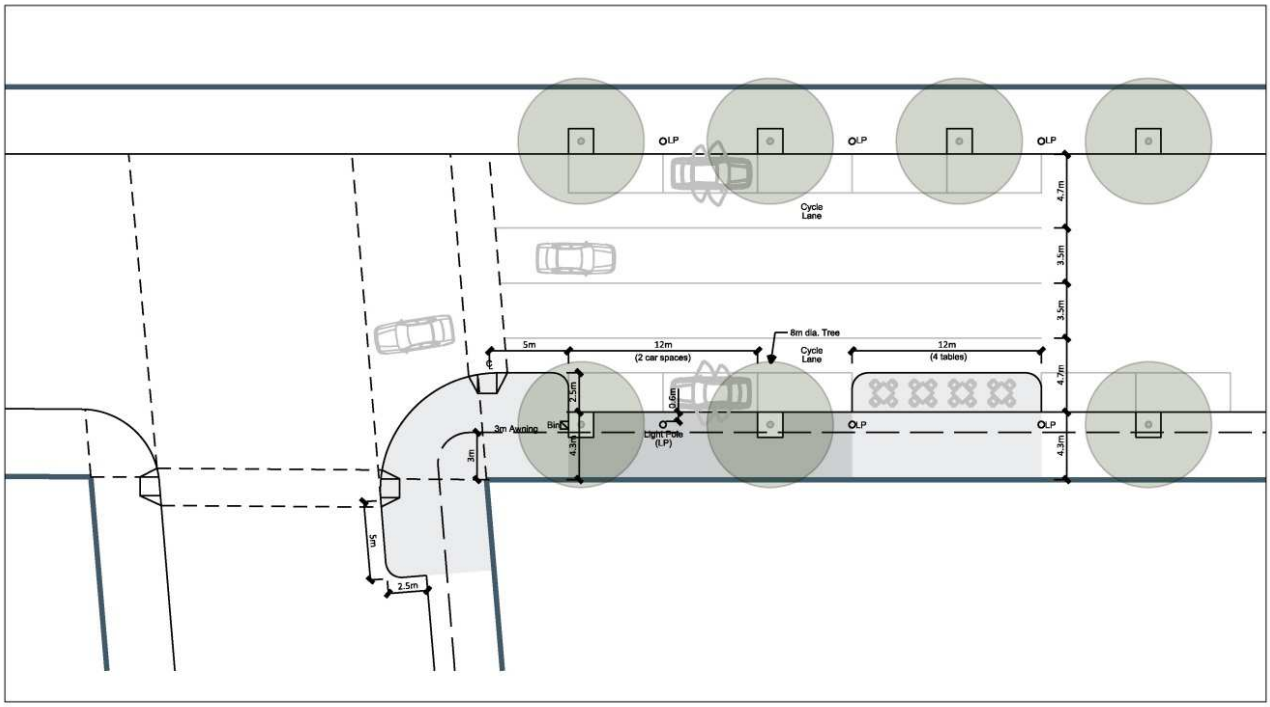
- fronting specialty retail and other land uses that create activity onto the street.
- Maximising on street parking and access for cyclists.
- Creating an attractive pedestrian environment

Controls

1. The design of Town Centre Streets is to be as shown on **Figure 4-64-6** and consistent with the controls below.

Quality of Materials	• Footpath pavement to be consistent material for the full-width. • Pedestrian pavement to be high-quality unit paver. • Use paving patterns / variety of colours or materials to differentiate outdoor dining areas and entrances to through-site links. • Additional planting can be provided in kerb blisters (eg. to frame outdoor dining areas). This will require removal of some on-street parking.
Street Trees	• Provide street trees at regular spacing, coordinate with awnings, outdoor dining, street lights, car park/loading bay entries and on street parking. • No street trees adjacent bus stops. • Tree species type is to be consistent for the length of the street. • More than one species can be used, particularly to achieve a particular pattern or to achieve appropriate solar access / shade out comes, but the pattern of species should be replicated for the entire length of the Main Street. • Provide minimum separation distance of 0.75m from edge of concrete structures to street tree. • Provide root guards.
Street Activation	• Active frontage are preferred for Town Centre Streets, but these streets may also provide vehicle access to internal parking and loading areas. • Buildings define the street edge (zero setbacks) where there is an active frontage or to screen internal parking and loading areas. • Where buildings do not have a zero setback, a landscaped setback is to be provided to screen utility areas, car parks and loading areas from view from the street.

	• Outdoor dining and other activities that activate the street are encouraged. Design is to consider barrier treatments to provide separation from traffic lanes and a pleasant environment. • No outdoor dining / on-street trading adjacent bus stops. • Outdoor dining to be located clear of building frontage to allow way-finding by people who are sight impaired.
Parking and loading	• Town Centre Streets may provide vehicle access to internal parking and loading areas. • The on-street parking lane provides for a range of functions (eg. loading bays, bus stops and turning lanes at intersections if required).
Light poles and bus stop coordination	• Coordinate light pole locations with street trees, bus shelters and awnings. • Ensure light pole design can accommodate a proprietary banner mounting system. • Arrangements for bus stops, the cycle lane, footpaths and road carriageway are to be ensure the safety of bus passengers, cyclists and pedestrians.
Intersections and pedestrian crossings	• Provide corner blisters at pedestrian crossings and mid-block crossings. • Provide low-level planting to the mid-block crossing. • Use bollards if crossings are raised.
Through site link	• Provide through-site link access to retail areas at the mid-block crossing location. • Provide additional building setbacks at entrances.
Awnings and weather protection	• Supplement weather protection for outdoor dining areas with umbrellas and retractable awnings. • Continuous awnings preferred along the length of street, subject to whether active street frontage uses locate on these streets.
Water Sensitive Urban Design	• Opportunity for WSUD in corner blisters and as a replacement for on street parking bays. • Tree pits are to collect and treat rain water from the road carriageway and downpipes from awnings to meet water quality standards specified in this DCP.



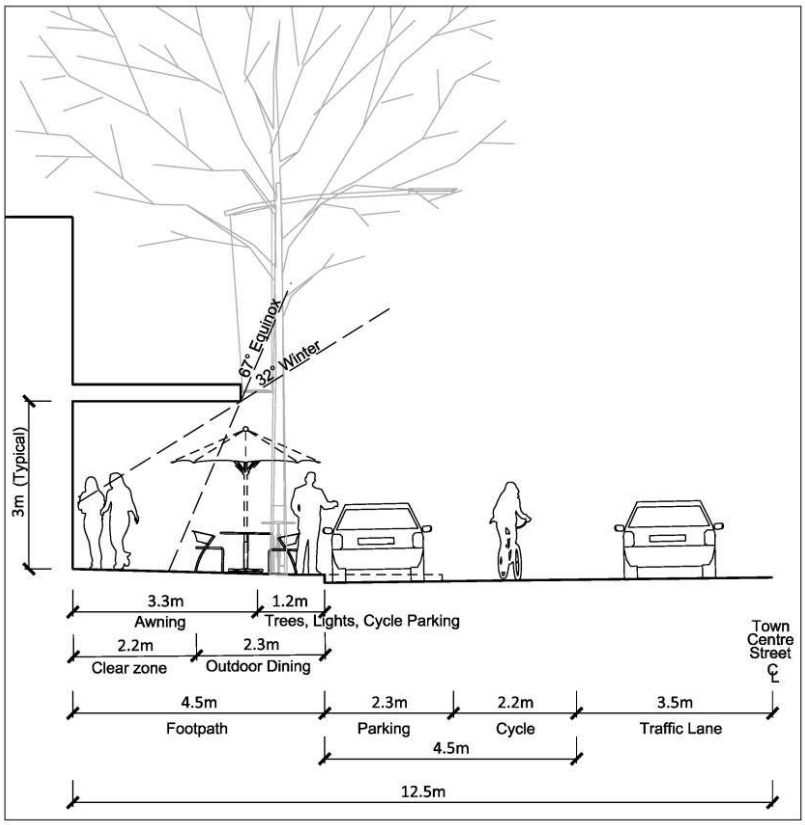


Figure 4-6: Town Centre Street typical plan and cross section

4.3.4 Bus Interchange

Objectives

a. To enable the function of the bus interchange to evolve as the Major Centre grows.

b. To ensure that the street is activated, but that other uses do not interfere with the operation of the bus interchange.

c. To ensure that the bus interchange is well integrated with the train station.

Controls

1. The design of the Bus Interchange Street is to be as shown on **Figure 4-74-7** and consistent with the controls below.

Quality of Materials	• Footpath pavement to be consistent material for the full-width. • Pedestrian pavement to be high-quality unit paver.
Street Trees	• No street trees adjacent bus stops. Provide shade trees in Bus Interchange Plaza connecting to Rail Station Concourse.
Street Activation	• No outdoor dining / on-street trading adjacent bus stops. • For outdoor dining facing the street, a minimum building setback of 2m at ground level is required. • Locate outdoor dining areas in Bus Interchange Plaza. Provide planter beds / awnings / retractable canopies for sun protection.
Parking and loading	• Parking and loading access is to be from other streets.
Light poles and bus stop coordination	• Coordinate light pole location with street trees, bus shelters and awnings. • The location of Bus Bays is to consider pedestrian access and operational requirements to provide sufficient queuing distance for the left-turn into Rickard Road and the Main Street. • Provide bus only lanes adjacent bus stop bays to avoid conflict with other vehicles
Intersections and pedestrian crossings	• Provide mid-block crossing centred on Bus Interchange Plaza. Consent authority to determine if the crossing is raised. • The design of the crossings should accommodate either raised or flush treatments, and signals as required • Provide through-site link access to retail areas at mid-block crossing location. Provide additional building setbacks at entrance. • Provide corner blisters at pedestrian crossings and mid-block crossing. • Provide low-level planting and bollards to mid-block crossing
Through site link	• Provide through-site link access to retail areas at the mid-block crossing location. • Provide additional building setbacks at entrances.
Awnings and weather protection	• Provide continuous awnings / colonnades over footpath. • Provide separate bus shelters for weather protection • Potential to provide colonnade flanking Bus Interchange Plaza to provide all-weather access from the Rail Station to the Bus Interchange.
Water Sensitive Urban Design	• No opportunity for WSUD on Bus Interchange Street.

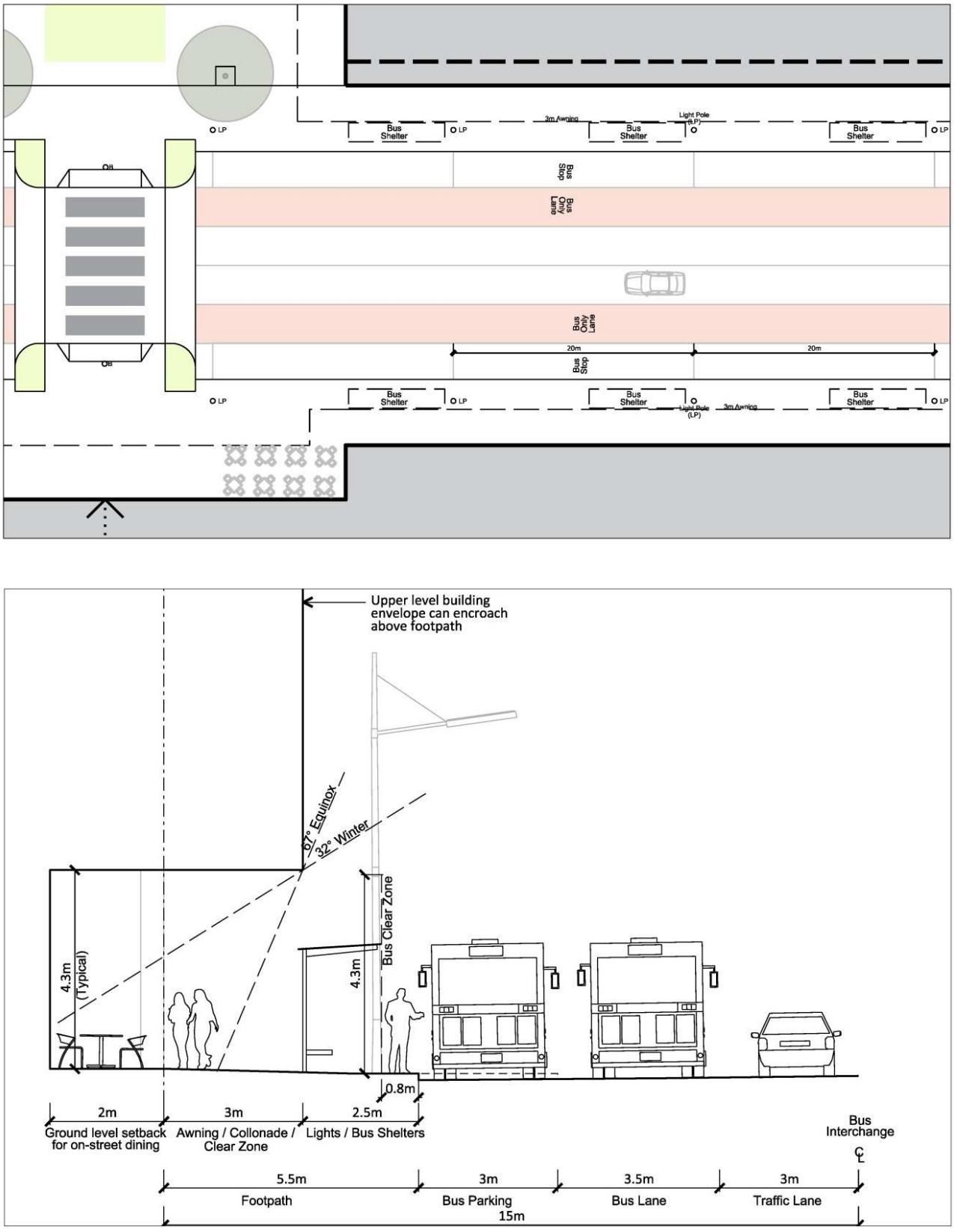


Figure 4-7: Bus interchange street typical plan and cross-section

4.3.5 Service Lanes

Objectives

a. To ensure that there is appropriate access for vehicles to development in the town centre, for purposes such as parking and loading.

b. To ensure that utility activities, parking and loading do not detract from the character of the Main Street and Town Centre Streets.

c. To provide opportunities for additional pedestrian connections through the Major Centre.

Controls

1. The design of Service Lanes is to be as shown on **Figure 4-84-8** and consistent with the controls below.

Quality of Materials	• Footpath pavement to be insitu concrete. • Driveways to be consistent treatment within public domain.
Street Trees	• Limit street tree planting to areas adjacent to intersections with other town centre streets.
Street Activation	• Outdoor Dining permitted near intersections of Town Centre Streets.
Parking and loading	• Service lanes are the primary access routes for vehicles to internal car parks and loading bays. • On street parking may be permitted on one side of the street only, providing it does not interfere with the function of the street.
Through site link	• Provide additional building setbacks at entrance to through site links.
Awnings and weather protection	• Awnings can wrap around corners from intersection with Town Centre Streets. • No requirement for continuous awnings.
Water Sensitive Urban Design	• No opportunity for WSUD on Service Lanes.

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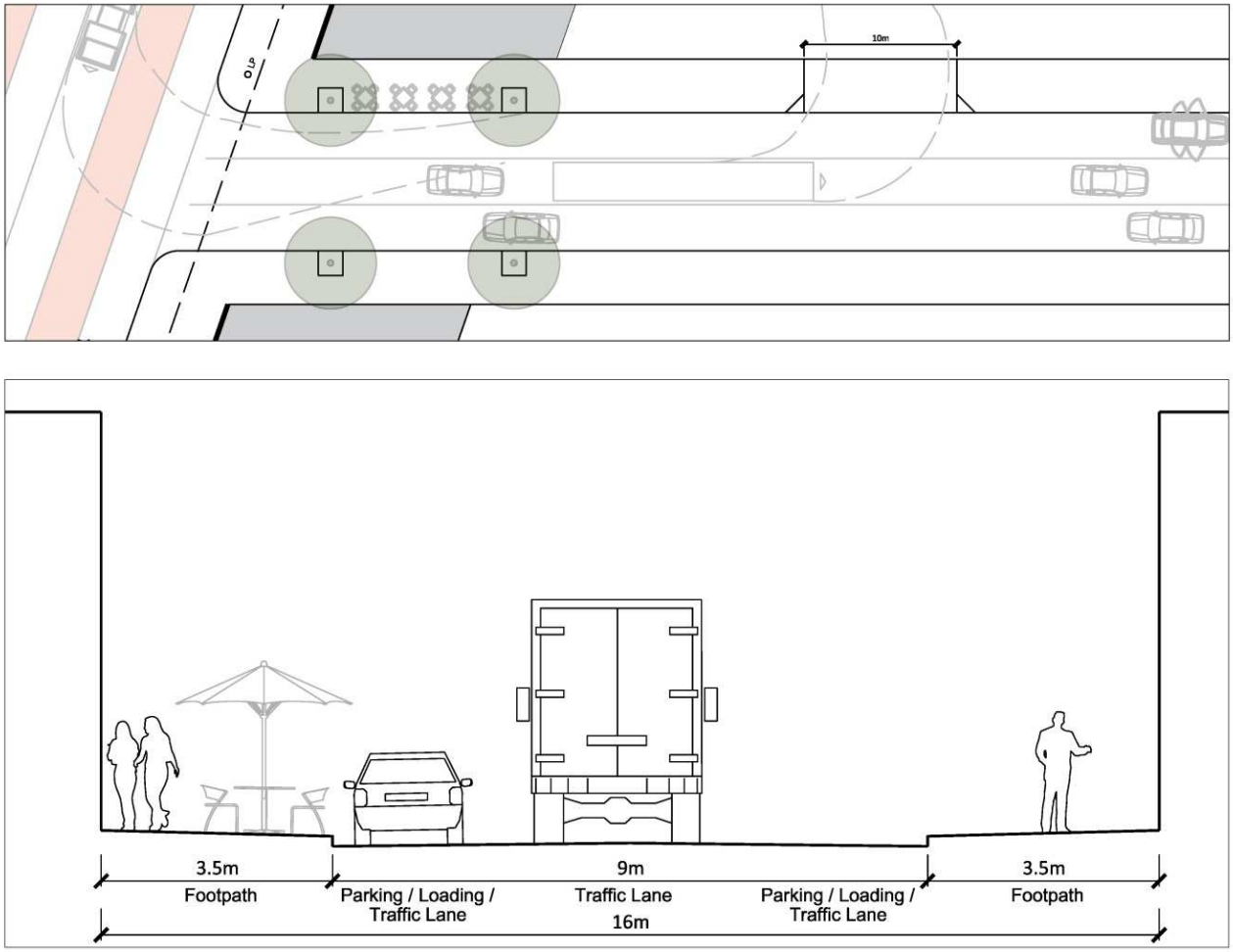


Figure 4-8: Service lane typical plan and cross-section

4.4 Plazas and squares

Objectives

a. To create a series of activity nodes within the public domain that are a focus for informal and organised community gatherings and interaction.

b. To establish places within the centre that promote active use of the public domain and an interface between development and the public domain.

c. To provide breaks in the built form at key locations.

d. To encourage development to be orientated towards the public domain rather than being internally focused.

Controls

1. The design of Plazas is to consider the following principles:

    - quality of social spaces;
    - safety and perceptions of safety;
    - provision for sight and mobility impaired people;
    - cater for special public events, markets etc;
    - pedestrian walkways and pavement surfaces;
    - pedestrian lighting;
    - location and amount of seating;
    - visual amenity;
    - passive recreation function;
    - cultural significance - places for social interaction and public art; and
    - maintenance requirements.

2. Plazas or squares are encouraged at key nodes within the centre, such as at intersections between Town Centre Streets and Service Lanes or Pedestrian Through Site Links, at intersections along Rickard Road, or to incorporate, highlight and interpret heritage items such as the Leppington Public School and the WV Scott Memorial.

3. Squares or plazas should be located to terminate or enhance vistas within the centre and to surrounding areas, particularly at high points or to connect the centre to the adjacent creek corridors.

4. The boundary dimensions of squares and plazas should be in the order of 40-70 metres. The dimensions and orientation of the plaza or square is to maximise solar access, particularly during winter.

5. The design of the square or plaza and adjoining buildings is to ensure that at least 50% of the area of the square or plaza receives sunlight between the hours of 11am-2pm on June 21. Above the first floor, buildings may need to be set back to ensure appropriate solar access to the square.

6. Plazas and squares should generally be square or rectangular, although irregular shapes may be appropriate to make use of residual land or where streets intersect at odd angles.

7. Squares and plazas may include water features to improve amenity, assist in management of micro-climates and to incorporate water sensitive urban design into the public domain.

8. Buildings are to be built to the boundary fronting squares, plazas and parks at the ground floor and first floor, or set back at the ground floor a maximum of 3 metres only where a colonnade is proposed within the setback.

9. Buildings fronting squares, plazas or public open space are to have active frontages above the ground floor that provide passive surveillance of the square or plaza. Commercial or retail tenancies are to have glazed facades or balconies overlooking the square, and residential development is to have balconies facing the square, plaza or park.

10. Materials and finishes are to be in accordance with **Table 4-1**.

11. Plant species selection for plazas and squares is to predominantly utilise species listed in **Table 4-2**.

12. Trees, awnings and colonnades are the preferred means of shade and weather protection within squares and plazas. Trees should be predominantly deciduous to provide shade in summer and solar access in winter.

4.4.1 Town Plaza

Controls

1. The Town Plaza is to be located mid-block on the main street generally in the location shown on the Indicative Layout Plan.

2. The design of the Town Plaza is to be consistent with the controls below and **Figure 4-94-9**.

Quality of Materials	• Pedestrian pavement to be high-quality unit paver.
Trees	• Provide shade trees in north-eastern corner to provide shade from the west in summer. • Provide deciduous trees on the southern side of the plaza
Activation	• Provide flexible public activity space with water and public art elements and free seating. • Integrate the development at ground level and upper floors with the plaza. Active uses at ground floor fronting all sides of the plaza and upper floor residential are encouraged to overlook the plaza. Orient balconies and living areas towards the plaza to provide passive surveillance and activity. • Locate outdoor dining on south-east side to provide good solar access in winter and shade from the western sun in summer. • Provide multiple areas for public seating with good visual surveillance and protection from summer sun (eg. shade trees). • Coordinate locations with pedestrian desire lines to avoid conflicts. • Opportunity for bespoke street furniture and public art integration into public seating.
Parking loading and vehicle access.	• Provide event and emergency vehicle access to the Town Plaza via the mid block crossing using removable bollards.
Through site link	• Provide through-site link access to retail areas at mid-block crossing location from the plaza. Provide additional building setbacks at entrances. Through site links are publicly accessible 24hrs.
Awnings and weather protection	• All development fronting the plaza is to provide continuous awning or colonnades.
Water Sensitive Urban Design	• WSUD to be integrated with tree planting Tree pits within the plaza are to collect and treat rain water from impervious surfaces to meet water quality standards specified in this DCP. • WSUD measures to be integrated with water features where practical.
Lighting	• In addition to street lighting, provide pedestrian lighting to plazas, mid-block crossings, marked and signalised pedestrian crossings, cycle lanes and through site links. • Provide feature lighting (eg. catenary) in the Town Plaza.

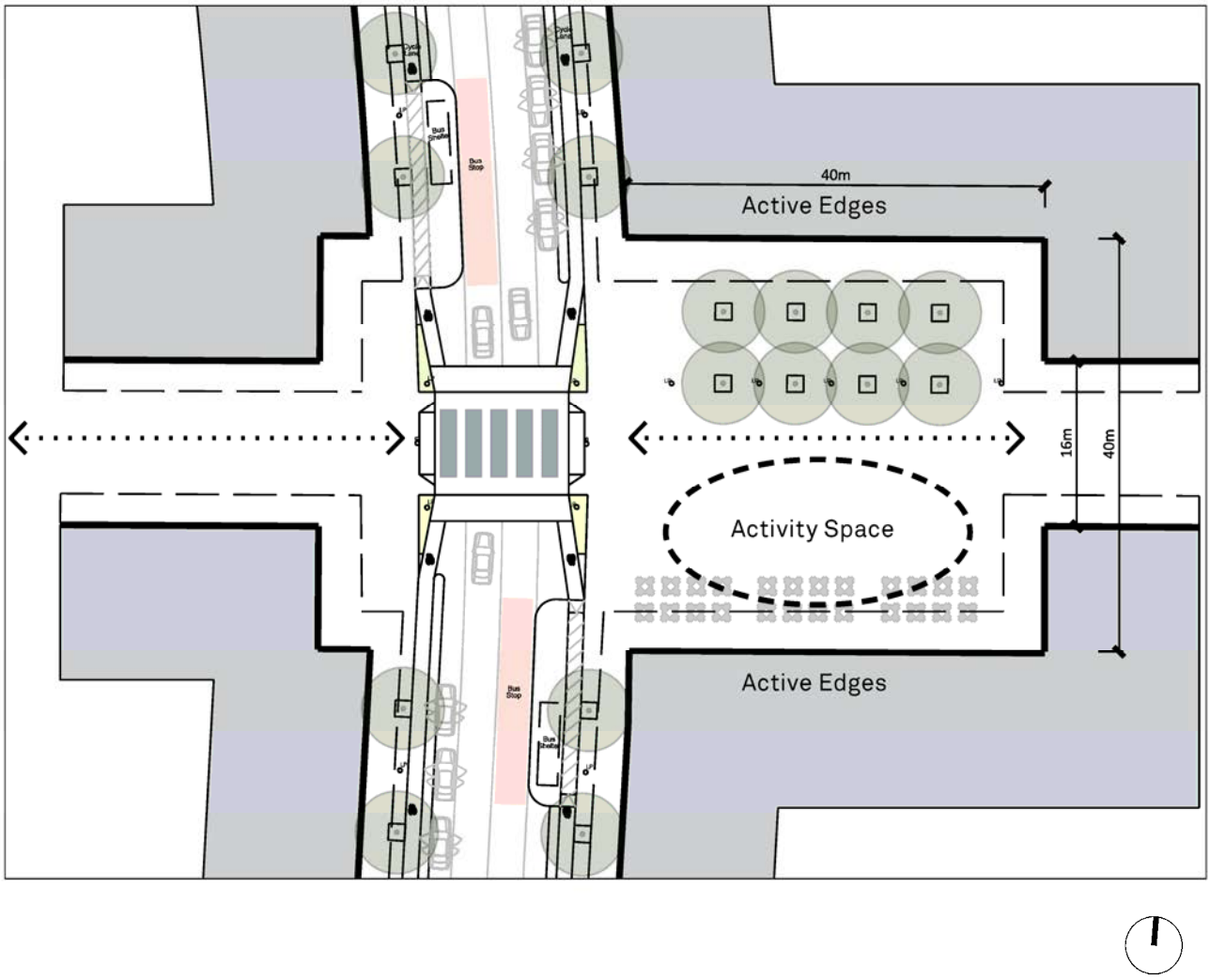


Figure 4-9: Layout of the Town Plaza

4.4.2 Rail and Bus Interchange Plaza

Controls

1. The Interchange Plaza is to be aligned with the Leppington Station concourse and entry, generally in the location shown on the Indicative Layout Plan.

2. The design of the Interchange Plaza is to be consistent with the controls below and **Figure 4-94-9**.

Quality of Materials	• Pedestrian pavement to be high-quality unit paver. • Paving material and design to integrate with station entry / concourse to assist way-finding.
Trees	• No street trees adjacent bus stops. Provide shade trees in Bus Interchange Plaza connecting to Rail Station Concourse.
Activation	• Provide flexible public activity space with water and public art elements and free seating. • Provide multiple areas for public seating with good visual surveillance and protection from summer sun (eg. shade trees). • Coordinate seating locations with pedestrian desire lines to avoid conflicts. • Integrate the development at ground level and upper floors with the plaza. Active uses at ground floor fronting all sides of the plaza and upper floor residential are encouraged to overlook the plaza. Orient balconies and living areas towards the plaza to provide passive surveillance and activity. • No outdoor dining / on-street trading adjacent bus stops. • Locate outdoor dining areas in Bus Interchange Plaza. • Provide planter beds / awnings / retractable canopies / colonnades for sun protection Provide multiple areas for public seating with good visual surveillance and protection from summer sun (eg. shade trees). • Opportunity for bespoke street furniture and public art integration into public seating to extend the public art themes adopted for Leppington Station.
Parking loading and vehicle access.	• Provide event and emergency vehicle access to the Interchange Plaza via the mid block crossing using removable bollards.
Through site link	• Provide through-site link access to retail areas at mid-block crossing location from the plaza. Provide additional building setbacks at entrances. Through site links are publicly accessible 24hrs.
Awnings and weather protection	• Supplement weather protection for outdoor dining areas with umbrellas and retractable awnings. • Provide colonnade flanking Bus Interchange Plaza to provide all-weather access from the Rail Station to the Bus Interchange.
Water Sensitive Urban Design	• WSUD to be integrated with tree planting Tree pits within the plaza are to collect and treat rain water from impervious surfaces to meet water quality standards specified in this DCP. • WSUD measures to be integrated with water features where practical.
Lighting	• In addition to street lighting, provide pedestrian lighting to plazas, mid-block crossings, marked and signalised pedestrian crossings, cycle lanes and through site links. • Provide feature lighting (eg. catenary) in the Interchange Plaza.

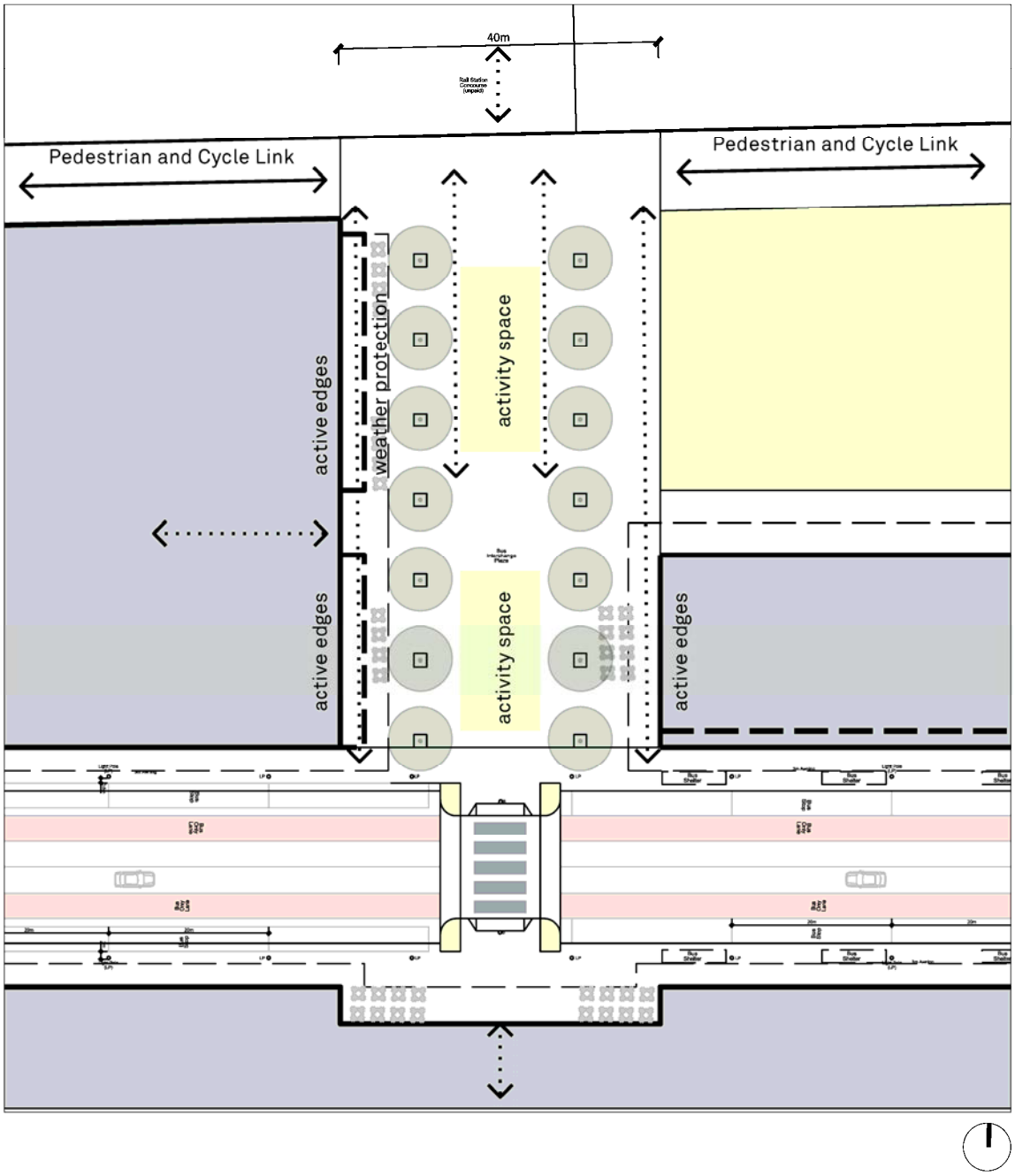


Figure 4-10: Layout of the Rail and Bus Interchange Plaza

4.4.3 Civic Centre Plaza

Controls

1. The Civic Centre Plaza is to be developed as part of the Civic and Cultural Centre to the north of Leppington Station.

2. The location of the Civic Centre Plaza is to align with a through site link from Leppington Station and integrate with the TAFE college to the north, generally in the location shown on the Indicative Layout Plan.

3. The design of the Civic Centre Plaza is to be consistent with the controls below and **Figure 4-114-11**.

Quality of Materials	• Pedestrian pavement to be high-quality unit paver. • Continue design themes from the station through the through-site links and plaza to assist in pedestrian way-finding to the station.
Trees	• Provide shade trees in eastern corner to provide shade from the west in summer.
Activation	• Provide flexible public activity space with water and public art elements and free seating. This space should also accommodate outdoor community events, eg. free markets, fetes, performances, street theatre etc associated with the community and cultural use of the buildings. • Provide multiple areas for public seating with good visual surveillance and protection from summer sun (eg. shade trees). • Coordinate seating locations with pedestrian desire lines to avoid conflicts. • Integrate the development at ground level and upper floors with the plaza. Active uses at ground floor fronting all sides of the plaza and upper floor residential are encouraged to overlook the plaza. Orient balconies and living areas towards the plaza to provide passive surveillance and activity. • No outdoor dining / on-street trading adjacent bus stops. • Locate outdoor dining areas on west side to provide good solar access in winter and shade from the western sun in summer. • Provide planter beds / awnings / retractable canopies / colonnades for sun protection Provide multiple areas for public seating with good visual surveillance and protection from summer sun (eg. shade trees). • Opportunity for bespoke street furniture and public art integration into public seating to extend the public art themes adopted for Leppington Station. • Provide pedestrian through-site link access to Civic areas at mid-block crossing location. Provide additional building setbacks at entrances.
Parking loading and vehicle access.	• Provide event and emergency vehicle access to the Civic Centre Plaza via the mid block crossing using removable bollards.
Through site link	• Provide through-site link access to retail areas at mid-block crossing location from the plaza. Provide additional building setbacks at entrances. Through site links are publicly accessible 24hrs.
Awnings and weather protection	• Supplement weather protection for outdoor dining areas with umbrellas and retractable awnings.
Water Sensitive Urban Design	• WSUD to be integrated with tree planting Tree pits within the plaza are to

	collect and treat rain water from impervious surfaces to meet water quality standards specified in this DCP. • WSUD measures to be integrated with water features where practical.
Lighting	• In addition to street lighting, provide pedestrian lighting to plazas, mid-block crossings, marked and signalised pedestrian crossings, cycle lanes and through site links. • Provide feature lighting (eg. catenary) in the Civic Centre Plaza.

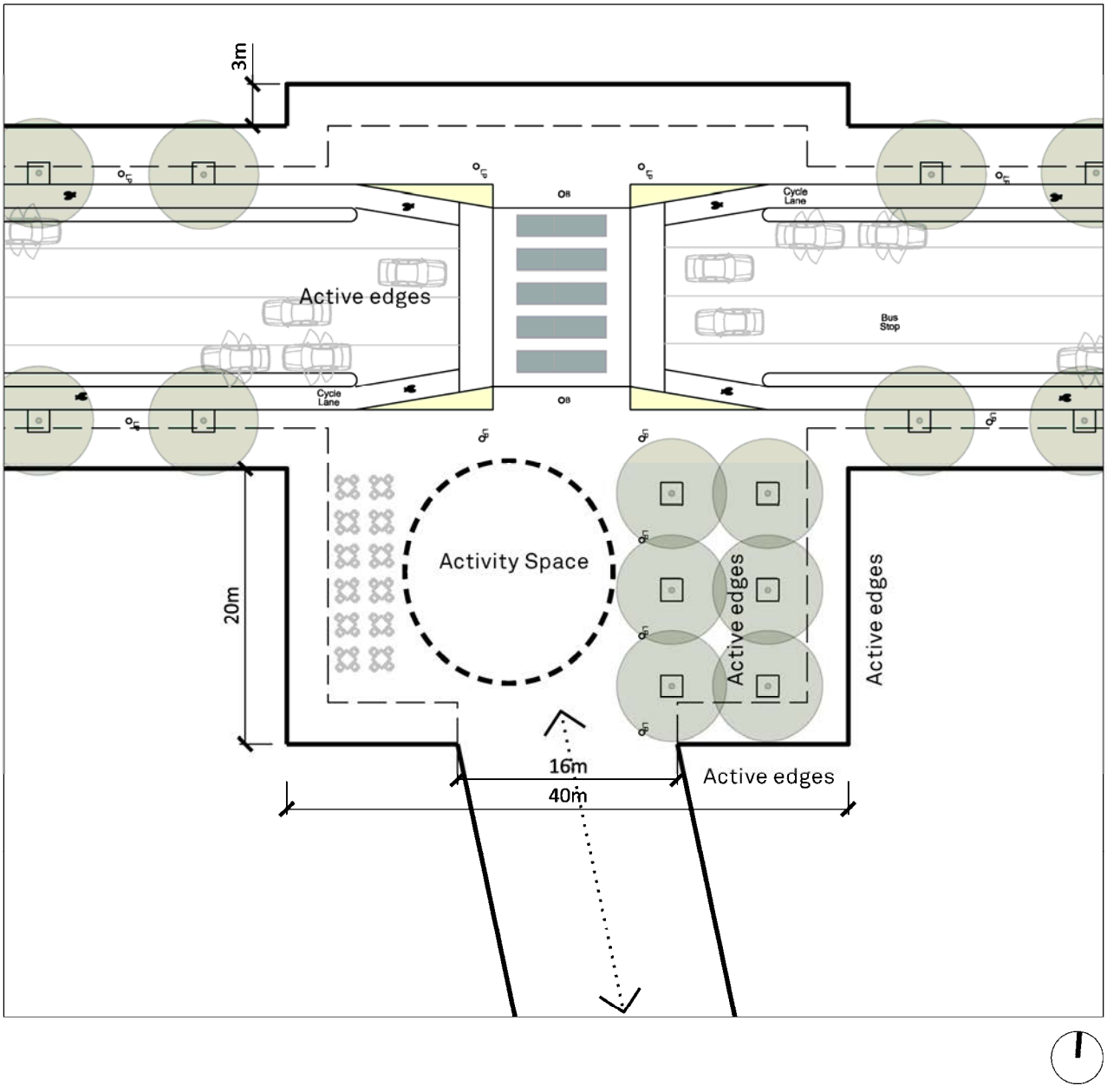


Figure 4-11: Layout of the Civic Centre Plaza

4.4.4 Small Urban Plazas and Pedestrian Through-site Links

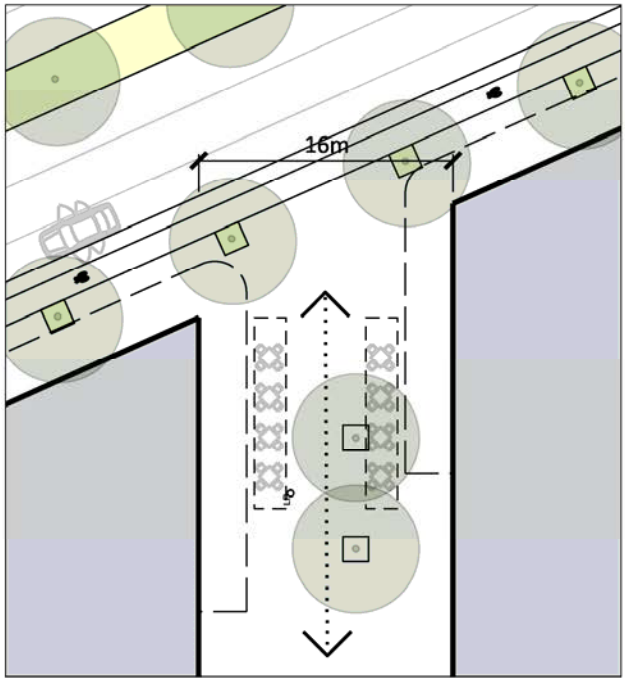
Controls

1. Small plazas and through site links are to be integrated with the design of development in the Major Centre.

2. Pedestrian through site links are to be located mid-block and where they will enhance pedestrian connectivity within the Centre.

3. The design of the Small Plazas is to be consistent with the controls below and **Figure 4-114-11**.

Quality of Materials	• Pedestrian pavement to be high-quality unit paver.
Trees	• Provide shade trees in eastern corner to provide shade from the west in summer.
Activation	• Locate outdoor dining areas at corners. Provide planter beds / awnings / retractable canopies for sun protection. • Through-site links and small urban plazas are publicly accessible 24hrs. • Provide multiple areas for public seating with good visual surveillance and protection from summer sun (eg. shade trees). • Coordinate locations with pedestrian desire lines to avoid conflicts. • Opportunity for bespoke street furniture and public art integration into public seating.
Parking loading and vehicle access.	• Provide event and emergency vehicle access to the Civic Centre Plaza via the mid block crossing using removable bollards.
Through site link	• Provide through-site link access to retail areas at mid-block crossing location from the plaza. Provide additional building setbacks at entrances. Through site links are publicly accessible 24hrs.
Awnings and weather protection	• Supplement weather protection for outdoor dining areas with umbrellas and retractable awnings.
Water Sensitive Urban Design	• WSUD to be integrated with tree planting Tree pits within the plaza are to collect and treat rain water from impervious surfaces to meet water quality standards specified in this DCP. • WSUD measures to be integrated with water features where practical.
Lighting	• In addition to street lighting, provide pedestrian lighting to plazas, mid-block crossings, marked and signalised pedestrian crossings, cycle lanes and through site links. • Provide feature lighting (eg. catenary) in the Civic Centre Plaza.



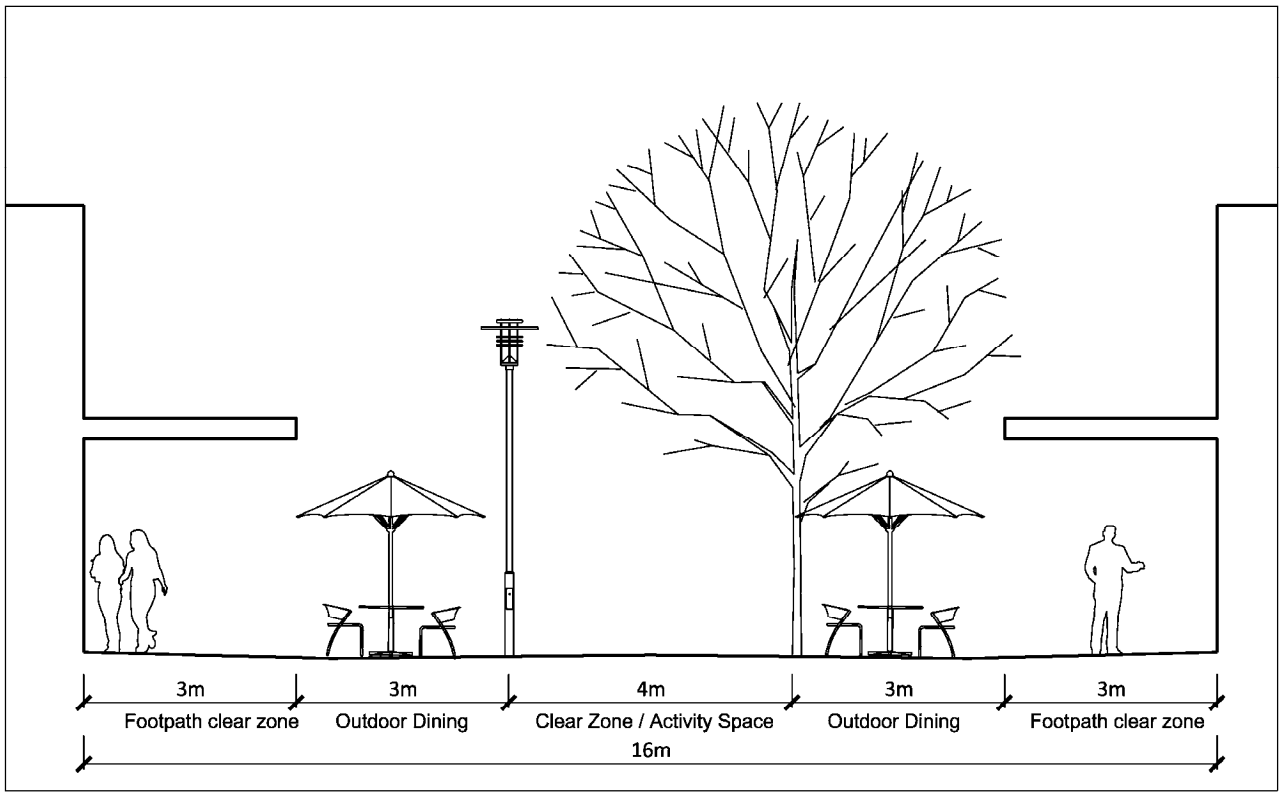


Figure 4-12: Design of small plazas

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4.5 Public Open Space

The Scalabrini Creek Corridor, west of the Town Centre and Civic Centre, provides the major north-south connecting open space element for the Major Centre. District level open space areas adjoin the creek corridor close to the retail core. This area of open space will act as a focus for community events and passive recreation, serving both the local residents, the Business Park and visitors to the retail core.

On the eastern side of the Major Centre, Byron Road Park provides a mix of sport facilities and a passive recreation environment serving local residents and the adjoining Business Park. Connecting north of Byron Road Park, the Bonds Creek Corridor provides a north-south connecting open space element, its recreation function serving primarily the adjoining residents.

Objectives

a. Public open space is to be integrated with the built form of the Major Centre.

b. Public open space is to provide a range of recreational and social opportunities for workers, residents and visitors to the Major Centre.

c. The design of public open space is to respect the natural environment, integrating water sensitive urban design and the rehabilitation of Riparian Protection Areas.

Controls

1. The design of Parks is to take into account the following principles:

    - integrate passive and active recreation functions with environmental functions;
    - quality of social spaces;
    - safety and perceptions of safety;
    - provision for sight and mobility impaired;
    - cater for special public events, markets etc;
    - pedestrian walkways and pavement surfaces;
    - pedestrian lighting;
    - location and amount of seating;
    - visual amenity;
    - cultural significance - places for social interaction and public art; and
    - maintenance requirements.

2. The design of public open space is to be generally in accordance with the concept designs at **Figure 4-13** to **Figure 4-16**.

3. Where public open space includes or is adjacent to a Riparian Protection Area, the concepts in **Figure 4-17** are to be implemented in the design.

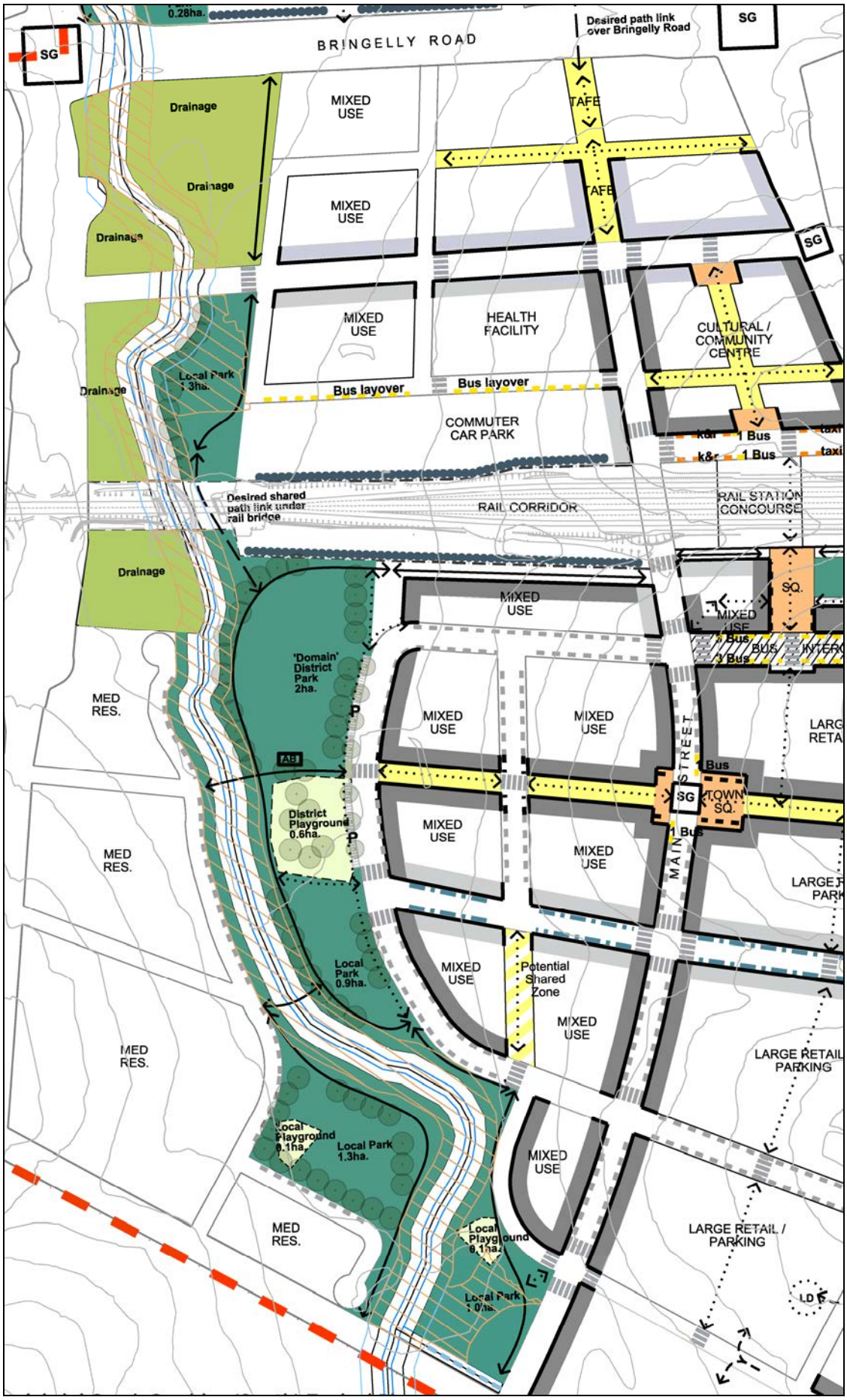
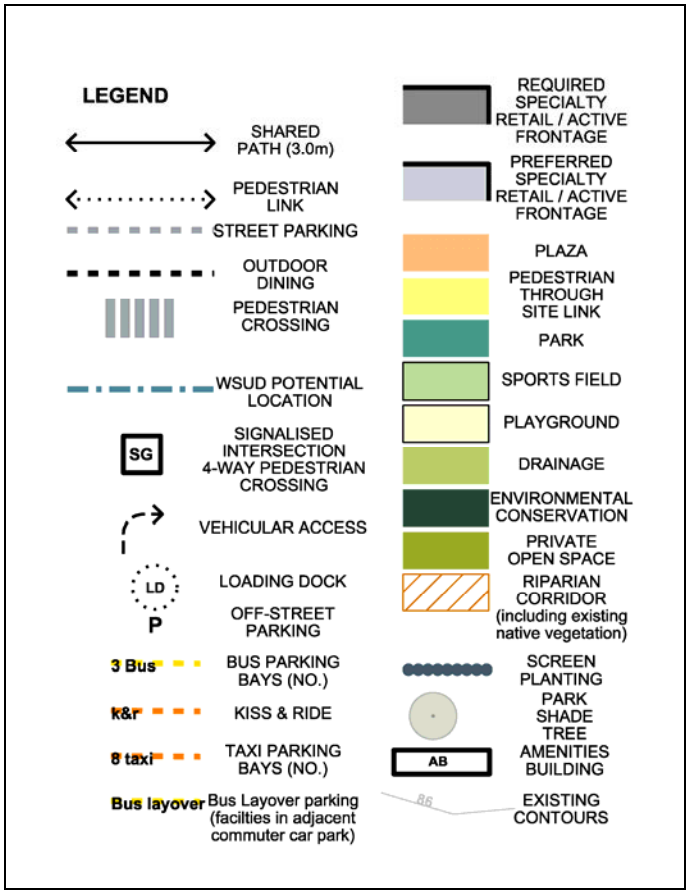

BRINGELLY ROAD
Desired path link over Bringelly Road
SG
0.28ha.
Drainage
MIXED USE
TAFE
HEALTH FACILITY
CULTURAL / COMMUNITY CENTRE
Local Park 1.3ha.
Bus layover
COMMUTER CAR PARK
1 Bus
RAIL CORRIDOR
Desired shared path link under rail bridge
RAIL STATION CONCOURSE
SQ.
'Domain' District Park 2ha.
MED RES.
AB
District Playground 0.6ha.
MAIN STREET
TOWN SQ.
Local Park 0.9ha.
Potential Shared Zone
LARGE RETAIL PARKING
Local Playground 0.1ha.
Local Park 1.3ha.
LARGE RETAIL / PARKING

Figure 4-13: Scalabrini Creek Corridor (South) concept design



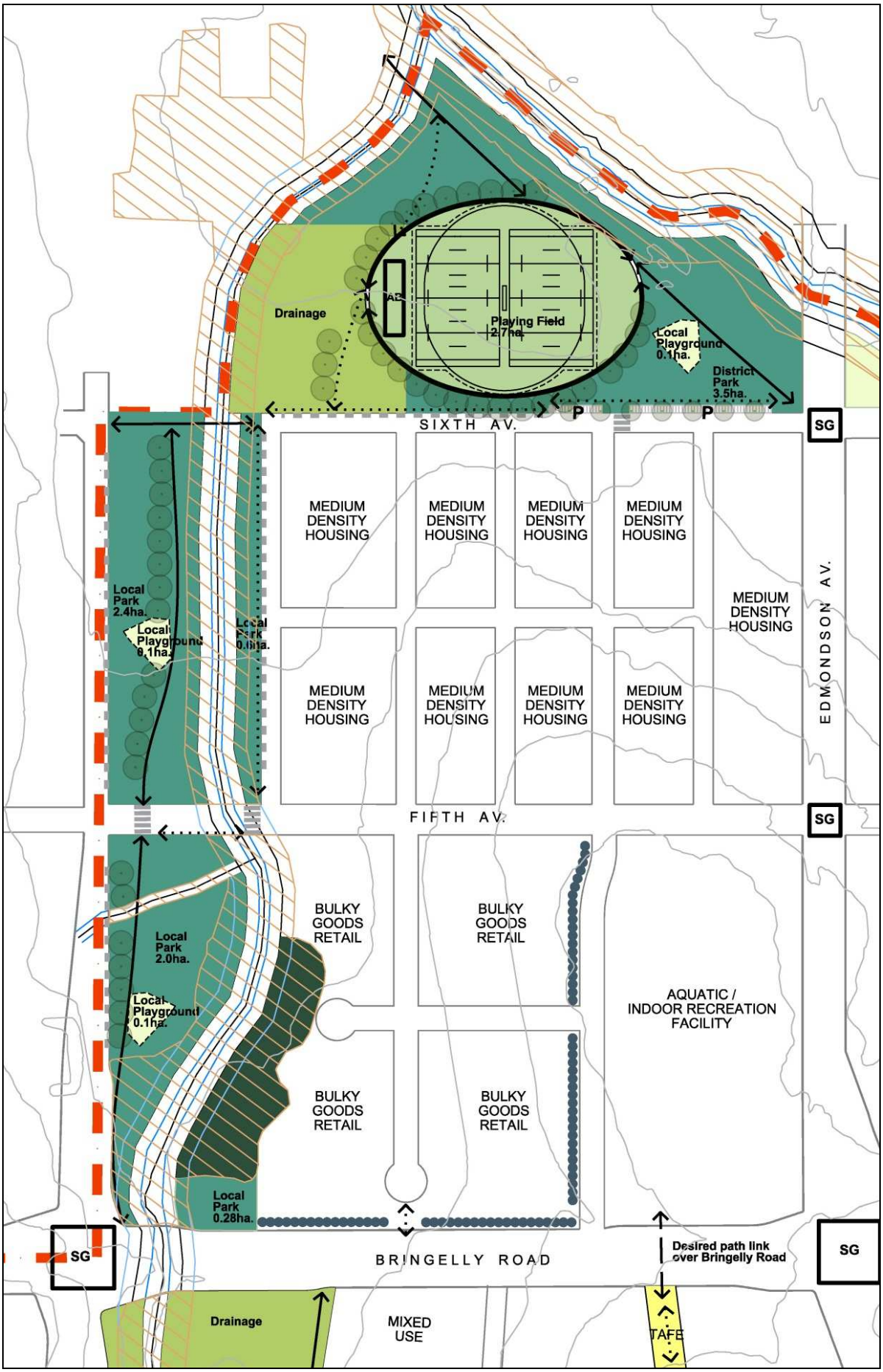
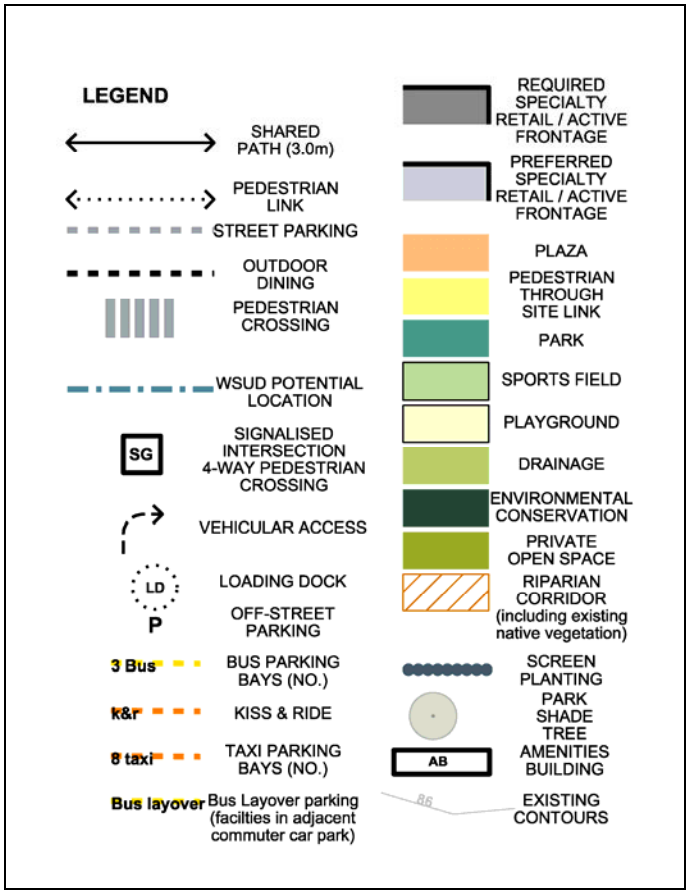

Drainage
AP
Playing Field 2.7ha.
Local Playground 0.1ha.
District Park 3.5ha.
SIXTH AV.
P
P
SG
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
EDMONDSON AV.
Local Park 2.4ha.
Local Playground 0.1ha.
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
FIFTH AV.
SG
Local Park 2.0ha.
Local Playground 0.1ha.
BULKY GOODS RETAIL
BULKY GOODS RETAIL
AQUATIC / INDOOR RECREATION FACILITY
BULKY GOODS RETAIL
BULKY GOODS RETAIL
Local Park 0.28ha.
SG
BRINGELLY ROAD
Desired path link over Bringelly Road
SG
Drainage
MIXED USE
TAFE

Figure 4-14: Scalabrini Creek Corridor (North) concept design



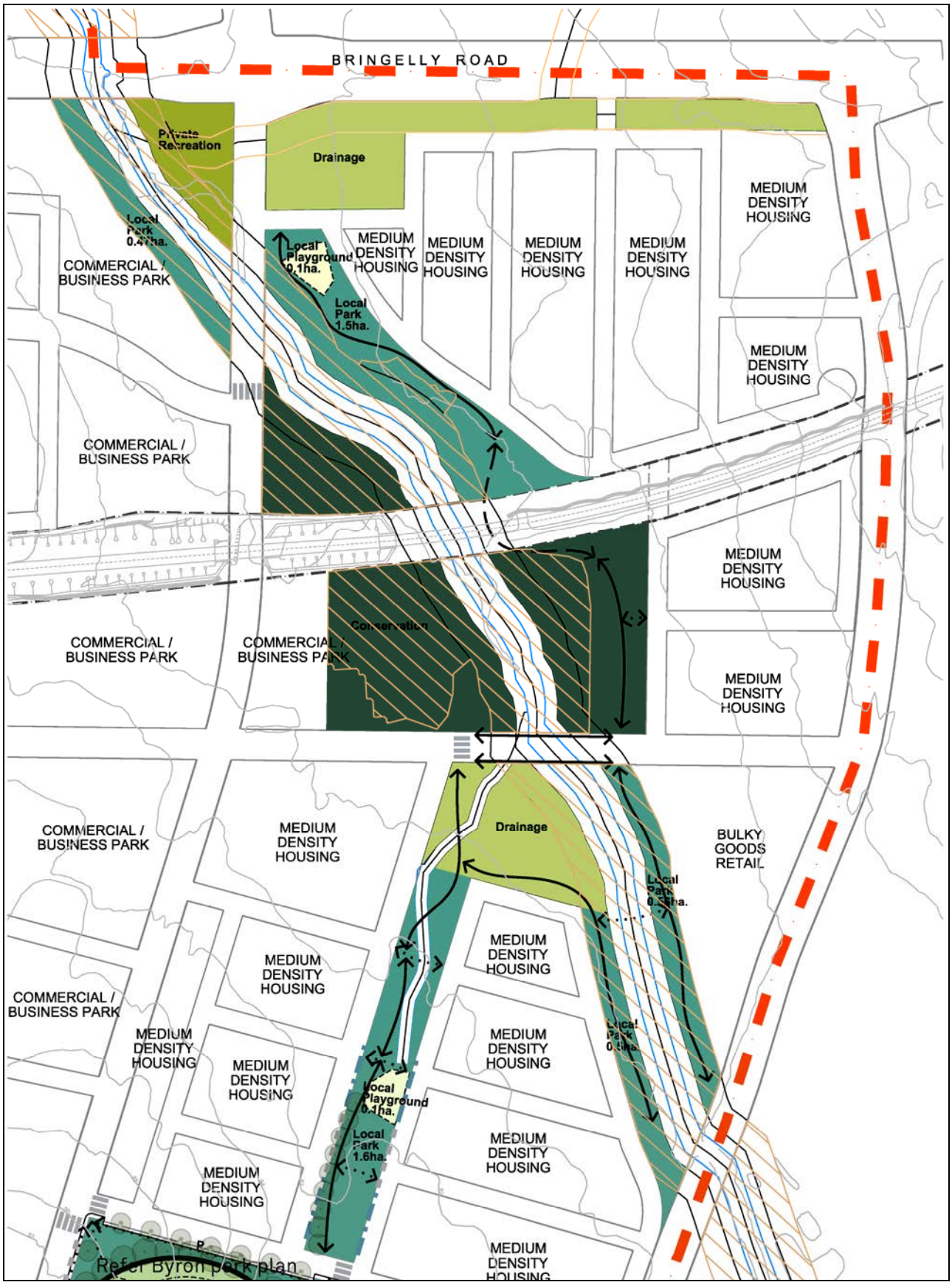
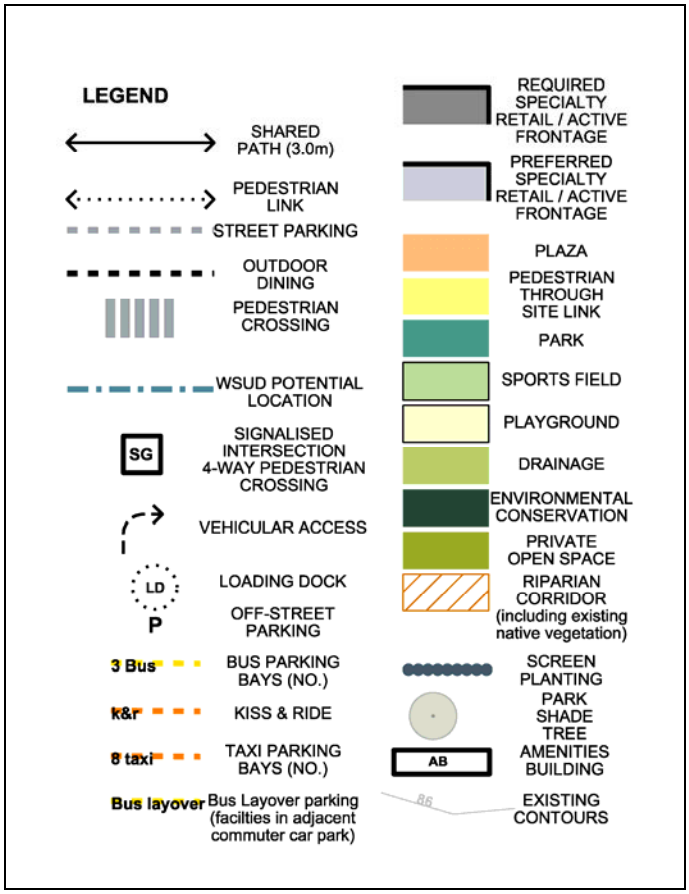

BRINGELLY ROAD
Drainage
MEDIUM DENSITY HOUSING
COMMERCIAL / BUSINESS PARK
Local Playground 0.1ha.
Local Park 1.5ha.
Conservation
BULKY GOODS RETAIL
Local Park 1.6ha.
Refer Byron park plan

Figure 4-15: Bonds Creek Corridor concept design



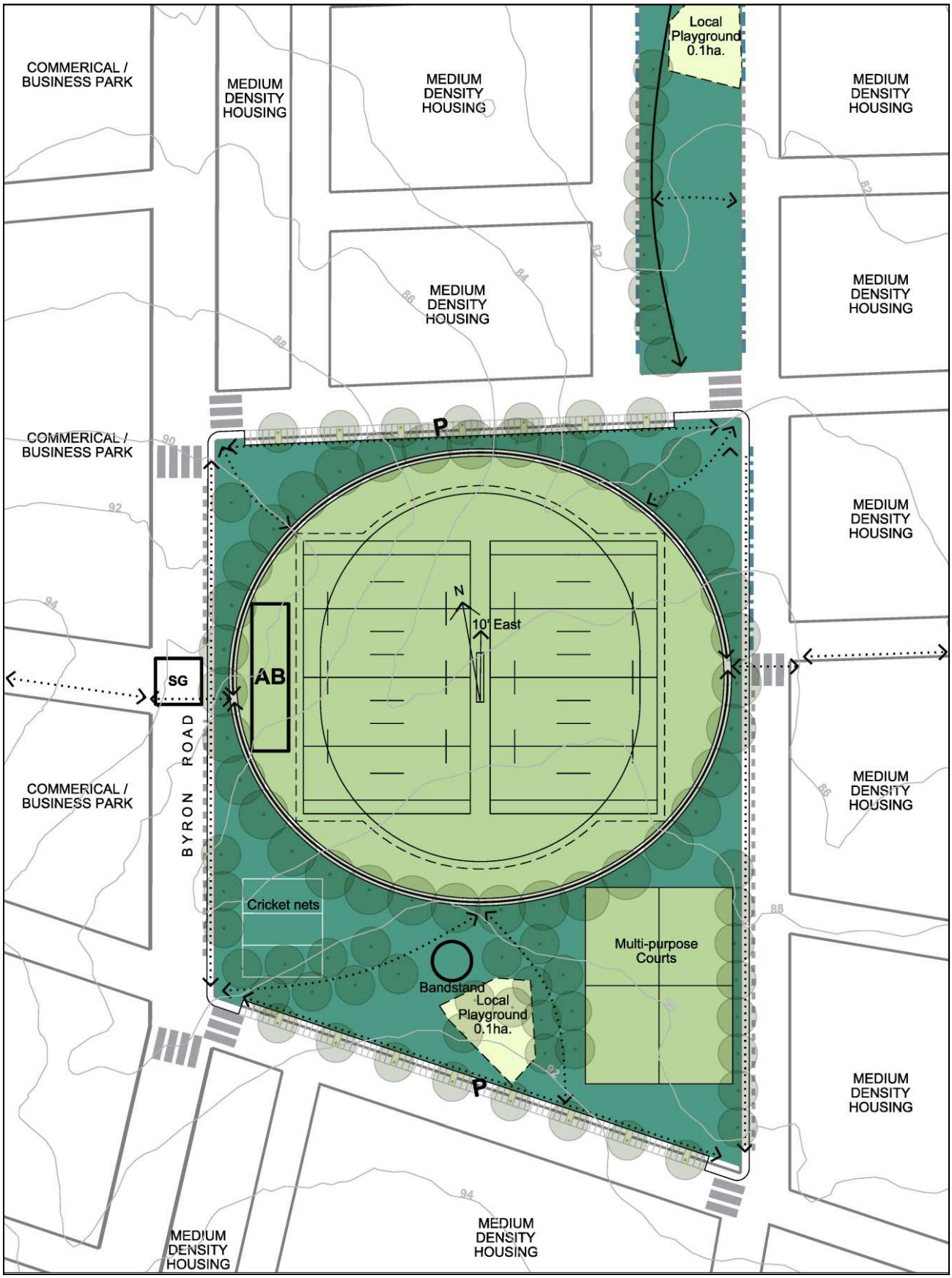
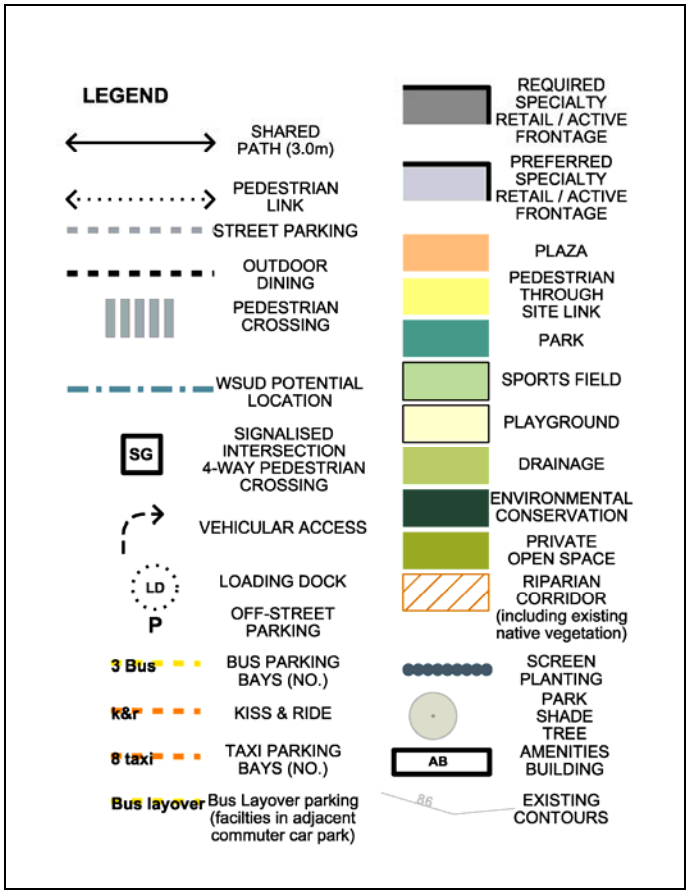

COMMERICAL / BUSINESS PARK
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
Local Playground 0.1ha.
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
COMMERICAL / BUSINESS PARK
P
MEDIUM DENSITY HOUSING
N
10° East
AB
SG
BYRON ROAD
COMMERICAL / BUSINESS PARK
MEDIUM DENSITY HOUSING
Cricket nets
Multi-purpose Courts
Bandstand
Local Playground 0.1ha.
P
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING
MEDIUM DENSITY HOUSING

Figure 4-16: Byron Road Park concept design



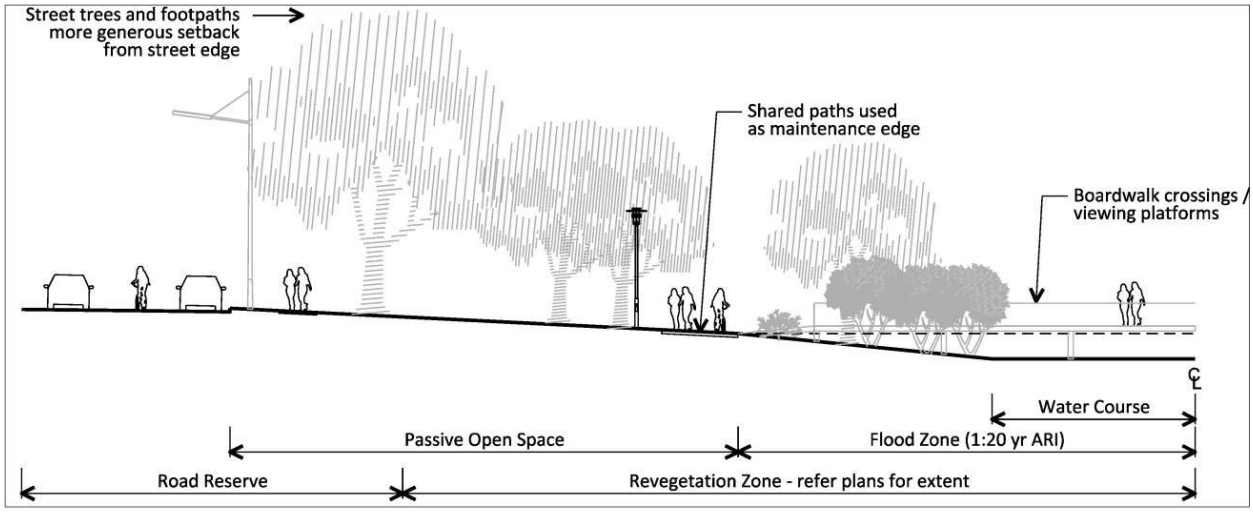


Figure 4-17: Concept design for open space corridors incorporating Riparian Protection Areas

5 Building Controls

5.1 Building envelopes and setbacks

5.1.1 Building orientation

Objectives

a. To establish a positive interface between buildings, streets, parks, plazas and squares.

b. To provide passive surveillance and activity within the public domain.

c. To ensure that buildings are positioned and orientated to maximise energy efficiency, take advantage of sunlight and provide protection from inclement weather.

Controls

1. Buildings are to be orientated towards and provide active frontages at street level, to Rickard Road, the Main Streets and preferably to Town Centre Streets, as shown on **Figure 5-15-1**.

2. Active ground floor uses that include outdoor seating and/or openable shopfronts are best orientated towards the north or east, however these uses are encouraged facing Rickard Road, the Main Street and Town Centre Streets regardless of their orientation.

3. The main pedestrian entries to buildings, including ground floor retail and commercial premises that face the street, are to be from the streets listed in the controls above with active frontages.

4. Buildings are to be orientated towards major access roads in the Leppington Major Centre, including Eastwood Road, Dickson Road, Ingleburn Road, Bringelly Road, Byron Road, Edmondson Avenue, Camden Valley Way and Cowpasture Road. Blank walls are not to face these roads, and glazing is to occupy at least 50% of the building façade width facing these roads.

5. Service and utility bays, loading docks and car park entries are to be orientated towards Service lanes, or where this is not possible, to streets that are not specified as requiring at Active Frontage in **Figure 5-15-1**. Where vehicle entry is provided from a Town Centre Street, car parks, service bays and loading docks are to be screened from view from the street.

6. Large format retail such as supermarkets and parking areas are to be sleeved or hidden by retail and commercial uses, or designed with a high proportion of glazing where the building fronts directly onto the Main Street or Town Centre Streets.

7. Buildings are to be orientated to provide attractive, active building frontages and passive surveillance to public open space, land zoned for drainage purposes, plazas, squares and pedestrian through-site links.

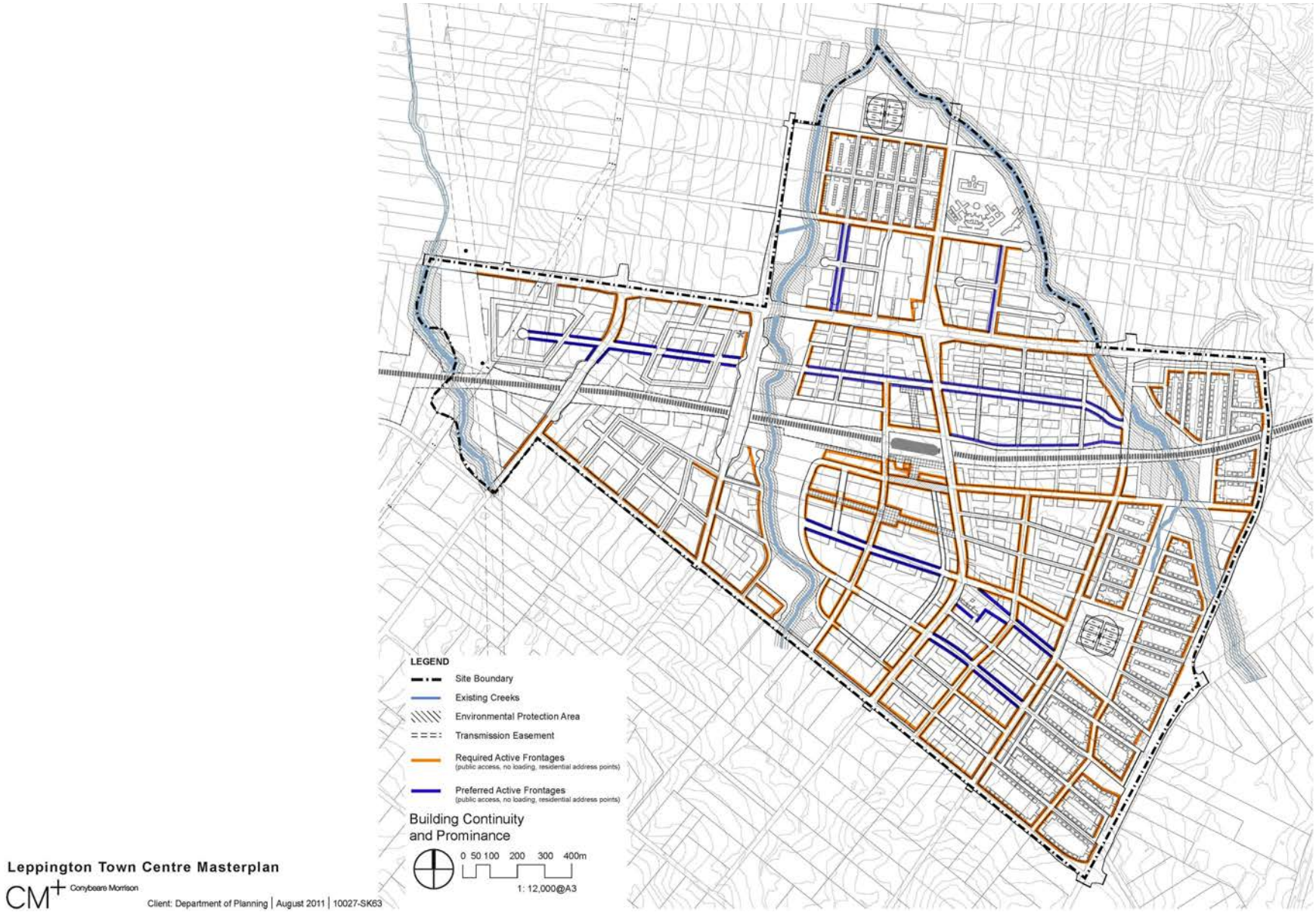


Figure 5-1: Building orientation

5.1.2 Setbacks

Objectives

a. To establish consistent building lines fronting streets and other elements of the public domain.

b. To provide sufficient space between buildings and the street for landscaping where necessary.

c. To establish the desired vertical and horizontal spatial proportions of streets and other public places.

d. To provide a defined street edge within a town centre context.

e. To encourage passive surveillance of streets and other public spaces.

Controls

1. Building setbacks are to be in accordance with **Figure 5-25-2**.

2. Where **Figure 5-25-2** identifies a zero setback, buildings are to be built to the property boundary (i.e. a zero setback), for at least the ground floor and first floor.

3. Projections beyond the zero setbacks lines may include awnings, verandas, balconies, roof overhangs and blade walls above street level.

4. On land where a front setback other than a zero setback applies, façade articulation elements may extend into the front setback to a maximum of 1.5 metres and for a maximum of 50% of the length of the building facade.

5. Setbacks for residential buildings (apart from residential buildings that contain retail or commercial uses at the ground floor), are to be in accordance with the residential setback controls in Part 4 of the main body of this DCP.

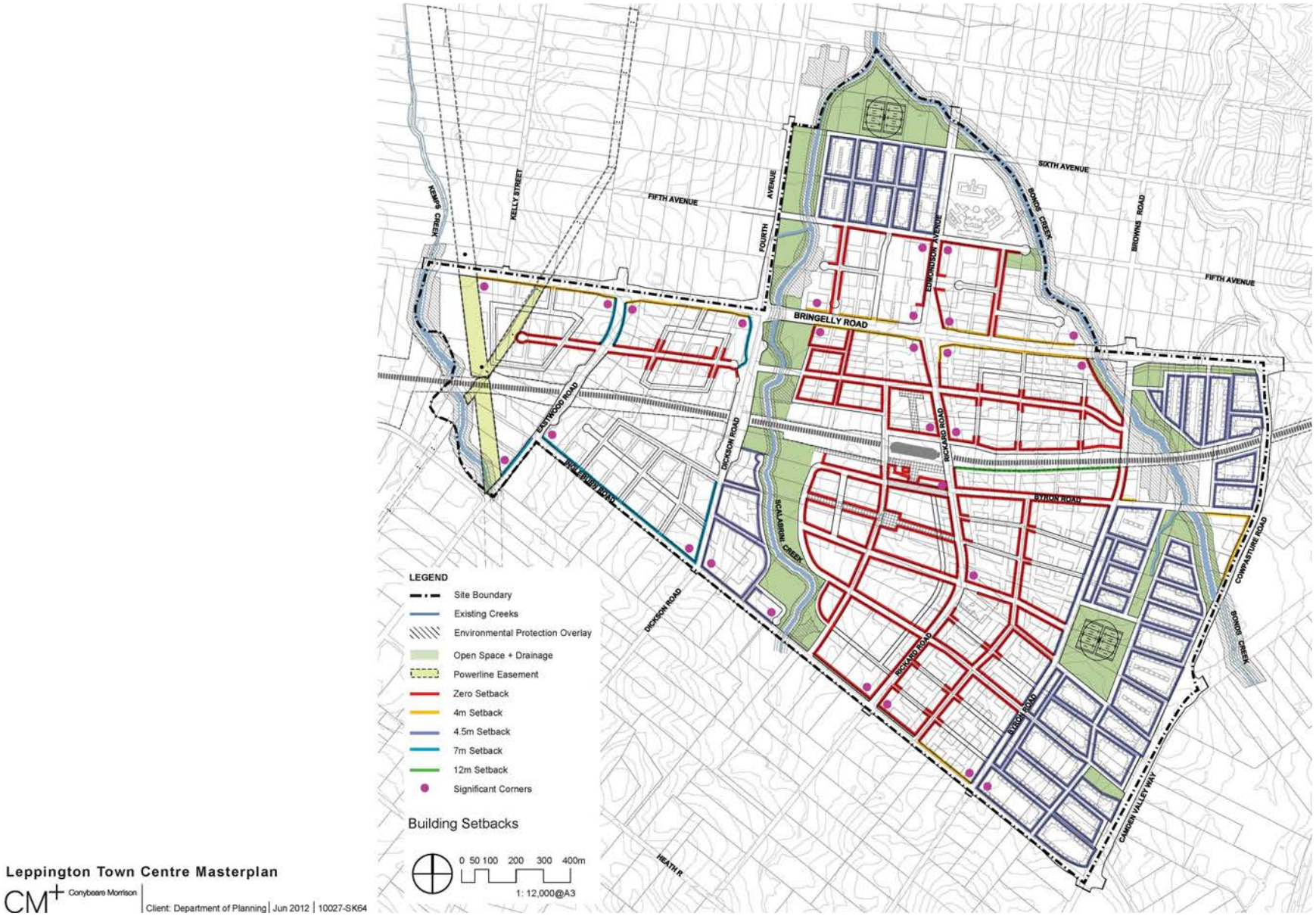


Figure 5-2: Building setbacks

5.1.3 Building height and envelope controls

Objectives

a. To control the height, bulk and scale of buildings to be consistent with the Leppington Major Centre Vision and Planning Principles.

b. To ensure appropriate sunlight penetration to streets and public spaces.

Controls

1. Maximum building heights are to be in accordance with **Figure 5-35-3**.

Note: *The Growth Centres SEPP specifies maximum building heights. The controls in this DCP are intended to provide more detailed guidance on appropriate building heights to achieve urban design, amenity and environmental sustainability outcomes for the Leppington Major Centre.*

2. The Rickard Road Transit Boulevard, Leppington Station, and prominent street corners should be reinforced in a visual context through concentrating building height and built form, as illustrated at **Figure 5-35-3**.

3. Taller buildings may also be concentrated along other major roads and adjacent to public open space, plazas and squares to emphasise and assist in way-finding to these public spaces, providing solar access requirements can still be achieved.

4. Above the first floor, building setbacks and separation distances are to be provided in accordance with the controls in Part 5 in the main body of this DCP.

Note: *it may be necessary to vary building setbacks and separation distances on upper floors from the numeric controls in Part 5 of the DCP, to ensure that privacy, amenity and solar access are provided in accordance with the relevant DCP controls.*

5. Buildings are to be designed to ensure a human scale is maintained at street level.

6. Minimum floor to finished ceiling heights are as follows:

    - Ground floor of all buildings (regardless of use): 3.6m
    - First floor for retail and/or commercial use: 3.3m
    - All other retail and/or commercial floors: 3.3m
    - All other residential floors: 2.7m

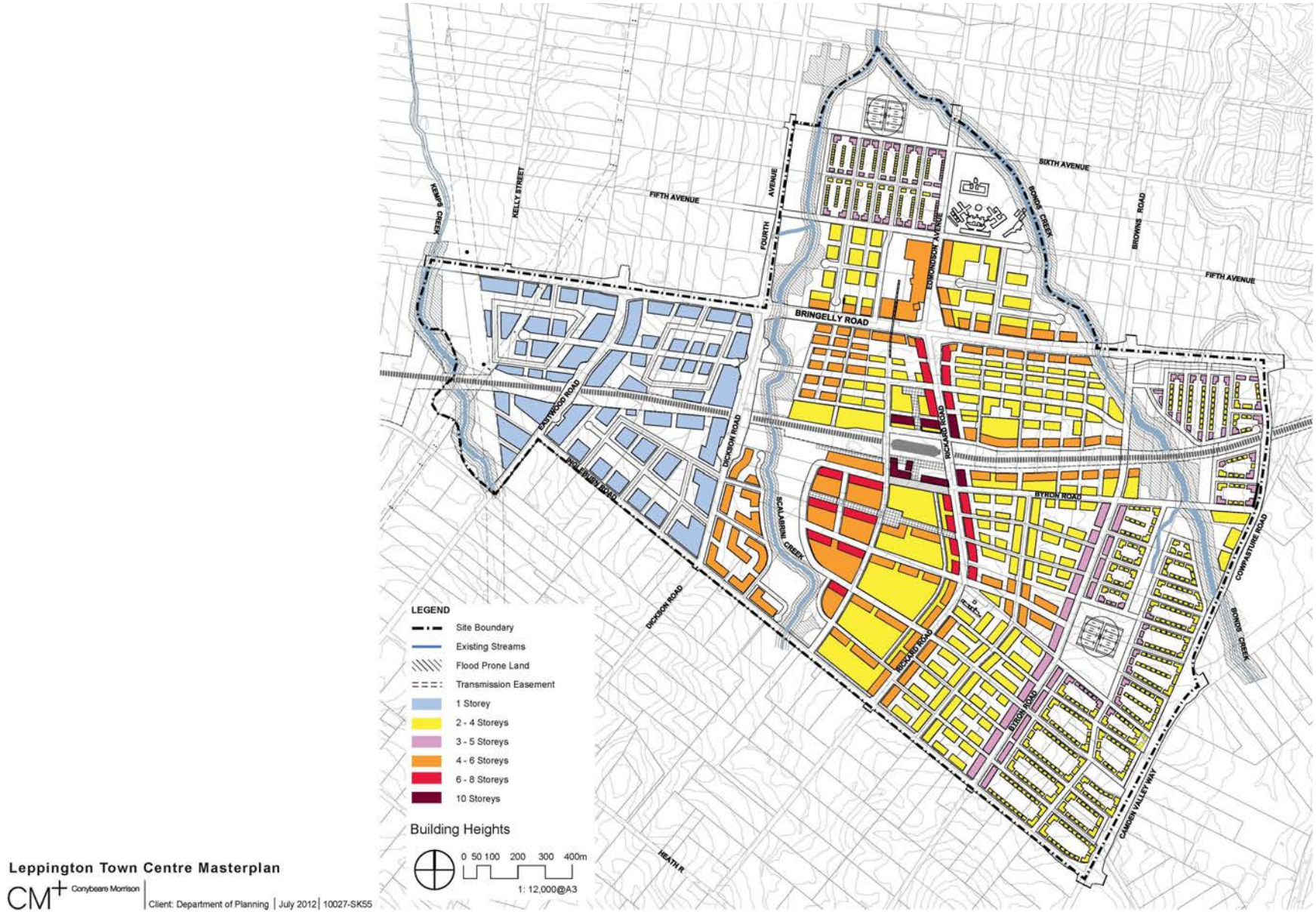


Figure 5-3: Building heights

5.2 Façade design

Objectives

a. To ensure that the design of building facades contributes positively to an attractive streetscape.

b. To encourage materials and finishes that are attractive, compliment the public domain, and are durable and easy to maintain.

c. To maximise activity and surveillance at street level.

Controls

1. Articulation zones should be provided to compliment the building mass and emphasise key design elements such as entrance points and respond to environmental conditions including solar access, noise, privacy and views.

2. External security shutters are not permitted.

3. On corner sites, shop fronts are to wrap around the corner.

4. Entries to residential or commercial lobbies, facing Rickard Road, Main Town Centre Streets or Internal Access Streets, are to be a maximum of 50% of the building frontage width or 10 metres, whichever is the lesser.

5. Architectural expression should be diverse across building groups/blocks and facades should be articulated to create visual interest.

6. There should be a contemporary architectural style based on simple primary building forms and a fine grained assemblage of elements (which may incorporate the diversity of character of streetscapes in historic towns such as Camden).

7. Façade design should create a series of vertical elements along a building length reflecting a traditional main street façade.

8. Building facades are to be designed to accentuate key architectural features and clearly delineate points of interest such as building entries, vertical and horizontal elements.

9. Building facades are to incorporate a variety of finishes and materials which provide visual relief to the built form and which complement the materials and colours adopted for the public domain (refer to **Part 4** of this Schedule).

10. Sleeve buildings are to be used to minimise the visual impact of large boxes, service areas and to define streets.

11. Roof forms and structures such as clock towers/spires are encouraged for key sites and roofs should be designed to break up the overall mass of a roof on a large building.

12. Roof elements should be used to screen mechanical plant.

5.3 Landscaping

Objectives

a. To integrate landscaping within development sites with the design of buildings and with the landscape character of the public domain.

b. To ensure landscaping contributes to an attractive streetscape, a safe environment for people, and to minimising the impacts of development on the natural environment.

Controls

1. A landscape plan is to be submitted for all development within the Leppington Major Centre where landscaped areas are required or proposed at ground level.

2. Where buildings require a setback of more than zero from the street, the setback area is to be landscaped and is to consist of predominantly soft ground with deep soil (ie. solid paving, concrete, or other impervious materials are to be minimised).

3. Landscaping within development sites is to complement the landscape character of adjoining streets and other public spaces (refer to the controls in **Part 0** of this Schedule).

4. The proportion of the site that is unpaved is to be maximised to enable maximum water infiltration. Planting is to include deep rooted tree species to assist in maintaining an appropriate water table.

5. Rainwater storage and re-use is required for all landscaping irrigation, with mains water only to be used as a backup. The capacity of on site water storage is to consider the likely water consumption required to maintain landscaped areas within the site.

6. Landscaping of development sites adjacent to Scalabrini Creek and Bonds Creek is to integrate with the natural characteristics of the existing vegetation or vegetation to be re-established along these creek corridors. Native (locally indigenous) plant species are to be the dominant landscape species in these locations.

7. Landscape plans submitted for development on bushfire-prone land (refer to the **Bushfire Risk and Asset Protection Zone Requirements** figure in **Schedule 1**) must be prepared in accordance with the NSW Rural Fire Service Planning for Bushfire Protection Guidelines.

8. Landscaping design and tree species selection is to consider solar access (in winter) and the provision of shade (in summer) to buildings, the public domain and outdoor areas within the development (including private or communal open space areas).

5.4 Water Sensitive Urban Design

Objectives

a. To protect and enhance natural water systems which may be affected by urban development.

b. To reduce storm water run-off and peak flows effected by urban development.

c. To meet stormwater quality targets through treatment systems such as bio-retention, swales, wetlands and raingardens.

d. To integrate stormwater detention and treatment with the urban structure of the Leppington Major Centre.

Controls

1. The Water Sensitive Urban Design controls in Clause 6.5 of the main body of the DCP also apply to development in the Business zones (B3, B4, B5 and B7) in Leppington Major Centre.

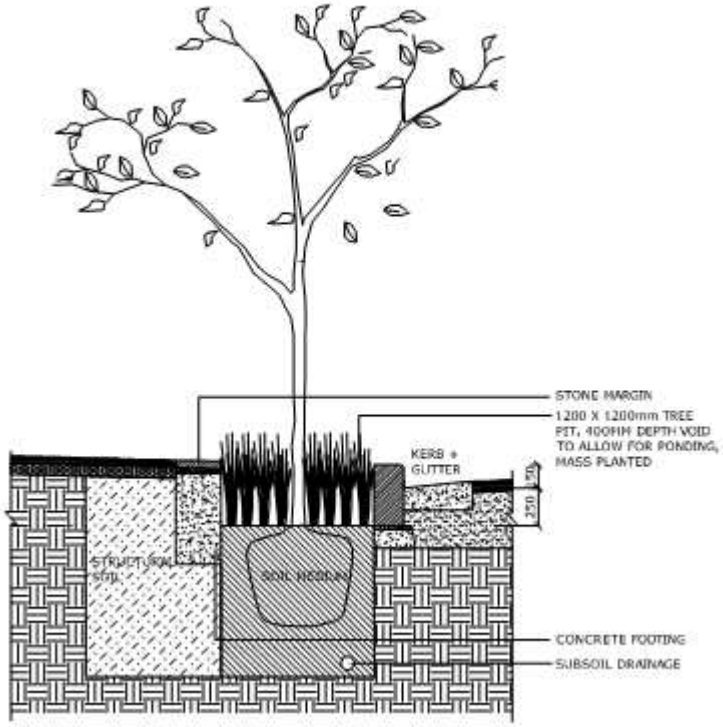
1. A Leppington Major Centre Water Sensitive Urban Design Strategy (WSUD Strategy) has been prepared by the Department of Planning and Infrastructure and is available from Council. Development applications must demonstrate compliance with the WSUD Strategy and the controls in this DCP (which take precedence over the Strategy) to Council's satisfaction.

2. Trunk stormwater detention basins and channels as shown on the Indicative Layout Plan have been designed to detain stormwater volume up to the 100 year ARI storm event from streets, residential zoned land and public spaces within the Leppington Town Centre. Detention of additional stormwater runoff as a result of other development is to be managed within the development site (on site detention) to ensure there is no increase in runoff in events up to the 100 year ARI event.

3. Where development adjoins or incorporates streets that follow drainage paths (low points), WSUD measures should be incorporated into the design of the street. Measures such as bioswales and tree pits are to be located in the road verge (as opposed to in a central median).

4. For individual Development Applications, a Water Cycle Management Strategy should be prepared by a suitably qualified consultant to demonstrate how the proposed development manages run off quantity and quality, reduces potable water use, minimises effluent production and integrates landscape irrigation with recycled water.

5. Measures to treat stormwater quality, to achieve the targets specified in clause 2.3.3 of the main body of this DCP, are to be incorporated into each development. The design and location of water quality treatment devices is to be consistent with the WSUD Strategy, and integrated with elements of the development such as car parks, landscaped areas, private open space, communal outdoor areas and setback zones.



Source: City of Ryde Public Domain Strategy

Figure 5-4: Design of tree pits

5.5 Parking, loading and access

Objectives

a. To ensure an appropriate number of parking spaces are provided within the Leppington Major Centre to service the needs of businesses, residents and visitors.

b. To encourage modes of travel other than private cars for travel within and to the Leppington Major Centre.

c. To ensure efficient and safe access for delivery and service vehicles to businesses within the Leppington Major Centre.

d. To provide integrated vehicle, bicycle and service access points without compromising streetscape character or pedestrian amenity.

Controls

1. On street parking to be provided throughout the centre in accordance with the cross sections in **Part 4** of this Schedule to contribute to street life and surveillance.

2. Rates of provision for car parking are to be determined with reference to the car parking rates specified in Part 4 of this DCP for residential development, Part 5 for commercial and retail development and Part 6 for industrial development. Rates may be modified (subject to agreement by Council), or Council may restrict the provision of parking to a maximum number of spaces because:

    - Access to public transport means that dependence on private cars is reduced within the Leppington Major Centre, or
    - Traffic congestion is likely to occur because parking provision generates traffic volumes in excess of planned road capacity, or
    - The required rate of car parking would result in detrimental impacts on the character and amenity of the centre, or
    - On street parking is available in proximity to the proposed development, reducing demand for internal car parking, or
    - Provision is made for other modes of transport eg. Walking and cycling that would reduce the demand for car parking, or
    - Efficiencies in car parking use are achieved by locating the proposed development adjacent to another development or land use that has spare car parking capacity (in general or at certain times of the day) or where parking provision can be shared between the developments, or
    - Shared use of car parking by commuters and the development is proposed, or
    - A detailed assessment of required provision of car parking demonstrates that parking will be appropriately provided at a rate which differs from the standards.

3. Rooftop parking is discouraged to preserve the future amenity for residential flat buildings located in the centre.

4. Below ground car parking is encouraged for higher density residential and mixed-use development and for major retail and commercial development.

5. The majority of car parking is to be provided under or behind buildings, and on street to limit visual impact and maintain pedestrian amenity.

6. Where multi-level parking is proposed above ground, the car park is to be screened from view from Rickard Road, Main Town Centre Streets and Internal Access Streets by buildings that present an active façade to the street.

7. Parking, loading and service areas are to be accessed predominantly from Secondary Town Centre Streets.

8. At grade car parking is permitted where the main access is from a Secondary Town Centre Street and where site landscaping and buildings provide appropriate visual screening from public places.

9. Car parks are not to be visible from public parks, squares or plazas.

10. Where below ground parking is along a street edge and cross ventilation is desirable, any exposed section of car park wall is to be appropriately modelled and scaled.

11. Natural ventilation of basement and sub-basement parking areas is encouraged to be provided wherever possible.

12. Service vehicle access points should be consolidated where possible to limit the potential for conflict points.

13. Bicycle racks/storage areas are to be provided in all developments in accordance with the requirements of Part 5 of the main body of this DCP. Bicycle racks/storage areas should be provided for both residents/employees and site visitors.

14. Within the B5 Business Development zone, between Bringelly Road and Fifth Avenue, car parks are to be located internally (i.e. behind buildings that provide frontages to Bringelly Road, Fifth Avenue and Edmondson Avenue).

15. Within the B5 Business Development zone, where car parking, loading or service areas are located adjacent to land zoned for public recreation, landscaping is to be used to screen the car park from view from the public recreation land.

16. Loading and service areas are not to be located adjacent to or across a road from land zoned for residential or public recreation purposes.

5.6 Development and use of flood prone land

Objectives

a. To enable development that is appropriate to the level of flood risk that applies to parts of Leppington Major Centre.

b. To maximise the development potential of land in Leppington Major Centre, and the productive use of land that is affected by flooding.

c. To ensure that development does not create an increased risk of flooding or changes to flooding conditions.

Controls

1. Development within the 100 year ARI flood extent, as shown on the Floodprone Land figure in Schedule 1, is only to occur where the controls relating to flood prone land in Part 2 of the main body of this DCP are met.

2. Use of flood prone land for activities that are ancillary to development on adjoining (non flood prone) land are encouraged, subject to compliance with Council's Floodplain Risk Management Policy and the Precinct Water Cycle Management Strategy (available from Council), and may include:

    - Communal areas or private open space associated with residential or mixed use development or development in the Business Park.
    - Landscaping.

5.7 Heritage

Objectives

a. To conserve and enhance the heritage significance of heritage items.

b. To retain an appropriate landscape setting for the item and views associated with the place.

c. To encourage ongoing use of heritage items, including adaptive reuse where this will contribute to the conservation of the item.

Controls

1. Developments in the vicinity of Leppington School Heritage Item must be sympathetic to the scale, massing and character of the significant weatherboard buildings and their garden setting. Buildings shall not exceed two storeys in height within 10 metres of the curtilage of the Leppington School site. Developments shall incorporate landscape treatments to ensure an appropriate transition of building scale between the heritage item and adjacent development.

2. Developments that coincide with the former Eastwood Road historic road alignment shall conserve elements of the original road alignment within the landscape, either by means of a natural landscape corridor or other forms of interpretation such as explanatory signage.

5.8 Staging of development

Objectives

a. To recognise that development of the Leppington Major Centre will occur progressively over a number of years and that early stages of development have the potential to influence long term outcomes for the centre.

b. To ensure that development, at all stages of the development of the centre, is consistent with the Leppington Major Centre Vision and Planning Principles.

c. To maximise the efficient delivery of infrastructure necessary to enable development to occur in the centre.

Controls

1. Development in the early stages of growth in the centre should be designed, oriented and located to comply with the relevant controls in this schedule, or to not preclude future development from complying with the controls and Planning Principles.

2. To the extent that it is practical, early development in the centre is to consider the layout, orientation and scale of future stages of development that may occur and whether the proposed development will enable future stages of development to occur.

3. In support of Control 2, Council may require the applicant to submit concept plans showing how the proposed development would integrate with potential future stages of development on the land or on adjoining land, in a manner that is consistent with the controls in this Schedule.

4. Temporary access arrangements may be agreed to by Council in situations where the road network is not sufficiently developed to enable compliance with the parking, loading and access requirements of clause 5.4. Where temporary access arrangements are proposed, applicants are to demonstrate how the development will enable transition to permanent access arrangements that comply with clause 5.4 when the road network is sufficiently completed.

5. To enable the efficient development of land in the early stages of the centre, Council may consider amendments to the locations of roads as shown on the Indicative Layout Plan, where necessary to maximise the development potential of land or to ensure that appropriate access is provided.

6. Despite Control 5, the locations of the Main Street, Bus Interchange Street and Town Centre Streets are generally fixed and applicants will be required to construct these roads at, or as close as possible to, the locations shown on the Indicative Layout Plan.

7. Council will generally require the full width of roads to be constructed as part of any development proposal that requires the construction of a new road, except for the road verge and footpath on the side opposite the development, where applicants can demonstrate to Council that that verge and footpath is not required to service the proposed development. Where the new road straddles a property boundary, Council may accept amendment to the location of the road to ensure the full road

carriageway width (and full width of verges/footpaths where required) can be constructed within the development site.

8. Construction of half road widths will only be permitted where the applicant can demonstrate to Council that the half road will have sufficient capacity and be safe for the predicted traffic volumes. Half roads will not be permitted where they form the primary means of vehicular access to parking areas for retail premises or commercial premises.

9. **Figure 5-55-4** illustrates the potential staging of development in Leppington Major Centre, based on factors including likely water, sewer and electricity servicing, development of the road network and demand for different types of development in the town centre. The staging of development is not required to occur as shown on **Figure 5-55-4**, but is to consider the other requirements of this clause to contribute to the orderly and efficient development of the centre.

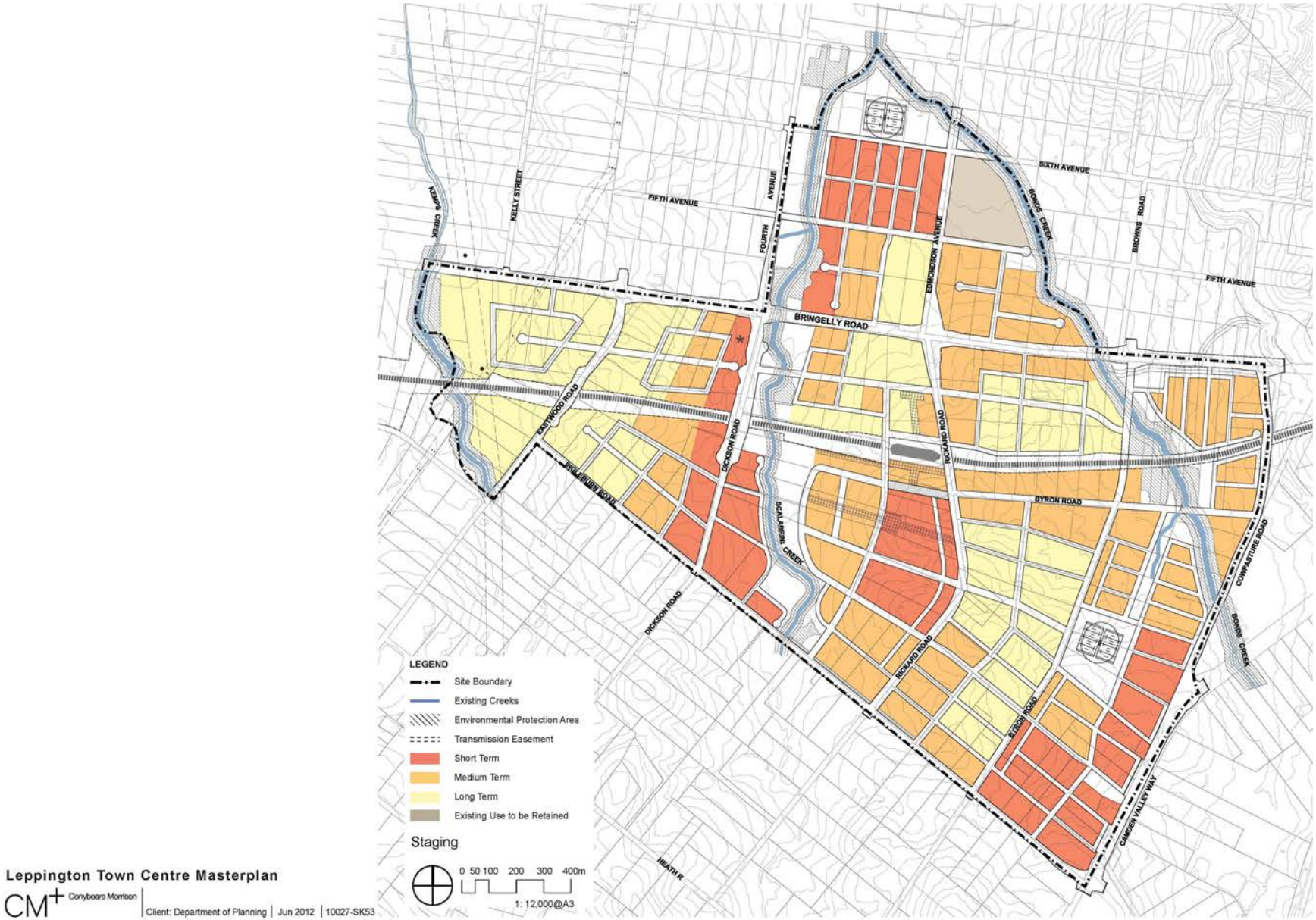


Figure 5-5: Indicative development stages in Leppington Major Centre

Schedule 3

East Leppington Precinct

Contents

Figures

Tables

1 Introduction

1.1 Name and application of this Schedule

This schedule forms part of the Liverpool Growth Centre Precincts Development Control Plan (also referred to as the 'Main DCP').

This schedule applies to all development on the land shown in **Figure 1-1** being that portion of the East Leppington Precinct located within the Liverpool Local Government Area (LGA). This schedule and related amendments to the Main DCP give effect to the provisions of the DCP for land within the East Leppington Precinct as shown on the Land Application Map.

1.2 Structure of this Schedule

This schedule should be read in conjunction with the Main DCP and is in addition to the Main DCP. In the event of an inconsistency between this Schedule and the Main DCP, this Schedule prevails.

Table 1-1 summarises the structure of this Schedule – East Leppington Precinct.

Table 1-1: Structure of this Schedule

Part	Summary
1 – Introduction	Identifies the land to which the Schedule applies.
2 – Subdivision Planning and Design	Establishes an overall vision and Indicative Layout Plan (ILP) for the East Leppington Precinct and supports the development controls in **Parts 2**, **3** and **4** of the Main DCP.
3 – Centres Development Controls	Provides specific objectives and controls that apply to land within the East Leppington neighbourhood centre, identified on the Indicative Layout Plan for the East Leppington Precinct. These controls are in addition to those in **Part 5** of the Main DCP.
4 – Site Specific Controls	Outlines specific objectives and controls for development in certain parts of the Precinct, including land affected by electricity and gas easements, heritage, and land adjacent to the Upper Canal, Denham Court Road and Camden Valley Way.

Additional notes to readers are provided throughout this document. These notes are not part of the formal provisions of the DCP, but are intended to provide additional guidance and explanation of the provisions.

If further guidance is required on the interpretation of provisions in the Main DCP, readers should refer to the definitions within the Main DCP and State Environmental Planning Policy (Sydney Growth Centres) (also referred to as the Growth Centres SEPP).

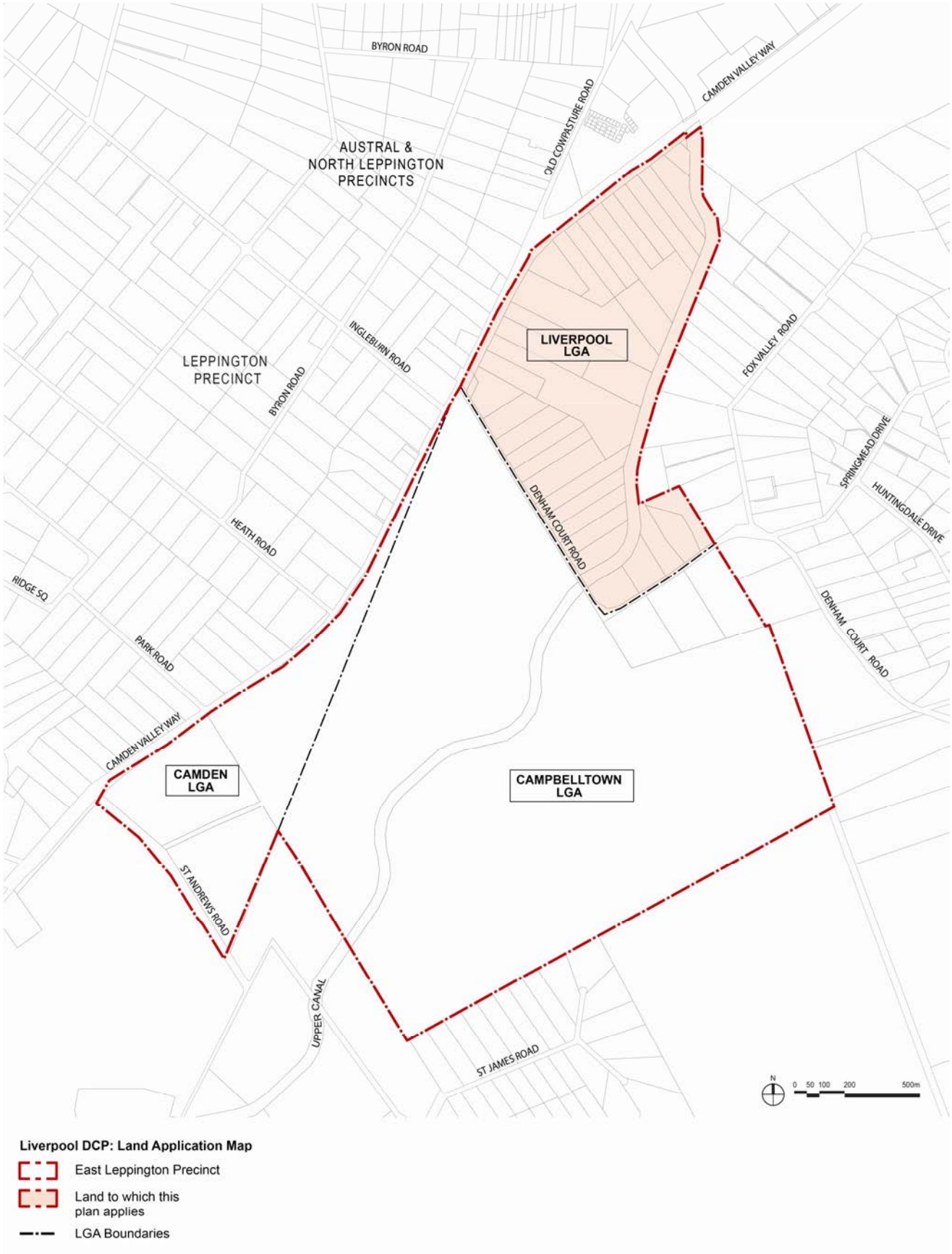


Figure 1-1: Land Application Map

2 Subdivision Planning and Design

2.1 East Leppington Precinct Vision

The vision for East Leppington Precinct is to develop a series of new walkable residential neighbourhoods supported by local retail, community and recreation facilities in an environmentally sustainable manner.

The Precinct as a whole will provide for:

- A range of residential densities, housing types and affordability options to meet the needs of a diverse and growing community.
- Detached housing comprising the majority of residential development, with medium density development located close to the Centres and along bus routes with areas of higher amenity with larger lots on the periphery of the Precinct.
- A Local Centre in the south providing a mix of retail, commercial and community services to cater for the needs of local residents in the Campbelltown part of the precinct. Located off Camden Valley Way it will be highly accessible and surrounded by medium density residential and mixed use development.
- A Neighbourhood Centre to the north serve the daily needs of the local community in the Liverpool part of the Precinct.
- A public domain that will include for the Liverpool part precinct:
    - passive recreation opportunities maximised along the Bonds Creek riparian corridor;
    - where possible, remnant vegetation retained in public parks; and
    - open space close to medium density housing and the neighbourhood centre.
- For the Campbelltown part precinct a public domain that will include:
    - conservation of areas containing endangered ecological communities;
    - special places focused on important landscape and cultural features including the Leppington House archaeological site;
    - sporting fields for active recreation opportunities; and
    - protection of the visual and landscape quality of the Scenic Hills.
- The incorporation of principles of ecological sustainability and measures to ensure that the important historic, environmental and visual elements of the Precinct are recognised and protected for future generations.

2.2 Referenced Figures

The figures included in this section are those referenced in the following parts of the Main DCP:

Part 2 Precinct Planning Outcomes;

Part 3 Neighbourhood and Subdivision Design;

Part 4 Development in the Residential Zones; and

Part 5 Centres Development Controls.

2.3 Cross references between Schedule and Main DCP

For ease of reference the following table links the figures in this Schedule with the provisions in the Main DCP.

Table 2-2: Cross References

Referenced Figures in this Schedule	**Related Section in Liverpool Growth Centres DCP (Main DCP)**
Figure 2-1 – Indicative Layout Plan	Section 2.2 of Main DCP
Figure 2-2 – Flood Prone Land	Section 2.3.1 of Main DCP
Figure 2-3 – Key Elements of Water Cycle Management and Ecology Strategy	Section 2.3.2 of Main DCP
Figure 2-4 – Areas of Potential Salinity Risk	Section 2.3.3 of Main DCP
Figure 2-5 – Aboriginal cultural heritage	Section 2.3.4 of Main DCP and Section 4.1 of this Schedule
Figure 2-6 – European cultural heritage	Section 2.3.4 of Main DCP
Figure 2-7 – Bushfire Risk and Asset Protection Zone Requirements	Sections 2.3.5 and 2.3.6 of Main DCP
Figure 2-8 – Location of easements (electricity & gas)	Section 2.3.8 of Main DCP
Figure 2-9 – Odour	Section 2.3.10 of Main DCP
Figure 2-10 – Potential noise attenuation measures	Section 2.3.9 of Main DCP
Figure 2-11 – Residential Structure	Section 3.2 of Main DCP
Figure 2-12 – Precinct Road Hierarchy	Section 3.2.3 of Main DCP
Figure 2-13 – Pedestrian and Cycleway Network	Section 3.2.4 of Main DCP
Figure 3-2 – Desired Future Layout of the Centre	section 5.3.1 of Main DCP

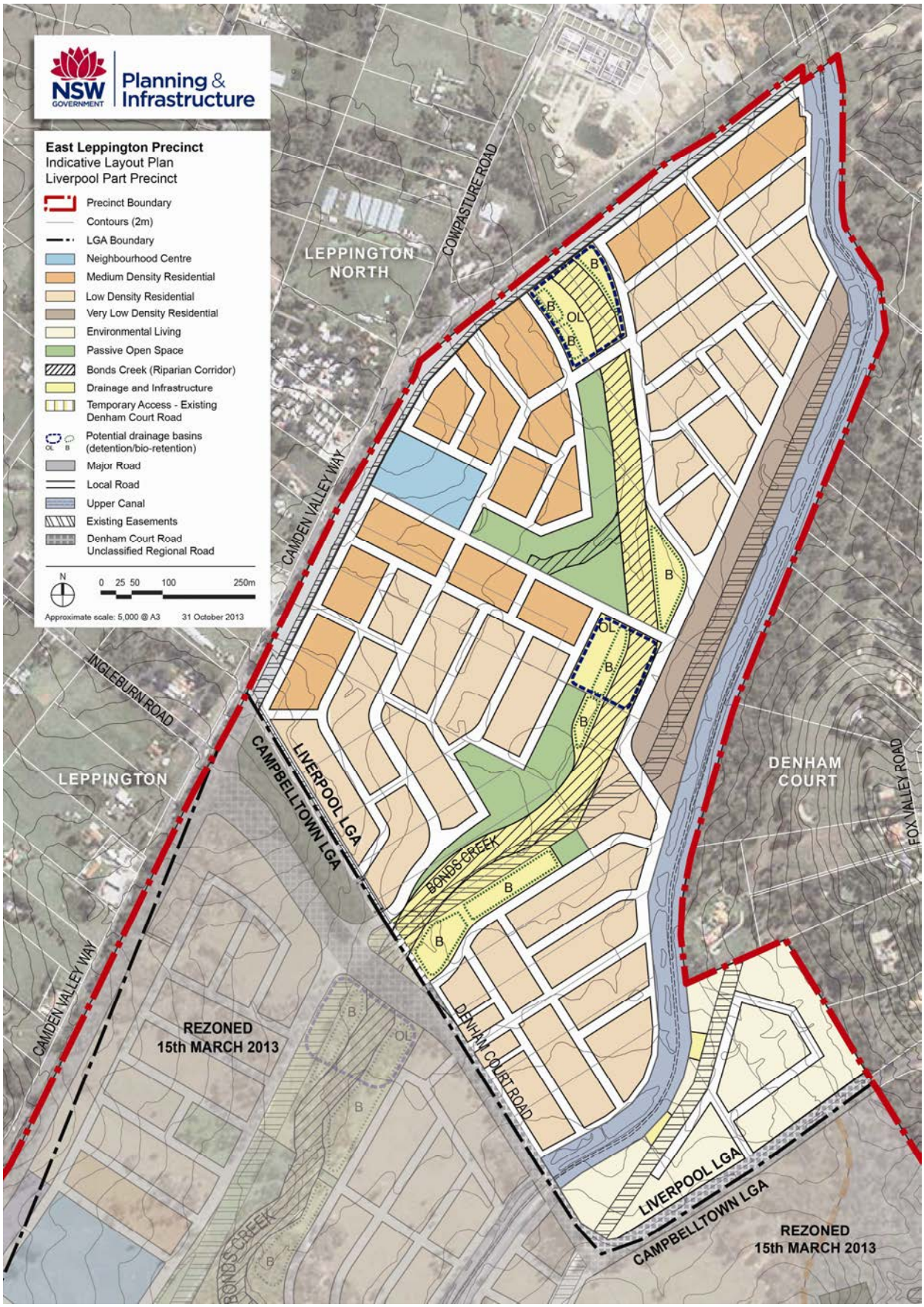


Figure 2-1: Indicative Layout Plan

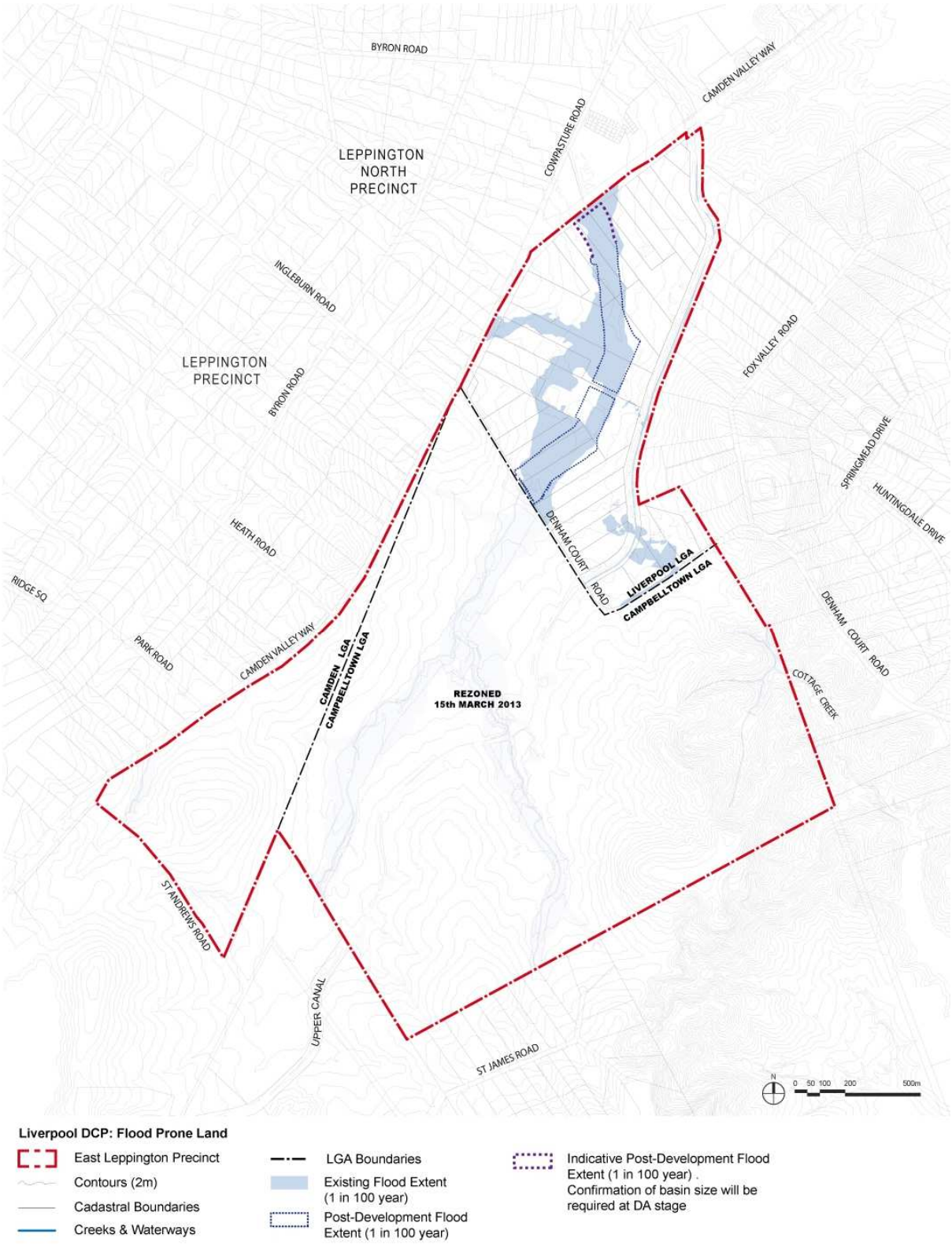


Figure 2-2: Flood prone land

Figure 2-3: Key elements of water cycle management and ecology strategy

***Note**: Refer to the Water Cycle Management Report for East Leppington June 2013.*

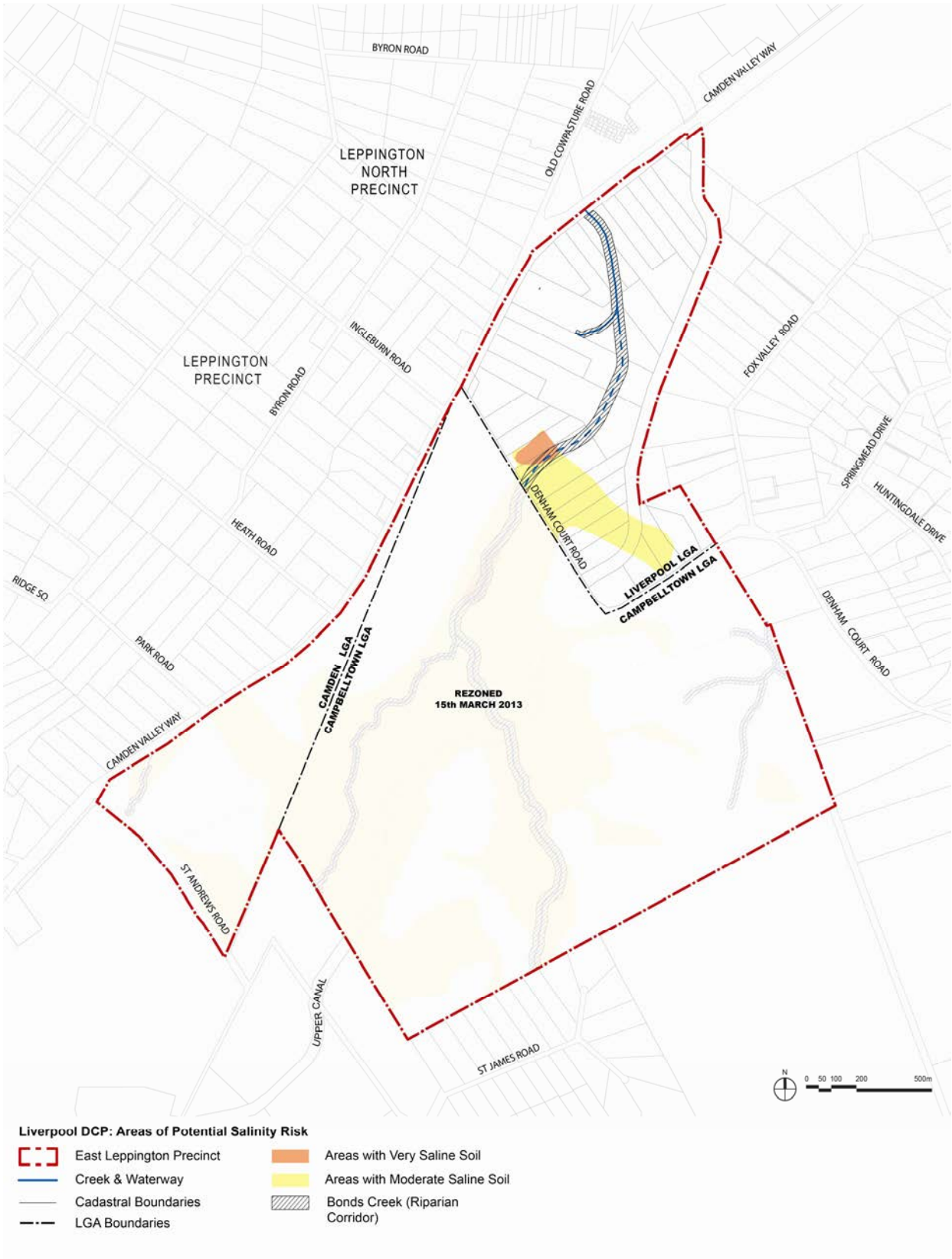


Figure 2-4: Areas of potential salinity risk

***Note**: Refer also to the East Leppington Preliminary Environmental Site Assessment 2012 by JBS for additional information on salinity.*

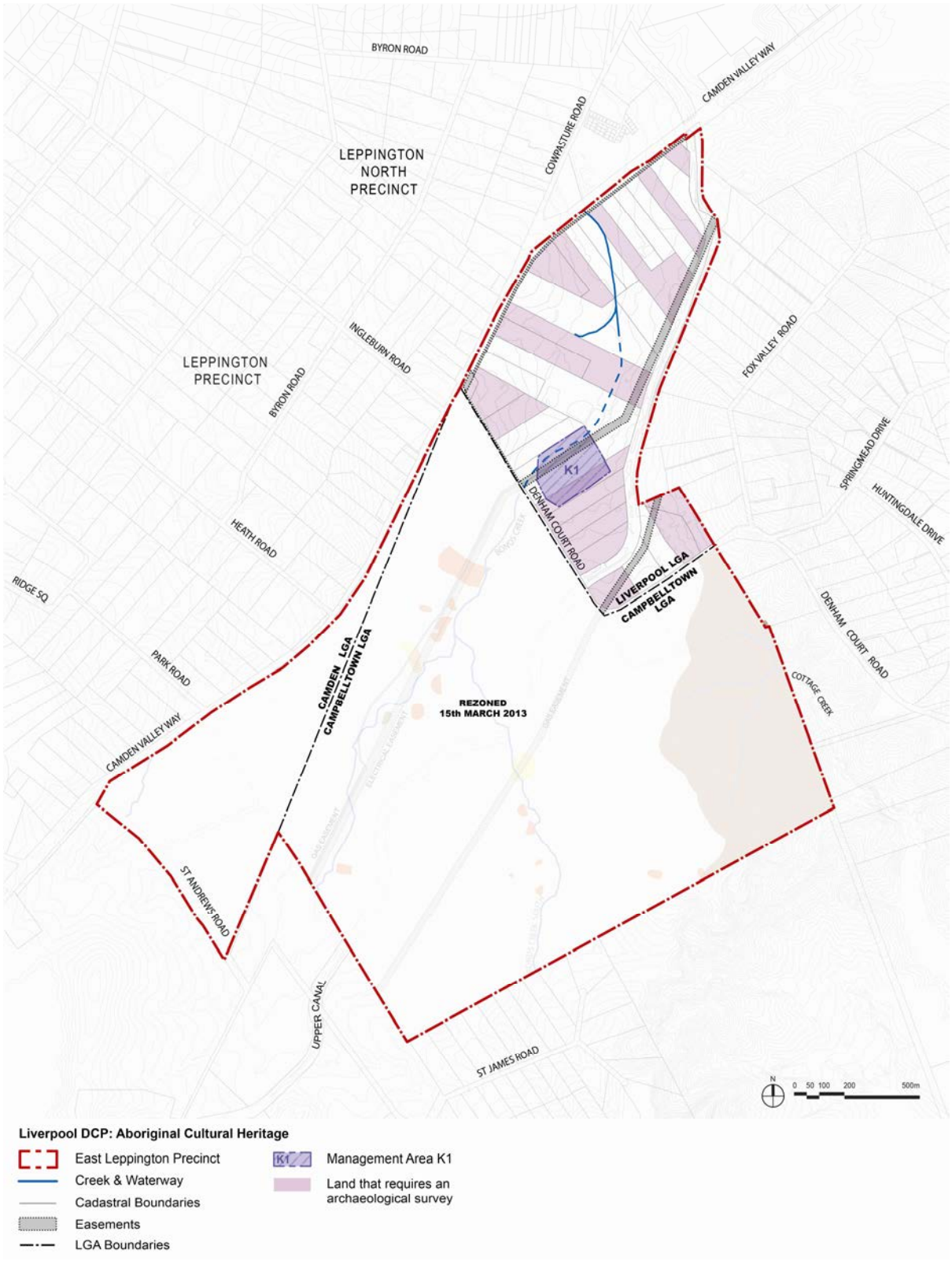


Figure 2-5: Aboriginal cultural heritage

Note: Refer to East Leppington Precinct Planning Indigenous and Non-Indigenous Heritage Assessment report dated June 2012. Specifically to Appendix D East Leppington Lands North of Denham Court Road – Aboriginal Archaeological Technical Report.

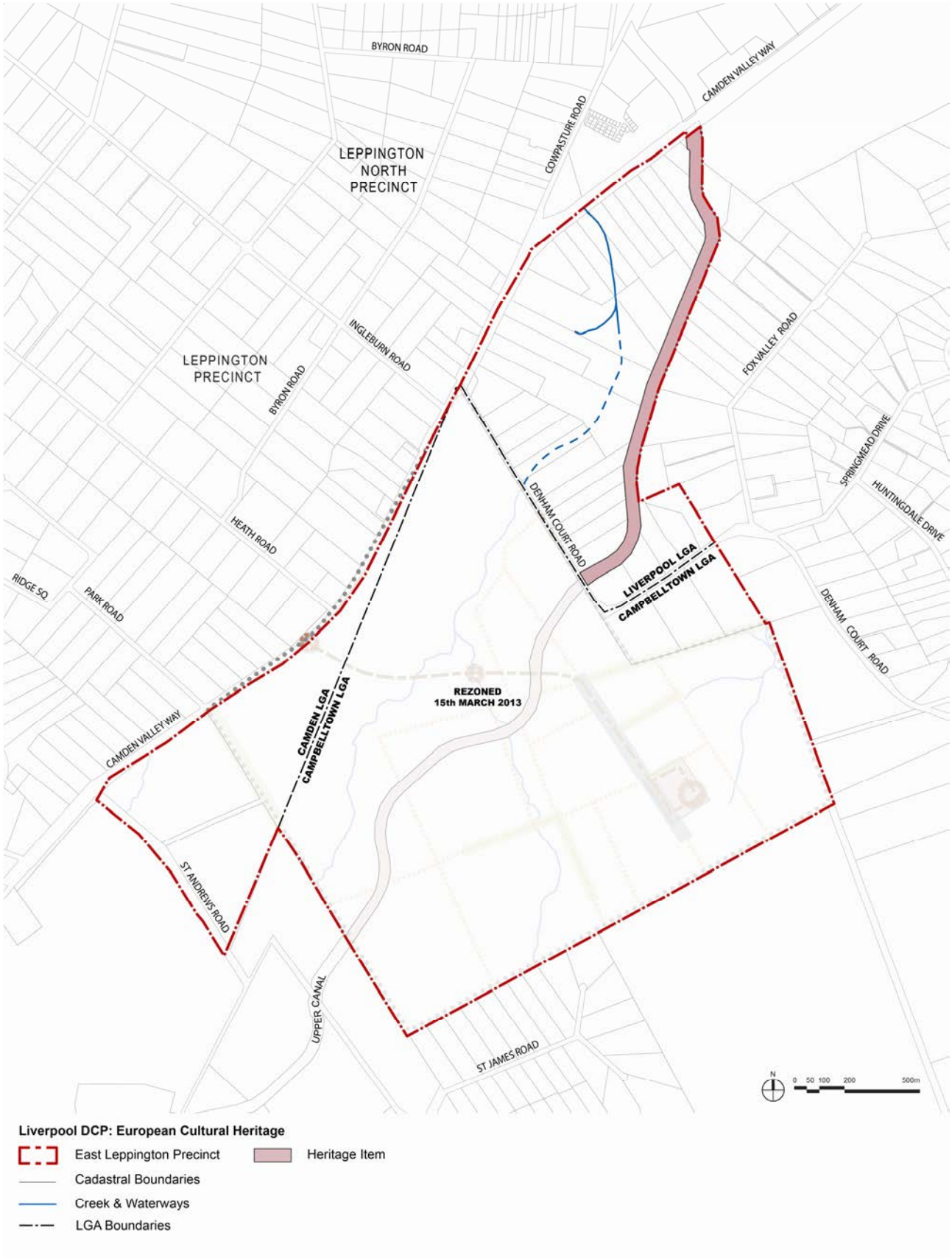


Figure 2-6: European cultural heritage

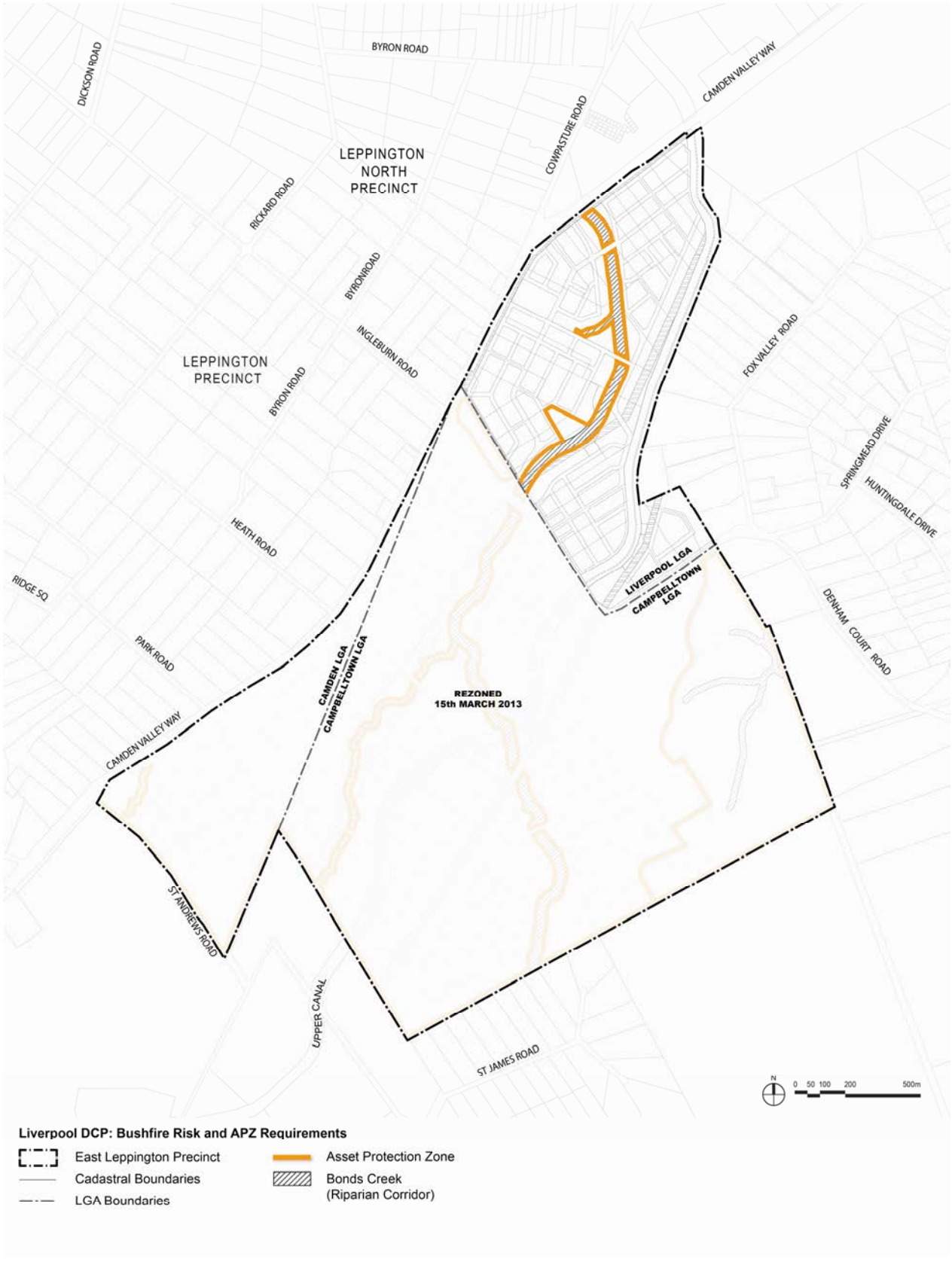


Figure 2-7: Bushfire Risk and Asset Protection Zone Requirements

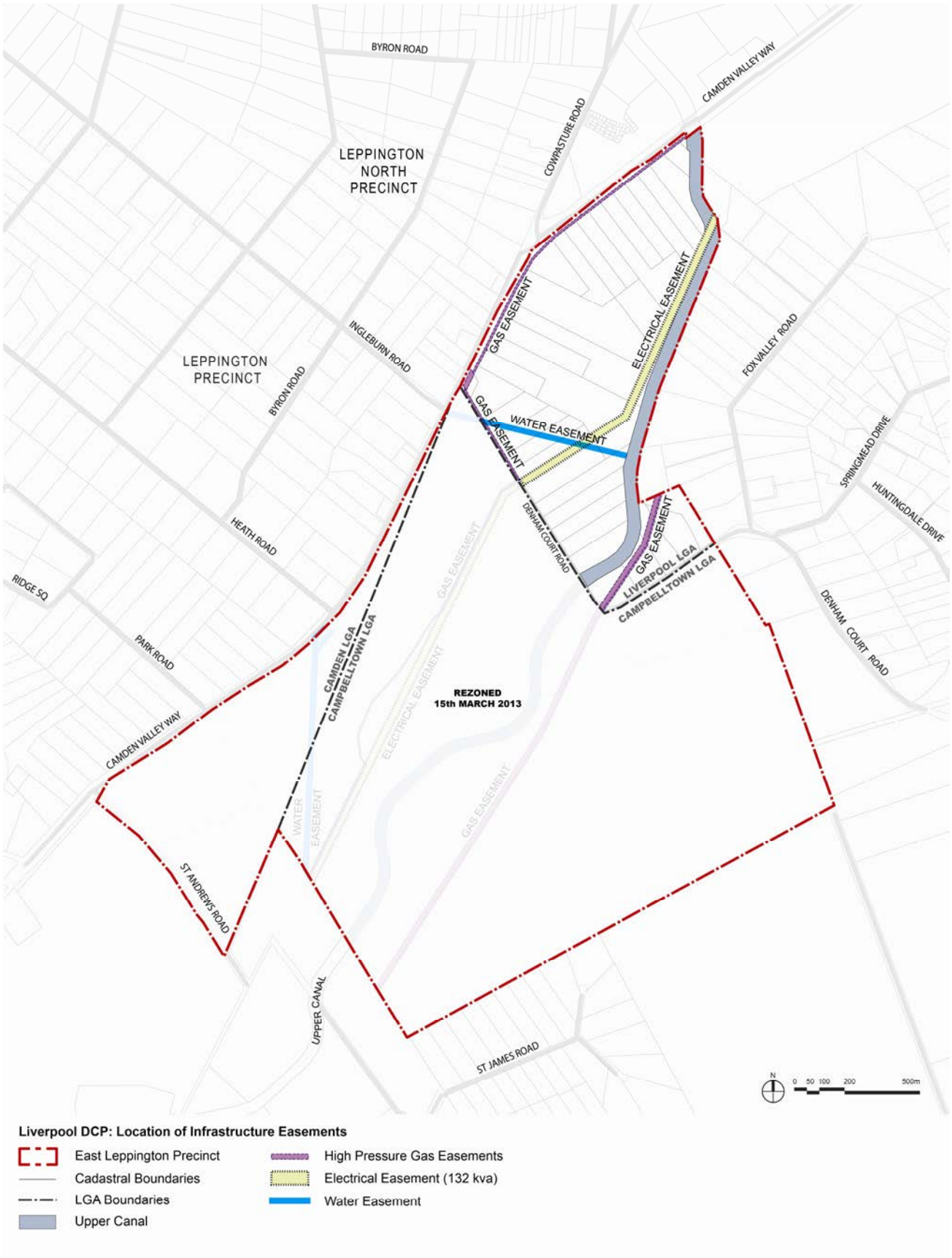


Figure 2-8: Location of easements (electricity, gas and water)

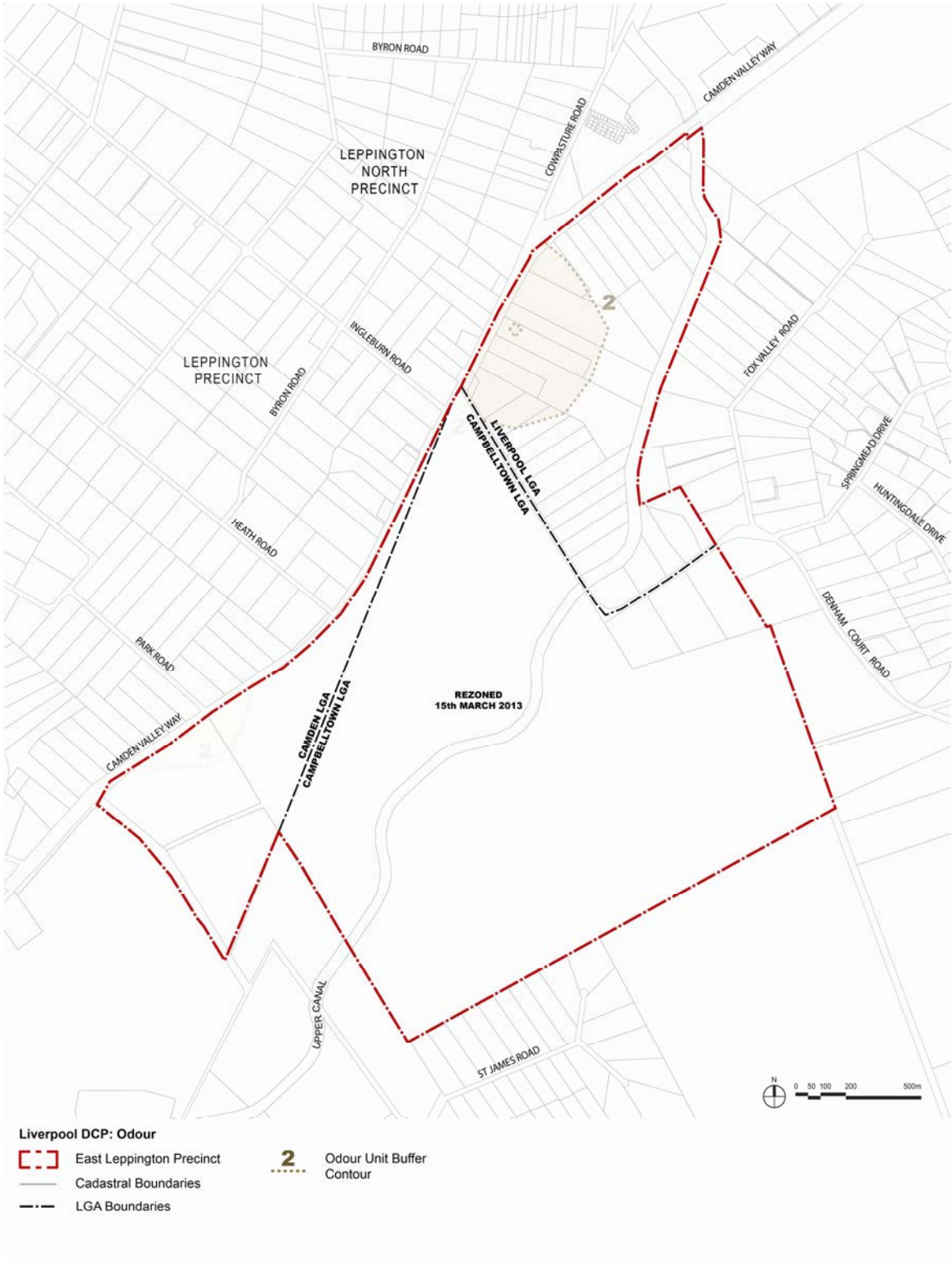


Figure 2-9: Odour

***Note**: The odour performance criteria for proposed development is 2 OU(odour threshold) which requires that odour levels be complied with 99% of the time, meaning that odour levels can only be exceeded for a time equivalent to 1% of the year.*

The 2 odour unit assessment criterion should be applied to a residential development in the Precinct. Refer to the technical study Preliminary Odour Impact Assessment by JBS 2011.

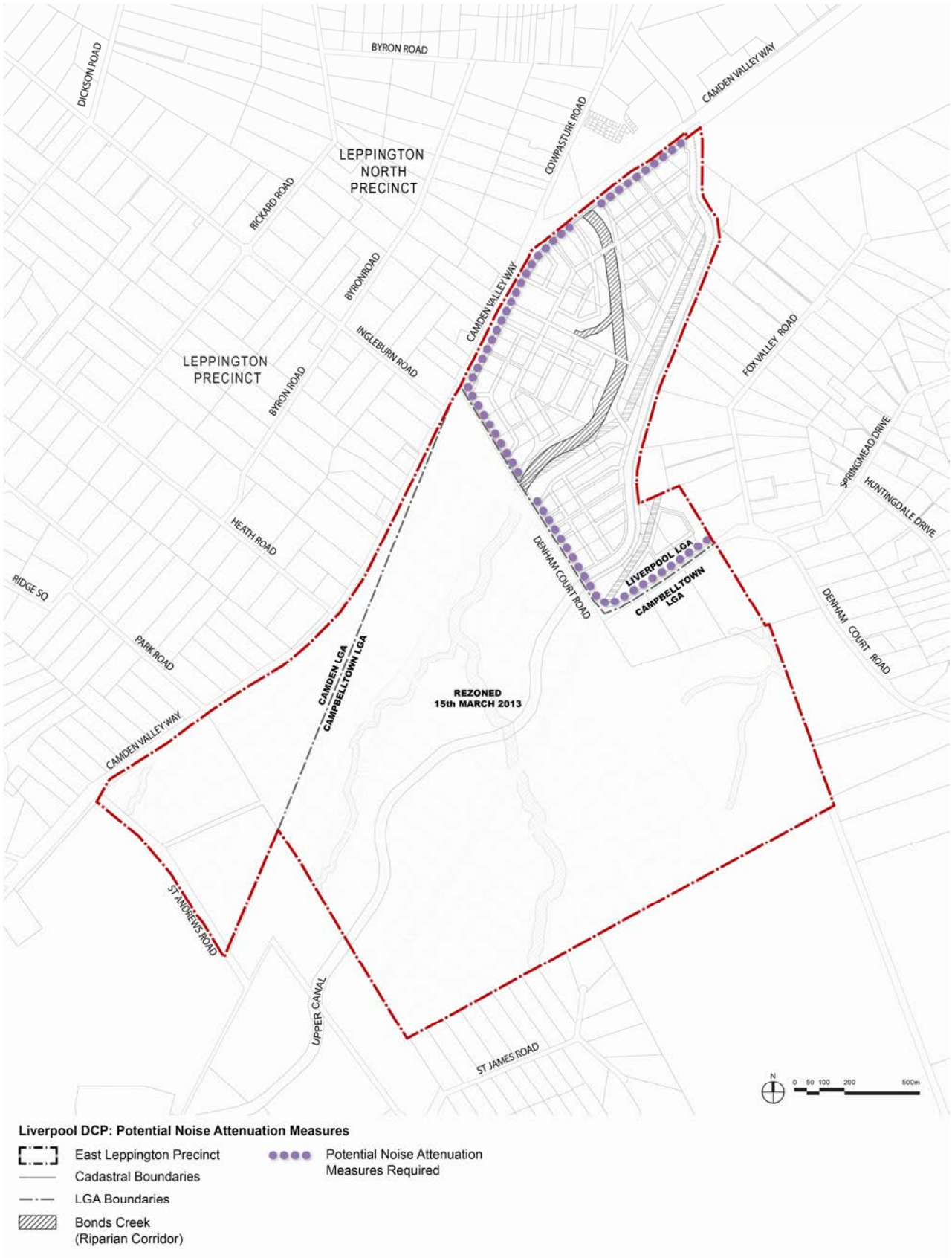


Figure 2-10: Potential noise attenuation measures

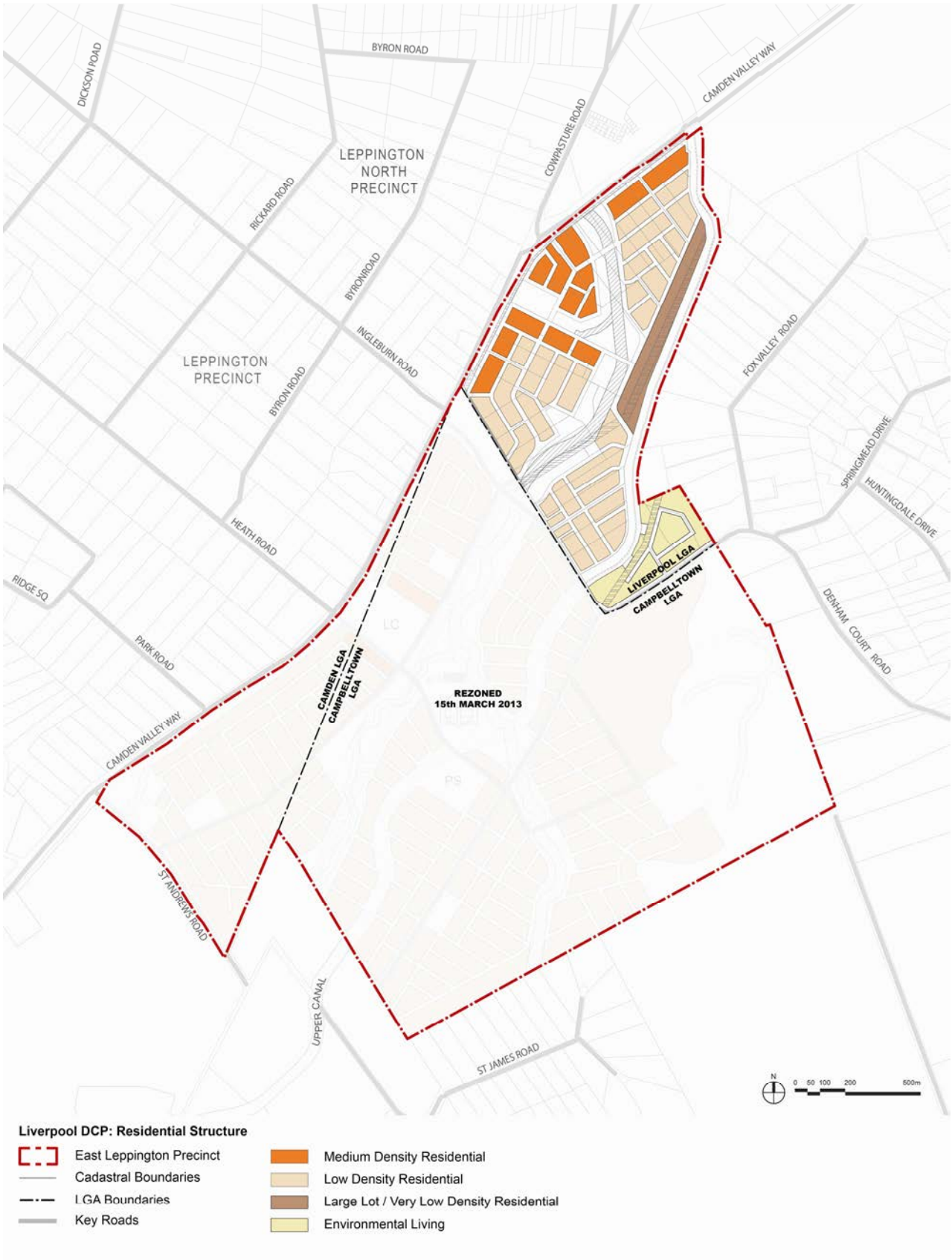


Figure 2-11: Residential structure

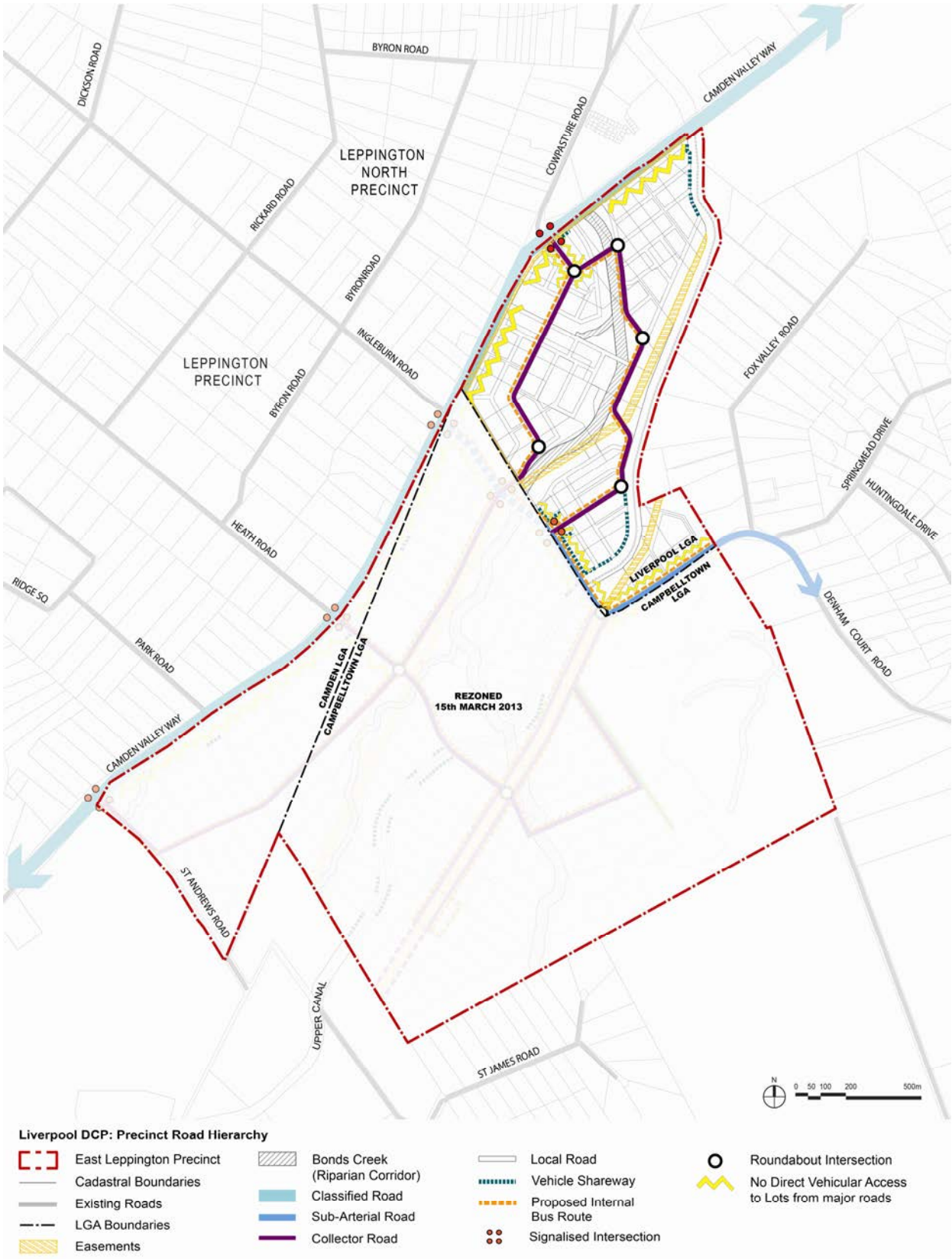


Figure 2-12: Precinct road hierarchy

Note 1*: The proposed bus routes in Figure 2-12 are indicative only. Bus routes will be determined as development proceeds based on the Precinct road hierarchy and demand.*

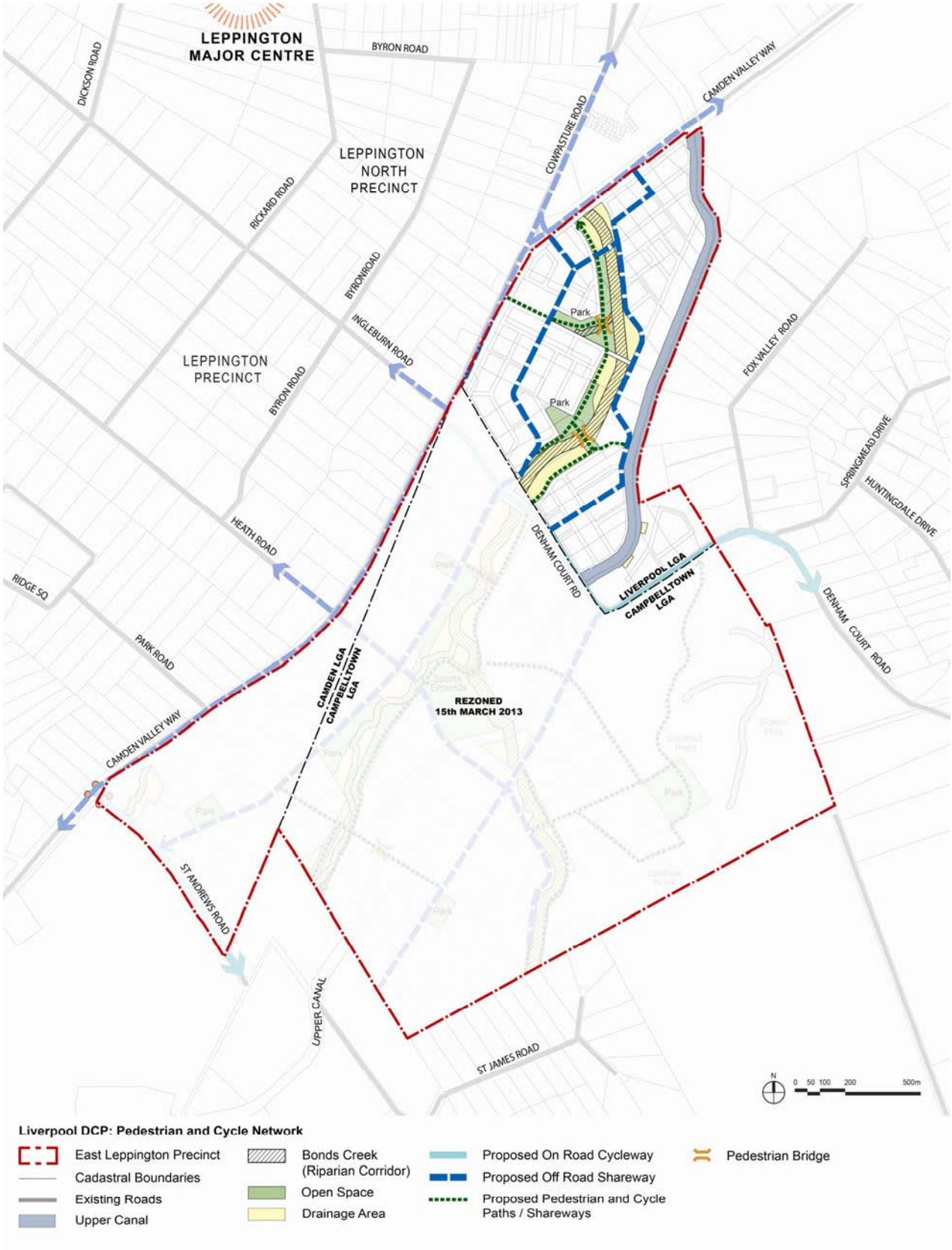


Figure 2-13: Pedestrian and cycleway network

2.4 Street Network and Design

Note: *The objectives and controls of this section must be read in conjunction with Section 3.2.3 of the Main DCP.*

Objectives

a. To ensure the street network in the East Leppington Precinct provides clear, safe and convenient access within and beyond the Precinct.

b. To enable road design and construction to respond to particular site constraints or opportunities.

c. To ensure that road construction on land adjoining gas easements or that may cross the easement considers potential impacts on the integrity and safety of the gas pipeline.

d. To ensure reasonable standards of public amenity and a high quality public domain in the Precinct.

e. To support a hierarchy for the road system and identified connections to Camden Valley Way and Denham Court Road.

Controls

1. The design and construction of streets is to be consistent with the road layout in **Figure 2-12**, the relevant typical designs in the Main DCP, and Council's Engineering Design Guide.

2. The locations of road intersections connecting to Camden Valley Way and Denham Court Road are to be consistent with the ILP and the Precinct road hierarchy **Figure 2-12** and are to include relative provision for turning lanes on these roads.

3. A local street or accessway is to separate residential development from Camden Valley Way and Denham Court Road. Typically these streets run parallel and adjacent to Camden Valley Way and Denham Court Road as indicated on the ILP.

4. The local street or accessway separating development and Camden Valley Way is to be designed in accordance with **Figure 2-14** which encourages a wider landscape buffer (providing for tiering of vegetation) to improve visual amenity for residential lots facing Camden Valley Way. The dimensions within this street corridor are flexible and can be varied to respond to localised conditions to the satisfaction of Council.

5. The design and location of the roads and of the acoustic or landscape treatment adjacent to Camden Valley Way and parts of Denham Court Road are to take into account the existing underground gas pipelines and easement. Refer to Section 4.3 of this DCP Schedule.

6. Where rear lane access is provided it is to be in accordance with the minimum dimensions of Figure **2-15**.

7. Significant individual trees may be incorporated within appropriate setbacks on individual lots.

8. The upgrading and re-alignment of Denham Court Road must consider the Water Cycle Management Report East Leppington June 2013 and manage drainage impacts.

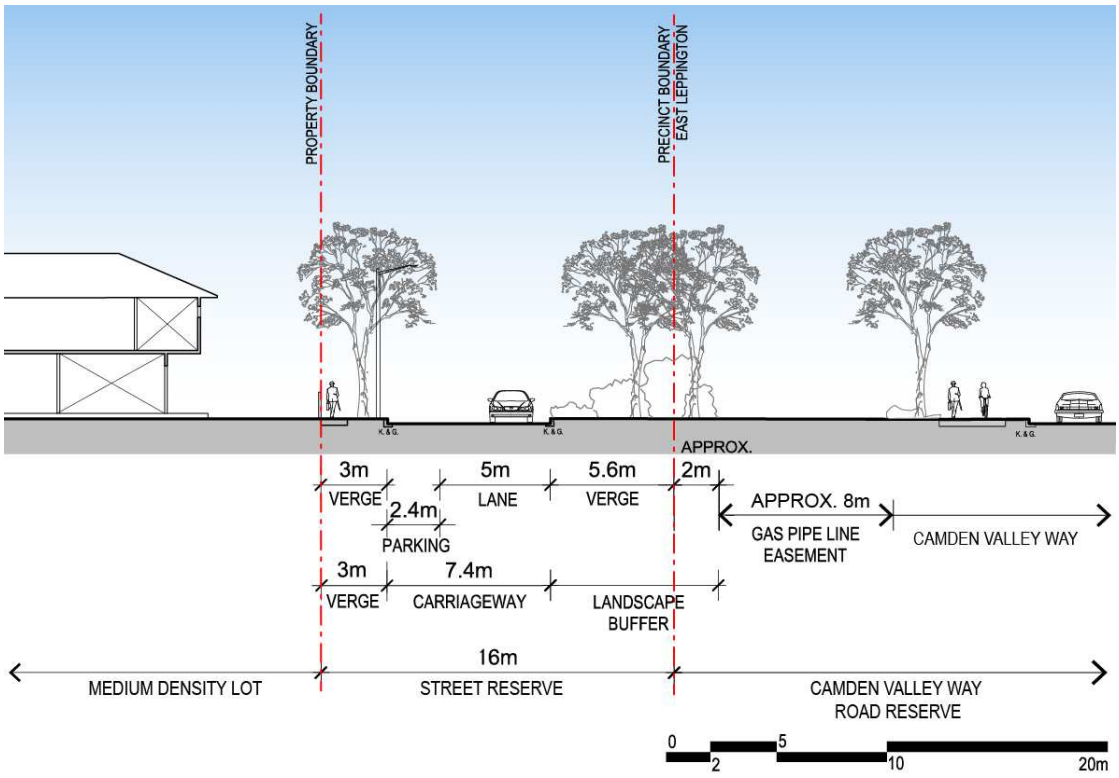


Figure 2-14: Street reserve to Camden Valley Way

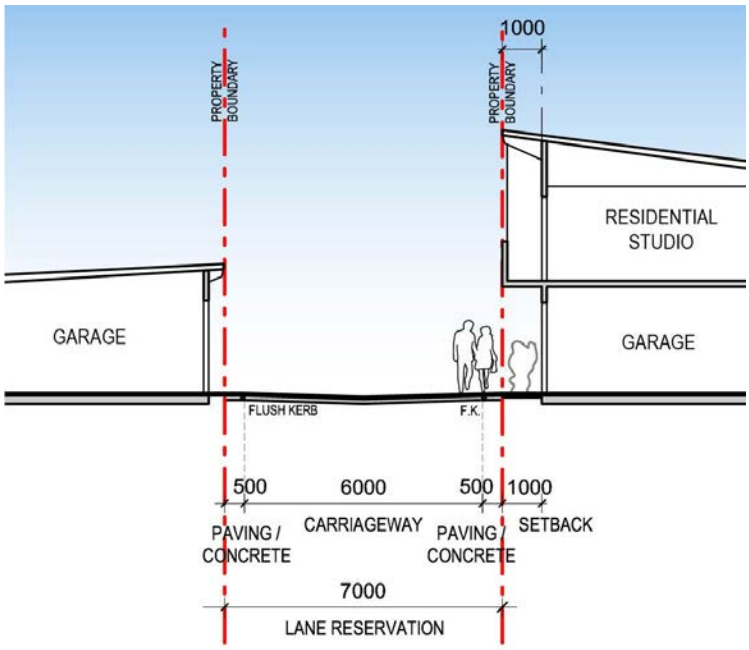


Figure 2-15: Indicative rear laneway

2.5 Noise attenuation measures

This section supplements Section 2.3.9 Noise and 3.2.3 Street network and design of the Main DCP and sets out controls for particular streets as shown in **Figure 2-10**. Future collector roads may carry larger volumes of traffic thereby requiring noise attenuation measures. The Main DCP requires an acoustic report where traffic volumes are predicted to exceed (or currently exceed) 6,000 vehicles per day.

Objectives

a. To enable road design and construction to respond to particular site constraints or opportunities.

b. To ensure reasonable standards of public amenity and a high quality public domain in the Precinct.

Controls

1. Noise attenuation measures are to incorporate a suite of measures such as subdivision layout, road layout, dwelling density, location and design, facade treatment etc as noise walls are not preferred. Refer to **Figure 2-16** for how these indicative measures can be applied.
2. In extenuating circumstances, where noise attenuation includes a structure, in addition to screening with vegetation, the use of natural materials including gabions, stone, timber or similar is preferred. See **Figure 2-17**.
3. Noise attenuation structures are to be appropriately screened by native, low maintenance, landscape planting and are to be maintained for a period of time following construction as specified by Council.
4. The design of any noise wall should consider scale, rhythm, proportion in collaboration with urban designers, noise consultants and engineers. Refer to the 'Noise wall design guideline' prepared by RMS (formerly RTA) dated February 2007 for detailed consideration.
5. Noise levels within the development are to comply with the Noise Criteria in Table 3.1 of *Development Near Rail Corridors and Busy Roads – Interim Guideline (Department of Planning 2008).* Possible design solutions to minimise the impact of traffic noise for dwellings include:
    i) Locating noise sensitive areas such as bedrooms and living rooms away from the noise source and less sensitive areas such as bathrooms, laundries, kitchens and storage closest to the noise source.
    ii) Providing mechanical air ventilation to eliminate the need for opening windows to achieve adequate ventilation.
    iii) Providing laminated or double-glazed windows with acoustic seals.
    iv) Minimising the number of doors and windows on the noisy side of the dwelling.
6. Noise attenuation measures, where required, shall be in place prior to the occupation of the dwelling affected by the noise.
7. Alternative noise attenuation options based on Acoustic Consultant recommendations may be considered by Council provided that they meet the noise criteria objectives.

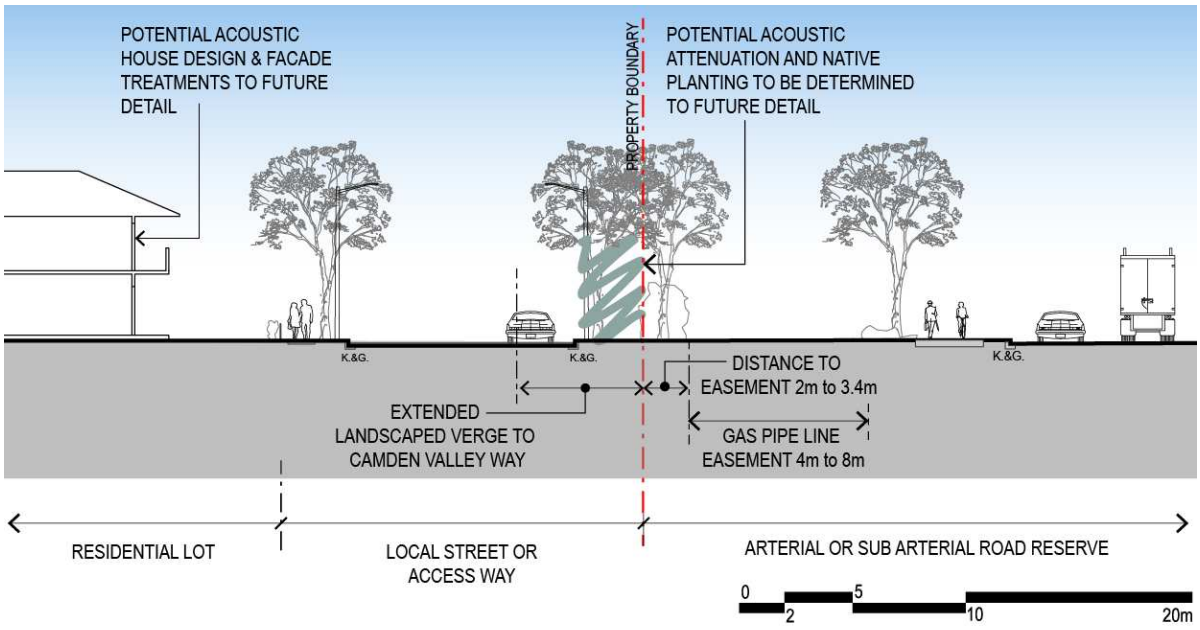


Figure 2-16: Noise attenuation measures Camden Valley Way & Denham Court Road.

Refer also to Section 4.4 for specific controls relating to Camden Valley Way and Denham Court Road.

Figure 2-17: Indicative rock gabion and timber acoustic wall.

2.6 Existing Native Vegetation and Open Space Network

This section is supplementary to Section 2.3.5 of the Main DCP and provides further guidance for the retention of areas of native vegetation within East Leppington Precinct.

Objectives

a. To incorporate the retention of areas of native vegetation within the urban layout and the open space network to improve amenity and urban development outcomes.

b. To facilitate the integration of native vegetation with the urban fabric for the Precinct.

c. To establish an open space network focused on the Bonds Creek corridor that provides for the recreation needs of the local community and encourages informal physical activities to promote an active lifestyle.

d. To establish a public domain that responds to key environmental features of the Precinct.

e. To establish a public domain that respects and interprets Aboriginal cultural heritage and European cultural heritage of the Precinct.

Controls

1. Areas of native vegetation should be considered for retention by:

    v) Adopting larger lot sizes, to allow trees to be retained within larger setbacks.

    vi) Retaining trees within open spaces where good quality vegetation exists. Refer **Figure 2-18**.

    vii) Retaining large trees within the verges of new roadways.

Figure 2-18: Example of the retention of trees in a local park

2. Within land that is shown as either Open Space or Riparian Corridor in **Figure 2-13**:

- all existing native vegetation is to be retained and rehabilitated, except where clearing is required for essential infrastructure such as roads, footpaths, cycleways and drainage; and
- native vegetation is to be conserved and managed in accordance with the Guidelines for Riparian Corridors 2012 prepared by the NSW Office of Water.

3. Development within the open space network shown in **Figure 2-13** shall be connected via a network of pedestrian, jogging and cycle links to encourage active play and optimise opportunities for public recreation.
4. The design of parks are to be consistent with the following:
    i) All new plantings shall be in accordance with Council's Prescribed Trees and Preferred Species list contained in Appendix C of this DCP, except where remnant native vegetation may require indigenous plant stock.
    ii) Landscape materials and design should respond to an identified landscaping schedule as specified and approved by Council.
    iii) Street furniture, lighting, paving etc. should be contemporary and reflect the local environmental character of the Precinct as well as interpretation initiatives (where appropriate).
    iv) Where Aboriginal objects or places of heritage significance or European heritage items, conservation areas or archaeological sites are associated with the open spaces their appropriate interpretation and management is required.

Note: *Refer to the Water Cycle Management Report East Leppington June 2013 for details relevant to the provision of drainage and open space lands.*

2.7 Residential Density – Areas of very low density

This section applies to all new development in areas of Very Low Density Residential and Environmental Living in the East Leppington Precinct (Liverpool part) as shown on the ILP. These areas adjoin the Sydney Catchment Authority's heritage-listed Upper Canal and include easements for electricity or gas. A sensitive development response to these easements and the adjoining Upper Canal is required. To respond to these parameters and provide for the future desired character, minimum lot sizes are specified under the Growth Centres SEPP.

Objectives

a. To provide for housing within a very low density residential environment.
b. To encourage residential housing on large lots within a landscape setting while preserving heritage and minimising impacts on nearby infrastructure resources (gas, electricity and water supply).
c. To ensure suitable lot configurations for development while minimising impacts on adjoining and nearby infrastructure.

d. To provide a streetscape character that is suited to and fits with the locality, surrounding built environment and open space/drainage corridors.

e. To provide a transition from adjoining rural residential land to a more dense urban development.

Controls

1. Subdivision design and housing location are to consider the environmental and infrastructure constraints of the locality while providing an efficient road and pedestrian network. The capability of the land to accommodate housing and the safe and efficient operation of infrastructure resources is to be demonstrated in the subdivision development application.

2. Restrictions apply to development within or adjoining gas and electricity easements and the water supply canal and the written approval of the relevant infrastructure agency is required. Refer to sections 4.2, 4.3 and 4.5 of this Schedule for more detail.

3. Wherever possible driveways are not to cross over easements.

4. Development in the E4 Environmental Living zone, and the R2 Low Density Residential zone on land identified as very low density residential on **Figure 2-11**, shall consider the following matters:

   i. building location, design and response to constraints from infrastructure corridors such as electricity lines, gas easements and the Sydney Catchment Authority's Upper Canal.

   ii. the relationship of the development to adjoining land uses including public open space and drainage infrastructure.

   iii. avoiding impacts on Existing Native Vegetation and other remnant native vegetation.

5. Development is to be generally consistent with **Figures 2-19** and **2-20** which provide a desired future subdivision layout for development. These are indicative layouts – refer to control 2 above.

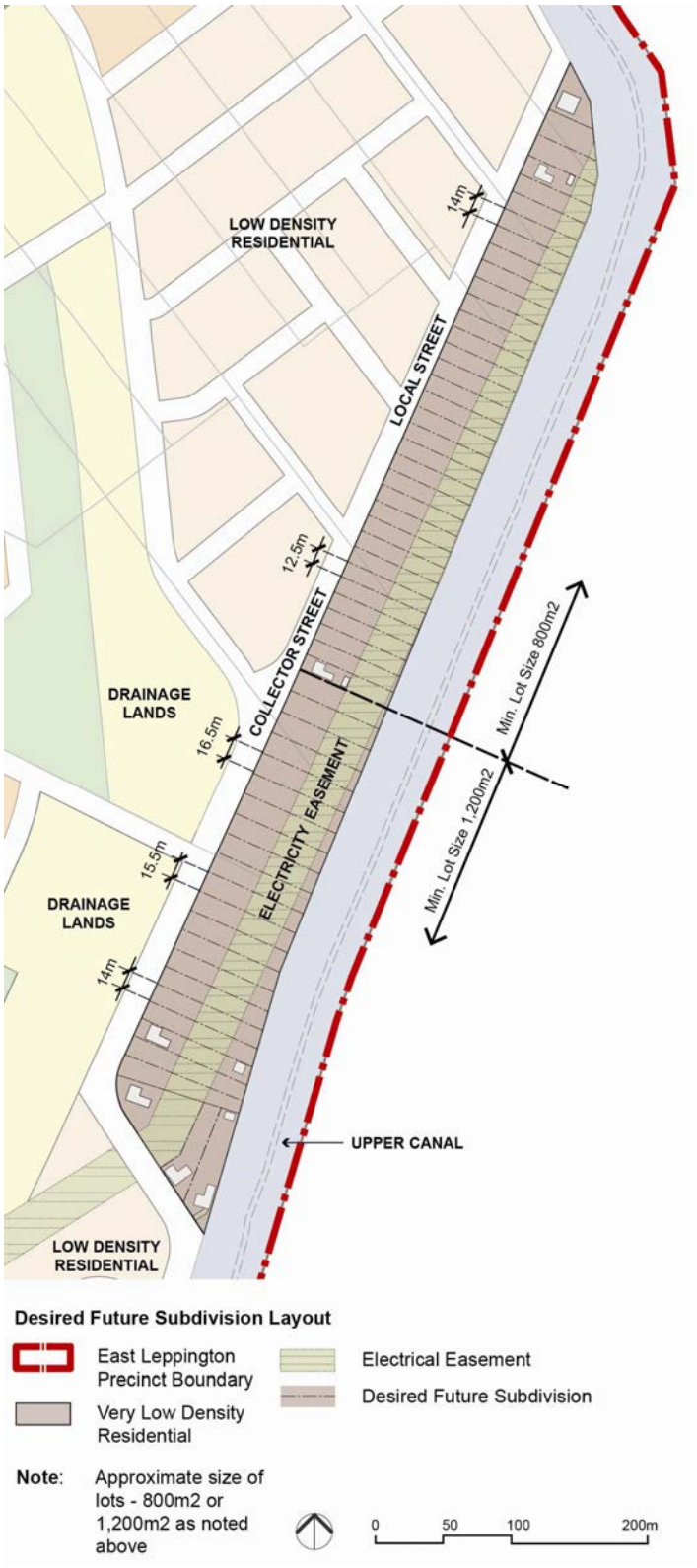


Figure 2-19: Desired future subdivision layout – Very Low Density Residential – Upper Canal

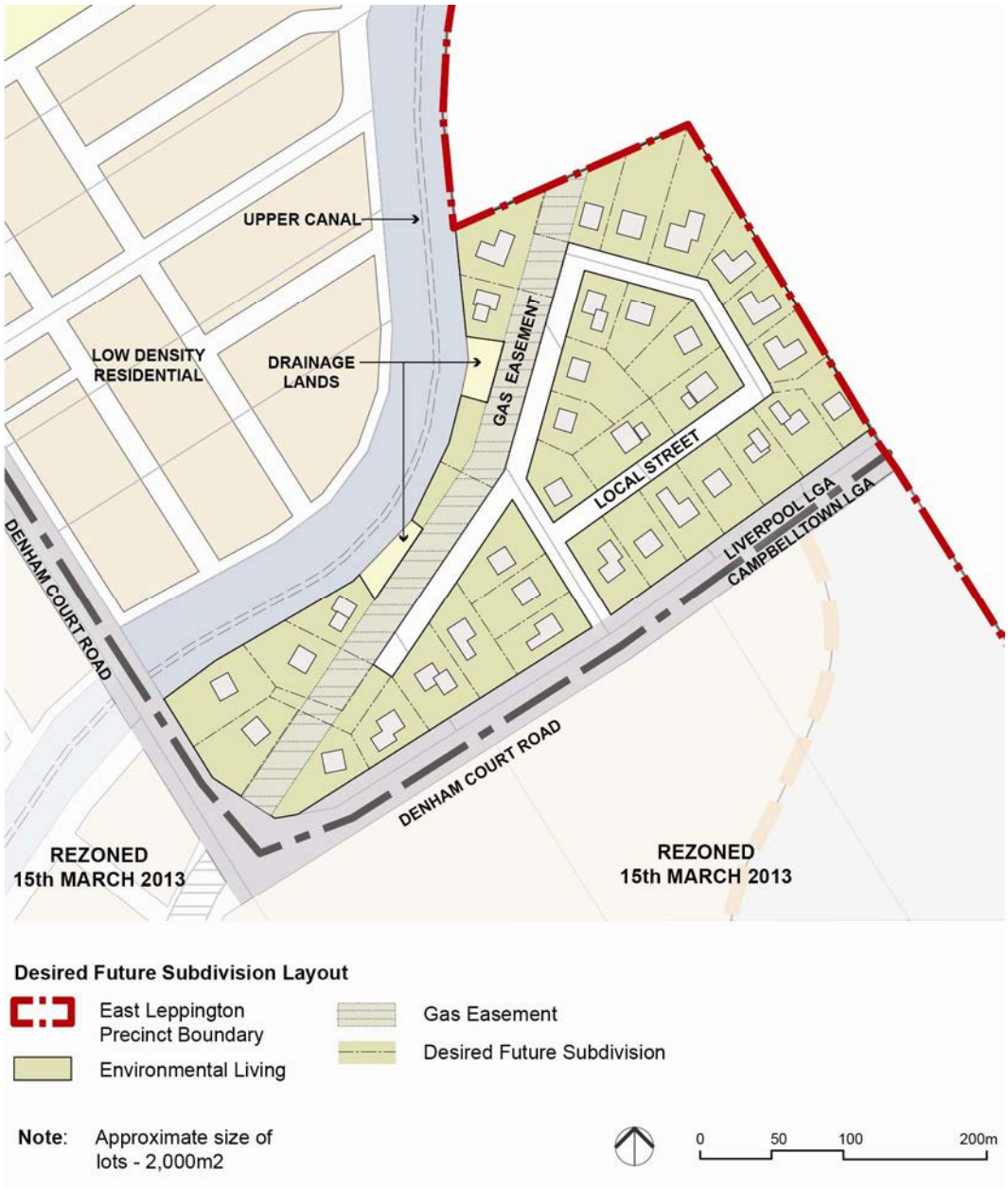


Figure 2-20: Desired future subdivision layout – Environmental Living – Denham Court Road

3 Centre Development Controls

3.1 East Leppington Neighbourhood Centre

This section outlines specific development objectives and controls relating to the design, development and operation of the Neighbourhood Centre identified in the Indicative Layout Plan at **Figure 2-1**.

This section provides specific controls which are additional to the Centre controls in Section 5 of the Main DCP. Under the Liverpool Growth Centre Precinct Plan a maximum gross floor area of 2,500m2 applies to retail premises within the Neighbourhood Centre. The location of the Neighbourhood Centre is shown in **Figure 3-1**.

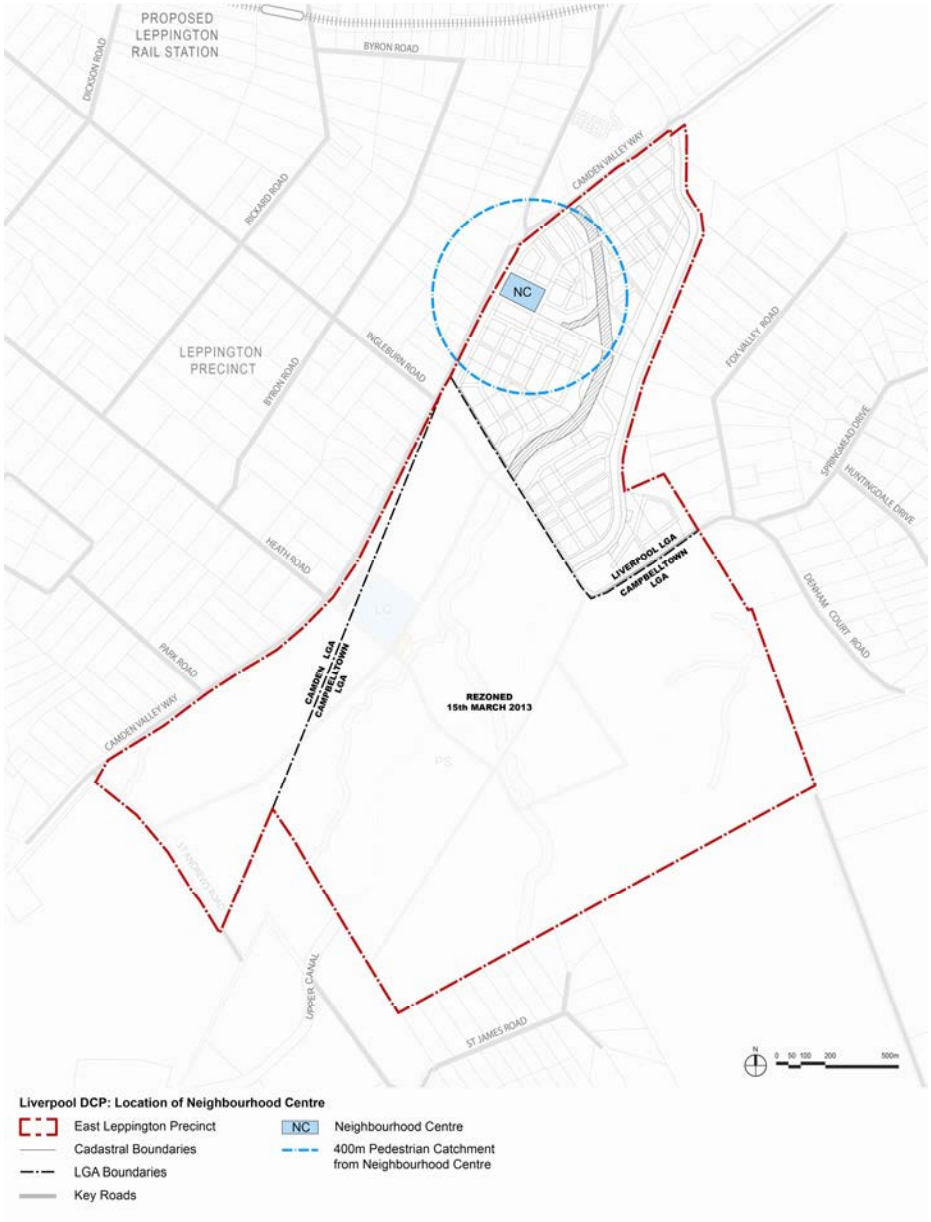


Figure 3-1: Location of Neighbourhood Centre

Objectives

a. To create a vibrant, mixed use Neighbourhood Centre with a range of small-scale retail, commercial and community uses for convenience shopping, employment and services for people living and working in the surrounding neighbourhood.

b. To encourage a high standard of development and an attractive environment within the Neighbourhood Centre.

c. To ensure active street frontages and a centre connected to public transport, walking and cycling routes.

d. To encourage centre design that responds to and addresses the open space adjacent to the east of the Neighbourhood Centre.

e. To promote a sense of place and focal point for the local community.

Controls

***Note**: Refer to Section 5.3.1 of the Main DCP. A Masterplan is required for all development in the centre.*

1. Development is to be consistent with the Desired future layout of the Neighbourhood Centre as shown in **Figure 3.2**. ***Note**: This is an indicative scheme for the site based on urban design principles to achieve a high level of amenity, public domain and quality design outcomes.*

2. Where proposed development varies from the Desired future layout, the applicant is to demonstrate consistency with the development principles in clause 5.2 of the Main DCP and the following controls and design principles for this Precinct.

3. The masterplan for the centre is to include a public domain landscape and urban design plan which establishes:

    i. Preferred materials, colours and finishes for paving and footpaths and other public spaces;

    ii. Preferred street tree species;

    iii. Specifications for street furniture including seating, lighting, signage, bike facilities; and

    iv. Public art.

4. Subsequent development will need to accord with the public domain landscape and urban design plan unless it is a significant advancement of the plan and fulfils the development principles of the DCP.

Built Form and Land Use

5. In addition to providing active frontages along local streets (**Figure 3-2**), provide active frontages to the local square and other suitable areas within the centre to create a lively, safe and attractive environment.

6. Provide a safe and attractive “green” link for pedestrians, cyclists and users of the centre between Camden Valley Way, the retail centre, the local park and the Bonds Creek corridor.

7. Weather protection via awnings or verandahs is required to retail frontages, together with sunshading to the east facing facades toward the collector road.

8. Design quality is encouraged via the use of quality, durable and sustainable external materials.

Transport, Access and Parking

9. Loading bays/areas are to be located behind buildings and not be visible from parks, wherever possible.

10. Loading areas that are adjacent to land zoned for residential uses are to include visual and acoustic screening to protect the amenity of residents.

11. Vehicular access into and out of the Highway Service Centre on Camden Valley Way is to be left in and left out only.

12. Vehicular access from the Highway Service Centre on Camden Valley Way into the retail centre[1] is permitted in one direction only. All traffic into and out of the retail centre is to be via local streets and the collector road. Vehicular access back onto Camden Valley Way is via the traffic lights at the intersection with Camden Valley Way, the new collector road and Cowpasture Road.

13. No vehicular access is permitted from the retail centre back into the Highway Service Centre and onto Camden Valley Way.

14. Site service areas and car parking viewed from public streets and residential areas are to be effectively screened with landscaping or other measures while still enabling reasonable surveillance of these spaces.

Public Domain

15. Provide a small local square (minimum of 200m2) as the focus for retail activity with active edges and access to sunlight and views across the Main Street to open space and the Bonds Creek corridor.

16. North facing footpaths are to allow for widening or increased building setbacks, to maximise solar access and opportunities for outdoor retail activities (such as outdoor cafes and dining).

17. Street tree planting may include appropriate use of exotic species in key locations (e.g. local square) to provide contrast to the native tree character established elsewhere throughout the Precinct and to allow for sunlight access in winter and shade in summer.

18. Street furniture, lighting, paving, planting and the like is to be provided in the public domain in accordance with Council's "Streetscape and Parking Guideline".

***Note**: The desired future layout for the Neighbourhood Centre is provided in Figure 3-2. Refer also to Section 5.3 of the Main DCP.*

[1]The consent of the Roads and Maritime Service (RMS) is required for vehicular access to Camden Valley Way.

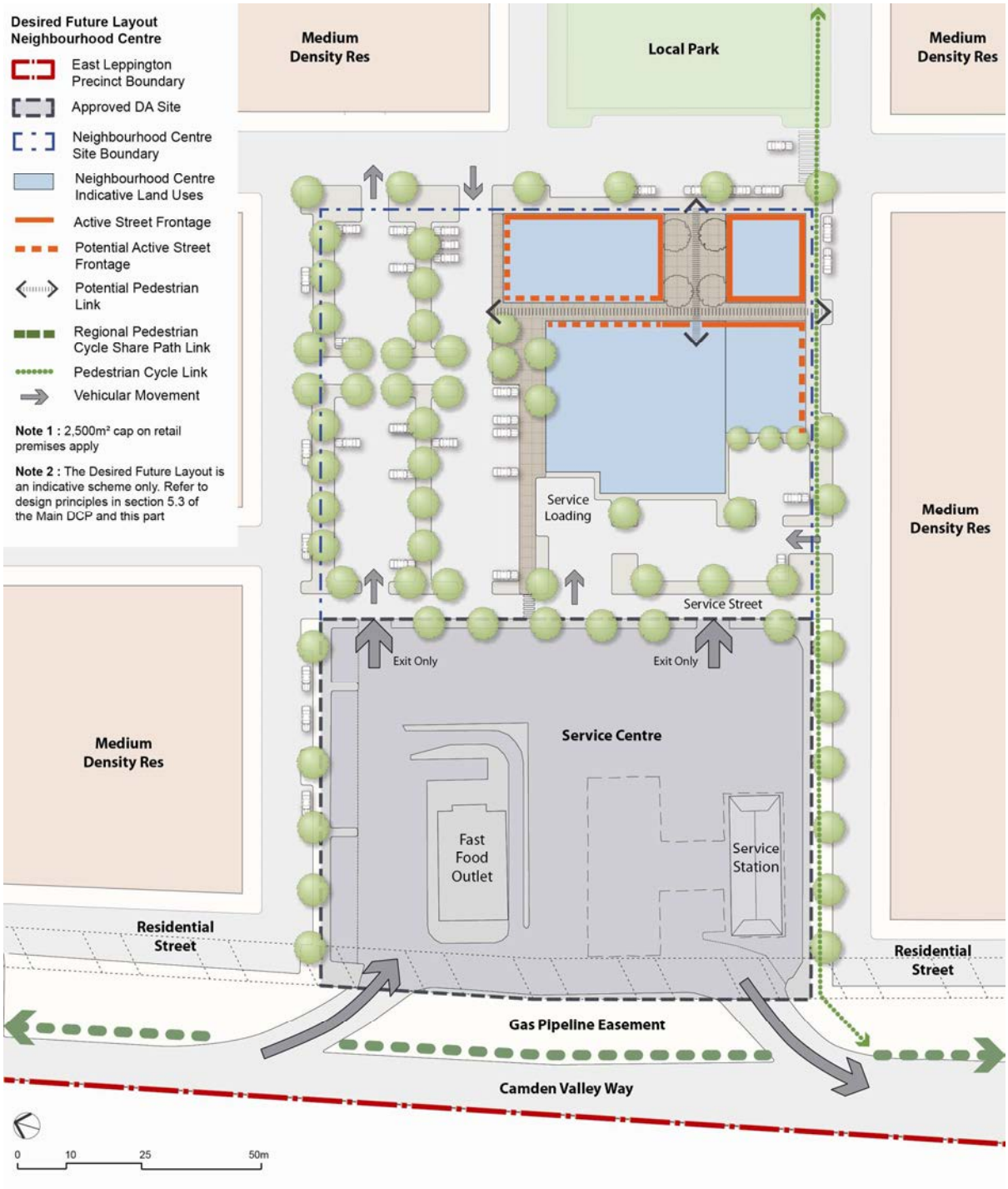


Figure 3-2: Desired future layout of the Neighbourhood Centre

4 Site Specific Controls

4.1 Aboriginal Cultural Heritage

Any one proposing to carry out an activity that may harm an Aboriginal object or a declared Aboriginal place must investigate, assess and report on the harm (being to destroy, deface, damage or move an object from the land) that maybe caused by the activity proposed.

Within the Liverpool Part of the Precinct, certain land has been surveyed and reported[2] upon as part of Precinct Planning work. These surveyed properties can rely upon the Aboriginal Cultural Heritage Impact Assessment Report prepared by Godden Mackay Logan dated June 2012 and titled East Leppington Precinct Planning Indigenous and Non-Indigenous Heritage Assessment and Appendix D Lands North of Denham Court Road - Aboriginal Archaeological Technical Report to consult with OEH and finalise relevant matters regarding Aboriginal cultural heritage prior to subdivision or development.

***Note**: Additional studies may be required as part of a Development Assessment process.*

Refer to **Figure 2.5** for those properties which have been surveyed and those that still require an archaeological survey for Aboriginal cultural heritage.

The provisions of this Schedule and Section 2.3.4 of the Main DCP apply.

Objectives

a. To ensure future development does not adversely impact Aboriginal cultural heritage conservation areas or sites of Aboriginal heritage value.

b. To ensure appropriate management and mitigation measures are implemented for identified Aboriginal conservation areas and Aboriginal heritage sites.

Controls

1. An Aboriginal archaeological survey is required for those lands identified in **Figure 2.5**. This survey is to be undertaken by a suitably qualified professional in consultation with the Office of Environment and Heritage NSW. Reference should be made to the relevant Office of Environment and Heritage (OEH) guidelines.

2. For land where an Aboriginal archaeological survey has been undertaken and a report prepared (as identified in footnote 2) consultation is required with OEH to finalise the process steps and approvals prior to development of the land. Note: This could be undertaken as a group of landowners or singularly.

[2] An Aboriginal Cultural Heritage Impact Assessment Report has been prepared by Godden Mackay Logan dated June 2012 and titled East Leppington Precinct Planning Indigenous and Non-Indigenous Heritage Assessment. Appendix D Lands North of Denham Court Road - Aboriginal Archaeological Technical Report applies specifically to those lands surveyed in the Liverpool LGA.

3. For land in Management Area K1 (**Figure 2.5**) a recommended mitigation strategy have been identified in Appendix D to the East Leppington Precinct Planning Indigenous and Non-Indigenous Heritage Assessment 2012 requiring consultation with OEH to determine how this may be correctly undertaken.

4.2 Lands adjacent to or within an Electricity Easement

Objectives

a. To ensure that development on land near or within electricity easements considers potential impacts on the integrity and safety of electricity infrastructure.

b. To ensure reasonable standards of public amenity and a high quality public domain in the vicinity of electricity easements.

Controls

1. Restrictions apply to planting and erection of raised public domain elements (such as lightpoles) and are identified in the *Mains Maintenance Instruction MMI 0015 - Management of Endeavour Energy's electrical easements (Endeavour Energy, 2011)* or as revised, for design requirements.

2. Subdivision of residential land containing easements is to be generally consistent with the desired future subdivision layout in **Figure 2-19** and **Figure 2-20**.

3. Within land shown as Very Low Density Residential on the ILP, the location of dwellings and substantial structures (as defined by Endeavour Energy) is to be consistent with **Figure 4-1** and the following design principles:

    i) Dwellings and substantial structures are to be located outside the easement.

    ii) Access to the easement for inspections and maintenance is not to be unduly restricted, therefore in certain circumstance where an easement is located within backyards or at the side of dwellings it is to be consistent with the requirements of the infrastructure agency.

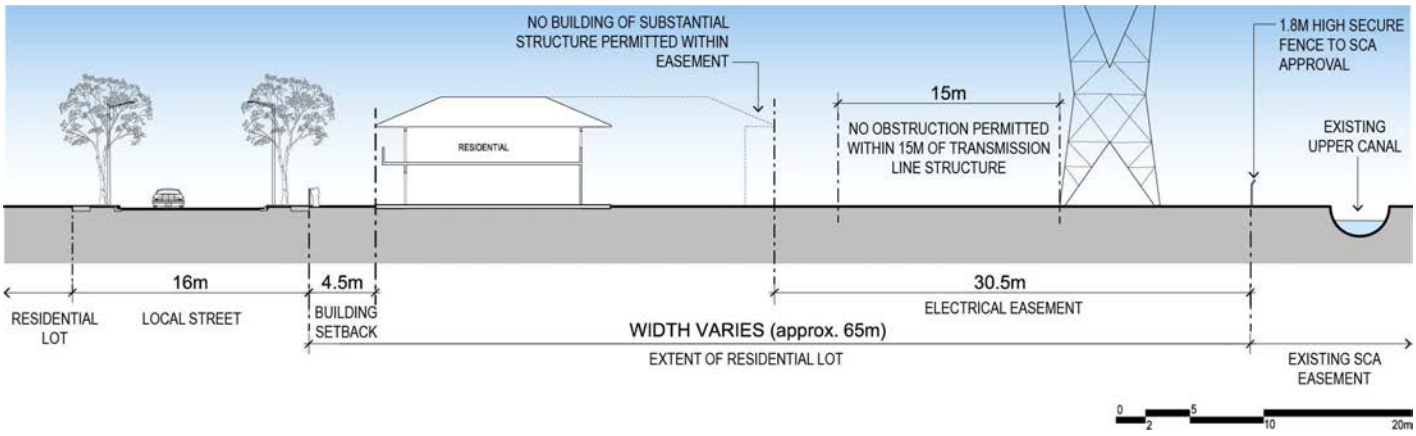


Figure 4-1: Location of dwellings - land affected by Endeavour Energy electricity easement

4. Any proposed ground level changes and or road crossings within the easement may require the transmission line to be reconstructed or modified to provide the requirement clearance. All costs associated with any reconstruction or modifications are the responsibility of the applicant.

4.3 Land adjacent to or affected by a Gas Easement

Objectives

a. To ensure development on land near or within gas easements considers potential impacts on the integrity and safety of the gas pipeline.

b. To ensure reasonable standards of residential amenity, safety and a high quality residential environment in the vicinity of high pressure gas easements.

Controls

1. Development and use of land within the easement is restricted by the conditions of the easement and applicants should demonstrate compliance with any restrictions imposed by the easement when submitting applications for development.

2. Subdivision of land containing easements should be minimal, however battle-axe lots and differently configured lots may be appropriate in some locations to maximise the development potential of land while avoiding impacts on the easement. Refer to **Figures 2.19** and **2.20** for an indicative lot layout.

3. Reference should be made to AS2885 in relation to sensitive land uses that may be restricted within a certain distance (referred to as the Zone of Influence) of the gas pipeline. Sensitive land uses include (but are not limited to) schools, hospitals, aged care facilities and community facilities. Applicants should consult with the organisation responsible for the gas pipeline to determine specific requirements.

4.4 Lands adjacent to Camden Valley Way & Denham Court Road

Refer also to Section 2.3.9 and Section 4 of the Main DCP.

Objectives

a. To ensure appropriate access to residential lands located next to Camden Valley Way and Denham Court Road.

b. To ensure reasonable standards of residential amenity and a high quality residential environment in the vicinity of Camden Valley Way and Denham Court Road.

c. To ensure residential dwellings are not adversely impacted by traffic noise through appropriate setbacks and noise attenuation measures.

Controls

1. Land adjoining Camden Valley Way and Denham Court Road[3] shall be accessed by vehicles via adjacent local streets within the Precinct.
2. Vehicular access to properties fronting Camden Valley Way provided by Roads and Maritime Services (RMS) as part of the upgrade of Camden Valley Way will be closed when alternative access is provided within the Precinct. Alternative access must be provided for any development on the land that includes a change of use from that lawfully commenced when alternative access was provided by RMS.
3. Where temporary access may be required for construction purposes to land along Camden Valley Way which entails crossing the gas easement, the temporary crossing is to be undertaken by the builder/developer to the satisfaction of the gas provider and with the approval of the RMS.
4. Any application for subdivision of the property occupied by the place of public worship is to include alternative access arrangements other than the temporary access to Camden Valley Way (as shown on **Figure 4-2**). The temporary access to Camden Valley Way shown on **Figure 4-2** is to remain open only until alternative access is available within the Precinct.

[3] *The northern part of Denham Court Road, to be replaced by the re-alignment and upgrade of Denham Court Road with Ingleburn Road, is to be retained as a local street as indicated on the ILP. Access to residential lots is permitted for this portion providing for a loop road with access denied to Camden Valley Way and the main collector road to the south.*

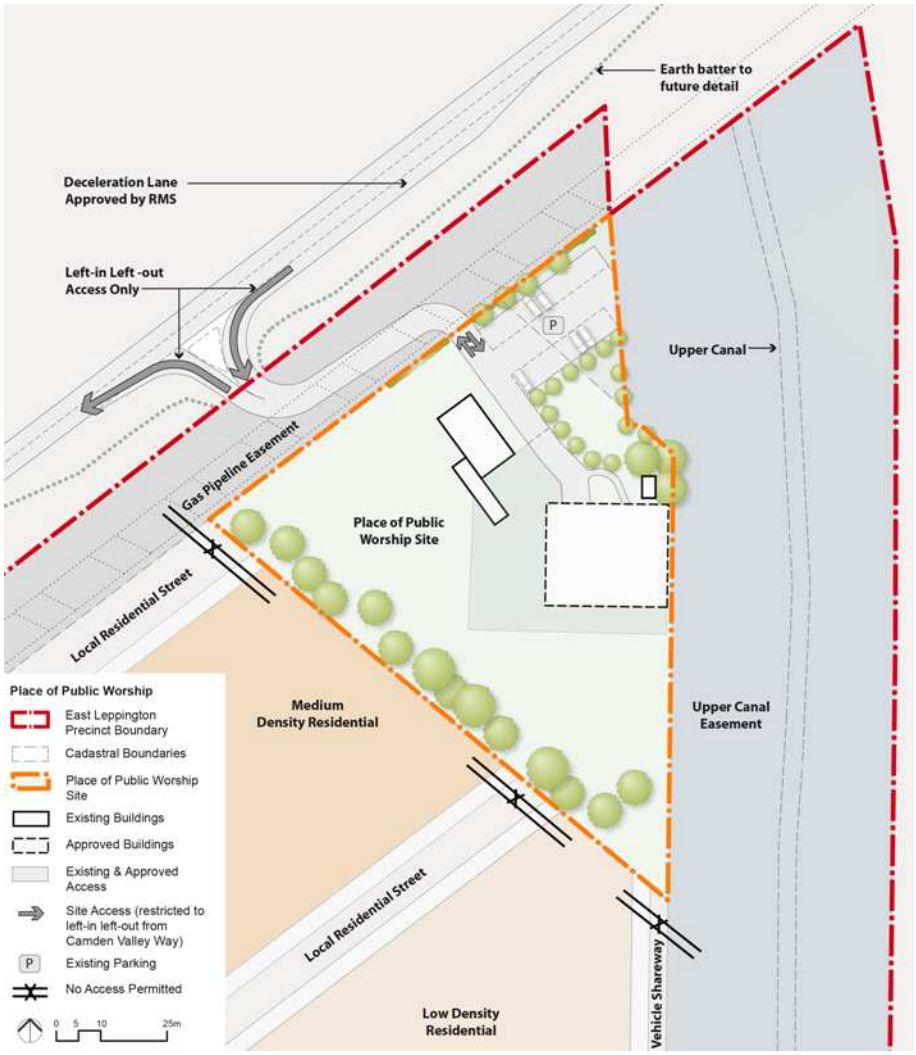


Figure 4-2: Access to Camden Valley Way and Place of Public Worship

5. Depending on the subdivision design the siting of dwellings relative to Camden Valley Way shall be consistent with **Figure 4-3** or **Figure 4-4** and the following controls:

    i) Dwellings must address the local street, running parallel to Camden Valley Way;

    ii) Principal private open space must be located to the rear of dwellings so that the buildings provide acoustic shielding, with consideration given to the levels of solar access and amenity as required elsewhere in the Main DCP; and

    iii) Suitable noise control treatments are provided for dwellings and noise sensitive uses. See section 2.3.9 of the Main DCP and section 2.5 of this Schedule.

6. Prior to undertaking any work at the existing Denham Court Road overbridge, the Heritage Branch should be contacted to determine if the stone abutments are relics or works as defined in the Heritage Act and whether a permit under section 139 of the Heritage Act is required.

***Note 1**: Development is to take into account the location of the gas pipeline to Camden Valley Way and Denham Court Road and the requirements of the infrastructure agency.*

***Note 2**: Development should also refer to the relevant Australian Standard, for example AS2107.*

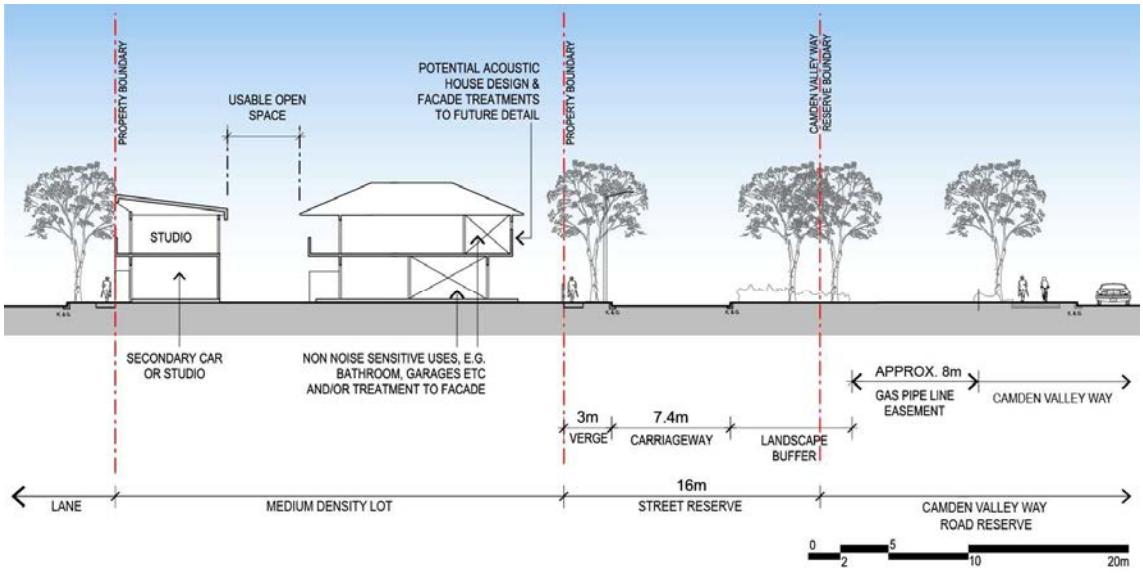


Figure 4-3: Camden Valley Way Section – medium density lot with studio/dwelling and rear lane access

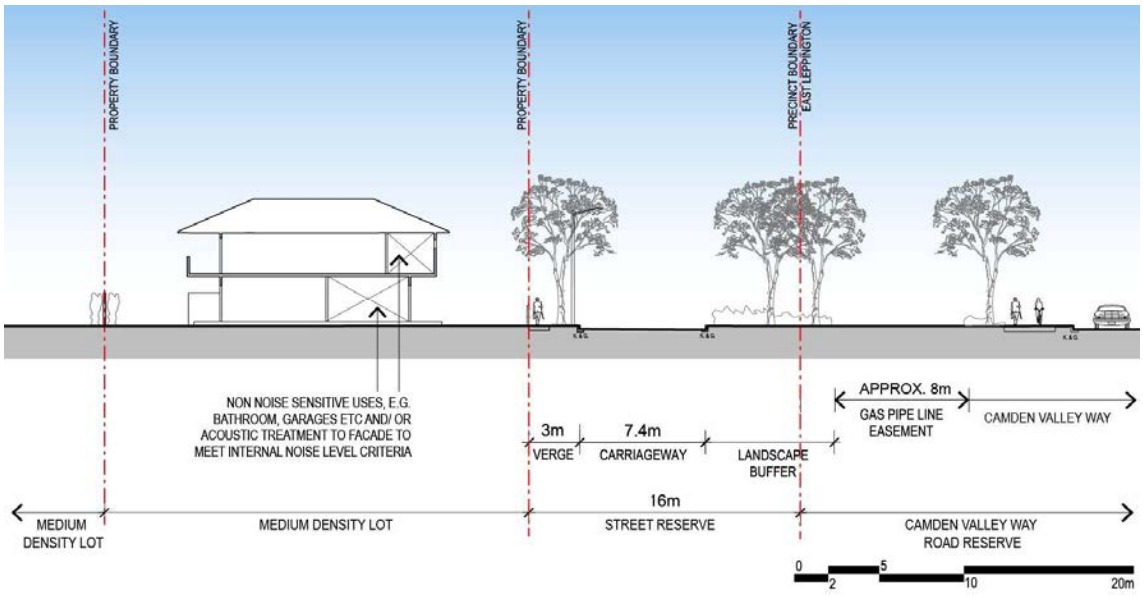


Figure 4-4: Camden Valley Way Section – medium density lot with single dwelling and no rear lane access

4.5 Land adjacent to the Sydney Catchment Authority Upper Canal

Objectives

a. To ensure that the Upper Canal is taken into account in siting, designing and constructing any proposed development adjoining or in the vicinity of the Canal.

b. To ensure that development adjacent to the Upper Canal corridor does not impact on the continued operation of the Canal infrastructure.

c. To provide for the safety and amenity of the public living or visiting areas adjacent to the Upper Canal.

d. To protect water quality by preventing stormwater or other pollutants entering the Upper Canal system.

Controls

1. Where development (including subdivision) is proposed adjacent to the Upper Canal corridor**,** applicants shall consult with the Sydney Catchment Authority (SCA) as part of the process of preparing the Development Application. Development is to be consistent with the SCA publication "*Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines*". Any written requirements of the SCA shall be submitted with the DA and the DA documentation shall show how the requirements have been addressed.

2. Prior written approval shall be obtained from the SCA for any access that may be required to the Upper Canal corridor during the investigation and construction phases.

3. Access points to the Upper Canal for SCA staff and contractors to carry out inspections and maintenance shall be retained or provided in accordance with SCA requirements.

4. Earthworks (excavation or filling) and landscape works carried out adjacent to or crossing the Upper Canal shall avoid impacting on water quality and damaging the Canal infrastructure, in accordance with SCA requirements.

5. Stormwater systems serving development adjacent to the Upper Canal shall be designed to ensure that stormwater does not enter the Canal. Stormwater management measures shall accommodate and not impede upstream flows from any systems that convey stormwater across, along or under the Upper Canal. Detailed plans showing the proposed stormwater management and runoff from development are to be submitted with the Development Application. The plans must demonstrate that stormwater will be managed up to the 1 in 100 year flood event to prevent runoff from within the Precinct entering the Canal.

6. Shareways may be located to the front or side boundary of a lot. Where shareways are to the side boundary, fences are to be maximum 1.8m high to the rear yard only. Side fences are to be 1.2m to corners.

7. Appropriate security fencing shall be provided, or existing fencing retained along the length of development boundaries that directly adjoin the Upper Canal corridor, in accordance with SCA requirements.

8. Where indicated on the ILP, a local road, shareway or pedestrian/ cycle way is to be provided, between development and the Upper Canal corridor. Refer to **Figure 4-5**. Wherever possible a road is to contain a landscaped verge between the carriageway and Upper Canal corridor. A footpath is not required to be constructed on the Canal side road verge as part of subdivision of adjoining land.

9. The State Heritage status of the Upper Canal (**Figure 2-6**) should be taken into account when designing development adjacent to the Canal corridor. Refer to Section 2.3.4 of the Main DCP.

Note: *The Upper Canal is owned and managed by the Sydney Catchment Authority and is located on land classified as a controlled area under the Sydney Water Catchment Management Act 1998. The Canal begins at Pheasants Nest Weir on the Nepean River and transfers water from the Upper Nepean dams to the Prospect Water Filtration Plant to supply a significant part of Sydney's drinking water. The Upper Canal is historically significant having functioned as part of Sydney's main water supply system for more than 120 years and is listed on the State Heritage Register. The Upper Canal is also an aesthetically significant landscape element within the Greater Sydney Metropolitan region.*

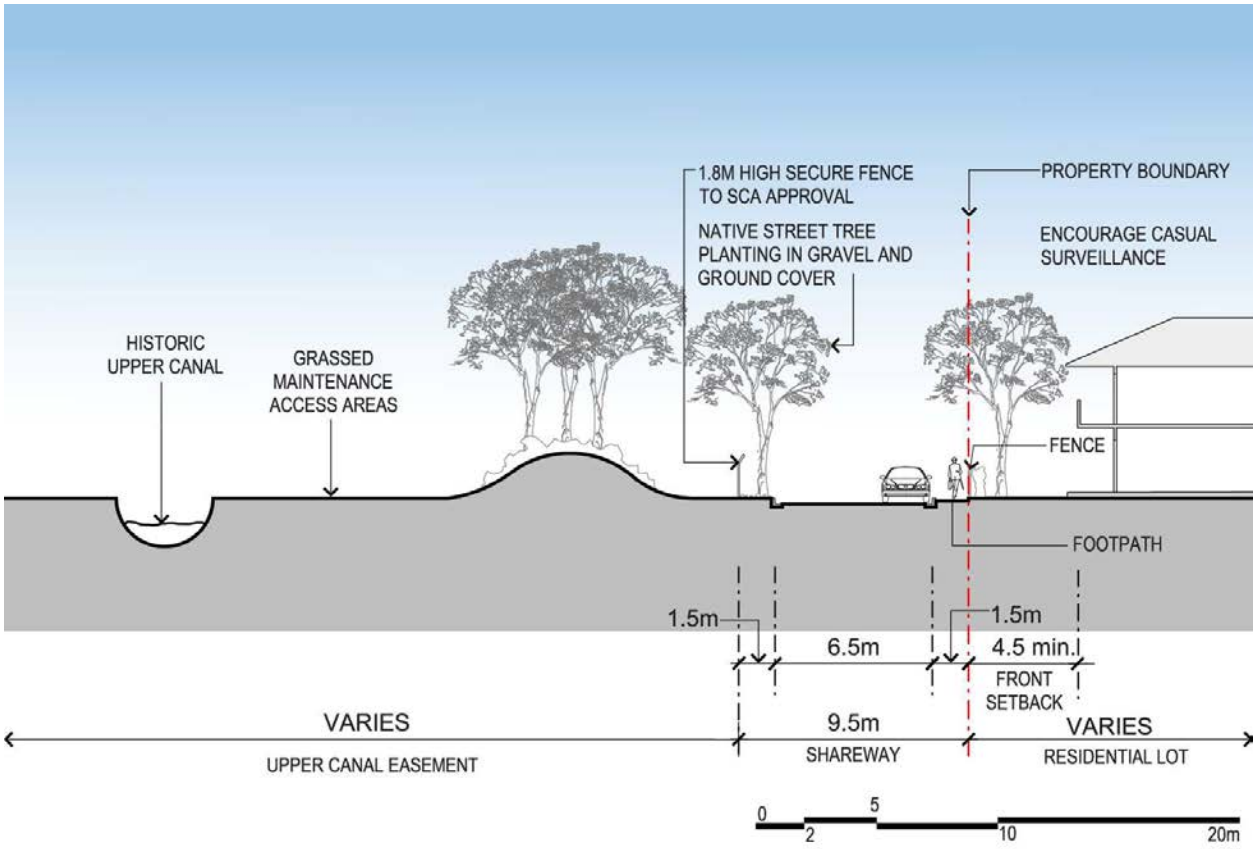


Figure 4-5: Typical access shareway - Sydney Catchment Authority Upper Canal

Appendix A

Glossary

Note: *definitions for terms are also included in the Dictionary contained within the Growth Centres SEPP, and in the event of any inconsistency, the definition in the Growth Centres SEPP takes precedence over the definitions in this DCP.*

"Access Streets and Laneways" provide local residential access to a small number of dwellings and serve a shared vehicular-pedestrian-cyclist use. They are intended to encourage a safe, low vehicle speed environment in which the residential function is dominant. Access streets function at the lowest level of the road hierarchy. They generally have development on one side and are located along drainage or open space reserves or along access-denied roads. The construction and dedication of access streets is the responsibility of the developer.

"Articulation zone" includes verandahs, porches, awnings, shading devices, bay windows, pergolas and the like. A carport is not considered part of the articulation zone.

"Active Frontages" are defined as one or a combination of the following:

- entrance to retail;
- shop front;
- glazed entries to commercial and residential lobbies;
- café or restaurant if accompanied by an entry from the street;
- active office uses, such as reception, if visible from the street; and
- public building if accompanied by an entry.

Note: *In some instances active frontages may be indicated in residential areas. In these circumstances, the active frontage indicates that the dwelling should be designed to orient building entries, living rooms and glazing towards the active frontage.*

"Attic" means a room within the main roof space of a building that has a 1.5m minimum wall height at edge of the room, a minimum 30 degree ceiling slope and does not incorporate or access a balcony.

"Attached dwellings" are defined in the Dictionary to the Growth Centres SEPP and comprise 3 or more dwellings on separate allotments that are joined by at least one common wall. An example layout for attached dwellings is at **Figure 1**.

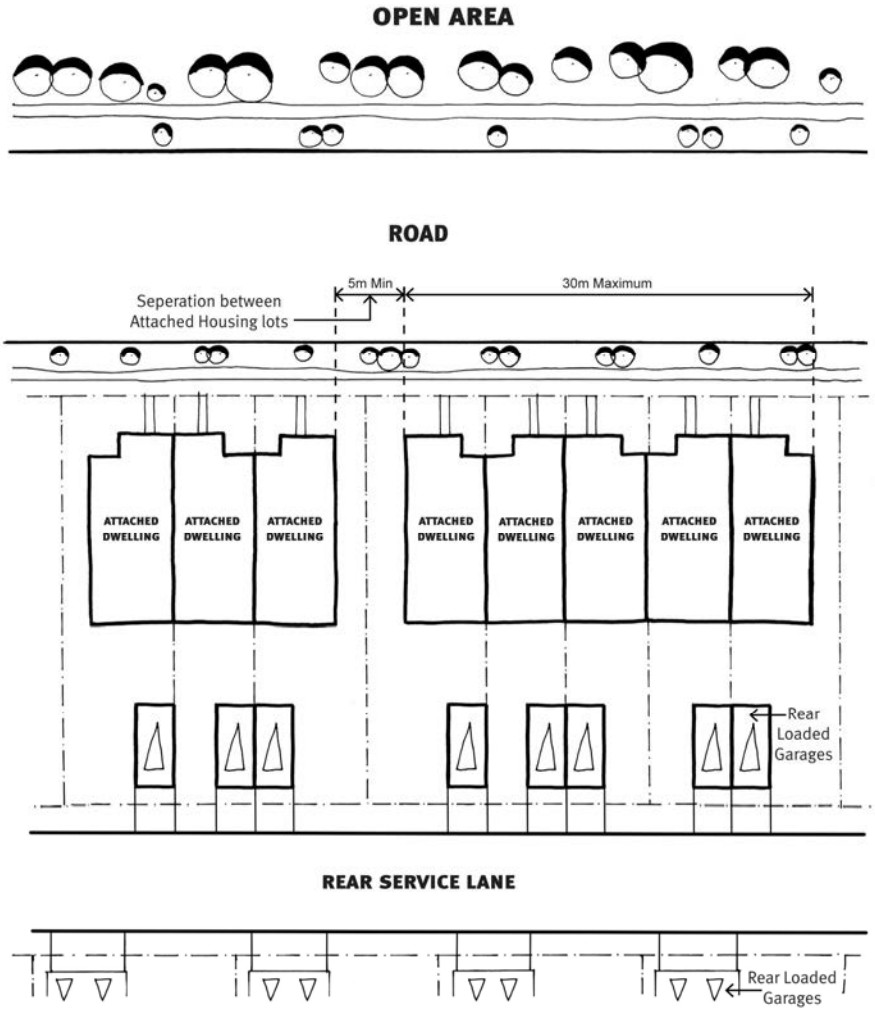


Figure 1: Attached Dwellings

"Arterial roads" are roads marked as such on the **Precinct Road Hierarchy** figure in the relevant Precinct Schedule. They are major roads that carry the majority of inter-regional traffic. Vehicular access from adjacent land is denied to ensure both the efficiency of the road and the safety of road users.

"Building footprint" means the area of land measured at finished ground level that is enclosed by the external walls of a building.

"Camden Growth Centre Precinct Plan" means Appendix 9 to *State Environmental Planning Policy (Sydney Region Growth Centres) 2006.*

"Collector roads" are roads marked as such on the **Precinct Road Hierarchy** figure in the relevant Precinct Schedule. They are the main internal roads that carry local traffic through the residential neighbourhoods to the sub-arterial and arterial roads, and provide access to major attractors within the precinct such as retail, commercial and educational facilities.

Dual Occupancy is defined in the Dictionary to the Growth Centres SEPP. A dual occupancy comprises two dwellings on a single allotment of land (which may or may not be strata subdivided). The dwellings may be attached to each other or separate.

Dual occupancy housing includes:

- the alteration or addition to an existing dwelling-house erected on an allotment so as to create two dwellings;
- the erection of another detached dwelling-house in addition to one already erected on an allotment, but only if not more than two dwellings will be created as a result of the development being carried out;
- the erection of a single building containing two dwellings on one allotment.
- the erection of two detached dwellings on one allotment.

In each example above, the dwellings may or may not be strata subdivided. See **Figure 3**.

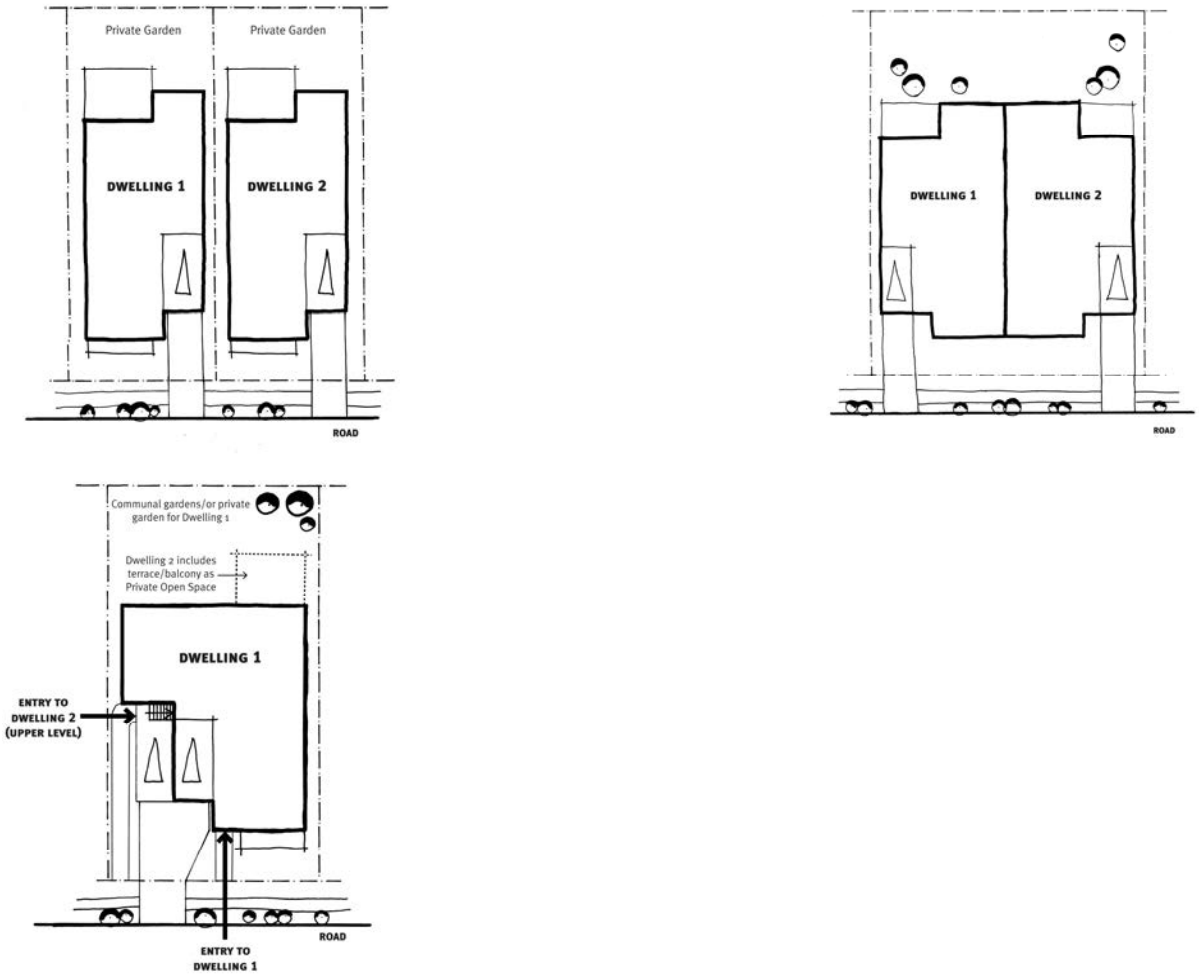


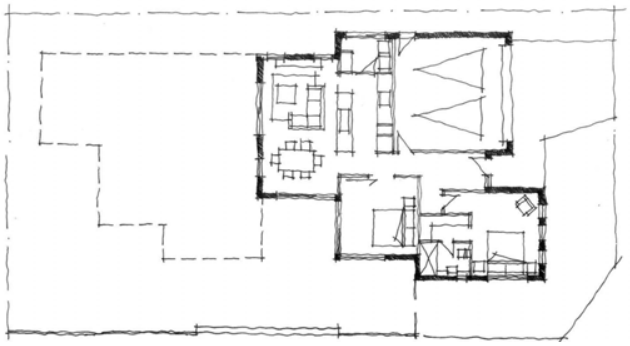
Figure 2: Dual Occupancy Dwellings – detached; attached; two storey

"Dual Occupancy – Lifehouse Dwellings" - The life house is a housing initiative that is designed to facilitate the

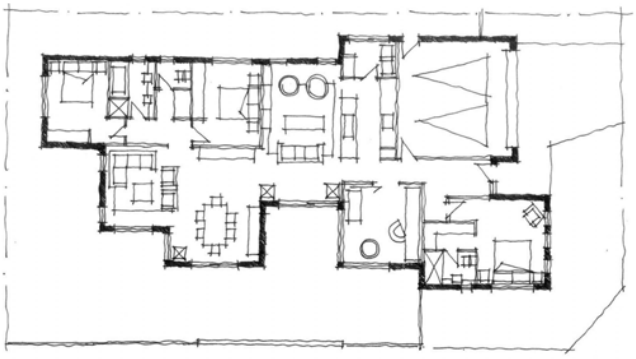
changing lifestyle needs of the home buyer. When built, the Lifehouse can respond to the current need of the resident. In time, as the residents' needs change, the dwelling can grow/downsize according to their needs, without them having to go through the expense of relocating. See **Figure 4**.

Lifehouse dwellings:

- can only occur on corner lots or lots with a rear lane and sufficient frontage width to allow a front-loaded garage, so that separate vehicle and pedestrian access will be possible to each dwelling;
- can be built on a single level, on split level or as two storey dwellings. The development of Stage 2 must comply with separation controls nominated in Australian Standards and the National Construction Code, enabling the final dual occupancy division of Stage 3 to progress without major works.
- must have all stages of the development designed and approved as part of the initial DA regardless of the proposed staging of construction and subdivision.



Phase 1: establish the home



Phase 2: grow to suit occupant

Phase 3: downsize and strata subdivide to suit occupant (Optional)

Figure 3: Lifehouse Dwelling (single level)

"**Dwelling House"** is a building containing one dwelling, on a single block of land. An example of a dwelling house is at **Figure 2.**

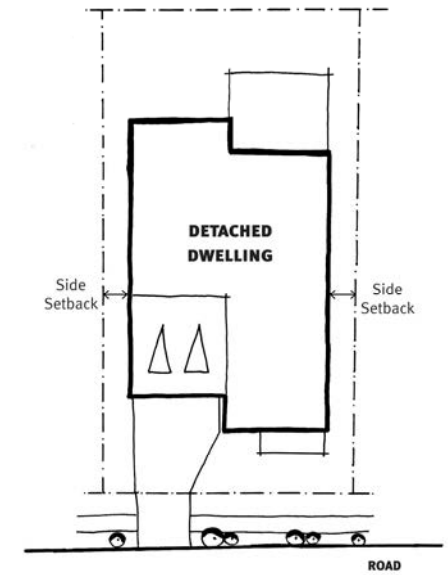


Figure 4: Dwelling house

"Flood Planning Levels (FPLs)" are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. Flood planning area is the area of land below the FPL and thus subject to flood related development controls. The concept of flood planning area generally supersedes the 'flood liable land" concept in the 1986 Manual. Flood Prone Land is land susceptible to flooding by the PMF event. Flood Prone Land is synonymous with flood liable land.

Green roof" is space which is not occupied by structures housing plant, equipment or stairway accesses. The green roof includes a vegetated layer, growing medium, and a waterproof membrane. Potted plants/planter boxes are acceptable as green roofs as long as they provide the minimum 30 per cent requirement of rooftop area as vegetation cover. In addition to the minimum 30 per cent vegetation cover, a green roof can include facilities for renewable energy, water collection infrastructure, walkways, furnishings, and the like.

"**Habitable room**" means any room or area used for normal domestic activities, including living, dining, family, lounge, bedrooms, study, kitchen, sun room, home entertainment room, alfresco room and play room.

"**Non-habitable**" room spaces of a specialised nature not occupied frequently or for extended periods, including bathrooms, toilets, pantries, walk-in wardrobes, corridors, lobbies, photographic darkrooms and clothes drying rooms.

"Liverpool Growth Centre Precinct Plan" means Appendix 8 to *State Environmental Planning Policy (Sydney Region Growth Centres) 2006.*

"**Landscaped area**" means any part of a site, at ground level, that is permeable and consists of soft landscaping, turf or planted areas and the like. It does not include driveways, parking areas, hard paved drying yards or other service areas, swimming pools, tennis courts, undercroft areas, roofed areas (excluding eaves <450mm to fascia board), outdoor rooms, balconies, rooftop gardens, terraces, decks, verandahs and the like.

"Local roads" are roads marked as such on the **Precinct Road Hierarchy** figure in the relevant Precinct Schedule. The function of the subdivisional roads, which may include minor loop roads and culs-de-dac, is to provide access to residential properties.

"Outdoor room", also known as an 'alfresco room' is a semi enclosed space (at least 1 side open) located adjacent a living / dining / kitchen area of a dwelling that sits within the main roof line of a dwelling.

"Principal dwelling" means the largest dwelling house on a lot, measured by gross fl oor area.

"Principal private open space" means the portion of private open space which is conveniently accessible from a living zone of the dwelling, and which receives the required amount of solar access.

"Private open space" means the portion of private land which serves as an extension of the dwelling to provide space for relaxation, dining, entertainment and recreation. It includes an outdoor room.

"Riparian Corridor" means the riparian protection area as shown on the Riparian Protection Areas map under the Growth Centres SEPP.

"Secondary Dwellings" - Secondary dwellings are defined in the Dictionary to the Growth Centres SEPP. They are dwellings that are on the same parcel of land as another dwelling, but are separate to the principle dwelling, have a separate access and have a maximum internal floor area as specified in the Precinct Plan.

Secondary dwellings must form a part of the DA submission for the main dwelling. A secondary dwelling that has its own separate access and parking can be strata subdivided at the time of DA approval or after the dwelling has been established.

Types of secondary dwelling:

- On grade studio unit (at ground level – See **Figures 5 and 7**) within the principle dwelling lot. This is only permitted within detached dwelling lots;
- Above garage studio units (See **Figures 6, 8 and 9**). This is only permitted on lots that have garages with rear access.
- A Type 1 Secondary Dwelling is one that is not strata subdivided from the principle dwelling.
- A Type 2 Secondary Dwelling is one that is, or is capable of being, strata subdivided from the principle dwelling.

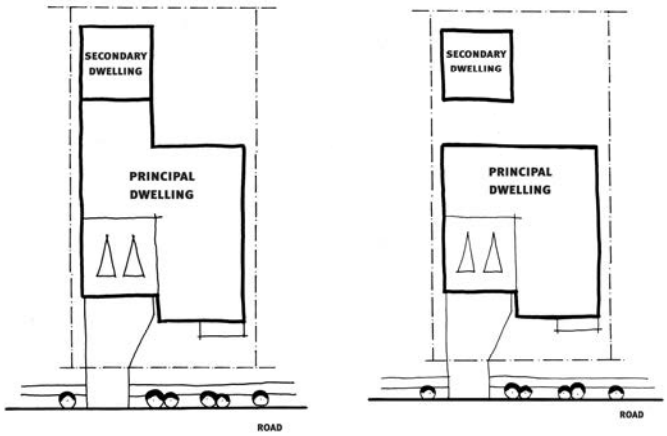


Figure 5: Secondary Dwelling (at ground level)

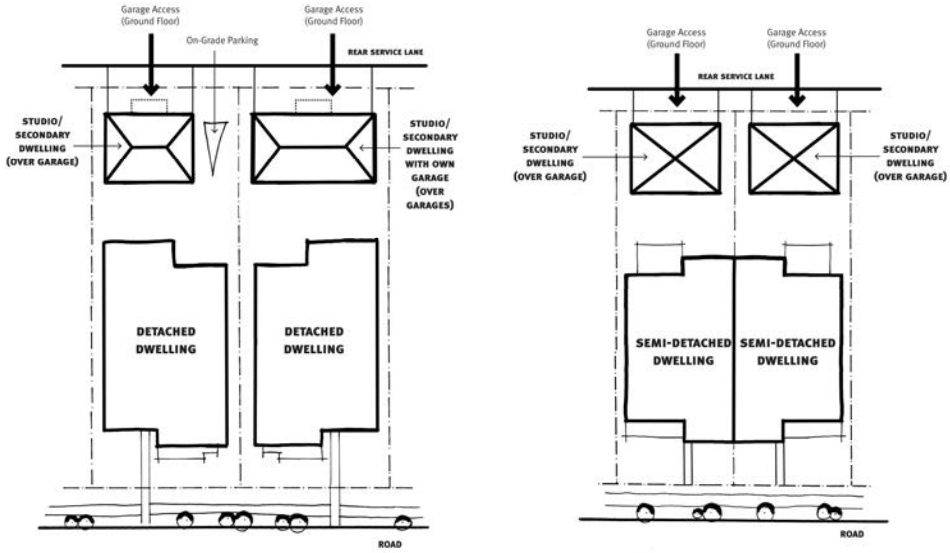


Figure 6: Secondary Dwelling (above garages)

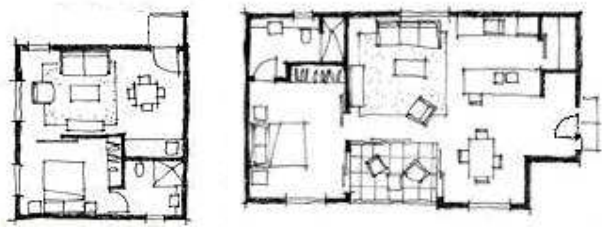


Figure 7: Indicative examples of Type 1 Studios – on ground level

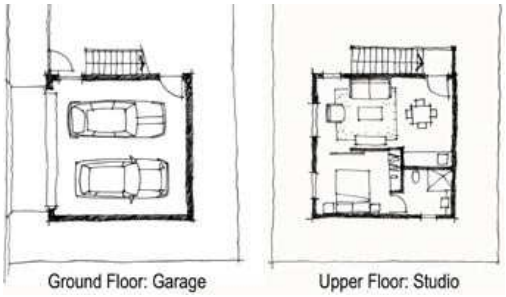


Figure 8: Indicative example of a secondary dwelling above a garage (Type 1 not strata subdivided)

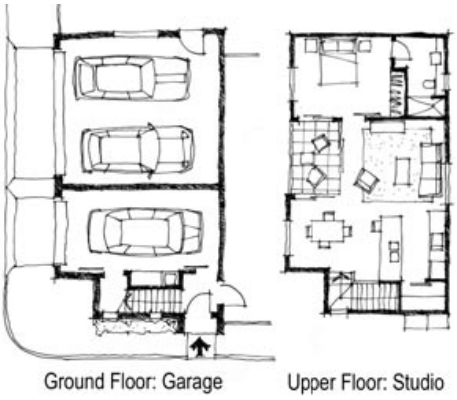


Figure 9: Indicative example of a secondary dwelling above a garage (Type 2 strata subdivided)

"Semi-detached dwellings" is defined in the Dictionary to the Growth Centres SEPP. They comprise two dwellings that share one common wall. Whilst their internal layout may be identical and their external appearance should have continuance of material and style, the external appearance of the two dwellings should not be identical. They should combine to appear as one large house by having varied façade treatment and articulation. Refer to **Figure 10**.

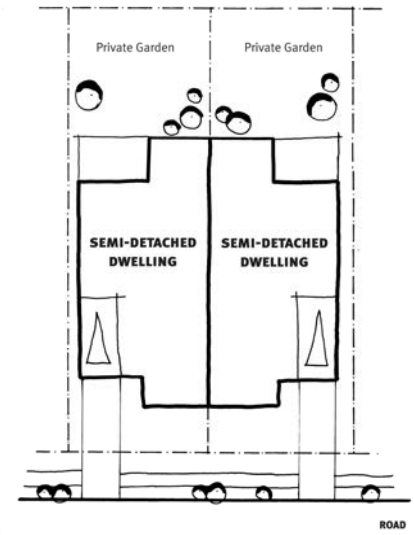


Figure 10: Semi-Detached Dwelling

"Sub-arterial roads" are roads marked as such on the **Precinct Road Hierarchy** figure in the relevant Precinct Schedule. Sub-arterial roads link regional and local traffic routes. Access from private properties is generally denied to these roads (except in special circumstances) for reasons of traffic safety and to maintain the capacity and efficiency of the road system. Council is normally responsible for the acquisition and construction of sub-arterial roads.

"Town Centre Streets" are roads marked as such on the **Precinct Road Hierarchy** figure or elsewhere in the relevant Precinct Schedule. They are specially designed to create a pleasant and comfortable pedestrian environment. Amenity and safety is to be maintained through wide shaded footpaths, traffic calming measures and pedestrian crossings.

"Walking Distance" is typically 400m or a 5 minute walk from a local destination or bus stop, or 800m or a 10 minute walk from a train station.

Appendix B

Salinity Management Guidelines

Contents

The Department acknowledges Douglas Partners Pty Ltd and Sydney Environmental and Soil Laboratory, Blacktown City Council and Landcom for sections of this document taken from the Salinity Management Report for Second Ponds Creek (1998).

1 Introduction

This Salinity Management Guideline contains background information, salinity risk mapping and management recommendations to control the effects of urban dryland salinity for proposed residential development within the Camden and Liverpool Growth Centre Precincts in the South West Growth Centre.

This Management Plan is based on the findings of relevant studies undertaken for Precinct Planning, relevant guidelines and policies in relation to urban salinity management and examples of salinity management plans prepared for other western Sydney urban release areas. In particular, these guidelines adopt the approach taken in the Salinity Management Plan prepared for the Second Ponds Creek release area in north-western Sydney. This guideline includes:

- general information on the causes and effects of urban salinity;
- findings and conclusions from GeoEnviro's Geotechnical, Salinity and Acid Sulphate Soil Investigation for the Austral and Leppington North Precincts (2011).
- Recommendations, measures and general guidelines for site development and construction, covering water management, site development and buildings.

The aim of this guideline is to present practical recommendations about how to manage and, where possible, mitigate the existing saline conditions on site, so as to:

- limit any impact of salinity on roads, buildings, vegetation, underground services, water courses and storages; and
- limit the impacts of development in the precinct on the processes of salinity and the impacts of salinity on the environment.

This guideline is broadly applicable to Precincts to which the Liverpool Growth Centre Precincts DCP 2011 or Camden Growth Centre Precincts DCP 2011 applies. However, more specific assessment of salinity issues for individual Precincts may identify the need for further investigation, more stringent or different controls and management measures for salinity in some situations.

1.1 Background

1.1.1 Proposed Development

Planning for South West Growth Centre is expected to provide for up to 110,000 new homes, developing progressively over the next 25 to 30 years, together with essential facilities and open space. The Precincts will be supported by Town Centres and smaller neighbourhood centres will provide local retail and community services. Several infrastructure upgrades are planned including new road crossings and the South West Rail Link which will improve regional links to surrounding areas.

1.1.2 Salinity Risk Maps

A review of the Department of Natural Resources Map of Salinity Potential in Western Sydney (2002) indicates that much of the South West Growth Centre is prone to salinity risks to varying degrees, including significant areas that are classified as either Moderate or High Salinity Risk. The general risk assessment has been supplemented by specific salinity risk assessments for Growth Centre Precincts that have been released for Precinct Planning. A **Salinity Risk Map** in the relevant Precinct Schedule to the DCP identifies areas of salinity risk in the Precinct.

1.2 The Causes of Urban Salinity

Soils containing salts occur naturally in western Sydney due to underlying geological formations. In undisturbed areas the salts are generally stored below the plant root zone where they have minimal impact. The development of Western Sydney has disturbed the soil profile, altered hydrological processes and, in some areas, led to concentrations of salts on soil surfaces, in building materials, and waterways. Some Precincts are located within an area that is predisposed to developing salinity issues.

Although saline soils and groundwater are a natural part of the Australian landscape, land management practices are now increasingly recognised as significant contributors to the expansion of salt affected areas. In particular, urban salinity is increasingly occurring around populated areas due to clearing and site development.

Salinity occurs when salts found naturally in the soil or groundwater are mobilised. Capillary rise and evaporation concentrate the salt on, and close to, the ground surface. Urban salinity becomes a problem when the natural hydrogeological balance is disturbed by human interaction. This may occur in urban areas due to changes to the water balance, increases in the volume of water into a natural system altering subsurface groundwater flows and levels, exposure of saline soils, and removal of deep rooted vegetation reducing rates of evapotranspiration. Even small changes in sensitive areas can result in the balance being irrecoverably altered and salinisation occurring.

Some building methods may also contribute to the process of urban salinity. In particular, compacted surfaces and filling can restrict groundwater flow and result in a concentration of salt in one area. Cutting into slopes for building can result in saline soils or ground water being exposed and intercepted. The use of imported fill material may be an additional source of salt or the filling may be less permeable, preventing good drainage. These issues may also result in problems with the design and construction of roads. In particular, the building of embankments and the compaction of layers can interfere with groundwater flow. Also the inappropriate positioning, grading and construction of drains can result in surface and groundwater mixing and stagnant pools forming that evaporate leaving salt encrusted ground.

Salinity issues may also arise as the result of cumulative impacts. A common example is from the gradual removal of vegetation across a site, which can contribute to a change in the hydrological regime from reduced evapotranspiration, a consequential rise in the ground water table, and subsequent salinity problems. Where vegetation is gradually removed the water table rises as a result of a smaller volume of water being used by the plants, allowing salts to be mobilised. Of more relevance in an urban landscape is the potential for an increase in water inputs into the hydrological regime. These increased inputs commonly come from watering of gardens and playing fields, infiltration of storm water and sewage and other service leakage.

These inputs may seem minor on their own but their cumulative effects over time produce an elevated groundwater table and eventually high levels of salinity.

Figure 1 (from "Good Housekeeping to Manage Urban Salinity" by the Department of Infrastructure Planning and Natural Resources) illustrates the urban salinity process and identifies situations where salinity problems can develop due to inappropriate planning and design.

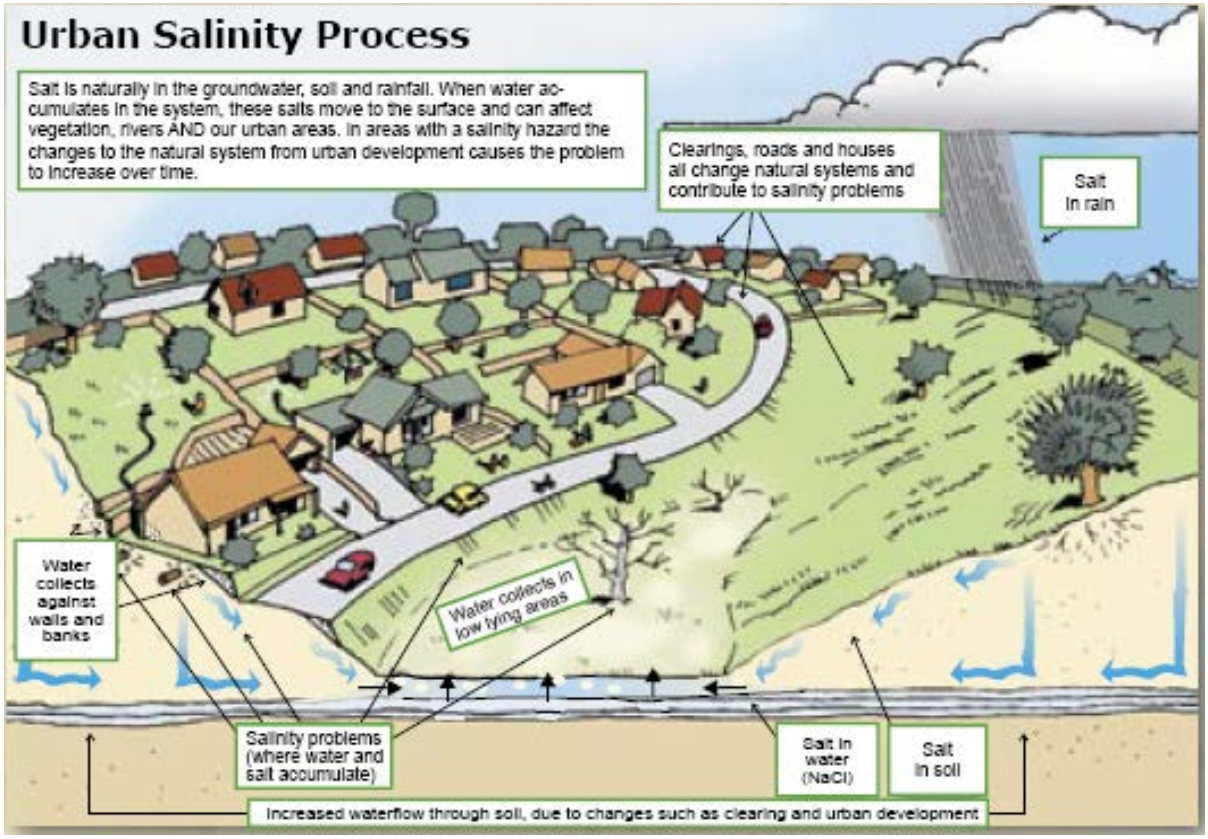


Figure 1: The Urban Salinity Process (DIPNR)

1.3 Effects of Salinity in an Urban Environment

Excess salinity in an urban environment can result in significant problems. It can manifest itself in a number of ways.

The effects of salinity can be observed in damage to building materials, infrastructure including pipework and roads and in death or poor health of vegetation. The effect of urban salinity is the result of both physical and chemical actions of the salt on concrete, bricks and metals. Salt moves into the pores of concrete and bricks and becomes concentrated when the water evaporates and can result in breakdown of materials and corrosion. Evidence of this may include crumbling, eroding or powdering of mortar or bricks, flaking of brick facing and cracking or corrosion of bricks.

High levels of salinity can result in damage to and even death of plants. Signs that vegetation is under stress from salinity include the discolouration and wilting of leaves and the death of less salt tolerant plant species. It may also be hard to establish lawns in areas that are subject to high salinity.

High levels of salinity may also affect soil structure, chemistry and productivity. This can reduce plant growth which in turn alters soil structure, chemistry and nutrient levels. As soils become more saline, plants and micro-organisms decline and soil structure deteriorates.

Water logging may also occur following a decline in nutrient levels. Over time, the alteration of soil structure can lead to the formation of gullies and other forms of soil erosion.

Salinity may also result in the corrosion of steel pipes, structural steel and reinforcement and can damage underground service pipes resulting in significant financial costs.

While limited groundwater was observed during the site investigations, these conditions may potentially change in periods of heavy downpour. Damage to pipes has the potential to exacerbate the problem by further recharging the aquifer.

Salinity can also have a significant effect on buildings and associated infrastructure where cutting and filling exposes buildings/structures to elevated salinity levels. This may include:

- degradation of bricks, concrete, road base and kerbing materials leading to expansion, cracking, strength and mass loss;
- corrosion of reinforcement and loss of structural integrity;
- rising/falling damp; and
- non-structural impacts, such as efflorescence on bricks.

These impacts can be prevented, minimised, or mitigated by the implementation of appropriate management measures as outlined in the Salinity Management Plan in **Section 3**.

2 Salinity Hazard Assessment

Salinity assessments undertaken as part of Precinct Planning are based on broad scale analysis of potential salinity risks including limited field sampling. The findings summarised in this section are indicative only of salinity conditions in the precinct. Further detailed salinity assessment investigation is only required if applicants wish to confirm site specific salinity conditions which may identify appropriate variations to these controls.

Salinity risk varies across the Growth Centres, and is often related to elevation, topography and the presence of watercourses. Saline groundwater is also an issue in most locations, although depth to ground water (below current surface level) varies considerably.

2.1 Salinity Risk Map

A **Salinity Risk Map** is included in the relevant Precinct's Schedule and is divided into:

- Low Risk Areas: The salinity of the area is considered typical of western Sydney. However, due to the broad nature of salinity assessments completed for most Growth Centre Precincts to date, the precautionary measures are to be implemented.
- Moderate or High Risk Areas: The salinity risk of the area is considered typical for creek line, floodplain or other low relief areas in western Sydney. These areas have a moderate or high risk of being affected by salinity and precautionary measures are to be implemented.

Note: *These maps are indicative only and site specific studies may be provided at the DA stage to determine salinity conditions and appropriate management measures which vary from these controls.*

3 Salinity Management Guidelines

3.1 Introduction

The Salinity Management Guidelines contain:

- general measures to consider across the Precincts, which include appropriate management strategies for the management of groundwater, site design and urban development, and measures to be taken at various stages of development; and
- strategies and measures for specific works in the Precinct.

3.2 General Measures

The following general measures apply to all development within the Liverpool or Camden Growth Centre Precincts. Where there is an inconsistency, the specific controls in the following sections take precedence. All development should be in line with the Western Sydney Salinity Code of Practice 2004.

Note that the practices for managing salinity will differ depending on the type of land use that is proposed on the site. For example, practices for land zoned Open Space and Recreation will require different approaches than practices within the Local Centre and residential zones.

Excavation and Filling

1. Excavations in excess of 1.0m should be battered to a 1 vertical to a 1 horizontal. Excavated stockpile material may either be treated immediately on site using 3% by weight of lime, otherwise capped with non-porous clay soils greater than 0.5m thick. Alternatively excavated material may be removed off-site to a landfill for treatment and disposal.

2. Gypsum should be mixed into filling containing sodic soils and cuts where sodic soils are exposed on slopes to improve soil structure and to minimise erosion potential.

3. Any material removed from the site should be carried out by a licensed contractor. This material should be sealed and contained using appropriate lining and capping material.

4. Exposure and disturbance of subsoil material must be reduced by minimising cut and fill. Time of exposure of bare ground (without vegetation) should be kept to a minimum. If extended periods of rain are forecast, the bare ground should be covered with stable fill such as ripped sandstone or stabilised with lime proportioned to 3% by weight.

5. Stormwater runoff from upstream should be diverted away from excavation areas by the use of bunding.

6. Filling areas are to be graded, revegetated and adequate surface drainage infrastructure installed as soon as practical to avoid excessive infiltration, minimise salt leaching, soil erosion and ponding of water on-site.

7. All imported fill should be verified by sampling and testing to ensure the material is non to slightly saline. Moderately to highly saline soil is not acceptable. Supporting information and documentation should be supplied verifying that the subject material complies. The addition of salts in the materials, fill or water used during construction must be limited.

8. Reversing or mixing the soil profile when undertaking cut and fill activities must be avoided. Soils must be replaced in their original order. Excavations deeper than 1m should be backfilled in the same order, alternatively this material may be treated by using lime or used in fill at depths more than 1m from finished level.

9. Batter slopes should be compacted with control of the moisture content to optimum moisture content plus 2 per cent (OMC +2%) or otherwise over-filled, compacted and then trimmed back to the final alignment to minimise infiltration through the exposed filling batters and the potential resulting flushing of salts from the filling. If the latter is to be carried out, the outer zone (3 metres) of the fill should be placed at OMC +2%.

Infrastructure and Drainage

10. Trenching for underground services should be carried out in such a manner that there is minimal rotation and vertical displacement of the original soil profile as the lower soil profile is more erodible.

11. Pipes used for stormwater drainage should be sealed to minimise the risk of leakage. Drainage, sewerage and water infrastructure is to be regularly maintained and repaired to prevent leakages.

12. Concrete of suitable strength and reinforcement cover is to be used for drainage structures and wherever contact with water and increased soil moisture is expected.

13. Watering or irrigation practices are to be managed to avoid excessive infiltration and water logging.

14. Natural drainage patterns and infiltration rates must be maintained as far as practicable. Drainage should not be designed to discharge to groundwater or salinity affected areas that is likely to cause increased water logging adjacent to the road or that concentrated surface runoff.

15. Direct runoff from paved areas into lined stormwater drains rather than along grassed channels as necessary.

16. Groundwater extraction must not occur on the site.

Stormwater

17. During construction, hay bales and other temporary erosion control devices should be placed at appropriate locations in areas where concentrated flows are expected and suitable dish drains should be constructed to retard flow and trap silt particles during heavy runoff. Temporary detention ponds in construction sites should be regularly monitored for water quality and cloudy water should be treated by flocculation with gypsum. This is critical before a storm event.

18. Surface drains should be provided along the top of batter slopes or greater than 2.5 metres height to reduce the potential for concentrated flows of water flows slopes which may cause scour. Well graded

subsoil should be provided at the base of all slopes where there are road pavements below the slope to reduce the risk of water logging.

19. Line or locate any ponds higher in the landscape to avoid recharge where proximity to the water table is likely to create groundwater mounding (refer 3.4 below).

20. Ensure an appropriate ratio of hard (impermeable) and permeable surfaces to avoid rainwater runoff infiltrating the ground in large volumes at any given location.

Vegetation

21. Native vegetation must be retained or restored on site where possible. Revegetation of the site may involve treatment of topsoil material and planting appropriate salt-tolerant water efficient plant species (trees, shrubs, and grasses).

Building Materials

22. In seepage and discharge areas or areas with a high potential sulphate, resistant building materials must be used. Sulphate resistant materials should be used for underground services, roads and paving.

23. For all building materials, the manufacturer's advice must be complied with regarding durability and correct use. Exposure of building materials to corrosive elements in soils should be minimised. Appropriate construction techniques such as suspended slab or piering to encourage ventilation and prevent soil moisture from being forced up the walls of the structure should be used.

Roads

24. Roads must have well designed sub surface drainage. A waterproof seal must be used on roads to minimise evaporation and the concentration of salt.

25. Roads and shoulder areas must be designed to drain surface water such that there is no excessive concentration of runoff or ponding which may result in water logging or additional recharge or groundwater. Road shoulders must also be sealed.

26. Materials and waters used in the construction of roads and fill embankments should be selected to contain minimal or no salt. Where it is difficult a capping layer of either topsoil or sandy materials should be placed to reduce capillary rise, act as a drainage layer and also reduce the potential for dispersive behaviour in the sodic soils.

27. Roads should not intercept known salt affected or water logged areas, and should be designed in a manner that does not impede the sub-soil flow or creates hydraulic pressure causing groundwater discharge.

28. Avoid or minimise the use of on site stormwater detention except where in accordance with a stormwater management strategy adopted for the Precinct.

Note: *Council may consider lower development densities to reduce pressure on groundwater in catchment areas, and to reduce the depth of excavation (deeper than 1m) and fill required on sloping lots.*

3.3 Residential and Other Buildings

Figure 3 presents diagrammatically a selection of salinity management tips for domestic dwellings.

Based on investigations to date, the following precautionary controls are to be implemented, unless site specific assessments are carried out to support the use of less stringent controls.

1. A high impact waterproof membrane, (not just a vapour proof membrane), should be lain under house slabs. The waterproof membrane must be extended to the outside face of the external edge beam up to the finishing ground level, as detailed in the Building Code of Australia (BCA).

2. For masonry building construction, the damp proof course must consist of polyethylene or poly-ethylene coated metal and correctly placed in accordance with BCA. Ground levels immediately adjacent to masonry walls must be kept below the damp proof course.

3. Appropriate infrastructure should be in place to manage urban water cycle and this includes all water flows such as water supply, stormwater and wastewater. Relevant design considerations are outlined in "*Evaluating Options for Water Sensitive Urban Design (WSUD) - a national guide*" Joint Steering Committee for Waster Sensitive Cities, July 2009.

4. For slab on ground construction, a layer of bedding sand at least 50mm thick should be laid under the slab to allow free drainage of water and to prevent pooling of water potentially carrying salts.

5. Concrete floor slabs must comprise of Class 32MPa concrete or sulphate resisting Type SR cement with a water cement ratio of 0.5. Similar concrete should be used for bored piers or footings.

6. Slabs must be vibrated and cured for a minimum 3 days

7. The minimum cover to reinforcement should be 30mm from a membrane in contact with the ground.

8. The minimum cover to reinforcement should be 50mm for strip footings and beams.

9. Admixtures for waterproofing and /or corrosion prevention may be used.

10. Salt tolerant masonry and mortar must be used below the damp proof course

11. Constant monitoring of water pipes to detect any leakages and the repair of damaged pipes as soon as possible after detection

12. Use Copper or non-metallic pipes instead of galvanised iron

13. Ensure any underground services are provided with adequate corrosion protection.

14. On sites where excavation and fill exceeds 1m, Council may require suspended slab or pier and beam construction as an alternative to 'slab on ground' construction. This may occur on sloping sites as this will minimise exposure to potentially corrosive soils and reduce the potential cut and fill on site which could alter subsurface flows.

15. Other measures that can be considered to improve the durability of concrete in saline environments should be considered. These include reducing the water cement ratio (hence increasing strength), minimising cracks and joins in plumbing on or near the concrete, reducing turbulence of any water flowing over the concrete and using a quality assurance supplier.

16. It is essential in all masonry buildings that a brick damp course be properly installed so that it cannot be bridged either internally or externally. This will prevent moisture moving into brick work and up the wall.

17. As there are various exposure classifications and durability ratings for the wide range of masonry available, reference should be made to the supplier in choosing suitable bricks of at least exposure quality. Water proofing agents can also be added to mortar to further restrict potential water movement.

18. Bricks that are not susceptible to damage from salt water should be used. These are generally less permeable, do not contain salts during their construction and have good internal strength so that they can withstand any stress imposed on them by any salt encrustation.

19. Design and construction to be carried out in accordance with relevant Australian Standards, Building Codes and current 'Industry Best Practice' in regard to urban salinity.

20. As indicated on **Figure 3**, service connections and stormwater runoffs should be checked to avoid leaky pipes which may affect off site areas lower down the slope and increase groundwater recharge resulting in increases in groundwater levels.

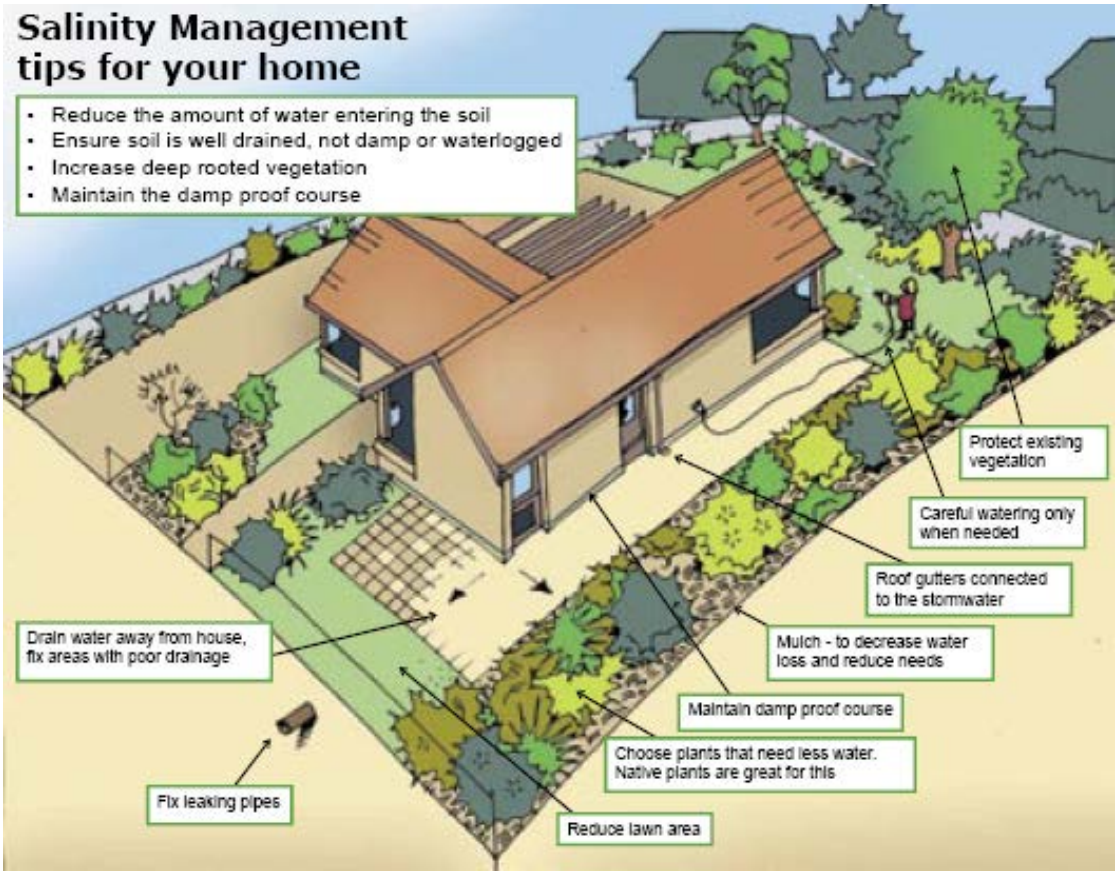


Figure 3: Salinity Management at Home (DIPNR)

3.4 Detention Ponds and Playing Fields

The following management strategies are to mitigate salinity impacts of detention ponds.

1. All excavation works should be minimised by staging the construction into small areas to prevent salinity from developing. Very saline soil is not recommended for use as building platform fill. This material may be buried beneath proposed roadways away from where underground services will be laid. Very saline soil should be placed at depths greater than 1.5m below design level and covered with non to slightly saline fill.

2. Surplus saline soil from construction works may be reused in playing fields. A revegetation scheme which includes introduction of salt tolerant plants should be in place. Amenities buildings, light poles, fences and other associated structures should be appropriately designed to reduce adverse impacts of the saline soil. A capping layer of non saline material with a minimum thickness of 1.5m may be adopted to reduce the impacts of salinity.

3. Detention ponds should be constructed to minimise build up of salts in the groundwater system via infiltration through the base of the ponds. This may be achieved by lining the ponds with synthetic HDPE liners. Clay liners may be considered if justification can be provided on the material selection process and proposed construction methodology. If using a clay lining, the possibility that on site clays may be saline should be investigated before they are used for this purpose. In these situations an impermeable geotech fabric may be preferable.

4. Sodic and dispersive soils can be managed by the addition of lime. Capping of sodic and dispersive soils within the embankments is recommended for protection against erosion.

5. Spillways should be provided in pond embankments to reduce the potential for concentrated flows of water down slopes causing scour.

6. Where mass concrete is required in or around the ponds, a minimum concrete strength of 32 MPa is recommended to limit the corrosive effects of the underlying and surrounding soils. Concrete or masonry elements of lower strength may be susceptible to long term adverse effects of the aggressive or saline soils.

7. Utilise native and deep rooted vegetation in order to minimise soil erosion and limit the rising of the water table.

3.5 Measures for Specific Assets

Table 1 summarises salinity management measures that are to be applied to the planning, design and construction of specific categories of assets in the Precincts.

Table 1: Salinity management measures for specific assets

Asset	Stage	Measure
Infrastructure and Utilities (Road Pavement, Drainage, Pipes, Structures, Pits, Substations, Duct Crossings, Sewer and Water Pipes)	Precinct Planning	▪ Consider appropriate site selection to prevent structural degradation; and ▪ Avoid low lying areas and areas near creek lines.
	DA	▪ Design and size drainage infrastructure to reduce the intensity of local and regional flooding. ▪ Ensure appropriate embankment designs. ▪ Design systems to avoid the interception of surface flow or groundwater recharge.
	DA/construction	▪ Avoid the use of materials such as clay and brass for piping. ▪ Ensure sufficient clearance to groundwater. ▪ Install appropriate subsoil drainage. ▪ Use materials of appropriate strength and cover for reinforcement. ▪ Avoid the disturbance of natural drainage patterns where possible. If this is not possible then realign drainage lines as close to natural patterns as possible.
	Post-development	▪ Maintain and repair to minimise leakages.
Landscaping and Existing Vegetation	DA/Construction/ Post Development	▪ Retain and/or establish the use of native salt-tolerant species, especially if deep rooted to minimise irrigation requirements. ▪ Line waterbodies to minimise groundwater discharge. ▪ Avoid overwatering of lawns, gardens and parklands. ▪ If possible, use 'smart' sprinkler systems or subsoil drip/capillary action systems and maintain them regularly. ▪ Carry out site specific investigations into the potential impacts of recycled water use and implement the recommendations of these studies. ▪ Ensure that existing riparian corridors are maintained.

Asset	Stage	Measure
Miscellaneous (Floor Slabs, Masonry Walls, Foundations, Carparks)	DA/Construction	▪ Ensure sufficient clearance to groundwater or install subsoil drainage. ▪ Avoid disturbance of the natural drainage pattern. ▪ Damp proof courses and vapour barriers are to be properly installed where applicable and maintained to ensure they are not breached by later additions. ▪ Use admixtures for waterproofing and corrosion prevention. ▪ On ground level, provide a sand/gravel layer of sufficient depth under the slab. ▪ Install appropriate membranes under slabs and ensure that they are extended to the outside face of the external edge beam up to the finished ground level. ▪ Use concrete of appropriate strength and cover for reinforcement. ▪ For floor slabs, ensure that concrete is of the appropriate strength and cover for reinforcement and are properly cured. The following requirements apply: ▪ minimum strength of 32MPa where the slab is at ground level ▪ cover must be at a reinforcement height of: ▪ 50mm from unprotected ground ▪ 30mm from a membrane in contact with the ground ▪ 50mm for strip footings and beams irrespective of the use of a damp proof membrane ▪ Ensure that damp proof course consists of adequate material and is correctly placed. ▪ Ensure that exposure class masonry units are used below any damp proof course, including for strip footings, and that appropriate mortar and mixing ratios are used. ▪ Select foundation type and material in according with Australian Standards with consideration of soil aggressivity. ▪ Allow for sufficient corrosion of steel or install the appropriate protective systems. ▪ Use permeable paving where practical.

Asset	Stage	Measure
Earthworks (Excavations, Cut and Fill, Re-contouring and Stockpiling)	Construction	▪ Revegetate and provide surface drainage as quickly as practical ▪ Install adequate erosion controls such as silt fences during excavation and until site stabilisation. ▪ Avoid excavation intersecting the groundwater, where possible. ▪ Ensure imported fill is non/slightly saline. ▪ Place cut materials in the original in-situ order, or if this is not possible, bury the most saline soil underneath less saline soil. ▪ Monitor runoff from stockpiles and conduct the appropriate tests to determine whether gypsum should be added. ▪ Ensure that stockpiles have adequate controls in place for erosion, covering and stabilisation.

4 References

Douglas Partners Pty Ltd and Sydney Environmental and Soil Laboratory. 1998. Salinity Management Report for Second Ponds Creek. Report to Blacktown City Council and Landcom.

DPNR. 2002. Salinity Potential in Western Sydney

Geoenviro Consultancy Pty Ltd. 2011. Geotechnical, Salinity and Acid Sulphate Soil Investigation (Austral and Leppington North Precincts. Report to Department of Planning and Infrastructure

SMEC Testing services. SMEC Land Capability and Contamination Report. Report to the Growth Centres Commission. Alex Avenue, Schofields, 16407/3816B, August 2007.)

Western Sydney Regional Organisation of Councils (WSROC). 2003. Western Sydney Salinity Code of Practice

Appendix C

Prescribed Trees and Preferred Species

1 Prescribed Trees and Preferred Species

1. A prescribed tree is identified as:
    - having more than 4 metres in height and having a trunk diameter of more than 200 millimetres when measured at height of 1 metre from the ground.
    - a tree identified as one of the species listed in **Table 1**.
2. Consent is not required:
    - for clearing species listed in **Table 5** or any other species which have been declared as noxious plants under the *Noxious Weeds Act 1993*;
    - for the removal of torn limbs or dead wood, such as individual branches, but not including whole trees, or
    - for pruning of less than 10% of the canopy or root system up to once every growing season and only of branches less than 100 millimetres in diameter, or
    - for pruning of more than 10% but less than 25% of the canopy, where the work will be undertaken by a suitably qualified person and Council has been notified of the work, and up to once every growing season, or
    - when inserting root barriers, when this will result in less than 10% of the root system being removed and up to once every growing season,
3. Pruning of prescribed trees is only acceptable if:
    - all work complies with the Australian Pruning Standards AS 4373-1996, and
    - any pruning will not result in harm to the health of the tree.

Table 1: Preferred Species

Scientific Name	Common Name	Mature Height	Mature Spread	Native
Prescribed Trees (Medium size)				
Acer palmatum Senkaki	Coral Bark Maple	4m	3m	X
Acer palmatum Dissectum Seiryu	Upright Dissectum	4m	3m	X
Acer rubrum	Red Maple	9m	7m	X
Acmena smithii	Red Head Acmena	6m	2m	√
Agonis flexuosa	Willow Myrtle	8m	4m	√
Angophora costata	Dwarf Darni	4m	2m	√
Bauhinia hookeri	Mountain Ebony	10m	5m	√
Brachychiton populneus	Kurrajong	8m	5m	√
Brachychiton rupestris	Bottle Tree	8m	5m	√
Cercis canadensis	Canadian Redbud	12m	3m	X
Cercis chinensis	Chinese Redbud	12m	4m	X
Cercis occidentalis	Californian Redbud	5m	2m	X
Cercis siliquastrum	Judas Tree	15m	5m	X
Cereus grandiflorus	Night Blooming Cereus	5m	2m	X

Scientific Name	Common Name	Mature Height	Mature Spread	Native
Ceretopetalum gummiferum	NSW Christmas Bush	6m	3m	√
Cupaniopsis anarcardiodes	Tuckerro	7m	3m	√
Elaeocarpus reticulates	Blue Berry Ash	8m	4m	√
Eucalyptus (grafted dwarf varieties)	Various, e.g: Wild Fire	1-5m	1-4m	√
Fraxinus griffithii	Evergreen Ash	6m	4m	X
Fraxinus oxycarpia	Raywood Varieties	10m	5m	X
Ginko biloba	Princeton Sentry	10m	3m	X
Gordonia axillaris	Poached Egg Camellia	7m	3m	X
Hymenosporum flavum	Native Frangipani	7m	3m	√
Jacaranda mimosifolia	Blue Haze Tree	15m	10m	X
Jubaea chilensis	Chilean Wine Palm	8m	4m	X
Juniperus chinensis Keteleeri	Corkscrew Conifer	4m	3m	X
Juniperus chinensis	Spartan Conifer	4m	2.5m	X
Koelreuteria paniculata	Golden Rain Tree	5m	3m	X
Lagerstroemia species	Crepe Myrtle	4m	3m	X
Laurus nobilis	Bay Laurel	6m	3m	X
Leptosperum species	Teatree	2.5m	2.5m	√
Lirodendron tulipefera fastigatum	Tulip Tree	12m	5m	X
Lophostemon confertus	Brush Box	9m	6m	√
Magnolia grandifolia	Exmouth Magnolia	7m	3m	X
Magnolia grandifolia	Dwarf Magnolia	4m	2m	X
Magnolia grandifolia	Kay Parris Magnolia	4m	2m	X
Magnolia x soulangeana	Tulip Magnolia	7m	4m	X
Magnolia soulangiana	Saucer Magnolia	6m	6m	X
Melaleuca styphelioides	Prickley Paperbark	6m	4m	√
Melaleuca decora	White Cloud Tree	5m	2m	√
Melaleuca linariifolia	Snow in Summer	6m	4m	√
Nyssa sylvatica	Weeping Blackgym	4m	3m	X
Nyssa sylvatica	Black Tupelo	15m	6m	X
Parrotia persica	Persian Witch Hazel	9m	3m	X
Pistacia chinensis	Chinese Pistachio	13m	4m	X
Prunus, Malus, Pyrus spp	Flowering fruit varieties	3-4m	3m	X
Pyrus calleryana (Flowering Pear)	Aristocrat Pear	6m	3m	X
Pyrus calleryana	Chanticleer Pear	9m	4m	X
Pyrus calleryana	Bradford Pear	6m	3m	X
Pyrus calleryana	Edgedell Pear	5m	3m	X

Scientific Name	Common Name	Mature Height	Mature Spread	Native
Pyrus calleryana	Glens Form Pear	8m	4m	X
Pyrus calleryana	Capital Pear	8m	4m	X
Pyrus betulaefolia	Southworth Dancer Pear	5m	4m	X
Quercus palustris	Narrow Green Pillar	10m	3m	X
Sapium sebiferum	Chinese Tallowwood	7m	3m	X
Syzygium australe	Pinnacle	6m	2m	√
Syzygium paniculatum	Brush Cherry	10m	4m	√
Tristaniopsis laurina	Luscious Water Gum	7m	3m	√
Zelkova serrata	Zelkova	10m	4m	X
Zelkova serrata	Green Vase/ Wine Glass	10m	4m	X
Zelkova serrata	Mushashino	8m	3m	X
Prescribed Trees (large size)				
Angophora costata	Sydney Red Gum	30m	10m	√
Angophora floribunda	Rough Barked Apple	20m	6m	√
Angophora subvelutina	Broad Leaf Apple	18m	6m	√
Araucaria araucana	Monkey Puzzle Tree	35m	8m	√
Araucaria bidwilli	Bunya Bunya Pine	40m	10m	√
Araucaria cunninghamii	Hoop Pine	45m	6m	√
Brachychiton acerifolis	Illawarra Flame Tree	30m	6m	√
Brachychiton discolour	Lacebark Kurragong	30m	6m	√
Caloedendron capense	Cape Chestnut	15m	8m	X
Carya illinoinensis	Pecan	30m	10m	X
Cedrus atlantica	Atlas Cedar	30m	8m	X
Cedrus deodara	Deodar Cedar	30m	6m	X
Cupressus funebris	Funeral Cypress	20m	5m	X
Eucalyptus amplifolia	Cabbage Gum	30m	5m	√
Eucalyptus bauerana	Blue Box	25m	4m	√
Eucalyptus benthamii	Camden White Gum	35m	8m	√
Eucalyptus crebra	Narrow leaf Red Iron Bark	30m	8m	√
Eucalyptus fibrosa	Broad leaf Red Iron Bark	30m	8m	√
Eucalyptus tereticornis	Forest Red Gum	40m	8m	√
Eucalyptus viminalis	Manna Ribbon Gum	50m	8m	√
Ficus macrophylla	Moreton Bay Fig	30m	8m	√
Ficus rubiginosa	Port Jackson Fig	18m	6m	√
Flindersia australis	Australian Teak	25m	5m	√
Ginkgo biloba	Maidenhair Tree	30m	8m	X

Scientific Name	Common Name	Mature Height	Mature Spread	Native
Liriodendron tulipifera	Tulip Tree	40m	8m	X
Livistona australis	Cabbage Palm	20m	2m	√
Macadamia integrifolia	Macadamia Nut Tree	15m	5m	√
Magnolia denudate	Yulan Tree	16m	8m	X
Magnolia grandifolia	Bull Bay Tree	18m	8m	X
Phoenix canariensis	Canary Island Date Palm	15m	5m	X
Pinus pinea	Italian Stone Pine	25m	4m	X
Podocarpus elatus	Illawarra Pine	25m	8m	√
Quercus coccinea	Scarlet Oak	15m	3m	X
Quercus palustris	Pin Oak	25m	5m	X
Quercus robur	English Oak	30m	6m	X
Schinus areira	Peppercorn Tree	17m	5m	X
Syzygium luehmannii	Small Leaf Water Gum	20m	8m	√
Ulmus parvifolia	Chinese Elm	12m	5m	X
Washington Robusta	Mexican Fan Palm	25m	3m	X

Preferred Hedges
Brunfelsia varieties
Loropetalum chinensis varieties
Michelia varieties
Photonia x fraseri ‘Little Red Robin’
Viburnum odoralissimum
Preferred Shrubs
Banksia spp
Bauhinia galpini
Brunfelsia – grandifolia, maliformis, pauciflora, dwarf varieties
Callistemon spp
Cordyline fruiticosa ‘Kiwi’
Cordyline fruiticosa ‘Rubra’
Dodonaea spp
Doryanthes excelsa
Eucalyptus:dwarf grafted varieties.
Gordonia axillaris
Grevillea/Erica/Eremophila spp
Ixora chinensis (Prince of Orange)
Kunzea/Acmena/Doryanthes spp

Indigofera australis
Leptospermum species
Loropetalum chinensis
Magnolia grandifolia ‘Little Gem’
Magnolia stellata ‘Star Magnolia’
Melaleuca ‘Revolution Gold’
Michelia figo (Port Wine Magnolia)
Myoporum montanum
Photonia ‘Red Robin’ and other smaller growth Photonia.
Viburnum varieties, eg odoralissimum
Syzygium spp.
Sub-Shrubs and Ground Covers
Acacia cognate ‘Mini Cog’
Anigozanthos “Bush Gems - varieties,eg Bush Haze, Bush Ranger
Dianella caerulea
Dichondra repens
Convolvulus mauritanicus
Goodenia hederacea
Hardenbergia violacea
Kniphofia “Maid of Orleans”
Melaleuca pentagona ‘Little Penta’
Myoparum spp
Myoporum parvifolium
Plectranthus parvifolius
Rhodanthe anthemoides
Scaevola aemula
Sedum sempervirens
Preferred Herbs
Dianella spp
Eremophila debilis (syn. Myoporum debile)
Lomandra spp (eg Tanika or Nyalla)
Pennisetum alopecureoides
Plectranthus parvifolius
Scaevola albida

Preferred Grasses
Carex appressa
Danthonia racemosa
Dianella varieties Imperata cylindrical
Lomandra varieties incl ‘Tanika’ ‘Nyalla’ etc
Sorghum leiocladum
Themeda australis
Preferred Climbers
Clematis aristate
Gelsemium sempervirens
Jasminum spp.
Hardenbergia violacea
Kennedia rubicunda
Mandevilla spp
Pandorea jasminoides
Trachelospermum jasminoides

Table 2: Salinity Tolerant

Salinity means common salt, toxic to most land plants when present in high levels in the soil. High levels of Salinity equate to high levels of salt in the ground. The following list provides examples of plants that are salt tolerant and can handle salinity conditions reasonably well.

Scientific Name	Common Name
Trees	
Angophora subvelutina	Broad Leaf Apple
Cupaniopsis anarcardiodes	Tuckeroo
Eucalyptus amplifolia	Cabbage Gum
Eucalyptus fibrosa	Broad Leaf Ironbark
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus moluccana	Grey Box
Casuarina glauca	Swamp Oak
Casuarina cunninghamiana	River Oak
Melaleuca decora	White Cloud Tree
Melaleuca linariifolia	Snow storm in Summer
Melaleuca styphelioides	Prickly leaf Paperbark
Metrosideros excelsa	NZ Christmas Tree

Ground Covers	
Hardenbergia violacea	Native Sarsoparilla
Myoporum parvifolium	Creeping Boobiala
Cynodon dactylon	Couch Grass
Shrubs	
Banksia ericifolia	Heath Banksia
Banksia speciosa	Showy Banksia
Banksia spinulosa	Hairpin Banksia
Indigofera australis	Australian Indigo
Melaleuca thymifolia	Thyme Honey Myrtle
Melaleuca nodosa	Ball Honey Myrtle
Myoporum floribundum	Boobialla
Myoporum insulare	Boobialla

Table 3: Littoral Species

Littoral means foreshores, riverbanks and the plants of that habitat. The following suggestions are for areas within or near flowpaths, watercourses or other riparian areas.

Scientific Name	Common Name
Baumea articulate	Jointed Rush
Bolboschoenus fluviatilus	Marsh Club Rush
Carex appressa	Ephemeral Marsh
Cyperus exaltatus	Tall Sedge
Eleocharis sphacelata	Tall Spike-rush
Gahnia sieberiana	Red Fruited Saw Sedge
Isolepis nodosa	Knobby Club Rush
Juncus usitatus	Common Rush
Philydrum lanuginosum	Woolly Frogmouth
Potamogeton tricarinatus	Floating Pondweed

Table 4: Macrophyte Species

Macrophyte means the plants that grow in or near wetlands, shallow lakes and streams.

Scientific Name	Common Name
Baumea articulate	Jointed Twig Rush
Bolboschoenus fluviatus	Marsh Club Rush
Carex appressa	Ephemeral Marsh
Cyperus exaltatus	Tall Sedge
Eleocharis sphacelata	Tall Spike Rush
Juncus usitatus	Common Rush
Phrgmites australis	Common Reed
Potamogeton tricarinatus	Floating Pondweed
Philydrum lanuginosum	Woolly Frogmouth

Note: It is important to note that this plant list is indicative only to provide a guide on the range of suitable plants for the region with consideration of functional, aesthetic, salt tolerance and horticultural requirements. The selection of species is expected to vary over time as a result of species availability, site conditions (driveways, bus stops, pedestrian and vehicle vision, etc), and plant viability.

2 Undesirable species

Table 5: Undesirable Species

Scientiific Name	Common Name
Bambusa	Bamboo
Eriobotrya	Loquat
Ficus Elastica	Rubber tree
Ligustrum	Large and small leaf Privet
Musa	Banana plant
Toxicodendron Succedaneum	Rhus or Wax tree
Morus	Mulberry
Arecastrum romanzoffianum Schefflera	Umbrella tree
Persea	Avocado
Ailanthus	Tree of heaven
Lagunaria Patersonia	Norfolk Island hibiscus
genus Cotoneaster	Cotoneaster
genus Erythrina	Coral tree
Cinnamomum camphora Ligustrum spp.	Camphor Laurel
Pinus radiate, Pinus elliotii	Radiata Pine
genus Salix	Willow
Mangifera Indica	Mango tree